

**THE EARTH AS A PROBLEM:
A CURRICULUM INQUIRY
INTO THE NATURE OF ENVIRONMENTAL EDUCATION**

by

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ABSTRACT

This thesis is a contribution to curriculum theory in environmental education. Its purpose is to analyze the concept of education as used by environmental educators and to examine how educational purposes are related to differing concepts of human-environment interactions and the environmental problématique. It examines three published written curricula using curriculum inquiry methodology as a means of examining two major claims. The first claim is that curricula in environmental education have been affected by a focus on environmental issues or problems, which has resulted in definitions, descriptions and curriculum proposals in the field having a syntax or narrative structure in the form of problem solving. The second claim of the thesis is that while different programs share the common underlying syntax they resolve issues concerning the nature of education, the concept of environment, the role of environmental action projects, and the nature of schooling in significantly different ways.

The thesis critiques the curriculum writings of William B. Stapp, Harold R. Hungerford, and Michael J. Cohen. Each has published curriculum work in environmental education and has been active in the development of the field. Their works were chosen because of their publicly accessible form. The inquiry demonstrates that the three programs present analyses of current global environmental problems as serious and in need of urgent attention. All three focus on solving or preventing environmental problems as a major purpose of environmental education.

In spite of the common emphasis on problem solving, the inquiry also reveals significant differences among the three programs in regard to concepts of education, views of the environment and the place and role of humans in it, approaches to environmental action projects as curricular elements, and ideas about the place of environmental education in schools. I conclude that although some environmental educators view the continuing debate about the nature and conceptualization of environmental education as needless repetition of issues which have been satisfactorily resolved, important questions remain to be addressed by curriculum theory in this field. In order for environmental education to nurture education as opposed to particular ideologies and beliefs curriculum writers should develop clear concepts of the nature of education and widen the focus of human environment relations beyond problem solving.

DEDICATION

This thesis is dedicated to my family. My grandparents and parents, Frank and Grace Hammond instilled me with a love of learning and exploring, a sense of risk taking and independence, community responsibility and service, a love of nature, and above all a respect for diverse people and ideas. My wife Rosemarie has provided the inspiration, loving support, and gentle pressure to get on with the work. My children, their partners and my grandchildren are wonderful people who remind me never to forget how important our actions are today if we are to have a biologically diverse, clean, safe, and sustainable environment for a productive future.

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I must also acknowledge my many professional colleagues in the school systems of the U.S. and Canada, as well as my students in the Lee County Public Schools who have helped me grow and learn throughout my exciting and wonderful career. In the particular context of this dissertation I wish to thank my many, many colleagues in the field of environmental education who have provided support, inspiration, and ideas in the course of more than thirty years. They have helped me to think and act on a higher level than would have been possible on my own. A special thanks is due to Dr. Harold Hungerford, Dr. Bill Stapp, and Dr. Mike Cohen whose curricular works form the focus of this inquiry. They have helped to develop the field of environmental education and their works have been important sources of insight for me.

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Chapter 1

The Earth as a Problem: A Curriculum Inquiry Into the Nature of Environmental Education

The goal of environmental education is to develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively toward solutions of current problems and prevention of new ones. (Belgrade Charter, 1976, p.1)

...many calls for action to exercise control over present and future environmental/social problems reflect a severe lack of consideration of what is involved in such a monumental and all inclusive enterprise....Possibly it is a disservice to persons and to serious thought about these problems to urge action that may well be unattainable and futile. (Kennedy, 1983, p.4)

Most states mandate that elementary school students receive some form of environmental education. Unfortunately, the education that they receive consists mostly of scare tactics and calls-to-arms. The real purpose of most environmental education is not to educate children in sound science and economics, but to activate them in environmentally correct ways. (Sanera, 1995a, No page)

We conclude that environmental education should be a learning process with four dimensions in that it seeks to enable participants to construct, transform, critique, and emancipate their world in an existential way: construct in the sense of building upon the prior knowledge, experiences, and ideas of learners; critique in the sense of investigating underlying values, assumptions, world views, morals, etc., as they are part of the world around the learner him/herself; emancipate in the sense of detecting, exposing, and, where possible, altering power distortions that impede communication and change; and transform in the sense of changing, shaping, influencing the world around them, regardless of scope or scale. (Wals & van der Leij, 1997a, p.24)

I. Introduction

The field of environmental education is of fairly recent derivation. The first published use of the term was in 1968, when Clarence Schoenfeld published it in the **Education Record** (Kennedy, 1983). Its development coincides closely with the growth of modern environmentalism. In effect, as concerns about the affects of human activities on the environment mounted

during the past three decades, governments, international and national agencies and non-governmental organizations have frequently proposed programs of information and education as a means of addressing environmental problems, a practical orientation apparent in the **Belgrade Charter**, cited above. The general form of the argument is that people do not want to damage their environment but often do so because they lack understanding of how their activities cause damage, or have no information about how to do things differently (Schneider, 1997). If they were, to use a currently popular phrase, environmentally literate (McClaren, 1989) they would change their behaviour and act to ameliorate past damage and avoid future problems; they would incorporate environmental protection into their concept of responsible citizenship. However, there are differing opinions about what is necessary, possible, and appropriate in environmental education, ranging from those who view it as a part of a broader social transformation, to those who question whether simplistic proposals for environmental action have much chance of success, necessary though they may be (Kennedy, 1983), or those who criticize environmental education as a form of indoctrination to the ideology of environmentalism. Orr (1992) even asks whether or not environmental education is an oxymoron.

Perhaps because of its association with environmental problems, sometimes extreme problems like massive oil spills or major air pollution incidents, or environmentally degrading practices with global consequences like the discharge of ozone depleting chemicals into the atmosphere, environmental education has been characterized by some as being crisis driven (Jickling, 1992a). Clear thinking is not characteristic of crisis mentalities. The term environmental education is a union of two concepts: education, and environment. Each is complex. An examination of many statements concerning environmental education reveals little critical reflection about the meanings of these terms, although perhaps more has been undertaken concerning the nature of the environment than about education. As I will attempt to illustrate in this thesis, all too often it has been assumed that there is a "common understanding" of the meaning of education and the nature of the environmental problématique (North American Association for Environmental Education, 1995, 1996). In fact, if there ever was a consensus, it has been severely strained in recent years by criticisms from inside the community of environmental educators and by attacks from outside by a variety of special interest organizations (Independent Commission on Environmental Education, 1997; Sanera, 1995a; Sanera and Shaw, 1996; Wals & van der Leij, 1997a, 1997b; Weston, 1996a).

The notion of involving students, especially in the K-12 school system, in environmental action projects, as proposed by a number of environmental educators (Hammond, 1997 November/December, 1997 Winter; Hungerford, Litherland, Peyton, Ramsey, & Volk, 1988; Orr,

1992; Stapp, Cromwell, Schmidt, & Alm, 1996) necessitates clear conceptualization of environmental education, especially within the context of the purposes of schools. Meantime, concerns about possible global climate changes (Government of Canada, 1997; Somerville, 1996) and other on-going serious environmental problems such as the depletion of ocean fisheries and the loss of temperate and tropical rain forests are likely to generate further proposals for campaigns of public education and information. The emergence of the World Wide Web and Internet offers a powerful new medium for communication and program implementation while speeding the pace of program development and expanding the size of potential audiences.

II. Purposes of the Dissertation

This thesis is a contribution to curriculum theory in the field of environmental education. Its purpose is to analyze the concept of education as used by environmental educators and to examine how educational purposes are related to differing concepts of human-environment interactions and the environmental problématique. Three different current programs of environmental education are critically reviewed. Each is represented by published environmental education curricula, support materials and other writings elaborating the premises of their authors. The focus of my critique therefore is selected, written, published works. The principal questions which organize the curriculum inquiry are:

1. How do the chosen curricula address the concept of education within the context of their views of environmental education.
2. How do the chosen curricula address the concept of environment, and in particular, the nature of human-environment interactions.
3. How do the chosen curricula conceive environmental action as an educational or curricular purpose, including their perspective of the purposes of schools.

The thesis develops two claims. The first claim is that environmental education descriptions and proposals, while often differing in detail, are broadly characterized by a common syntax which might also be termed a "story" (Hart, 1996; MacDonald, 1997) or narrative but which could also be considered a curriculum theory of environmental education. In form this syntax is claimed to be closely similar to sequences described in models of problem solving. The problems to be solved or addressed, arise from human activities in the environment; in order

to solve them successfully, the problem solvers (students, environmentally responsible citizens, etc.) will need to be “equipped” with certain capabilities: knowledge, skills, attitudes, etc. This will be accomplished by certain curricular arrangements: instruction, learning experiences, and so on.

This syntax incorporates concepts about the nature of humankind’s environmental situation (the problem), epistemologies (ideas about how we understand the problem situation and about what forms of knowledge can help address it) as well as ideas about human capacities for change and action. This claim is examined through a survey of the development of environmental education within the context of the environmental movement from 1962–1997 and an analysis of major documents from the era. A corollary proposition also examined here is that the particular syntax or story has exerted a powerful, often hidden influence on thinking about environmental education resulting in a failure to address assumptions and thereby leaving the field of environmental education open to criticism, misrepresentation and confusion.

The second claim is that while environmental education curricula are broadly grounded in a common syntax they differ significantly in the ways in which they resolve questions concerning the nature of education in general, the educational relevance and potential of environmental education, and the functions of environmental education in schools with special reference to their views of the nature and purposes of environmental action projects. This claim is developed through a curriculum inquiry focused on three published, widely distributed written curricula and other supporting materials by the same authors or groups. The inquiry examines differences among the three programs in concepts of education, human nature, especially in terms of human-environment relationships, and differing concepts of the need for and nature of change in those relationships. The selected programs also differ in the way in which they perceive schools as contributing to the solution or continuance of environmental problems or even as sources of the problems in the first place.

III. Significance of the Study for the Writer

I have worked in the field of environmental and science education for more than thirty years. I have been a teacher, curriculum developer, school district administrator, member of non-governmental environmental organizations and member of public boards entrusted with the stewardship of habitats and natural resources. I have experienced the need for environmental education among both school-age and adult populations. I have become acutely aware of the political context of environmental education as my community engages in active and sometimes

acrimonious debates about its environmental future. I have worked to develop and implement programs of environmental education in schools, nature centres, and government agencies. I have also been involved in developing and implementing environmental action projects as an element of environmental education within the K-12 school system. The questions which surround the educational potential of action projects, as well as the conceptual and practical problems of implementing them in programs which are truly educational rather than indoctrinative, are of direct relevance to my life experience as a teacher and environmentalist.

IV. Delimitation of the Study

This dissertation is a contribution to curriculum theory in the field of environmental education. While it critically examines the position of environmental action within the curricula of three different environmental education programs it does not attempt to determine empirically the efficacy of the three programs by external measures of program effectiveness. It is not, therefore a means-ends assessment of efficiency or effectiveness or a summative evaluation (Scriven, 1967) although the critique does consider the match between proposed means and stated ends as well as their appropriateness. Other programs of environmental education also contain environmental action projects as components. The three programs chosen for this inquiry were selected on the basis of criteria described in Chapter Two but it is recognized that they do not constitute the full set of environmental education curricula with action components.

Because my experience is grounded extensively in the United States the chosen programs were all developed within the U.S. Their structures and operations reflect the intentions of their authors to have them used in schools in that country (although they have been used in some schools outside the U.S.). Other nations have environmental education curricula and some of these curricula also entail action work (Robottom, 1994; Gayford, 1996). Because of my lack of experience in those cultural/political contexts I have chosen to direct my attention to U.S. curricula. The selected programs are widely distributed and there has been considerable writing published about them. The authors are also active in environmental education at the national (U.S.) and international levels so they are sometimes cited as having influenced the development of programs in other countries.

The programs are intended largely for audiences in the age spectrum covered by the K-12 school system, but they are not obligatorily restricted to these audiences and have at times been used in non-school program settings or with older clients.

V. Outline of the Dissertation

Chapter Two reviews methodologies of curriculum inquiry and criticism. The chapter explores and methodologies which might be of service to the focus of this dissertation. Clearly, because the thesis is based on written curriculum documents, there are some practical limitations on the selection of approaches. The focus of the chapter is to develop an approach which can reveal intentions through design (Thomas, 1985; Werner, 1978). The chapter also examines concepts of curriculum theory (Barrow, 1984, Zais, 1976) as well as concepts of curriculum criticism Eisner (1985) and Schubert (1986). At the end of the Chapter I make an initial proposal for a set of focusing questions for the critical review of the published curricula.

Chapter 3 is intended to provide a foundation for Chapter 4 and to provide the reader with an overview of the development of the field of environmental education in the context of contemporary environmentalism. Particular attention is paid to the relationship between scientific and societal views of the contemporary status of human-environment relationships and the significance of these views as shaping forces in the development of environmental education as a field and their influence on the incorporation of action as a major purpose of environmental education.

Chapter 4 develops the first claim of the thesis, namely that environmental education is characterized by an underlying common syntax or story line. The chapter examines the concept of education in the context of environmental education and considers the various views of human environment interactions which are explicit and implicit in proposals for environmental education. The influence of early descriptions of environmental education on the development of the field is assessed and the ways in which the common story has affected curriculum theory in environmental education is also reviewed. The chapter offers a different definition of environmental education and describes the tasks of an adequate curriculum theory of environmental education. In concluding, I return to a consideration of a framework for inquiry into the selected curricula, and select a critical approach based on the analysis of issues in environmental education from the chapter.

Chapters 5, 6, and 7 are an inquiry into the three selected curricula, beginning with the proposals of Harold Hungerford and his collaborators in Chapter 5, moving to the program of William Stapp and his co-workers in Chapter 6, and concluding with the environmental education program of Michael J. Cohen in Chapter 7. These Chapters provide the basis for a review of the second claim that while many environmental education programs reflect the common

narrative structure, they differ in significant ways in how they resolve questions concerning the nature of education in general, the educational relevance and potential of environmental education, and the functions of environmental education in schools with special reference to their views of the nature and purposes of environmental action projects.

Chapter 8 assesses the two main claims of the thesis in the light of the findings and propositions of the previous chapters. It summarizes the differences and similarities among the three critiqued curricula and assesses the meaning of their proposals in the context of the issues raised in Chapter 4 and the critical questions which formed the focus of the inquiry. The Chapter closes by considering the adequacy of its critique. Taking the position that curriculum inquiry should be formative and result in improvement, the implications of the thesis for curriculum theory in environmental education are assessed.

Chapter 2

Curriculum Inquiry :

In Pursuit of an Understanding of Environmental Education Curriculum Proposals.

I. Paradigms of Curriculum Inquiry and Methodological Issues in Curriculum Criticism

This thesis is an inquiry into curriculum in the field of environmental education. It is concerned with how human-environment interactions are addressed curricularly within school programs in ways which both foster the existing purposes of schools and serve to nurture those habits of mind associated with education. Given these interests the thesis falls within the genre of curriculum theory.

Barrow (1984) concisely describes curriculum theory as:

...theory related to curriculum and closely related matters. It is centrally related to the prescribed content of schooling, but it must also concern itself with closely related issues such as the unintended consequences of teaching a curriculum, the problem of establishing whether one is achieving one's object, and the methods suitable for imparting it.... (pp.11-14)

...the theory represents understanding of the practice....insofar as the theory is good, that means that it does offer a true account of what is the case.... (p.12)

Curriculum theory, then, will primarily address itself to questions about the prescribed content of the school curriculum, on the grounds that a good theoretical grasp of what we are teaching, and why, and what we should teach and why is essential to judging our practice, carrying it out, and improving it. (p. 14)

He also describes the nature of the field of curriculum inquiry (or research as it is termed in his commentary:

Curriculum research involves establishing the aims or ends of education and other aspects of schooling, clarifying the concepts central to the enterprise, working out what is logically required for organization and methods by the nature of the enterprise, establishing insofar as we can what social, psychological, and administrative factors may have what effects on success at achieving our aims in practice, describing contingent and logical constraints and demands on procedures of implementation and evaluation, and prescribing

procedures for them. Each of these elements has to be approached in a different kind of way, yet each of these elements has to be given due attention if we are to make reasonable curriculum proposals. Curriculum research must therefore involve interrelationship. (Barrow, 1985, p.36, cited in Short, 1991, p.1)

In some writing the term philosophy is used interchangeably to mean a normative theory of education, that is. a theory of what should be taught, or of what is important in education. Phenix (1964) offers the view that: "...philosophy of the curriculum is necessary. By such a philosophy is meant a critically examined, coherent system of ideas by which all the constituent parts of the course of instruction are identified and ordered."

O' Connor (1957) lists three functions for theory (which he defines as a body of related problems): description; prediction; and explanation. Curriculum theory in education is generally less concerned with prediction than are theories in the natural sciences. Barrow (1984) and others (Schubert, 1986) describe two general types of curriculum theory or theoretical work : descriptive and prescriptive. Descriptive theory is defined as that theory which aims to describe and understand what happens when we try to teach people different things in various ways, and why it goes on, and what would likely happen if things were to be done differently (note the element of prediction in the latter). Prescriptive theory explores and offers informed answers to questions of value and priority including the possible consequences of a particular practice and about what we should be trying to do. This latter form of theory is very value-laden because it addresses questions of what ought or should be done. Zais (1976) defines the concerns of curriculum theory as "...the nature of the curriculum and the forces that determine its content and organization" (p.98). Figure 2.1, drawn after Zais, illustrates his concept of the curriculum and its foundations (or shaping influences). As Barrow (cited above) has noted, different methodologies might well be applied to questions concerning the various shaping influences or to curricular elements such as aims, goals, and objectives, or evaluation. What is perhaps common to all curriculum inquiry, regardless of methodology, is a focus on a problematic area or areas, on a renewed (or novel) examination of some curricular element or shaping influence which may have been viewed previously as if to be taken for granted, or as containing no further significant questions. As I hope to demonstrate in Chapter 4, the field of environmental education has been dominated by views that questions about education per se, and about the nature of human-environment interactions have been resolved and require no further serious attention.

Schubert (1986) writes of curriculum studies as "...an area of inquiry...that focuses on what is learned and should be learned in educative institutions...." (p.4). Stenhouse (1975) attributes two functions to curriculum theory: first, that it serves to organize the data, the facts

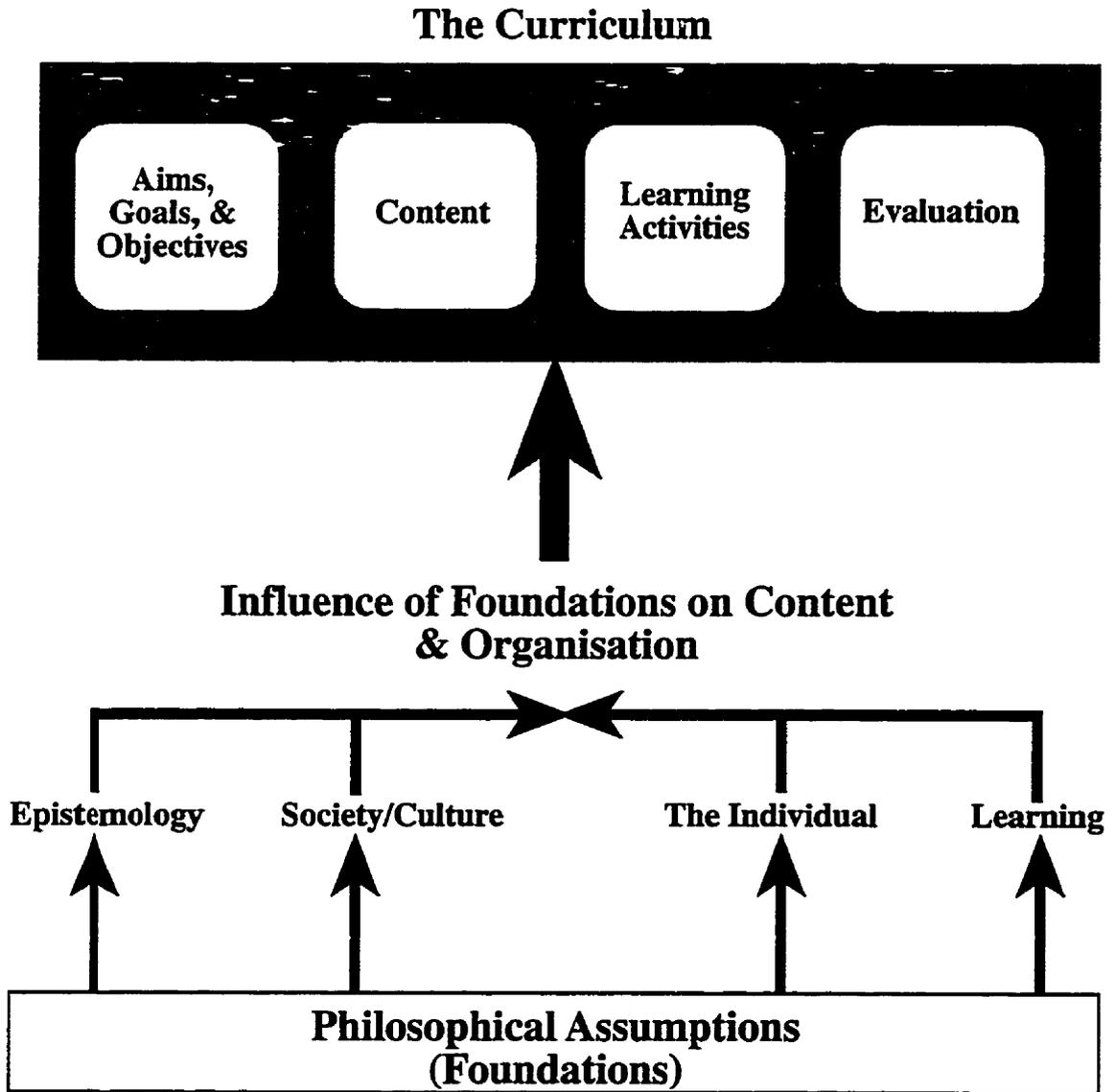


Figure 2.1. A Model of the Curriculum, its Foundations, and Influences on Content and Organisation as Proposed by Zais (1976).

we have, in such a way as to provide an understanding, and second that it provides a basis for action. He extends his commentary on the first function by noting that theory is well grounded if it rests on sound, well explicated assumptions, and is comprehensive to the extent that it embraces a wide range of data and considerations. (Stenhouse, 1975, p.70.) Eisner, (1985) writes that theory provides frameworks which can be used to provide alternative explanations for curricular “events”, for the things which happen, or are proposed to happen in a curriculum (Schubert, 1986, p.234).

Because the focus of curriculum inquiry and theory making is curriculum, it is important to consider the nature of curriculum itself. In one sense that seems a simple matter. Barrow (1984) refers to Hirst’s (1968) definition and modifies it slightly to describe curriculum as “...a program of activities (by teachers and pupils) designed so that pupils will attain so far as possible certain educational or other ends or objectives.” (1984, p.11). Schubert (1986) restates the oft-used definition of curriculum arising from its etymological roots as a “course” or “circuit” to be run or completed but he notes that this concept can be extended to that of a journey of learning or to growth and development, both metaphors commonly used in educational writing. (Schubert, 1986, p.6). Stenhouse (1975) offers a somewhat different definitional focus: “A curriculum is an attempt to communicate the essential principles and features of an educational proposal in such a form that it is open to critical scrutiny and capable of effective translation into practice” (p.4).

It is important to recognize two major facets of this definition. First, curriculum in this sense is a proposal for educational practices and , second, it is publicly communicated , available for critical scrutiny. Stenhouse notes that at a minimum, “...a curriculum should provide a basis for planning a course, studying it empirically, and considering the grounds for its justification.” He further emphasizes the public nature of curriculum proposals, “A curriculum is the means by which the experience of attempting to put an educational proposal into practice is made publicly available (p.5). “

The definitions offered above would seem to reflect a view of curriculum as a written proposal for educational activities in schools, a form of blueprint for action by teachers and students. Ralph Tyler’s classic work, **Basic principles of curriculum and instruction** (1949) offers four basic questions to be addressed by a curriculum:

1. What educational purposes should the schools seek to attain;
2. What educational experiences can be offered which are likely to

- attain these purposes;
3. How can educational experiences be effectively organized;
 4. How can we determine whether these purposes are being attained?

Tyler's questions became virtually a "cookbook" formula for curriculum development and dominated the curriculum field for many years, although Schubert (1986) questions whether this was Tyler's intention. However, the conception of curriculum as a plan, as well as Tyler's key questions, is still reflected in the definitions offered by Saylor, Alexander, & Lewis (1981): "We define curriculum as a plan for providing sets of learning opportunities for persons to be educated" (p.8.); and Taba (1962) : A curriculum is a plan for learning." She extends this stating:

All curricula, no matter what their particular design, are composed of certain elements. A curriculum usually contains a statement of aims and of specific objectives; it indicates some selection and organization of content; it either implies or manifests certain patterns of teaching, whether because the objectives demand them or because the content organization requires them. Finally it includes a program of evaluation of the outcomes. (p.10)

Taba's definition clearly reflects Tyler's four questions. However, as the curriculum field has developed a wider range of conceptions of curriculum has emerged. Schubert (1986, pp. 26-33) lists some major images of curriculum as:

- Curriculum as content or subject matter;
- Curriculum as a program of planned activities;
- Curriculum as intended learning outcomes;
- Curriculum as discrete tasks and concepts;
- Curriculum as experience;
- Curriculum as an agenda for social reconstruction;
- Curriculum as the interpretation of lived experience ("currere").

The first three images, along with the fifth are fairly conventional. The concept of curriculum as emergent in the lived experiences of teachers and students moves away from the notion of a curriculum as a plan created to guide the work of teachers and the experiences of students. The purpose of curriculum according to this concept is not so much education as

emancipation from ideology and unwarranted convention, as well as mutual reconceptualization (Schubert, 1986, p. 33). Some contemporary curriculum theorists are very critical of the view of curriculum as a plan or program because they see it as extending the notion that teachers and students simply implement the intentions of those in power: school principals, parent committees, school boards, Ministries of Education, or professional curriculum developers and text writers— in short persons outside the classroom setting who have some sort of vested interest in the content of the curriculum, the manner of its activation, and the achievement of students. Qualitative, anthropological or ethnographic investigations of life in classrooms (Goodlad, 1984; Goodson and Cole, 1993) have found that the curriculum emerges not only from written curriculum proposals and policies as embodied by the **Integrated Resource Packages** of the British Columbia provincial school system, but through selections from and modifications to these proposals made by teachers and students in the course of their work (Carr, 1993; Hart, 1996) These modifications and selections reflect the meanings which the participants in classroom life attach to their own roles, the course of study, the particular field of content, to the particular school, and to the concept of education in general. Schubert cites the work of curriculum theorists like Pinar and Grumet, who regard the curriculum as a “...social process whereby individuals come to a greater understanding of themselves, others, and the world through mutual reconceptualizationThe central focus...is autobiographical. The curriculum is the interpretation of lived experiences” (Grumet, as cited in Schubert, 1986, p.33).

Critics of the reconceptualist view of curriculum often contend that its focus is psycho-analytical or psychotherapeutic rather than educational and thus beyond the scope of responsibility (or competence) of schools and teachers. Nevertheless, curriculum scholars (Eisner, 1985; Schubert, 1986) recognize that there is a significant difference between the curriculum as written or designed, the curriculum as taught by classroom teachers, the curriculum as learned by students, and the curriculum as developed through refinements and modifications made by teachers and/or curriculum developers and evaluators. Furthermore, Eisner (1985) proposes a null or hidden curriculum comprised of those areas of content and domains of skill which are simply not represented in the official program of the school. Their absence, of course, reflects the meaning or value systems of the curriculum makers, teachers, or both. Recent curriculum scholarship has attempted to develop methodologies that can elucidate the thinking and decision making of teachers in the course of their curricular work including collaborative autobiography, examination of personal practical knowledge, studies of teacher lore, and studies of teachers' working lives (Hart, 1996).

For the curriculum student interested in developing a critique of a curriculum proposal or a comparison among different proposals with the purpose of creating enlarged understanding, the question of whether to focus on written, published, publicly accessible curriculum documents, or on the way in which the proposals are instantiated in particular classrooms and schools, or both, is important. Schubert (1986) reflects this question when he states that a major question is to what extent curriculum studies can address questions of what is learned and taught, and what should be learned and taught generically or in situationally specific contexts. Perhaps ideally the investigator should be able to follow a curriculum proposal from its written form (and perhaps even before that to the process of developing the written proposal) to its realization in classrooms with teachers and students. In practice this can be difficult to accomplish with the result that the curriculum critic will usually choose a frame, or “bracket” as Eisner uses the term (1985, p.224) for his or her criticism, whether that is the curriculum as written, as taught, as experienced and learned by students, or as understood by school administrators, policy makers, parents or members of a community.

My frame, therefore, is on a critique of the selected curricula as written documents. Eisner (1985) claims that educational criticism can be applied to any set of objects and events that one considers relevant to the aims of educational practice, (p.248) citing the work of Elisabeth Vallance on Social Studies textbooks as a particular example of a critique focused on written curricular materials (as cited in Eisner, 1985).

Werner (1978) claims that curriculum criticism is a form of curriculum inquiry or curriculum evaluation which has a critical interpretive frame of reference. He describes two other frames of reference which have also been used in the evaluation of curricular materials, namely, the empirical-analytic and the situational-interpretive. Werner claims that each methodology is designed to “make sense” of curriculum programs and materials but that the type of sense-making which results depends on the frame of reference which the evaluator brings to the evaluation (Thomas, 1985). Table 2.1, based on the work of Werner and Thomas, compares the orientations of the three different frames. It is important to note, as Thomas has done, that:

These three orientations make it possible to gain a more accurate picture of what is happening in student -teacher interactions and the educational environment designed to promote learning-understanding and development of knowledge....A complete understanding of the educational environment will only come when understanding includes information from each of the three frames of reference. (p.67)

The critical-interpretive frame of reference has been described and developed by several curriculum scholars, in particular Eraut, Goad, and Smith, (1975); Mann, (1968); Werner (1978, 1981); and Willis, (1978). Criticism is viewed here as defined by Werner (1981) as, "...a judging of the roots or foundations of something...not to be construed as an attack or an apologetic in defense of some idea" (as cited in Thomas, 1985, p.25).

The tasks of the critical interpretive frame of reference emphasize identification of presuppositions, their origins, effects and possible appropriate alternatives (Thomas, 1985) while its aims include disclosure of meaning, extension of knowledge, and preparation for change, although Eraut et al., (1975) and Willis, (1978) maintain that the goals of this form of inquiry are not specifically decision-oriented, as contrasted with the aims of the empirical-analytic frame which address the needs of decision-makers through a focus on a means-ends form of analysis (Thomas, 1985; Werner, 1978). The third frame of reference, termed situational-interpretive, has as its purposes the discovery and clarification of the meaning and relevance which a program has for the various groups involved. The focus of this orientation is on the curriculum not as written, but as taught and experienced in operation (Aoki, 1978). The research methodologies noted above (Hart, 1996) which attend to a rich description of classroom life and the work and thinking of teachers are appropriate to this orientation. It requires that the investigator immerse him or herself in the classrooms where the curriculum is being activated over an extended period of time. Some proponents of this approach also suggest that the researcher become a participant in the situation through an active dialogue with teachers, students, and other curriculum "players" (Robottom, 1994; Hart, 1996).

Curriculum criticism (in the critical interpretive frame) is seen by its practitioners as a method of educational evaluation which offers a mechanism for focusing on the value patterns or meaning systems shaping curricula, programs, or materials (Thomas, 1985, p.25). The use of the term meaning system in this context is significant. Thomas, citing the work of Mann (1978), Werner (1981), and Willis (1978) states that:

.. the primary aim of curriculum criticism , as a form of the critical orientation to curriculum evaluation, is to disclose the "meanings" inherent in curricular programs or materials....A basic premise of this analysis is that curricular programs are similar to literary work in that the design of the work constitutes an assertion of meaning. (p.33)

The term meaning system refers to the author's value pattern (as revealed by the choices made in the creation of a curriculum proposal). Accounting for the presence of a "choice" as

Empirical/analytical: Tasks:	Situational-Interpretive:Tasks:	Critical-Interpretive: Tasks:
<p>1. To assess the degree of relatedness between means and ends:</p> <p>1.1 How effective are the means in achieving the ends?</p> <p>1.2 How much consistency is there between and among the objectives, content, resources, and strategies of the program?</p> <p>1.3 How much certainty (precision) is there in predicting (achieving) the specified outcomes?</p> <p>2. To compare this relatedness among programs?</p> <p>2.1 Which program is the most cost effective and time efficient?</p> <p>2.2 Which program produces greater net increases on outcome performance indicators?</p>	<p>1. To make explicit the perceptions of various groups:</p> <p>1.1 What constitutes the "program" in the view of the participating groups?</p> <p>1.2 Do they perceive the program as meaningful, relevant, and appropriate to their own situations and concerns?</p> <p>1.3 What are the perceived strengths and concerns?</p> <p>2. To make explicit the situational setting of a program:</p> <p>2.1 What frames of reference do participating groups bring to the program? (e.g., cultural and experiential frames of reference, intentions, background, values).</p> <p>2.2 What is the place and understanding of the program in the larger school and community context?</p>	<p>1. To make explicit perspectives (of man, knowledge, etc.) underlying programs:</p> <p>1.1 What are the underlying intents?</p> <p>1.2 What are the underlying assumptions?</p> <p>1.3 What are the underlying approaches?</p> <p>2. To make explicit social relations maintained and legitimized through perspectives?</p> <p>2.1 What teaching relations are implied?</p> <p>2.2 What views of students are implied?</p> <p>2.3 Whose interests are being served?</p> <p>3. To make explicit sources of these perspectives:</p> <p>3.1 Are the root metaphors appropriate?</p> <p>3.2 What are the implications of "borrowing" these metaphors from other fields?</p> <p>4. To make explicit the control function of these perspectives:</p> <p>4.1 What "knowledge" is selected and neglected?</p> <p>4.2 In what ways do these perspectives allow/disallow us to see?</p> <p>4.3 Who has the power to control?</p> <p>5. To make explicit arguments/criteria/standards for changing these perspectives:</p> <p>5.1 What alternative perspectives can be considered?</p> <p>5.2 Are these perspectives "ethically" justifiable?</p> <p>5.3 Are these perspectives consistent with our basic values and views of man?</p>

Table 2.1: Three Modes of Sense Making in Curriculum Inquiry

Redrawn after Werner, 1978; Thomas, 1985.

part of the curriculum focuses on the meaning of the choice. Accounting for the combination of choices in the curriculum proposal as a whole, serves as a reflection of the meaning system operating during the decision-making process in the process of curriculum authorship. The “meaning system” is an integral part of the curriculum apparent as an interconnecting component of the curricular work. The value pattern of the curriculum developer thus contributes to the structuring and final framework of the curriculum program or material and thereby expresses and reflects the “curriculum meaning system” of the author (Werner, 1978).

The process of curriculum development (authorship) involves a series of decisions. At each point choices are made based on beliefs, attitudes, and presuppositions about schooling, education, learning, knowledge and the roles of teachers and students. The decisions may be made without conscious awareness of the operation of underlying values and concepts. While the resulting program or material consists of explicitly stated goals, objectives, and learning activities these embody views of education, learning, knowledge, the content area, and even of ideal human beings and desirable behaviors that remain implicit. Werner claims that the implicit value pattern creates a context influencing the evolution of the explicit curriculum. At the same time it also influences the “null curriculum” (Eisner, 1985), namely the things not chosen for inclusion in the program even though they exist in the universe of possible choices available to the curriculum author (Thomas, 1985). Werner (1978) cites Friere: “All educational practice implies a theoretical stance on the educator’s part. This stance in turn implies....sometimes more, sometimes less, explicitly...an interpretation of man and his world. It could not be otherwise.” (Cited in Werner, p.15)

Thus the value pattern, reflected in the choices made by the author, as woven through the explicit, implicit and null curriculum elements (Eisner, 1985) can be seen as the meaning system structuring the curriculum. The design of the program reflects its underlying meanings. Therefore the critic discloses meaning by explaining design (Mann, 1968; Thomas, 1985).

Thomas (1985) summarizes the premises on which this approach to curriculum criticism rests. First:

...curriculum development (including learning materials) can effectively be viewed as an editorial process. The author selects aims, goals, and evaluation methods from a ‘universe of possibilities’. He or she makes these choices from her (his) own philosophical stance regarding what is ‘best’ in terms of a learning environment, evaluation etc. This stance is a value laden one.

Second, “the design of the curriculum material reflects the ‘meaning system’ of the author. Third, ‘the intended view and the operationalized view may or may not match. (Thomas, pp.34-35)

Schubert (1986) uses different terminology to express similar concepts about the work of curriculum scholars and developers. He proposes three paradigms of curriculum inquiry, defining a paradigm as:

...the conceptual lenses through which curriculum problems are perceived....The conceptual frameworks we use to deliberate about curriculum problems shape their character and impel us to acceptance of some forms of evidence and rejection of others....paradigms...govern the kinds of questions we ask and the ways in which we view the consequences of our efforts. (Schubert, p.2)

The three paradigms he offers are similar to the frames of reference of Werner (above): the paradigm of Perennial Analytic Categories; the paradigm of Practical Curriculum Inquiry, and the paradigm of Critical Praxis. Table 2.2 summarizes the major features of the three paradigms using a framework for comparison based on the comprehensive knowledge theory of Habermas (1971). The paradigm of perennial analytic categories reflects the definitions of curriculum offered by Taba, above, and the four curricular questions of Ralph Tyler. Of it, Schubert offers the view that it became “ubiquitous, became the paradigm, the governing rules, for the conduct of educational research....” (p.173). The Practical paradigm is exemplified by the work of Joseph Schwab (1969). According to Schubert, Schwab based his critique of the dominant paradigm of Perennial Analytic Categories (a term not used by Schwab) on Aristotle’s concept of the theoretic versus the practical, analyzing both the dominant paradigm and the practical according to their address to the Aristotelian categories of Formal Cause (Problem Source); Efficient Cause (Method of Inquiry); Material Cause (Subject of Inquiry) and Final Cause (End of the Inquiry) (Schubert, 1986, p.175). Some scholars were critical of Schwab’s work as contributing to the view that theory and practice are fundamentally different and that the work of theorists and that of practitioners is antagonistic or that theory is divorced from and irrelevant to practice almost by definition. However Schubert contends that Schwab had no intention to divorce theory from practice and that he certainly did not devalue theory but rather argued for a full understanding of a curricular situation based on inquiry within an ecosystem of curricular or classroom commonplaces comprised of teachers, learners, subject matter, and the milieu (the environment of physical, social, psychological and economic aspects). In this ecosystem the components are themselves in constant interaction and change is the norm.

Practical Inquiry	Perennial Analytic Categories	Critical Praxis
<ul style="list-style-type: none"> • Emphasizes Understanding and Communicative Interaction • Sees Humans as Active Creators of Knowledge • Looks for Assumptions and Meanings Beneath the Texture of Everyday Life • Views Reality as Intersubjectively Constituted and Shared Within a Historical, Political, and Social Context • Focuses Sensitively to Meaning Through Language Use 	<ul style="list-style-type: none"> • Proposes Principles of Control and Certainty • Operates in the Interests of Law Like Propositions that are Empirically Testable • Assumes Knowledge to be Value Free • Assumes Knowledge to be Objectified • Values Efficiency or Parsimony • Accepts Social Reality As It is Unquestionably 	<ul style="list-style-type: none"> • Assumes the Necessity of Ideological Critique and Action • Seeks to Expose That Which is Oppressive and Dominating • Requires Sensitivity to False Consciousness • Makes Distorted Conceptions and Unjust Values Problematic • Examines and Explicates Value Systems and Concepts of Justice on Which Inquiry is Based
Serves Practical Interests	Serves Technical Interests	Serves the Interests of Emancipation
Social Organisation for Interaction	Social Organisation for Work	Social Organisation for Power
Type of Inquiry: Hermeneutic	Type of Inquiry: Empirical/analytic	Type of Inquiry: Critical

Table 2.2: Three Paradigms of Curriculum Inquiry
(After Schubert, 1986)

More recent research focusing on life in classrooms and teacher thinking is grounded on the notion that, as Hart (1996) puts it:

... all practices have theory embedded within them ...both theory and practice are theory guided activities, each of which may be undertaken with varying degrees of intelligence and success....both [research and practice] are solved by practitioners formulating decisions in light of the framework of understanding that they already possess. (Hart, p.63)

The third paradigm described by Schubert is that of Critical Praxis, exemplified by the writings of Michael Apple, William Pinar, Henry Giroux, and Madeline Grumet (Schubert, 1986). As Schubert describes the paradigm its focus is on drawing to consciousness the taken-for-granted, invisible assumptions of the dominant epistemological view termed social behaviorism or neopositivism. While the paradigm of Critical Praxis is quite eclectic, including radical social critiques and works in the genre of artistic criticism, it is claimed by Schubert to have certain common tendencies although he is careful to note that they do not constitute a set of criteria for membership in a reconceptualist “club”. Schubert offers the following list, developed by Paul Klohr (1980), as attributes of the paradigm:

- An organic view of nature;
- A view of individuals as creators of knowledge and culture;
- Personal experience as the base of method;
- Attention to preconscious experience as opposed to behavior and consciousness;
- Attention to new sources of literature for curriculum inquiry including existentialism, phenomenology, radical psychoanalysis, critical theory and some Eastern thought;
- A focus on personal liberation or emancipation and on freeing oneself from ideologies and assumptions or on developing “wide awakesness”;
- Means and ends that include diversity and pluralism;
- Political and social reconceptualization;
- Development of new language forms such as those emphasizing moral compassion, and the aesthetic imagination rather than industrial/mechanistic metaphors. (Schubert, 1986, pp.178-80)

According to Schubert the curriculum paradigms have two “uses” or forms of influence on thought and action: first, they direct the kinds of questions which are asked or which form the

focus of inquiry; second, they shape the methodologies which are chosen for the inquiry (1985, p.182). Schubert makes a distinction between the terms “research” and “inquiry”. He contends that while the terms are often used interchangeably, “research” is frequently associated with the logical positivist and objectivist orientations, while inquiry is applied to a wide range of philosophical, historical, normative, and critical forms of investigation. He notes further, “There is a sense in which curriculum inquiry penetrates every aspect of the curriculum field, for no dimension of curriculum could proceed apart from inquiry that precedes, accompanies, and reflects upon action.” (p.43)

Kelly (1975) proposes that a critique consists of four overlapping phases each of which contributes to understanding of the work at the focus of the critical inquiry: description, analysis, interpretation, and evaluation. Eisner describes three of these in more detail.

A. Description

Eisner terms this phase of the critical process an attempt to identify and characterize, portray, or render in language the relevant qualities of (a curricular work). He notes that the educational critic, like critics of the arts or literature, does not write about everything that exists in a situation but rather about what he or she brackets, what her or she chooses to attend to. Eisner also notes that the sort of descriptive writing offered in a critique is not a catalog or enumeration of objects discovered by the critic in the work reviewed. Description focuses on both the pervasive qualities of the situation or object, its characteristic features, and on its particular qualities. In Eisner’s view this phase of criticism makes the greatest demands on the critic’s verbal and expressive abilities. The critic must be in touch not only with the qualities of the work, but with her response to it.

B. Interpretation

Eisner notes that there is no sharp line between the descriptive and interpretive phases of the critical act. Interpretation entails the development of understanding of what has been rendered through description by using (among other things) ideas, concepts, models, and theories from social sciences and history. It attends to the meaning of the work for those involved. In order to apply theoretical frameworks in interpreting a work the critic must know the theory involved and be able to decide whether or not it is appropriate. Eisner makes a comparison between this process and the practice of casuistry in legal theory wherein a decision must be made regarding within which body of law a particular case resides. Eisner contends it is a

complex art and that schools of education tend to assume that knowledge of theory automatically confers the ability to apply theory appropriately, without practice in doing so. Finally, he claims that the interpretive aspects of criticism are similar to the processes of “thick description” in which ethnographers seek the deep structure of social events, that is the underlying rules or nodes which order these events.

C. Evaluation

Eisner makes the statement that the evaluative aspects of educational criticism most clearly distinguish the work of educators from that of social scientists. For Eisner, the notion of education is normative, meaning a process which fosters personal development and social well-being (p.235). The word value is at the heart of the process of evaluation. Thus the evaluation of a curricular work or educational program must be grounded in some view of what counts from an educational perspective (Thomas, 1985,36; Eisner, 1985, pp. 229-238.) This raises the issue of what values to apply to the evaluation of phenomena that claim to be educational. For Eisner the value-driven aspect of educational criticism pervades the entire process and cannot be avoided.

It is important is to recognize and explicate these values so that the reader of the critique can decide whether or not they are appropriate and understand how they may have affected the choices made and frames used by the critic during description and interpretation. Eisner’s understanding of evaluation is also based on the belief that the “point of educational criticism is to improve the educational process. This cannot be done unless one has some conception of what counts in the process” p.235.) He sharpens the distinction between the social scientist and the educational critic contending that the former has no professional responsibility to assess the educational value of a culture or group, but the educator does. The making of these judgments requires the use of educational criteria. Furthermore, the critic must be aware of the educational values to which he or she subscribes as well as those which have been rejected. The competent critic will be able to provide grounds for these choices even while recognizing that others may disagree.

Eisner believes that disagreement among critics about the value assigned to a common set of educational “events” is not necessarily a liability. He states that one of the possible benefits from disagreement among educational critics is that it will raise the level, if not in fact creating, the sort of discussion of educational practices and policies which is now uncommon. He states:

...I believe intelligent and professionally responsible deliberation calls for...the application of multiple perspectives on an issue or policy, perspectives that view the phenomena from different angles, weigh the costs and benefits, and lead to the core considerations as well as to the ramifications of alternative policy decisions. The denial of complexity in educational matters as in politics is the beginning of tyranny. Educational criticism could contribute to the appreciation of such complexity and therefore provide a more adequate basis for the making of educational judgments. (Eisner, p.237)

It is important to note Eisner's comment that the distinctions between these categories is:

...sharper on paper than in fact. All description is in some degree evaluative inasmuch as only a fool would choose to describe the trivial. All evaluation is interpretive to the degree that one seeks to make some sense of what a situation or an experience means. Nevertheless, the distinctions are useful to the extent that they sharpen perception of the foci of criticism and therefore enable us to read or create criticism more intelligently. (Eisner, p.230)

Eisner summarizes by stating that the descriptive phase aims at the vivid rendering of the qualities perceived in the situation, the interpretive at providing an understanding of what has been rendered and the evaluative at assessing the educational import of the events or objects described and interpreted (p.238.) It is significant here that Eisner makes no mention of Kelly's process category of analysis. While the elements of criticism may be in a relationship which is much more complex than a linear sequence, Kelly's proposal seems to suggest that analysis follows description. A dictionary definition of analysis offers that the process involves, "the separation of a whole into its parts; an examination of the parts of a whole to discover their nature, relationship with each other and with the whole" (**Gage Canadian Dictionary**, de Wolff, Gregg, Harris, & Scargill, 1997). Eisner's omission of this element may reflect his view that description must be more than a cataloging or enumeration of contents. He may, therefore, believe that analysis too easily becomes just that. The curriculum literature contains, especially within the context of the paradigm of Perennial Analytic Categories, many systems for curricular analysis, whether the analysis focuses on written materials or on classroom activities. There is a danger that analysis will direct description to the point of impoverishing it. Below, in the discussion of the methodological approach which I have chosen for this thesis, I return to a consideration of the value of analysis as a part of the critical process.

Movement through the phases of criticism is claimed by Thomas (1985) and Werner (1978) to involve selections of a focal point for the critique, selection of an appropriate methodological framework for the analysis of that focal point, and an appropriate component of public dialogue (p.36). Note here the inclusion of analysis as part of the process. However, it is unclear whether or not Thomas and Werner are using the term in a rather broad sense as incorporating the acts of description, interpretation, and evaluation.

Eisner, especially in **The Educational Imagination** (1985), has written at some length about the nature and development of connoisseurship as an attribute of criticism. He maintains that while everyone who has spent some time in a school as a teacher or as a student possesses some degree of educational connoisseurship, the capacity can be developed and refined. This requires the opportunity to attend to the events of educational life in a “focused, sensitive, and conscious” way (Eisner, 1985, p. 221) and to compare and discuss what one sees so that perceptions can be refined and what has been seen can be integrated and appraised through dialogue with other connoisseurs. Eisner also notes that the process is value driven. As he puts it:

This process is not serial: we do not see and then assess significance; the very ideas that define educational virtue for usoperate within the perceptual processes to locate among thousands of possibilities what we choose to see. The essence of perception is that it is selective; there is no value-free mode of seeing. (Eisner, p.222)

Eisner states that the development of connoisseurship is more “than a species of discrimination training” (p.222). He notes further:

To discern what an event means requires an understanding of the context in which the event occurs; that context requires not only some knowledge of the people involved and the circumstances within which the event occurs, but in many situations also something about the past, against which the particulars of the present can be placed. (p.222)

In this context, an “event” can be taken to mean the subject of the connoisseurship and the critique. How then, are criticism and connoisseurship different? Eisner offers the following explanation: criticism is the public side of connoisseurship. He extends this to state that one can be a connoisseur without being a critic, in the sense that a connoisseur of fine food or wine can practice her appreciation without engaging in public discourse about the nature of her perceptions. On the other hand, one cannot be a critic, according to Eisner, without having the skills (and experience) of connoisseurship. What the critic offers is a rendering of the subject of the

critique, not a substitute for the experience. Eisner acknowledges a debt to Kozloff for the concept of rendering using his idea that criticism's merit is in giving not an account of the work being critiqued, nor a response to the work, but a rendering of the interaction between the response and the work itself. This is a demanding assignment. "What critics do or should try to do is not to translate what cannot be translated but rather to create a rendering of a situation, event, or object that will provide pointers to those aspects of the situation, event, or object that are in some way significant." (Eisner, p.224)

Thomas notes however that the quality of a critique will depend on the appropriateness (meaning significance) of the chosen focus. She applies two criteria from the work of Mann (1968) and Willis (1978) to the determination of appropriateness: the degree of internal consistency between the critic's comments and the methodology employed in the analysis; and the ability of the critique to disclose and explain the meaning within the curricular work (Thomas, 1985, p.38).

Having selected a focus, the second task facing the critic is to select an appropriate methodological framework. Thomas notes that no single methodological approach can be viewed as best since "the methodological principle which is appropriate for assessment of one focal point may not be appropriate for that of a different focal point" (p.38-9). I will revisit this issue in the second section of this chapter. Vallance (1975), for example, chose to focus on the experiential and aesthetic aspects of text books used in social studies programs with an emphasis on the texts as human constructions. She applied the language (methodology) of art criticism thereby treating the "reader" of the text in a manner similar to the "viewer" of a work of art and focusing her analysis on possible reader responses to the curricular work.

Kelly (1975) applies the methodology of literary criticism to curricular analysis using the concepts of metaphor, point of view (voice), plot (order) and theme as a framework for the critique of curriculum materials. Willis (1978) also draws from the methodology of literary criticism suggesting four possible elements for a qualitative analysis of curriculum materials: the author; the work, the world, and the audience. Werner (1981) treats the author of a curricular work as an editor as much as an author, employing a method termed editorial criticism for the analysis of curricular materials. He describes it as: "...an attempt to illuminate a work by exploring the process of its creation, examining the sources and perspectives available to the writer (or developer) in arranging the parts to form a whole." (Cited in Thomas, 1985, p.45)

The critic's focus in this methodology is on the author and the process of curriculum development. The author is seen as an editor, selecting aims, goals, subject components, activities and forms of evaluation from a wide array of possibilities. The result of these selections is a teaching/learning document, a written curriculum (Thomas, 1985, p.45). The design of the document reflects the author's view of content, teacher roles, student roles, and context. Again, the design gives form to the values and presuppositions of the author.

Through editorial criticism the critic tries to make explicit the values and presuppositions which have been operative in the development process. This process should reveal the implicit and the null curricula in the sense of Eisner "through an analysis of the rationale and design components of the materials as well as through descriptions of the social context in which the document was developed" (Thomas, 1985, p.46). Werner defines three process stages for editorial criticism: first, the statement of a critical problem of relevance to the curriculum material. This is to be done by stating the critical problem(s) as a question. The second stage entails gathering data related to the critical problem from within the document and from its social context. This may involve an analysis of stated rationale, content, materials, resources, and evaluation materials. The critic should also attempt to examine terms, values, allusions, metaphors and procedures which are of significance to the critical question and attempt to determine from what theories or other sources these elements are derived (Werner, 1981). The third stage of the process of editorial criticism entails validating the critique through documentation, relevancy, or a formal public dialogue.

Werner suggests that the process of editorial criticism has three aims, which Thomas claims might also be considered as its products: the exposure of underlying perspectives embodied in the materials; revelation of relationships between the document and its social context (defined as social ideals, situations, movements, etc. which might have influenced the development of the materials); and the determination of the possible implications of these relationships for classroom practices (Thomas, p.46).

Of course, the application of analytical categories from literary criticism to curriculum documents requires acceptance of the premise that there is sufficient similarity between the organization and presentation of curriculum materials and literature to make this methodological approach appropriate and useful in the discovery of meanings within curriculum (Thomas, p.40). Thomas contends that the ultimate test of methodology resides in whether or not it enables understanding of basic curricular presuppositions and allows an interpretation of the curriculum as well as outlining possible directions for change. She cites Willis (1978) to the effect

that the best critic is one who has the largest number of flexible, explanatory methodologies at his/her disposal and the intelligence to know when and how to apply those methods. I would suggest that the best critic may not be the one with the largest number of methods but rather the one who selects those which are appropriate for his/her critical purposes.

Werner proposes three principles for the validation of an editorial critique: first, the critic must make explicit the methodological framework and purposes of the critique in a way which reveals the presuppositions and biases of the critic. Second, there should be an element of public dialogue about the critique. This can be done by open debate on the critical problem or framework or through consensual validation by other people such as the original developers or users of the program. Third, the validity of the critique should also be judged through its contribution to better understanding of the curriculum materials.

While Werner's principles for the validation of an editorial critique are useful in the context of that form of criticism, they are not the only proposals which have been offered concerning the assessment of the quality of works of educational criticism. Eisner (1985) and Thomas (1985) claim that the overall merit of any critique must be assessed holistically on the basis not of the critique as a product but on the enhanced understanding which it develops in the reader and in its capacity to make the user of the critique capable of more effective critical insights. Even so, some criteria of judgment may be helpful in arriving at a determination of the quality of a critique. Eisner suggests two: structural corroboration and referential adequacy.

Structural corroboration is defined as the process of gathering data or information and using it to establish links that eventually create a whole that is supported by the bits of evidence that constitute it. "Evidence is structurally corroborative when bits of evidence validate each other, the story holds up, the pieces fit, it makes sense, the facts are consistent" (Eisner, p.241). He uses the example of the mystery writing of Agatha Christie as exemplified by her character Inspector Poirot whose work embodies structural corroboration.

According to Eisner a work of educational criticism demonstrates structural corroboration when the facts presented or the interpretation of the facts shows that the facts support each other. In simple terms the old expression that one swallow does not a summer make reflects the need for structural corroboration. In other words, we seek patterns in the flow of events, consistencies, and associations. Of course, one needs to pay attention to the possibility of mistaking conjunction with cause and effect. Eisner also notes that structurally corroborated conclusions can nevertheless still be false. He cites Geertz' (1973) statement that nothing hangs together as

well and is so persuasive as a swindler's story (p.242). Thus, there needs to be some sort of cross check on structural corroboration. Referential adequacy can help provide such a check.

Referential adequacy is to be found when the critic's work enables us to find for ourselves, in the work which is the focus of the critique, what the critique cues us to find. Eisner notes that in this sense criticism is highly empirical and that referential adequacy provides the empirical check of critical disclosure. Effective educational criticism, as has been noted above, should result in the reeducation of our perception of an educational event or object (p.242). Eisner recognizes and acknowledges that an objection which might be made to the notion of referential adequacy is that the criticism biases our perception; we see what the critic wants us to see and the critique becomes a self-fulfilling prophecy. Eisner acknowledges that criticism is a kind of advance organizer. To address this objection it can be suggested that if a critique is fully educative, (it reeducates our perception in Eisner's terminology) then it should make us more aware of its effects on our perception rather than persuading us to suspend critical judgment and simply accept those of the critic. In fact, Eisner emphasizes that effective criticism should arouse "productive diversity" among educators rather than seeking conformity and agreement.

Eisner concludes his discussion of structural corroboration and referential adequacy stating that they comprise two major means to determine the validity of a critique. He also notes that there is a difference between criticism which focuses on objects or materials and that which addresses activities or phenomena, such as classroom interactions and routines. To some extent, every class, and every day in class, is different and unique. This requires the critic whose work focuses on classrooms in action, on life in classrooms and schools, to spend time in the situation and to become familiar with it. This is not a quick and easy process. Eisner notes that one reason teachers often reject critiques of practice is that they feel, often quite rightly, that the critic has not spent enough time in the context to be able to arrive at an informed, deep and meaningful critique, especially one which can be used to improve the educational situation. (In other terms, the critic has not developed connoisseurship). The critic whose focus is on classrooms therefore must recognize this requirement for immersion and be prepared to make the commitment of time and energy required for it.

II. Development of a Critical Approach

While there is no single best method of curriculum inquiry (Clandinin and Connelly, 1994) some are more appropriate than others for particular tasks. In the discussion above I have focused my attention on approaches to curriculum inquiry which might be used to examine

written curriculum proposals. The work of Werner, Eisner, and Thomas, for example approaches curriculum materials as if they were literary and resulting from editorship. There are similarities between literary and curriculum works in that each are the results of authorship viewed as a conscious act involving selections by the author from a large range of possible approaches. In works of literature the author makes choices about plot, point of view, characterization, detail of description, and use of devices such as metaphor (although many writers reject the notion that they approach their work in any linear, check list manner). These choices are influenced by operative experience, values, and beliefs. Literary works may also reflect the author's view of the readers or audience. While the choices may be implicit and not openly reasoned and reflected upon by the writer at each step along the way, the final structure of the work nevertheless reflects them. Curriculum writers also make choices from a wider universe of possibilities. Some of these choices are driven by the same factors described above: beliefs, values, experiences, and knowledge. But a written curriculum, unlike a work of literature, is intended to be put into operation, to be used to guide teaching and learning activities, to influence the organization of learning experiences, to plan and conduct evaluation of learning. A written curriculum is a proposal, a plan, intended for use. In fact, one way of critiquing a curriculum proposal is to assess its practicality, the possibility of implementing it in schools, although such critiques have a way of becoming justifications for maintaining the *status quo* in school practices. Furthermore, as Zais (1976) suggests, curriculum making is often set in a political context because curricula are activated in schools and schools are at the focus of contending ideas about purpose and priority.

Clearly, the validity of a critical approach should be judged on the basis of whether it helps us to understand and appreciate its subject. Curriculum criticism and inquiry must ultimately help us think about and make judgments of merit concerning how the author of a written curriculum addresses the tasks of curriculum making, in the same way that works of artistic or literary criticism partially focus on the ways in which artists and writers accomplish their works. The danger presented by too much focus on critical methodology is that the person seeking to clarify questions of meaning and worth can get lost in the process and lose sight of first purposes. Thus, the selection and application of a critical approach should be based on some conception of what we are trying to understand and on what bases a critical approach should be chosen over other possibilities.

The focus of this thesis is on written curricula. This fact means that the range of critical methods which focus on the curriculum in action, as an emerging series of transactions in the realities of school classrooms or other instructional settings, are not useful for the purposes of

this thesis as important and interesting as they are in fully appreciating the meaning and merit of a curriculum. My focus is also on written curricula in the field of environmental education. In Chapter 4 I examine the problematic nature of this compound term in greater depth, but it would seem apparent that any critical method which aims to develop greater understanding of written curricula in EE must attempt to reveal how the curriculum author addresses questions of educational significance and how he or she addresses and resolves the relationship between education and the development of environmental understanding. Just as the adequacy and worth of written curricula in mathematics must be assessed through consideration of how the curricularist conceives mathematics as a form of knowledge, regards mathematical understanding and skill and how he or she proposes to address their development through a curriculum, so too must an inquiry into the nature of a written environmental education curriculum address the way in which the author resolves similar questions.

Curricula are also normally designed to be used in school programs. Schools are institutions with particular functions in society. As Barrow (1981) has pointed out, there is nothing particularly difficult about definitions of schools, as places where people are gathered for the purpose of imparting instruction and schooling as the process of doing so, but the issue of what purposes are to be served by schools is more difficult and interesting. Of concern here is the need to distinguish between educational purposes and the purposes of schools. Thus, advocates of many social causes argue that their particular concerns should be included in the school program because they will “educate” students to be safe drivers, sensible alcohol drinkers, healthy and physically active people, eaters of sensible diets, wise consumers, and so on. These things may be worth teaching people about, but they may have little if anything to do with educating them. Unfortunately, the use of the term “education” has become so ill-defined and broad that it has almost rendered word meaningless. Whether or not we agree with the proposals of educational philosophers regarding the definition of the term, we should agree that there is value in trying to restore the word education and the verb to educate to a more restricted usage. Then it becomes possible to ask questions about the differences between the purposes of education and the purposes of schools and the ways in which one may support or antagonize the other.

Some people view schools simply as convenient physical locations through which to provide services to the young, with “education” (typically either undefined or assumed to mean everything in the formal curriculum) being seen as just another service. The difficult thing about this view is that it provides no basis for deciding about priorities, especially when funds and resources are in short supply, as they regularly are in contemporary schools. People also seem very loath to make decisions about the relative importance of the various functions of

schools and to prioritize among them. As Goodlad remarks, "We want it all" (Goodlad, 1984). In Chapter 4 I return to consider the place of environmental education within the larger purposes of schools, but for now I wish to propose that any adequate critical approach to written environmental education curricula should provide an account of how the writer deals with what is educational about EE, as opposed to, or in the context of other purposes of schools. In short, if the curriculum author views his or her proposal as having merit and utility for inclusion in school programs what does he or she believe the program contributes to schooling. Obviously, how the curriculum writer addresses this question implies some concept of the purposes of schools per se.

Thus, a suitable critical approach should help us understand how the curriculum writer in environmental education resolves, in curricular terms, the following questions.

1. How does the curriculum address the concept of education within the context of environmental education.
2. How does the curriculum address the concept of environment, and in particular, the nature of human-environment interactions. (The first two questions really ask how the curriculum author employs the topic of human-environment interactions in the service of education. It asks what is educational about environmental education.)
3. How does the curriculum address environmental action as an educational or curricular purpose.
4. What relationship does the curriculum describe or imply between its purposes and those of schools (assuming that the writer sees the curriculum as being appropriate for use in school programs; otherwise, we must ask in what contexts the curriculum is intended to be used.)

As noted in Chapter 1, this thesis develops two claims. First, it is claimed that environmental education curricula share a broadly common outline or syntax, a syntax appropriate to considering environmental education as focused on problem solving. While this claim will be assessed through the historical chronology of Chapter 3 and the subsequent analysis of Chapter 4, it will be extended by applying the questions above to the review of the three selected curricula in Chapters 5, 6, and 7. However, at the end of Chapter 4 the adequacy of the four questions as a focus for curriculum inquiry in environmental education will be reconsidered before applying them to the reviewed programs.

The second claim, namely that the general problem solving syntax of environmental education programs is developed in quite different ways in different curricula is assessed directly through application of the focal questions to the critiqued programs.

Having identified four focal questions appropriate to the thesis' purposes and to its use of written curriculum documents, the second methodological task is then to define an organizing framework appropriate to the focal questions. An organizing framework is a means of seeking answers to the focal question from within the curriculum documents. It might be seen as a tool for focusing attention on relevant details, in this case detail relevant to the four broader questions.

Barrow's comment about curriculum research, cited above, for example, indicates some of the elements which might be used to construct a framework for inquiry into written curriculum works: aims, procedures for implementation and evaluation, and content. Other writers (Bardwell, Monroe, & Tudor, 1994; Hart, 1979; McClaren, 1997; Robottom, 1994; Wals & van der Leij, 1997a) have developed frameworks specifically for analysis and description of written EE curriculum proposals. Table 2.3 summarizes a number of different analytical frameworks which have been used to define and describe the components of curricula. Some of the categories used in these frameworks can be seen as necessary for understanding any curricular work, for example, consideration of purposes and goals, pedagogical approaches, or evaluation strategies. They mirror Tyler's generic curricular questions, and Schubert's paradigm of Perennial Analytic Categories. Other categories of analysis can be seen as "foundational" or factors influencing the design of the curriculum elements in the sense of Zais' "eclectic" model of curriculum and its foundations (Figure 2.1).

The categories for description and interpretation which I propose to apply to the three selected curricula and use to address the four organizing questions are:

Metaphysics; how the program defines the environment and what it considers to be humankind's place in it. (The topic of how the concept of environment has changed during the development of the field of EE is discussed in more detail in Chapter 4.)

Epistemology; the program's view of what knowledge (and forms of knowledge) are foundational to understanding human-environment interactions.

Proponent:	Rugg (1927)	Tyler (1949)	Taba (1962)	Scw hab (1973)	Joyce & Well (1972)	Stenhouse (1975)
Curricular Element	Purposes/Goals	Purposes	Aims/Objectives	Subject Matter	Orientation/Focus	Justification (Public Statement)
Learners	Learning	Educ.Experiences	Learning Patterns	Learners	Social System Characteristics	Princ.for.Diagnosis
Student Roles	Teacher Roles	Teaching Patterns	Teachers	Role of Teachers	Principles of Reaction	Princ. for Decisions re Indiv St
Content	Teaching Strategies	Content	Subject Matter	Principles of Reaction	Princ. for Content Selection	
Form of Organisation	Organisation	Organisation	Organisation	Syntax	Princ. for Dec. Making	
Eval. of St. Lrng	Organisation	Principles of Reaction	Principles of Reaction	Princ. to guide & eval. student prog	Princ to guide & eval Teachers' progress.	
Admin Conds, Implement. Iss, Format of Matris,	Princ to guide & eval Teachers' progress.	Princ to guide & eval. student prog	Princ to guide & eval Teachers' progress.	Princ to guide & eval. student prog	Princ to guide & eval Teachers' progress.	
Support System Chars.	Princ to guide & eval. student prog	Princ to guide & eval Teachers' progress.	Princ to guide & eval. student prog	Princ to guide & eval Teachers' progress.	Princ to guide & eval. student prog	
Guidance re Feasib. & Implmt.	Princ to guide & eval. student prog	Princ to guide & eval Teachers' progress.	Princ to guide & eval. student prog	Princ to guide & eval Teachers' progress.	Princ to guide & eval. student prog	

Table 2.3: Generic Categories of Curriculum Analysis.

Approach to skills; the program's view of what skills are necessary for the development of environmental understanding.

Perspective on Action; how the program describes and addresses the relationships among learning about action, learning through action, and learning from action and what types of action projects are fostered (This topic is dealt with in more detail in chapter 4).

Problem Solving; the program's assumptions about and model of problem solving in the context of environmental problems and issues.

Structure; how the program organizes instruction and learning experiences; is it discipline based, issues oriented, thematic, historical.

Learners; the program's view of the role of the learner and perspectives on learning.

Teachers; the program's view of the role of teachers and the nature of teaching.

Sequence; the program's proposals for, or support of, particular sequences of instruction, learning experiences, etc.

Ethical perspectives; how the program addresses ethical questions regarding human environment interactions and environmental actions.

Fit with the institutions of schooling; is the program designed to be used in schools; how the program addresses questions of location in the school curriculum, interdisciplinarity, and implementation.

The framework is broadly reflective of categories for analysis and description of EE curricula proposed by McClaren, (1997), the North American Association for Environmental Education [NAAEE], (1996), and Wals and van der Leij, (1997a). It is not intended to restrict the descriptive, interpretive or evaluative phases of the critique solely to these categories. Nor will I attempt to force-fit the three programs to the framework. It is intended to be a starting point, an aid to comparison, and a tool for thinking.

The relationship between a focal question or questions and an organizing framework for curriculum inquiry is complex and not well addressed in the writings about critical methods. While it may be claimed that the framework should be placed at the service of the focal question(s), the application of the framework during the phases of description and interpretation may reveal new questions which are worth asking. The approach to curriculum inquiry defined by Schubert as the paradigm of Perennial Analytic Categories, while criticized by some as objectifying teachers and students and ignoring the richness of life in classrooms can nevertheless be useful for directing attention to attributes present in written curriculum documents. It also has the advantage of facilitating comparison among different curriculum proposals. Although it may be argued that every classroom is unique, every teacher and every pupil different, and every transaction among Schwab's classroom commonalities special, there is still some value in attempting to seek similarities and significant differences as starting points for comparison. Otherwise, comparison is impossible. The problem of categorization is that it categorizes; the power of categorization is that it categorizes.

I have chosen to employ a method of curriculum inquiry appropriate and useful for the review of written curriculum works and also for the purposes of the specific inquiry. The methodology is deliberately eclectic. The broad outline of the approach reflects Eisner's concepts of the nature and purposes of description, interpretation and evaluation, described above. In the descriptive phase of the critique I will attempt to let the curriculum authors speak with their own voices as much as possible in a written review which of necessity excerpts from larger total bodies of work. My purpose in this is to let the reader who is unfamiliar with the original works, develop an understanding not only of the content, but also of the style of the critiqued proposals. The interpretive and evaluative phases of the critique are undertaken using conceptual analysis in the sense of seeking to make the concepts and ideas of the proposals clearer and more accessible to comparison and review.

III. Rationale for the Use of Written Curriculum Proposals

In this study I have chosen to focus on written curriculum proposals and associated written or electronically published works of the authors. Thus, my critique of the three environmental education proposals is based on an extensive review of published, publicly accessible documents. In some cases the authors of the proposals make claims within their materials concerning the efficacy or operation of their programs in schools or other educational settings and in some cases evaluative studies are offered in support of these claims. It was not my purpose to validate these claims empirically through extended studies of classrooms in which

teachers are implementing the written materials. Thus, my choice of methodology has been to some extent determined by the use of written curriculum materials as the subjects of my review.

There are two questions to be addressed at this point: why choose to focus on written materials rather than going into classrooms or other instructional settings where the selected programs were in operation, and why these programs?

In selecting written curriculum proposals as my focus I was cognizant that at this point in the history of environmental education there is an active on-going debate about curriculum goals, purposes, and content (Independent Commission on Environmental Education, 1997; McClaren, 1997; NAAEE, 1996; Orr, 1992; Robottom, 1994; R.E. Roth, 1997; Sanera, 1995a, 1995b; Wals & van der Leij, 1997a). The debate is heavily grounded in an examination of written curricula. It is characteristic of environmental education that it is often to be found at the margin of the core or common curriculum of most typical public elementary and secondary schools. Thus, the adoption of environmental education curriculum is still largely a choice made at the school and classroom levels by individual teachers or small groups (Hart, 1996). Especially in the U.S., the executives of organizations such as the North American Association for Environmental Education appear to believe that there would be wider acceptance for environmental education and greater inclusion of environmental education programs in the core curriculum if there were “national standards” or at least “guidelines” for curriculum development and classroom practice (R.E. Roth, 1997; Simmons, 1996). This intention is reflected in the following statement included in the Introduction to **Environmental Education Materials: Guidelines for Excellence** (North American Association for Environmental Education [NAAEE], 1996):

Through the National Environmental Education Standards Project, the North American Association for Environmental Education (NAAEE) is taking the lead in establishing guidelines for the development of coherent, cogent, and comprehensive environmental education programs. These guidelines will also point the way toward using environmental education as a means of meeting the standards set by the traditional disciplines. (NAAEE, 1996, p.2)

However although the **Guidelines** document claims to represent “...a shared view of the core concepts that environmentally literate citizens need” and that it “...reflect(s) a widely shared understanding of environmental education....” (p.2) others have pointed out that in fact such a consensus does not exist in the environmental education community (Jickling, 1996; R.E. Roth, 1997) and that even the use of terms such as “environmental literacy” is not unproblematic (MacDonald, 1997; Weston, 1996). To date, the debate over these questions is largely grounded

in written curriculum proposals and the theories on which they are based. One of the significant elements of the debate concerns which curricular examples should be chosen as the basis for standards or as exemplary programs (neglecting the issue of whether the uniformity and centralization implied by standards would be educationally desirable in the first place). The debate is also fostered by the fact that the curriculum writers whose work might be chosen as a reference point for environmental education "guidelines" would likely have considerable influence in the competitive search for funds for curriculum research and development from Federal agencies such as the **Environmental Protection Agency (EPA)**, the **National Science Foundation**, or the **National Aeronautics and Space Administration (NASA)**. Barrow (1984) has commented on the political dimensions of curriculum noting:

Rather than seeing curriculum theory as a body of technical knowledge to be thrust on the schools through political savoir-faire, we should think of actual influences on curriculum as constraints on past and present practice that need to be understood, very often in order to be challenged. This will help us to appreciate that much of what is going on is the product of circumstance rather than reason....To understand the power of circumstance is one thing; to bow down to it as a determinant of future practice is another. (p.17)

In this spirit my critique is intended to contribute to a broader understanding of the educational issues which attend curriculum in environmental education and to raise the debate beyond a focus on standards or guidelines to a more fundamental consideration of problems concerning the nature and purposes of environmental education itself as revealed by some significant contemporary curricula. As John Dewey remarked in 1938 in **Experience and Education**:

It is the business of an intelligent theory of education to ascertain the causes for the conflicts that exist and then, instead of taking one side or the other, to indicate a plan of operations proceeding from a level deeper and more inclusive than is represented by the practices and ideas of the contending parties. (as cited in Schubert, 1986, p.7)

The second question attendant on the use of written curriculum materials as a basis for my review concerns why these programs were selected. As has been noted above, the choice of a frame for a curriculum inquiry is to some extent value driven and also driven by the connoisseurship experience of the writer/critic. William Stapp is one of the earliest proponents of environmental education. His writings on the subject appear shortly after the first formal use of the term in 1968. His definitions of environmental education are often cited by other authors

and curricularists (Kennedy, 1983). He was a pioneer in the use of electronic communication to connect students and teachers in different schools to exchange information from research on water quality and pollution sources. He has published a series of curriculum workbooks and resource handbooks in support of the workbooks. He has traveled widely and participated in projects operated under the auspices of the United Nations Scientific Educational and Cultural Organization [UNESCO] and the United Nations Environment Program [UNEP]. He is an acknowledged and honored authority in the field (President's Council for Sustainable Development, 1995).

From the outset his work in environmental education has linked community development and environmental quality. His recent collaborations with Arjen Wals have developed the community action orientation even more clearly. Given his recognized status in the field no attempt to understand the concept of environmental action as a component of EE would be likely to be considered as credible without inclusion of his work. In addition, because he has supervised many graduate students over the course of a number of years, he and his students might be considered to represent a "school of thought" in environmental education.

In a similar way Harold Hungerford and his colleagues and students have been actively developing a body of work in environmental education since the early 1980's. Their work addresses not only curriculum development and the creation of resource materials in support of their program proposals, but also empirical research, largely in the analytic-empiric and quantitative social science traditions on the environmental behavior of students and adults. As an Editor of the **Journal of Environmental Education** and an active member of the executive of the North American Association for Environmental Education Hungerford has been one of the people who defined the directions of environmental education and the research methodology and agenda within the field. He has a large number of former graduate students who are also active in the field and in professional organizations associated with environmental education. His curriculum work is firmly grounded in a body of psychological theory developed through his own research and that of many of his students and associates. His proposals for environmental education may be considered to be highly coherent and theory-based. They therefore offer a significant body of published, publicly accessible work on which to base a critical review. Hence, Hungerford's work was selected as one focus of this critique because it represents a clearly identifiable, widely recognized and cited concept of environmental education and has a clearly developed approach to environmental action. Perhaps because of Hungerford's continuing influence on the field, his approach to environmental education has also attracted criticism (Robottom, 1994; van der Leij & Wals, 1997) . There is, therefore, the opportunity to enter into

a public debate by assessing the validity of the critique in terms of what it offers to an understanding of the issues and contributes to a possible resolution of some of the significant areas of conflict within the field at this time (McClaren, 1997; R.E. Roth, 1997).

In Hungerford's research on the determinants of environmental behavior, research which forms a major part of the theoretical base for his curriculum proposals, there is mention of the significance of environmental sensitivity (or bonding to the environment) as an important influence on student behavior. However, Hungerford makes the claim that this factor has not formed a major focus for his curriculum work either as an element of his goals or as a part of his methodological approach because it is simply not practical to address environmental sensitivity in the context of contemporary American public schools.

The third curriculum chosen for critical review in this dissertation was selected because it makes quite a different claim, namely that the development of greater environmental awareness and the removal of culturally acquired perceptual filters should be the major purpose and methodological focus of environmental education. The program reviewed here is that of Michael J. Cohen, as embodied in **Project Nature Connect** and other curriculum proposals and environmental writings. Of the three programs reviewed his is perhaps most clearly based on a personal perspective and life experience. Cohen's work with the **Audubon Society's Expedition Institute** program for over twenty years gave him a rich understanding of the issues surrounding environmental sensitivity and awareness and places his curriculum work squarely in the experientialist tradition. Of the three authors Cohen is closest to the Deep Ecology perspective of environmentalism and his orientation is to social reconstruction. Thus, I considered it essential to a full understanding of the spectrum of curricular approaches to environmental education and action to include his written materials in my critique.

To summarize, the three programs were chosen for this critique because they are in fact proposals for the education of learners with respect to the environment; they fall within the genre of environmental education, and they offer a curriculum for its attainment. Each of the programs also addresses what might be termed the question of human-environment interactions. All three programs are published and widely available. Two of the three program authors have been actively involved in the curricular politics of environmental education and all three have been professionally active in the field for many years. Each program has attracted a cadre of followers, active users, and advocates. In the case of Stapp and Hungerford, their program

proposals and concepts of environmental education are frequently cited in the literature of environmental education (Bardwell, et al., 1994; Wilke, 1993) and they have helped define the field. In Stenhouse's (1975) sense of the term, all three programs represent highly public communications about the purposes and nature of environmental education.

Chapter 3

From Silent Spring to Kyoto: The Development of Environmental Education in the Context of Changing Views of the Environmental Problematique.

I. Preamble

This chapter presents an outline of some of the events and concepts which have influenced the development of environmental education from 1968 to the present, the era in which the three curricula that are the focus of my inquiry were formulated. A number of the major environmental proposals and policies offered in Canada and the United States and by the United Nations during the past three decades are presented in chronological order. The chronology also locates major landmarks in the development of environmental education. Figure 3.1 is a time line along which the events are diagramed. While in some cases there are fairly clear connections between events in the development of environmental education and those in the larger domain of environmentalism and environmental policy, the juxtaposition of events in a chronology does not demonstrate cause and effect. It would require an historical analysis beyond the scope of this thesis to reveal more precisely the relationships between events, actors, and societal trends during the period. Where possible I have cited original sources and contemporary accounts. I have also cross checked my chronology against the accounts of a number of other authors who have described relevant events in the same period (Council on Environmental Quality, 1995; Disinger, 1993; Hart, 1979; Kennedy, 1983; North American Association for Environmental Education, 1996; United Nations Conference on Environment and Development: The Earth Summit 1992; Environmental education: Quo Vadis, 1995). I have also not attempted a full analysis of the interactions among events in the environmental movement and other significant events and trends in the same period (the Vietnam War or the American Civil Rights Movement in the U.S., for example.) The three decade period has been one of intense activity in terms of environmental research, policy development, and environmental education, so the chronology is of necessity incomplete and to some extent selective, although it includes most of the major environmental education policies, laws, and statements issued at the national and international level in Canada and the U.S. and by the United Nations in the period.

As noted above, the chronology focuses on events, policies and proposals within Canada and the U.S., and on major intergovernmental initiatives such as those launched by the United Nations General Assembly and its agencies. This is not to suggest that the rest of the world has been uninvolved or disinterested in environmental problems or environmental education. Because my focus is on three curricula developed in the U.S., by American authors, I have limited the scope of the chronology to Canada, the U.S., and to initiatives of the United Nations and its agencies. However, especially in the cases of Stapp and Hungerford, their writings and curricular proposals are sometimes cited in international policies concerning environmental education and have had an influence on EE outside North America (Kennedy, 1983; President's Council on Sustainable Development, 1995).

While it is not the purpose of this chapter to provide a history of environmental education or the environmental movement it attempts to set the three principal authors and their curriculum works in context. A fairer and more complete critique should result by understanding some of the events which have delimited and defined the contemporary "conversation" (some might prefer "debate") concerning the nature of the environmental problématique (Mesarovic & Pestel, 1974) and its significance for school programs and education in general. This is particularly relevant to two of the focal questions for the critique, namely to understand how the three curricula reveal or reflect their writers' views of humankind's environmental situation (Chapter 2, question 2) and how each resolves the issue of action to address environmental problems as a purpose for or methodology of environmental education (Chapter 2, Question 3) although it also has relevance for the others.

Chapter 4 interprets the significance of some of the elements of the chronology for the development and current status of environmental education. It outlines several issues which are of current concern to environmental educators, curriculum theorists and developers, as well as to makers and critics of education policies and reviews the focal questions of the inquiry and the organizing framework, described in Chapter 2 in their light. Thus, Chapter 4 is a further contribution to the development of a framework for understanding both the curricula themselves and the adequacy of my inquiry into them.

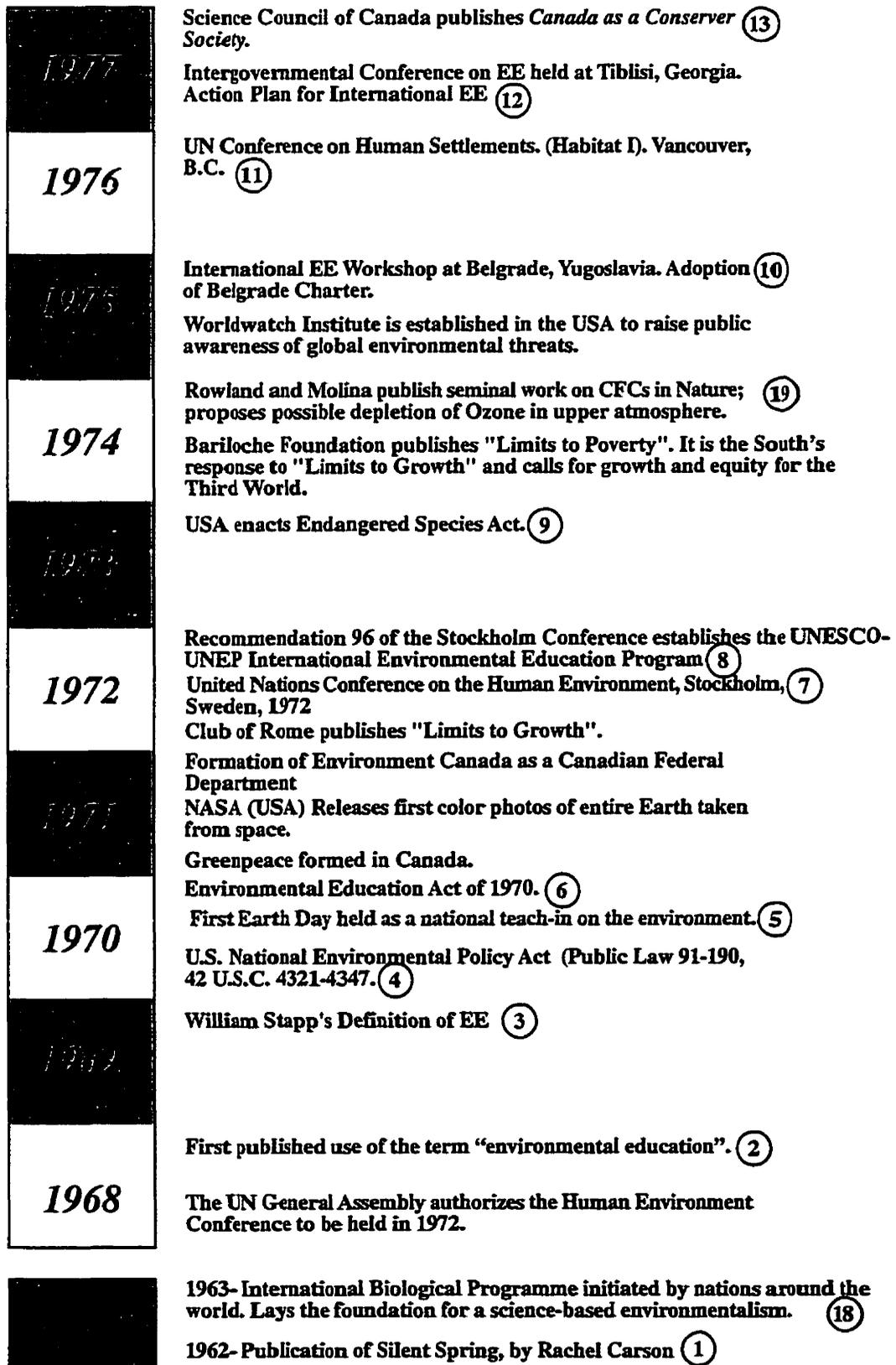


Figure 3.1. (Part 1): Timeline of Significant Events in the Development of Environmental Education & the Environmental Movement, 1962-1998.

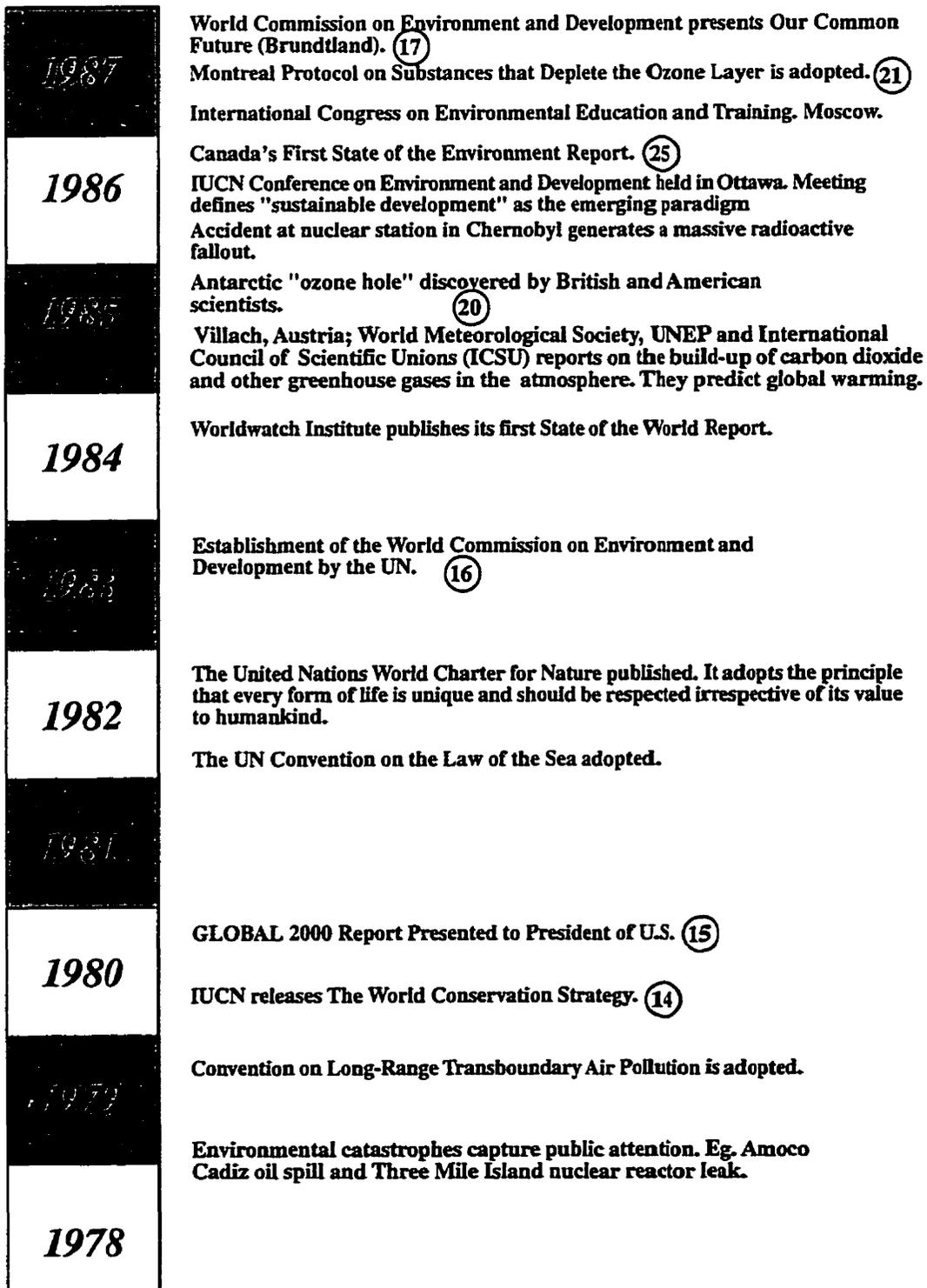


Figure 3.1 (Part 2) : Timeline of Significant Events in the Development of Environmental Education & the Environmental Movement, 1962-1998

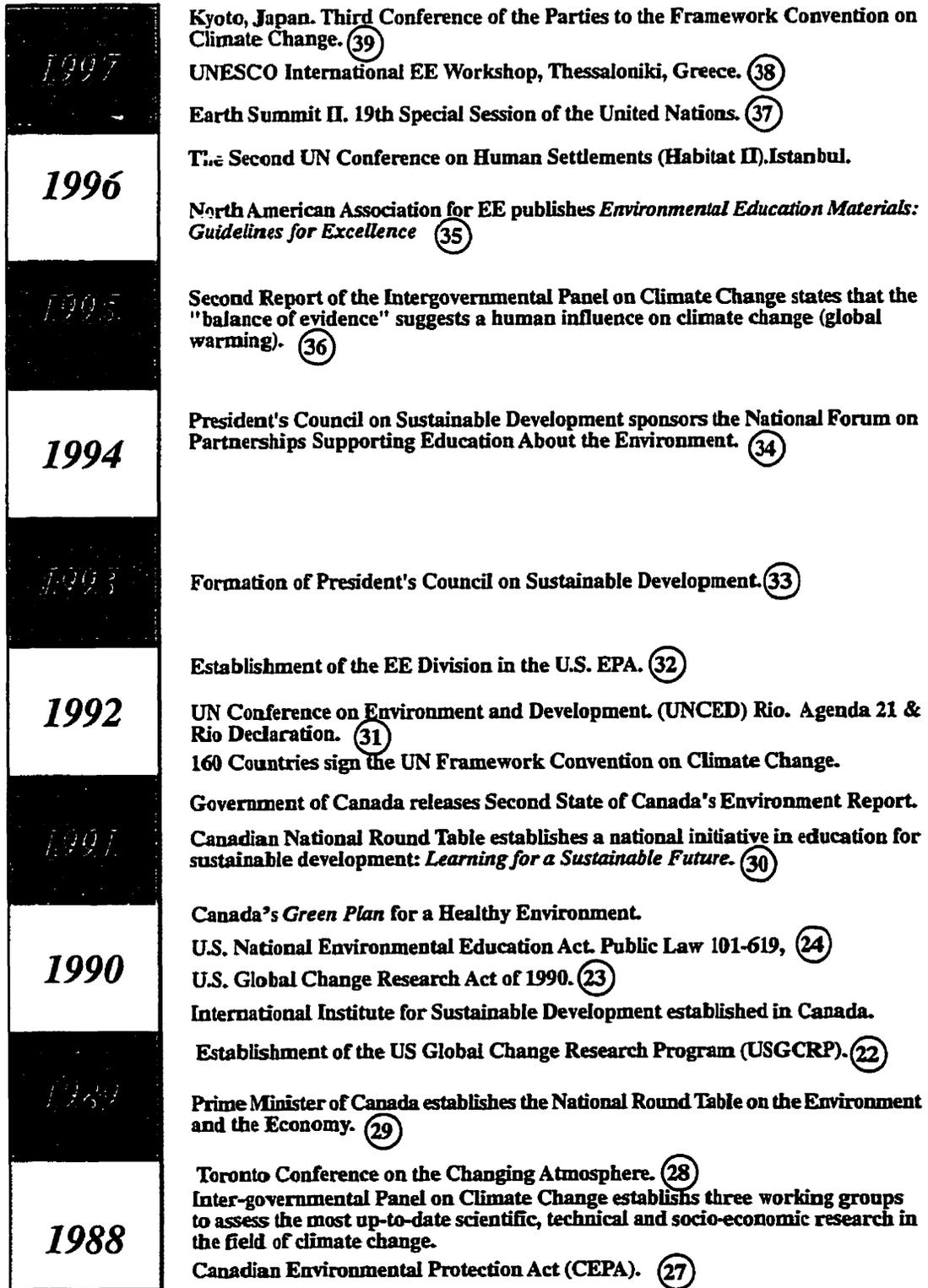


Figure 3.1 (Part 3): Timeline of Significant Events in the Development of Environmental Education & the Environmental Movement, 1962-1998.

II. A Chronology of Selected Environmental Education and Environmental Policies from 1968-1998

A. A Note on Using Figure 3.1

As noted previously, the chronology which follows is not a complete description of every event having significance for environmental education or environmentalism and knowledge during the era from 1968-present. Figure 3.1 (which is broken into three sections) diagrams events which are described in more detail below, but it also includes some events which are not discussed further here. Events which are discussed in this section are indicated by circled numbers on the Figure; the numbers are referred to below in the context of the particular descriptive paragraphs.

B. The Chronology

Humans have been interested in the environment in a practical way since the earliest appearance of our species. As Odum (1959) points out in his pioneering ecology text, primal humans needed to have a definite knowledge of the environment in order to survive and with the use of tools and fire they began to modify it in significant ways. Although this chronology begins in 1968 concern about the affects of human activities on the environment was evident in North America before that time. In 1864 George Perkins Marsh published **Man and Nature**, a book which influenced a number of prominent U.S. citizens to become involved in conservation and the protection of nature including Horace Greeley, Ralph Waldo Emerson, and Henry David Thoreau. In the late 1800's the American conservation movement had taken definite form and was beginning to shape some government policies. In 1872 the Federal government set aside more than 2 million acres of land to create Yellowstone National Park and banned all hunting within it. This act is generally regarded as starting the first wave of resource conservation in the U.S. (Miller, 1990). In 1875 the American Forestry Association was formed to develop public support for forest protection and reforestation. In 1885 New York became the first state to establish a state forest. In 1890 the U.S. Census Bureau, in a phrase attributed to historian Frederick J. Turner declared that the "geographic frontier was closed" (Miller, 1990, p.36). In 1892 John Muir founded the Sierra Club and in 1905 the Audubon Society was formed to protect wildlife. The term of president Theodore Roosevelt from 1901-1909 saw many important items of conservation legislation and is often described as the Golden Era of conservation in the U.S. (Miller). For example, in 1905 Congress created the U.S. Forest Service, while in 1912 it created the U.S. National Park System.

In the post World War I era politicians returned to an emphasis on exploitation of public lands and natural resources. Herbert Hoover, for example, proposed that the federal government return all remaining federal lands to the states or sell them to private interests. But the beginning of the Great Depression in 1929 saw a return of interest in the role of the federal government in land ownership, conservation, and management, especially since financially desperate state governments and private owners were often happy to transfer land tenure. To provide jobs for more than two million unemployed young men President Franklin D. Roosevelt created the Civilian Conservation Corps (CCC). The CCC undertook many land restoration and conservation projects across the country including tree planting, park development, watershed renewal, and soil erosion control.

During the years of World War II and the immediate post war period there was less interest in an active government role in land management and environmental protection. However, 1948 saw the first major air pollution disaster in the U.S. in Donora, Pennsylvania where contaminants from a steel mill, zinc smelter and sulfuric acid plant stagnated over the town causing about 6000 people to become ill and 20 to die. Even so, few people took this incident as a possible symptom of more serious environmental problems (Miller, 1990). But this attitude began to change with the publication in 1962 of **Silent Spring** by Rachel Carson (1). Carson had spent most of her working life as a marine biologist and writer with the U.S. Fish and Wildlife Service. As a result she was aware that in 1960 biologists with the USFWS had found DDT in the tissues of fish where there had been mass spraying of the forests for spruce bud worm. Moreover, their research discovered traces of the pesticide in fish more than 30 miles away from the actual site of the spraying. In the same summer biologists at wildlife refuges in California discovered hundreds of dead and dying fish-eating bird species. Further investigation showed that plankton and fish in the lakes, as well as the affected birds, contained toxaphene (DDD), a close relative of DDT, as well as the pesticide DDE. Research showed that these compounds were very persistent in the environment and that they could be concentrated in the food chains, ultimately causing serious problems for many species at the top of the food pyramid, including fish eating birds like Osprey, Bald Eagles, Gulls, Herons, Pelicans, and Grebes (Council on Environmental Quality, 1995). **Silent Spring** provided a clear and publicly accessible account of these problems and also made the general public aware that pollution was not to be seen merely as a localized, point source issue, but as having affects on the operation of biogeochemical cycles on which all life, including humans, depend. **Silent Spring** is generally regarded as the starting point for the modern environmental movement in the U.S. (Council on Environmental Quality, 1995; Hawkins & Vinton, 1973; Miller, 1990).

In the years from 1962 until the end of the decade the mass media began to pay more attention to environmental problems and to publicize environmental problems like major air pollution events in New York city in 1963, the highly polluted Cuyahoga River, in Cleveland, Ohio which actually caught fire destroying two bridges, the Santa Barbara Oil Spill, the eutrophication of Lake Erie by contaminated sewage discharge and run-off, and the possible extinction of well-known wildlife species through loss of habitat and pollution (Council on Environmental Quality, 1995; Hawkins and Vinton, 1973; Feather, 1980; Miller, 1990). In the same period the Apollo series of space missions mounted by the National Aeronautics and Space Agency in the U.S. (and similar manned orbital flights made by Soviet Cosmonauts) produced dramatic photographs of the Earth from space. Many writers have noted (Milbrath, 1989; Miller) that these photographs contributed to a growing sense of the Earth not as a collection of nation-states on the classical Mercator projection maps of school classrooms, but as a dynamic, complex, and integrated whole. That view was given eloquent expression by Adlai Stevenson in his final address to the United Nations Economic and Social Council (1965) as U.S. Ambassador to the U.N.:

We travel together, passengers on a little spaceship, dependent on its vulnerable resources of air and soil; all committed for our safety to its security and peace; preserved from annihilation only by the care, the work, and I will say the love we give our fragile craft. (U.N. Economic & Social Council, 1965, p.90)

Hence, by 1968 when Clarence Schoenfeld made the first published use of the term “environmental education” (Hart, 1979; Kennedy, 1983) there was widespread public concern about the state of the environment and how human activities might be damaging it (2). In 1969 William Stapp developed a frequently cited description of the purposes of environmental education (3):

Environmental education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solutions. (Stapp, 1969a p.3)

Containing as it does the term “biophysical” environment Stapp’s description reflects the influence of the earth systems science view of the biosphere, while also developing a focus on “problems” associated with human activities in the biosphere. In 1969 Robert Roth described the goals of environmental management education (emphasis mine) as:

The development of a citizenry that is:

- (1) knowledgeable of the interrelated biophysical and sociocultural environments of which man is a part;
- (2) aware of the associated environmental problems and management alternatives of use in solving these problems; and
- (3) motivated to work toward the maintenance and further development of diverse environments that are optimum for living. (Roth, R.E., 1969, p.65)

Roth's description extended Stapp's biophysical environment to incorporate sociocultural elements recognizing thereby the subjective complexity of the concept of the human environment itself. I will return to a consideration of this issue in Section III of this chapter.

Moreover, he offers a definition of "optimum environment", as:

...one which induces each individual to develop continually from birth to death as a result of systematic challenges by physical and mental tasks which elicit normal adaptive response within his rapidly increasing and eventually declining capabilities. (Roth, R.E. p.65).

While Roth's definition of "optimum" environment is somewhat opaque and mechanistic in style it signals the introduction of another attribute of environmental education into definitions and descriptions of the field: a focus on lifelong development and learning as significant purposes for EE. Thus he extended environmental education to incorporate not only a focus on the biophysical, but also the social and cultural elements of the environment and to include the notion that environmental education was concerned with lifelong human development as an aspect of environmental quality. Hence, as early as 1969 the field of environmental education was being described as requiring a multi- if not interdisciplinary approach (Jacobs, 1989).

In the climate of scientific concern and public opinion of the late 60's and early '70's governments began to develop comprehensive environmental policies. Richard Nixon supported the development of important U.S. environmental legislation (Marland, 1971; Train, Cahn, and MacDonald, 1971). On January 1, 1970 he signed into law the **National Environmental Policy Act of 1970** (National Environmental Policy Act, 1970), proclaiming it to be the "Act of the decade" (Council on Environmental Quality, 1995). The Act states its purpose as:

To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality. (National Environmental Policy Act, 1970, no page)

The Act also contains the interesting statement that:

(c) The Congress recognizes that each person should enjoy a healthful environment and that each person has a responsibility to contribute to the preservation and enhancement of the environment. (National Environmental Policy Act, Sec. 102)

It also mandates an interdisciplinary and integrated approach to environmental matters, stating:

...all agencies of the Federal Government shall —

(A) utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the

environmental design arts in planning and in decision making which may have an impact on man's environment.... (Sec. 102)

The Act also required environmental impact statements for virtually all activities of the Federal government. The **President's Council on Environmental Quality** was required to make regular reports on the state of the nation's environment (the Council issued its 25th Anniversary Report to President Clinton in 1995). It is significant that NEPA had wide political support and passed both houses of Congress by wide margins.

April 22, 1970 saw the first **Earth Day** celebration (5). Earth Day was modeled on the "Teach-In's" on college campuses concerning the Vietnam War. U.S. Senator Gaylord Nelson, with the support of non-governmental organizations such as Environmental Action, Friends of the Earth, and the Sierra Club promoted Earth Day I as a national day of concern for the Earth. Earth Day celebrations (or protests as they were also commonly described) attracted more than 300 000 participants on campuses and in communities across the U.S. It was now clear to politicians that the environment would have to be addressed in their campaigns. In fact, between 1969 and 1980 the U.S. Congress alone passed more than 24 separate pieces of legislation to protect air, water, land, and wildlife (Miller, 1990).

Of particular interest to this dissertation, in addition to the NEPA, Congress enacted the **Environmental Education Act of 1970** (6). In a sense, the NEPA and the EEA may be seen as two sides of the same environmental policy coin. The intentions of the Environmental Education Act are described in the following passage from the **Report on the Environmental Quality Education Act** (United States Senate Committee on Labor and Public Welfare, 1970):

The citizens of this country, both present and future, must understand the ecosystem and the interrelationships between its parts. Each phase of education, from preschool through adult and continuing education, must be reordered to permit the introduction of ecological understanding. (U.S. Senate Committee on Labor and Public Welfare, 1970, pp.1-2)

The scope and purposes of environmental education were also defined by the Senate committee:

Environmental education is an integrated process which deals with man's interrelationship with his natural and man-made surroundings, including the relation of population growth, pollution, resource allocation and depletion, conservation, technology, and urban and rural planning to the total environment. Environmental education is a study of the factors influencing ecosystems, mental and physical health, living and working conditions, decaying cities, and population pressures. Environmental education is intended to promote among citizens the awareness and understanding of the environment, our relationship to it, and the concern and responsible action necessary to assure our survival and to improve the quality of life. (U.S. Senate Committee on Labor and Public Welfare, p.3)

Thus, while the National Environmental Policy Act called for responsible environmental citizenship, the Environmental Education Act later in the same year advanced a national policy on environmental education which was clearly intended to foster environmental understanding and the capacity for responsible actions. This comprehensive definition contains many of the attributes now commonly associated with environmental education including its integrated and inter- or multidisciplinary nature, its focus on both natural and built environments, and its orientation toward action.

In Canada there was also a high level of public interest in the environment, an interest which was translated into policy actions and political statements by the leaders of the time. Thus, in 1971 an Act of Parliament created a new department of the Federal government: **Environment Canada** (Government of Canada, 1991). In the same year, speaking in Vancouver Prime Minister Pierre Trudeau stated:

At a time when we know without the slightest doubt that the ability of the biosphere to maintain life is finite, when we are aware that the resources available to us are limited, there are elements in our society which nevertheless assumes that man is at his ingenious best when his skills are employed to market products in ever more attractive, and often less disposable packages. There is no shortage of persons who rationalize that for the benefits of shareholders or taxpayers, raw waste or sewage can be pumped with impunity into rivers or vented into the atmosphere. Surely we are not so ignorant as to assume that , somehow, the earth will begin producing more resources at an inexhaustible rate. Surely we do not prefer to live beside garbage dumps, to breathe smog, and to look out on polluted oceans....Technological accomplishment and population growth have both reached such a degree of acceleration that the world at this moment is placed at the commencement of several exponential curves. Going up at a perilous rate are population and pollution; coming down at a rate of equal concern are reserves of natural resources and acreage suitable for cultivation....Isn't it time we paid heed to resource exhaustion, to environmental deterioration, to the social costs of overcrowding, to the extent of solid waste disposal? (Environment Canada, 1972, pp.81-2)

In the U.S. in 1972 a new agency, the **Environmental Protection Agency (EPA)** was established by Executive Order to coordinate various environmental statutes, develop national environmental quality standards, and train professionals to monitor the environment and address areas of concern. NEPA and the EPA gave the U.S. Federal government the power to enforce environmental standards and address environmental problems in a more uniform fashion than had been the case under a plethora of different state regulations in the absence of clear national policy. The organization of the EPA under its first Director, William Ruckelshaus also reflected a multidisciplinary approach to environmental problems rather than dividing them among the traditional compartments of land, water, air, soil, forests, wildlife, and so on.

The environment was also becoming a matter for attention by the United Nations. In 1972 the UN convened an international **Conference on the Human Environment (7)** held in Stockholm, Sweden. Canada played an important role in the conference in the person of the conference Chair, Maurice Strong, a Canadian who also Chaired the Second UN Conference on the Human Environment twenty years later in Rio.

Canada and the human environment, (Environment Canada, 1972) the working paper prepared as Canada's submission to the Stockholm Conference mentions education as follows:

There is a need to improve environmental education at all levels. At the professional and technical levels, educational programs must provide the skilled

manpower needed to tackle environmental problems quickly. There is a real shortage of skilled people now. In the elementary and high schools, improved programs will progressively develop the awareness and understanding of environmental problems which are needed if future problems are to be forestalled....Increasing interest in environmental education is developing in the schools, to supplement older programs in outdoor education. The need for rapid and significant progress in this area of general school education is recognized... (Environment Canada, p.69)

One of the recommendations of the Stockholm Conference was that the United Nations Educational Scientific and Cultural Organization (UNESCO) join with the United Nations Environment Program (UNEP) to create an International Environmental Education Program (IEEP) (8). The IEEP was to serve as a catalyst for a number of important international conferences on environmental education held during the decade. Meantime, in the U.S. the pace of environmental legislation continued with the passage in 1972 of the **Water Pollution Control Act; Marine Mammal Protection Act; Insecticide, Fungicide, and Rodenticide Act (Pesticide Act);** and the **Coastal Zone Management Act**. In 1973 Congress adopted the **Endangered Species Act (9)**.

In 1975 the **Belgrade Conference (10)**, described officially as an International EE Workshop developed a broad statement defining environmental education and establishing its purposes. The significance of both the Belgrade and Tbilisi Conference (described below) resides in the agreement which was reached among delegates representing both the developed and lesser developed countries and the free market and centrally planned (communist and socialist) economies. The **Belgrade Charter** states that environmental education should:

...develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations, and commitment to work toward solutions of current problems and the prevention of new ones. (Belgrade Charter, 1976, p.2)

In addition, the **Charter** declared that EE was to:

- foster clear awareness of, and concern about, economic, social, political, and ecological interdependence in urban and rural areas;

- provide every person with opportunities to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the environment;

- create new patterns of behavior of individuals, groups, and society as a whole towards the environment. (United Nations Scientific, Educational, and Cultural Organization, 1978)

In 1976 the **UN Conference on Human Settlements (Habitat I)** (11) was held in Vancouver, B.C. While not directly seen as an “environmental conference” it did focus on a number of environmental issues of concern to urban populations and extended the concept that the human environment was not to be considered only as non-built, rural or wilderness, but also as the constructed or built environment. This is a departure from earlier efforts in conservation education and outdoor education which often focused educational efforts on natural places where human interventions were absent or minimal (Miles & Priest, 1990). In the U.S. in 1976 Congress continued to enact a series of environmental laws and policies including the **Federal Land Policy and Management Act**, the **National Forest Management Act**, the **Resource Conservation and Recovery Act**, and the **Fishery Conservation Act** (Miller, 1990).

In 1977, in Tbilisi, Georgia (U.S.S.R.) the UNESCO-UNEP International Environmental Education Program extended the work done at Belgrade in 1975 at the Intergovernmental Conference on EE (12). This meeting developed an Action Plan for International EE which included a statement of twelve principles for environmental education:

Environmental education should—

- consider the environment in its totality—natural, built, technological and social (economic, political, cultural-historical, moral, aesthetic);
- Be a continuous, lifelong process, beginning at the preschool level and continuing through all formal and non-formal stages;
- Be interdisciplinary in its approach, drawing on the specific content of each discipline in making possible a holistic and balanced perspective;
- Examine major environmental issues from local, national, regional, and international points of view so that students receive insights into environmental conditions in other geographic areas;
- Focus on current and potential environmental situations, while taking into account the historical perspective;
- Promote the value and necessity of local, national, and international cooperation in the prevention and solution of environmental problems;

- Explicitly consider environmental aspects in plans for development and growth;
- Enable learners to have a role in planning their learning experiences and provide an opportunity for making decisions and accepting their consequences;
- Relate environmental sensitivity, knowledge, problem solving skills and values clarification to every age, but with special emphasis on environmental sensitivity to the learner's own community in early years;
- Help learners discover the symptoms and real causes to environmental problems;
- Emphasize the complexity of environmental problems and thus the need to develop critical thinking and problem solving skills;
- Utilize diverse learning environments and a broad array of educational approaches to teaching/learning about and from the environment with due stress on practical activities and first hand experience. ((United Nations Educational, Scientific and Cultural Organization, 1978)

Taken together the Belgrade Charter and the Principles from the Tbilisi Conference influenced the development of environmental education programs and policies for the next two decades, so much so that one Canadian analyst (Projet de Société, 1995) reviewing the contents of Chapter 36 (Environmental Education) of **Agenda 21**, the implementation plan for environmental action adopted at the **Second United Nations Conference on the Human Environment**, in Rio, 1992 noted that it was strange that the **Agenda** still based its statements concerning education on the Tbilisi Principles produced 15 years previously.

In 1977 the Science Council of Canada released **Canada as a Conservor Society (13)** . The report was the result of a four year study of the status of the Canadian environment. While Canada has no equivalent to the Council on Environmental Quality in the U.S., Canada as a Conservor Society gave the Canadian public, policy makers and politicians a current environment status report. In this period Parliament also passed a number of environmental laws and policies, including a **National Parks Strategy** in 1979.

Environmental policy proposals and reports were by no means only generated by national governments or the United Nations and its various agencies. In 1980, the International

Union for the Conservation of Nature (IUCN) released a major policy proposal entitled **The World Conservation Strategy** (14). While the **Strategy** had few direct results it heralded a decade of attempts to create a global approach to the environment in recognition of the fact that national boundaries and even continental limits offer no barriers to the movement of pollutants. Additionally, the world's fish stocks were coming under increasing pressure as large national fleets roamed further afield in search of catches, often fishing just outside (and even inside) the declared territorial limits of other countries. Problems such as acid rain, desertification, deforestation, loss of biological diversity and the management of international river systems demanded new levels of international cooperation while environmental conflicts were seen as possible threats to peace.

Also in 1980 in the U.S. **The Global 2000 Report to the President** (Hileman, 1983) (15) (a Report by the Council on Environmental Quality) analyzed the results of a three year, interagency study of projected changes in world population, environment, and resources through the end of the century, based on a continuation of current trends and practices. It has been described by McNeil (1983) as:

..... the first attempt by a government to examine in an orderly and comprehensive way the future (possible futures) of our planet and its inhabitants....Evidence from other sources also indicates that while we cannot yet model such complex systems very well, and we cannot predict in detail many potential problems, the interlocking nature of resources loss and environmental damage together suggest an increasingly difficult period ahead. (McNeil, 1983, p.43)

The Report was commissioned under the administration of President Carter and presented to a Republican administration under President Reagan. It summarized its findings in a rather gloomy statement:

If present trends continue, the world at 2000 will be more crowded, more polluted, less stable ecologically, and more vulnerable to disruption than the world we live in now. Serious stresses involving population, resources, and environment are clearly visible ahead. Despite greater material output, the world's people will be poorer in many ways than they are today.

For hundreds of millions of the desperately poor, the outlook for food and other necessities of life will be no better. For many, it will be worse. Barring revolutionary advances in technology, life for most people on earth will be more precarious in 2000 than it is now — unless the nations of the world act decisively to alter current trends. (McNeil, 1983, p.53)

The total report was a comprehensive three-volume publication that was been translated into many languages and sold half a million copies, although it met with little favor among members of the Reagan Cabinet and Congress:

The basic conflict about the Report seems to be between those who believe the earth has nearly unlimited resources to support a continually expanding number of people, and those who think the resources are limited and that we have almost exhausted the planet's capacity to support life in a satisfactory way. Recently some of the world's leaders have expressed deep concern about the global predicament. President Daniel Arap Moi of Kenya, in opening the Nairobi Conference of the United Nations Environment Programme, said, 'The issue before us today— is not that of human well-being, but of human survival. Through thoughtless projects of development and over-exploitation, worsened by consequences of mass poverty and infinite malpractices, havoc has been spread across the whole spectrum of the natural environment. There is no doubt whatsoever that continuation of the current trends will lead to total collapse. Those trends must be halted; and where possible reversed. (McNeil, 1983, p.60)

The **Global 2000** report may be considered to announce the start of a world wide examination of the status of human-environment interactions in the context of a global view of the biosphere and an emerging world economy. This trend was continued in a number of conferences and meetings organized by the OECD during the early '80's. The theme which was developing was that environmental concerns were inseparable from economics. Although this should not have been surprising, given the common root of both ecology and economics , it was a radical notion at the time. In 1983 Resolution 38/161 of the UN General Assembly called for the creation of a **World Commission on Environment and Development (WCED)** (16). The resolution also called upon the Secretary-General to appoint the Chairman and Vice-Chairman of the Commission and in turn directed them to jointly appoint the remaining members, at least half of whom were to be selected from the developing world. The Secretary General appointed Mrs. Gro Harlem Brundtland of Norway, then leader of the Norwegian Labor Party, as Chairman and Dr. Mansour Khalid, the former Minister of Foreign Affairs from Sudan, as Vice-Chairman. They appointed the remaining members of the Commission. The Commission, which came to be known by the name of its chair, began work in 1984. It functioned as an independent body with its members serving the Commission in their individual capacities, not as representatives of their governments. It was thus been able to address any issues, solicit any advice, and to formulate and present any proposals and recommendations that it considered pertinent and relevant (World Commission on Environment and Development, 1987a). In 1987 the Commission presented its report, entitled **Our Common Future** to the 42nd Session of the

UN General Assembly. The major concept advanced by the Commission was that of sustainable development. Sustainable development is a theory concerning how human activities should be arranged in order to permit economic growth and development while conserving and even enhancing environmental quality. The Commission defined sustainable development as consisting of new paths to economic and social progress that “meet the needs of the present without compromising the ability of future generations to meet their own needs” (MacNeill, 1989, p.157).

Annex 1 of the Report of the WCED expands the concept of sustainability in terms of a set of general principles of international law. It is to be remembered that the WCED reported to the General Assembly of the UN, an organization which often seeks to formulate policies as international charters to which member states are asked to subscribe. Clearly, the principles as written here were stated in a form which presupposed a charter for sustainable development.

ANNEX 1.

I. General Principles, Rights, and Responsibilities.

Fundamental Human Right

1. All human beings have the fundamental right to an environment adequate for their health and well-being.

Inter-Generational Equity

2. States shall conserve and use the environment and natural resources for the benefit of present and future generations.

Conservation and Sustainable Use

3. States shall maintain ecosystems and ecological processes essential for the functioning of the biosphere, shall preserve biological diversity, and shall observe the principle of optimum sustainable yield in the use of living natural resources and ecosystems. (World Commission on Environment and Development, 1987b, **Annex 1**)

The other articles in **Annex 1** include principles concerning environmentally damaging activities which have transboundary impacts and the responsibilities of states to compensate others for damage resulting from transboundary impacts. Additionally, the Annex articulates the

concept that more developed states have a responsibility to assist lesser developed states in matters concerning sustainable development and environmental protection.

Ruckelshaus (1989) describes the concept of sustainable development as:

...the nascent doctrine that economic growth and development must take place, and be maintained over time, within the limits set by ecology in the broadest sense—by the interrelations of human beings and their works, the biosphere and the physical and chemical laws that govern it. The doctrine of sustainability holds too that the spread of a reasonable level of prosperity and security to the less developed nations is essential to protecting ecological balance and hence essential to the continued prosperity of the wealthy nations. It follows that environmental protection and economic development are complementary rather than antagonistic processes (p.167)

MacNeill, who was a member of the Commission and a principal architect of the **Our Common Future** report lists the conditions which will have to be met in order to achieve the conditions of sustainability as:

- changes in societal values and goals;
- changes in incentives;
- changes in the dominant processes of decision making to merge environment and economic considerations;
- reduction in rates of population growth;

- renewal or even increase in national and community basic stocks of ecological capital;

- a significant and rapid reduction in the energy and raw material content of every unit of production;
- accounting systems need to consider the environmental costs of production.

He concludes stating:

Countries must begin to treat the integrity of the environment and the sustainability of development as a foreign policy issue of paramount importance...A foreign policy for environment and development could serve to improve overall effectiveness, coordination and cooperation with regard to rapidly evolving developments concerning the management of the commons—the oceans, the atmosphere, Antarctica and outer space. (MacNeill, 1989, p.165)

The members of the Brundtland Commission considered their vision of a sustainable economy to be fairly radical. They believed that their proposals went to the root of many contemporary environmental problems in a way that band-aid, one issue at one place and time approaches did not, necessary though immediate response to acute environmental problems might be. By linking economics and the environment the Commission made a political issue of the ecological and social destructiveness of current concepts of and approaches to development. The attainment of sustainability was seen as a matter of broader participation in decision-making, new forms of multilateral cooperation, the extension and sharing of new technologies, increased international investment, expanded roles for transnational corporations, the removal of artificial trade barriers, and expanded global trade. The concept, or theory of sustainability (a term which has supplanted “sustainable development” in much modern writing) has defined the cultural conversation concerning human-environment relationships in the period since 1987. Virtually every environmental conference, policy proposal, statute, and curriculum has been influenced by the idea. Businesses, industries, and government departments in most nations include the term in their environmental policy statements. Environmental education has also been seen by the U.N. and a number of states as an instrument to promote sustainability, a trend which is discussed in Chapter 4.

While sustainable development or sustainability has become an environmental catch phrase the real value of the concept may be as a focus for a larger discussion of the current status of human-environment interactions and of possible future conditions given the continuation of certain trends including reasonable projections of population, food production, energy use patterns, and resource use in general. Clearly, the members of the Brundtland Commission, like the authors of the **Global 2000** report which preceded it in the U.S., did not consider present conditions to be sustainable. To change the direction in which humanity seems to be heading, whether according to the ideas of sustainability or some other set of prescriptions will be a major undertaking. In her Foreword to **Our Common Future** (World Commission on Environment and Development, 1987), Brundtland warned:

Unless we are able to translate our words into language that can reach the minds and hearts of people young and old, we shall not be able to undertake the extensive social changes needed to correct the course of development. (World Commission on Environment & Development, 1987, Foreword)

Ruckelshaus (1989) is also clearly aware of the challenge:

Can we move nations and people in the direction of sustainability? Such a move would be a modification of society comparable to only two other changes: the agricultural revolution of the late Neolithic and the Industrial Revolution of the last two centuries. Those revolutions were gradual, spontaneous, and largely unconscious. This one will have to be a fully conscious operation, guided by the best foresight that science can provide—foresight pushed to its limit. If we actually do it the undertaking will be absolutely unique in humanity's stay on the earth. (Ruckelshaus, 1989, p.167)

He continues by articulating three concepts which must be understood if sustainable development is to be attained. First, we will have to recognize that the human species is part of nature and draws sustenance from a finite natural world. This means that the continuance of humankind depends on abstaining from activities which destroy the natural systems that regenerate the world. Second, we must understand that economic activity should account for the environmental costs of production. At present many economic models and systems of accountancy discount important environmental assets, ignore or encourage their degradation or even treat them as if they were valueless or free. Apparent wealth created in the present is actually stolen from our descendants. Third, we must appreciate that the maintenance of a livable global environment depends on the sustainable development of the entire human family. There is no path to sustainability which can encompass the wealthy few at the expense of a much poorer majority. According to Ruckelshaus people are unlikely to develop these concepts and act on them simply because the arguments for change are good, or because the alternatives are unpleasant. He claims that most people and organizations change when it is in their interest to change. To change interests three things must happen: leaders must articulate values which are consistent with sustainability; second, motivations must be established to support those values; third, institutions must be developed to apply the motivations. In Ruckelshaus' view the first task is fairly simple to achieve, the second is much harder, and third the most difficult (Ruckelshaus). Although it may be implied in parts of all three, he does not explicitly mention education. The attitudes of the proponents of sustainability toward education will be examined in Chapter 4, below.

As significant as the work of the **World Commission on Environment and Economy** was during the 80's it was not the only influence on environmentalism or environmental education. During the decades from 1960 the international scientific community had launched a major effort to understand the workings of the biogeosphere. Odum, 1959, remarks:

...Until comparatively recently, ecologists were content to describe how nature "looks" (sometimes by means of fantastic terms!) and to speculate on what she

may have looked like in the past or might look like in the future. Now, an equal emphasis is being placed on what nature “does,” and rightly so, because the changing face of nature can never be understood unless her metabolism is also studied! This change in approach brings the small organisms into true perspective with the large and encourages the use of experimental methods to supplement the analytical. It is evident that so long as a purely descriptive viewpoint is maintained there is very little in common between such structurally diverse organisms as spermatophytes, vertebrates and bacteria. In real life, however, all these are intimately linked functionally in ecological systems, according to well defined laws. Thus, the only kind of general ecology is that which I call a “functional ecology,” and this kind is of the greatest interest to all students of the subject, regardless of present or future specializations. Truly general or basic courses in ecology have often not been available in our largest universities because the subject is fragmented by departmental lines, which traditionally are drawn along morphological or taxonomic rather than physiological lines.... (Odum, 1959, p.ix)

A number of international research efforts attempted both to approach ecology “functionally” and also to break down the barriers to communication and collaboration across the diverse disciplines involved in studying the Earth. One of the best known of these was the **International Biological Program (IBP)** (18), which was succeeded by the **International Geophysical and Biophysical Year** (Somerville, 1996). For the first time oceanographers, climatologists, soil scientists, geologists, botanists, zoologists, and geographers began to collaborate in order to understand relationships between soil microbes and air quality, forests and climate, ocean currents and the weather. Chemists and physicists entered into research projects with meteorologists and foresters. Moreover, the effort was stimulated by the growing availability of space satellite-based remote sensing data and powerful new data processing methods enabled by powerful computers. While interplanetary probes and the moon landings attracted great media attention, a much larger proportion of the space program’s resources were devoted to studying the Earth. Data collection which once required years of difficult field work could now be accomplished in a much shorter time with less effort (although field work is still an essential element of global change research) (Aspen Global Change Institute, 1992). Moreover, data gathering in remote places as over the deep oceans, tropical rain forests and polar regions became possible on a year round basis rather than being restricted to limited field seasons or intense short term surveys. The power of new computer technologies made it possible to analyze and interpret the large data sets which were collected and to construct simulations and models of climate, (known as GCM’s or Global Climate Models) deforestation, soil erosion, desertification, atmosphere-ocean interactions, ocean currents and temperatures, and urbanization. For the first time a picture of the Earth functioning as an entire system began to emerge (Schneider, 1997).

One of the early results of the international, multidisciplinary effort in Earth Sciences was the discovery of the phenomenon of ozone depletion in the upper atmosphere, especially in the South Polar region. In 1974 Molina and Rowland theorized that the popular cleaning solvents and foaming agents known as CFC's (chlorofluorocarbons) might release chlorine atoms in the stratosphere which could act as catalysts to destroy the Earth's thin layer of ozone molecules, a layer which both protects the surface of the Earth from the sun's damaging UV radiation, but which is also responsible for the thermal properties of the stratosphere as an insulator against the cold of space, part of the planet's natural, and essential Greenhouse Effect (Molina & Rowland, 1974; Council on Environmental Quality, 1995). Molina and Rowland estimated that if CFC emissions continued at the 1972 rate of 800 000 tons/year the amount of chlorine subsequently released could destroy about 20-40% of the Earth's ozone layer within 30 years. At this time, it is important to note, there was no evidence from field-based measurements to demonstrate that ozone was in fact being depleted in the stratosphere. The U.S. National Academy of Sciences validated their theory experimentally in 1976. On the basis of the NAS results the U.S. Federal government banned the use of CFC's as propellants in "non-essential" aerosols after December 15, 1978. But the move to limit CFC's in popular spray can applications still left large amounts of CFC's in use in other industries, and their use continued unabated in other countries. Moreover, related chlorine-containing compounds were also still in general use both in the U.S. and elsewhere. Nevertheless, it is significant that in this case regulators acted before there was a full understanding of the precise nature of the problem, or of whether it even existed under natural conditions. They took action as a precaution, on the basis that prevention is better than cure, a principle later to be known as the Precautionary Principle. However, the cautious approach was given justification when, in 1985, scientists published actual data showing the existence of a significant region of upper atmosphere ozone depletion above the South Pole, the so-called Ozone Hole (Somerville, 1996) (20). On the basis of this finding the United Nations negotiated the 1985 **Vienna Convention for the Protection of the Ozone Layer**. The Vienna Convention established the framework for later international agreements concerning the emission and production of ozone depleting substances and set up new international institutions to address the problem. In September, 1987 representatives of 24 countries signed the **Montreal Protocol** (21). The Protocol established a timetable for the reduction of CFC's in the industrialized countries between 1987 and 2000. The timetable was accelerated by later negotiations at London in 1990 and Copenhagen in 1992, with the phase out date for most CFC's being set at 1996 rather than 2000. Agreements were also extended to cover other ozone depleting substances like methyl bromide and carbon tetrachloride (used in fungicides and cleaning solvents). It is significant that a number of agreements concerning the reduction and elimination of ozone depleting substances have been attained through negotiations between industry consortia and

government regulators where representatives of industry have voluntarily agreed to limit and eliminate uses of these chemicals and to work together with research groups to find alternatives. Treaties like the **Montreal Protocol** are now widely regarded as examples of how concerted international effort can eliminate or reduce environmental threats. There is even evidence (Kempton, Boster, & Hartley, 1996) that the U.S. general public reasons about other environmental threats like greenhouse gas emissions using the ozone depletion case as a conceptual model. Unfortunately, the story of ozone depletion is not concluded. Because CFC's are no longer being produced by their former manufacturers and are banned in many developed nations, there is now an active, and growing international black market in the chemicals. Many poorer nations have not been able to afford the new technology needed to use alternatives to CFC's and blame the developed nations for creating the problem (and selling it to them) in the first place. To address the latter problem the Multilateral Ozone Fund was established in 1991 to assist developing countries in meeting the economic costs of replacing outmoded technologies based on ozone depleting chemicals. The fund has so-far financed over 1,800 projects in 106 developing countries at a cost of US \$565 million. The Fund is one of the most subscribed (by the developed nations) of all the UN's funds with more than 85% of contributions made regularly (The Chemistry of Atmospheric Policy, 1997). It is an excellent illustration of international cooperation and a specific example of the principle that the costs of sustainable development should be shared equitably between the developed and lesser developed nations (Ruckleshaus, 1989). With financial support through the fund the economic incentive to continue use CFC's may eventually be eliminated, thus destroying the black market in these materials. However, that may well depend on international economic conditions, conditions which can change rapidly as the recent Asian financial crisis has shown.

The ozone depletion case may be considered a striking practical example of the application of scientific research to the development of international treaties, policies, and regulations. The research program begun in the early 60's to develop a broad understanding of the entire biogeosphere as a functioning, dynamic, and evolving system is now commonly described under the term global change research. In 1989 the United Nations Environmental Program's (UNEP) Governing Council established eight areas of concentration which broadly reflect the agenda of global change research: climate change and atmospheric pollution, management of shared freshwater resources, deterioration of coastal areas and oceans, land degradation, biological impoverishment, hazardous wastes and toxic chemicals, and degradation of human health conditions and the quality of life (Teaching Global Change Through Environmental Education, 1993). The term global change research, while typically linked to the issue of global climate change, or less aptly to global warming, is in fact much more inclusive. Schneider (1997) outlines the

major Earth systems science questions (another, and perhaps more accurate term for global change research):

1. How long did it take for the climate and life on Earth to evolve this far?
2. How does the Earth work as a coupled set of subsystems that includes living and nonliving parts?
3. How are people disturbing the Earth system?
4. What have we learned from the workings of the natural system that can help us forecast how human disturbances might affect it?
5. What are some of the tradeoffs between environmental protection and economic development, and how can both sets of these seemingly conflicting interests be reconciled? (Schneider, p.xiii)

The last question falls directly within the circle of the sustainability discussion and injects a clearly interdisciplinary focus, beyond the scope of purely scientific disciplines.

In 1989 a Presidential Initiative in the FY90 budget established the **United States Global Change Research Program (USGCRP)** (22) as a high-priority research effort, designed to:

Address key uncertainties about changes in the Earth system both
natural and human-induced
Monitor, understand, and predict global change
Provide a sound scientific basis for national and international
decision making on global change issues.

Congress codified the USGCRP in the **Global Change Research Act of 1990** (23) in order to provide for:

...development and coordination of a comprehensive and integrated United States research program which will assist the Nation and the world to understand, assess, predict, and respond to human-induced and natural processes of global change.

...increasing the overall effectiveness and productivity of Federal global change research efforts. (Subcommittee on Global Change Research, 1997)

The Global Change Research Act defines global change as:

... changes in the global environment (including alterations in climate, land productivity, oceans or other water resources, atmospheric chemistry, and ecological systems) that may alter the capacity of the Earth to sustain life. (Global Change Research Act of 1990, Subcommittee on Global Change Research, 1997)

The Introduction to the Act (Findings) states:

§ 2931. Findings and purpose

.....(1) Industrial, agricultural, and other human activities, coupled with an expanding world population, are contributing to processes of global change that may significantly alter the Earth habitat within a few human generations.

(2) Such human-induced changes, in conjunction with natural fluctuations, may lead to significant global warming and thus alter world climate patterns and increase global sea levels. Over the next century, these consequences could adversely affect world agricultural and marine production, coastal habitability, biological diversity, human health, and global economic and social well-being.

(3) The release of chlorofluorocarbons and other stratospheric ozone-depleting substances is rapidly reducing the ability of the atmosphere to screen out harmful ultraviolet radiation, which could adversely affect human health and ecological systems.

(4) Development of effective policies to abate, mitigate, and cope with global change will rely on greatly improved scientific understanding of global environmental processes and on our ability to distinguish human-induced from natural global change.

(5) New developments in interdisciplinary Earth sciences, global observing systems, and computing technology make possible significant advances in the scientific understanding and prediction of these global changes and their effects.

(6) Although significant Federal global change research efforts are underway, an effective Federal research program will require efficient interagency coordination, and coordination with the research activities of State, private, and

international entities. (Global Change Research Act of 1990)

The Act continues, describing its purpose as:

.... to provide for development and coordination of a comprehensive and integrated United States research program which will assist the Nation and the world to understand, assess, predict, and respond to human-induced and natural processes of global change. (Global Change Research Act)

It is noteworthy that the Act does not suggest that all global change is induced by human activities. It does imply that whatever the genesis of a given global change or set of them, it will be necessary to understand the change, assess its consequences, and plan appropriate responses.

In 1990 UNESCO described six steps which were required at the national level to develop EE Strategies. They included the development of a “national policy on environmental education, preparation of short- and long term plans for realizing the strategy, formulation of specific programs to implement the strategy, and the development of a “Management Information System” to oversee and ensure effective implementation, evaluation, and improvement of the EE strategy and programs” (Planning Environmental Education at the National Level, 1990). While it was likely not directly influenced by the UNESCO proposals, the U.S. enacted the **National Environmental Education Act of 1990 [NEEA] (24) (Public Law 101-619) (NEEA)** supplanting the **Environmental Education Act of 1970**. The new Act placed responsibility for environmental education in the Environmental Protection Agency rather than the Department of Education, which had administered the old EEA. The **Findings** of the NEEA are quite similar in some ways to those cited above for the **Global Change Research Act of 1990**, also passed in 1990:

The Congress finds that—

- (1) Threats to human health and environmental quality are increasingly complex, involving a wide range of conventional and toxic contaminants in the air and water and on the land.
- (2) There is growing evidence of international environmental problems, such as global warming, ocean pollution, and declines in species diversity, and that these problems pose serious threats to human health and the environment on a global scale.

(3) Environmental problems represent as significant a threat to the quality of life and the economic vitality of urban areas as they do the natural balance of rural areas.

(4) Effective response to complex environmental problems requires understanding of the natural and built environment, awareness of environmental problems and their origins (including those in urban areas), and the skills to solve these problems.

(5) Development of effective solutions to environmental problems and effective implementation of environmental programs requires a well educated and trained, professional work force.

(6) Current Federal efforts to inform and educate the public concerning the natural and built environment and environmental problems are not adequate.

(7) Existing Federal support for development and training of professionals in environmental fields is not sufficient.

(8) The Federal Government, acting through the Environmental Protection Agency, should work with local education institutions, State education agencies, not-for-profit educational and environmental organizations, noncommercial educational broadcasting entities, and private sector interests to support development of curricula, special projects, and other activities, to increase understanding of the natural and built environment and to improve awareness of environmental problems.

(9) The Federal Government, acting through the coordinated efforts of its agencies and with the leadership of the Environmental Protection Agency, should work with local education institutions, State education agencies, not-for-profit educational and environmental organizations, noncommercial educational broadcasting entities, and private sector interests to develop programs to provide increased emphasis and financial resources for the purpose of attracting students into environmental engineering and assisting them in pursuing the programs to complete the advanced technical education required to provide effective problem solving capabilities for complex environmental issues.

(10) Federal natural resource agencies such as the United States Forest Service have a wide range of environmental expertise and a long history of cooperation with educational institutions and technology transfer that can assist in furthering the purposes of the Act. (National Environmental Education Act of 1990)

The Act makes a clear statement of national policy in regard to environmental education:

(b)... It is the policy of the United States to establish and support a program of education on the environment, for students and personnel working with students, through activities in schools, institutions of higher education, and related educational activities, and to encourage post secondary students to pursue careers related to the environment. (NEEA, 1990)

The Act instructs the Director of the Environmental Protection Agency (EPA) to establish an Office of Environmental Education within the Agency. The Act also establishes an Environmental Education and Training Program, a system of Environmental Education Grants, Fellowships and Internships for students and teachers, and a national award scheme, the Environmental Education Awards to be given for outstanding contributions to environmental education by individuals and organizations. The major awards are named after Theodore Roosevelt, Henry David Thoreau, Rachel Carson, and Gifford Pinchot. The Act also establishes an Environmental Education Advisory Council and Task Force. Among other duties the Council will nominate the recipients of the Environmental Awards, and advise the EPA on matters related to the activities, functions, and policies conducted under the Act. The Task Force will include representatives from other government departments including Education, Interior, Agriculture, the National Oceanic and Atmospheric Administration, the Tennessee Valley Authority, the Council on Environmental Quality, and the National Science Foundation. Every two years the Advisory Council is expected to issue a report on the status of EE in the nation. Finally, the Act establishes a National Environmental Education and Training Foundation as a charitable, non-profit corporation to support and promote environmental education and training, both in the U.S. and internationally, with specific mention in the Act of interactions with Canada and Mexico. The **National Environmental Education Act** may be viewed as a very comprehensive national policy initiative in support of environmental education and training. Noting the highly practical tone of the **National Environmental Education Act of 1990**, Disinger (1993) claims: "The 1990 ...Act is a practical statement of educational purpose structured for implementation in the 1990's under the leadership of the United States Environmental Protection Agency" (p. 24).

Certainly the emphasis given to preparation for careers in fields such as "environmental engineering" would appear to substantiate this view, although the **Findings** takes a very broad view of the nature of current environmental problems and thus of the potential scope of environmental education. It is certainly the case that Congress viewed environmental education as a means of addressing environmental problems, not as a means to broader purposes associated with the concept of education *per se*. The issue of environmental education as an instrument of

policy will be addressed in Section III of this Chapter while the question of environmental action as an element of environmental education is a major focus and will be revisited throughout the thesis. An omission in the NEEA is any definition of environmental education (although environmental engineering is defined). The Act simply defers to existing definitions in the policies of the various states and agencies which will now work under the Act's umbrella. In the absence of a definition in the Act the views of its framers regarding the nature of environmental education can only be inferred from its general preamble and policy directions.

In Canada, during the period from the release of the Brundtland Report (World Commission on Environment and Development, 1987a) until the early 90's there were a number of environmental initiatives. As mentioned above, Canada hosted the meetings which led to the **Montreal Protocol** in 1987. In 1986 Environment Canada produced the nation's first **State of the Environment Report** (25). This was followed by a second in 1991 (Government of Canada, 1991) (26). 1988 saw passage of the **Canadian Environmental Protection Act (CEPA)** (Resource Renewal Institute, 1998) by Parliament (27). CEPA is the most important Canadian environmental statute, covering human and environmental health as it relates to atmospheric, aquatic, and terrestrial concerns. Its intent is to address pollution problems at the source, before they occur, by applying such principles as pollution prevention, the ecosystem approach, biodiversity, the precautionary principle, and user/producer responsibility. The Act consolidated five major laws administered by Environment Canada—those dealing with contaminants, water, air, ocean dumping, and the Department of the Environment. Also in 1988 the **Toronto Conference on the Changing Atmosphere** (28) fostered a series of wide ranging discussions on the possible impacts of human activities on the atmosphere, including Greenhouse gas emissions as well as ozone depleting substances. In 1990 the Federal government released Canada's **Green Plan for a Healthy Environment**. The Green Plan's stated objective was "to secure for current and future generations a safe and healthy environment, and a sound and prosperous economy." The plan had a major impact on environmental policy by combining a comprehensive approach, a clearly defined set of interest areas, and substantial government funding. It originally allotted an additional C\$ 3 billion to environmental spending over a five-year period, and contained more than 100 new policies, programs, and standards. The plan listed seven policy categories, including: clean water, air, and land; renewable resources; unique spaces and species; global environmental security (which included global warming and ozone depletion as well as transboundary pollution); environmentally responsible decision-making (which included education); emergency preparedness (for environmental accidents and disasters); the Arctic; and Federal environmental stewardship which included the government's own environmental auditing and environmental impact assessments (Resource Renewal Institute, 1998).

Although the plan was never fully implemented it succeeded in launching more than 80 initiatives including an Arctic Environmental Strategy, and the creation of 47 new protected areas including five new National Parks and three Marine Reserves (Resource Renewal Institute, 1998). The Plan sparked a nation-wide discussion of ways to reduce or eliminate the effects of some human activities on the environment, a discussion stimulated further by the establishment in that year by the Prime Minister of a **National Round Table on the Environment and Economy**, (29) a measure quickly followed by the establishment of complementary provincial Round Tables. In the 1991 the National Round Table created **Learning for a Sustainable Future** (30), a nation wide initiative in sustainable development education. The Program Board of LSF includes representatives from the Council of Ministers of Education, the Council of Ministers of the Environment, Federal and provincial governments, industry, and N.G.O.'s. The program has 5 phases:

1. Fact-finding and consultation;
2. Facilitating the cooperative development of provincial and territorial programs for sustainable development education;
3. supporting program strategies in:
 - curriculum design
 - pre and in-service teacher education
 - production and distribution of relevant materials
4. identifying models of SD education and coordinating the dissemination of innovative strategies, programs, activities, and materials;
5. establishing and implementing an on-going evaluative process. (Learning for a Sustainable Future, 1993).

Although **Our Common Future** generated many initiatives among member states of the UN and on the part of UN agencies, the General Assembly took the position that there should be an international conference on the human environment modeled on the Stockholm Conference of 1972 in order to permit member states to engage in a wide-ranging discussion of the issues of sustainable development and provide an opportunity for participation by non-governmental environment organizations from around the world. Thus, in 1990 the UN General Assembly made the decision to hold the United Nations Conference on Environment and Development (UNCED), in Rio in 1992 (31) on the twentieth anniversary of the first Earth Summit. In doing so the Assembly declared that one of the goals of UNCED should be "to promote environmental education, especially of the younger generation, as well as other measures to increase aware-

ness of the value of the environment” (United Nations cooperation and coordination in environmental education, 1990, p.2). In the same year UNESCO also issued a description of competencies for teachers of environmental education (Environmentally educated teachers--the priority of priorities, 1990). The list included Ecological Foundations, Conceptual Awareness, Investigation and Evaluation, and Environmental Action Skills (pp. 2-3). Of particular note for the purposes of this thesis is its description of the Environmental Action Skill category:

The effective environmentally educated teacher should be competent to take positive environmental action for the purpose of achieving and maintaining a dynamic equilibrium between the quality of life and the quality of the environment (if indeed one can be separated from the other) and develop similar competencies in learners to take individual or group action when appropriate, such as persuasion, consumerism, political action, legal action, ecomanagement, or combinations of these categories of action. (Environmentally educated teachers, 1990, p.3)

By 1991 planning for UNCED (or the Rio Earth Summit as it also came to be known) was well advanced. It is typical of the UN to produce a large number of reports and working documents prior to major world conferences. UNCED was no exception to the pattern. In 1991 the Preparatory Committee for the UNCED, meeting in Geneva, issued a report on Cross Sectoral Issues, with a focus on **Environment and Development Education and Public Awareness** (UN General Assembly, 1991). The conjunction of “environment” and “development” and “education” is notable. The report repeats the statement (above) about promoting environmental education and continues to state that environmental problems arise from ignorance or lack of awareness and are avoidable.

All individuals must become aware of their impact, have access to accurate information, the skills and tools to make environmentally sound decisions and an environmental ethic to guide their actions. In the future this environmental literacy must not only be a need for the individual but a necessity for society as a whole. Global environmental literacy and competence are critical . (United Nations General Assembly, 1991: p.5)

This is one of the first major policy statements to link literacy and environmental education under the common term, environmental literacy. In the years to follow a number of UN documents continued this emphasis by linking environmental education to general education and especially to the UN’s own campaigns to reduce or eliminate illiteracy.

An ecomanagement, technological orientation to sustainability is also evident in the report:

The challenge of successful **planetary management** and development is enormous as it entails both collaboratively developing truly sustainable and culturally appropriate models and developing a politically acceptable strategy for implementing the model in every day life....Accurate information, gathered globally and used by environmentally competent **decision-makers** at all levels will be essential to devise the policies....” (p.5)....An environmentally literate society would allow **policy makers** to make longer term appropriate decisions (p.6)...Environmental and development education is **instrumental** in seeking and achieving sustainable development . (United Nations General Assembly, 1991, p.6, emphases mine)

The statement appears to suggest that it will be easier to persuade a literate population of the need to support appropriate environmental policies, policies formulated by decision makers. In Section III of this chapter I further examine the implications of this approach to sustainable development and discuss the views of some of its major critics.

As the Rio Earth Summit (United Nations Conference on Environment and Development) took shape two important documents formed the centerpiece of its work. The first was the **Rio Declaration** and the second was **Agenda 21** (UN Conference on Environment and Development, 1992b) (31). The **Rio Declaration** (UNCED The Earth Summit, 1992) defined a set of 27 Principles for “Working towards international agreements which respect the interests of all and protect the integrity of the global environmental and developmental system,....”. **Agenda 21** described in detail the mechanisms by which the Principles of the **Rio Declaration** might be attained. The preamble to **Agenda 21** offers a clear perspective of the environmental situation as viewed by the conference organizers.

Chapter 1

PREAMBLE*

1.1. Humanity stands at a defining moment in history. We are confronted with a perpetuation of disparities between and within nations, a worsening of poverty, hunger, ill health and illiteracy, and the continuing deterioration of the ecosystems on which we depend for our well-being. However, integration of environment and development concerns and greater attention to them will lead to the fulfillment of basic needs, improved living standards for all, better protected and managed ecosystems and a safer, more prosperous future. No nation can

achieve this on its own; but together we can - in a global partnership for sustainable development. (United Nations Conference on Environment and Development, 1992, **Agenda 21**, Preamble)

Other sections of the Preamble note that in order to attain the principles of the Rio Declaration and make **Agenda 21** possible it will be necessary for individual nation states to bring the concepts to life in their own contexts, through their own political processes. But the preamble also notes this will not be possible without a substantial amount of support from the developed world to the lesser developed nations, a continuation of the idea of equity outlined above by Ruckelshaus.

The opening lines of **Agenda 21** present a clear case: humanity faces increasing problems and greater risks if it continues down the current path. There must be a reconciliation of environmental and economic interests and values. Sustainable development is the correct approach to this, but international cooperation is required to achieve it because sustainability cannot be attained by nations acting in isolation.

Given the weight of these claims it would be reasonable to expect that **Agenda 21** would also contain major proposals concerning the need for environmental education and the methods to attain it. In fact, while Chapter 36 of the **Agenda** does address education, it is a strangely weak offering. In fact, some commentators have characterized the whole sustainability movement as lacking in attention to environmental education (Orr, 1992) while others suggest that the advocates of sustainability regard environmental education simply as indoctrination to the concept (doctrine to apply Ruckelshaus' term) of sustainability (Jickling, 1992a). The organizers of the Rio Summit believed that the importance of education was infused throughout the entire program of the conference. Chapter 36 of the **Agenda** states:

Education, raising of public awareness and training are linked to virtually all areas in Agenda 21, and even more closely to the ones on meeting basic needs, capacity-building, data and information, science, and the role of major groups. This chapter sets out broad proposals, while specific suggestions related to sectoral issues are contained in other chapters. The Declaration and Recommendations of the Tbilisi Intergovernmental Conference on Environmental Education 1/ organized by UNESCO and UNEP and held in 1977, have provided the fundamental principles for the proposals in this document.

36.2. Programme areas described in the present chapter are:

- (a) Reorienting education towards sustainable development;
- (b) Increasing public awareness;
- (c) Promoting training.”

(United Nations Conference on Environment and Development, 1992, **Agenda 21**, Chapter 36 , Emphases mine)

In terms of “reorienting education toward sustainable development”, **Agenda 21** states:

36.3. Education, including formal education, public awareness and training should be recognized as a process by which human beings and societies can reach their fullest potential. Education is critical for **promoting** sustainable development and improving the capacity of the people to address environment and development issues. While basic education provides the underpinning for any environmental and development education, the latter needs to be incorporated as an essential part of learning. Both formal and non-formal education are indispensable to **changing people’s attitudes** so that they have the capacity to assess and address their sustainable development concerns. It is also critical for achieving environmental and ethical awareness, values and attitudes, skills and **behavior consistent with sustainable development** and for effective public participation in decision-making. To be effective, environment and development education should deal with the dynamics of both the physical/biological and socioeconomic environment and human (which may include spiritual)

development, should be integrated in all disciplines, and should employ formal and non-formal methods and effective means of communication. (United Nations Conference on Environment and Development, 1992, **Agenda 21**, Chapter 36, Emphases mine)

Chapter 36 continues, describing the objectives of EE:

36.4. Recognizing that countries, regional and international organizations will develop their own priorities and schedules for implementation in accordance with their needs, policies and programmes, the following objectives are proposed:

- (a) To endorse the recommendations arising from the World Conference on Education for All: Meeting Basic Learning Needs 2/ (Jomtien, Thailand, 5-9 March 1990) and to strive to ensure universal access to basic education, and to

achieve primary education for at least 80 per cent of girls and 80 per cent of boys of primary school age through formal schooling or non-formal education and to reduce the adult illiteracy rate to at least half of its 1990 level. Efforts should focus on reducing the high illiteracy levels and redressing the lack of basic education among women and should bring their literacy levels into line with those of men;

(b) To achieve environmental and development awareness in all sectors of society on a world-wide scale as soon as possible;

(c) To strive to achieve the accessibility of environmental and development education, linked to social education, from primary school age through adulthood to all groups of people;

(d) To promote integration of environment and development concepts, including demography, in all educational programmes, in particular the analysis of the causes of major environment and development issues in a local context, drawing on the best available scientific evidence and other appropriate sources of knowledge, and giving special emphasis to the further training of decision makers at all levels. (United Nations Conference on Environment and Development, 1992, **Agenda 21**, Chapter 36, Sect.4. a-d.)

It is clear from these statements that environmental education was seen in **Agenda 21** as part of a larger effort to improve literacy and basic education, and that it was also viewed as an essential instrument for the “promotion” of concepts of environment and development. It is notable that Chapter 36 makes direct reference to the principles of environmental education outlined at the Tbilisi Conference in 1977 even though they were developed ten years prior to the articulation of sustainable development by the WCED. Apparently those preparing Chapter 36 of the **Agenda** still held them to represent the best available description of environmental education.

By 1992, the U.S. Environmental Protection Agency (EPA) had established an **Environmental Education Division (EED)** (32) in compliance with the requirements of the NEEA of 1990. The primary mission of the EED is described as:

To advance and support national and international environmental education efforts to develop an environmentally conscious and responsible public, and to inspire in all individuals a sense of personal responsibility for the care of the environment. (U.S. EPA 1993, **EE—Outlook for the Future**, p.2)

In its 1993 Report, **EE—Outlook for the Future** (EPA, 1993), the Environmental Education Division offers some information from various surveys of the state of environmental education in the U.S. Citing a 1991 **Renew America** survey, **Outlook for the Future** lists the following statistics:

- 89% of incoming college students identified the environment as their top social concern;
- 90% of US high school students said they did not know enough about environmental issues;
- Only 17% of high school students said they learned anything about the environment in their classes;
- 84% of HS students said they would take action to improve the environment if they had more information about what to do.

The report continues, stating:

These findings make it clear that EE as it has been conducted thus far has not met its enormous challenge....To develop a responsible and environmentally aware citizenry, educators must not only understand environmental issues, but be able to communicate the necessity to reconcile advancing technology with the realities of global limits. (U.S. EPA 1993, p.2)

In response to the survey information, and in compliance with its mandate under the Act, the Environmental Education Division (EED) enunciated five goals to guide its operations:

1. Stimulate communication, innovation, and partnerships;
2. Educate and motivate youth to protect and preserve our environment;
3. Promote the pursuit of environmental careers;
4. Develop an environmentally conscious and responsible public;
5. Reach across international boundaries. (U.S. EPA, p.4)

Item 2 of the list has the most direct relationship to environmental education in the K-12 public school context. However, item 1, is broken into three strategies. Strategy Three is “To Provide Grants for Models of Excellence in Environmental Education” (U.S. EPA, 1993: p.5.

The strategy is to make use of the Grants program established under the **National Environmental Education Act of 1990** to fund models of excellence in environmental education. The projects funded are innovative grassroots-level programs and projects developed by schools, universities, state/local/tribal education agencies, and non-profit organizations (U.S. EPA, 1993:p.5). The 1993 report notes that the EED distributed more than 2.4 million dollars in grants in 1992 (in response to over 3,000 applications requesting more than 100 million dollars); in 1993 the amount awarded was increased to 2.7 million dollars. The Report notes that increasing the total amount available to the Grants program will be a high priority for the EED. Thus, by 1992 the **National Environmental Education Act of 1990** resulted in financial support directly to environmental education efforts at the local level in the U.S. It should, however, be noted that under the **Environmental Education Act of 1970**, which was administered through the Department of Education, school districts and other education agencies could apply for financial support under the terms of various education grant programs. In most cases however the programs were not specifically designated for environmental education. Whether the new National Environmental Education Act, administered through the EPA will ultimately result in more financial support to grass-roots EE programs remains to be seen. MacDonald (1996) claims that support for EE under the new program amounted to only .2% of the EPA's total 1992 budget.

In Canada in 1993 the educational initiative of the **National Round Table on Environment and Economy**, Learning for a Sustainable Future, published **Developing a Cooperative Framework for Sustainable Development Education** (1993). It states that:

Sustainable development is not a "quick-fix" for complex and interrelated environmental crises, it is a context for rethinking traditional assumptions about human interactions with the planet and with each other. It implies profound change in political, economic and social structures, policies, attitudes and behavior, and new areas of cooperation and partnership. Sustainable development is a global framework for cooperation within which each country can develop its own strategies for the 21st century. (**Developing a Cooperative Framework for Sustainable Development Education**, Learning for a Sustainable Future, p.3)

The document continues by describing its purposes:

This discussion document is an attempt to set out a context in which learning relevant to the challenge before educators can be viewed. It is in no way intended to impose a model for curriculum planning, only a perspective for reflection on the implications of education for a sustainable future and for

curriculum for attaining it. Within this perspective the integrity of all existing discipline areas is maintained....The context begins by projecting a vision of the knowledge, skills, and values which will be needed by future citizens living in a sustainable society. From this projection the context extrapolates some possible implications for today's curriculum....The skills and values needed by the future citizen suggest the methodology for today's classroom and indicates strategies for teaching new specific skills for interacting with the environment and cooperating with others for planning and action towards sustainability. (**Developing a Cooperative Framework**, p.6)

A list of capabilities needed by citizens in a future sustainable society follows:

What must future citizens know and what skills and what attitudes will they need to contribute to the development of a sustainable society and to live in harmony within it?

They must be able to....

- Recognize the realities of environmental stress which threatens the survival of the planet and the stability of the world community;
- Identify the interlocking forces which have caused the present environmental crisis, particularly the pressures of differing forms of economic development on societies;
- Identify the social, cultural, economic and political changes needed for solutions at international, national and local levels;
- Develop and implement cooperative strategies and practical methodologies to implement change at international, national and local levels;
- Effect a transformation in their interactions with the environment and with each other to ensure a sustainable future.” (**Developing a Cooperative Framework** p.7)

This report softens the position that sustainable development represents a clear blueprint for the transformation of economic and environmental activities. Instead, it treats the concept of sustainable development as a focus for discussion and framework for thinking about human-environment interactions. Even so, the abilities suggested as essential for the citizens of a sustainable society include “recognition of the realities of environmental stress”, and the ability to make the personal changes required to “ensure a sustainable future.” This language might be seen as incompatible with the concept of education (Jickling, 1992a, 1992b).

In the U.S. the federal government did not adopt the “Round Table” approach to discussion of the implications and possible implementation of **Agenda 21** and the **Rio Declaration** employed by Canada and many other countries as a follow-up to the UNCED Conference in Rio. Instead the President employed an Executive Order to create the **President’s Council on Sustainable Development (PCSD)** (33) in 1993. The Council is comprised of 25 members, including 5 cabinet secretaries, CEO’s of business, and Executive Director’s of Environmental NGO’s. The mandate of the Council is:

To develop policy recommendations to enhance the sustainability of our nation’s economic, environmental, and social future. (President’s Council for Sustainable Development, 1995)

In 1994 the **National Science and Technology Council**, in cooperation with the President’s Council for Sustainable Development (PCSD) convened a **National Forum on Partnerships Supporting Education About the Environment** (34). The forum was co-chaired by John H. Gibbons, Assistant to the President for Science and Technology, Madeline Kunin, Deputy Secretary of the U.S. Department of Education, Keith Wheeler, Executive Director of the Global Rivers Environmental Education Network (GREEN), and Ralph Ponce de Leon, Corporate V.P. of Motorola Inc. More than 100 distinguished American environmental educators were invited to attend. (They included both Bill Stapp and Harold Hungerford, whose works are subjects of this critique; Bill Stapp was profiled at the conference as an outstanding contributor to international environmental education.) Concurrently the PCSD convened a meeting of leaders from industry, government, and environmental, labor, and civil rights organizations to develop policy recommendations to ensure the sustainability of the nation’s economic, environmental, and social future (PCSD, 1995, Chapt.1, p.3.) **The National Forum** produced an account of its proceedings under the title, **Education for Sustainability: An Agenda for Action** (PCSD, 1995). The document was adopted by the Council’s Public Linkage Task Force’s Education Working Group as a policy framework for education for sustainability. The **Agenda for Action** defines education for sustainability as:

....a lifelong learning process that leads to an informed and involved citizenry having the creative problem-solving skills, scientific and social literacy, and commitment to engage in responsible individual and cooperative actions. These actions will help ensure an environmentally sound and economically prosperous future. (PCSD, 1995, p.1)

This emphasis is extended in the statement that, “...education is critical for promoting sustainable development” (p.2). However, the **Agenda** echoes the Canadian proposals in de-

clarifying that, "Sustainable development is therefore a process rather than a fixed goal." The **Agenda** also states that education for sustainability depends on six core themes. Collectively these themes outline a course of action to educate for sustainability. They are:

- lifelong learning
- interdisciplinary approaches
- systems thinking
- partnerships
- multicultural perspectives
- empowerment. (PCSD, 1995, p.3)

The principles are similar to the capabilities described as necessary for the future citizens of a sustainable society in the Canadian document cited above (*Learning for a Sustainable Future*, 1993.) The emphasis on lifelong learning, interdisciplinary approaches, and systems thinking is a recurrent element of many other descriptions of environmental education, extending back to at least the late 70's if not before (Hart, 1979). The themes of multiculturalism and partnerships are more recent, likely reflecting both **Agenda 21** from Rio and national priorities in the U.S., while empowerment is a popular term in contemporary education writing and has been proposed as an essential purpose of environmental education as well (Wals and van der Leij, 1997), although it often appears to be used in rather undefined ways.

The **Agenda** closes with some strong statements to the effect that education for sustainability is positioned to be a priority for the coming decade and that the overarching goal must be to infuse the concepts of sustainability into all learning, in all settings, formal and non-formal, on a lifelong basis. It repeats the oft-heard claim that education for sustainability (or environmental education) must entail developing citizens who understand the "interconnections among the environmental, economic, and social disciplines" (PCSD, 1995: **Agenda for Action**, p.77). However, perhaps the most interesting element of the **Agenda** report is a quotation from a speech made during the Forum by Noel Brown, Chairman of the North American Regional Office of the UN Environment Program. He asked:

..Can the United States and the American people, pioneer sustainable patterns of consumption and lifestyle,(and) can you educate for that? This is a challenge we

would like to put to you. (PCSD, 1995, p.77)

In the two years following the Forum the North American Association for Environmental Education established a committee to develop “national standards” for environmental education (North American Association for Environmental Education [NAAEE], 1995). The standards were released as a **Working Outline** in August, 1995. The document produced a mixed response, with a number of environmental educators expressing considerable concern over the centralization of control of EE, at least within the U.S., likely to result from the standards if they were to be used by various government agencies as criteria for funding environmental education curriculum development and program operations. The **Working Outline** states:

Environmental education is a lifelong process with roots firmly planted in the education of school-age children. Across the nation, however, the content and quality of the environmental education provided to students vary widely. This inconsistency is due, in part, to the fact that there are no agreed-upon standards for environmental education. The work of practitioners and theoreticians has created much common ground about what makes for good environmental education; but nowhere is this practical wisdom recorded in a way that provides focus and direction for the field.

The North American Association for Environmental Education’s Standards Project aims to provide students, parents, educators, and administrators a set of common guidelines for environmental education— an understanding of what students should know and be able to do. These standards will outline the core ingredients for quality environmental education, based on commonly accepted ideas about what an environmentally literate citizen should know and be able to do.

These are voluntary standards. They do not define a national curriculum nor do they prescribe how environmental education will be taught at the state and local level. Educators, community members, and parents will continue to develop locally appropriate curricula, using the standards as guidelines against which they can monitor the quality of their children’s education.

The North American Association for Environmental Education (NAAEE) is taking the lead in establishing standards to guide the development of coherent, comprehensive environmental education programs. (NAAEE, 1995, p.1. emphasis mine)

In spite of the disclaimer that the standards were not an attempt to define a national curriculum for EE in the U.S., it would be disingenuous for the Executive of a large, international organization like the NAAEE to claim that the publication of such standards would be likely to be ignored by the various government agencies and granting bodies which review proposals for environmental education. The document goes on to state that the Standard's Project will produce a set of standards that reflect "the field's best thinking about what makes for environmentally educated learners. It then continues referring to the influence of two documents which have been mentioned a number of times previously in this chronology: the Belgrade Charter (1975) and the Tbilisi Declaration (1978). The Outline even quotes directly from the "vision" of environmental education articulated in the **Belgrade Charter**, claiming it to be "widely accepted":

The goal of environmental education is to develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones. (From the **Belgrade Charter** as cited in NAAEE, 1995, p.2)

The draft then lists the objectives for EE formulated at Tbilisi in their entirety. Clearly these two conferences are very much alive and well in their continuing influence on the field of EE, at least in the U.S. The claim is made (NAAEE, 1995) that:

On the foundation of these visions and goals for environmental education, the field has evolved a **shared** view of the core concepts and skills necessary to an environmentally literate citizen. These **common** visions, goals, and understandings underpin the **current notion of environmental education**—and they inform these standards for learners. (p.3, Emphasis mine)

With this statement the authors of the standards document clearly make a claim that there is a widely shared consensus about the nature and purposes of EE. In Section III below I revisit this claim and examine some challenges to it. The document then lists and expands on the seven areas from which learner standards will be developed. It claims that these areas are "drawn from an extensive review of the literature on environmental education", although no references are provided other than for the Belgrade and Tbilisi statements and to work by Hungerford, in 1994, which is not otherwise identified. The seven areas proposed as organizing categories for standards development are:

1. Affective dimensions
2. Ecological knowledge
3. Sociopolitical knowledge
4. Understanding of environmental issues
5. Problem solving skills
6. Sense of personal responsibility
7. Knowledge of citizen action strategies. (NAAEE, 1995, p.3)

The Working Outline then breaks each category into a series of possible items for development of standards. for example, Category 7, Knowledge of Citizen Action Strategies, is broken into four topics:

Knowledge of strategies

Ability to formulate action plans

Skill in various modes of acting

Ability to work alone and with others. (NAAEE, 1995 p.9)

The authors of the document state that its purpose is to “prompt discussion and feedback” about some important questions:

Does the outline adequately reflect the core ingredients of quality environmental education?

With what level of detail should the standards specify essential knowledge and skills?

**What kind of link with standards from other disciplines would be helpful?
(NAAEE, 1995, p.3)**

The Working Outline must have produced the desired response because when the final version was issued in 1996, there were considerable changes, including the title, which had become: **Environmental education materials: Guidelines for excellence** (North American Association for Environmental Education, 1996) (35), replacing **National Standards** of the 1995 Outline. The Guidelines document is described as a “set of recommendations for developing and selecting environmental education materials. The purpose of the document is described as to help developers of instructional materials produce “high quality products” and to provide educators with a “tool to evaluate the wide array of available environmental education materials” NAAEE, 1996, p.1. The Guidelines for Excellence version still makes reference to both the Belgrade Charter and the Tbilisi Declaration and claims that the guidelines are “grounded in a common understanding of effective environmental education.” However, the original list of elements from the Tbilisi Declaration are now abridged to three broad objectives (NAAEE, 1996):

- To foster clear awareness of and concern about economic, social, political, and ecological interdependence in urban and rural areas;
- To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the environment;
- To create new patterns of behavior of individuals, groups, and society as a whole towards the environment. (NAAEE, 1996, p.1)

These three objectives, later termed “principles” are said to be “researched, critiqued, revisited and expanded” and to stand as a “strong foundation” for a shared view of concepts and skills that environmentally literate citizens need.

The Guidelines document makes the further statement (p.2) that “In an effort to assure that these Guidelines for Excellence do reflect a widely shared understanding of environmental education they were developed by a “writing team” comprised of environmental education professionals from a variety of backgrounds and organizational affiliations” (NAAEE, 1996, p.2.). Additionally, drafts were circulated to over 1000 practitioners and scholars in the field, eg. teachers, educational administrators, environmental scientists, and curriculum developers. Clearly, the “writing team” was interested in establishing the credibility of the document. In presentation, organization, and content the final **Guidelines** publication is very different from the 1995 version. The seven categories for standards development are now termed “key characteristics”; each characteristic is broken into Guidelines, which in turn are divided into “Indica-

tors” (things to look for in materials, etc.) Each indicator is usually accompanied by an illustrative example. The guidelines are said to offer “...a way of judging the relative merit of different materials, a standard to aim for in developing new materials, and a set of ideas about what a well-rounded EE curriculum might be like” (NAAEE, 1996, p.3). The claim is also made that “it is not reasonable to expect that all environmental education materials will follow all the guidelines....This shortcoming does not necessarily mean that the materials should not be used....The **Guidelines for excellence** can point out a weakness that instructors can compensate for in the way they use the materials” (NAAEE, 1996, p.3). The Key Characteristics are:

1. Fairness and Accuracy
2. Depth
3. Emphasis on Skills Building
4. Action Orientation
5. Instructional Soundness
6. Usability.

This is a different list, with quite different characteristics, from that proposed in the 1995 draft. The 1996 **Guidelines** document offers no indication of how or why the original list was revised or why certain categories were deleted. The examples which are used to illustrate “Excellence” in each category are drawn from a number of well known published EE programs, including **Project WILD**; **Food First Curriculum** ; **Project Learning Tree**; **Environmental Issues and Actions: Skill Development Modules**; and **Aquatic Project WILD**, (the above all listed in **Guidelines for Excellence**, NAAEE, 1996.) Clearly, the **Guidelines** are to be used as a Checklist by curriculum developers, materials designers, and presumably, although not explicitly mentioned, those reviewing proposals to funding agencies such as the Environmental Education Division of the EPA which provides grants for program and materials development. While the Characteristics are described in much more detail than were the Categories of the Working Outline of 1995, they are still far from the lists of behavioral objectives or learning outcomes favored in a number of recent curriculum documents in Canada and the U.S. However, at the time of writing the NAAEE was considering the development of a much more specific list of attributes in order to conform to the approaches taken in curricula such as Mathematics and Science. Some concerns were expressed regarding this approach at a meeting concerning Academic Planning in EE convened by the Association in Florida in March, 1998, and it remains to be seen how far the Association will venture down the path of ever greater specification. Certainly critics of environmental education curricula are active both from the scholarly community and from right of center political lobbies in the U.S. I will consider some of their criticisms in

Chapter 4. It is certain that the “standards debate” in the U.S. has not been resolved and because the membership of NAAEE includes many Canadian environmental educators it is certain to have some impact in Canada as well.

During the intense period of international policy activity which followed the release of the Brundtland Report and continued into the 90's, research on global change (or Earth systems science) also continued. The discovery of the ozone depleting capacities of CFC's by Molina and Rowland and the subsequent verification of CFC activity in the upper atmosphere during the 1970's and 80's were more or less coincidental. As Somerville (1996) notes, the scientists involved did not set out to discover either ozone depletion or the ozone hole. They were engaged in other research and the discoveries were the fruitful result of scientific curiosity, good research, and luck. But the CFC example generated greater official interest in atmospheric research with the result that there was more funding for studies and major government agencies such as NASA and NOAA in the U.S. directed more effort and resources to investigations of global climate. In 1990 the **Intergovernmental Panel on Climate Change (IPCC)** formed to facilitate discussion of climate change findings by scientists from around the world released its first major, comprehensive report (Houghton, et al, 1990). The report summarized a large amount of the climate change research to that date and addressed the issue of whether or not the Earth's climate was in fact warming and what might be the effects of doubling atmospheric carbon dioxide. (The scientific community has chosen to construct many of its Global Climate Models (GCM's) around the carbon dioxide doubling scenario because it seems likely that carbon dioxide levels in the Earth's atmosphere will reach double their preindustrial levels sometime in the 21st century. The models however, work as if carbon dioxide was doubled instantaneously—they are in a sense “thought experiments”, although highly sophisticated and quantitative ones (Somerville, 1996). Because of the recent great increase in available, low cost computer processing capacity it is possible to develop Earth System Models (ESM's) which can to some extent replicate transient conditions—the conditions which are actually happening on the Earth now as carbon dioxide gradually increases, along with various other greenhouse gases (Schneider, 1997). The 1990 IPCC report (Houghton, Jenkins, & Ephraums, 1990) presents an interesting table in which the authors rate different possible climate futures on the basis of the degree of certainty assigned to them by the majority of the scientific community. Thus, the statement that, “In a carbon dioxide doubling scenario the lower atmosphere and Earth's surface warm” is given a rating of five stars—very high agreement among scientists about the certainty of this occurrence. On the other hand, the statement that “precipitation changes little in subtropical arid areas” is given only two stars to indicate that there is far less agreement that this future scenario would in fact develop in a CO₂ doubled atmosphere. The extremely comprehen-

sive nature of the report, as well as the accessible, clear manner of its presentation resulted in a lot of attention being directed at it by politicians and policy makers, the media, and by critics, both within and outside the scientific community. The “Global Warming” controversy was launched.

It is not within the scope or intent of this thesis to review the nature of the global warming or greenhouse Earth debate; it is important to note that it is an interesting example of the interaction among science, technology, and societal issues and one which is likely to be of importance to environmental educators from now on. The debate has been intensified since the release of the **Second IPCC Assessment Report** in December 1995 (Houghton, Filho Meria, Callander, Harris, Kattenberg, & Maskell, 1996) (36). The Executive Summary of the Report contains the memorable phrase “the balance of evidence suggests that there is a discernible human influence on climate” (Schneider, 1997, p.88). The single word “discernible” was the product of hours of debate among the scientists on the panel.

The entire global climate change debate is an excellent illustration of the current state of scientific literacy among the public at large, members of the media, and policy makers and politicians. There are a number of important epistemological issues here, as well as interesting and important educational challenges. The situation is complicated because it is very difficult for people outside the research community to deal with some of the inherent uncertainty in scientific research, especially when they want unambiguous answers and firm predictions on which to base action, action which may be extremely expensive, or politically unpopular. It is complicated even further by the fact that the debate is politically charged, with powerful lobby groups deliberately adding to public confusion and uncertainty and scientists dueling over complex scientific issues in public forums. Even so, the weight of scientific opinion concerning human affects on global climate has resulted in political action to reduce potential future problems. Thus, in 1996 the **Second Conference of the Parties to the Framework Convention on Climate Change** adopted the **Geneva Declaration** calling for legally binding commitments for post 2000 greenhouse gas emission targets. This declaration was preparatory to the **Third Conference of the Parties to the Framework Convention on Climate Changes** which was held in Kyoto, Japan, in December, 1997. In his opening remarks to the Kyoto conference, the Secretary General of the UN, Kofi Annan, stated:

There are times when only an act of courage can spur progress in world affairs. The Kyoto Conference on the United Nations Framework Convention on Climate Change will be such a moment. At Kyoto, the industrialized countries will have

an opportunity to exercise their power and wealth in the interest of sustainable development for the planet. By taking decisive action to reduce their emissions of greenhouse gases to below 1990 levels by 2010, they will fulfill their commitment to lead a global and cooperative response to global warming in the next century - thereby driving the requisite technological changes and motivating developing countries, in turn, to limit the growth of their emissions.

Much, then, is at stake in Kyoto. Success depends on the readiness of States to take action despite the lack of complete scientific understanding. This precautionary approach has served us well in our narrow escape from destroying the earth's stratospheric ozone layer. Today, once again, scientists have confirmed that we face a major risk. The best global insurance policy against this risk will be an early start on emissions reductions.

We all know that in our personal lives, no less than in affairs of state, it can be difficult to heed long-term and unclear risks, no matter how potentially serious. This is what makes leadership so essential today. The global community will not solve the climate change problem at one stroke in Kyoto but, by moving from general pledges to a first phase of legally binding national targets for reducing emissions, it will have made a solution possible. (United Nations, 1997, Press Release)

Of particular interest here is the reference to the so-called precautionary principle, that is, action may be required in the face of uncertainty because the consequences of inaction may prove to be even greater than the costs of premature or inappropriate action. This is an idea with which insurance companies and others who manage risk have long experience. It is, however, highly contentious when applied to international agreements to which member states must gain acceptance from national, regional, and local governments. It also presents particular educational challenges if people are expected to understand the need for such policies, especially when they may well cause inconvenience and raise prices, at least in the short term.

In spite of the flurry of national and international initiatives taken after the Rio UNCED conference, many environmental organizations were critical of the amount of real progress made to address environmental problems. Meetings, Round Tables, Public Participation Forums, Declarations and Charters may be useful, but ultimately concrete actions must be taken. Furthermore, if people begin to suspect that the endless rounds of meetings and "participation events" have been co-opted by experts and consultants whose work depends not on implementation but on discussion, there can be negative results. People can become cynical or simply apathetic, believing that nothing will ever actually result from all the meetings, talk, and reports:

... many Canadians are becoming critical of the consultation process. There is some feeling that the round tables, which were designed to bring public views into the policy process, have in fact become elite bodies, more and more insulated from public concerns. Furthermore, members of round tables frequently suffer from "consultation fatigue," and question their effectiveness. It seems to many that governments are consulting simply for the sake of consulting.... Consultation fatigue comes from being involved in a process that has no clear end. Resource Renewal Institute, 1998 **The Environmental Atlas**, [On-line].

To assess the results of UNCED the General Assembly of the UN convened a Special Session in 1997 (37) This meeting, designated **Earth Summit II** by the media, was much more modest and attracted much less attention than the Rio Summit. The preliminary documents for the Special Session note that it was not its purpose to renegotiate the provisions of **Agenda 21** or to place special priorities on some of its items, but to accelerate the implementation of all its provisions. The preamble notes that:

4. We acknowledge that a number of positive results have been achieved, but we are deeply concerned that the overall trends with respect to sustainable development are worse today than they were in 1992. We emphasize that the implementation of Agenda 21 in a comprehensive manner remains vitally important and is more urgent now than ever. (United Nations General Assembly, 1997, Item 9. Assessment of Progress. Annex, Programme for the Further Implementation of Agenda 21 , 11th plenary meeting, 19th special session)

The Annex to the Resolution of the Special Session of the General Assembly emphasizes the view expressed in the Preamble:

...Five years after the United Nations Conference on Environment and Development, the state of the global environment has continued to deteriorate, as noted in the Global Environment Outlook of the United Nations Environment Programme, and significant environmental problems remain deeply embedded in the socioeconomic fabric of countries in all regions. (UN General Assembly, 11th Plenary, 1997)

Nevertheless, the meeting reaffirmed its commitment to the concept of sustainable development:

We are convinced that the achievement of sustainable development requires the integration of its economic, environmental and social components. We recommit to working together in the spirit of global partnership to reinforce our joint efforts to meet equitably the needs of present and future generations. (UN General Assembly, 11th Plenary, 1997)

The Special Session charged the **Commission on Environment and Development** to develop processes to further sustainable development on a world-wide basis and to report again in 2002. It will be interesting to see if the perspectives of the progress toward sustainability expressed at Earth Summit II will have changed by then.

In December 1997, in Thessaloniki, Greece, UNESCO and the government of Greece jointly sponsored a conference on **Environment and Society: Education and Public Awareness for Sustainability** (38). It is of interest here to note that the term “sustainability” has replaced the term sustainable development. But the conference announcement contains some very interesting claims concerning the educational requirements for sustainability:

Education is no longer seen as an objective in and of itself but as a means to bring about changes in behavior and lifestyles, to disseminate knowledge and develop skills and to prepare the public to support changes towards sustainability from other sectors. (UNESCO, 1997, Emphasis mine)

The preliminary papers for the conference refer to “a new international consensus and framework for action” emerging from a series of UN conferences, including Rio (UNCED) in 1992, the Cairo Conference on Population (1994), the Beijing Conference on Women (1995), the Copenhagen Conference on Social Development (1995) and Human Settlements in Istanbul (Habitat II) in 1996. The conference preliminaries also describe the objectives of the conference as to:

- highlight the critical role of education and public awareness in achieving sustainability;
- consider the important contribution of environmental education;
- provide elements for the further development of the work program of the UN Commission on Sustainable Development;
- mobilize action at international, national and local levels. (UNESCO, 1997)

The outcomes of the conference are expected to include “clarification” of the concept and key messages of education for sustainability and an inventory of “best practices”. An **Issues Forum** held during the conference examined the notion that an international consensus concerning the need for education for a sustainable future was an incentive for action, and how formal education could be “reoriented” toward sustainability. The preliminary statements and

the expected objectives and outcomes of the conference clearly represent the UN position that environmental education is essentially to promote sustainability and “prepare the public” to support its implementation by other sectors including government and industry. Although the conference proceedings had not been released at the time of writing this dissertation, they will no doubt fuel the debate regarding the appropriateness of education, or environmental education, as servants of the “doctrine” of sustainability.

In March, 1998, in Bonn, Germany, the **Kyoto Protocol** (39) resulting from the Third Conference on the Framework Convention on Climate Change was officially opened for signature by the member states of the UN. The member states have 1 year, until March 16, 1999, to sign the Protocol.

By signing a treaty a State indicates that it recognizes the authentic text, intends to complete the procedures for becoming legally bound by it, and is committed not to act against the treaty’s objectives before being so bound. Signature is not, however, the key political act; this is ratification (or its alternatives of acceptance, approval, or accession), whereby a State binds itself to observe the treaty. Depending on a country’s system of governance, signature may be simply an executive decision while ratification may require legislative approval.

The Protocol will enter into force 90 days after it has been ratified by at least 55 Parties to the Convention; these Parties must include developed countries representing at least 55% of this group’s total 1990 carbon dioxide emissions. (United Nations, 1998)

Heads of State or other designated officials may sign the **Protocol** at the UN Headquarters in New York during the one year period. While it is expected that a number of major nations will sign, whether or not the the Protocol will be ratified by the various national governments remains uncertain. The U.S. Congress, for example, might well refuse to ratify the agreement, as might the Parliament of Canada. Even before Kyoto there was considerable, well organized and powerful opposition to the Framework Convention within Canada and the U.S. A particularly troublesome area of disagreement concerns the fact that the lesser developed nations will have initially to meet less stringent requirements for greenhouse gas emission reductions and have a longer time period in which to reach them while the more developed nations will have to move to emission control targets more rapidly. Of course, this is an illustration of the practical operation of the equity principle of sustainable development (Ruckelshaus, 1989), but it is likely to be a hard sell with the general public in developed, high energy use nations like Canada and the U.S. Again, the interesting question is what role could or should education play in this issue.

III. Summary

The above chronology is intended to provide a rich context for the discussion and critique of EE programs. It omits some conferences, policies, conventions, and forums which influenced both the development of environmental concern and environmental education in the era from 1968 to 1998. Figure 3.1 provides a more extensive list of major environmental events in the era even though only some of these are described in greater detail above. In writing the chronology I have used direct citations from various key documents. In the course of my research for the chapter, and for the entire dissertation, I discovered that while many authors make reference to conference proceedings and legislation, they often assume that their readers have access to the materials and have read the actual documents. I believe it is important to portray as richly as possible within the limited space of this chapter the major elements of the landscape in which environmentalism and environmental education have developed during the past three decades. I view written curricula as intentional works: they are written with instruction and learning in mind, with the intent that they will be implemented in classrooms and schools or used by single self-directed learners or in educational programs offered outside schools. Their writers and developers do not live in a vacuum. They are sometimes involved in shaping and even creating the educational fields in which their curricula operate. They are not immune to political and social pressures, pressures which can be applied through access to funds, resources, and professional advancement. In the three chapters in which I critique the selected curricula I focus on how their authors address questions which have arisen in the past and still have currency during the period in which their curriculum work was done and continues to be done. By developing a rather rich description of some of the major documents of the era I hope I contribute to the readers' understanding of the environmental education field and enable them to assess the adequacy of my critique, and judge my curriculum connoisseurship. Before proceeding to an inquiry into the three curricula, however, it is necessary to explicate some of the issues latent in the chronology (Chapter 4). These issues will later be given further consideration in the context of each of the chosen curriculum (Chapters 5-7).

Chapter 4

Environmental Education: An Alloy of Two Problematic Concepts

I. Introduction

The term environmental education is a complex of two concepts: environment and education. Its meaning arises from the interplay between the two, that is, the meaning of EE is different from that of either word alone. It must be understood by thinking about education and about the environment, and what the two have to do with each other. It is to the two concepts and their relationship that I address the discussion which follows. I will also make reference to events in the development of EE which have been described in context in the chronology of Chapter 3.

II. What is Educational About Environmental Education

As the chronology in Chapter 3 shows, concern about environmental education coevolved with contemporary environmental concerns. Although it is difficult to assign precise dates to the onset of societal trends, the chronology uses the publication of Rachel Carson's **Silent Spring** (1962) as a marker for the beginning of recent general interest in the state of human-environment interactions. During the thirty five years which followed **Silent Spring** knowledge of the environment increased, mainly as a consequence of greater research efforts by scientists around the world in many different disciplines aided by the use of new tools, especially space based remote sensors and powerful computer data processing systems. The result has been the development of better understanding of how human activities affect the environment in various ways, obvious and subtle, local as well as global in scope.

As knowledge of the mechanisms of ecology has grown, the work of scientists has rapidly been made available to the general public, politicians, and policy makers by global media networks. Within hours an oil spill from a tanker disaster in the English Channel or Alaska will be seen on television screens around the world. Scientific organizations regularly produce press releases to popularize the findings of research which once was distributed mainly to professionals through publications in scholarly journals. The growth of computer information networks (the Internet and World Wide Web) has made the dispersal of scientific research findings and interpretations and popularizations of those findings, much more immediate.

As a consequence, the general public has developed greater awareness of environmental problems. Trend analyses and surveys in Canada and the U.S. have shown a consistent growth in the percentage of the population who characterize themselves as “environmentalists” and who believe that although scientific research may be incomplete, there is enough information available about problems like global climate change, to warrant action from politicians (Canadian Council of Ministers of the Environment, 1993; Kempton, Boster & Hartley, 1996). At the same time there is also evidence of widespread misconceptions about environmental processes and basic ecological concepts as well as a lack of knowledge of what the average person might practically do to reduce his or her impacts on the environment (Kempton, Boster & Hartley). Where government policies have resulted in widespread, readily available approaches to ameliorate human affects on the environment, as exemplified by popular Blue Box recycling programs, household composting, water and energy conservation campaigns, they have generally received widespread support in Canada and the U.S.

The development of the field of environmental education and the rise of interest and concern about the environment are tightly linked. From the early 70’s onward, governments and other agencies regularly proposed environmental education as a means of addressing environmental problems, whether these were very specific, as in cases where people were told how to safely dispose of toxic household chemicals to avoid water pollution, or much more systemic, as with proposals for education to nurture the economic shifts needed for sustainable development. The general assumption underlying both focused and systemic proposals for environmental education is that people generally do not want to damage their environment but may do so unwittingly through lack of knowledge and appropriate skills (Schneider, 1997; United Nations General Assembly, 1991). The argument is often extended to claim that if people are shown what to do, how to do it, and told why it is necessary, they will make needed changes in their behavior. “Education”, environmental education, is regarded by many policy makers and environmentalists as a strategy to “fix” environmental problems.

The number of different programs described as environmental education which have been developed and implemented in Canada and the United States in the past three decades is staggering. Even when considered only at the level of broad categories and topics of concern, they are still very numerous: water conservation, water pollution control, air pollution control, recycling, habitat protection, habitat restoration, endangered species protection and restoration, energy conservation, reforestation, soil conservation, biological pest control, the organic farming and food movements, permaculture, ecoagriculture, ecoforestry, urban beautification and renewal, urban forestry, city farming and gardening, and ecotourism. For any of these topics it is

possible to identify curriculum materials, information campaigns, teacher in-service efforts, and other approaches to informing and educating people which have been produced, distributed, and operated by governments, governmental agencies (at all levels from local to international) and non-governmental organizations. Groups like the Sierra Club, National Audubon Society, and Greenpeace have gained international renown for their campaigns to inform (and persuade) people about environmental issues; they also produce an array of curricula and offer a number of educational programs.

Given this situation, the curriculum theorist interested in the nature of environmental education and faced with the staggering array of different programs and materials in a range of different media, addressing students from infancy to adulthood, in schools and outside them, must return to basic principles in order to gain a framework for understanding and for assessing their educational worth (Barrow, 1984). There are several obstacles to developing such understanding.

First, there is a difference between informing people and educating them. Information is necessary for the process of education, but is not sufficient to it. An advertisement may claim to be informative, while also trying to get the reader suspend critical judgment and buy a particular product or service. On the other hand, it is a purpose of education to awaken and sustain critical judgment. To date, there has been no definite and explicit attempt by surveyors of environmental education and information materials to distinguish between the two forms (Independent Commission on Environmental Education, 1997; North American Association for Environmental Education, 1996).

Second, related closely to the first, while it is common for proponents of environmental education to use the term education in their offerings, there is often no attempt to define what is meant by education per se. The early descriptions of environmental education such as those of Stapp (1969a), Roth, R.E. (1969), Swan (1974), the **Environmental Education Act of 1970**, or promulgated at the Belgrade and Tbilisi Conferences of 1975 and 1978 all appear to assume a common understanding of the term education. Hence, definitions tended to focus on the attributes which must be developed for a person or citizenry to be environmentally educated, and on the nature of the environment or environmental problems on which these attributes were to be focused. In fact, there is evidence that some proponents of environmental education regarded any questioning of the consensus around the scope and nature of environmental education as unnecessary, time and resource wasting, or destructive to the development of the field (Jickling, 1992 b). One early champion even characterized discussions about the meaning of words like

education in the context of environmental education as part of the "dung heap syndrome" (Schafer, 1979). But the fundamental questions remained unanswered and are still largely unresolved (Jickling, 1992 b, 1997): what is educational about environmental education? As critics now begin to mount attacks on environmental education the problem has returned to haunt us (Sanera & Shaw, 1996; Independent Commission on Environmental Education, 1997).

As Jickling and others have noted (Barrow, 1984; Goodlad, 1984; Jickling, 1992 b, 1997; Stenhouse, 1975) the concept of education is difficult, in spite of many years of discussion by educational philosophers and curriculum theorists. However, while it may be contested ground, anyone wanting to engage in curriculum criticism and inquiry must venture on to it. As Barrow reminds us, education has to do with the development of mind and is a different concept than schooling. Things may be done in schools which, while worthwhile (or sometimes not) have nothing to do with education. In some ways it is easier to describe what education is not, than to state precisely what it is: education is not about the mere accumulation of facts or bits of unrelated information, as dominant as the quiz show metaphor of education may be in the popular imagination. It is also not the development of great depth in a highly specialized field, although an educated person could have a specialization. "The essence of the educated mind is a breadth of understanding." Understanding rather than "brilliance and speed in a specialism" (Barrow, 1984).

An educated person has the capacity to recognize different sorts of problems for what they are and to separate statements grounded in one form of knowledge like science from those grounded in religion or emotion. An educated person has a grasp of logical distinctions, an attribute which is at the heart of much that has been written about critical thinking. Barrow also uses the term "conceptual finesse" applied to the educated mind. Conceptual finesse means possession of a storehouse of concepts that are both clear and specific and which are applied by the educated person in their appropriate contexts. The educated mind, moreover, is demonstrated not only in schools or professional discourse, but in all the walks of life. As Stenhouse put it education inducts humans into the knowledge of their culture as a thinking system. The most important characteristic of the knowledge mode is that one can (and does) think with it. "Education as induction into knowledge is successful to the extent that it makes the behavioral outcomes of the students unpredictable" (Stenhouse, 1975, p.82.). Education therefore has to do also with developing an autonomous habit of mind, being willing to think for oneself.

If there is a weakness in this description of education so far, it resides in its focus on analysis rather than synthesis. At some point understanding is revealed not only in recognition,

but in new cognition. The subject of creativity is as problematic as that of education itself. The popular notion that people who are more creative are so because they have not been inducted into extant knowledge has been largely debunked by current cognitive research (Resnick & Klopfer, 1989). Creative individuals are those who have acquired a “storehouse” of concepts, and are able to use the storehouse as a base for reconceptualization. Conceptual finesse is a hallmark of the creative mind.

Nothing that has been written here so far constitutes a curricular proposal. In fact, one of the things that sometimes frustrates practitioners is that education theorists don't provide detailed descriptions of what is to be done in schools to attain these educational attributes. Again, Barrow (1984) comments on the view held by some that because attempts to understand and define the nature of education don't offer recipes for developing school programs they are somehow irrelevant.

I find this line of reasoning extraordinary. The theory has told us something of what we should be trying to achieve. It provides a clear criterion against which to judge the educational worth of what we do. ...it (tells) us how to judge what we do specifically, without which specification is useless and unwarranted. (Barrow, 1984, p.92)

Barrow does offer the view that if it is accepted that education involves developing the mind and that this at least entails minimizing errors and misconceptions which in turn entails the ability to recognize logical distinctions that exist between discrete forms of understanding, then, inasmuch as the forms which exist are scientific, religious, aesthetic, interpersonal, mathematical, moral, and philosophical (a categorization after Hirst's (1974) forms of knowledge), students require a basic understanding of those forms in order to become educated. He makes an observation about Hirst's proposals that is of particular importance for environmental educators: description of the seven forms of knowledge proposed by Hirst does not demand that they be taught as separate subjects or in any other particular way, even though traditionalists often insist that the compartmentalization of school programs into disciplines based on some or all of the forms is the best, if not the only way to organize a curriculum. Therefore, a field of educational concern like environmental education which encompasses a wide range of subject matter and therefore seems to require an interdisciplinary or multidisciplinary approach may seem to fit poorly in a curriculum organized around disciplines. If so, this does not imply that environmental education or any interdisciplinary approach is necessarily antithetical to the proposal that students understand the different forms of discourse associated with the several forms of knowledge. But it does suggest that clear thinking about how different forms of knowledge contribute

to knowledge of the environment will be required if we are to avoid creating intellectual confusion justified by a claim of interdisciplinarity.

Hirst's theory of knowledge and Barrow's analysis of the nature of education implies a view of what people should ideally be like, a view of the nature of knowledge, and a view of what is characteristically human (Barrow, 1984, p.35). Any soundly constructed theory of education will contain similar assumptions, whether stated explicitly or implicitly. Of course, there are critics and theorists of environmental education who would dispute Barrow's assumptions, even going so far as to say that it is precisely these traditional views of the nature of knowledge (our epistemology) which have led to the current environmental situation (Bateson, 1972, 1979; Orr, 1992; Wals & van der Leij, 1997a; Weston, 1996a, 1996b). However, a satisfactory theory of environmental education must, if it claims to be educational, give an account of what is meant by education and provide some criteria for judging the worth of curricular proposals. By doing so it provides a rational ground for debate about curriculum issues, debates based on more than matters of specific content, sequence, arrangement, and technique. Additionally, as Barrow also notes, if the theory intends to have application in schools then it also must be grounded in a concept of schooling or the purposes of schools.

Thus, if we are to engage in judgments about the worth of curriculum proposals in the genre of environmental education we should base our judgments on how well the proposals address the concept of education *per se*. It is not enough to simply declare that the educational component of environmental education can be taken for granted, or that its meaning is so well understood there is no need to consider it. Claims for curricular worth based on broad consensus or agreement among all who are polled (as in the case of the recent North American Association Environmental Education [NAAEE] (1996) **Guidelines for Excellence**) are dubious. A curriculum agreed to be valuable by a large number of misinformed or uninformed people, or by those who have simply never given much thought to questions of educational merit can still be miseducational.

Proposals for environmental education often embody three strands of thought or ideas about the relationship between education and the environment: education about the environment; education for the environment; and education through the environment (Hammond, 1997b; Jickling, 1997). Jickling attributes the first articulation of these strands to Lucas in Australia in 1979, but their roots considerably predate the first published use of the term environmental education. For example, as early as 1941 Lawrence Holt, co-founder of the Aberdovey **Outward Bound** school in Wales, in 1941 (Miner, 1990) was speaking of that

program as being less a training for the sea than a training through the sea, where challenging marine experiences were a means of character development. Moreover, traces of the three strand idea can be found in the writings of Thoreau, and much earlier in those of Plato.

Science Out of Doors, the report of the Study Group on Education and Field Biology (1963) illustrates the education through the environment strand of thought. It also predates both the definition of EE and Lucas' writings in 1979:

“Our proposals should do much...to open a vast and stimulating field of knowledge in a discipline which trains, perhaps better than any other, such mental attributes as acute powers of observation, concentration, patience, the appreciation of form and colour, and the detailed ordering of thought...” (Study Group on Education and Biology, **Science Out of Doors**, 1963, p.4.

In **Models of Teaching** Joyce and Weil (1972) also state that every model both instructs and nurtures certain attributes or qualities. Thus, both what is taught and how it is taught are important. Priest (1990) maintains that environmental education has always had two dimensions: ecosystematic and ekistic. Ecosystematic relationships refer to the interdependence of living organisms; they incorporate basic biological concepts such as energy pyramids and food webs. Ekistic relationships refer to the interactions between humans and the natural resources of the environment, in other words how human activities influence the quality of the environment, and how, in turn, the environment influences the quality of their lives, both in physical terms as through the availability of clean drinking water and the aesthetic or spiritual dimensions through natural beauty. Environmental education therefore addresses both the “workings of nature” (Odum, 1959) and the way in which humans affect, and are affected by them.

Critics of environmental education sometimes contend that it has strayed from an emphasis on learning about the environment and become prematurely fixed on education for the environment, in order to address or mediate environmental problems. To some commentators this is the result of too much emphasis on interdisciplinary approaches or too little emphasis on understanding the environment from a scientific viewpoint (Independent Commission on EE, 1997; Study Group on Education and Field Biology, 1963). **Science Out of Doors** (The Study Group on Education and Field Biology, 1963) clearly expressed this view many years ago:

Attempts are being made by American educationalists to evaluate the effectiveness of this approach to environmental studies and there are indications

that it has serious shortcomings. The most serious of these result from too much conservation being taught directly in schools relative to the amount of basic science in the syllabuses. It is now recognized that sound education in basic science is essential **before** conservation concepts and practices can be interpreted. (p.190, emphasis mine)

Jickling (1992a, 1997) and other critics (Gough, 1998) also maintain that environmental education has been largely appropriated by those who emphasize the “for” strand of thought and uncritically regard EE as a means of “fixing” environmental problems, or their root causes such as ignorance, misconceptions, and prejudices. Jickling (1997) applies a framework for thinking about the “conceptual ground” on which uses of education in the term environmental education rest based on the work of Walsh (1993). Walsh’s framework is comprised of three axes defining a geometry of education. Each axis is a dialectic between two conditions. Axis one is a continuum from the “formal” to the “wide” uses of education; axis two extends from the “normative” to the “descriptive” uses; and axis three is defined by loaded versus open uses. Jickling notes that uses of education do not occur at “fixed” locations in this three dimensional space, but rather as fluid interplays between the two poles of each range, a notion similar to the probability spaces of the field theory of quantum physics. In addition, the three dialectics interact. Thus, the “wide” interpretation of education can be more open or more loaded.

Applying two axes of Walsh’s geometry, normative/descriptive and open/loaded to writings about environmental education, Jickling contends that while early definitions, such as that of Stapp, were mainly descriptive, they quickly became prescriptive. Thus, terms such as “the ultimate goal of...” and “the main aim for...” are commonly found in writing about the purposes of EE to this day, as in proposals about education for sustainability (United Nations Educational Scientific and Cultural Organization, 1997). Additionally, prescriptions of environmental education moved along the other axis from open to loaded becoming rich in objectives (or standards to use more modern terminology (NAAEE, 1995) such as the production of informed and skilled citizens or the promotion of responsible environmental behavior. Moreover, the loading of the prescription is strengthened by the influence of behaviorist theory in which objectives are to be stated as behavioral outcomes. Jickling asks whether or not a curriculum proposal (environmental or otherwise) can be appropriated to the advancement of particular ends, especially when these ends are very precisely defined (loaded) and remain true to broader concepts of education. Certainly Stenhouse’s suggestion that education should serve to make instructional outcomes less predictable flies directly in the face of the educational objectives/behavioral outcomes approach which is so currently popular in EE curricula, especially at this time in the U.S. This trend is clearly seen in the terminology of the NAAEE’s 1995 “Working

Outline” which is sub-titled, “What School-Age Learners Should Know and Be Able to Do.”

Additionally, a new term is beginning to appear in some environmental education proposals, especially those advanced by the advocates of sustainable development: social marketing. For example, a recently released book from the Canadian National Round Table on Environment and Economy, entitled **Tools of Change: Proven Methods for Promoting Environmental Citizenship** (National Round Table on the Environment and the Economy, [NRTEE] 1998) is described as offering “principles of community-based social marketing” to help people take actions and adopt habits that are more environmentally sustainable. The claim is also made that the practices described in the book have “already been successful in changing people’s behavior” (NRTEE, 1998, Review, March, 1998.) This line of thought concerning the purposes of environmental education was also given strong expression in the statement of purposes cited in Chapter 3 (Figure 3.1, Part 3, #38) for the UNESCO conference on education for sustainability held in Thessaloniki, Greece, in December, 1997 (UNESCO, 1997).

In these statements “education” has been replaced with social marketing, a system akin to the advertising and persuasion techniques applied so successfully to selling soft drinks, cigarettes, and blue jeans. Critics concerned about the rise of corporatism (Saul, 1995) will not be surprised. Uncritical acceptance of this approach in materials published by the Canadian National Round Table certainly reinforces a need for clearer thinking about the meaning of education in the context of environmental education. Without clear educational criteria environmental education can be appropriated by almost any sort of “for” cause. The value of criteria resides precisely in their use to delimit, identify characteristics, to categorize and assess the merits of proposals on the basis of their coherence. Some environmental educators in the “education for the environment” camp have tried to address these concerns by identifying characteristics such as critical thinking, the examination of ideologies, and criticism of conventional wisdom as central to “education for the environment” (Huckle, 1983, 1987; Gough, 1987, and Fien, 1993.) Sometimes these terms seem simply to be tacked on or incorporated in long lists of “objectives” and learning outcomes, almost as an afterthought in the absence of a broader sense of educational purposes.

Within the context of the UNESCO-United Nations Environment Program agenda, environmental education has been joined to world wide campaigns to improve general literacy (Environmental literacy for all, 1989). The argument here appears to be that an illiterate population will not be accessible to print-based campaigns supporting sound environmental practices or policies related to sustainable development. While it would be difficult to argue against the

promotion of literacy, it is still important to note that while literacy may be necessary for education (and some would argue against this viewpoint by claiming that it denies the knowledge of indigenous peoples) it is not sufficient to it. Being able to read is still no guarantee that people will want to read, and exercise critical judgment about what is worth reading.

An extension to the notion of connecting environmental education to the promotion of general literacy is the use of the term “environmental literacy” (McClaren, 1989; Roth, C.E. 1995, or “ecological literacy” (Orr, 1992). It also appears to be an attempt to address the educational purposes of environmental education by linking it to larger educational priorities. In a broad sense, environmental or ecological literacy implies the ability to “read” the environment, to appreciate its sometimes subtle patterns and be aware of environmental changes and processes. Orr argues that the lack of attention to a basic awareness of the “land” means that many people in the developed, urbanized western world are ignorant of where their food comes from, the sources of their drinking water, the means by which electricity is generated, and most of their other connections to and dependencies on the ecosystem. To use his term, we have nurtured a generation of “ecological Yahoos”. Many elements of McClaren’s (1989), Roth’s (1995) and Orr’s proposals are consistent with broader descriptions of education, encompassing attention to different forms of knowledge and to how each assesses claims and to what each can contribute to environmental understanding. MacDonald (1997) however, while admiring some elements of Orr’s critique of contemporary education, contends that his approach is based on the largely uncritical acceptance of a view of western culture as flawed and of a particular analysis of humankind’s current environmental situation.

To the extent that proponents of environmental education support its inclusion in the curriculum of schools, there is also a need for theories of environmental education to address the purposes and nature of schools. Barrow (1984) notes that it is this sort of thing which is often least found in books on the curriculum—“the beginnings of a philosophical examination of what is involved in the whole enterprise of schooling, through consideration of its basic concepts” (p.37). He continues to propose that schools should accomplish five purposes: they should educate, foster physical development and activity, socialize, and nurture moral and emotional development. Note, therefore, that the ambit of schooling is wider than that of education alone, which forces us to consider whether some of the activities and functions organized in schools, conducted under one of the other four categories or not, are compatible with its educational purposes. Barrow’s proposals concerning the purposes of schools are echoed in the work of Goodlad (1984) whose *Study of Schools* found that parents and educators had high levels of agreement concerning four purposes of schooling: academic, civic, vocational, and personal.

While the language of his report is quite different from that of Barrow it nevertheless affirms that schools are seen as accomplishing more than strictly educational functions. Moreover, as noted previously (Chapter 2), Goodlad found that the people in his survey were unwilling to abandon any of the four purposes even when faced with dwindling funds and resources.

Of course, having proposed several missions for schooling is different from outlining the sort of curriculum that might obtain those purposes. In Barrow's view such a curriculum would have at its core the study of science and mathematics, literature and history, and physical activities as well as religion, presented not as a particular religious dogma, or set of prescriptions, but as a form of knowledge, a way of thinking and knowing and making statements or propositions. Barrow suggests that the other core subjects deserve a place in the core curriculum because, in the case of science, mathematics, and religion, they are discrete forms of knowledge, while the study of history and literature supports both understanding of the remaining forms of knowledge: aesthetic, philosophical, moral, and interpersonal as well as the socialization and emotional development functions of schools. He allows that the inclusion of these subjects in the core curriculum doesn't mean that all the other possible subject fields and activities which might be found in a school program are worthless or undesirable, but that the things he does outline are essential. Again, there is no attempt to list which literary works should be read, what mathematics should be done, which sciences should be given emphasis, or what approach should be made to the study of history. In Barrow's view the work of the curriculum theorist stops above the level of such specification and teachers (presumably educated teachers) should be left to make judgments about these matters. Of course, contemporary educational literature is full of much more specific accounts and outlines of exactly what should be taught, how, when and how what has been learned should be assessed. There are popular books and programs based on work by education critics like Allan Bloom (1987) with titles like, "What every third grader needs to know", presumably so parents can check up on the quality of their child's schooling (which is treated as being equivalent to education).

Once again, whether we accept Barrow's conception of the elements indispensable to a core curriculum or not, the questions he raises are critical for curriculum theory, at least to the extent that they offer a way of thinking about schooling and making judgments about what should be done under its banner, and how priority decisions might be made. Unfortunately, environmental education, like other areas of educational concern, has often been distracted into long debates about whether or not it should be taught as a discrete subject or infused throughout the school program. The more important question is what purposes should properly be assigned to schools. Once we address that question it becomes possible to decide how environmental

education could support the educational, and /or other purposes. Even if we take the position, as some do (Orr (1992; Wals & van der Leij (1997a), that environmental education should be part of an agenda for fundamental change in schools, it is still necessary to address the question of what schools are for. If one holds the view that environmental education and schools are antithetical and that EE must be “deschooled” (Weston (1996b), we still have to articulate a theory of education, even if it is radically different from those of Adler (1982), Barrow (1984), Bloom (1987), Stenhouse (1975) or others who base their theories on more conventional views of knowledge and the human condition. Unfortunately, the radical critics within environmental education often fail to do this. At the same time other environmental educators appear to be scrambling to accommodate criticism by fitting environmental education to proposals for schools which are miseducational or anti-intellectual. Failure of clear thought often results in ambivalence, inconsistency, and uncertainty especially in the face of political pressures. I will return to this topic in more detail in Sections 3 and 4 of this Chapter where I discuss criticisms of environmental education and the NAAEE’s **Guidelines for Excellence in Environmental Education** (1996).

To summarize, theories of environmental education are largely based on descriptions or prescriptions which assume that educational questions have been resolved and that the potential contribution of environmental education to the purposes of schools is unproblematic. These assumptions appear to be groundless. At present the field is divided between a rather small group of critical curriculum theorists, and a much larger group of practitioners, many with roots in government agencies, school systems, and non-governmental environmental organizations who want to get on with the business of writing detailed sets of “standards” or “guidelines” for curricula, without taking time to consider the nature of the business in which they are ultimately engaged. The marginal position of environmental education and environmental studies in many school programs, if they are addressed at all, may result in part from the failure of environmental educators to adequately address its educational purposes and articulation with the purposes of schools in ways which are comprehensible for teachers, administrators, and education policy makers (Jickling, 1997). On the other hand, it may well be that environmental education, as Orr (1992) and Weston (1996a, 1996b) have suggested, is antithetical to the institution of modern schooling and is a challenge to contemporary epistemology (Bateson, 1979; Cohen, 1995, 1997; Roszak, 1992). Nevertheless, radical critics must still address whether environmental education is in fact educational, even if they wish to offer a new conception of the nature of education, or to ground their proposals for schooling in a radical epistemology.

In recent years other critics have joined the environmental education debate to challenge the analyses of the environmental problematique and environmental world view which undergirds a great deal of environmental education. These critics claim that environmental education has been appropriated by advocates for particular actions or approaches or promulgates particular environmental ideologies. Before considering their comments in Section III it will be useful to review some issues concerning the second element of the term environmental education.

III. Conceptions of Environment within Environmental Education.

The word environment is derived from an old French word meaning surroundings. However, recent definitions often refer to the interaction between the environment and living things, as in "all the surrounding conditions and influences that affect the development of a living thing" (Gage *Canadian Dictionary*, de Wolf, Gregg, Harris, & Scargill, 1997, p.520). Environmental education might therefore be seen as addressing educational attention to the interactions between living things and their surroundings, including other life forms. Eugene Odum (1959), one of the pioneers of the modern field of ecological studies limits the use of the term environment to those things which have operational significance to an organism during its life cycle. He tightens his restrictive use of the term by adding the comment that the beginning ecologist should try to discover, by means of observation, analysis, and experiment which factors are operationally significant and determine how these factors bring about their effects on the individual, population, or community (p.95). Miller (1990) takes a similar approach stating that the environment is all the external conditions and factors, living and non-living (biotic and abiotic) that affect an organism.

Is environmental education therefore merely another way of describing the study of ecology. The term ecology is itself of fairly recent origin, having been coined by the biologist Ernst Haeckel in 1869 and not recognized as a distinct field of biology until about 1900 (Odum, 1959). The word ecology is derived from the Greek word "oikos" meaning house or "place to live". Thus, ecology is the study of organisms "at home". Typically it is defined as the study of the relationships between organisms or groups of organisms and the environment. Odum maintains that the focus of ecology is the biology of groups of organisms (populations, communities) and the processes determining their interactions with the environment. It is, in concise terms, the study of the structure and function of nature "(it being understood that mankind is part of nature)" (Odum, 1959, p.4, parentheses in the original.) Cunningham (1994) states that while ecology is concerned with populations, communities and ecosystems, organismic biology is concerned with tissues and organs while molecular biology operates at the sub-cellular level.

Even so, he contends that “the underlying questions about how matter and energy are captured and used to maintain life are the same in all biological disciplines” (p.21). Ultimately, therefore, biology as a discipline addresses the nature and maintenance of life but its focus ranges from the sub-atomic to planetary levels of scale, and across the vast reach of geological history. Wilson (1998) extends this proposition by classifying the concerns of modern biology as being defined in evolutionary, ecological, organismic, cellular, and biochemical space-time. He claims that two super ordinate ideas unite and drive the biological sciences at each of these space-time segments:

1. The idea that all living phenomena are ultimately obedient to the laws of physics and chemistry, with higher levels of organization arising by aggregate behavior at lower levels;

and

2. The idea that all biological phenomena are products of evolution, and principally of evolution by natural selection. (p.134)

Thus, ecology is concerned with the interactions between groups of organisms, including humans, and their environment, over time. Because all organisms change, and in turn are changed by, their environment, ecology addresses environmental changes, especially as those changes affect the maintenance of life. Given that description of ecology, it is easy to appreciate that it will be concerned with the effects wrought on the environment by human activities, as well as with the structure and functioning of environments where human modifications are absent or minimal.

Some modern critics of environmental education contend that it has strayed from a strictly scientific focus and become overly concerned with economic, social, and political issues surrounding human impacts (Independent Commission on Environmental Education, 1997; Sanera & Shaw, 1996). Even the report of the Study Group on Education and Field Biology in the U.K. in 1963 expressed concern that there was not enough attention to basic science prior to dealing with to conservation practices. But ecologists identified the need to take a multi-disciplinary or interdisciplinary approach to its studies from its early development as an experimental field. In fact, in 1959 Odum noted the difficulty of developing a comprehensive understanding of the environment in the departmentalized structure of contemporary university and college programs, where even sub-fields of the biological sciences are often separated, not to mention other sciences or social sciences such as economics. Orr (1992) repeated this concern, as did

the teachers who reported to the National Forum on Partnerships Supporting Education About the Environment (President's Council for Sustainable Development, 1995). The discipline based structure of the school curriculum may impose severe restrictions on interdisciplinary studies of almost any kind. It is perhaps for this reason that ecology and related environmental studies are frequently pursued in separate departments or schools for Resource Management, or Environmental Studies where the faculty represent a number of relevant disciplines and can interact more frequently. Wilson (1998) extends the idea of interdisciplinarity even further, advancing the notion that the natural sciences are being increasingly unified by the growing recognition that the laws and principles which apply to the behaviors of atoms and molecules also apply at higher levels of organization and larger scales. He terms this a consilience among the discrete disciplines of the natural sciences. Additionally, he proposes that the principles of the natural sciences can ultimately be extended to the behaviors of humans and the traditional domains of the social sciences and humanities. He admits that many complex higher order phenomena cannot currently be understood by physics, chemistry, and biology, thus requiring the generation of principles based on how things work at larger scales. Even so, he states:

the entities of each level can be reduced; and the principles used to describe the level, if apposite and correct, can be telescoped into those of the lower levels and, especially, the next level down. That in essence is the process of reduction, or top-down consilience, which has been intellectually responsible for the enormous success of the natural sciences. (Wilson, 1988, p.135)

Wilson maintains that the natural sciences have been sequestered from the other great branches of learning because the social sciences and humanities are thought to be grounded in the "...ineffable phenomena of mind and culture, too complex and holistic, and too dependent on historical circumstance to be consilient with the natural sciences" (p.137). He believes that this "venerable perception" is about to change and that the growth of two disciplines, the brain sciences and evolutionary biology will fill the gap between the "two epistemologies". He cites the work of C.P. Snow concerning the separation of the two cultures but maintains that this space is now waiting to be entered from "both sides" with an effort to understand "hereditary human nature":

Such is the interdisciplinary subject awaiting study by all the great branches of learning, and I can think of no more important intellectual undertaking. The relationship between biological evolution and cultural evolution is, in my opinion, both the central problem of the social sciences and humanities and one of the great remaining problems of the natural sciences. (p.143)

Without accepting Wilson's sweeping thesis of a coming consilience among all branches of knowledge, the field of environmental studies, even defined more narrowly as the study of ecology, is very broad. Human beings have been included as part of the fabric or machinery of nature by most of the leading scholars in the field of ecology. If humans are part of nature, and are elements of the environment, then their works, technologies, constructions, and cultural processes can also be seen as part of nature. Although the comparison is coarse, human beings build cities and termites construct colonies. Each modifies the environment. No consideration of termite ecology is complete without an account of their colony building, land modifying activities (and termite colonies have been shown to affect not only the landscape but also the atmosphere in significant ways); similarly, human interactions with the environment include cities and other constructions, technologies, and works of art and literature. Without great difficulty it is possible to expand the domain of environmental studies to include the entire scope of education. In fact, some environmental educators have gone so far as to state that "all education is environmental education" (Orr, 1992) and to claim that environmental education is good education (NAAEE, 1996). Of course, human beings live their lives, and think their thoughts in, about, and through environments but continuing this line of reasoning can easily be self-defeating. If environmental education is simply another term for all education then there is no need for any particular curricular attention to it and the field loses any meaningful identity or focus. This problem can perhaps be avoided by emphasizing Odum's concept that environmental studies (or ecology in the sense of its modern usage) focuses on the interactions between organisms and the environment which support the maintenance of life. Certainly, early descriptions of environmental education, while taking a generally broad view of the nature of the environment and scope of environmental education tended to stress environmental problems arising from human activities and potentially threatening life or degrading its quality. For example, concerns for "decaying cities", mental and physical health, living and working conditions, and population pressures were listed as subjects for environmental education in the Report to the U.S. Senate regarding the **Environmental Education Act of 1970** (U.S. Senate Committee on Labor and Public Welfare, 1970.) The **National Environmental Policy Act of 1970** states its purpose as:

To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation;

The **Belgrade Charter** (Belgrade Charter, 1976) states that environmental education should:

...develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations, and commitment to work toward solutions of current problems and the prevention of new ones. (p.2)

These statements express an “environmental problem” focus for environmental education. Environmental education is concerned about the interactions between humanity and the environment with the purpose of advancing human understanding of how their actions affect the quality or maintenance of human life or the lives of other species. While some might contend that this description gives power to the view that environmental education has been “crisis-driven” (Jickling, 1992), an understanding of human activities in the environment with respect to the maintenance of life can address positive, ameliorative and constructive actions as well as those which are destructive. The second **State of Canada’s Environment Report** (Government of Canada, 1991) concludes with the statement that:

There are 27 million environmental decision makers in Canada and nearly 6 billion world wide. A better environment ultimately depends on better decisions by all of them....It is also clear that we are only beginning to understand the full range of our impacts on the environment and its impacts on us. (Government of Canada, 1991, pp. 27-26)

But regarding the environment as a problem or a venue for “decision-making” are only two ways of considering it. Sauvé (1996) offers a typology of conceptions of the environment within environmental education. She proposes that environmental education programs tend to regard the environment from one or more of the following perspectives: as nature, as a resource, as a problem (or set of them), as a place to live, as the biosphere, and as a community project. Each perspective entails different types of relationships. Thus, if the the environment is regarded as a problem then an environmental education program supporting that view will focus on solving problems, while if it is viewed as a community project, the program will nurture group decision making, action research, and cooperative action. Sauvé also notes that there are a number of other possible orientations to the environment. Again, Suavé’s typology reflects the fact that the study of the environment is the study of interactions and processes between organisms and the environment and that the focus of environmental education is human interactions with it.

Clearly, understanding the environment raises interesting and important epistemological problems. If one of the purposes of education is to induct students into an understanding of the different forms of knowledge and provide them with opportunities to explore how different forms assess claims and conduct discourse, then the environment is a topic rich in opportunities. But this cannot be done by ignoring questions about the very nature of environmental knowledge, assuming such questions aren't important, viewing them as beyond the comprehension of students and teachers, or ruling them outside the limits of ecology narrowly defined as a "science". Unfortunately, all of these positions can be found in contemporary writing about environmental education, whether by critics or advocates (Jickling, 1992a, 1996, 1997; Independent Commission on Environmental Education, 1997; Sanera & Shaw, 1996).

Some critics of environmental education have advanced the view that it indoctrinates students to an ideology, the ideology of environmentalism. There is no generally accepted definition of this term. Environmentalists are often grouped with conservationists as people concerned about the state of human-environment interactions and with the effects of human acts on the environment. President Ronald Reagan declared himself to be an environmentalist (Milbrath, 1989), while recent surveys indicate that more than 70% of Americans also describe themselves in that way (Kempton, Boster, & Hartley, 1996). But generalized concern for the environment is different from believing that there are serious and urgent environmental problems which result from human activities. This belief might better characterize modern environmentalism. Milbrath describes environmentalists as bearers of bad news, reporters of disasters and crises, although in recent years environmental organizations have also placed emphasis on solutions to environmental problems rather than on identifying problems and placing the blame on those who cause them. If environmental education can be said to address understanding of human-environment interactions with a focus on problematic aspects of those interactions, then it is important to describe the nature of the environmental problematique as interpreted by current scholarship and to appreciate the range of proposals offered to address environmental problems. If environmental education is to avoid the claim that it is really indoctrination, it must demonstrate that it helps students understand the nature of different ideas about human/environment relations and the current state of affairs rather than simply presenting a single perspective or a highly selected set of views. However, if critics really seek to scourge environmental education of all controversy they in turn are proposing a particular vision of the purpose of schools and the nature of education which should be confronted squarely in debates about the purpose and scope of environmental education.

There are two broad areas of disagreement with respect to the nature of human-environment problems: diagnosis and prescription. Diagnosis entails defining and describing the problems; prescription entails deciding on and implementing corrective or remedial actions. Implicit in the former is deciding whether there is a problem at all (or at least one requiring any action) and implicit in the latter is determining the urgency of the need for action.

In terms of the diagnosis of current problems in human/environment interactions the agenda of the U.N. global change research program provides a list of the major issues: human population increase; animal farming, energy resource use, ozone depletion, atmosphere pollution, deforestation, water pollution, land use degradation, global climate change (sometimes wrongly described as global warming), and loss of biodiversity (Teaching global change through environmental education, 1993). These problems are frequently connected and interact with each other: loss of biodiversity is caused by deforestation, which in turn can result from the expansion of animal agriculture. Deforestation can also influence global climate change. Even among those who agree that the list of issues to be addressed by global change research programs provides an acceptable description of current environmental concerns, there is often disagreement about the urgency and scale of problems. It is sometimes difficult to obtain precise information about the current status of the environment and human impacts on it. Researchers address considerable attention to determining measurement procedures and agreeing on standards for comparison. Even matters which might seem to be non-controversial, such as the size of the human population or the number of species threatened with extinction in Canada, are invested with arguments concerning how census data are obtained, and how reliable they are. Using Carson's *Silent Spring* as a datum, since 1962 there has been a torrent of information about the environment and the impacts of humans on it. At first much attention focused on distinct problems in particular locales, as did the research that provoked Carson's attention. But, as noted in Chapter 3, there has been a significant change in our ability to connect isolated information to form a more systemic, global perspective about how local actions can have international consequences, as in the case of chlorofluorocarbon (CFC) pollution and the ozone layer in the stratosphere. As knowledge of how biogeochemical cycles operate has developed it has provided models to explain the circulation and accumulation of contaminants and the ways in which the combined result of many small, local actions can have global impacts.

Underlying this array of concerns are two basic ecological concepts. First, all organisms affect their environment. Their total environmental impact is the product of the number of organisms, the number of resource units used by each individual, and the amount of degradation and pollution generated by each unit of resource use (Miller, 1990, Schneider, 1997). For humans

this equation is often termed the I=PAT relationship: environmental impact (I)= population (P) x affluence/capita (A) x technology used (T), but it is essentially the same set of variables (Schneider, 1997, p.xv). Wackernagel and Rees (1996) refer to the sum of resource and energy requirements and environmental impacts of an individual human being as his or her “ecological footprint” and have produced ways of estimating it for persons living in developed and lesser developed nations. The second key concept has been referred to as the First Law of Ecology. It is that everything is connected—it is impossible to do one of anything in an ecosystem (Miller, 1990).

Scientists who study global change clearly state that the Earth must be understood as a dynamic system that has changed many times in the past, sometimes dramatically as during previous Ice Ages (Royal Society of Canada, 1993; Schneider, 1997). There is also strong evidence of past catastrophic changes caused by massive earthquakes, volcanic eruptions, and impacts from comets or asteroids. Entire ecosystems including numerous species have become extinct. The continents themselves are in constant motion. The early Earth atmosphere contained no oxygen—the atmosphere of today is about 20% oxygen: almost all of it was generated by living organisms—a major global scale environmental change and one which made the flowering of terrestrial life possible (Schneider, 1997). Most of these global environmental changes happened long before the appearance of the first humans. Global change can result from the operation of very long term natural cycles like those which govern the tilt of the Earth on its axis, the change in the plane of the Earth’s rotation around the sun and the Sun’s energy output. The whole of human civilization may have developed inside one portion of a much longer cycle of climate change. What is of concern to global change scientists is the rate at which human activities now seem to be modifying the environment and possibly amplifying natural changes:

The earth’s environment has changed more rapidly in the past generation than at any other comparable time in history, one of the primary sources of these dynamics being precipitated by human interaction with the biosphere. (Teaching global change through environmental education, 1993, p.1)

Thus, environmental changes are not new, nor do they result only from human activities. However, the size of the human population, combined with the scale and nature of our use of resources and energy appears to be producing very rapid and far reaching environmental changes, changes which might outstrip or degrade the life maintaining capacities of the biosphere. This view is exemplified in the following policy statements, issued ten years apart. In 1974, the Organization for Economic Cooperation and Development (OECD) released the following statement on environmental policy:

THE GOVERNMENTS OF OECD MEMBER COUNTRIES:

(Recognise) 'that increasing population, industrialisation and urbanisation place growing pressures on the limited assimilative capacity of the environment, and on the finite stock of natural resources;' (Adopted by Member Governments during the meeting of the Environment Committee at Ministerial level 14th November 1974; OECD, 1974)

In 1984, before the establishment of the World Commission on Environment and Development by the United Nations, the OECD convened an international conference on environment and economics. Among its conclusions is the following statement:

12. The conference concluded that OECD Member countries are at a watershed in the evolution of environmental policies. New directions are needed in order to achieve a continuous improvement in environmental conditions and to avoid irreversible damage to the environment. (OECD International Conference on Environment and Economics: Conclusions, Paris, 21. 07. 1984)

Volumes have been written about each of the problems and issues listed under the general rubric of global change. But, if the agenda of international programs of environmental research provides an accurate outline of the issues in human-environment interactions, we have the basis for a broad description or diagnosis. It should be noted, however, that there are those who reject the notion that any of these conditions are of grave concern, or warrant serious, wide-ranging societal changes. Thus, for some, the population of humans is not a problem of numbers *per se* but of distribution, poverty, lack of economic development, poor technology, bad planning, or other deficits. Some even claim that the Earth could support many more people, at an acceptable living standard (Simon, 1981). Miller (1990) contrasts these broadly different perspectives of the environmental situation as Neo-Malthusian versus Cornucopian.

Neo-Malthusians regard current environmental problems as serious, and as likely to get more serious unless major efforts are made to address them immediately. Cornucopians feel that the seriousness of environmental problems is frequently exaggerated or that problems which do exist can be solved by economic growth and technological innovation. (In other words, they believe that the systems that generated the problems can, if modified, remedy them.) Cornucopians view nature as "resources" for human use; Neo-Malthusians tend to view nature as a life support system which requires protection and wise stewardship. Cornucopians believe that there are really no long term problems with resource use because we can always find more, or develop technologies which will provide substitutes for any resources which become depleted

or scarce. Perhaps the ultimate Cornucopian view is that if the Earth becomes too crowded and resources too scarce and limited, we can simply go elsewhere via space travel and exploit new planets, like Mars. If these planets are not now suitable for human life we can apply planetary engineering to them so that they become hospitable. Neo-Malthusians believe that the Earth is our home and that we had better act wisely to maintain and protect it. While space travel may become more common and accessible than it is now, it will not offer an escape from environmental problems. They also believe that new technologies can help solve environmental problems, but that we still need to change our life styles significantly to avoid wasteful consumption and reduce our personal use of raw materials and energy.

While Miller's description of two broadly different views of humankind's situation probably oversimplifies a complex spectrum of environmental beliefs (Government of Canada, 1991; Sauvé, 1996) , it highlights the fact that there isn't a common diagnosis of our environmental situation nor is there a consensus concerning what, if anything, needs to be done. However, the majority view held by the global scientific community and policy makers is that there are significant environmental problems, which arise from human activities and require both further research and policy actions at the local, regional, national, and international levels. This position is reflected in the preamble to **Agenda 21**, the major document produced for discussion and action at the Rio United Nations Commission on Environment and Development Earth Summit Conference in 1992:

1.3. Agenda 21 addresses the pressing problems of today and also aims at preparing the world for the challenges of the next century. **It reflects a global consensus** and political commitment at the highest level on development and environment cooperation. (UNCED, 1992, emphasis mine)

The generally accepted diagnosis of the seriousness of environmental problems has generated a widely offered prescription for action: sustainable development or sustainability. Ever since the publication of the Brundtland Report, **Our Common Future** (World Commission on Environment and Development, 1987) the term sustainable development has been widely used in government policies, corporate statements, and proposals from environmental organizations as a strategy to address environmental concerns. But is the prescription really as clear and widely accepted as it might seem from the kind of statements made at Rio in 1992 and in subsequent UN pronouncements?

As noted in Chapter 3, the core concept of sustainable development is that human activities should be conducted in such a way as to ensure that future generations will have the same

opportunities to meet their basic life needs as does the present. In other words, we should not do things in the present which steal from future generations. An extension of the concept is that human use of energy and resources in the present should be adjusted so that the more developed and affluent countries do not obtain their life styles at the expense of the poorer, lesser developed nations. The concept attempts to link economics with ecology by taking the position that economic activities ultimately depend on the functioning of the ecosystem. Therefore, activities which damage or degrade the environment should be viewed as uneconomic, even if they generate profits in the short term. This concept is explicit in a comment by Maurice Strong, Secretary-General of the UNCED Conference on environment and development held in Rio in 1992:

By definition if a business does not continuously renew its plant equipment and the resource base on which its profit depends, it simply runs down. Sustainable development is simply applying those criteria to include the entire resource base, the planet. (Government of Canada, 1991, pp.27-17)

The members of the Brundtland Commission considered their vision of a sustainable economy to be fairly radical. They believed their proposals went to the root of many contemporary environmental problems in a way that band-aid, one issue at one place and time approaches did not, necessary though immediate responses to acute environmental problems might be. By linking economics and the environment the Commission made a political issue of the ecological and social consequences of current concepts of and approaches to development. The attainment of sustainability is seen as a matter of broader participation in decision-making, new forms of multilateral cooperation, the extension and sharing of new technologies, increased international investment, an expanded role for transnational corporations, the removal of artificial trade barriers, and expanded global trade.

Wackernagel and Rees (1996) note that one of the problems with the concept of sustainable development is that it is "treacherously ambiguous". They continue, noting that those people who focus on sustainability hear a call for ecological and social transformation, a world of environmental stability and social justice. On the other hand, those who identify with the "development" portion of the term hear a call for more sensitive growth and a reformed version of the status quo. Wackernagel and Rees cite Redclift's comment that "...unless we are prepared to interrogate our assumptions about both development and the environment and give political effect to the conclusions we reach, the reality of unsustainable development will remain..." (p.33). They continue by noting Herman Daly's distinction between growth, meaning to get bigger, and development which means to get better (or at least different). For Daly, a well

known economist, sustainable development entails progressive social betterment without growing beyond ecological carrying capacity. Thus, the term sustainable growth, which has appeared in some political and corporate descriptions of sustainable development is to be regarded as a nonsensical self-contradiction. In fact, developing sustainability (as contrasted to sustainable development) may require a reduction in economic throughput.

Wackernagel and Rees also claim that **Our Common Future** equated sustainable development with an increase in economic growth in both the industrialized and developing nations. To attain it without compromising the environment the Commission called for increased efficiency in material and energy use combined with environmentally benign technologies as well as production systems which preserved the ecological base. According to Wackernagel and Rees **Our Common Future** failed to analyze the causes of the poverty and inequity which they sought to address and also omitted consideration of whether the economic growth they proposed would be biophysically sustainable under any conceivable system. In fact, they claim, the Commission failed to confront arguments that liberalized trade and conventional efficiency gains might actually work against sustainability. These ambiguities and contradictions have led some to consider sustainability as a justification for business as usual. As Wackernagel and Rees put it: "In today's materialistic, growth-bound world, the politically acceptable is ecologically disastrous while the ecologically necessary is politically impossible." (p.40)

Orr (1992) also critiques the concept of sustainability noting that the phrase raises as many questions as it answers. For him the term presumes that we know, or can discover, levels and thresholds of environmental carrying capacity, which is to say what is sustainable and what is not. He also notes that the phrase suggests a level of agreement about the causes of unsustainability which does not exist. Orr claims that the Commission tried to reach a compromise between two versions of sustainability which he distinguishes as technological sustainability versus ecological sustainability. As he puts it:

In the most general terms, the difference is whether a society can become sustainable within the modern paradigm through better technologies and more accurate prices, or whether sustainability requires the transition to a post modern world that transcends....'individualism, anthropocentrism, patriarchy, mechanization, economism, consumerism, nationalism, and militarism. (p.24)

In this sense, sustainable development is another form of Miller's Cornucopian belief system. But Orr makes the important comment that the two approaches to sustainability, if seen as successive stages are not mutually exclusive. Using a medical analogy he notes that the vital

signs of the heart attack victim must be stabilized or all else is moot. However, in the long term he claims that the only path to real sustainability is not through more of the same practices and approaches which created the crisis in the first place, but through ecological sustainability which seeks alternatives to these by rethinking “architecture, urban design, transportation, economics, community patterns, resource use, forestry, the importance of wilderness and our central values” (p.24). He remarks that while the two perspectives on sustainability can be partially complementary their practitioners and advocates tend to have “very different views about the extent of our plight, technology, centralized power, economics, social change and how it occurs, the role of public participation, the importance of value changes, and ultimately very different visions of a sustainable society” (p.24). These are not trivial differences.

For some, as Orr notes, sustainability can be attained through more efficient technologies and by reforms to economic policy. This approach assumes that there is nothing fundamentally wrong and that the existing paradigms of business, industry, and development can continue, albeit with considerable adjustment. In fact, for advocates of this approach, the only path to sustainability is through continued economic growth on a more equitable, world wide basis. Advocates of technological sustainability typically see the process of reform as being led by experts and technologists who develop and implement policies and improve existing processes or invent more effective ones. In fact, in some of the policy statements concerning sustainability, education is simply a means (a technology) to support its implementation by convincing the general population to support initiatives from officials and experts. On the other hand, advocates of ecological sustainability do not believe that “business as usual” can produce it. They believe, as Orr explains above, that fundamental changes are needed, essentially a change in world view or paradigm (Milbrath, 1989). They connect sustainability with community development, human rights, equity, and justice. They want fundamental reforms to the current political and economic systems. Thus, while many political and business leaders regularly use the term sustainability as if there was a clear and common understanding of the meaning of the term, in fact the concept is at the focus of a fundamental debate about the future of humanity.

From an educational perspective the topic of sustainability or sustainable development should provide an important opportunity for the critical examination of beliefs and values, and for appreciating the quality of the evidence used to argue various positions about the concept. This is unlikely to occur if sustainability is presented as “the solution” to “the environmental problem” and it is simply assumed that agreement exists both about the nature of the problem and its solution. Unfortunately, policy documents generated by international, national, and

regional advocates of sustainable development all too often appear to take this approach. It is worth restating the opening paragraph of the brochure announcing the UNESCO Conference on "Education and Public Awareness for Sustainability" held in Thessaloniki, Greece, in 1997:

Education is no longer seen as an objective in and of itself but as a means to bring about changes in behavior and lifestyles, to disseminate knowledge and develop skills and to prepare the public to support changes towards sustainability from other sectors. UNESCO, 1997.

Clearly, in the view of the authors of this announcement, sustainability is the answer to environmental problems and education is the means to get the public to support its implementation.

Even David Orr, who is critical of official policies and statements about sustainability, especially those in the genre he terms technological sustainability, believes nevertheless that a global societal shift to sustainability is required and that education is essential for its attainment. In response to critics who argue that directing education for sustainability, or any other specific agenda is contrary to the spirit of education *per se*, he responds (Orr, 1992):

Should we strive to teach values appropriate to sustainability, or should we present these as only one possible orientation to the world?...Is value free education possible? Is it desirable? If neither how can values be integrated into the learning process without jeopardizing objectivity and a fair treatment of facts, data, and logic?

As difficult as these issues may be, there are strong precedents for the integration of objectivity with a strong value orientation. Medical education, for example, has a clear bias toward human health, not disease...Likewise, economics is intended to expand our understanding of the conditions for prosperity. Except by pedants, knowledge has never been regarded as an end in itself, but rather as a means to human well-being. By the same logic, environmental studies ought to have a clear direction favoring harmony between human and natural systems while preserving objectivity in the handling of facts, data, and logic. (Orr, p.142)

In addition to the apparent contradiction in assuming that once environmental studies are given "clear direction favoring harmony between human and natural systems" objectivity in the handling of facts, data and logic can be preserved his statement seems to imply the view that the arguments of those who contend that it is entirely appropriate for humankind to subjugate nature to the end of meeting human needs are undeserving of educational consideration because a

priori they are not of value and can therefore be dismissed by all right thinking people. Courtenay Hall (1996) has criticized Orr's arguments concerning the value-orientation of environmental education as falling short on the criteria of inclusiveness, open-mindedness, and criticalness. She adds:

As much as environmentalist perspectives have been left out of the curriculum, this problem is not best corrected by building them into the curriculum to the exclusion or trivialization of views and literature from other (including "dominant" perspectives. Further, the questioning which (Orr promotes) is always of dominant Western beliefs and practices and never of environmentalist claims. Their critiques are important, but environmental education's critical focus should not be employed only on dominant culture discourses and withheld from environmentalist ones. (Courtenay Hall, p.142)

It is important to recognize that the entire body of thought within the domain of sustainability or sustainable development is grounded on the premise that our current pattern of human activity cannot be sustained and that a "new balance" must be sought in order for the current situation to be corrected. As the B.C. Round Table on Environment and Economy (BCRTEE) (1993) states:

Sustainability concepts are ideas and perspectives that, taken collectively, help define the relationship of people to the earth and outline how we can change our attitudes and behavior to ensure the planet's on-going ability to support all life while we continue to strive for an improved global standard of living for people. (BCRTEE, 1993, p.9)

This line of reasoning is often then extended to urge economic globalization on the one hand and grass roots political action and community-based development on the other while never questioning whether they are compatible, a contradiction noted by Wackernagel and Rees and by Orr. Discussions of sustainability are characterized by arguments about how to achieve it, often with opposing views from those who regard sustainability as requiring "technological" approaches versus those who believe deeper societal changes and reforms are needed. What is usually not subjected to critical review is whether or not there actually is a serious environmental problem at the global scale in the first place and on what sorts of evidence those who argue that there is an environmental crisis base their claims. Julian Simon, a well known contrarian economist, for example challenged environmentalists to produce evidence to support their case that the environment was generally deteriorating, citing counter evidence to the effect that while there were certainly localized, serious problems, the general world environmental situation vis a

vis the welfare of human beings, was improving (Miller, 1990). This case has been put more recently by Ausubel (1996) who views human progress as follows:

The largest global change is that humans—vulnerable, pathetic mammals when naked—have learned how to control their environment. Science and technology are our best strategies for control, and our success is why we now number nearly six billion. (Ausubel, 1996, p.12)

There are indications that debates about the nature of our environmental problems and how to address them (or even if they require address at all), will become more difficult and strident. The changes needed to implement some of the provisions of the climate change protocols negotiated at Kyoto are likely to affect the price of fuel in the developed western world and result in higher standards for emission controls. These changes may ultimately lower costs and create employment, but in the short term they may raise consumer prices and result in job-losses in some resource and energy industries. Certainly they likely will mean a shift in power from one type of industry or resource sector to others. Already, large oil companies have invested many dollars in advertising to oppose the provisions of the Kyoto agreements (David Suzuki Foundation, 1997; An urgent message about climate change, 1997).

The science of global change, and especially global climate change is complex. Science is an on-going process. Today's theories can be replaced by new observations and experimental results. New methods and technologies provide new perspectives. Science is not so much about certainty as it is about progressive refinement of understanding. As in other fields of scholarship, debates are common among those who support different theories and methods, or who have different views of the significance and reliability of experimental data. These debates can be quite heated and confusing to outside observers. Of course, they provide interesting fodder for journalists who report on scientific issues for popular media. While science is not a consensual activity, there are nevertheless views which are held by most reputable scientists as distinct from those of a minority, or those promoted by others with poor reputations (Somerville, 1996). While most scientists can recognize and evaluate the quality of reports from different sources, members of the lay community are often not easily able to do so.

Moreover, because science isn't done in a social/political or economic vacuum (Science Council of Canada, 1984), vested interests may try to use the results of research to support or oppose policies and to influence policy makers, making judgments about the reliability of reports even more difficult. Policy makers themselves must decide about the risks associated with

possibly premature or unnecessary actions to address potential problems as opposed to those arising from inaction. The process of risk assessment is also complex and poorly understood by the general public.

Recent studies of public understanding of global climate change and other global change issues (Kempton, Boster & Hartley, 1996) and other studies of general scientific knowledge such as **The Private Universe Project** (Harvard Smithsonian Center for Astrophysics, 1995) appear to show that while there is general interest in and support for environmental protection and conservation measures in the U.S., there are serious misconceptions about fundamental principles of ecology and Earth science. Of even greater concern is that some of these misconceptions are found among graduates from some of the best institutions of higher education in the U.S. Global change science isn't simple and the level of reporting about it in the mass media can be very poor (Schneider, 1997). Thus, for example, the term global warming is popularly used to describe all aspects of global climate change. In fact, however, global climate changes, even if the results of an overall warming trend, may be actualized in particular places as cooler, wetter weather (Calvin, 1998). It is difficult for lay people to understand how "warming" on a global scale can mean colder winters where they live. Small wonder therefore that those with vested interests in convincing people that fears of global climate change are exaggerated have fertile ground in which to sow doubt (The Political Economy Research Center, [PERC]1997).

These are some of the challenges facing an environmental education program which tries to help people develop the ability to understand environmental questions and appreciate how knowledge of the environment and human activities in it has been constructed.

To summarise, environmental education is linked with modern environmentalism. Environmentalism may be defined as a set of beliefs, based mainly on scientific claims and more recently on economic analyses, that there are serious problems in the environment caused or amplified by human activities. Environmentalists believe that these problems degrade the quality of life, and may ultimately threaten the capacity of the Earth's ecosystems to sustain life. While there is a substantial body of scientific research in support of this point of view, reflecting mainstream thinking in the scientific community, it is not uncontested. Disagreements mainly revolve around different views of the seriousness of environmental problems and how to address them, although this statement tends to suggest that differences mainly concern matters of priority and technical approach, when in some cases there are profoundly different perspectives of human-nature relationships, the place of humanity in nature, and the value of the environment or major components of it (Kellert, 1997; Quinn, 1992, 1997; Roszak, 1992). The

different views are often represented in debates surrounding the concept of sustainable development (Suavé, 1996).

The various views of the current state of human-environment relations also have consequences for the development of environmental education curricula. If, for example, environmental problems are seen as requiring mainly the application of existing knowledge and technology, then the curricular focus will likely be on the acquisition of technical knowledge and skills, with an emphasis on science, mathematics, applied sciences, and economics. If, on the other hand, the curriculum developer believes that environmental problems reflect more radical societal problems or fundamental flaws in contemporary epistemology, his or her program proposals are likely to focus on values, ethics, religious perspectives, radical critique, and empowerment for personal and societal change. Sauvé (1996) outlines the consequences of four different views of sustainable development and the nature of human-environment relationships for curriculum development. She contends that the point of her analysis is not to suggest that any single paradigm of environmental education is the right, best, or only way, but to support the position also advanced by Hart, (1990), Jickling (1992a, 1997), and Robottom (1990) that environmental educators should treat the differing perspectives as a focus for critical thought rather than rendering them part of the implicit or null curriculum or disparaging them as idiosyncratic distractions from the serious work of environmental education. If, as Sauvé and others (Hart, 1990) claim, it is the personal theories of practitioners, self constructed in the course of their daily lives and work, explicated or not, that are the greatest influences on practice then the challenge facing the developers of written curricula is to invite practitioners to engage in critical reflection before deciding about different possible approaches, the range of professional options and the relative educational merits of each. A curriculum considered this way is not a tool for marketing educational materials, or obtaining funds from granting agencies, but a catalyst for thinking about how to address humanity's current environmental situation in ways which are educationally sound.

To this point I have tried to show that the concept of education in the term environmental education is often either taken as commonly understood or as so unproblematic as not to require further consideration, while the term environment reveals a host of conceptual difficulties including fundamental differences concerning the place of humankind in nature, the extent and seriousness of problems created by human activities in the environment, the means of addressing environmental problems (including disagreements concerning whether they need to be addressed at all) and about which forms of knowledge are of most value or importance in understanding human-environment interactions or solving environmental problems. Again, however,

environmental educators all too often appear to approach curriculum development by assuming that there is a common perspective about the nature and seriousness of environmental problems and a generally held conception of the role of humankind in nature. I will now turn to the some of the recent consequences of this treatment of the key concepts of environmental education in curriculum work.

IV. Contemporary Critics of Environmental Education

“The environmental education movement is based on flawed information, biased presentations, and misguided objectives. At worst...impressionable children are being browbeaten into an irrational rejection of consumption, economic growth and free market capitalism. (New York Times, April 22, 1997, p.A8 cited in Wals and van der Leij, 1997b, p.49)

As the above passage shows, disagreements about the nature of environmental education are not confined to academic journals and members of the environmental community. In the past three years there has been a number of highly focused, well organized, critical appraisals of environmental education. In the state of Arizona, for example, criticism of environmental education has led to the withdrawal or non-funding of proposals for environmental education and there has been a sustained attack on that state’s policy for environmental education (C. Allen and K. Baldwin, personal communication, August, 1996). One of the most frequently cited published attacks on environmental education is entitled **Facts Not Fear: A Parent’s Guide to Teaching Children About the Environment** (Sanera & Shaw, 1996). Michael Sanera is Director of the Claremont Institute’s Center for Environmental Education Research. Jane Shaw is a research fellow with the Political Economy Research Center (PERC) in Bozeman, Montana. These organizations may fairly be described as “right of center” in their political orientation. In a published essay, *Kids and the Environment: Taught to be Warriors, Worriers* (Sanera, 1995a) Sanera advances the case that:

Most states mandate that elementary school students receive some form of environmental education. Unfortunately, the education that they receive consists mostly of scare tactics and calls-to-arms. The real purpose of most environmental education is not to educate children in sound science and economics, but to activate them in environmentally correct ways. (Sanera, 1995a, No page)

He extends his argument into the area of environmental education concerning energy resources and conservation in a published version of a speech made to the Association for Private Enterprise Education:

The author found that most texts ignore or incompletely explain basic economic principles in their discussions of energy and natural resources. Slightly over half the texts incorrectly informed students that energy and resources are in danger of depletion when economic research demonstrates the opposite. (Sanera, 1995a. No page)

In other work he contends that environmental education is “misleading, if not downright wrong” (Sanera & Folsom, 1995), “promotes biased information over sound scientific data and balanced academic research, political action seems a higher goal than real education” (Sanera, 1996). Other critics also supported by the Claremont Institute claim that environmentalists are advocates, not educators, and as such are ill-suited to teach children the “facts and theories of ecology” (Kwong, 1995), while Sanera’s collaborator at the **Political Economy Research Center**, Jane Shaw, maintains that::

Many environmental materials in the schools usually tell just one side of the story,...Rather than introduce children to the spirit of scientific inquiry, they try to turn them into automatons—and scare them as well.....Heavily influenced by activist environmental groups, schools emphasize worst-case situations and express hostility to normal activities such as logging and farming... (PERC, 1997. No page)

Many of the critics and the organizations which support them make extensive use of the World Wide Web as a medium for the distribution of their views, although they also publish in conventional print formats. Additionally, Sanera is active on the public lecture circuit and even appeared in an interview broadcast nation-wide by CNN television on Earth Day, 1997 (Wals and van der Leij, 1997a.) He has clearly influenced the views of organizations such as Concerned Women of America (CWA) which describes itself as “America’s largest pro-family womens’ organization” and claims to have more than one half million members. At the World Wide Web site maintained by CWA there is a review of Sanera and Shaw’s **Facts Not Fear**, stating:

Millions of children are being taught that “growth in world population may result in massive starvation, that ozone depletion will cause epidemics of deadly skin cancer, and that global warming will cause the polar ice caps to melt and flood coastal cities,” according to Michael Sanera, the author of **Facts Not Fear: A Parent’s Guide to Teaching Children About the Environment**. The problem is that these predictions of gloom and doom are not based on facts.

The plain truth is that world population growth peaked in the late '60s and then

began to decline. Despite reports of incessant ozone depletion, there have been no epidemics of skin cancer, cataracts, immune diseases, or ecological calamities. Moreover, the government's own measurements, as cited by the National Center for Public Policy Research, show that the earth's temperature has cooled by .037 degrees Celsius over the past 18 years.

Educators are supposed to teach students how to think critically about the facts, not how to lobby on behalf of environmental groups. Keep politics out of the classroom. Children deserve an education that will equip them to address the real dangers of the 21st century. (Concerned Women of America, 1997, no page)

It is important to note that the "real dangers" are not identified. The political influence of groups such as CWA should not be underestimated. They maintain an active presence as lobbyists in Washington, D.C. and also promote their views by means of television and radio programs.

A possibly more credible critique of environmental education has recently been mounted by the George C. Marshall Institute, which is described as a "non-profit research group". The Institute has established an Independent Commission on Environmental Education, chaired by Robert L. Sproull, Emeritus President and Professor of Physics, University of Rochester and composed of 9 other reputable scholars, including John F. Disinger, a well known American environmental educator who worked at ERIC's science, mathematics and environmental education Clearinghouse, was active in the North American Association for Environmental Education, and was a Professor of Natural Resources and in the Department of Education Studies at Ohio State University. The Commission released its findings in April, 1997, in a report entitled, **Are We Building Environmental Literacy?** It concluded that:

...although environmental education is an important topic for grades K-12, many environmental education materials used in our nation's schools do not give students enough science and economics to understand the environmental challenges we will face in the next century. (Independent Commission on Environmental Education, 1997, No page)

In a press release issued by the Institute the commission's chairman, Robert Sproull added:

We found some excellent resources, factual, exciting, and challenging at all grade levels. We also found many, however, that simply ignored or misstated the most important and interesting scientific questions at the heart of an education about the environment, " said Commission chair Dr. Robert L. Sproull. (Independent Commission on Environmental Education, 1997, No page)

The approach taken by the Commission was to undertake a content analysis of environmental education materials from “diverse sources that were widely used, recommended, or suggested as suitable for classroom use by an established science or education organization”. The materials reviewed were produced by a range of sources including government agencies, text publishers, environmental organizations, and industry groups. According to the Commission “good” materials tended to:

- engage students in real scientific experiments and doing what scientists really do;
- recognize uncertainties and tradeoffs in environmental decision making;
- use the complexities of environmental topics to motivate students to further study of science and economics.

The problems described by the Commission included:

- ..an oversimplification of the complexities that characterize environmental decisions;
- factual errors, such as estimates of U.S. oil production that are wrong by a factor of ten;
- a failure to distinguish between scientific hypotheses and established facts;
- too little instruction in risk or cost-benefit analyses.

The report also states:

(The Commission) noted the importance of teaching environmental stewardship, but stressed the requirement to give students the intellectual tools they need to become responsible citizens. The panel was especially troubled by the unsophisticated level of the high school environmental science textbooks, the very place where students should deal with complex science. Commission chair Sproull called these texts ‘science-lite.’ ‘Some high school environmental texts have very little science, and in many, what science there is is often incomplete, simplistic, and at times just plain wrong.

The environment presents an opportunity for multidisciplinary education that permits students to apply learning from science, social science, mathematics, history, and other disciplines,’ said Sproull. ‘Unfortunately, these materials miss a great chance to use the environment to bring these subjects alive for students. (Independent Commission on Environmental Education, 1997, no page)

The commission made a number of recommendations including a call for educators and academics in the disciplines to pay more attention to the content of educational materials and that a “peer review” process be used to improve publications. Textbook publishers “should submit materials to scientific review from all relevant disciplines”. Moreover, perhaps predictably, teachers should relieve substantive preparation in science, mathematics, and economics in order to teach environmental science. “The report also notes the difficulty teachers confront with environmental education because it is multidisciplinary “, noting that this fact means that there is an even more urgent need to ensure that “available classroom materials promote environmental literacy.” The commission’s chair also lauded the diversity of views among its members and stated that this added to the comprehensive and thoughtful nature of its reviews. However, the published version of the commission’s reviews states that they are “not intended to be comprehensive” and that they are “summaries”. Additionally, the commission provides no statement of the criteria which were applied to the reviewed materials, although the bases for some of their criticisms and praise can be inferred from the remarks made in the press releases concerning the report and also from the conclusions and recommendations made in **Are We Building Environmental Literacy?**

It is evident that there is currently a body of work which is critical of environmental education. While it would be tempting to categorize some of these criticisms as biased and politically motivated based on the political orientation of the organizations which generated and distributed them, this would obscure the need to think clearly about the nature of environmental education and about weaknesses in it which provoke attacks and give credence to critical reviews. The style and tone of the criticisms of Sanera and his associates is quite different from that of the George C. Marshall Institute’s Independent Commission. Sanera et al. are appealing not to environmental educators but to parents, members of the general public, and groups with potential political influence on school programs. The Marshall Institute’s commission on the other hand appears to be addressing members of the environmental education community. In fact it states that its work should not be seen as an attack on EE but as being motivated by a desire for improvement. I will consider these two sources of criticism separately.

The critiques of Sanera and his associates while claiming objectivity, reveal some significant preconceptions. First, the title of Sanera and Shaw’s **Facts Not Fear** suggests particular views of the nature of education, the purposes of schools and the nature of knowledge itself, views which are extended in other essays, speeches and writings. Their major claim is that

environmental educators are deliberately misrepresenting the real state of affairs with respect to the environment. They are doing this either by stating non-facts (making untrue statements), or facts which are the result of flawed scientific research done by people whose credibility should be doubted. Furthermore, environmental education, they claim, has been appropriated to serve a political agenda which challenges free market economics and the Cornucopian paradigm (Miller, 1990). Consider for example, Sanera's statement that, "Slightly over half the texts incorrectly informed students that energy and resources are in danger of depletion when economic research demonstrates the opposite" (Sanera, 1995a). If this statement is true, then Sanera might have a case that environmental education is at best a pretty sloppy business or at worst deliberately distorting things to "frighten" or indoctrinate students. He might have made the case that because there are diverse opinions about the state of global energy resources, environmental education materials should at the very least help students appreciate both the nature of the different views and the possible reasons for them. But he doesn't take this position. Instead, he makes the counterclaim that "economic research demonstrates the opposite." But does it?

In March, 1998 *Scientific American*, a long standing, credible, if popular publication which presents findings from a number of fields of scholarship including the core natural sciences, psychology, and economics, as well as the Earth and Space Sciences in a form accessible to informed, reasonably well educated readers, published a Special Report, entitled, Preventing the next oil crunch. It contains articles by leading authorities in the field of energy resource economics, oil exploration and extraction technologies. The introduction to the entire report states, "Global production of oil from conventional sources is likely to peak and decline permanently during the next decade, according to the most thoughtful analyses" (Special Report: Preventing the next oil crunch, 1998, p.4). The series of articles which form the body of the Special Report are not written by hysterical "tree-hugging" environmentalists, nor do they present doom's day scenarios. They account for discrepancies in both the estimates of fossil fuel stocks and reserves and their interpretation. They acknowledge that new technologies can help discover new stocks and certainly improve extraction from sources once thought to be inaccessible or exhausted. Even so, they argue for an "orderly transition" to other energy sources, a transition which can only be made if we are willing to acknowledge the need and commit resources to accomplish it. This will, of course, require political decisions. The lead article is entitled, The end of cheap oil (Campbell & Laherrère, 1998). In their paper the authors state:

We have spent most of our careers exploring for oil, studying reserve figures and estimating the amount of oil left to discover....Over the years we have come to

appreciate that the relevant statistics are far more complicated than they first appear...Getting good estimates of reserves is much harder, however. Almost all the publicly available statistics are taken from surveys conducted by the **Oil and Gas Journal** and **World Oil**. Each year these two trade journals query oil firms and governments around the world. They then publish whatever production and reserve numbers they receive but are not able to verify them. The results, which are often accepted uncritically, contain systematic errors. For one, many of the reported figures are unrealistic. Estimating reserves is an inexact science to begin with....(Campbell & Laherrere, 1998, p.79)

It would be fair to say, therefore, that at least one group of acknowledged experts does not agree with Sanera's assessment of the state of knowledge about energy resources or that "economic research demonstrates the opposite". The point here is not to play the game of "My expert is bigger than your expert", but to point out that it would be a fair criticism of environmental education to indicate examples where programs make statements as if they were uncontested truths when in fact there are uncertainties or methodological problems in data collection and interpretation. It is not, however, fair comment to replace one contestable "certainty" with another (its opposite), which is then represented as the actual true state of affairs. By taking this approach, Sanera and his colleagues reveal some biases of their own.

However, there is another premise embedded in the arguments of Sanera and his supporters concerning the nature of environmental education, namely, that (the real or true) facts will not generate fear, because there is actually nothing to be afraid of. That is, if we accept the claim that there really are no serious environmental concerns, or that they have been grossly exaggerated then there is no reason for fear. On the other hand, let us assume for the moment that the "facts" are such that they are actually likely to generate a fearful emotional response, as in the situation of a patient who is informed by a physician that she has a life-threatening illness. Is Sanera suggesting that any facts which might raise controversy or generate anxiety should be excluded from consideration in schools? Surely, to return to Barrow's conception of education, the purpose is not to avoid the legitimately fearful, or the consideration of fearful possibilities, but to recognize an emotional response, and consider what can be done to address it in a sensible manner. The patient confronted with bad news will not be well served by dismissing the doctor as an alarmist. Furthermore there is some empirical evidence to suggest that young students are not protected from feeling afraid by omitting fearful topics, such as the possible threat of nuclear war, for example, from school programs (Hargraves, 1984).

Third, it appears that Sanera, his associates and followers consider schools to be places where students should be taught to think (critically) about "facts", even if it is unclear how such

facts are to be determined or derived. However, students should not be taught about political action or confronted with the political dimensions of environmental problems. As the Concerned Women of America (1997) state, "keep politics out of schools". But surely schools already socialize children to a set of political concepts, those of western democracy as currently practiced in the United States. In fact, organizations like CWA claim to want to strengthen these fundamental American values. Of course, there is a distinction to be made between indoctrinating students to a particular political ideology as opposed to inviting them to think critically about the nature of politics per se and about the differences between political discourse and the discourse of science, mathematics, or religion. Orr (1992) views environmental education as inescapably political simply because politics is concerned with making societal decisions about values and priorities. He maintains further that human-environment interactions are affected by those decisions, and the state of our environment reflects the consequences of past choices. To exclude consideration of the politics of contemporary issues from the agenda of education and schooling is to possibly leave children and adolescents either apathetic about the political process or to foster ignorance and nurture indoctrination. Of course, the views of some environmentalists, but certainly not all, are challenging to mainstream politics and economics. It appears that Sanera and his associates want to exclude such views from schools in the guise of protecting students from political indoctrination. It is also possible, however, that they wish students to consider only current mainstream political ideology. The point here is not that school programs should promote particular political positions, even if they already do this explicitly or implicitly, but to consider how politics as such and political issues can be considered in educationally sound ways.

If Sanera intends by his critique to improve environmental education then he might do well to propose criteria of educational merit or suitability for inclusion in school programs and focus on areas where critiqued programs fail to meet his criteria. His readers could then decide in the first place whether or not his bases for making judgments and criticisms were valid and useful rather than simply having to accept his case as put. Instead, Sanera and his followers often appear to argue to replace one ideology, environmentalism, with a second, which might be termed frontier economics (Government of Canada, 1991) or corporatism (Saul, 1995).

The Independent Commission on Environmental Education's approach to critiquing environmental education materials seems more impartial, objective, and fair-minded than that of Sanera et al. Certainly, the commission's chair contends that its work should not be viewed as an attack on environmental education but as positive, constructive criticism. Nevertheless, the report and published statements about it by the staff of the Institute reflect particular views of

the nature of environmental education. First, the commission appears to believe that environmental education should be mainly “environmental science” and that the study of the environment should emphasize the procedures and perspectives of the natural sciences, mathematics, and economics, the latter apparently being considered a science. The chair’s claim that too many environmental education programs appear to be “science-lite” suggests that environmental education should be approached as a scientific form of knowledge and discourse. While acknowledging that concerns about conservation, mitigation, and stewardship may be legitimate foci for environmental education, they are to be considered largely within the context of scientific ways of knowing, and only after students have been thoroughly grounded in “real” science. Students should gain the intellectual tools they need to become “responsible citizens”, but what these tools are is not revealed. This comment is joined to a criticism of the weak science in high school environmental texts so it may well be that responsible citizenship is also seen as having scientific understanding and methods at its heart. There is little mention of other forms of knowledge as having anything at all to do with appreciating or understanding the environment although the Institute reports that the commission suggests that the environment “...permits students to apply learning from science, social science, mathematics, history, and other disciplines...”. If environmental studies are to be multidisciplinary, the disciplines which appear to be given most consideration are the sciences and mathematics, plus economics: environmental topics are to be used to “motivate students to further study of science and economics”. Additionally, the Commission recommends that environmental education materials should be submitted to “scientific review” from all “relevant disciplines”. How would a scholar of English Literature engage in a “scientific review” of the educational contribution made by an environmental education program to literary understanding or the appreciation of literature?

The commission offers no statement of the criteria by which it decided about the worth of the materials it reviewed. We are left to infer that whether or not they presented environmental topics through the lens of the sciences, mathematics, and economics and engaged students in doing “real science” as done by “real scientists” were foundations of the critique. In addition, since the commission apparently found substantial errors in content, the quality of scientific information was also probably taken into consideration in its reviews. For example, the Commission noted

“...factual errors, such as estimates of U.S. oil production that are wrong by a factor of ten” (Independent Commission on EE, 1997). Again, as I have shown above in referring to the recent Special Report in *Scientific American* (March, 1998), there are in fact substantial areas of disagreement in estimates of U.S. oil reserves and production. Apparently the reviewers of the

commission felt a great deal more certain about the figures for oil production than do acknowledged authorities in the field. So, which “facts” should have been cited by the errant texts?

Again, the issue here is not whether or not the content of some environmental education programs contains errors, but whether or not the approach taken by the commission in assessing educational merit was based on clearly stated criteria. If the Commission’s critique is based not on a preference for one set of environmental data over another (especially where there is uncertainty and disagreement) but on how programs present data *per se*, and initiate students into the ways in which knowledge is constructed and claims made and tested in different disciplines and fields, then they have performed a useful service. If its argument is that the facts presented in some programs are not acceptable or correct implying thereby not that the facts are open to debate, but that they should be replaced with “true facts” which are incontestable, then the commission is open to charges of bias. At the date of this writing there have been too few intensive reviews of the commission’s work to decide, although some commentators have claimed that it tends to find pro-industry, pro-resource use, and pro-free market economics oriented materials to be acceptable, while those taking a more radical conservationist or ecological approach to sustainability were found wanting, or simply not reviewed.

It should be noted at this point that there are other critics of environmental education whose critiques are grounded in the notion that environmental education is not radical enough, or has been co-opted by corporate and government agency interests to support “resource management” approaches and Cornucopian ideologies (Van Matre, 1972, 1974, 1979; Weston, 1996). Orr (1992) even asks whether or not environmental education as traditionally practiced doesn’t represent an oxymoron. Organizations like Defenders of Wildlife in the U.S., for example, have attacked programs like Project WILD as perpetuating consumptive approaches to natural resources and as treating animals only in terms of their value to humans, especially as objects of hunting and fishing. This criticism gains weight when it is considered that Project WILD is sponsored mainly by state Fish and Game agencies which rely heavily on revenues from the sale of licenses for hunting and fishing. Once again, the conceptual problems of environmental education and the lack of well developed criteria of educational merit and appropriateness joined to a clear position on the purposes of schools returns to haunt environmental educators.

V. Professional Environmental Educators Respond to the Critics: The Challenge of Assessing Quality in Environmental Education Materials and Programs

The North American Association for Environmental Education (its name notwithstanding) is the largest professional environmental education organization in the world, with members from many countries other than Canada, the U.S., and Mexico. The Association has been increasingly conscious of the attacks and critical comments directed at environmental education, both from the left and right. In 1994, partially in response to critics, it established a committee to develop “standards” for environmental education as a follow up to the **National Forum on Partnerships Supporting Education About the Environment** (President’s Council for Sustainable Development, 1994). The results of its efforts, published first as **National Standards for Environmental Education: What School-Age Learners Should Know and Be Able to Do** (Working Outline) (NAAEE, 1995) and in a revised format in 1996 as **Environmental Education Materials: Guidelines for Excellence** (NAAEE, 1996) have been described above. As noted, there was considerable response to the 1995 Working Outline with the result that the term “standards” for curriculum in environmental education was dropped and the language softened to Guidelines (Roth, R.E. 1997). The final Guidelines document is described as a set of “recommendations for developing and selecting environmental education materials, including activity guides, lesson plans, and other instructional materials. The Guidelines are intended to help developers produce “high quality products” while giving educators a “tool to evaluate the wide array of available environmental education materials” (NAAEE, 1996, p.1.).

There are several questions to be asked about the NAAEE’s Guidelines document from the standpoint of the concerns of this chapter, that is what perspective does it offer concerning the educational purposes of environmental education, and what views does it support, implicitly or explicitly, concerning the environment and human-environment relationships. In other words, how useful will the Guidelines be in helping educators decide about the educational merits of environmental education materials. However, before proceeding to a consideration of that question, it is worth noting that the Guidelines document refers to curricula, materials, resources, texts, and other ways of presenting environmental education without making any clear distinction among them. The document refers to “curriculum developers”, but makes no attempt to define a curriculum as distinct from materials, resource packages, texts, multimedia kits, and other educational publications. In Chapter 2 I have discussed some concepts of curriculum and curriculum criticism. Is a curriculum more than a single lesson, learning activity or enrichment presentation.

The blending of curricula, materials, resources, media kits and other presentational formats in the Guidelines document most likely reflects the fact that there is a tendency to blur or ignore distinctions between environmental education and environmental information. A great many agencies and organizations produce information about the environment, ranging from nature study and conservation programs from the Audubon Society, to water conservation materials offered by government agencies and utilities charged with water management and supply, to information for hunters and fishers provided by Fish and Game agencies in states and provinces. These information packages are often distributed free to schools. Sometimes they are supported by in-service programs for teachers or by in-school visits from resource persons. They are often presented as “educational” when in fact, they are clearly informational. Given the great variety of environmental materials it is unfortunate that the NAAEE Guidelines simply lumped them all together under the umbrella term, environmental education. Again, this reflects a failure to address the issue of what is educational about environmental education. The problem of lumping information with education also afflicts the work of the critics of EE, in particular the Independent Commission of the George C. Marshall Institute, discussed above.

To be fair, the trend toward treating information and education under the same banner also reflects the fact that while more than 30 U.S. States mandate environmental education (Independent Commission on Environmental Education, 1997), EE is still often treated as a supplementary topic in the school program and is included where there are keen teachers, or spare time, often near the end of the school year. **Project WILD** (Canadian Wildlife Federation, 1992) for example, perhaps the most widely used environmental education program in North America, has always described itself as a supplement to the regular school curriculum and its materials provide support to teachers who wish to use it as a means of enhancing existing curricula in science, mathematics, social studies, language arts, etc. Again, it might have been extremely helpful had the NAAEE Guidelines document attempted to provide a classification of differences among educational versus informational materials, curricula vs enrichment materials and supplementary resources, but it did not.

It might also have been helpful if the Guidelines had made a distinction among the different forms of presenting environmental education and attempted to define those aspects of environmental education, if any, which place particular constraints on the curricular commonplaces. There is a difference between written curriculum proposals and curriculum as taught in classrooms, experienced by students, and finally learned by them. The emphasis of the Guidelines is on materials, not classroom situations and student experiences. In places it seems

that the document holds the implicit view that curricula and other “materials” are made outside classrooms by developers, text writers, or experts and then applied by teachers, although the authors state that they expect educators, administrators, curriculum designers, and materials developers to exercise flexibility in their interpretation of the Guidelines and to shape content, technique and other aspects of instruction to their own situations. Even given these comments the Guideline’s view of the role of teachers in curriculum development is quite different from those of Hart (1990, 1996), Robottom (1990, 1994) and Wals and van der Leij (1997a). The authors of the Guidelines document state that it provides a set of ideas about what a well-rounded environmental education curriculum might be like, but they note that few materials will exemplify all six guidelines. Nowhere in the document is found an explicit description of the nature of education *per se*, or of the purposes of schools. The authors claim that the Guidelines represent a “common understanding of effective environmental education” (p.1), but as I have shown previously, this understanding may be shared by many environmental educators, but it is by no means unanimous, assuming that consensus or unanimity were desirable in a field like environmental education.

Perhaps this is why the **Guidelines** document doesn’t clearly address foundational concepts of education, the environment, and schooling which should form the basis for developing a set of criteria or standards of judgment about the quality of environmental education materials. Perhaps the authors believed that if the guidelines are grounded in a “common understanding” then there was no need to return to a consideration of these questions. But the statements in the **Guidelines** regarding a consensus about the educational purposes of environmental education and the place of EE in schooling deny the existence of an active and serious on-going debate in the EE community at present which is reflected in the writings of Courtenay Hall (1996), Hart (1990, 1996), Jickling (1992a, 1992b, 1997) MacDonald (1996,1997) McClaren (1997), Orr (1992), Robottom (1994), Sauvé (1996) and Weston (1996a, 1996b). Although NAAEE claims to be an international organization it appears to ignore works by environmental educators from Canada, Australia, the U.K., and even from within the U.S. when the authors dissent from the mainstream “common understanding”. It is not likely that the development of EE as a field will be well served by this approach.

As a document the **Guidelines** attempts several tasks, although it doesn’t present them explicitly as listed here:

It develops a description of the attributes of an environmentally literate citizen;
 It describes the nature of the environment which is to be the focus of educational concern;
 It offers elements of a prescriptive theory of environmental education;
 It offers elements of a descriptive theory of environmental education;
 It offers suggestions to authors/designers/developers concerning practical aspects of presenting and designing environmental education materials.

Unfortunately, these purposes are blended and amalgamated through the entire document. It is difficult to determine when it is addressing teachers, administrators, curriculum developers, or authors and to separate the vision of the environmentally literate student from a list of criteria for materials development or a description of possible learning experiences. But, possibly most significant, at no point does it clearly and directly suggest that environmental education materials, curricula, or resources, to be truly educational should problematize human environment interactions and apparent environmental problems (Hart, 1996). Rather than assuming that students, teachers, and other users accept the “story line of (environmental) risk” which has a lineage traceable from Malthus, through Darwin , to Marsh, Muir, Pinchot, Carson and eventually to the Club of Rome’s **Limits to Growth** in 1972 and **Our Common Future** in 1987 (MacDonald, 1997), environmental education programs should awaken understanding and awareness that in fact it is a “story” created within certain forms of knowledge and discourse and a suitable subject for critical inquiry in its own right. Many environmental education proposals list critical thinking among their purposes, as does the Guidelines. But to what ends is critical thought directed and what is meant by the term?

For example, the Guidelines document refers to the now popular concept that environmental education materials should meet criteria of “fairness”, “accuracy”, “balance”, and “openness”. While noting, for example, that to be “balanced” does not mean giving equal emphasis and time to every possible idea and viewpoint on an issue, the document fails to seize the educational opportunity which is represented by these goals. Thus, the Guidelines offers that “environmental education materials should reflect sound-theories and well-documented facts about subjects and issues” (p.5). It then offers a list of suggestions to the reader concerning “What to Look For” in regard to Factual Accuracy. Included in the list are “clearly referenced facts”, current data drawn from identified sources, language appropriate to education rather than

“propagandizing”, information from primary sources (rather than reviews or newspaper articles), and evidence that a range of experts reviewed the materials. Of course, the key question is “what is a fact” in the first place, and how can students be taught to think about the nature of evidence and the different ways in which different forms of knowledge test claims and assess truth. To do otherwise is to perpetuate epistemological problems of the type characterized by Bateson (1979) as confusions about number, quantity, quality, and value. Particularly disturbing is the weight given in “What to Look For” to the authority of experts. Again, if we seek to educate students in critical thought they should address issues of precisely this sort: how do we decide whether a person is an expert and whether his or her expertise implies that we should unquestioningly accept his or her claims and arguments? What is the nature and current status of the field in which the expert’s expertise has been established? These are questions with greater educational merit than having students decide that a particular item of data must be true because it was published in a widely read and cited trade journal (a problem mentioned above in the discussion of the “facts” about U.S. oil reserves.)

The authors of the **Guidelines** appear to subscribe to the view that the only materials which should be allowed into schools are those which meet their criteria. Leaving aside for the moment whether or not the **Guidelines** offers an acceptable way of assessing educational merit, it is useful to note again that many of the materials presumably to be evaluated are not curricula, and do not claim to be educative, but rather are presented as information, or as points of view or arguments for particular actions. Should the publications of a strong advocacy group such as Greenpeace or Defenders of Wildlife be excluded from schools because they clearly present particular viewpoints and arguments, often accompanied by selected information claimed to be factual. To be sure, such materials, handled poorly by teachers, could be uncritically accepted by students who might consider them to be exact and objective. But basing law on “hard cases” (unless we assume that the majority of teachers are incompetent) seems a poor way to proceed. The critics of environmental education, especially those on the right side of the U.S. political spectrum call for keeping “politics” out of schools: by this they seem often to really mean keeping out of schools all the views of those who disagree with them. The **Guidelines** document, by failing to distinguish between education and information, offers the view that all materials (as distinct from curricula or programs) should embody “Fairness”, by which they appear to mean that there should be a presentation of different opinions and perspectives in a balanced way in every item of environmental education and information material. Is it reasonable to expect that Greenpeace will present the views of those who want to return to hunting large numbers of whales when the organization was founded on the view that this is wrong, a view based both on scientific, moral, and aesthetic arguments. If students are shielded from all

strongly held views on the grounds that they may be unfair, biased, or inaccurate will they learn to think about the very nature of fairness, bias, and accuracy? Examination of perspectives and different points of view in schools doesn't mean agreement. The task of educators is to provoke thought, to nurture critical inquiry, and the asking of hard questions. If students are only to be presented with the intellectual equivalent of Pabulum, how will they ever develop the habits of mind we associate with education.

Without dissecting the **Guidelines** document further, I wish to make the point that it is an attempt to address issues of quality in environmental education curricula and environmental information materials. The attempt is worth making, even without the attacks of critics like Michael Sanera. The NAAEE's initiative would have been more worthwhile had it avoided simply responding to the charges of critics and repeating oft cited definitions such as those of Tbilisi and returned to a consideration of first principles which could provide a basis for making judgments (or at least thinking about judgmental criteria) of the educational worth of materials and programs. For this to have happened the NAAEE's "writing team" should have asked:

What does an environmental education curriculum have to accomplish in order to foster educational development or to have educational merit;

How do the educational purposes of environmental education conform with other purposes and structures of contemporary schooling;

Are there environmental information materials, which while outside the boundaries of education in a strict sense of the term, are still compatible with the purposes of schooling and which might enliven modern schooling; could these information materials be incorporated into an environmental education program given other curricular conditions (effective use by teachers as foci for critical thinking or the analysis of claims);

What is the difference between environmental information and environmental education; what is the difference between environmental education materials which are supplemental to curricula (environmental or otherwise) and those which are intended to serve as curricula (in short, what IS a curriculum for environmental education and how does it differ from other written environmental education materials).

The problem that arises from this list of questions concerns the tendency of modern educational writing to blend educational concepts and purposes with those of schooling, and, in some cases to extend the purposes of schools so widely as to blur any boundary between their purposes and those which might better be performed by other elements of society. At this point I want to propose that the term environmental education should be distinguished from environmental schooling. In doing so, I take the position of Barrow, Goodlad, and others who claim that there are many things which are done in schools which are useful, valuable, and necessary but which are not necessarily educational. Moreover, I propose that if education arises from thoughtful transactions among students, teachers, objects of study, including texts (which offer the experiences and knowledge of others vicariously), works of art and literature, direct experiences such as laboratory experiments or field work) then it may be argued that many of the functions performed in schools (and legitimately done there within the framework of purposes proposed by Barrow, for example), can have benefits for both education and schooling.

For example, consider the student who takes a course in woodwork, a subject not included as one of the major forms of knowledge by Hirst and Barrow. The woodwork course is also not in the list of those subjects which are seen by Barrow (or Adler, 1982 or Bloom, 1987) as clearly belonging in the core curriculum on the basis of definite criteria about how to decide about the contents of the core. Even so, Barrow notes that other subjects may well be included in schools and seen as valuable and useful applying criteria other than those he offers for educational merit or for inclusion in the core curriculum of schools. But could woodworking contribute to socialization, physical, moral, or emotional development. Could it even foster education. The answer to these questions is likely found in the nature of the emergent curriculum, the set of transactions that occurs in every classroom, every day. Mathematics can likely be taught and learned in ways which are not educational. It might even be argued that they can be taught in ways which are appositional to education. By the same token, woodworking, as the focus of a set of transactions between student and teacher which addresses issues such as the nature of beauty, good design, efficiency, process, product and value, might well foster education, while if taught as a set of mindless drills and tasks in a setting where students simply followed rigid plans and formulas it could inhibit both the habits of mind associated with education and good craft work.

Hence, while it is useful to make a distinction between the purposes of education and the functions of schools and schooling, it is also important to recognize, as Barrow does, that

definitions of education imply ideas about the nature of knowledge, of what people should ideally be like, and what is characteristically human. These ideas affect how various subjects and activities are viewed within schools and by society at large. In certain forms they can, unfortunately, generate a syndrome characterized by Goodlad (1984) as the rigid separation of hands and mind, a problem given eloquent expression by the cartoonist Gary Larson and captioned, "Non-singing canaries take woodshop." A consideration of what is meant by education in the context of environmental education would have been an excellent, and ultimately practical starting point for the NAAEE's effort to develop criteria for assessing program quality. In Chapters 5, 6, and 7 I will return to the question of educational merit in the context of the three critiqued programs.

VI. The Action Orientation of Environmental Education

Early descriptions of environmental education emphasized its concern with environmental problems and proposed equipping people with means of acting to address problems. This orientation is clearly seen in Stapp's 1969a definition:

Environmental education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and **motivated to work toward their solutions.** (Emphasis mine)

R.E. Roth included the triad of knowledge, awareness, and motivation as purposes of EE in his 1969 definition. The **Environmental Education Act of 1970** reflects the same major goals:

... **to promote** among citizens the awareness and understanding of the environment, our relationship to it, and the **concern and responsible action** necessary to assure our survival and to improve the quality of life. (U.S.Senate Committee on Labor and Public Welfare, 1970, p.3, emphasis mine.)

By 1975 the **Belgrade Charter** entrenched these purposes stating again that the goals of EE should be to:

...**develop a world population** that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations, and **commitment to work toward solutions** of current

problems and the prevention of new ones. (Belgrade Charter, 1976, p.2, emphasis mine)

Significant in the Belgrade proposals was an emphasis on values, as well as knowledge, attitudes and skills, and on awareness directed to “economic, social, political, and ecological interdependence” in both rural and urban settings. In addition, environmental education programs are to provide the knowledge, values, attitudes, commitment, and skills needed to “protect and improve” the environment. Two years later the Tbilisi Conference extended the list of purposes from Belgrade and offered a much more detailed list of goals and program characteristics. Thus, EE was to be interdisciplinary, consider the environment in its totality, including cultural and even moral dimensions, promote cooperative efforts to prevent and solve environmental problems, use strategies for developing knowledge, values clarification, and problem solving skills and place “due stress on practical activities and first hand experience.” Students were also to have a voice in selecting their learning experiences and special attention was to be paid to early childhood (Final report: Intergovernmental conference on environmental education, 1978.) The Tbilisi documents exercised significant influence on thinking about environmental education from that date onward. **The National Environmental Education Act of 1990** (see Chapter 3 for more detail on the Act) begins by outlining the serious nature and complexity of environmental problems and then offers environmental education as a means of developing, “understanding of the natural and built environment, awareness of environmental problems and their origins (including those in urban areas), and the skills to solve these problems (a restatement of the familiar knowledge, awareness, and skill triad.) Disinger (1993) terms the Act, “... a practical statement of educational purpose structured for implementation in the 1990’s under the leadership of the United States Environmental Protection Agency.” (p.24)

Considering the various descriptions of the purposes of environmental education outlined in the sections above, and in Chapter 3, it is evident that there is a broadly similar syntax to most of them. The typical syntax has the form:

Environmental education (should)....

Followed by a verb (foster, promote, aim to, etc.)....

Followed by a Noun (citizens, environmentally literate citizens, learners, etc.)....

Who are/can/will.....

Do Certain things or possess certain attributes: knowledgeable, skilled, motivated, take action...

Which will be achieved by (certain learning experiences, instructional strategies, support systems.

Implicit in the syntax is the premise that environmental education is needed because

By means of.....

A continuous, lifelong process, beginning at the preschool level and continuing through all formal and non-formal stages;

Through.....

An interdisciplinary approach, drawing on the specific content of each discipline making possible a holistic and balanced perspective;

Utilizing diverse learning environments and a broad array of educational approaches to teaching/learning about and from the environment with due stress on practical activities and first hand experiences.

Environmental Aspects of Plans for Development & Growth
The Complexity of Environmental Problems
Current and potential environmental situations, as well as historical patterns
Major environmental issue at the local, regional, national and international levels, and of environmental conditions in other geographic areas

DISCOVER the symptoms and real causes to environmental problems;
Play a role in **PLANNING THEIR LEARNING EXPERIENCES**
Make **DECISIONS** and accept their **CONSEQUENCES**;
SOLVE Problems;
THINK CRITICALLY

The necessity of local, national, and international cooperation in the prevention and solution of environmental problems;
Values Clarification

Have Knowledge Of....

Have Skills to....

Value....

Environmental Education Should....

Foster

Learners

Who

Figure 4.1: A Typical Syntax in Definitions of Environmental Education, Illustrated Through the Tiblisi Principles (UNESCO-UNEP, 1978)

Environmental Education should...

Stapp, 1969				
	Aim at	a Citizenry	That is....	<p>Knowledgeable</p> <p>Aware of...</p> <p>how to help solve environmental problems....</p> <p>Motivated</p> <p>to work toward the solutions to environmental problems</p>
Roth, 1969				
<i>(Environmental Management Education.....)</i>	Foster	a Citizenry	That is....	<p>Knowledgeable</p> <p>Aware of..</p> <p>the associated environmental problems and management alternatives of use in solving these problems;</p> <p>Motivated</p> <p>to work toward the maintenance and further development of diverse environments that are OPTIMUM for living.</p>

Table 4.1. (Part 1): The Syntax of Environmental Education Program Descriptions Compared

Environmental Education should...

The DDAG of 1970

(EE is an integrated process that...)

Promote a Citizenry

That is....

Knowledgeable

ABOUT the factors influencing ecosystems, mental and physical health, living and working conditions, decaying cities, and population pressures; the relation of population growth, pollution, resource allocation and depletion, conservation, technology, and urban and rural planning to the total environment.

Aware

of the environment and our relationship to it.

Concerned

and prepared to take responsible action necessary to assure our survival and improve quality of life.

Swan, 1974

Environmental education is to...

Develop a Citizenry

That is....

Knowledgeable

ABOUT the biophysical environment and associated problems

Aware

of how to become effectively involved in working toward the development of a more livable future

Motivated

to work toward the development of a more liveable future....

Table 4.1 (Part 2): The Syntax of Environmental Education Program Descriptions Compared

Environmental Education should...

Belgrade, UNESCO-UNEP, 1975.

Develop	A World Population	that is....	By....
		<p>Knowledgeable of the environment and associated problems</p> <p>Aware of and Concerned about the environment and associated problems</p> <p>Skills, attitudes, motivations and commitment to work toward solutions of current problems and prevention of new ones. Prepared to PROTECT & IMPROVE the environment.</p>	<p>Providing every person with opportunities to acquire (knowledge, skills, attitudes motivations & commitments..</p> <p>Creating new patterns of behaviour of individuals, groups, and society as a whole</p>

Table 4.1 (Part 3): The Syntax of Environmental Education Program Descriptions Compared

Environmental Education should...

<i>Orr, 1992</i>				
<i>Education for ecological literacy</i>	Develop	Stewardship	<i>By...</i>	Interdisciplinarity
		Prudence		A dialogue with a place which has the characteristics of a good conversation
		Enhanced competence with natural systems		Experiences in the natural world
		A shift in perspective from 'conqueror of the land community to plain member and citizen of it'		Modelling concepts and values in the style in which they operate. Form--Function.
		Foundational knowledge of the sciences, humanities, and social sciences under the umbrella of human-environment interactions.		
		<i>"All education is environmental education."</i>		

Table 4.1 (Part 4): The Syntax of Environmental Education Program Descriptions Compared

Environmental Education should...

CHERNOB, 1992

**Education for
environmental
literacy**

Develops

Knowledge
all the cognitive understandings about the workings of the natural world and human interactions and interrelationships with it;

Skills

-those cognitive, affective, and psychomotor abilities that can be developed, refined, and applied to human interactions with the environment, or to

Affect

encompasses all emotional traits and dispositions that appear to be potentially or actually associated with the environment and people's relationship to it

Behaviour

--all activities which maintain and/or improve the quality of the environment and that deal responsibly with concerns

Table 4.1 (Part 5): The Syntax of Environmental Education Program Descriptions Compared

Environmental Education should...

NAEP, 1996

Develop environmentally literate citizens....

Who are

Knowledgeable About...

- Natural Processes and Systems;
- How feelings, experiences, attitudes and perceptions influence environmental issues;
- The ideals, principles and practices of citizenship in "our democratic republic".

Skilled in...

- Investigation & Analysis of Environmental Issues Using a Variety of Techniques;
- Use of Basic Science and Math Skills to Explore the Nature of Bias;
- Citizenship;
- Critical and creative thinking;
- Higher Order Thinking Skills including identifying, investigating and analysing environmental issues and formulating and evaluating alternative solutions.
- Resolving environmental issues

Possess Habits of Mind to....

- Work individually as well as cooperatively to improve environmental conditions;
- Recognise uncertainty;
- envision alternative scenarios;
- adapt to changing conditions & information;
- a sense of personal stake & responsibility
- self efficacy

By...

Being Learner Centered;

Providing opportunities for students to construct their own understandings through hands-on/minds on investigations

Engaging learners in Direct Experiences;

Supporting development of an active learning community where learners share ideas and expertise and prompt continued inquiry

Providing Real World contexts and issues from which concepts and skills can be learned.

Being Comprehensive and cohesive

Encouraging learners to understand and forge connections with their immediate surroundings

Helping people move from local connections to larger systems, broader issues, and a more sophisticated comprehension of causes, connections, and consequences.

Using EE to meet standards of the traditional disciplines;

Providing opportunities to synthesize knowledge and experiences across disciplines; (Interdisciplinary).

Integrating and building upon the disciplines.

Table 4.1 (Part 6): The Syntax of Environmental Education Program Descriptions Compared

Environmental Education should...

Learning for Change 1993

<i>Education for Sustainability will</i>	Foster educated citizens who	<i>Fully contribute to building a sustainable British Columbia by</i>	By Understanding the holistic nature of the world and the interconnectedness of natural and human systems Understanding the global nature of the world and how local and regional issues are part of the whole.	Educating people about sustainability Equipping people with the skills to critically evaluate information, adapt to change, and find creative solutions to complex problems.
			Having the skills necessary to constructively participate in local, national, and global	Training people for employment in new knowledge-based environmental and technology industries
			Being Prepared to take responsibility as a contributing global citizen.	Training people in new management and entrepreneurial skills. Focusing on basic literacy and life skills for all people. Promoting the concept of life long learning.

* B.C. Round Table on the Environment and the Economy.

Table 4.1 (Part 7): The Syntax of Environmental Education Program Descriptions Compared

Environmental Education should...

Wals & van der Leij, 1997

Foster learners....	Who can	CONSTRUCT in the sense of building upon the prior knowledge, experiences, and ideas	By	
		CRITIQUE in the sense of investigating underlying values, assumptions, world views, morals, etc. as they are part of the world around the learner and as they are a part of the learner him/herself;		Being a participatory process that can lead to educational change...
		EMANCIPATE in the sense of detecting, exposing and, where possible altering power distortions that impede communication and change;		Leading to educational reform that ultimately can help people reshape relationships between each other and their environment.
		TRANSFORM in the sense of changing, shaping, influencing the world around them, regardless of scope or scale		Emphasizing autonomous thinking about environmental issue
				Being a Learning Process

Table 4.1 (Part 8): The Syntax of Environmental Education Program Descriptions Compared

there are environmental problems which must be addressed. Figure 4.1 illustrates the syntax of the Tbilisi principles in diagrammatic form, while Table 4.1 summarizes the syntax of a number of major proposals concerning EE which have been described in more detail in Chapter 3, and in previous sections of this chapter.

The recent **Guidelines** for EE produced by the North American Association for Environmental Education (NAAEE, 1996) acknowledges the legacy of the Tbilisi conference. Some of the Tbilisi statements are clearly reflected in the section of the **Guidelines** entitled "Environmental Education and Learning" (p.1.) where EE is said to be learner-centered, providing real world contexts and issues from which concepts and skills can be learned. In addition, EE is to view the environment within the context of human influences incorporating economics, culture, politics, and social equity as well as natural processes and systems. Learners are also to explore how feelings, experiences, attitudes, and perceptions influence environmental issues. They are to become knowledgeable about natural and human processes and systems. They are to investigate and analyze environmental problems and issues, using a variety of techniques. Moreover, the **Guidelines** document mentions students learning to recognize bias, appreciate the nature of uncertainty in environmental problems, and envision alternative scenarios, while adapting to changing conditions and information. For the first time the document refers to the development of "habits of mind" through which citizens will be better able to address common problems and take advantage of opportunities, whether environmental or otherwise.

In terms of environmental action, the **Guidelines** state that environmental education materials should develop "lifelong skills" that enable learners to prevent and address environmental issues (p.9.) Among the skills required are critical and creative thinking as well as skills in identification, definition, and evaluation of environmental issues. A number of methodologies are proposed as supporting these processes including risk analysis, costs/benefit analysis, ethical analysis, analysis of cumulative effects, economic analysis, and social impact analysis. Students are to learn the strengths, weaknesses and biases of the different approaches. The document also lists a set of specific action skills including defining issues, deciding whether action is warranted, identifying the people involved in the issue, selecting appropriate actions, and appreciating the possible consequences of each, creating an action plan, implementing the plan, and evaluating results. Supporting the action skills are the ability to forecast and engage in long term planning, skills in communication and conflict resolution, group cooperation and leadership, and citizenship skills such as participation in political or regulatory processes and consumer actions, as well as media campaigns and community service. Also offered as supports for action projects are skills in environmental monitoring, designing research projects, evaluating

the results of research, and using various technologies for data gathering, communication, analysis, and presentation. This is an ambitious list of action strategies and supporting skills.

The **Guidelines** document also addresses the issue of developing motivations and character attributes associated with civic responsibility, under the heading “Action Orientation” (p.12). Two components are described as major attributes of an action orientation: a sense of personal stake and responsibility; and a sense of self-efficacy. Personal stake entails examination of the choices which can be made to help resolve environmental issues while examining the possible consequences of these choices. Self-efficacy entails the learner having a sense of his or her ability to influence the outcome of a situation.

While it is fairly easy to see which procedures might be used to develop the skills associated with action, it is less obvious how character traits or personality attributes like an orientation to action or self-efficacy are to be taught. The **Guidelines** propose that materials should promote **intergenerational** and **global responsibility** (p.12, emphasis in the original) and provide opportunities for reflection on options and personal choices. The materials are also to contain examples of people of different ages, races, genders, cultures, education and income levels who have made a “difference by taking responsible action” (p.12). This notion is embodied in Knapp’s **Environmental Heroes and Heroines** (1993) a book containing several short profiles of people who have been involved in raising awareness of or solving environmental problems. The materials are also to emphasize that many individual actions can have a cumulative effect either in creating or solving environmental problems. The assumption seems to be that people are more likely to have a sense of personal stake and responsibility if they are provided with role models with whom they can identify, and are invited to reflect on how their own actions can make a difference to environmental problems.

There are, of course probably other attitudes and traits which are important for success in action projects including patience, persistence, a sense of humor, and possibly courage. Whether or not these can be addressed curricularly is an issue for debate and discussion. Whether or not a curriculum that did explicitly address them would be congruent with the purposes of education is also moot. It is certain that many forms of training, especially in the military, police, and emergency medical areas attend to the development of character attributes in order to foster performance under difficult, fast changing and dangerous situations. But again, the goals of training are often different from those of education. In training the purpose is typically to develop behaviors that are so thoroughly learned and practiced, under conditions as close as possible to those in which they will be required, that they become essentially automatic.

Such high level training is extremely useful and important, but it is unlikely that reflective or critical thinking and a consideration of larger purposes and consequences is characteristic of it. Those questions must be addressed before the training is called into use, or even undertaken. The German Army of WW II was highly trained; unfortunately the training was placed at the service of very flawed purposes.

To develop a sense of self-efficacy the **Guidelines** propose that materials should provide a variety of individual and community strategies for civic involvement and provide opportunities for learners to practice the strategies through projects generated in school or in the larger community. Again, the document also recommends offering students examples of completed action projects so they can analyze the factors that were significant in their success or failure. Learners are also to share the results of their projects with others including peers and members of the community.

All of these suggestions are reasonable and sensible. The **Guidelines** document makes no attempt to confront the arguments of critics like Michael Sanera who claim that not only are students being encouraged to “worry” about environmental problems, but also to become “warriors” (Sanera, 1995a) and that this reflects the environmentalist bias of environmental education, is political, and does not belong in schools. The **Guidelines** would be more useful to those facing attacks from critics and opponents like Sanera had the document offered clear perspectives of the nature of education and the purposes of schools and then made a bridge between environmental action projects and those perspectives. While these statements wouldn’t be likely to satisfy or discourage critics of Sanera’s sort, they would at least define a clear field for debate, a useful function for theory in any field. Do parents, for example, really believe that students should not be invited to participate in the lives of their communities while they are in schools? Do they believe that the best way to foster citizenship and ultimately participation in the polity of a democracy is to exclude anything remotely political from consideration in school programs? Do they subscribe to the notion (strongly held by some) that schools should be cloisters away from the hurly burly of community life and action where students gain only declarative knowledge (about things) but are offered very limited forms of procedural knowledge? Goodlad’s (1984) major study of American schools, while now possibly somewhat dated, certainly suggests that most parents do not want a rigid separation of school from community and that they expect schools to attend to the socialization, physical development, and personal development of students as well as to educate them. In fact, Goodlad found that even when confronted with claims of need to eliminate or give lesser priority to purposes other than the educational (or academic to use his term), parents still demanded that schools attend to all four

major goals. The fact that Goodlad's survey found such views of schooling to be widely held doesn't constitute a sound philosophical basis for including them as purposes of schools but it does provide an indication of the views held in the community at large. This is important when confronting the claims of people who claim to "speak" for the public.

While the **Guidelines** document refers to environmental action as an element of environmental education it doesn't define what is meant by action nor does it discriminate between learning about action, learning through action, and learning from Action (Hammond, 1997a, 1997b) although the examples it offers illustrate the three types. When students are presented with role models and study environmental projects and issues in which the exemplars were involved they are learning about action. When they review examples of projects conducted by others and investigate procedures and organization as well as the success or failure of the project, they are learning about action. When students actually decide to develop an environmental action project beyond the stage of paper and pencil plans or classroom simulations they are in a position to learn through action. If a class, for example, decides to implement a school composting program its members will have to move into the world of practice and grapple with practical details often not anticipated in the best of simulations or exercises. They may find indeed, that the best laid plans often go awry. They will have to figure out how to proceed from that point. Once action is undertaken opportunities for learning appear which simply do not materialize in simulations. For example, if the class begins to set up its composter in the school yard the students may encounter neighbors in the school's area who are concerned about odor, or attracting pests or the unsightly nature of the project. On the other hand, they may also meet people who will help once they see them actually getting down to work. There is a lot to be learned in the course of the endeavor. Some of what is learned will be very practical: how to use certain tools, how much things cost, how long it actually takes to build things, and so on. Some of what is learned will be in the area of character development: what do you do when some of the team members decide to give up. What do you do when you become discouraged and lose confidence.

Finally, if the class persists and brings a project into being, and completes or undertakes to continue it, they will have a chance to learn from action. It has been said that learning results not from experience but from what you make of experience. When the class debriefs its work and assesses success and failure, costs and benefits, and consequences, both planned and unplanned, it turns experience and activity into an opportunity to learn from experience. Furthermore, if the project team or class then decides to communicate with others about its experiences it is becoming a participant in a culture of performance. These days the Internet is rich in exam-

ples of people sharing with others what they have learned from experiences and there is growing interest by educational researchers in the nature of intentional learning communities (Hewitt and Scardamalia, 1996) .

Is any of this action work educational? As in the case of the hypothetical woodwork class discussed above, the answer is to be found in the quality of the interactions among the students, the work, the people who help (including teachers) and sources and resources brought to bear on the project. The learning from aspect may be the most powerful potential contributor to educational development but all three elements are important. Can action projects contribute to the purposes of schooling (sensu Barrow and Goodlad, for example). The answer is most likely yes, but only if the project is not an isolated end in its own right, and is seen as having to do with those purposes by both students and teachers. This requires explication of and reflection on the larger meaning of the project. These processes are enhanced when a project is publicly communicated not only to other students in the school, but to members of the larger community.

Of course, when students decide to undertake projects which go beyond the form of classroom exercises there is always the chance they will encounter people who disagree with their actions, or that students should act at all, on anything outside classrooms and school yards. If their projects are in areas of contention, where disagreements exist, they may well find themselves in political arenas. The schools of Canada and the U.S. operate in the context of democratic societies. Democracies are not characterized by universal agreement, by people always going along with the majority, but by active dialogue, and the right to dissent and disagree. Students can learn a great deal about the rights and responsibilities of citizenship and the processes of democracy by grappling with such projects and issues.

There is a legitimate concern that when students engage in action projects they have been recruited to the service of the teachers' or school's causes. What happens, for example, if a student or group within a class, decides not to participate in a project because they oppose it on principle. In many schools decisions are made for and about students without much consultation. Some of these are required by law or regulations and students are more or less required to conform. But when a class undertakes an environmental action project that is unlikely to be the case. Teachers and students alike will need to learn how to cope with disagreement and provide those who have well founded, but different sets of ideas with opportunities to act on their principles. If students propose courses of action which are destructive, abuse the rights of others, or are socially unacceptable for good and just cause, then this provides an important opportunity

for them to develop ethical criteria for action and to ponder morality as such. It should not be assumed that every student will support or elect the same action project, or want to participate in a project of any sort. Compulsion to action, supported by strong peer pressure could rightly be considered a form of indoctrination. I have proposed several categories of curricular approach to school-based action projects based on differences in the amount of teacher direction and control, the degree to which projects are selected and directed by students or teachers (or mutually negotiated), types of outcome, the degree of change required in instruction and institutional structures, the amount of engagement by students and the approach to motivation (Hammond, 1997a, 1997b). I will consider the adequacy of this classification of different approaches to school-based action projects following my review of the three selected programs in Chapters 5, 6, and 7.

For now it is sufficient to say that environmental education has had an orientation toward action to address or avoid environmental problems caused by human actions since its early days. In fact, the common syntax of descriptions of the purposes of environmental education implies the prior existence of problems and issues in the environment which require human intervention or change in behavior. If action is to be more than a wistful intention and is to contribute to the educational purposes of environmental education, or to schooling, there must be clear thinking about the criteria which could be used to assess the merits of action projects as contributors to the specific purposes of education or/and the larger purposes of schools. Unfortunately, curriculum theory in environmental education has so far largely failed to provide such criteria. Making detailed lists of the skills required for effective environmental action does not constitute an educational justification for action projects in a school program. Action, therefore, is a concept within environmental education which requires further analysis. My inquiry into the three selected programs is intended to contribute to this.

VII. Summary: Education, Environment, and Environmental Education

In this Chapter I have developed the case that environmental education is an amalgam of two concepts, each complex in its own right. In addition the concept of schooling is often implicit in environmental education because a great deal of the effort directed toward it is intended to be undertaken in schools. Environmental education has codeveloped with the environmental movement during the decades from 1968-present. It has had a focus on environmental problems since its first descriptions and has regularly been seen by governments, international, national and state agencies, and by non-governmental organizations of many different kinds, as a means of addressing problems caused by human actions.

While environmental education is grounded in ecology as a branch of the biological sciences, the delimitation of ecology is somewhat problematic. Clearly, contemporary ecology is concerned with the relationships between groups of organisms (communities and populations) and their environment, including other organisms. The focus of ecology is at a larger scale than that molecular, cellular, or organism biology. In addition, ecology clearly includes human-environment interactions and treats humankind as part of nature, although the issue of unique differences between humans and other life forms remains difficult. For example, has the development of culture created a new context for human development, one in which the rules of biological evolution no longer apply, or is culture simply another expression of biology, and thus, ultimately, of physics and chemistry, as Wilson (1998) suggests. Any resolution of these questions is beyond the scope of this thesis, but their complexity explains some of the difficulty found in defining and delimiting environmental education and analyzing the concepts it contains.

I propose that the concerns of environmental education are distinct from those of ecology. First, the focus of environmental education is on human beings, even when non-human settings are used as objects of study and venues for learning experiences. It is humans who are being educated about the environment (or through environmental experiences). Ecology, on the other hand, is not concerned specifically with education and ecological studies can focus entirely on non-human populations. Second, environmental education is concerned, as ecology is not, with the nature of human learning and understanding of the environment. Its key questions as a field concern how humans can think about their environment in an educated manner or what it means to exercise educated habits of mind regarding the environment. As a curricular field it must address how the capacity for educated thought about the environment can be nurtured through programs of instruction and intentional experience. Because most, although certainly not all, curricula, are activated in schools, environmental education curriculum theorists must also be concerned with the purposes of schools and other agencies which develop and operate curricula. Contemporary environmental educators typically focus educational attention on problems arising from interactions between humans and the environment. However, viewing the environment from a problem-centered perspective is not the only way of developing environmental education, as Sauvé (1996) has rightly pointed out. In fact, an issues or problem-centered approach to environmental education may restrict its educational potential. This is an issue to which I will return after considering the three programs which are critiqued in the following Chapters. However, I now wish to propose a definition of environmental education different from that of Stapp in 1969a. My intent is to shift thought about the nature and purposes of environmental education away from the syntax of knowledge, skills, and attitudes

(motivations) deployed by citizens to address environmental problems in order to focus attention on the curriculum theoretical nature of environmental education.

*Environmental education is a field of curriculum theory
which addresses how humans develop educated understanding of
their interactions with the environment.*

The definition has, I believe, some advantages over others in that it avoids a narrow focus on environmental problems, but doesn't exclude consideration of issues and problems from the ambit of environmental education. The term "their interactions" doesn't imply that only human interaction that damage the environment or cause problems are of interest. It situates environmental education in the larger field of curriculum theory, thereby emphasizing its engagement with concepts of education, learning, and schooling. Through use of the term "educated understanding" it places learning about human-environment interactions at the service of educational purposes. The term doesn't mix prescriptive and descriptive theoretical elements. It doesn't assume acceptance of a particular position vis a vis the current environmental problématique. The phrase "educated understanding" is troublesome, but it will necessitate discussion of what is meant by education and understanding rather than assuming that a common meaning exists, as seems largely to have been the case since Stapp's 1969 definition. By situating environmental education within curriculum theory emphasis is placed on thinking about what environmental educators, as curricularists, really have to contribute to ideas about education and schooling.

Any satisfactory environmental education curriculum theory should contain both prescriptive and descriptive elements. As has been outlined in Chapter 2, prescriptive theory addresses issues of priority and purpose, and the consequences and value of things which are done in a curriculum. Descriptive theory, on the other hand, is concerned with what is to be done, and how things are to be accomplished and with what changes are possible in a curriculum. Curriculum theory is also concerned with the context of and influences on curriculum in the sense that it addresses the things that may or do influence curriculum, and also whether or not these influences are acceptable (Barrow, 1984, Zais, 1976). Again, unless there is a definite attempt to consider what is meant by education, the purposes of schools, and how those purposes support or conflict with those of education, it is difficult for an educator to assess the claims of those wishing to influence the curriculum of schools or to have a reasoned base for accepting or rejecting their demands. In my view, one of the deficiencies of curriculum theory in environmental education is that it has focused on more and more detailed descriptive elements, without

adequate attention to the prescriptive elements of theory and with almost no attempt to prioritize among its purposes or develop criteria which might be used to assess demands for the redirection of its curricula. Kennedy (1983) noted this attribute of EE curriculum theory when she asked whether environmental educators really believed that all possible purposes had equal importance, or even that all environmental problems were of equal urgency. It is clear that various pressure groups are now seeking to influence the direction and development of environmental education curriculum. The failure of environmental educators to develop an adequate curriculum theory makes it difficult for them to do more than either react or respond to pressure in a defensive or submissive manner.

As an approach to making some logical distinctions among the various purposes of curriculum within the context of environmental education I have developed a Venn Diagram (Figure 4.2). Venn diagrams are used in the mathematics of sets to illustrate relationships. For example, cats are mammals, so the set of mammals completely includes the set of cats. Cats are also carnivores, as are bears, but no cat is also a bear, so, while the set of bears and the set of cats are completely included in the set of carnivores, there is no overlap, or intersection between the set of bears and the set of cats. In the realm of educational theory, however, there may well be intersections. But, while the set of education and the set of schooling have some intersection, everything done in schools is not necessarily educational. The first task of the set theorist is to determine the characteristics of membership in a particular set: what makes a bear, a bear, and what makes education educational. Of course, it is often much more difficult to do this for concepts as opposed to physical objects. As a tool for thinking about the problem I have attempted to construct a Venn diagram of the possible set relationships between the purposes of education, the purposes of schools, culture (or society), environmental education, and school-based environmental action projects. The diagram is crude, and probably not entirely apt, but it illustrates at least some of the logical distinctions which must be made in order to clarify thinking about the nature of environmental education. The note accompanying the figure explains the assumptions I have used in constructing the relationships among the circles (sets) of the figure.

A question which arises from this exercise concerns the relationship between schooling and education: some purposes of schools are not educational, even if they are necessary and valid within acceptable concepts of schooling. But are some aspects of education antithetical to the commonly accepted purposes of schools? Thus, becoming educated may make one less likely to be socialized, or less likely to accept socialization without question. For example, the development of citizenship is frequently proposed as a purpose of schooling, likely within the

The Biogeosphere/Planetary Ecosystem

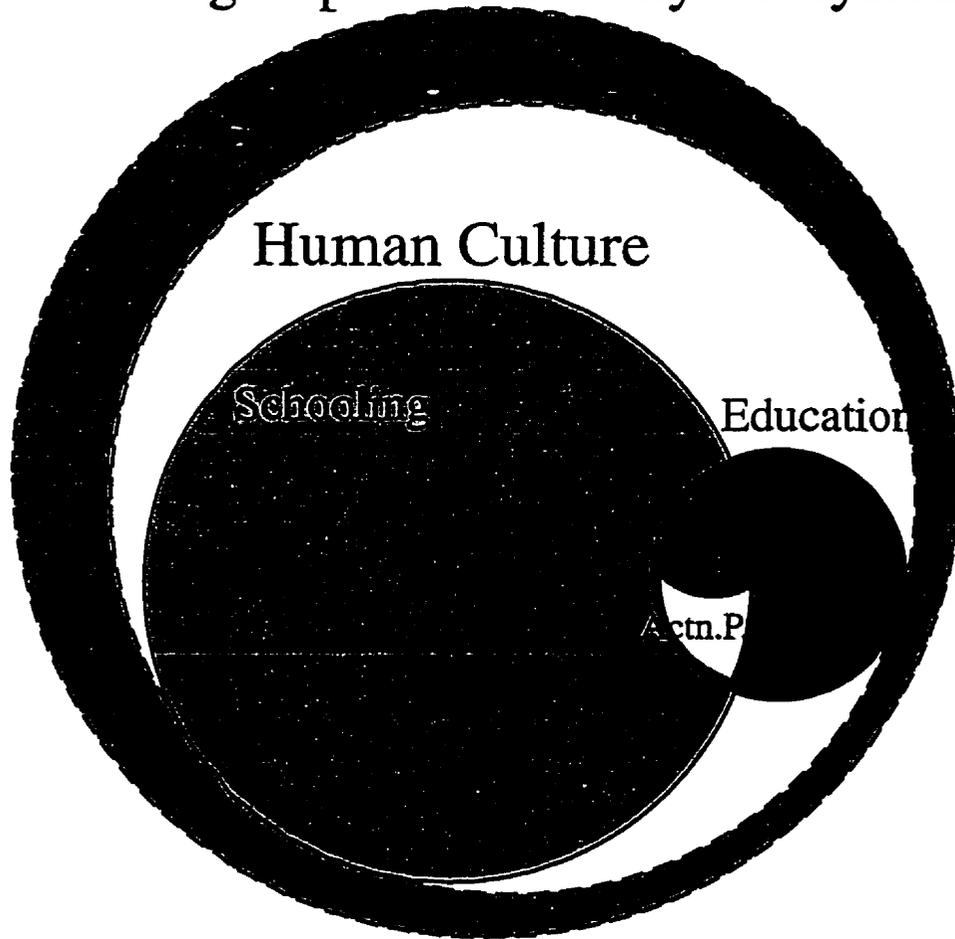


Figure 4.2. A Venn Diagram of Relationships Among the Sets of Schooling, Education, Environmental Education, and Action Projects

Note: This diagram shows Education as a Set with Intersections to the Set of Schooling, and as an included set in Human Culture and the Biogeosphere. In this attempt to diagram the logical relationships the set of education (black) is not included in the set of schooling, although it intersects the set of schooling (the intersection is dark grey). Environmental education, for the purposes of this dissertation is to be found in the intersection between education and schooling (as would most other curricular elements). Action projects (white) are a subset of the intersection.

domain of socialization. For some this means automatic acceptance of democracy as the best form of government, all too often without raising important educational questions about why democracy might be judged to be best and about the very nature of government, the rights and responsibilities of citizens as opposed to those of persons as individual human beings, and the purposes of politics. A well educated person might decide to refuse “socialization” by not participating in conventional civic exercises (singing the national anthem, swearing allegiance to the flag, saying a particular prayer each morning) on the grounds that some or all of these practices are performed without explanation or opportunity for reasoned dissent, and embody a set of unquestioned assumptions or are even counter to the fundamental concepts of democracy as he or she understands them. Education doesn’t necessarily make people more conventional or easy to govern; nor does it require that people rebel against convention, but it does require thoughtful and critical consideration of when it might be appropriate to practice civil disobedience or not to conform. The history of environmentalism is rich in examples of those who chose to dissent from accepted social practice and the views of the majority, Thoreau being one of the most notable (Miller, 1990). The issue of the fit between the purposes of schools and the purposes of environmental education has been raised by several environmental educators including Orr (1992) and Weston (1996).

Before proceeding to consider the three curricula chosen for review in this dissertation it is now possible to consider criteria which might be useful in judging the worth of curriculum proposals or curriculum theories in environmental education. I propose the following:

1. A curriculum theory in environmental education must offer a clear position about the nature of education. This means it should include both prescriptive elements which propose which habits of mind are consistent with education as well as descriptive aspects which explain why things should be done in particular ways, and what other approaches might be consistent with educational purposes. An worthwhile curriculum theory is not a “sales pitch” for one best approach to instruction, learning environments, and student experience. It should help people consider whether different arrangements of the curricular commonplaces are consistent with the educational purposes it describes.

If curriculum theory or curriculum proposals in environmental education fail to address this criterion they permit almost anything to be offered as having educational value and they

leave teachers, school administrators and others who must make choices and selections from among competing advocates and priorities with no assistance. The North American Association for Environmental Education (1996) **Guidelines** document may imply a view of education, but it certainly doesn't take a clear position, which creates the difficulty in deciding about the difference between informative as opposed to educational materials.

2. Because, as proposed in the definition above, environmental education is concerned with human-environment interactions a worthwhile theory of environmental education should make both definitions and descriptions of the environment (including human-kind's position in it) and human-environment interaction foci for educational inquiry and critical thought, rather than advancing a particular view of interactions with the environment and assuming that it is unproblematic. Human interactions with the environment is a subject rich in educational potential, a potential that can be reached only if the topic is addressed in ways which provoke critical and creative thought and help students appreciate how different forms of knowledge contribute to our understanding of the environment and our concepts of humanity's role in it.

Critics like Sanera often support their critiques with examples of teachers who have approached environmental education as if all the students and their parents shared a common view of the nature of environmental problems and their seriousness. They often also assume that students have a common value set regarding nature, conservation, and environmental quality. Environmental education, if it is to be educational must not make such assumptions and must approach the domain of human-environment interactions as a focus for inquiry rather than a problem with known solutions toward which we all need to work. This does not require the elimination of controversy or divergent views, or the exclusion of those who hold strong opinions. But it makes these views the focus of educational consideration. Scientists like Somerville (1996) for example, who have studied global climate change and subscribe to the dominant view that humans are influencing climate are still careful to note that the majority position, even while enjoying a large consensus among scientists, could be wrong, either in general or particular terms. To understand global climate change students need to learn something about the nature of science as a form of knowledge. They can then consider the arguments by appreciating whether they are based on scientific reasoning, or some other principles and

beliefs. This is an appropriate educational approach. To say, as NAAEE does, that it must be “balanced” is to miss an opportunity to consider the logical distinctions among different forms of argument.

3. To the extent that a curriculum theory is to be applied in the context of school programs it should also distinguish between educational purposes and those appropriate to the goals of schooling. This implies presentation of a clear position on the purposes of schools. A worthwhile theory of environmental education, set in the context of schooling, should help people think about which things are validly included in a school curriculum and the priority which should be assigned to them. It should also provide criteria for making judgments about proposals for changes to the school program.

This criterion is perhaps the one which is most seldom satisfied by descriptions of environmental education, or even given much attention in discussion of it. The early definitions make almost no mention of schools and schooling; even foundational documents like the **Belgrade Charter** or the **Tbilisi Principles** seem to assume that people agree about the purposes of schools so there is no need to mention the matter. Schools are simply places where environmental education occurs. Little or nothing is said concerning what else might be going on in them, or of how the purposes of environmental education and those of schools do, or should interact. However some early writings about EE suggested that it implied major changes in the nature of schooling (Hawkins and Vinton, 1973) (often termed educational reform, which isn't the same thing even if the two are commonly equated).

Criterion 1 and 3 might be said to be useful in assessing the merits of any curriculum theory, but criterion 2 is uniquely important to environmental education. If a curriculum theory of environmental education addresses the three elements listed above it will help us consider whether or not environmental action projects are educationally appropriate and/or supportive of valid purposes of schools. The point is not that a particular theory be seen as the truth, or the best theory, but that it should perform the functions of curriculum theory by helping us think about how things are done, and what should or might be done.

In Chapter 2 I proposed a set of four focusing questions for this inquiry and developed a framework to aid in organizing it. In that chapter I stated that after setting environmental educa-

tion in context and reviewing the development of the field in Chapter 3 and discussing its conceptual problems in Chapter 4, I would return to reassess the adequacy of the questions and framework before proceeding. Let me now review the questions proposed in Chapter 2.

1. How does the curriculum address the concept of education within the context of environmental education.
2. How does the curriculum address the concept of environment, and in particular, the nature of human-environment interactions.
3. How does the curriculum address environmental action as an educational or curricular purpose.
4. What relationship does the curriculum describe or imply between its purposes and those of schools (assuming that the writer sees the curriculum as being appropriate for use in school programs; otherwise, we must ask in what contexts the curriculum is intended to be used.)

In the light of the analysis of the concepts of education and environment in the context of environmental education which I began above, these questions still appear to be the right questions around which to organize an inquiry into written environmental education curriculum. They are also consistent with the criteria I offer above for the assessment of the adequacy of curriculum theory in environmental education and with proposed definition of EE.

Turning now to the framework for the inquiry, the following elements were proposed in Chapter 2:

Metaphysics; how the program defines the environment and what it considers to be humankind's place in it.

Epistemology; the program's view of what knowledge (and forms of knowledge) are foundational to understanding human-environment interactions.

Approach to skills; the program's view of what skills are necessary for the development of environmental understanding.

Perspective on Action; how the program describes and addresses the relationships among learning about action, learning through action, and learning from action and what types of action projects are fostered (This topic is dealt with in more detail in chapter 4).

Problem Solving; the program's assumptions about and model of problem solving in the context of environmental problems and issues.

Structure; how the program organizes instruction and learning experiences; is it discipline based, issues oriented, thematic, historical.

Learners; the program's view of the role of the learner and perspectives on learning.

Teachers; the program's view of the role of teachers and the nature of teaching.

Sequence; the program's proposals for, or support of, particular sequences of instruction, learning experiences, etc.

Ethical perspectives; how the program addresses ethical questions regarding human environment interactions and environmental actions.

Fit with the institutions of schooling; is the program designed to be used in schools; how the program addresses questions of location in the school curriculum, interdisciplinarity, and implementation.

I believe that Chapters 3 and 4 support a position that these are valid elements around which to organize an inquiry into EE curricula. However, as noted in Chapter 2, any framework can quickly become restrictive by focusing attention so much that other elements which may be in plain sight, but outside the categories of the framework, are neglected. I will try to bear this in mind as I approach the three selected works. In the final analysis it is my intention to assess the educational worth of the programs which are reviewed.

Chapter 5

Environmental Education as a System for Shaping Citizenship Behaviour: The Curricular Work of Harold Hungerford

I. Introduction

Harold Hungerford at the University of Southern Illinois is arguably the most influential environmental educator in the United States. He, his graduate students, and research associates form a significant school of thought about the nature and purposes of environmental education and the goals of educational research in the field. For many years the works of members of his school have been prominently represented in almost every issue of the **Journal of Environmental Education**. His thinking has influenced national and international policies on environmental education (North American Association for Environmental Education [NAAEE], 1996; United Nations Scientific, Educational & Cultural Organization -United Nations Environment Program [UNESCO-UNEP], 1978; President's Council for Sustainable Development, 1985) and his model of environmental education shapes curriculum development initiatives and research projects. No review of the field of environmental education would be complete without considering his work. The remainder of this chapter is organized in three sections: Section II is a descriptive overview of the curriculum work of Hungerford and his associates. Section III applies the organizing framework of Chapter 2 to analyses and interpret major curriculum proposals developed by Hungerford, et al. Section IV uses the findings of Sections II and III to address the focusing questions of this inquiry and assess the educational merits of the written curricula. I often refer to the Hungerford model, or approach or to Hungerford's work. In actual fact, Harold Hungerford is mentor of a group of scholars, curriculum developers and program administrators, and the leading member of a school of thought concerning environmental education which might be termed the **Issue Investigation-Citizen Action Training** model (IICA). Thus, referring to the Hungerford model is really an abbreviated way of describing a collection of writings and curricular proposals developed by Hungerford and his co-workers and students over the span of two decades. The main curriculum documents used in the critique are **Investigating and evaluating environmental issues and actions: Skill development modules** (IEEIA) (Hungerford, Litherland, Peyton, Ramsey & Volk, 1988, 1992), **Threatened and endangered animals: An extended case study for the investigation and evaluation of issues surrounding threatened and endangered animals of the United States** (TEA) (Hagengruber

& Hungerford, 1993) and **Ecology: An Introduction for non-science majors** (Hungerford, 1997) as well as several published research papers describing their curriculum theories (Hungerford & Volk, 1990; Volk, 1993).

II. Description and Overview

A. Perspective of the Current Environmental Situation and Humankind's Role In It

Like many other environmentalists and environmental educators, Hungerford believes that we currently face serious environmental problems, both at the local and global level. In a preface for students the 1992 edition of **Investigating and evaluating environmental issues and actions** (Hungerford, Litherland, et al.), states:

If you're worried about the future of the Earth, you are not alone. Many people are alarmed about problems in the environment. Lester Brown is one of these people. He got a group of people together to study the environment, its problems, and what can be done to help. The group is called the Worldwatch Institute. In 1984, these men and women started publishing a yearly "report card" called the State of the World. The first report card gave us a scary, but honest, picture of the environment and its problems. It named soil, energy, and population as three big problems. The report also said that unless something is done, time will run out for millions of people. The number of people on Earth is over 5 billion people. The world's population of human beings has almost doubled in the last thirty years. That spells trouble! As the Earth's population has gotten larger, the Earth's resources have gotten scarcer. Forest lands are becoming fewer. The ocean's fish catch is getting smaller. Important animals and plants are becoming extinct Grasslands are becoming poorer. Farm soils are eroding away and there are fewer fields to cultivate for growing food. What we have is a growing population which needs more and more water, food, and shelter. We also have shrinking resources. There is simply less to go around. We already see many cases of crowding, severe food shortages, fuel scarcity, and poorer living conditions. Unless something is done to bring about a balance between human needs and available resources, the future is gloomy! At this point you may be asking yourself, 'Why are they telling me this?' We are not out to frighten you, but we do want you to understand just how serious the situation is. **Probably the most important message for you to get is that things in the environment are not good. And, they will get worse unless we do something... and do it soon!** (Hungerford, Litherland, et al. 1992, pp.i-ii, emphasis mine)

This is a pretty clear outline of the authors' analysis of humanity's current environmental situation. Hungerford puts his feelings in a more personal way in the Acknowledgement to **Ecology: An introduction for non-science majors** (1997) as he writes:

...and my father who, every so often, was able to take a few moments from his teaching schedule to show me how to use a shotgun, how to fish the Kankakee River, how to long for the days when huge flocks of mallards blackened the sky, and how to appreciate a natural river system long since damaged by selfish and ecologically-illiterate people....I cannot give that original river system back to me nor to the people of Indiana and Illinois. Nor can I live my youth again. But maybe—just maybe—a few mature or maturing learners somewhere, sometime will get help from this document and find a way to communicate to others just how important, complicated, and precious their 'ecological environment' is. I hope so! (Hungerford, 1997, p.iii.)

He extends his personal stance further in an Editorial Comment on *Morality and the Environment*, found as an Afterword on the inside back cover of the same work:

As we struggle to shape a path that Mankind will follow in the praise of all animal and plant species, we realize that the struggle is, by and large, only a delaying action in the war against its ever present egocentric stupor to suddenly realize the futility of what seems to be a never ending race toward some kinds of species oblivion—a race toward oblivion for itself as well as for its living partners—the plants and non-human animals—of the earth....Perhaps a new generation will see the folly of what its parents and grandparents have dedicated themselves to: a gross national product without the slightest hint of environmental stability...To deny the possibility of this awakening is to deny the opportunity to salvage something from the biosphere that can help a new generation in its quest for some sort of environmental health—environmental morality if you will. (Hungerford, 1997, no page [Afterword])

The passages describe a pattern of causes and effects for environmental problems. The causes are rising population and selfish, ecologically illiterate people who have paid little or no attention to the affects of their activities on the environment with the result that soils are being eroded, rivers polluted, species driven to extinction, and resources dwindling. It is also evident from the quote that Hungerford views his work as a moral endeavor, an attempt to find educational approaches which can address these concerns, and make possible the “awakening” to which he refers. But, more optimistically, he believes that many students are already aware of, and concerned about environmental problems:

.. you know that you are part of the environment. Since the environment is all around you and you are part of it, it is very important to you. You can't get along without air to breathe. You need food to eat and water to drink. You need clothes to wear and somewhere to live. Yes, maybe there even ought to be a tree close by and a squirrel to watch and an owl to listen to at night. Some students are also worried about what the environment will be like when their children are growing up. (Hungerford, Litherland et al., 1992, p.i.)

The statement expresses a view of humankind's place in the environment: humans are part of it, inseparable from it and dependent on it. Moreover, concern about environmental quality focuses not only on necessities, but on aesthetic elements of the natural world nearby: being able to see trees and squirrels, or to hear owls. But according to Hungerford and his associates, the generalized concern they recognize in many students has not been nurtured into a capacity for effective action by the contemporary education system, even though there are encouraging examples of environmental action projects:

Do students know about science/technology/society (STS) issues? Are students willing to help solve STS issues? The answer is . . . You Bet! And it's happening across North America. Students in Kentucky have adopted, cleaned, and monitored the environmental quality of streams and rivers. Students in Wisconsin have placed hatching boxes in local streams and stocked them with trout. Students in Illinois have established recycling programs in schools and towns. Students in Missouri have participated in town meetings concerning zoning practices.

Let's be cautious! Most students do not know how to take the citizenship actions necessary to help solve STS issues. This may also be true for many adults. Many citizens have little knowledge (and less practice) of the skills involved in issue resolution. (Ramsey, Hungerford, & Volk, 1989a, pp.118-120, emphasis mine)

Thus, they believe, human-environment interactions are in disarray. There are serious problems now and they are likely to get worse unless people take action. There are also some signs that people, especially younger people, are aware of environmental problems and want to do something about them. In fact, there are some examples of people taking effective action. But, in spite of local initiatives most people do not know how to translate environmental concern into citizenship actions to resolve issues. The use of the term citizenship action is noteworthy here. Clearly, Hungerford and his co-workers do not view effective action only as taking personal responsibility and acting on one's own, but as people acting together as citizens, as members of a polity. Environmental action and effective, active citizenship are linked, and it would appear that they have political dimensions as well.

B. Hungerford's Curricular Response to Environmental Problems

Although schools are not mentioned explicitly in the above passages it would seem that effective, active environmental citizenship has not been fostered by the school system. Hungerford and his colleagues believe this could and should be changed. In a 1988 curriculum publication, Hungerford, Litherland, Peyton, Ramsey, and Volk defined environmental education as: "...that part of education which deals with ecologically related social issues in the environment, and focuses on the development of responsible citizenship behaviors regarding those issues." (p.1)

This definition clearly establishes the development of responsible citizenship as the major purpose of environmental education and gives the field a focus on "ecologically related social issues". As discussed in Chapter 4, this definition places Hungerford squarely in that group of environmental educators who link its purposes to environmental problems. Even though people may enjoy and appreciate the environment aesthetically that is not the focus for environmental education in this description. Another word which has significance in the definition is "behavior". In an important later synthesis of their views of the purposes and methods of environmental education Hungerford, with his major co-author Trudi Volk (Hungerford & Volk, 1990) propose:

The ultimate aim of education is *shaping human behavior*. Societies throughout the world establish educational systems in order to develop citizens who will *behave in desirable ways*. In education, some of the *desired behaviors are sharply defined....other desired behaviors are more complex....it is on one of these latter behaviors that this paper is focused....specifically (it) will address the effectiveness of environmental education for promoting responsible citizenship behavior.* (Hungerford & Volk, p.8, Emphasis mine)

The behaviorist orientation of this passage is clear. The purpose of education is to change behavior in desirable ways; in fact the title of the paper from which the passage was taken is *Changing Learner Behavior Through Environmental Education*. Moreover, environmental education is to "promote" these behavioral changes. This is a clear enunciation of the authors' views of the nature of education in general and EE in particular.

In the same synthesis Hungerford and Volk (1990) refer to the objectives for environmental education proposed at the UNESCO Tbilisi Conference of 1977 (described in Chapters 3 and 4), but extend those goals with a description of the meaning of environmental citizenship:

By using these objectives we might define an environmentally responsible citizen as one who has (1) an awareness and sensitivity to the total environment and its allied problems, (and/or issues), (2) a basic understanding of the environment and its allied problems and/or issues, (3) feelings of concern for the environment and motivation for actively participating in environmental improvement and protection, (4) skills for identifying and solving environmental problems (and/or issues). (Hungerford & Volk, 1990, p.9)

They also remark that the educational task implied by the Tbilisi objectives, as extended by their own concept of an environmentally literate citizen is ambitious:

The citizenship behavior that they describe demands an educational thrust that goes beyond “basic” education in its traditional sense. Instead, we are faced with a set of objectives that paint a broad picture of behavior encompassing not only knowledge, attitudes, and skills, but also **active participation in society**. (Hungerford & Volk, p.9, emphasis mine)

It is interesting to note that the “broad picture of behavior” includes knowledge, attitudes, and skills, and active civic participation. This is a definition of behavior somewhat different from classical behaviorism’s focus on overt and demonstrable acts. When Hungerford and Volk speak of behavior change they presumably mean changing not only how people act, but also how they think.

They extend their description of environmental citizenship further in the same paper when they offer a Superordinate Goal for environmental education:

...to aid citizens in becoming environmentally knowledgeable and, above all, skilled and dedicated citizens who are willing to work, individually and collectively, toward achieving and/or maintaining a dynamic equilibrium between quality of life and the quality of the environment. (Hungerford & Volk, p.13)

Notice that the broad form of this definition mirrors Stapp’s 1969 description. There is a subtle change here away from the active promotion of the earlier passage: the purpose of EE is to aid citizens in becoming knowledgeable, skilled, dedicated, and willing to work (individually and collectively). These goals also echo the concept of sustainability, namely, the attainment of a balance or equilibrium between human quality of life and the quality of the environment. The superordinate goal is supported by four major goal constellations, or Levels, as: I. Ecological Foundations; II. Conceptual Awareness—Issues and Values; III. The Investigation and Evaluation Level; IV. Action Skills (Hungerford & Volk, 1990, p.13).

It is important to note that these are described as levels in a hierarchy with ecological foundations at the lowest level, and action skills at the most advanced. This would also suggest a sequence of instructional activities and learning experiences. Hungerford and Volk (1990) continue their synthesis by listing Critical Education Components of a “total educational program for environmental education if changes in learner behavior are desired” :

It appears that we can maximize opportunities to change learner behavior in the environmental dimension if educational agencies will:

1. teach environmentally significant ecological concepts and the environmental interrelationships that exist within and between these concepts;
2. provide carefully designed in-depth opportunities for learners to achieve some level of environmental sensitivity that will promote a desire to behave in appropriate ways;
3. provide a curriculum that will result in in-depth knowledge of issues;
4. provide a curriculum that will teach learners the skills of issue analysis and investigation as well as provide the time needed for the application of those skills;
5. provide a curriculum that will teach learners the citizenship skills needed for issue remediation as well as the time needed for the application of these skills; and
6. provide an instructional setting that increases learners' expectancy of reinforcement for acting in responsible ways, ie. attempt to develop an internal locus of control in learners. (Hungerford & Volk,1990, p.14)

The Critical Components can be seen as Hungerford's design specifications for environmental education program design and operation. They are the outline of a prescriptive and descriptive theory of environmental education (Barrow, 1984, Schubert, 1986). The components imply what should be done and also how it might be accomplished by “educational agencies”, a term suggesting that the authors view their curriculum proposals as having application not only in schools, but possibly in other government agencies, non-government organizations, and so on.

As will be seen below, the work of Hungerford and his co-workers has been shaped by these design specifications. Moreover, the Components reflect Hungerford's conception of human environmental behavior and the ways in which it might be systematically shaped or

changed. This emphasis on behavior has led other environmental educators to criticize the approach (Robottom, 1994; Wals & van der Leij, 1997a, 1997b). I will explore this issue later in this chapter and in Chapter 8. It is however clear in many of Hungerford et al.'s writings that their curricular work is an application of a psychological theory. In fact, it is impossible to fully understand Hungerford and his co-workers' approach to environmental education without an appreciation of its psychological foundations. It is to a description of that that I briefly turn now.

C. The Psychological Foundations of Hungerford's Curriculum Work

Before describing the psychological theory that shapes Hungerford's curriculum designs, it is useful to outline his view of conventional approaches to environmental education. It is important to note that Hungerford has been critical of the EE field as a whole, on several grounds. In their 1990 review article, Hungerford and Volk describe three important issues facing the field of EE:

1. We Seem to be Losing the Battle for the Environment;
2. There are Too Few Sound National Strategies for EE;
3. Educators are Focused on the Wrong Strategies.

Of the first concern they offer the analysis that, "...we must admit that we have not been successful, on a widespread basis, in convincing world citizens to act in environmentally responsible ways." (Hungerford & Volk, 1990, p.16). There is a notable, but subtle shift of emphasis here to "world citizens" and "worldwide" problems from a U.S. focus, so if EE has been largely unsuccessful this description applies to programs world wide. Of the second concern regarding national strategies they offer the view that relatively few nations have made a commitment to EE programs that involve students throughout their schooling and utilize a carefully constructed, research-based scope and sequence. "As a result, only a fraction of our young learners are being exposed to logically developed, well-articulated EE programs." (Hungerford & Volk, 1990, p.16). I have discussed the marginal or supplementary position of many EE programs in Chapter 4. Nor, they claim, can we hope that the lack of school programs is offset by media attention to environmental issues, especially if one hopes for more effective citizenship:

Few media events focus on skills associated with individual citizens' ownership and empowerment....Without opportunities for ownership or empowerment, it appears unlikely that these efforts will move the public to widespread

participation in environmental responsibility. Thus media efforts tend to focus on the awareness level (which tends to be ineffective in changing learner behavior) and often fails to reach a large audience of learners. (Hungerford & Volk, p.17)

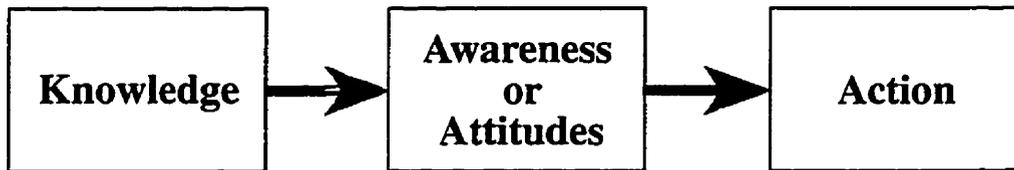
Thus Hungerford and Volk claim that while the mass media may raise awareness, they do not create the personal engagement required for serious, extended action to address environmental problems. They then address the third concern, that educators are focused on the wrong strategies:

Unfortunately, the majority of instructional materials in EE fail to develop skills associated with investigating and evaluating issues or with responsible citizen participation....Thus the results of our efforts are learners who may act in an environmentally positive manner with relation to one issue (or set of issues) but who do not have the knowledge, skills, and awareness to assume environmental responsibility in their day to day lives. (Hungerford & Volk, p.17)

This comment expresses the belief that there are generic skills, which, once acquired can be transferred to and applied in other problem situations throughout life. They extend their diagnosis (or at least reinforce their view of the flaws in thinking which underlie current approaches):

As stated before, most educators firmly believe that, if we teach learners about something, behavior can be modified. In some cases, perhaps, this is true. **However, in educating for generalizable responsible environmental behavior, the evidence is to the contrary. Typically issue awareness does not lead to behavior in the environmental dimension....we must look to a new model of instruction if behavior is important...students must be given the opportunity to develop the sense of "ownership" and "empowerment" so that they are fully invested in an environmental sense and prompted to become responsible, active citizens.** (Hungerford & Volk, p.17, emphasis mine)

This is a clear claim that environmental educators have gone astray by developing programs which emphasize learning about things (declarative knowledge) while neglecting to attend to process knowledge and skills (procedural knowledge). Hungerford's view of the assumptions made by the majority of environmental education programs is illustrated in Figure 5.1.



ASSUMPTIONS

Increasing knowledge leads to favorable attitudes...which in turn lead to action promoting better environmental quality. (Ramsey and Rickson, 1977, in Hungerford and Volk, 1990.)

This thinking has largely been linked to the assumption that ...if we make human beings more knowledgeable, they will, in turn, become more aware of the environment and its problems and, thus, be more motivated to act toward the environment in more responsible ways. (Hungerford and Volk, 1990).

CLAIM

Research into environmental behavior, unfortunately, does not bear out the validity of these linear models for changing behavior. (Hungerford and Volk, 1990).

Figure 5.1: The Behavioral Change System of Conventional Environmental Education Programs.

But if much of the curriculum field of EE has gone astray, Hungerford and Volk offer hope in a rather ringing declaration: “The research is very clear on the matter. **Citizenship behavior can be developed through environmental education.** The strategies are known. The tools are available. The challenge lies in a willingness to do things differently than we have in the past.” (Hungerford & Volk, 1990, p.17)

The implications of the statement are clear: Hungerford and his associates have developed a research-based approach to environmental education focused on constructive behavioral change leading to enhanced, active, lifelong environmental citizenship, an approach which is “logically developed” and “well articulated” in contrast to the ineffective, poorly implemented educational efforts of most others. What is required is for governments and agencies of education to adopt this approach and make a “nationally focused” effort at environmental education. In fact, Hungerford’s school of environmental education has been fairly successful in having its approach (or major elements of it) adopted in the U.S. as a basis for program standards for environmental education (NAAEE, 1995, 1996) with the result that other approaches and programs are often assessed for funding/approval using Hungerford’s model as a template. Meanwhile, Hungerford and his associates are generating (and marketing) volumes of curriculum material which faithfully reflect their approach and mirror the program standards they have influenced. Curriculum development addresses not only educational realities but also political ones.

It is important to recall the **National Environmental Education Act of 1990** (National Environmental Education Act, 1990) which made provision for an Environmental Education Division (EED) within the Environmental Protection Agency (EPA) (see Chapter 3). The EED was, among other things, to set up a system of funding for the development of EE programs and to identify exemplary programs that could be used as models (and presumably also as criteria for the evaluation of funding proposals). Moreover, the EED was to administrate a system of grants for university and college-based EE curriculum development projects. In this context, a group of university curriculum developers with a clearly articulated, published body of EE curriculum materials, supported by research projects, and based on empirical research concerning the determinants of environmental citizenship behaviors would likely be well-positioned to catch the attention of a government agency like the EED.

However, if as Hungerford and Volk claim, citizenship behaviors can be developed through application of known strategies and available tools, what are they. What, precisely, is known about environmental citizenship behavior that could be used to inform curriculum devel-

opment and instructional practices. The answer to this question is to be found in the introductory pages and Teacher's Guides to much of Hungerford and his associates' curriculum work and is outlined in detail in a 1990 review article (Hungerford & Volk, 1990) and a later paper (Volk, 1993) included as a contribution to a **Teacher resource handbook for environmental education** (Wilke, 1993). The theory has slowly developed over a 10-15 year period from about 1980-1995 through research efforts by Hungerford and a number of graduate students and colleagues.

Hungerford's general curriculum theory was heavily influenced by a study conducted by Hines (1986/87) in which she undertook a meta-analysis of research on the determinants of responsible environmental citizenship behaviors. The organizing question for her research was what is known about the characteristics of people who have taken action to address and resolve environmental problems and issues. In other words, why do some people decide to get involved in a problem or issue and pursue it to resolution while others, although concerned, do not take action, or if they do, give up before reaching any successful conclusion. What are the psychological or sociological determinants of these different behavior patterns. Hines' meta-analysis included 128 research studies conducted in the period from 1971 to 1986. Her criteria for including studies in the analysis required that they contain empirical data, ie. that they take a quantitative research approach. In the end she identified 15 variables which were analyzed to assess the strength of their association with environmental citizenship behaviors. Hungerford and Volk (1990) state that from this "scientific research" emerged a model of "responsible environmental behavior".

The model has become the foundation of their subsequent curriculum work. It proposes that a person's intention to act on an environmental problem is influenced by their action skills, their knowledge of action strategies, knowledge of issues, and by personality factors (1990, p.10). Personality factors include attitudes, locus of control, and personal responsibility. Figure 5.2 summarizes Hines' findings as a model of responsible citizenship behavior. Subsequent research led to a refined or evolved version of the original Hines model, as shown in Figure 5.3. It distinguishes among the processes of knowing, caring and doing and describes a set of variables having influence on each. The sets are categorized as Entry Level Variables, including environmental sensitivity, androgyny, knowledge of ecology, and attitudes toward pollution, technology, and economics, which influence Knowing; Ownership Variables, influencing "Caring" and described as in-depth knowledge of issues and personal investment; followed in turn by Empowerment Variables, associated with Doing and including perceived skill in using environmental action strategies, knowledge of environmental action strategies (in a synergistic relationship with each other) and locus of control. Taken together, as illustrated in Figure 5.4, these

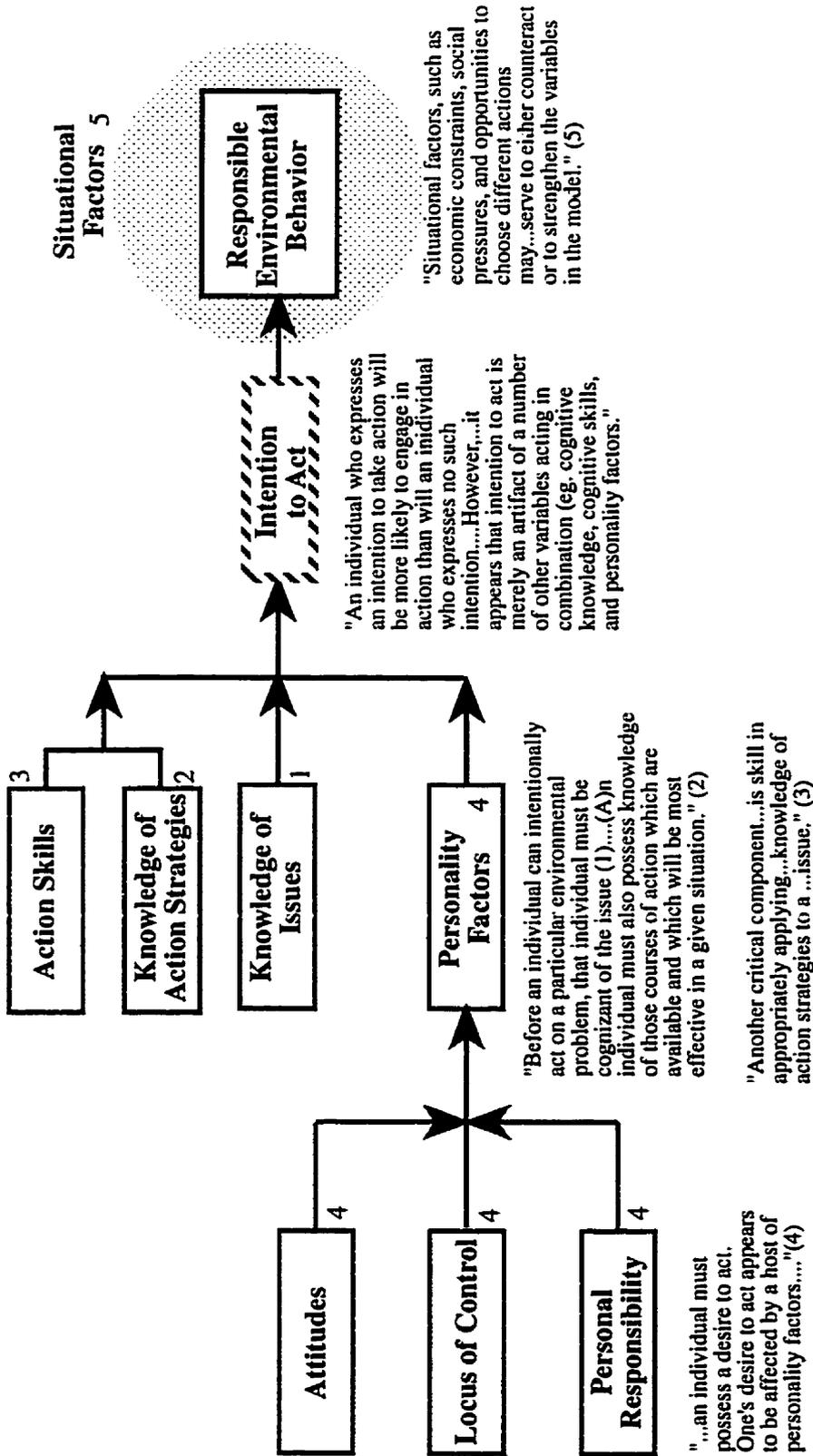


Figure 5.2: The Model of Responsible Environmental Behaviour Proposed by Hines (1986/87).

variables may be seen as attributes of environmental literacy, a term equivalent in Hungerford's usage with responsible environmental citizenship.

One of the most interesting of the Entry Level variables is "environmental sensitivity." Hines found that it was a very significant (if not the most significant) influence on subsequent environmental action behaviors. However, Hungerford and his colleagues chose not to address it in their curricular proposals, although they readily engaged with knowledge of ecology, and attitudes toward pollution, technology, and economics. As an explanation for the apparent assignment of environmental sensitivity to the null curriculum of his program, Hungerford offers that sensitivity has been shown to be influenced by extensive time spent in the outdoors, often in the company of adults or peers who were significant role models. Most environmentally sensitive individuals spent considerable time engaged in outdoor activities, often in relative pristine environments. The activities included hunting, fishing, hiking and so on. Because of these findings Hungerford took the position that the constraints surrounding most contemporary urban public schools would make it impossible for teachers to arrange experiences that could foster the sensitivity of the students, even though enhanced sensitivity, or bonding with nature, might well have a significant impact on their future environmental behavior. Hungerford and Volk (1990) write:

"If these research studies are to help us make educational decisions about developing environmental sensitivity, it seems important that learners have environmentally positive experiences in nonformal outdoor settings over long periods of time. And, in the formal classroom, we must look to teachers who are, themselves, sensitive and willing to act as positive role models for learners. **Both of these conditions, for millions of learners, are hard to meet.**" (p.13. Hungerford & Volk, emphasis mine)

So, although Hines' meta-analysis was an important foundation for the psychological theory behind Hungerford's curricular work, from the very outset decisions were made based on practical considerations rather than possible educative or instructional significance. The decision concerning environmental sensitivity was made based on the view that it would be impractical to try to address it curricularly. In Chapter 7, I discuss the work of Michael Cohen whose approach to environmental education is based on exactly the opposite viewpoint that environmental sensitivity is an indispensable purpose of environmental education and should be the major focus of its methodology.

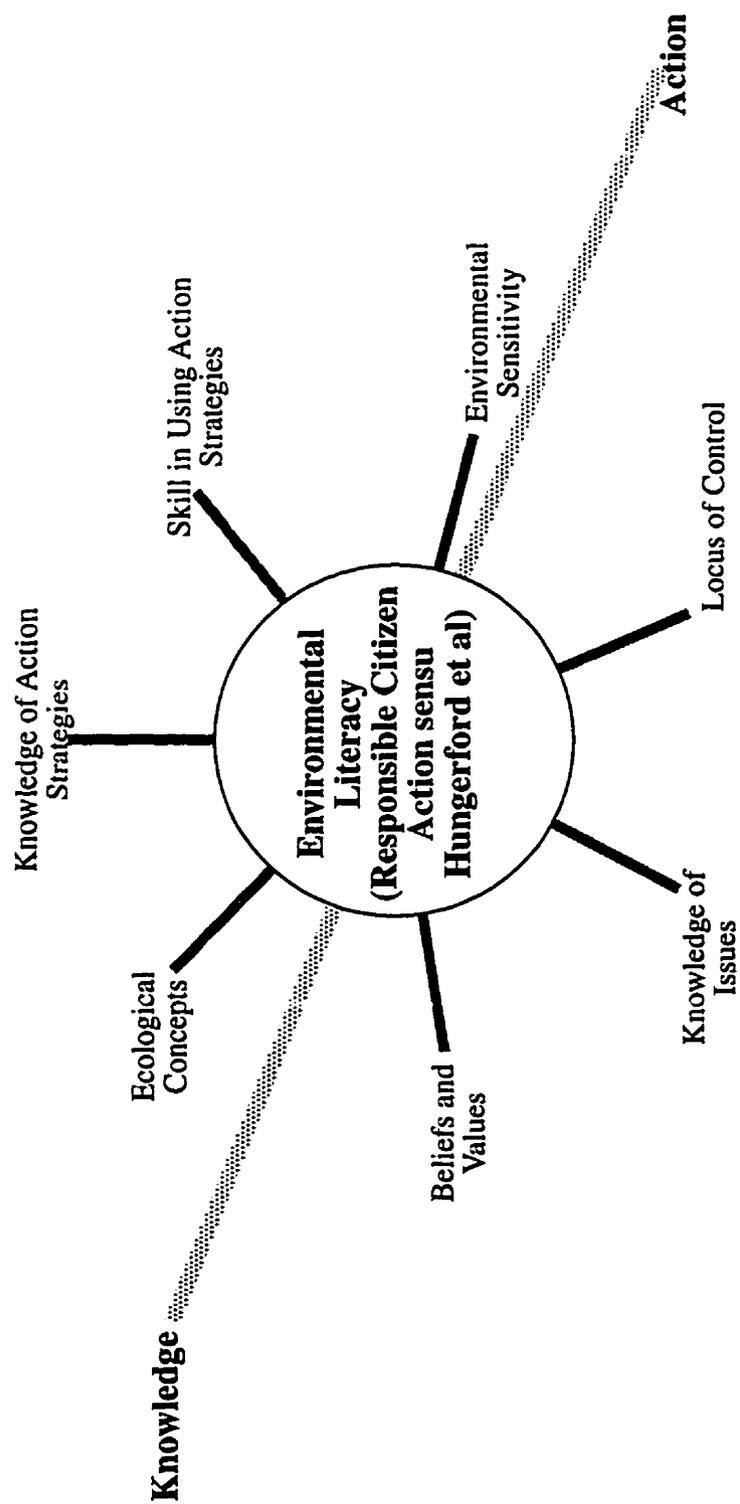


Fig.5.4: A Representation of the Elements of Environmental Literacy (Attributes of an Environmentally Responsible Citizen) as Proposed by Hungerford and Volk, (1990, pp.4-5).

In the 1990 Changing learner behavior.... paper Hungerford and Volk write “Certainly there is no one best way to implement these components in an instructional setting even though the research provides the reader with some meaningful clues concerning important and successful strategies” (p.13). But, however it is to be done, the theoretical position developed by this research implies that the major influences on effective, environmentally active citizens are known. Being known, they can now be incorporated into the design and development of environmental education curricula. Another way of putting this is that environmental education curricula should try to replicate the conditions which nurtured those who have been demonstrably effective in addressing environmental issues through effective, responsible, citizenship actions. We should try to clone the processes that generated Rachel Carson or Aldo Leopold. Human behavior is complex, but it can be simplified and understood, and once understood, it can be manipulated (changed) by addressing the variables that appear to affect it; of course the resulting behavior changes will be desirable. There are value positions underlying these claims which I will examine in Section IV of this chapter.

It is clear that to Hungerford and his associates schools are means of shaping human behaviors in desirable ways to produce model environmental citizens. Therefore a program which proposes to change human behavior by manipulating the variables that affect it is entirely appropriate for schools. In fact, as noted above, Hungerford and his associates appear to view the development of knowledge as a change in behavior. Certainly many political pronouncements concerning the purposes of schools (or of education, as defined) echo the view that the school curriculum should be an instrument of national policy or a means to attain desirable social purposes, whether more effective driving habits, healthy eating, greater physical fitness, and so on. Whether these purposes are educational and whether they belong in the core curriculum of schools is often either assumed to be self evident or is given scant attention. In a contribution to a collection of essays concerning environmental problem solving, Hungerford and his colleagues (Winther, Volk & Hungerford, 1994) affirm their views of the role of institutions of education in developing environmental citizenship:

Historically, education is responsible for imparting important knowledge and skills. thus, the schools are responsible for teaching learners to read and write as well as important concepts about the world in which they live. More than that though, schools are supposed to teach learners how to be productive citizens-how to get along with other human beings and what is expected of them in society. Some behaviors are clearly defined and easily measured: **knowing how** to spell and recalling facts. Other behaviors, such as being able to obtain gainful employment or developing social skills, are more complex. **We also believe**

responsible citizenship action with respect to the environment is an essential component of education for all of us at the close of the twentieth century. This paper will describe a model of environmental education that has been shown to be effective in **shaping** such behavior. If students are to become responsible citizens who understand and act effectively on environmental issues, **they should first understand, at least nominally, the scientific principles involved in issues.** They must also **understand the positions, beliefs, and values of the people involved in the issues.** They should be able to investigate the issues within their community in order to make sound decisions regarding the solution of particular issues. Finally, if they are to play a positive role in the constructive resolution of the issue, they must be able to develop sound action plans, and at the same time, communicate and work with people who hold values and positions different from their own.” (Winther, et al. pp.25-26, emphasis mine)

This quotation is significant in that it distinguishes between the goal of responsible citizenship action with respect to the environment and a model of environmental education which can “shape” such behavior. It offers the broad outline of a curriculum. Figure 5.5 diagrams the elements of this curricular proposal and I shall refer to it as I briefly describe its main features below.

Winther et al. also develop the concept of an environmentally responsible citizen as one who understands and acts effectively on environmental issues. In order for students to achieve these capabilities, they must first develop at least a nominal understanding of the scientific principles involved in the issue, understand the “positions, beliefs and values” of the people involved in the issue and be able to investigate the issue as it exists in their own communities in order to make sound decisions regarding its solutions. Finally, they must develop action plans and communicate and work with people who hold values and positions different from their own (p.24). As noted above, there is a definite sequence here. Knowledge of scientific principles and understanding of the positions, beliefs and values of the people involved is prerequisite to investigating an issue and then acting on it.

In support of the attributes required at each stage they define a series of Goal Levels:

Related to this overall goal for environmental education are four major levels of subgoals which were developed to **lead the learner** toward the superordinate goal:

Goal Level I: The Ecological Foundations Level.

(Termed “Science Foundations in Figure 5.5). Instruction at this level seeks to

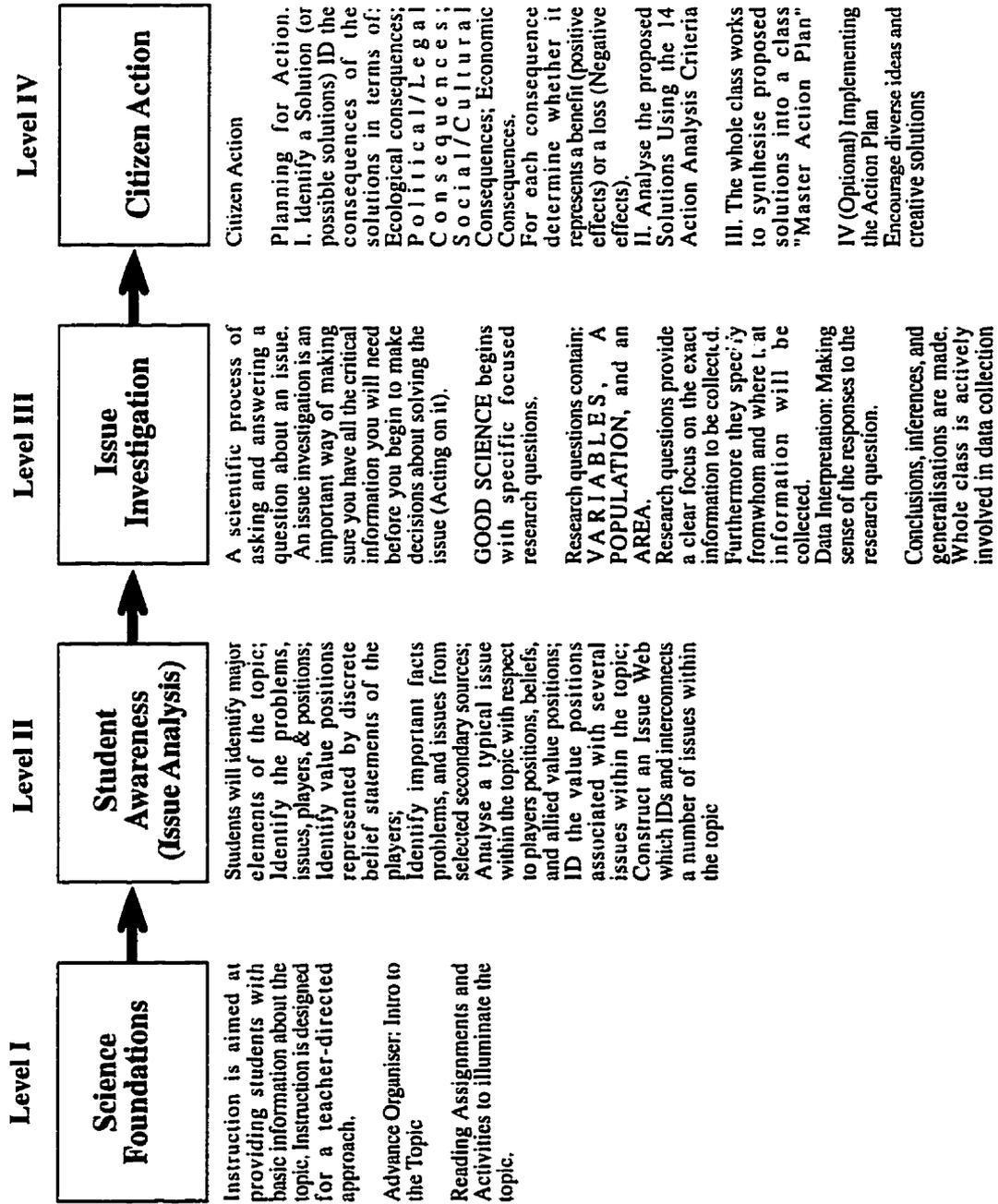


Figure 5.5: The Investigating and Evaluating Environmental Issues and Actions (IEEIA) Program Model as Described by Hungerford, Litherland, Peyton, Ramsey, and Volk (1992).

provide learners with sufficient ecological knowledge to permit him/her to eventually make ecologically sound decisions with respect to environmental issues.

Goal Level II: The Conceptual Awareness Level. (Termed “Student Awareness or Issue Analysis in Figure 5.5).

This level of instruction seeks to guide the development of a conceptual awareness of how individual and collective actions may influence the relationship between quality of life and the quality of the environment and, also, how these actions result in environmental issues which may be resolved through investigation, evaluation, values clarification, decision making, and finally citizenship action.

Goal Level III: The Investigation and Evaluation Level . (Termed Issue Investigation in Figure 5.5)

Education at this level provides for the development of the knowledge and skills necessary to permit learners to investigate environmental issues and evaluate alternative solutions for solving these issues. Similarly, values are clarified with respect to issues and alternative solutions.

Goal Level IV: Action Skills Level-Training and Application. (Termed Citizen Action in Figure 5.5)

Education at this level seeks to guide the development of those skills necessary for learners to take positive environmental action for the purpose of achieving and / or maintaining a dynamic equilibrium between the quality of life and the quality of the environment. (Winther et al. pp. 26-27, emphasis mine)

A core element of Hungerford et al’s theory of environmental education is that it cannot be assumed that knowledge leads to awareness which in turn can be translated into effective environmental action and that there is a distinct difference between declarative knowledge and procedural knowledge. This means that curriculum must attend to the transfer of learning from one context to another and to helping students develop skills which are generic enough to be applicable to a range of settings. Both transfer of learning and generic skills are problematic concepts for learning and curriculum theorists. It is also important to appreciate that the goals in the above list are in a hierarchical arrangement. Hungerford and his coworkers believe that ecological knowledge is prerequisite to ecologically responsible action, and that conceptual awareness and skills in issue investigation and evaluation, built on the foundation of ecological

knowledge precede training to develop the skills required for positive environmental action. However, in other writings Hungerford and his co-authors (Hungerford, Litherland, et al., 1992) waiver (although only slightly) from the claim that the components of environmental education are best arranged in a linear sequence from knowledge to action.

Literacy, then, begins with knowledge and ends with action. Although these literacy components are , by and large hierarchical in nature , there are many instances where two or more of the components can be acquired simultaneously (e.g., certain ecological knowledge and issues knowledge, or, issue information and the alternative methods of investigating those issues). In fact, to assume that each literacy component or sub component must be acquired independently of others is probably educationally unsound. (Hungerford, Litherland, et al. p.3 , emphasis mine)

Even so, the passage does not suggest departing from the fundamental syntax of knowledge, awareness, investigation and action. The literacy referred to here is environmental literacy, a term used somewhat interchangeably with environmentally responsible citizenship in the different documents produced by Hungerford and his various co-authors. I will now turn to a somewhat more detailed description of the components of the Goal Levels. Before doing so it is worth drawing attention to a definitional problem, a problem embodied in the term “conceptual awareness”. Exactly what is meant by this term? Is conceptual awareness the same thing as awareness of environmental problems? Or is it awareness of concepts of human interactions with the environment and how human acts affect the quality of the environment. Is awareness in the context of the this Goal Level the same thing as understanding? Is awareness another form of knowledge? While Hungerford and his associates are sometimes very careful to define terms, as in the case of the definitions they provide for issue, problem and so on (below) they do not provide clear definitions of their meanings of the terms concept and awareness which are used repeatedly in their writings. These definitional questions arise again in considering the Goal Level descriptions which follow.

In the Goal Level of Ecological Foundations Hungerford and Volk (1990) and Hungerford, Litherland et al., (1992) list nine conceptual elements:

- A. Individuals and populations
- B. Interactions and interdependence
- C. Environmental influences and limiting factors

- D. Energy flow and nutrient cycling
- E. Community and ecosystem concepts
- F. Homeostasis
- G. Succession
- H. Humans as members of ecosystems
- I. The ecological implications of human activities and communities. (Hungerford & Volk, 1990, p.19)

Again the use of the term “conceptual element” as opposed to “concept” is interesting. Conceptual elements are described by the authors as the knowledge required to permit students to make ecologically sound decisions. It would appear that in Hungerford et al. terminology, knowledge is comprised of concepts, although whether the items in the list are considered to be concepts, or elements of concepts, remains unclear. For the purposes of this critique it is quite clear that Hungerford and his associates believe there is a definite body of knowledge, specifically in the field of ecology as a branch of biology, that is prerequisite to effective action on environmental problems. In earlier writings about how students were to obtain this foundational knowledge it was suggested that they should have gained basic ecological understanding prior to undertaking the core of the Issue Analysis and Action program.

These modules do not include an ecological foundations component. That is, they were designed on the assumption that a student interacting with them would already have a foundation in the basic ecological concepts which explain the operation of the biosphere. The knowledge of concepts such as energy transfer, population dynamics, homeostatic balance, community and ecosystem interactions, etc. is essential for understanding the ecological basis of environmental issues and solutions. The authors have assumed that students will have much of this information. This assumption may be faulty in some instructional situations. (Hungerford, Litherland, et al., 1992, p.12)

It is noteworthy however that Hungerford and some of his co-workers have begun to publish books intended to function as a support system for the main curriculum materials. A good example of this is **Ecology: An introduction for non-science majors** (Hungerford, 1997) which could serve as a supplementary text for the Ecological Foundations goal level. In fact, the

topics in **Ecology** are very similar to the conceptual elements listed above for that Goal Level. Apparently the assumption was faulty often enough to require the development of new materials specifically to address the need for students to have a foundation of basic ecological knowledge before they begin to use the **Investigating and evaluating environmental issues and actions** module. A complete curricular system is taking form here.

The second goal level is Issue Awareness or Issue Analysis. It is described as being comprised of skill development with both training and application phases. In the training phase students will learn the skills associated with "issue analysis". Issue analysis is a method of examining an STS issue in terms of its players, their positions, and the beliefs underlying the positions. It is important to note that Hungerford and his associates have developed definitions of issue as distinct from problem. A problem is defined as an environmental situation or condition in which something or someone is at risk or threatened. An issue is a problem about which two or more people or groups of people disagree. The disagreements might concern the definition of the problem, its seriousness, and/or the manner of its solution. Hence, in the issue analysis phase of the process students are taught to identify both the problem and different views of the problem held by various players, which by definition, make the problem an issue. Presumably, if there was no disagreement, there would be no issue (Ramsey, et al., 1989a). They also define the words "player" and "position" and provide descriptions of the meaning of beliefs and values:

Player: Those person(s) or group(s) who have a role in an issue or its solution.

Position: The stand or posture taken by the player in regard to the issue or its solution.

Issues are complex. The ideas presented above are probably not enough for some one to completely understand an environmental issue. In this lesson two more ideas are presented which will help you understand environmental issues. Those new ideas are beliefs and values. Both beliefs and values are related to a player's position on the issue.

A **Belief** is an idea that a person holds. The person thinks or believes that the idea is true. In reality, it might or might not be, but the person believes that it is.

Often a person's beliefs are strongly related to his or her values. **Values** are specific ideas which help an individual decide what is important or worthy. A value is the comparative worth a person places on something. Each individual has personal values which develop in response to past experiences. These values

might involve money, status, beauty, religion, or a number of other characteristics. How do values influence beliefs? How do beliefs influence positions on issues?

Values provide the guides for individuals to determine what is important to them. In this way, values help shape the beliefs that an individual holds on an issue. They help determine that individual's position on that issue. (p.38)

Hungerford and his co-workers (Ramsey et al., 1989a; 1989b) maintain that it is possible to analyze an environmental issue by finding out who the players are, the positions they hold concerning the issue, and the beliefs and values they have which may influence their positions.

A skilled observer can identify a player's values by carefully listening to a player's belief statements and analyzing them. By analyzing what players say and do, you can get an idea about what values the players are using to make decisions in an issue. Issues arise because different people think different things are important. (Ramsey et al., 1989a, p.38)

Presumably a curriculum focused on environmental issues should develop students' abilities to observe and listen in order to identify values, beliefs, and different positions concerning issues as part of the Issue Awareness or Analysis phase.

The third phase is Issue Investigation. It is a very important stage in the overall curricular sequence. Issue investigation is described as "a scientific process of asking and answering a question about an issue (Ramsey, et al, 1989, pp.90-93.) Education at this level provides for the development of the knowledge and skills necessary to permit learners to investigate environmental issues and evaluate alternative solutions for solving these issues. Similarly, values are clarified with respect to issues and alternative solutions (Winther et al., 1994, p.27). The use of the term "scientific" is important here. The science entails using surveys, questionnaires, and opinionnaires to generate quantitative data about an issue.

A **survey** is a critical inspection in a certain area used to provide exact information. For example, surveys could be conducted to determine the amount of litter on the school playground or to determine the number of trash barrels in a local park. A **questionnaire** is a carefully written set of questions about a particular subject that is given to a carefully selected sample of human beings. An **opinionnaire** is a carefully written set of questions which measures the opinions of a carefully selected sample of human beings. For example, an opinionnaire could be given to a town's residents to determine their opinions about where a new landfill should be placed. Many investigations combine the questionnaire

and opinionnaire. That is, an investigation method might be designed to collect both information and opinions from a sample of human beings. (Ramsey, et al., 1989a, pp.90-93)

The focus of these methods should be understanding variables associated with an environmental issue. Variables are factors or conditions associated with STS issues for which data are to be collected. Some of the variables that might be considered during the planning of an issue investigation include:

Factual Information about Problems, Issues, and Solutions

Respondents' Knowledge of Problems, Issues, and Solutions

Respondents' Perceived Knowledge of Problems, Issues, and Solutions

Respondents' Opinions About Problems, Issues, and Solutions

Respondents' Behaviors Concerning the Issue. (Ramsey, et al., 1989a).

In Hungerford's view science includes social science and is characterized by structured means of gathering information about human actions, beliefs, and/or values in such a way that it can be treated quantitatively, in other words, the instruments or methodologies generate data. The curriculum modules also discuss how data are to be handled. Data interpretation means:

... making sense of the responses (to survey instruments). It includes conclusions, inferences, and recommendations. Conclusions are factual summary statements of the results. Inferences are general statements about what the data means. Recommendations are suggested actions concerning the issue based on the conclusions and inferences. (Ramsey, et al., 1989a, pp.91-93)

Thus, environmental issues can be understood by means of scientific methodologies which identify people's beliefs and opinions, and indicate the values they hold. The data collected by these methods can be analyzed and used to generate conclusions, make inferences, and construct recommendations. An epistemology which favors objective, statistically valid and reliable measurements is evident. What is not addressed as clearly is whether or not an opinion held by a majority should determine policy or action, even if it is based on faulty logic, superstition, or fear. It is assumed that people are basically rational: if they are presented with data showing that their beliefs are founded on incorrect information they will change them and support appropriate action or policy.

The final phase of the curricular process is the Action stage. Its purposes are defined as to guide the development of those skills necessary for learners to take positive environmental action for the purpose of achieving and/or maintaining a dynamic equilibrium between the quality of life and the quality of the environment, presumably in the context of a particular environmental issue. The first step in this phase is to identify a solution or several possible solutions and then to assess the ecological, political, legal, economic and sociocultural consequences of the solution (or of each alternative). This done, each consequence is weighed by means of whether it is a cost (loss) or a benefit. Following this, the possible solutions are assessed using a set of 14 **Action Analysis Criteria** (Ramsey, et al., 1989):

1. To what extent is there sufficient evidence to warrant action on this issue?
2. Are there alternative actions available for use? What are they?
3. To what extent is this action the most effective one available?
4. What are the legal consequences of this action?
5. What are the social consequences of this action?
6. What are the economic consequences of this action?
7. What are the ecological consequences of this action?
8. To what extent do my personal values support this decision?
9. What are the beliefs and values of others involved in this decision?
10. Do I understand the procedures necessary to take this action?
11. Do I have the skills needed to take this action?
12. Do I have the courage to take this action?
13. Do I have the time needed to complete this action?
14. Do I have the other resources needed to do this action effectively? (Ramsey, et al., 1989a, pp. 122-126)

In the last two stages an entire class works to synthesize proposed solutions into a “master plan” . Then as an option, the class may implement the plan. It is important to note that the actual implementation phase is considered to be optional. This may reflect some nervousness about the ability of teachers and schools to handle real dissent and opposition in community settings where they try to put their plans into effect, although Hungerford, Litherland et al. (1992) state that they do hope students will attempt to put the plans into effect in their communities. They do not, however, believe that it would be appropriate to make this an obligatory element of the program. I will comment more on this under the focusing questions, below.

In the various modules in which the process is employed Hungerford and his associates provide examples of different action strategies. These include several Action Methods.

PERSUASION: Persuasion is the act of trying to convince a person (or a group of persons) that a certain action is correct. Logical appeals such as discussion, letter writing, and posters are the most positive approach to persuasion. However, emotional appeals and coercive efforts are also common types of persuasion.

CONSUMERISM: Consumerism is the act of buying (or not buying) a product or service. This action relies on the economic power of purchasing or boycotting to support (or not support) certain ideas held by producers, manufacturers, agencies, legislatures, or even nations. Direct boycotting, indirect boycotting, and consumer conservation are types of consumerism.

POLITICAL ACTION: Political action refers to any mode of action which brings pressure on political and/or government agencies (and their representatives) in order to persuade them to take a certain action. Voting, campaigning, and lobbying are common types of political action.

PHYSICAL INTERVENTION: (Termed Ecomanagement in the more recent curriculum modules, Hungerford, et al, 1992, p.68.) Physical intervention is simply a phrase which refers to a physical action taken to help improve the status of an issue. For example, litter can be reduced by a clean up campaign. (Ramsey, et al., 1989a, pp. 118-120)

Forms of action such as civil disobedience, although part of the American experience, are not listed as options. Hungerford, Litherland, et al. are not unaware of the omission, and they refer to it in the 1992 IEEIA Module (p.64) where they write that although civil disobedience is part of the American tradition it seemed wise not to include it in action strategies and instead to teach students to work within the system to bring about sound solutions to issues. Students who

wish to propose civil disobedience are to be asked to consider the consequences and cost/benefits of their proposals, presumably as a means of inviting them to reconsider unlawful forms of action and choose more acceptable approaches. It is unclear that there would or should be any discussion of the concept of civil disobedience *per se*.

Hungerford and Volk (1990) note that one of their purposes has been to develop a program model which will make it possible to address the complexity of environmental behaviors. They contend that it is this apparent complexity which led educators to assume that knowledge leads to awareness which in turn automatically leads to behavior, an assumption they claim is challenged by their research and that of their colleagues (Hines, 1986/87; Marcinkowski, 1989; Sia, 1985/86; Sivek, 1989).

For the purposes of this thesis it is not necessary to provide further detail about the instructional strategies to be used in the four main stages of the Investigation, Evaluation and Action process. The model is quite linear and sequential in form, with knowledge, especially of the scientific and societal dimensions of environmental issues, preceding action, although some things may be done together in the sequence, for example, developing action plans and communicating with issue stake holders. The major purposes and approaches of each of the four stages have been described in sufficient detail to permit an analysis and assessment of the proposals.

Before proceeding to Section III it should be made clear that in the view of Hungerford and his colleagues schools should be expected (and are expected) to act as means to particular societal ends. Of course, it follows that they believe it is possible to operate an effective and powerful program of environmental education within the existing structure of schools, even though change may be needed (Hungerford & Volk, 1990):

One of the serious impediments to the kind of instruction recommended in this document is the fact that it **differs substantially from typical educational practice....we must look to a new model of instruction if behavior is important....because all environmental behavior is somehow issue related it appears as though issues must be the focus of instruction beyond environmental sensitivity, ecological foundations, and issue awareness.** (Hungerford & Volk, p.17, emphasis mine)

The position that it is possible to employ schools as effective vehicles for environmental education, especially an issues focused EE, albeit after making significant changes in practice and the allocation of time and resources, as held by Hungerford et al, is quite different from the

views of environmental educators who regard schools in their current form as antithetical to environmental education and/or as fundamental sources of the problems in human-environment interactions (Cohen, 1988, 1997; Orr, 1992; Weston, 1996a, 1996b). For these critics environmental education programs should raise fundamental questions about the core purposes of schooling and the premises of the modern world as expressed in the curriculum. As frustrated with or critical of school EE programs as Hungerford et al may be, they still believe in the schools as agencies for social reconstruction or reproduction.

In this passage is also found the interesting statement that all environmental behavior is somehow issue related. This places tight restrictions on the scope and purposes of EE. In fact, Hungerford and Volk emphasize this by making clear the view that environmental sensitivity, ecological foundations, and issue awareness are not sufficient for a complete environmental education curriculum: a comprehensive curriculum must make environmental issues the focus of instruction. Hence, not only has environmental sensitivity been discarded as a variable for possible curricular manipulation on practical, logistical grounds, it has now seen as having low priority or as inappropriate. Hines research certainly would not support this position.

Thus, Hungerford offers an approach to environmental education, which is claimed to achieve environmental citizenship behaviors. He contends that the research that supports its approach is clear, strategies are known, tools are available. All that is required is the will to do things differently. My task will now be to examine some of the issues and possible consequences associated with this well-presented, highly structured and coherent approach to environmental education.

III. Application of the Inquiry Framework

A. Metaphysics and Epistemology.

The world view expressed throughout Hungerford's work is one in which humans are clearly part of the environment, inseparable from, and dependent on it. Human needs must be met without damaging the quality of the environment, that is, without destroying the capacity of the environment to continue to meet human needs. However, some of the program materials, especially **Threatened and Endangered Animals** (Hagengruber & Hungerford, 1993) note that some people believe that other species have rights and that it is immoral for humans to threaten their survival or to drive them to extinction. In addition, wildlife should be protected simply so that humans can continue to appreciate and enjoy them, quite aside from the impor-

tance of species diversity for ecosystem stability or as potential sources of new foods, fibres, drugs or other chemical products (Hagengruber & Hungerford, 1993, p.16). But humankind is at the center of this world view as an actor, whether conserving, managing, damaging or appreciating the natural world and other life forms. The term “nature” or “natural” is seldom used in these materials. It seems to be assumed that humans are part of nature, and therefore are natural. Whether it is natural for humans to modify the planet and even drive species to extinction in the process is not addressed. The statement is made, after Leopold, that concern about species loss is relatively recent. It is extended by citing Leopold’s claim that the native hunter who killed the last mammoth in North America “thought only of steaks” (Hagengruber & Hungerford, p.15) and that the sailor who clubbed the last Auk thought of “nothing at all”. This is a fairly superficial account of the history of humankind’s relationship to other species.

It is also apparent that Hungerford and his co-workers view the current state of human-environment interactions as a matter for serious concern. They don’t establish a “crisis” tone in their writings, but they certainly do not believe that our current patterns of activity are sustainable. The focus of environmental education is clearly placed on environmental issues. Thus, while people may value the environment for aesthetic reasons (spiritual and religious perspectives are not mentioned), environmental education should attend to understanding, analyzing and addressing issues. The environment is a source of problems about which humans often disagree, so they become issues. As has been noted before, this is only one possible perspective on the environment but it drives a set of particular curricular approaches (Sauvé, 1996).

Another theme which underlying most of this curricular work is that human beings will be rational actors, as long as they are provided with knowledge and skills needed to solve problems and understand the psychological bases of behavior. We can change our behaviors and we can affect the behavior of others. Human behavior can be scientifically understood, and, being understood can be changed. This appears to be a classical behavior modification approach to teaching (Joyce and Weil, 1972). There is also a mix of behaviorism’s determinism with a belief in empowerment and personal efficacy to be found in these works. While viewed as actors, capable of making changes and taking effective action to address problems and issues, humans are also sometimes represented as simply a combination of influencing factors: “it appears that intention to act is merely an artifact of a number of other variables acting in combination: cognitive knowledge, cognitive skills, and personality factors” (Hungerford & Volk, 1990). Behavior change is not attained by the techniques of reinforcement, although the reinforcement model is

applied to explain some behaviors, as when a person who likes to fish is described as expecting positive reinforcement from the activity:

An individual who believes that he/she has good fishing skills is more likely to attempt fishing because there is an expectation of success or reinforcement for this behavior. This person has an internal locus of control for fishing.
(Hungerford & Volk, p.12)

This statement proposes that beliefs are the result of previously reinforced behavior: I believe that I have good skills in fishing because I've had success in past fishing trips which reinforces my belief. Does this imply that the source of belief is reinforced experience? The definition of belief employed in the program materials is "...an idea that a person holds. The person thinks or believes that the idea is true. In reality, it might or might not be, but the person believes that it is. Often a person's beliefs are strongly related to his or her values" (Ramsey, et al, 1989, p.38). Extending this line of reasoning it would seem that experience is the source of ideas and experiences which, if reinforced, are likely to become beliefs, especially if the reinforcement is positive so that the experience (and associated belief) are valued. This sort of logical analysis of the relationships implied by the various concepts of behavior and definitions found in the program materials is largely lacking.

In epistemological terms Hungerford's program might be described as applied behavioral science. It embodies the view that human behavior can be understood by rational analysis through a behaviorist lens. Such understanding enables conflict resolution and effective environmental action on issues, defined as problems where differences exist among those concerned (the players). Human behavior results from a combination of variables. By understanding what variables may have shaped a particular behavior, it is possible to alter it by modifying the shaping variable. It is also possible to use quantitative methodologies to gain an understanding of the beliefs and knowledge which people have about issues, and to appreciate their opinions. The emphasis throughout the program is on the collection of "data" about these matters, largely by using survey techniques on sample populations. The message is that good science involves formulating very precise questions which are appropriate to quantitative survey methods and then using such methods to gain data from which inferences, conclusions and ultimately recommendations can be made. The entire third phase of the program is concerned with developing student skills in using these methods. No mention is made of more recent qualitative methods for social science research or of phenomenological approaches. The implicit message would appear to be that they are not "good" science, or at least not as good as those approaches that

generate numerical data which can be statistically analyzed. This view of the relative value of different forms of information and their potential contribution to knowledge and applications may partially explain the decision to avoid any curricular attention to the set of variables described as “environmental sensitivity” even though Hines’ meta-analysis found them to be highly significant influences on environmental citizenship behaviors. Environmental sensitivity requires time and repeated experience to develop, often in the company of others who model such sensitivity and environmental values. It is not as amenable, in Hungerford’s view, to skill development in a school-based curriculum. It is also difficult to study quantitatively.

The word “skill” is used repeatedly throughout the Hungerford materials, and it is applied in a number of contexts which appear to imply that it doesn’t have a single meaning for the authors. There are skills in issue analysis and investigation, citizenship skills, issue remediation skills, action skills, skill in appropriately applying knowledge, observational skills, skills in reading and mathematics and skills in identifying and solving environmental problems. In general it would appear that a skill is a technique or a set of techniques, applied to a particular task. To be skilled therefore entails learning skills and then knowing which skills (or skill) applies in a given situation and being able to bring the method or technique to bear in an effective and possibly efficient manner. A great deal has been written about skill learning (and teaching) and considerable research has been done in the area, largely because of the interest it holds for corporations, some professions and trades, and the military. Even though Hungerford’s curricular approach is grounded in a psychological theory of human behavior, his instructional proposals make no reference to similar foundational research concerning learning in general, and skill development in particular. This seems odd, especially given the major emphasis placed on skills.

It is also important to note that humans are seen not as individuals so much as citizens, as members of classes, and as participants in a polity. When classes develop proposals for action they are to develop a master plan to which the entire class will apparently agree, although the possibility of individual student action plans is acknowledged. Even so, the authors state that generally well-organized groups have more power for effective action (Ramsey, et al., 1989b). What is not addressed in either student or teacher materials is how to deal with a situation in a class where there are very different, possibly opposed views of how to act on the same problem, and all the proposed actions are potentially useful, practical, and appropriate. It seems to be assumed that students will either develop a consensual master plan, or develop a several different personal action plans. Of course, if it is not expected that students will actually try to put

their plans into effect, the question is rather academic. Plans on paper can co-exist, but plans put into action in the world outside the classroom may not.

Finally, the issue investigation phase of the process (Fig.5.5) is designed to generate information about specific questions. Once the data is analyzed, inferences can be made from it, conclusions drawn, and recommendations made concerning possible actions. However, do action proposals necessarily have to arise from data about the current state of affairs in the community. Is the only source of an action plan the data gathered by a research survey directed at the community's knowledge and opinions? The linkage between the data collection of Phase 3 and the Action planning of Phase 4 is not made clear.

B. Structure and Curricular Approach

All the curriculum materials generated by Hungerford and his associates are highly structured. In fact, it is a program claim that this method is superior to other approaches to EE precisely because it takes a definite approach to a sequence of instruction and to the development of final outcomes. The main claim is that most programs of EE operate on the syntax that knowledge leads to awareness which leads to behavior (action). While Hungerford et al don't dispute some parts of this sequence, they claim that research shows that the possession of knowledge does not automatically lead to action and that most programs are limited in their approach because they offer little beyond issue awareness (by which term they appear to mean presentation of a few facts and concepts in a broad outline of the problem). Their program materials on the other hand take students "far beyond issue awareness, into issue investigation and citizenship action" Ramsey, et al, 1989a, p.iii. The four steps in this process, arranged as shown in Figure 5.5 are used as the organizing framework for program materials. Since the publication of *Ecology* (Hungerford, 1997), it appears likely that not only will this framework organize individual modules in the program (Hungerford, Litherland, et al., 1992) but will also guide the development of separate curriculum resources to support and extend each phase. Within a phase teachers and students have some room to modify activities and approaches, but the overall program is sequentially structured and one stage supports the next.

Hungerford's materials appear to fall within the category of curricular approaches described by Eisner (1985) as technological (curriculum as technology). The assumptions of the approach are that once outcomes are clearly defined a curriculum can be developed to attain them, essentially by reverse engineering from a description of the product. The foundational meta-analysis of Hines, described previously, was directed at studying the "end product",

namely environmentally responsible citizens, and attempting to determine what was known about the influences on their behavior. Once the end product was better understood, as well as the experiences which might have influenced its development, the information was translated into a curriculum plan. Hungerford and Volk (1990) reinforce the technological metaphor by their frequent use of flow chart diagrams in which the curricular elements are arranged in sequences. The word module, as in Skill Development Module, also has a mechanical, parts-in-a-machine connotation. Although this orientation is less evident in Hungerford's work to date, treating curriculum as a technology lends itself to management by objectives approaches in which the success of the program is assessed by quantitative outcome measures like test scores, or cost/student instructional hour/ or pupil teacher ratios. This is a very deterministic approach to curriculum. There is little room for the emergence of new insights and approaches based on the real experiences of those who apply the program. In many cases, time is of the essence and the teachers and students have to keep going, keep on track and schedule. As a consequence, the Hungerford materials fit well with the structure and schedule of many schools and can easily be adapted to test-based outcome measurements (see below).

C. Approach to Knowledge and Skills

As has already been discussed in Section III-A, the Hungerford materials place considerable emphasis on skills and skill development. In addition, the program emphasizes two types of knowledge: foundational knowledge of ecology (Level I) and knowledge gained by data collection and analysis (Levels II and III). Knowledge is created by taking things apart and figuring out their components and the interactions among them. When information is to be collected about humans, even when it concerns their opinions, it is to be gathered through structured, quantitative approaches such as questionnaires and opinionnaires or other survey instruments. Such information is considered to shed light on the variable which has been defined as the focus of the investigation. Students are taught these methods and they are expected to design their own tools and apply them to the investigation of issues. When action plans are ultimately developed they should arise from the data gathered by these research methods.

Issues therefore are viewed as being understood by analysis. Even beliefs and values can be treated as variables to be assessed quantitatively. The possible contribution of other forms of knowledge to an understanding of environmental problems and issues is not discussed. Science is clearly represented as the best form of knowledge for environmental decision making. Everything can be understood through a scientific lens. Naturally, given this view it is fairly easy to define sets of skills which are necessary for a successful scientific inquiry and then to develop

written modules which help teachers teach them to students and students to learn them. For a teacher looking for a very clear structure and definite methodology, this approach is likely to be very attractive.

D. Problem Solving

The focus of the Hungerford program is not as much on problems as it is on issues and actions to address issues. Hungerford and his associates define an issue as a problem about which there are differing views concerning what should be done, how urgent it is, or even about the nature of the problem per se. Hungerford doesn't assume a common view of environmental problems: quite the opposite, he assumes that people will frequently disagree and that these different perspectives and views should be understood through data collection and analysis. He offers a distinct approach to issue analysis and resolution. The general syntax of the approach and some of its main elements are diagrammed in Fig.5.5. It consists of three main phases: Issue Awareness or Analysis, Issue Investigation, and Action. All three depend on foundational knowledge of ecology (Level 1, "Science Foundations"). The Issue Analysis/Awareness phase involves identifying the major elements of the topic, including the issues, the players, and their positions. Students also gather information from secondary sources, concerning both the scientific or other knowledge available about the problem and examples of similar problems and issues which have been addressed elsewhere. In the Issue Investigation phase students learn the skills needed to design and apply social science methodologies, as discussed above, to the issue. At the end of the process they make inferences from the data, arrive at conclusions and generalizations. This phase then leads to the Action phase in which students identify possible solutions, assess consequences and costs/benefits of solutions, and evaluate proposals using a set of Action Analysis Criteria. Finally students develop firm plans, or a class master plan. The last stage is optional and involves the actual implementation of the action plan.

Most of the elements of this sequence are similar to other approaches to problem solving in broad outline (Burns, 1976; de Bono, 1982; Koberg and Bagnall, 1976). A notable omission is attention to the development of unconventional or creative solutions or methods for generating a large number of possible alternatives prior to selecting the best and/or most practical. Methodologies such as brainstorming, creative imagery, or psychocybernetic approaches, all frequently employed in other problem solving systems, are not used here. This might imply that the solutions to most environmental problems are already known, and what is needed is to understand how people disagree, and why, and then develop methods to influence public opinion or those of key decision makers.

E. Roles of Teachers and Students

The Hungerford Investigating and Evaluating Environmental Issues and Actions (IEEIA) handbook (Hungerford, Litherland et al., 1992) is organized into two main sections: a student book and a teacher guide. Each contains important clues as to the views of the authors about the roles of students and teachers. Overall, the materials are quite teacher directed, especially the Foundational Level I, which is seen as being intended for a teacher-directed approach. However, as the students progress through the next three levels to the final action phase more and more responsibility is assigned to them to design plans and methods, conduct research, analyze data and present findings. The teacher remains in general control of the process, but the students are actively involved in the latter phases.

The instructions to teachers in the IEEIA handbook suggests that the authors have designed the various student activities with a particular instructional process in mind. That process entails identification and presentation of the topic for the unit, and definition of terms. This is to be followed by demonstrations in which teachers model skills or concepts for students. Finally, the students participate in applying skills and definitions in practice situations. The instructions to teachers also emphasize that the modules use a hierarchy of skill development, therefore they are advised to use the curriculum in the sequence in which it is presented. However, the authors also comment that where teams of teachers collaborate, more than one element of the hierarchy might be presented at the same time, with different team members handling different elements.

The teacher instructions also place special emphasis on the matter of values clarification. Hungerford and his co-workers apply the values clarification strategies of Raths, Harmin & Simon (1966), Scherer (1978), and Simon, Howe, and Kirschenbaum (1972). Hungerford and his associates maintain that didactic teaching of values is ineffective and that students have difficulty sorting out the wide range of values modelled in our society, so values clarification seems the best alternative. They urge teachers to share their values with students, but to do so in a way which allows students to assess the ecological consequences of the teacher's values and not in a dogmatic or authoritative manner. They call for the creation of an open, free, and respectful atmosphere in the class. There is no mention, however, of how to address the concerns of students (and parents) who view values clarification as an intrusion on personal privacy or subtle means of indoctrination via peer pressure and self-disclosure.

The overall approach suggested concerning the role and responsibilities of teachers is described in the following passage (Hungerford, Litherland, et al., 1992):

Research suggests that students tend to achieve to the level of teacher expectations. This being the case, set rational but high quality expectations for your students. If the students have developed the skills addressed in Modules I-IV, they do have the prerequisite abilities to do autonomous research. It is up to the teacher to work with the students in terms of the responsibilities they have as independent investigators, e.g., respecting the rights of others, abiding by school rules. It may be helpful to have a class discussion with the students regarding the rights that they have as they pursue their research and the concomitant responsibilities. There is nothing wrong with making the ground rules clear, but it should be done from a positive standpoint. **During the actual research period, the teacher will act as a consultant, resource person, possibly a liaison between school and community, and most of all, an encouraging supporter of the students.** The role is a rigorous one, demanding energy and attention. However, the payoff of this expenditure is well worth the effort. (Hungerford, Litherland, et al. p. 58 , emphasis mine)

In terms of the roles of students, the Hungerford materials “speak” directly to student readers in the prefaces to the student handbooks. They ask students to consider themselves as citizens not only of their own communities (regardless of whether or not they are actually of age to vote) and of the world. They ask them to think of themselves as part of the hope for a better environment, as people who can contribute to solving environmental problems. They address students as persons who are already concerned and interested in those problems. They also announce that the goal of the materials in the program is to help them become responsible citizens. Hungerford’s IEELA materials are somewhat unique in making an explicit statement concerning student rights in a democratic society. The statement is found in the student section of the IEELA Solid Waste Case Study (Ramsey, et al, 1989a) :

“Let’s begin with a list of principles about you and your role in a democratic society.

1. You have the right to be heard and to act on science/technology/society issues.
2. You have the responsibility to exercise that right and to be knowledgeable and skilled in such actions.
3. Some actions are mandated by law, but most involve your own choice.
4. You have the ability to investigate STS issues and to obtain information on which you can base a plan of action.

5. Most of the actions that you take in your life have consequences (environmental, economic, social, etc.). You have the responsibility to consider whether an action will be positive or negative over the long run.

6. You have the ability to become skilled in at least some of the methods of citizenship action.

You should now understand that it is your responsibility as a citizen to participate in issue resolution. And that you have rights which help you do this. (Ramsey, et al. 1989a, pp. 118-120)

In actual fact the list above contains only one right, the right to be heard and act on STS issues; the other items in the list appear to be responsibilities and abilities, not rights. Even so, it is an interesting opportunity to place the matter of student rights and responsibilities on the agenda for class discussion. This is likely especially important in situations where students do a lot of field work in the community and attempt to implement action plans outside the school.

F. Sequence

I have already discussed the sequence contained in Hungerford's materials, and in particular the **IEEIA Handbook** (Hungerford, Litherland, et al.,1992) and the **Solid Waste Case Study** materials (Ramsey, et al, 1989a). The materials are designed to be used in a particular sequence which reflects the psychological theory that shaped them (see below for further comments on this). Teachers are advised to maintain the sequence in their classrooms when they use the curricula. Additionally, the design is claimed to represent a hierarchy of skill development, so each stage is prerequisite to the next.

G. Perspective on Action

The culmination of the program is the development by students of action plans, or, in a group a class master plan. The authors emphasize that evaluation should be based on the products of student research and the quality of the action plans and projects. It is in these demonstrations that students bring the knowledge and skills they have gained in the course of the program together. The entire orientation of the various materials is to environmental issues and "citizenship actions". There are, however, a number of underlying assumptions about action which are woven through the materials.

First, sound environmental action is regarded as being based on ecological principles. In doing their analysis and investigation work students may discover that economics plays a role, but economic principles are not to be given first consideration in developing action plans, although cost benefit analysis can be used as one element in selecting the best or most appropriate solution. Second, by definition, environmental issues entail disagreements among people with different views. Action therefore involves seeking consensus or agreement wherever possible among the factions or player concerning a commonly accepted solution. Environmental action will, in this way be almost unavoidably political in Orr's (1992) sense that politics involves arriving at priorities among competing values, and assessing values at a community level. Hence, all environmental issues are seen as having knowledge components, and value or political elements as well. Economics involves values so economic considerations will most likely appear also.

Hungerford et al have developed a set of action analysis criteria to help students decide among various possible courses of action. They include consideration of legal, social, economic and ecological consequences, as well as practical considerations such as whether or not the proponents have the required knowledge and skills, and the time, resources, and even courage to take the action they are considering. As also noted in Section II, Hungerford and his colleagues offer four broad categories of action including ecomanagement, consumerism, persuasion and political action. They reject civil disobedience as a form of persuasion or political action and suggest that students should work within the system to resolve issues.

The most important aspect of this approach to action is that in spite of all the intense skill development, issue research, and planning which the modules support, the final stage of actually implementing an action plan is optional. This likely means that in most classroom situations the program will stop with students presenting plans for action, but never actually putting the plans into effect. As I have proposed elsewhere, there are three broad categories of action learning: learning about action, learning through action, and learning from action (Hammond, 1997a, 1997b). When students stop at the preparation and plan presentation stage of an action process they have no opportunity to learn directly through and from action. Even the best simulation and role play cannot replicate the experiences of actually putting a plan in play and finding out whether or not it really is workable, practical, and effective. Moreover, it is in the course of action that the elements of the action situation really become apparent: the players, the political forces, the time required, the costs, the tools needed and skills required. Good case studies and teaching strategies like role plays and simulations can help bring the reality of implemented action plans into classrooms, but they have definite limits. In my view, the

Hungerford materials are surprisingly equivocal about the need to really have students get down to work. I will return to this issue in Section IV below.

H. Ethics

I have already described the materials included in the handbooks concerning student and teacher roles, and student “rights” in particular. The 1992 IEEIA Handbook (Hungerford, Litherland, et al.) also states that teachers need to work with students to inform them about the responsibilities they have as independent researchers, for example, respecting the rights of others and following school rules. This seems to imply that as students, especially in the senior grades, begin to go out into the community beyond the school in order to gather data about issues they will be working outside the direct supervision of the teacher and need to agree on a code of conduct for this phase of their work. While there is a suggestion that students might also consider the rights of the subjects of their investigations, very little is said on the topic of research ethics.

In Canada the Social Sciences and Humanities Research Council and most universities and research institutions have developed guidelines concerning all research which employs human subjects, including methods like questionnaire surveys. They apply to student project research as well as to research carried out by professors. The guidelines are still under active discussion, but they take the broad stance that the subjects of research must be fully informed about the purposes and nature of the research and give informed consent before being involved in it. Additionally, most guidelines call for researchers to make provision for the subjects to get copies of the final research reports, if they wish, and/or to be given the chance to comment on any transcribed interviews, statements, etc, before they become part of a final report. Privacy concerns must also be addressed so that informants can be sure that their information will be anonymous or their identity protected. In the U.S. there is less enforcement of a general research code of ethics in the social sciences, but these issues are certainly under active consideration. Given this, it is odd that there is essentially no instruction given to students in this area, or even any major discussion of the issue. In time, if classroom teachers have student researchers going into the community with survey instruments, there is sure to be concern expressed regarding who and how the information obtained will be used. This question certainly needs to be addressed.

In terms of environmental ethics, the materials do not present or take an ethical position, other than to affirm the dependency of humans on the environment. If there is an ethic here it is fairly pragmatic (Krauthammer, 1991; Light & Katz, 1996). **Threatened and Endangered**

Animals (Hagengruber & Hungerford, 1993) does list a number of moral and ethical reasons why humans might want to save endangered species and raises the question of the right of non-human species to survive, but does not enter into a detailed consideration of the question. These are complex ethical problems and environmental ethicists are quite divided in their views concerning whether humans have a moral duty to protect other species and whether other species can be considered to have rights if they aren't capable of moral reasoning (Light & Katz, 1996). **Threatened Species** certainly uses the Hungerford approach to analyzing the views of different "players" in issues of species loss, but it never addresses how different forms of knowledge might contribute to the conversation. The form best represented is science.

I. Fit With Schools

As has been described above the Hungerford materials are intended for use by educational agencies, in particular K-12 schools, although application to Junior College level classes also seems possible. In a number of ways the materials are well suited to school use. They are organized in units or modules which can be addressed in a series of classes in a school timetable. They provide advice to teachers concerning implementation and use. They avoid directing students toward action projects and proposals which are likely to be unacceptable to school programs. If there is a problem of "fit" it concerns curricular location: the IEEIA Modules could certainly be used in a social studies program, especially given their attention to social/political/and economic aspects of environmental issues. If the materials were incorporated into a team-taught multidisciplinary environmental studies program they would be easy to implement. The ecological foundations unit could be addressed as part of a biology or science course and the remaining three levels could form part of a social studies class. Some of these possibilities for implementation are suggested in the Teacher sections of the handbook. The program would likely fit much better in the senior high school program of a large comprehensive school in the U.S. where students often have more electives and a wider range of courses acceptable for graduation requirements than in most Canadian provinces where many university bound students have little program flexibility, even though schools can develop local option courses. The material that I have used for this review make no direct attempt, as some EE materials do, to link program elements to learning outcomes or goals in the core curriculum (Canadian Wildlife Federation, 1992).

IV. Hungerford 's Work in Light of the Focusing Questions

A. How does the curriculum address the concept of education within the context of environmental education

The Hungerford program materials offer a clear portion on the nature and purposes of education. That view is most directly stated in Hungerford and Volk, 1990 and although I have cited it above, it is worth restating here:

The ultimate aim of education is **shaping human behavior**. Societies throughout the world establish educational systems in order to develop citizens who will **behave in desirable ways**. (p.8. emphasis mine)

This description of the purposes of education is linked to a definition of environmental education: ...that part of education which deals with ecologically related social issues in the environment, and focuses on the development of responsible citizenship behaviors regarding those issues.” (Hungerford, Litherland et al., 1988, p.1)

So, education is directed at shaping human behaviors in desirable ways and environmental education, as a subset of education in general, is focused on shaping behavior toward responsible citizenship concerning environmental issues. The first statement also claims that “educational systems”, presumably equivalent to schools, have been established for this purpose. Education is for citizenship and schools are the agencies society has established for this purpose. Responsible environmental behavior is another component of good citizenship and Hungerford and his associates have developed a theory-based, systematic, coherent, sequential program which, they claim, research has shown to accomplish these purposes.

The first question which must be asked is whether or not Hungerford's concept of education is worthwhile and sound. Most definitions of education in general entail more than citizenship training and behavior modification. Stenhouse (1975) has already been cited noting that education should make predictable behavioral outcomes less possible. While Hungerford defines environmentally responsible citizenship as involving behaviors which strive to reach a balance between human needs and environmental quality, these concepts are themselves problematic. Citizenship implies membership in a polity, a community. As such, the concept requires consideration of the relationship between individual human rights and responsibilities and those of the state. Does the state have automatic authority or does its authority rest on moral

grounds. If the state behaves immorally, as in fostering policies which encourage or permit environmental destruction, is this moral, even if it is supported by the majority (Saul, 1995). If the state's exercise of authority is immoral don't people have a duty, if they are to behave morally, to oppose the authority of the state? If the purpose of education is to affect behavior change toward desirable ends, who decides what ends are desirable, and how is the decision taken? Because of Hungerford's failure to address these fundamental questions and his definition of education as the servant of the state, he misses educational opportunities which might be provided by critical examination of questions like those above. Perhaps he and his co-workers were unwilling to go too far along the path of a truly critical inquiry into the root causes of environmental problems. The idea that the relationship between individuals and the state might itself be a focus of one of the inquiries in the program doesn't seem to have arisen, despite a passing mention of civil disobedience as a form of action not to be considered as appropriate for students.

A second conceptual blind spot in Hungerford's work lies in his epistemological assumption that the form of knowledge which has the most to contribute to understanding environmental issues and questions of environmental citizenship is science, an assumption carried through almost to the exclusion of any other form of knowledge. The entire program is structured around a foundation of knowledge derived from ecology, as a science, and the methodologies modelled and advocated through skill development in issue investigation are entirely grounded in an empirical, objectivist foundation. Good science is based on these approaches, as he puts it (Hungerford, Litherland et al., 1992). This shuts off opportunities to extend student understanding of different forms of discourse, of how different forms of knowledge make claims and test them or to develop conceptual finesse, to use Barrow's term (1984).

Other critics have attacked Hungerford on the grounds that the program exemplifies top down, centralist, expert driven conceptions of curriculum research, implementation and development. Robottom (1994) and Wals and van der Leij (1997a) have developed extended critiques of Hungerford's approach. However, a great deal of their commentary reflects very different views of the purposes of schooling and the nature of curriculum rather than a critique of educational merit. Robottom comes closest in offering the view that curricula which address environmental problem solving should be critical in nature, by which he means that while the inquiries conducted by students should address the value elements of issues: social, environmental and other, they should also address the assumptions implicit in any proposal for action concerning how communities ought to relate to their environment. True critical inquiry doesn't just find out what people know, or think they know, or their opinions, but seeks to discover how these views

are constructed in the first place. In a community where almost every family is directly or indirectly dependent on logging there are likely to be many deep rooted assumptions about how people should treat the environment. Proposals to act on any issue in such a context are likely to reflect these assumptions and shape which actions are chosen for implementation or detailed planning. It is the task of an educational approach to environmental issues to illuminate these assumptions and help students discover whether the game is rigged from the outset.

Other criticisms mounted by Robottom and Wals and van der Leij focus on different curriculum conceptions and have more to do with the role of schools in addressing environmental issues than with ideas of education as such. I will, therefore, consider some of their comments under question 4, below. There is, however, the claim that behaviorism is inherently anti-intellectual and therefore antithetical to most broad concepts of education. If by behaviorism is meant behavior modification using schedules of reward and punishment to reinforce or discourage overt actions, then there may well be validity to the view that it is not compatible with concepts of critical thought and breadth of understanding. In fact, behavior modification approaches are often used in training, therapy and rehabilitation where purposes are quite different from those of education. Some elements of this line of criticism are to be found in Wals and van der Leij's (1997a, 1997b) critique. However, while Hungerford et al. certainly make some use of the language of behaviorism and other psychological theories, and direct their research efforts at understanding the determinants of behavior, their actual educational methodology is not generally congruent with behavioral models of teaching (Joyce and Weil, 1972). As I have noted above, even their use of the term behavior includes knowledge and attitudes as much as overt actions. While behaviorism can be criticized on whether or not it is an adequate psychological theory, that is beyond the scope of my purposes here.

In constructing a critique of the educational elements of Hungerford's approach to environmental education it is worthwhile to ask whether or not, assuming that Hines' foundational study is valid and that the factors she listed do influence whether and how people act on environmental problems, these findings constitute grounds for constructing the sequence proposed in the flow chart of Fig.5.2. In turn, if the sequence she proposes is correct, does that permit stating that there is only one best way to arrange the elements of a curriculum which intends to help students understand environmental issues and develop the capacity to act on them. I would suggest that these claims are suspect. They have the form of the naturalistic fallacy, namely that describing how something is leads to ought conclusions (Schubert, 1986, p.125). Education as a field is rich in examples of people who make claims about what should be done on the basis of what is without stating the necessary minor premises that permit such

conclusions. A sounder approach might have been to examine the nature of environmental issues in order to determine what sorts of skills and knowledge students might reasonably have to learn in order to understand and address them. Figure 5.4, for example, places the various aspects of citizen action loosely around a circular center. The elements are not arranged in a sequence or given priorities. But it might be logically argued that certain things should be done before other things because they are included in larger sets of skill or knowledge and are required to be done in a particular order. But, returning to Figure 5.5, while it may be sensible to view knowledge of ecological concepts as being useful in understanding environmental problem solving and choosing appropriate actions, is this knowledge absolutely prerequisite to learning the skills of issue analysis, or even essential to effective environmental action, as Hungerford et al claim. Do people really have to have advanced ecological concepts before they can set up and operate an effective recycling program? What appears to have happened here is that a value stance has been affirmed by recourse to empirical data, and Hungerford et al are really offering a particular view of what should be done, rather than what must be done. In fact, the decision to avoid paying attention to environmental sensitivity on practical grounds indicates that preferences were at work in applying Hines' findings to the curriculum design in the first place. This is not to suggest that some of the skills and concepts that are proposed for inclusion aren't useful to understanding and addressing environmental problems; what is problematic is the claim that they are linked in a tightly sequential manner which requires that teachers and students learn about and address environmental issues only in specific ways. Remember that Hungerford claims his approach is superior to other approaches, not necessarily on the grounds that students learn more effectively in his program, but because its sequence is based on firm empirical foundations.

To close, there is no doubt at all that Hungerford has developed a coherent (in the sense that it has a definite structure and organization) program. It is grounded on a body of psychological research. The research is interesting, but it probably does not justify the claim that there is one best approach to teaching students about environmental issues, and especially that there is one hierarchical sequence. A more important issue for consideration is whether or not the program is fully educational in terms of helping students develop a broad understanding and the capacity to recognize how different forms of knowledge can contribute to people's interpretation of an issue and their actions on it. My assessment is that if students were asked to think about questions first, and then inquired into the various approaches which might be used to address them, before being taught particular methods of inquiry and analysis there would be more opportunity for the program to make an educational contribution. This is not to claim that Hungerford et al's ideas are without practical value as things which might help sort out an

environmental issue and decide on courses of action, but they are not the only things which might help and it may well be that there are other approaches to be discovered and better methods to apply, were the methods themselves objects of inquiry. Finally, as noted in section III, there are significant research ethics issues which are simply not raised. The popularity of the Hungerford materials appears to reside in the fact that they appear to offer everything a teacher needs to begin a unit of work on environmental issues. They provide a step by step series of activities, they offer practical suggestions, they are readily usable in school programs, and they are supported by a number of printed resource materials. These are very attractive features to teachers facing large classes and frantic schedules. But the educational merits of the material should be given first consideration.

B. How does the Curriculum Address the Concept of Environment, and in Particular, the Topic of Human-Environment Interactions

The Hungerford program's orientation to human-environment interactions and the nature of the environmental problematique is stated clearly at the outset of most of the materials. A number of these statements are included in Section II, above. The environment may be a source of recreation, aesthetic pleasure, and even spiritual comfort (Hagenruber and Hungerford, 1993), but it is first and foremost a source of problems, which, because humans often disagree about solutions, are also issues. As has been noted already, Hungerford and his co-workers view the main task of environmental education as to address issues, to help students become aware of them, to develop the skills needed to analyze and investigate them, and to learn how to develop action plans.

Humans are clearly seen as being responsible for environmental problems. Their actions create them and they must and should take responsibility for solving them. Humans are actors on the environmental stage, the most significant actors. They aren't behaving badly because they are a flawed species, or are intentionally trying to damage the environment or attack other species, but because they are uneducated, environmentally illiterate, or simply haven't thought about the consequences of their choices. No attempt is made to discriminate among the environmental impacts of people in the developed world as opposed to the lesser developed nations (as have Wackernagel and Rees [1996] for example).

It is interesting, in fact, given the psychological orientation of Hungerford's curricular work, that there is no attempt to define the variables which might influence our environmentally damaging behaviors: are we, for instance, being urged to consume, to equate a consumptive life

style with happiness and a quality existence? This type of consideration is given little attention in the issue awareness level of the program, but consumerism is offered as an action strategy in Level 4.

Thus, the basic approach of the program assumes that if humans are given a chance to understand their environmental behavior and to discover the factors which affect environmental problems and turn them into issues, they will be willing to make the changes in behavior required to change things in a positive way.

There are several possible concerns about the environmental issues orientation of the program. First, the environment is a source of pleasure, a subject for aesthetic appreciation, and a venue for recreation as well as wellspring of resources and a source of problems. By focusing on problems and issues the environment, not human actions, may come to be seen as the problem. As Orr (1992) remarks, the environment is not the problem—we are the problem. But this is not really a true statement either. The environment may change through natural catastrophe or the operation of large cycles over which we have no control (solar energy output cycles, for example). We may have to confront environmental problems which are not of our making, but which will still profoundly affect our lives. So, while we may be responsible for most of the issues that are now apparent, we don't have to take responsibility for every environmental change. Interestingly, Hungerford uses the example of Mount St. Helens but he focuses attention on the issue of how to handle the mass of dead trees left behind after the eruption.

The second problem with an issues focus is that it may make it easy for students to become so directed to specific issues that they lose sight of the larger, root causes of our current environmental situation. Is our consumer life style an issue? It certainly appears to create environmental problems, and people don't agree about how serious a problem it is or about what to do about it, if anything. But it isn't an issue with clearly defined boundaries, in the way that might characterize a debate about whether or not to build a new sanitary land-fill. Many of the examples which are provided in Hungerford's works illustrate specific issues with quite clear causes. Certainly he describes our consumer oriented life style as a cause of problems in the introduction to IEEIA, (Hungerford, Litherland, et al.1992), but most of the other examples are more restricted. Furthermore, if, as he claims in the introductory remarks cited earlier in this chapter, growing human population is a source of problems, then this will not be an easy issue to approach as a one point, defined problem. As Robottom (1994) states, it is important for students to critique the assumptions behind these described problems and issues. What do we really think should be the ideal state of affairs between humans and the environment, especially

when that is translated to specific community settings as Robottom suggests. If I live in a medium size city I may oppose further growth because I don't want the problems I associate with growth. But a developer may have quite different assumptions about the sort of ideal city size, as may the person who wants to move to my town from a big city, or a small town. We should not, in other words, assume that all people even share the view that there is a problem at all and we have to understand that our assumptions place real, if unconscious constraints on the solutions we might offer for problems. It is an educational challenge to programs like Hungerford's to help students develop critical thought about these assumptions.

C. How Does the Program Address Environmental Action as an Educational or Curricular Purpose

In Section III I note that Hungerford presents the actual implementation of student action plans as an optional program element. In my view this cuts students off from the possibility of significant learning by eliminating the chance to learn through and from action. In Chapter 4 I have developed the distinction among these forms. I believe that some of the most important educational opportunities in action projects arise in the course of actually doing the work and having to make changes in the light of actual situations, and also in the process of debriefing the project to assess success and failure, to consider what has been learned, and to think about how things might have been done differently. In the learning through and from phases students may very well confront failure and have to reassess their positions and consider entirely new approaches which were not considered in the preplanning phase. Failure is not given a lot of attention among Hungerford's action skills, but learning how to deal with failure, with both the emotional and practical consequences of failure is rich in potential for learning and education. While Hungerford expresses the view that students should try to carry their plans through into actual work on action projects outside the school classroom, I expect that the relatively light emphasis given to this possibility suggests that it is not really a priority.

Robottom (1994) has described several criteria (he calls them principles) for environmental problem solving projects. They are:

1. Environmental problem solving should be inquiry based;
2. Environmental problem solving should be critical;
3. Environmental problem solving should be community based;
4. Environmental problem solving should be collaborative;
5. The Outcome of environmental problem solving is unpredictable;

6. Environmental problem solving should avoid the centralized, deterministic strategies of the module/model approach. (Robottom, pp. 74-76)

I have already considered the second element of the list, namely the critical nature of problem solving. It is noteworthy that a number of these make sense only if students and teachers, in collaboration with community partners, actually try to implement an action project. Item 6 reflects the differences in curriculum orientation between Robottom and Hungerford and his associates, where Robottom is opposed to the notion of curriculum development as a process directed from outside the school or community and then implemented by local people under the supervision of professionals and experts. For him, the curriculum is emergent from local circumstances and in the course of the work. He describes the Hungerford approach as the RDDA model (research-development-dissemination-adoption). I will return to these differences in viewpoint in section D, below.

D. What Relationship Does the Curriculum Describe or Imply Between Its Purposes and the Purposes of Schools

As noted above and in Section III, Hungerford believes that schools exist to nurture desirable behavior change, and in particular to foster responsible citizenship. He makes no attempt to distinguish between the functions of schooling and the nature of education. It seems that everything done in schools is a priori assumed to be educational. As Barrow (1981, 1984) and others have pointed out this assumption is not helpful for thinking about what might and should be included in school programs, which things are essential for the educational purposes of schools, and which are important to meet other purposes such as socialization, physical, moral, and emotional development. If everything, de facto, is educational simply because it occurs under school roofs, then we have no basis for making decisions about priority or resisting the claims of those who want to appropriate schools for particular purposes, perhaps at the expense of other functions. Robottom (1994) and Wals and van der Leij (1997a, 1997b) have criticized Hungerford on the grounds that his program reinforces existing social structures and power arrangements while reducing the role of local teachers, parents, and community members in creating the curriculum, activating it, and doing action research on it. Robottom (1994) has defined four dialectics along which he places the differences between Hungerford's view of schools and those of the reconceptualist, practical or critical praxis orientations (Schubert, 1986).

The Hungerford Module Approach ————— Community-Based Reconstructive

1. Transmissive 2. Predetermined 3. Systematic 4. Generalizable (p.77).	1. Transactional 2. Generative/emergent 3. Opportunistic 4. Idiosyncratic
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Table 5.1: Summary of Differences Between the Hungerford and Community Based Reconstructive Approaches.

Wals and van der Leij are also critical of Hungerford, claiming that his approach exemplifies a objectivist, positivist epistemology, seeks universal generalizations in knowledge, puts power in the hands of the teacher, treats the learner as a recipient of information and instruction (consumer to use their term) and focuses instruction on lectures and skill modules. They propose that environmental education should be an agent for school reform and that schools, as reformed, should engage in developing students' capacities to critique construct, emancipate, and transform their societies. These views clearly do not suggest that schools should focus on desired changes in behavior, at least not if the changes are desired by the social mainstream. For Wals and van der Leij the very concept of environmental education implies social reconstruction. They hear the call for sustainable development as a call for radical change, not business as usual. If environmental education fits in schools it should be there as part of a larger revised curriculum in which traditional epistemologies are questioned, the forms of knowledge are viewed as a source of humankind's problems, and learners are expected to work with teachers and community members to define the school program in ways appropriate to their context. While Hungerford errs in assuming that schools should focus so much on socialization for citizenship, Wals and van der Leij are likely imposing their concepts of a reformed society and restructured human-environment relationships on the schools. Even so, Hungerford maintains that the program he proposes requires significant changes in the way teachers work with students with a shift from teacher directed instruction to a role as facilitator, team leader, and mentor in later stages. Moreover, the structure of the IEEIA program, as noted in section III, implies (but doesn't require) the use of multidisciplinary, integrated, or team-teaching approaches, rather than the traditional 1 teacher/class/subject organization that is characteristic of most high schools.

Barrow (1984) proposes five functions for schools: physical development, education, moral and emotional development, and socialization. He offers a conception of a core curriculum to support these purposes. It includes natural science and mathematics, physical activities, history, literature, and religion. He claims that these subjects belong in the core curriculum because they clearly support the functions he proposes. Science, mathematics and religion are forms of knowledge, while history and literature can support the socialization, educational purposes and also embody the remaining forms of knowledge: aesthetic, moral and philosophical. Many other writers have offered different proposals for the core curriculum. Barrow's would certainly be assigned to category of academic rationalism by Eisner. But whether one agrees with Barrow or not, he at least offers a clear proposal about the purposes of schools and he distinguishes education from the others. He also doesn't claim that the core subjects are the only courses that might be found in a school program, but merely that they are indispensable and important. Hungerford, and many environmental educators fail to attempt to develop the same sort of proposal. Either they describe processes, separated from any content (as in the construct, transform, emancipate, and critique) of Wals and van der Leij, or simply assume somehow that the whole school program is educational by definition, as Hungerford seems to, or believe that the school's functions will be transacted anew virtually every day and the curriculum will reflect these transactions, including its content and processes, which leaves schools open to the wishes of active factions or majority rule, or to teachers and administrators by default. I will return to this issue in the final Chapter of this thesis, but I wish to suggest here that environment-human interactions, addressing the whole spectrum of ways in which humans act on and are affected by their surroundings, can be developed in ways that support all the purposes of schools and integrate with all the fields and forms of knowledge offered by Barrow. If there are recurrent themes in the curriculum which appear in many subjects, and require (and enliven) many different disciplines for a full understanding, then humanity's place in the environment is such a theme.

V. Summary

Harold Hungerford and his coworkers have developed a substantial body of curriculum work focused on helping students develop an understanding of environmental issues and actions. The program is based on a foundation of ecological knowledge, seen as prerequisite to the other program elements. It also supports a view of inquiry which is empirical and quantitative in nature and sees action proposals as arising from the results of such inquiry. It places considerable emphasis on the development of a hierarchy of skills related to issue analysis, investigation, and action planning. The major premise on which the program is based is that knowledge only

leads on to effective environmental action if students are taught the requisite skills and given opportunities to apply their knowledge to action plans. The program is also grounded in a psychological theory of the determinants of environmental citizenship behaviours and the interaction among these determinants. The psychological theory has directly influenced the sequential and hierarchical structure of the program.

While there are many useful aspects of the Hungerford program materials, it does not embody a comprehensive educational approach because of its very restrictive approach to knowledge and by failing to engage students in critical inquiry concerning the nature of research, the ethical responsibilities of researchers, and the ways in which empirical data should affect decision making. By focusing exclusively on environmental problems and issues it also marginalizes other ways of appreciating and understanding human-environment interactions.

Chapter 6

The Action Research-Community Problem Solving Model: The Curriculum Work of William Stapp

I. Introduction

This chapter examines the environmental education curriculum proposals developed and adapted by William B. Stapp, his co-workers, and students at the University of Michigan's School of Natural Resources (Ann Arbor). While Clay Schoenfeld is given credit for coining the term environmental education Stapp's 1969 definition is the most cited description of the field even to this day (see Chapter 3, above). He has been a participant in almost every significant forum and conference on EE and his thinking has had a major impact on the development of the field (Kennedy, 1983; President's Council for Sustainable Development, 1995). He was the first Director of Environmental Education for the United Nations Education Scientific and Cultural Organization (UNESCO) and in that capacity organized both the Belgrade and Tbilisi meetings which generated the **Belgrade Charter** on EE and the **Tbilisi Principles**, referred to above (Chapter 3 and 4). These two pivotal documents have essentially defined the field of EE ever since (North American Association for Environmental Education [NAAEE], 1996). He is intensely interested in environmental justice and community action. In his work in Michigan state Stapp noticed that most rivers began in watersheds in white, rural and suburban areas and passed through inner city neighborhoods populated by low income, minority and ethnic peoples. He began to develop approaches to environmental education which allowed the stake holders from all groups affected by the river to meet together using water quality as a common focus of concern. This work became the basis for **GREEN**, the Global Rivers Environmental Education Network, a world wide organization in 140 countries which helps local communities understand environmental problems resulting from human activities in watersheds and develop action strategies to address them (President's Council for Sustainable Development, 1995). The Stapp framework evolved from an environmental "encounters" approach to student investigations of the environment to become the **Action Research - Community Problem Solving (AR-CPS)** strategy. That strategy is the focus of this chapter's critique, although the full spectrum of Stapp's curriculum work will be considered.

In this Chapter, as in Chapter 5 for Harold Hungerford, I will often refer to Stapp's work as an abbreviated way of writing about a body of published writing which has been produced by Stapp in concert with other colleagues and graduate students. He frequently collaborates with

other environmental educators and they have produced a large body of written work in the field of EE. In this Chapter I will make particular reference to **Environmental education for empowerment** (Stapp, Wals, & Stankorb, 1996); **Investigating streams and rivers** (Stapp, Cromwell, Schmidt, & Alm, 1996); **Field manual for water quality monitoring** (Mitchell & Stapp, 1990); and **Education in action: A community problem-solving program for schools** (Bull, Cromwell, Cwikiel, DiChiro, Guarino, Rathje, Stapp, Wals, & Youngquist, 1988), although I will also refer to other written work. Of the three principal authors whose works form the focus of my critique in this thesis, Stapp is the most internationally known and his materials are used in many countries. The international and multicultural orientation of his work is reflected in the **Field manual for global low-cost water quality monitoring** (Stapp & Mitchell, 1995) and **Cross cultural watershed partners** (Stapp, Pennock & Donahue, 1996).

II. Overview and Description

A. Perspective of the Environment and Humankind 's Role in It

Stapp's pioneering definition of environmental education (Stapp, 1969a) (Chapter 3) describes its purpose as to produce a citizenry that is knowledgeable concerning the biophysical environment. Additionally, it states that these citizens should be knowledgeable about "its associated problems" aware of how to help solve them, and motivated to work toward the solutions. This definition therefore regards the environment as biophysical and humans as actors in it who are to become knowledgeable, aware in order to address problems, and motivated to work on the problems. There is a clear issues orientation in the definition and humans are distinct from the biophysical environment toward which they are to express concern and direct restorative efforts.

Environmental education for empowerment (Stapp, Wals, & Stankorb, 1996) offers a diagram of the environment and human relationships with it. The model recognizes the biophysical environment of the 1969 definition, but adds economic, social, and political elements in addition. All four elements are surrounded by a frame, implying that taken together they comprise the human environment. In the context of this model, the authors propose that ecological problems arise from human decisions based on "neglect, lack of awareness, and inequality" and the assumption that technology can transcend the limited carrying capacity of the Earth. Stapp, Wals and Stankorb claim that it is clear that humanity cannot escape "ecological laws" even though humans have exceptional characteristics (culture, faith, and consciousness). Humanity is only one of the many species that interdependently exist in the global ecosystem. Thus" our

actions must be consonant with the Earth's functions if we are to survive and maintain a reasonable quality of life" (Stapp, Wals, & Stankorb, p.12).

Stapp's analysis of the current state of human environment interactions is similar to that of a number of other environmental educators and environmentalists. He perceives a growing world population which is placing increasing demands on the environment. Humans depend on the environment for all basic life needs, but their activities often create pollution and degrade the life support systems on which they depend. Many of Stapp's views of the current status of the environment are grounded in his work on river systems in many different countries around the world in conjunction with the GREEN project. He often sets his concerns and educational approach in the context of wetlands and watersheds (Stapp & Mitchell, 1995):

Why Rivers?

Rivers were chosen as the central focus of GREEN primarily because they are a reliable and informative index of the environmental quality of their catchments. ...Rivers bind together the natural and human environment from the mountains to the sea, and from farmland to the inner city. In fact, 85 percent of the world's human population lives on or near a river. (Stapp & Mitchell, 1995, p.15-16)

Water is an essential, yet finite, substance for all human, animal and plant life. Although water covers more than 70 percent of the Earth's surface, 97 percent of it is salt water in the seas and oceans. Approximately 80 percent of Earth's freshwater is frozen in ice caps and glaciers and therefore technically unusable by Earth's biota. The usable freshwater that remains is unevenly distributed across the surface of the planet. For example, only fifteen of the world's largest rivers carry up to one-third of the total global surface water.

Water is an extremely important resource for humans. We admire it for its beauty and we need it for agricultural, municipal and industrial uses, drinking, transportation, recreation, and just about every other human activity. The problem with our usage of water is that with almost every use we contaminate or pollute it. As populations multiply and nations become more industrialized, water is being used more heavily than ever. This puts an unbearable strain on water's natural ability to cleanse itself of pollutants. The question of water quality is perhaps most acute in the developing world, where it is currently estimated that over one billion people are unable to obtain acceptable drinking water and 75 percent of the population lacks adequate sanitary facilities. Both water quality and water quantity have become critical issues, affecting all life. The state of a local water body reflects the health of the surrounding environment. A healthy stream will reflect a healthy environment and, conversely, a polluted stream will reflect unhealthy, unwise land uses in the surrounding environment. (Stapp & Mitchell, p.36)

These statements present a resources management orientation, but Stapp recognizes the environment as having aesthetic and even spiritual values: he has worked extensively in India, along the watershed of the Ganges and he illustrates some of his writings with photographs of Hindus bathing in the sacred river and appreciates the religious significance of water in many cultures and faiths. His writings also recognize that the ecosystem is naturally dynamic and continually changes, whether humans intervene or not. He appreciates that humans live in a “sliver” of geological time and they often don’t appreciate past changes and current long term change processes.

Stapp has a very global perspective of environmental problems. His early work with UNESCO gave him the opportunity to travel widely and he continues to work in international projects. So his writing has definite multicultural, international and global environmental overtones. He recognizes the transboundary nature of many environmental issues (Stapp & Mitchell, 1995):

Globalization” refers to the increasingly interdependent world, linked by a closely coupled world economy. This shrinking world is brought closer together by massive environmental problems and issues that transcend national and even continental boundaries—issues that can be addressed only through an unprecedented degree of global cooperation.” (p. 15)

The theme that cooperative efforts will be required in order to address environmental problems recurs through Stapp’s writings. Environmental problems are community problems, whether at the neighborhood, regional, national, or international level of definition:

Currently, 2.4 billion people in the world live in urban areas. By the year 2025, the world’s urban population is expected to reach 5 billion, putting additional strains on both water quality and quantity and increasing stress on an already scanty infrastructure. The management of water and catchment areas is a global issue. There are more than 200 international river basins—57 in Africa, 48 in Europe, 40 in Asia, 36 in South America and 33 in North and Central America. The lives and livelihoods of half of the world are directly dependent on the way in which catchment ecosystems within these international river basins are managed. (Stapp & Mitchell, 1995, p.41)

In spite of his recognition of the scope and urgency of environmental problems, Stapp and his co-workers see signs that problems can be addressed and things can be changed for the better:

Fortunately, recognition of the value of wetlands is growing and many are now protected legally. Many previously drained wetlands are being restored in efforts to recover the benefits of these invaluable ecosystems. (Stapp & Mitchell, 1995, p.41)

Air quality is, in many respects, far better in U.S. cities today than it was just twenty years ago.” (Frank, Luera, & Stapp, 1996, p.vii.)

He is also concerned that environmental issues are sometimes communicated to students in ways which cause fear and despair and he sees the task of environmental education as to provide realistic information about environmental problems in a manner which awakens informed concern and activates students to act on problems (Stapp & Mitchell, 1995):

One major challenge that will increasingly confront environmental educators is to develop curricula and instructional strategies that emphasize the global aspect of local environmental issues but do not overwhelm the students or cause them to lose hope.

How can we educate and empower students to take action on local issues, while simultaneously developing within them a global, cross-cultural perspective? How can we best encourage this first generation of truly planetary citizens to assume responsibility for their shared home? (p.15)

Our main assertion is that we should involve people, including students, in the challenges of our time. Nobody knows the right ethical lifestyle yet, but we all have to be responsible for seeking a world which is built upon human equality and sustainable sharing of natural resources, not only as members of the Western world, but the world as a whole. (Stapp, Wals, & Stankorb, 1996, p.5)

The last passage clearly reflects the sustainable development concept that environmental problems must be addressed within a framework of greater equity and social justice on an international basis. This is a fairly recent theme for environmental education, but it has been gaining strength since the Rio UNCED conference (Chapter 3) and links the concerns of EE with global programs for literacy, human rights, womens’ issues, and indigenous peoples’ concerns (Stapp, Wals, & Stankorb, 1996):

The field of Environmental Education cannot be seen as isolated from other emerging educational fields, in Western society, that focus on human rights issues, development issues and peace and conflict issues. (p.5)

In 1996 Stapp and his coworkers offered a new definition of EE, one quite different from his classic 1969 version which has so heavily influenced thinking in the field (Chapter 4). The 1996 version is (Stapp, Wals, & Stankorb, 1996) :

We view Environmental Education as the process that enables students and teachers to participate more fully in the complete process of educational activities to resolve an issue that the learners have identified. This definition of Environmental Education differs from more traditional ones which more narrowly focus on goals and objectives that have been predetermined by outside experts. We see Environmental Education more as an open-ended process that helps people make sense of an increasingly complex world.”(Stapp, Wals, & Stankorb, p.5 , emphasis mine)

The issue/problem focus of environmental education is still found here, but the oft-used combination of knowledge, skills, awareness and motivation to act has been replaced by “the complete process of educational activities to resolve an issue that the learners have identified.” The implications of this definition for curriculum development are discussed later in this chapter.

To summarize, Stapp and his coworkers view environmental problems as serious, but amenable to human action. They emphasize the need for community action and cooperative effort at every scale from local to global. While seeing the environment as a source of resources, they also recognize its importance for other species as well and appreciate the aesthetic, religious or spiritual and recreational aspects of the human environmental experience. Even so, their environmental work focuses on environmental problems, or slightly more broadly, on ecomanagement. In the following pages I will describe how Stapp proposes to address the challenge of environmental issues through education.

B. Stapp’s Curricular Response to Environmental Problems

In order to appreciate Stapp’s orientation to the environment, its problems, and human actions in the environment it is necessary to recall that he is a Professor in the School Of Natural Resources at the University of Michigan. He has a long academic background in resources management and biology, especially ecology. He approaches environmental education in part as a tool in the kit of the resource manager, a way of accomplishing resource management goals by informing and educating people so that they become aware of their impacts on the environment and can take action to address the problems their activities create.

Stapp's initial definition and concept of environmental education was developed through his work on the writing and implementation of the **U.S. Environmental Education Act of 1970** (Chapter 3). His ideas were extended globally by his work as organizer of the UNESCO-United Nations Environment Program (UNEP) environmental education conferences in Belgrade in 1975, and Tbilisi in 1977. The definitions of environmental education developed by these meetings have shaped the field of environmental education for more than two decades (see Chapter 3).

In 1970, at the time of the passage of the **U.S. Environmental Education Act**, Stapp reviewed the literature on learning in order to assess its potential application to environmental education. The review led to the articulation of several principles which were to influence his subsequent curriculum work.

- * Behaviors that are reinforced are most likely to recur. It is important that desired behaviors be reinforced by the home, school, church, youth organizations, etc.
- * The most effective effort is put forth by youth when they try tasks that fall in the "range of challenge" — not too easy and not too hard — where success seems likely but not certain.
- * Youth are more likely to throw themselves wholeheartedly into any project if they themselves have a meaningful role in the selection and planning of the enterprise.
- * Reaction to excessive direction by the teacher is likely to be apathetic conformity, defiance, or escape from the whole affair.
- * What is learned is most likely to be available for use if it is learned in a situation much like that in which it is to be used and immediately preceding the time when it is needed. Learning in youth, then forgetting, and then relearning when need arises is not an efficient procedure.
- * The learning process in school ought to involve dynamic methods of inquiry.
- * Research shows little correlation between cognitive achievement and concern and values. Able students who achieve well in traditional "content-centered courses" do not necessarily demonstrate commitment to positive social goals.
- * Learning takes place through the active behavior of the student. It is what he

does that he learns, not what the teacher does. The essential means of an education are the experiences provided, not the things to which the student is merely exposed.

* One of the keys to motivation is a sense of excitement about discovering for oneself, as opposed to having a generalization presented by a teacher and requiring a student to prove it.

* Attitudes may not be formed through a rational process by which facts are gathered and a reasonable conclusion drawn, but rather through repeated exposure to ideas.

* Helping citizens to acquire technical knowledge alone regarding an environmental problem may not increase their concern for the problem.

* Citizens are more likely to become involved in environmental issues if they are aware of how they can have some effect upon decision making. (Stapp, 1970, no page)

Again, Stapp is not an educational psychologist. His growing interest in environmental education led him to turn to the research literature on learning in order to understand what specialists in the education field considered to be the state of knowledge about learning and how to nurture it. The list of principles was derived from his survey and synopsis of the research to that time. He provides no information about the parameters of his literature search, or about the criteria he may have used in selecting papers having significance for EE. The organizing questions addressed by the list seem to have been how to help young people engage in learning and learn effectively.

The principles present a view of effective learning environments, learning experiences, and teaching as actively engaging young learners in appropriately challenging learning experiences in which they experience sufficient success to be willing to continue their efforts. Active engagement implies that the learners have a voice in selecting what is learned and how it is to be approached. Learning is seen as being more likely to be transferred if the learning experience has elements similar to the situation in which the learning is to be applied. Immediacy in applying learning to actual problems, as opposed to exercises, is also an aid to transfer. Additionally, the principles suggest that success in cognitive learning, or content learning does not automatically imply the formation of positive societal values, that attitude formation is not simply a rational, fact based process, and that motivation is positively correlated with experiences in which the learner is permitted to find things out for him/herself.

Many of these generalizations are found in contemporary reviews of research on the conditions which foster learning (Resnick & Klopfer, 1989; West, Farmer & Wolff, 1991). However, it is useful to note Barrow's (1984) point that writings about learning fall into two broad categories: those that address the physiological and psychological nature of learning, that is what happens internally when people learn things; and second, those that address what can be done to support and nurture learning in an instructional or curricular sense. The assumption, which is common, that basic research on neurology and brain physiology should direct curriculum design is, Barrow claims, open to question. Stapp's review largely addresses generalizations of the second sort, namely, what conditions foster learning (particularly in young people.) He also makes contact with concepts of attitude formation and motivation, both of which are commonly associated with learning.

The significance of the list of principles is that it became the foundation for much of Stapp's subsequent curriculum work. As in the case of Hungerford (Chapter 5), his curriculum theory was influenced by psychological (or instructional) generalizations and theories. Based on the review and the principles as stated, Stapp concluded that environmental learning occurred best in a curriculum structure based on problem identification and solution, where problems were drawn from "encounters" (experiences) that focused the attention of learners on their local environment and required integration of relevant economic, social, technological, and political information. (Hawkins & Vinton 1973, pp. 106-107). The environmental encounters were developed around topics such as transportation, solid wastes, air pollution, water pollution, land-use planning, or community green space and parks situated in the local environment of the students. They provided foci for student studies. The approach entailed engaging students in learning situations where direct encounters with the environment served as springboards for learning. Emphasis was also placed on learners initiating and taking responsibility for engaging in an action research process to environmental problem solving. Thus, student actions arose directly from their first hand experiences in various environmental settings outside the school: local wetlands and streams, waste dumps, parks, neighborhoods. From 1974 through 1979 Stapp and Cox developed and published a series of **Environmental Education Activity Manuals** (Stapp, 1974) based on these ideas. The series provided a number of student activities, example action projects for students and was designed to be a resource for teachers and students.

Gradually the EE Activity Manual series evolved into the curricular approach which characterizes much of Stapp's later work, the **Action Research-Community Problem Solving (AR-CPS)** model (Bull, et al, 1988). It is offered as an approach to education which addresses a number of problems in conventional schooling:

Many of the **problems** we face in life are very complex. Their resolution requires an approach that calls upon training and understanding from a variety of fields. Traditional education strives to provide this training by dividing classroom material into independent subjects that are thought to be easily digestible by students. The reasoning behind this approach is that once students have learned the proper units of information from these separate subjects, they will be able to draw upon them as needed throughout life. Unfortunately, this approach often defeats its **purpose of teaching children how to handle the problems that come their way**. We believe there are several reasons for this:

- Teaching isolated units may help students learn how to analyze, but it doesn't help them learn how to synthesize. Many **problems** require the integration of various skills and the synthesis of information
- This approach may fail to engage or motivate students because it doesn't make direct connections between school work and real life. Many of their questions about life go unanswered or are never asked at all.
- Many students cannot excel in this approach and are consequently left behind the rest of the class. This teaches them failure and creates feelings of inadequacy.
- This approach emphasizes competition, not cooperation. Instead of fostering positive interaction and creative, joint decision making (characteristics which enhance democracy), this approach isolates students from each other and induces mistrust and rivalry between them.
- This approach doesn't teach a basic, step-by-step **problem-solving** process, one that is useful **regardless** of the specific **problems** one faces." (Bull, et al. pp. 3-4, emphasis mine)

Significant in this statement of program rationale is the view that one of the major purposes of education and schooling is to prepare students to solve life's many complex problems. Human-environment interactions are a source of problems, and given a problem-issues focus for EE, students need to be taught how to address problems. Not only has the environment become a problem, but life is filled with problems. The purpose of education (and schools) is to equip people to solve them. I will discuss the implications of this orientation later in this Chapter and in Chapter 8. Notable also is a general critique of the manner of operation of contemporary schools.

If conventional schooling fails on a number of counts, Stapp and his co-workers offer a program for positive change. It is the **Action Research-Community Problem Solving** approach:

The Action Research- Community Problem-Solving (AR-CPS) process, on the other hand, is a viable educational approach that prepares children for the often **confusing and overwhelming problems** life presents. It has always been difficult growing up, but today's children face a **future fraught with problems** as complicated as the world is vast. Global crises continue to escalate due to increasing world tensions and ecological degradation. We must make the commitment to provide today's students with the educational training necessary to enable them to **develop creative, reasoned solutions to the problems** they face. (Bull, et al. p.4, emphasis mine)

Again, the problem orientation to education and life is evident here. What is the AR-CPS approach? It is described as emphasizing:

...cooperative group work, the development of useful skills, problem-solving, and constant evaluation. This approach links Action Research with Community Problem-Solving to improve education and address community problems. In Action Research, learners work through repeated steps of planning, implementation, and evaluation to develop an understanding of a problem and then take action to address it....Community Problem-Solving teaches skills in the context of a real world problem, one that affects the learners in their own community. It focuses on upgrading the quality of the social and natural environment. Together, Action Research and Community Problem-Solving represent a systematic approach to learning that equips learners with the experience and skills necessary to become confident and competent decision-makers in their society. (Bull, et al. pp 4-5)

Thus, the AR-CPS process, as with the earlier environmental encounters, is engaged through contact with "real world problems" in the local community of the students. The action research component addresses the improvement of both the social and natural environment, thereby linking social and environmental issues, in a manner consistent with the concept of environment described above in which the human environment is not only biophysical, but also economic, social and political. During an AR-CPS program students are treated as "practitioners of their own education", explorers, researchers, theorists, planners, and actors (Bull et al, 1988). Through the process, they come to assume more responsibility for their own learning. The teacher becomes a guide and facilitator, who oversees and supervises, teaching skills and developing and reinforcing concepts as the need for them arises. He or she also shares the role

of learner by reflecting on teaching practices and implementing new methods.

Stapp and his associates claim that the result of the process is “a well-rounded learning experience, for student and teacher alike, that serves as a model of a way for a group of people to work jointly toward resolution of a problem of mutual concern. It is a living example of problem-solving which demonstrates to the learners that action is possible, even on seemingly complicated tasks” (Bull, et al, 1988, p.5.)

Stapp and his co-workers emphasize that each learning situation is unique, so the process will play out differently in the context of different encounters in various settings. However, they maintain that its general approach is transferable to any environmental problem. Moreover, given that social, economic and political aspects are incorporated into the environment, the process will apply to problems which are not typically seen as environmental. It is, in other words, a generic approach to community based action research and problem solving. What are the elements of the process. Like many approaches to problem solving it has several steps or stages (Burns, 1976; Koberg & Bagnall, 1976; de Bono, 1982), in fact the procedure is organized into 13 steps.

1. Planning the Process

In this stage a decision is made to undertake a project and the planning phase begins. The teacher consults with members of the school’s critical community: other teachers, the principal, the librarian, students, and their parents. Through the consultation, support is obtained from other members of the school community. This builds potential team support.

2. Assessing Student Skills

In this stage the teacher assesses the information gathering, communication, and group process skills of students and decides which activities to use during the project to help students learn or reinforce needed skills.

3. Increasing Awareness

The teacher and the students explore community issues to become aware of various problems that exist.

4. Brainstorming

The students brainstorm a list of problems they are interested in helping to resolve.

5. Developing Criteria

The students develop a set of criteria (guidelines) with which to narrow down the list of problems to one or a few project topics.

6. Choosing a Topic.

Using the criteria the students select a topic.

7. Researching the Topic.

The students gather information on their topic to learn more about it.

8. Developing a Problem Statement

The students develop a problem statement that defines the problem clearly so they have a focus for their work.

9. More Research

The students continue their research, further refining the focus and increasing their awareness of the topic.

10. Determining Alternative Strategies

The students brainstorm a list of alternative strategies for addressing the problem.

11. Developing Criteria

The students develop a set of criteria with which to narrow the possible alternatives to one plan that they will implement to affect the change they desire.

12. Implementing and Evaluating the Plan

The students implement their plan and evaluate its effectiveness in achieving their goal.

13. Tying It Up

At this point, the students can decide to revise their plan to make it more effective, try another plan, or stop the process. (Bull, et al., 1988, pp. 7-8)

The steps in the process are outlined in detail in the chapters of the various handbooks in which it is subsequently used as an organizing framework for curriculum. I will not address

them in more detail in this thesis, but I will discuss some of the implications of the model later in this chapter. In the 1988 **Education in action** handbook cited above these elements are presented as if they were steps in a linear sequence. Later work, considered next, makes it clear that this is not the case in practice. It should be noted here, however, that the 13 steps listed above are described in Bull et al's **Education in action** (1988) as the AR-CPS process. In more recent work there is a greater distinction between the Action Research and the Community Problem Solving parts of the process (Stapp, Wals, & Stankorb, 1996, **Environmental education for empowerment**).

It is stated that because of the complex nature of most environmental problems, more than one discipline should be engaged in the process of problem solving and action. In a number of their writings Stapp and his co-workers call for integrated or interdisciplinary approaches. In fact, the claim is made that while a working knowledge of scientific foundations is important, social issues must also be addressed and this will require the application of concepts and skills from geography, history, economics, the humanities, computing sciences, and the arts (Frank et al., 1996.) To facilitate an interdisciplinary approach the authors recommend:

... that this program be used in a full variety of disciplinary settings. Teaching aspects of the program in a number of different classes simultaneously will likely result in the broadest possible conception of the issues. Teachers from various disciplines should consider working as teams in teaching the program. (Frank, et al, 1996, p.x)

The above problem solving framework which was published in 1988, would fit reasonably well in conventional schools, although it does promote the use of team teaching, frequent field work in community settings, and an interdisciplinary approach. At the time of writing, none of these attributes were regularly found in secondary school classrooms in the U.S. (Goodlad, 1984). So, while its vision of environmental education presents some challenges to the conventional structures and curriculum patterns of schools, it is certainly not a call for radical school reform. But over the next 10 years Stapp's ideas about the AR-CPS program developed further and began to take on a different form. In recent work Stapp and his network of associates and students have moved toward a socially critical orientation. This is reflected clearly in the following passages from **Environmental education for empowerment** (Stapp, Wals, & Stankorb, 1996):

In writing a book about educational change we have included a critical evaluation of the status quo in education and will use this critique to illustrate the promise of

an alternate approach. Suggesting educational change requires more than merely presenting a different approach. **It also requires a thoughtful evaluation of our society in general and our schools in particular.** Good solutions cannot be developed without first pinpointing the cause of the trouble. Yet, evaluating trends in society and suggesting models for change are subjective activities. We have selected to highlight rather than obscure our subjectivity because we wish to present a thought-provoking text that may lead to debate and, subsequently, educational change. (Stapp, Wals, & Stankorb, p.1, emphasis mine)

Our main biases in this book are twofold. First we are concerned about the quality of both the natural and social environment and consequently feel it is important to incorporate environmental issues in the classroom. Second, we believe that teachers and students should play a major role in shaping their own education. Teachers' personal classroom experiences and insights are not tapped enough in designing good education. At the same time, students are often an untapped source of renewable energy and creativity with ideas and concerns of their own.

Our search for alternatives therefore was inspired by a combination of our educational experiences, our concern for the quality of education, and our concern for the quality of the environment. We believe that the synthesis of Action Research and Community Problem Solving comprises a suitable alternative that should be considered by anyone interested in improving the quality of education. (Stapp, Wals, & Stankorb, pp.1-2)

In developing the action research portion of their approach Stapp and his co-workers acknowledge their debt to Kurt Lewin, a social scientist who worked in the 1940's, although Lewin was influenced by the ideas of John Dewey. Lewin was interested in improving people's working and living conditions and believed in democratic decision-making, a more equitable distribution of power, and that practical problems were an important source of ideas and knowledge. He focused his attention on helping people affected by problems become involved in solving them for themselves rather than relying on the intervention of outside experts. He involved workers in articulating, discussing and eventually acting on their particular problems. His method was comprised of analysis, conceptualization, fact-finding, planning, implementation, and evaluation, which was then repeated in a spiral of activities resulting in a cyclical process of task resolution (Stapp, Wals, & Stankorb, 1996, p.3.).

Action research is claimed to be a methodology that addresses social problems by linking theories of change with practical action. It is designed to promote critical thinking at every stage of the process (Stapp and Wals, 1994, p.53) Action research embodies three themes: commitment to democratic principles, praxis, and the action research spiral.

Commitment to democratic principles in action research assumes that the people who are most affected by a social situation ought to be the ones evaluating it as well the ones empowered to take action to change it. In schools this means that teachers, administrators, students and parents should be at the center of the action research approach to problem solving. Thus, action research posits that the people who live with a particular condition are more qualified to identify its problems and develop solutions than are experts from outside (Stapp and Wals, 1994).

The concept of praxis in the context of Action Research entails the conjunction of evaluation, reflection, and action in the context of a problematic situation. This is an active process where participants are engaged in a spiral process of task resolution marked by critical reflection and action with evaluation being comprised of analysis, conceptualization, fact finding, planning, execution, and evaluation also in a spiral or recursive relationship. In other words, in praxis people learn through and from action (Hammond, 1997a, 1997b) (see Figure 6.1).

Stapp, Wals, and Stankorb (1996) note that praxis parallels the ideas of Paulo Freire who wrote of both praxis and conscientization. Conscientization is a process that moves an individual toward liberation by raising critical consciousness of his or her state of oppression. This ultimately causes the person to act in an effort to change his or her sociopolitical environment. They cite Friere's passage:

You never really understand an issue or know how to help resolve it until you involve yourself in the issue. Then you begin to understand it, to identify the principal parties and actors involved, and begin to realize how to change it. (Freire, 1970, cited in Stapp, Wals, & Stankorb, 1996).

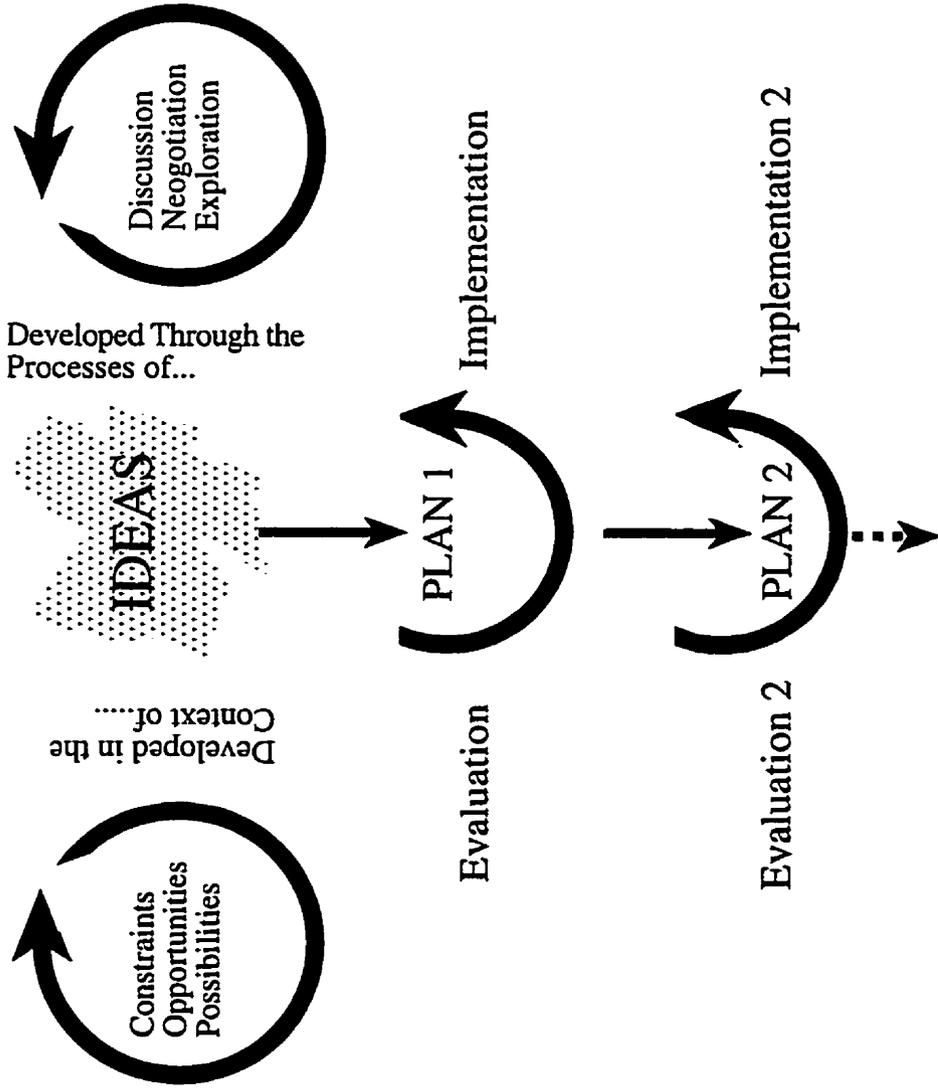
The third element of the process is the action research spiral. This entails a series of sequential steps that are repeated each time with more integration of what has been learned and decided with each cycle. Participants first gather information, then examine constraints, examine opportunities and possibilities and discuss, negotiate and explore the possibilities, then devise and evaluate a plan of action, implement the plan, evaluate the results and redesign and implement the revised plan. The process is diagrammed in Figure 6.1 (Stapp & Wals, 1994).

The second part of the approach is the community problem solving (CPS) process. It has origins in grassroots community organizing efforts to help groups concerned about local problems and conditions effect change. Stapp and Wals describe it as focused on resolving or improving local issues through a problem solving process in which groups concerned about local

problems are helped to become more effective in accomplishing their goals. Stapp and Wals (1994) acknowledge the work of Brody (1982) as an influence on their own approach. The process has a number of elements: recognizing a problem; setting problem objectives; working in groups; collecting, organizing, and analyzing information; defining the problem from a variety of perspectives; identifying, considering and selecting alternative actions; developing and carrying out a plan of action; and evaluating the outcome of the entire process (p.55). The CPS process as described by Stapp et al in **EE for empowerment** is very similar to the outline of the entire AR-CPS process offered by Bull, et al (1988) in **Education for action**. The major differences between action research and community problem solving is AR's attention to reflection and learning from action with possible cycles of recursion in which the problem solving community, having made an initial effort to address an issue, assess the results and on the basis of new understanding of it, gained through action, recycle back into the problem situation using different or revised approaches.

Without going into great detail about these steps it is important to note some points about the process which are emphasized by Stapp et al in **EE for empowerment**. First, defining a problem requires understanding of the background of the situation. This may require considerable work to get below the presented surface of the problem: the real problem may not be at all what people say it is, but they may be unwilling to state what the real problem is because of peer pressure, fear of social censure, or cultural convention. Once the actual problem situation is understood it is important to develop a precise problem statement, as contrasted to a general expression of concern. Once this is done the group (and the CPS process is typically group-based) figures out the precise nature of the problem and its dimensions and possibility of solution. The next stage entails developing problem objectives stating exactly what the group wants to accomplish in a given time frame. Setting objectives requires defining the nature of a successful outcome.

All phases of the process require effective group work. Stapp et al note that this area is not well developed in schools. Thus, most groups will need to be taught, or to learn basic procedures: how to establish agendas, delegate tasks, resolve conflicts, generate ideas, select and prioritize ideas, assign roles, and so on. Because the CPS phase of the process, by definition, is concerned with real problems in actual communities, success will likely be influenced by the ability of the task group to find partners and build coalitions of support. Again, many people have not had experience in doing this sort of work and they will need assistance to develop the required skills. The CPS group will also need to learn how to develop action plans.



(Note: The cycle is really a spiral in which plans are progressively refined through the cycle of implementation, evaluation [reflection], revision, implementation, further evaluation, and so on.)

Figure 6.1: The Action Research Cycle as Described by Stapp and Wals (1994) and Stapp, Wals, and Stankorb (1996).

The Action Research-Community Problem Solving approach is therefore a synthesis of two concepts of locally based community action to solve environmental problems, Action Research and Community Problem Solving. Stapp et al describe the approach as a model, but they note that this term suggests a set of universal rules or guidelines which are to be strictly followed. This, they state, undermines their view that the members of the school community must really develop their own approaches to implementation, evaluation, problem definition, and so on. The AR-CPS process can provide assistance and serve as a support, but they claim it should not be seen as a recipe for solving any and all community problems. There are some important potential difficulties here and I will consider them later in this chapter.

Stapp and Wals (1994) claim that:

By synthesizing action research and community problem solving we have arrived at a learning process that enables students and teachers to participate more fully in the planning, implementing, and evaluating of educational activities aimed at resolving an environmental issue that the learners have identified

During the AR&CPS process, students are given responsibility in planning educational activities and are provided with the opportunity to take responsible action toward improving the quality of their community environment. (p.58)

They note that several presuppositions underlie this approach to environmental education:

It is crucial for society to solve critical issues with the full participation of its young members;

Students need to know that they can be forces for constructive change and that their involvement is indeed needed in the world;

Giving students a chance to investigate and act on a problem of their own choice increases their motivation to learn;

The school and its community contain an abundance of rich material— of printed matter (newspapers, books, magazines), human resources (students, teachers, parents, institutions, organizations,) equipment, (chemical analysis kits, water monitoring devices, computers), for making education more meaningful to the students. (Stapp & Wals, 1994, p.58)

The combined process of Action Research and Community Problem Solving entails several steps, although Stapp and Wals note that while they are presented in a linear arrangement do not necessarily have to be undertaken in that sequence. Teachers and students should decide how to perform the tasks and determine the sequence according to their particular contexts. The steps or elements of the combined AR-CPS process are:

Planning the Process;
 Assessing Student Skills;
 Selecting a Topic;
 Researching the Topic;
 Determining Action;
 Evaluation of the Project.

In each of these stages various Action Research and/or CPS approaches can be applied and the general concept of Praxis encompasses the entire project.

It is important to note here that while Stapp and Wals (1994) and Stapp, Wals, and Stankorb (1996) employ the AR-CPS approach to their proposals, working with different collaborators on other projects, Stapp takes different approaches to the investigation of environmental issues. *Investigating Streams and Rivers* (Stapp, Cromwell, Schmidt, & Alm, 1996) for example, employs a much more conventional approach to problem solving although it does have some broad similarities to elements of the AR-CPS process. Thus, under problem solving in that handbook the authors outline the following steps: identifying specific problems, visualizing the future, selecting an issue to address, contacting organizations and decision-makers, developing an action plan, taking action, and following up on action. There is no mention of the radical critique of schools embodied in the Action Research methodology, although clearly some of the components of AR or CPS could be used here. Thus, Stapp appears to have an eclectic view of environmental education as a problem-solving endeavor. This is clearly quite different from the approach of Hungerford and his associates described in Chapter 5. In Chapter 8 I will give closer consideration to the differences and similarities in the orientations of Hungerford, Stapp, and Cohen.

To summarize, Stapp and his colleagues have developed an array of materials designed to help teachers and students engage with local environmental issues and problems. His work presents a problem solving syntax, although his view of the problem solving and action-taking process has evolved toward more local control and decision making concerning the selection and

definition of problems, the development of problem solving processes, and the initiation and conduct of action. Nevertheless, his view of environmental education is clearly problem and issue focused, although his conception of the environment engages students and teachers not only in the biophysical dimensions of problems but also in their economic, social, and political elements. This broad view of environmental issues can lead environmental education to be viewed as an aspect of overall social transformation and reconstruction. The methodologies of environmental education therefore begin to merge with those of social criticism and critical praxis. In Section III I apply the framework of the critique to his proposals in order to analyze and interpret the significance of some aspects of his curricular work.

Section III: Application of the Inquiry Framework

A. Metaphysics and Epistemology

Stapp's environmental world view is common to most environmental educators. He sees serious problems in human relationships with the environment. These problems arise in part from ignorance and lack of awareness, and in part from a failure to empower people (or of people to empower themselves) to engage in a radical critique of their current situation. Accepting Friere's view that liberation entails recognition of how one is oppressed implies that many people are in fact living constrained or mystified lives without knowing it. The massive consumerism and wastefulness which are commonly regarded as contributing to environmental problems, especially as these habits are expressed in the developed western world may reflect deeper dissatisfactions with life. The existence and gravity of environmental problems is taken as a widely accepted fact and is presented in this manner in Stapp's various publications. Even so, local people are seen as having to discover and analyze their own particular environmental/social situation so that they can make the decisions regarding what, if anything, is to be done. There is a deep commitment to personal empowerment through membership in groups within democratic societies. It is assumed that critically aware people can take charge of their lives and their environments and can develop the knowledge to act in environmentally sensible ways.

Stapp's background in resource management and biological sciences tends to foster an approach to inquiry which is firmly grounded in empirical science and its technologies. Stapp's work makes frequent reference to environmental monitoring by use of science based investigative tools and techniques, as in his several handbooks on water and air quality. While science is not seen as an essential prerequisite, it is nevertheless often used as an important means on discovering and analyzing local environmental situations, or of responding to generalized con-

cerns. Knowledge, at least science knowledge, does not have to precede awareness, or even action. But the development of knowledge often appears to be initiated by science-based empirical approaches, although they often interact with other forms of knowledge including interpersonal, mathematical, aesthetic, philosophical and religious modes of knowing. The later program materials present a view of expertise which is charged with suspicion. Experts are people who come from outside communities and exercise authority over local people and their rights to decide about their lives. Schools are seen as communities and they too are afflicted by the imposition of expertise from outside. There is an explicit view that groups are more powerful than individuals, that many minds are better than one and that truth or a better perception of the situation and more effective actions always arise through group processes such as debate, group idea generation, negotiation, discussion, and so on. Stapp, Wals, and Stankorb describe their epistemological position in **Environmental education for empowerment** (1996), as being in the socially critical paradigm and therefore concerned with knowledge in interaction with metaknowledge (learning how to learn). However, program materials generated by Stapp with other co-workers take a more liberal progressive (or practical) approach in which epistemology is characterized by a search for factual knowledge and understanding (Stapp, Cromwell, Schmidt & Alm, 1996; Frank, Luera, & Stapp, 1996). In general, therefore, Stapp's work is epistemologically eclectic although driven by concern for the environment and a belief in human rationality and capacities for action.

B. Structure and Curriculum Approach

Stapp collaborates with many different environmental educators. He is a very personable and approachable man who is highly dedicated to the pursuit of environmental education so he creates and supports collaborative projects of many kinds. His recent work, while still evidencing his long standing concern for rivers and watersheds, also includes programs which address air quality (Frank, Luera & Stapp, 1996), **EE for empowerment** (Stapp, Wals, & Stankorb, 1996), and cross cultural environmental education (Stapp, Pennock, & Donahue, 1996). Therefore there is no single "Stapp" program structure. However, there are some broad similarities in many of his curriculum works. First, there is usually an encountered problem area or issue (water quality) which acts as a focus or rationale for the other materials; second, there is usually support for teachers and students to learn how to assess the problem which is the focus of the work, typically through some form of science based environmental monitoring activity (water quality measurements, air quality measurements, etc.); third, there is usually an approach to problem solving, in some instances using the AR-CPS format (Bull et al., 1988; Stapp, Wals, Stankorb, 1996), but in others using more conventional problem solving methods (Stapp,

Cromwell, Schmidt & Alm, 1996); finally, there is often a section dealing with resources to support teachers and students working in the problem area (references, ideas for building equipment, suggestions for setting up computer networks to support projects, how to build community partnerships, and so on.)

Thus, to refer to a curriculum orientation in Stapp's material is difficult, simply because it is very eclectic. Certainly, the materials convey little of either academic rationalism or curriculum as technology (Eisner, 1985) orientations. Stapp, Wals and Stankorb (1996) describe **EE for empowerment** and the AR-CPS approaches as having an orientation toward group processes and action. This would tend to put these works in Eisner's category of social reconstruction. The action research components of the AR-CPS model entail not only the definition of a local environmental issue or problem but also action to resolve the problem in the real world. The model entails a reduction or elimination of the boundaries between the school and the community. The school's program is to engage with community concerns and students are to an active role in community affairs in the course of gaining an education. However, the focus on students and teachers taking an active role in creating and activating the curriculum and becoming more in control of their own learning experiences carries a strong flavor of the personal relevance curricular orientation as Eisner (1985) describes it:

The curriculum is to emerge out of the sympathetic interaction of teachers and students within a process called teacher-pupil planning. ... for experience to be educational students must have some investment in it—must have some hand in its development and that without actual participation or the availability of real choices within the curriculum schooling is likely to be little more than a series of meaningless routines, tasks undertaken to please someone else's conception of what is important" (Eisner, 1985, p.68)

The personal relevance orientation sensu Eisner is quite similar in approach to the description of the Experientialist curricular approach as Schubert (1986) uses the term:

Students must be given opportunity to reconstruct their experience, study its possible meanings, and interpret its significance for their own sense of meaning and direction. The experiential approach to curriculum acknowledges the essential goodness of each individual. It holds that as individuals reflect on their own experience, they are drawn together in sharing with others who are embarked on similar journeys. This makes all persons, not just experts, agents of their own learning. (Schubert, 1986, p. 17)

Stapp's perspective is that students learn best by engaging in real problems which they identify from their own experience, within their own community. They learn by engaging their interests through an AR&CPS process that acknowledges that all involved in the learning community can teach and learn from the others in honest and worthwhile ways. This is certainly broadly similar to the Experientialist curricular orientation.

Schubert's description is consistent with many of the claims and concepts offered in **EE for empowerment** and in Bull, et al. (1988). However, Stapp's work seems intended to take a practical approach to curriculum matters. Stapp never loses sight of environmental concerns, and especially his own first love, river watersheds and wetlands. He is interested in developing educational experiences which engage students, teachers, and members of the community at large in caring for and about them and in working to solve problems and prevent new ones. He is interested in curriculum theory to the extent that it helps address these practical concerns, and has explanatory power for the things he sees in schools and communities around the world. His approach is not dogmatic. He doesn't claim to have discovered the curricular equivalent to the universal tool kit.

C. Approach to Knowledge and Skills

The Stapp materials place less emphasis on skills than do those of Hungerford, et al., but skills are still seen as important in that the program's authors consider many people to be poorly equipped for group based problem solving or for constructing networks of collaboration in communities. Thus, people are seen as needing to learn certain skills, both of a technical nature (as in learning how to use water quality test kits) and process based (as in developing skills in conflict resolution). There is content knowledge to be learned, but it is seen as being acquired as needed in the course of problem solving work, rather than formally required as a prerequisite. The use of project logs and personal journals are intended to foster reflection about the progress and status of projects. Such reflection can address not only what is known, but what needs to be known, and how to gain the knowledge. Both knowledge and skills therefore are emergent from the work of addressing environmental issues and community situations rather than requirements for examinations or certification. Environmental problems are seen as intrinsically multifaceted and therefore as requiring multidisciplinary approaches. Disciplines other than science are also honored, including the arts, mathematics, politics, social sciences, economics, the humanities, and computer science.

In **EE for empowerment** (1996) Stapp et al remark that their approach assumes that learning is enhanced when student ideas, views, mini-theories, and so on are acknowledged as being of value. They claim that for students to be willing to advance ideas and theories of their own they must work in a climate which might be characterized as intellectually safe, which is not to say that it accepts every idea as having equal merit and validity. It is a climate characterized by equality rather than authority, or, put differently, one where authority is assigned on the basis of demonstrated knowledge, expertise, or some other important capacity rather than automatically invested in a person assigned a particular role. Authority is to be earned.

The approach to knowledge is similar to the concepts of socially-distributed intelligence (Perkins, 1992) or learning communities and cognitive apprenticeships (Resnick and Klopfer, 1989) in which ideas are refined and developed through interactions among members of classes, teams, work groups, and so on. Students are no longer pitted against each other in competitive approaches to evaluation and grading in such classes (see below re roles of teachers and students.)

It is important to note that Stapp and his co-workers have not abandoned the notion of a core curriculum or certainly of basic areas of content and skill which all students should encounter. Students should learn science, math, reading, writing, literature, and so on, but these things should be learned in the context of the problem solving process. The emphasis therefore tends to be not on a “great books” (Adler, 1982) approach to knowledge but on knowledge of forms and disciplines gained in the context of particular problems. The difficulty with this idea is that students addressing problems in a river watershed may well hone their skills in math, science, language and other fields in the course of their work, but they are unlikely to see any need to read Shakespeare or understand the historical and social significance of the Bill of Rights. Additionally, Stapp, Wals and Stankorb (1996) suggest that the skills associated with community problem solving should be considered to be part of the basic or core curriculum in any event. Clearly the position advanced in **EE for empowerment** does not accept that EE is a supplement to business as usual in schools, although other recent work by Stapp does lend itself to EE as a curricular option or resource unit.

D. Problem Solving

I have already described the major elements of the AR-CPS approach to problem solving and action research in Section II. For the purposes of understanding Stapp’s EE curriculum theory and the curriculum proposals which embody it, it is important to emphasize several

characteristics which run through all the work essentially as themes:

1. There are problems in human-environment relations;
2. These problems are important in their own right, but used as a focus for action work they provide an opportunity for educational development and can contribute to the purposes of schools and community development;
3. People, especially working together in groups and by establishing networks and creating partnerships, can be effective in solving or remediating environmental problems;
4. There is no single best paradigm of problem solving although the AR-CPS process offers a useful, educationally and socially powerful approach;
5. Problem solving should acknowledge the complexity of environmental problems, including the multidisciplinary nature of most problems and the need to engage many forms of knowledge in their solution;
6. Problem solving can be used as a focus for many elements of the school curriculum and can add relevance and vitality to the program for students;
7. Problem solving entails not only the application of existing knowledge, skills and methods appropriately in problem situations but also entails the invention or creation of new approaches, novel solutions, and even entirely new ways of framing problems.

Again, Stapp's approach is eclectic, using a combination of methods and approaches. It places great importance on the problem solving process in the context of communities and particular issues or problem situations. It allows the problem solvers great freedom to modify sequences, alter and adapt process elements. It views problem solving as a recursive process in which the people involved in the process learn and develop knowledge through and from the work, which in turn changes the problem solving situation, requiring modifications to procedure. The problem solver's own reflections on the situation are also used as data in the process.

E. Roles of Teacher and Student

A major theme which runs through Stapp's curriculum proposals is that students and teachers should work together in a democratic learning environment where they may, at times, exchange roles, and where teachers become learners, and learners become teachers. Class interactions are directed by the problem solving focus and the situations which emerge in the process of action research or community problem solving. Students are viewed as becoming much more committed to the curricular work when they have an active voice in establishing the agenda, identifying needs and goals, setting standards, and designing learning experiences and approaches to inquiry. The teacher is clearly a facilitator, mentor, guide, fellow investigator. At times, as the situation requires, teachers may function in a didactic fashion—the view of teachers and students is situational and emergent, not ideological, except with some overtones of suspicion about formal authority and expertise:

Students become the practitioners of their own education when they take on the role of explorers, researchers, theorists, planners and actors. They come to assume more responsibility for their own learning. The teacher becomes the guide and facilitator in this process and shares the role of learner when reflecting upon his or her own teaching practices and when learning about the issue in which the students immerse themselves. (Stapp and Wals, 1994, p.58)

Teachers working with the AR-CPS need support from their colleagues as this approach involves the handing over of some of the control—sometimes obtained after a long struggle—of the classroom process to the students, working with an open-ended curriculum geared toward action taking, and evaluating the learners using journal entries and participation levels as guidelines. (Stapp and Wals, 1994, p.59)

These comments should not be taken to mean that teachers have no role in organizing the learning process. Students will need guidance to define the purposes of their education, conduct their investigations, and identify appropriate actions. Stapp et al (1996) note that to become facilitators teachers must become aware of the capacities, needs, and past experiences of students in developing a learning plan or project. They refer to Dewey's concept of the learning plan from *Experience and education* (1938) which describes the plan as "a cooperative enterprise which is developed through reciprocal give and take, the teacher "taking, but also not being afraid to give. The essential point is that the purpose grow and take shape through the process of social intelligence".

One of the functions of schools which often defines, and limits if not poisons student-teacher relationships, even in the most caring and democratic of classrooms is evaluation and grading. Stapp, Wals, and Stankorb in **EE for empowerment** (1996) state that:

With regard to individual students' evaluation, the philosophy behind AR-CPS is founded on the belief that students will develop skills and become empowered as a result of their experience with the project. Empowerment here means that students, having been given responsibility for the planning of their own education and the opportunity to investigate and act upon an issue that concerns them, obtain the feeling that they can have an impact on decisions that affect their lives. Although one can have a false sense of empowerment, it seems that talent and knowledge go much further in solving problems if one has self-confidence. Students' verbal statements and written journal entries are instrumental in detecting feelings of empowerment or disempowerment and can help the teacher in readjusting the project and/or spending more time with a particular student. (Stapp, Wals, & Stankorb, p.63).

Stapp and Wals have also developed this theme (1994):

As a day-to-day process, the growth and learning that occurs in AR-CPS cannot be measured with a grade on the culminating action alone. A student's contribution in all stages of the project should be considered in the evaluation. Teachers in past projects have used several criteria on which to base a grade including effort put into journal writing, quality of student reports, level of class participation, ability to work in a small group, quality of oral reports, and student self-evaluation. Although assigning a grade seems inevitable, most action-research-based approaches in education maintain that the purpose of evaluation is not to assess, judge, and compare students, but to give them feedback that stimulates further learning. (Stapp & Wals, p.63)

To summarize, Stapp and his colleagues see teachers and students in classrooms along with the immediate members of the school community as being at the heart of the curriculum. These persons activate the curriculum, plan it, modify it, decide on priorities, and develop their own directions. In a real sense the curriculum emerges from these transactions. The school and classroom climate is basically egalitarian and democratic; expertise is based on knowledge and skill rather than formal assigned authority. The purpose of evaluation is not categorization, or sorting and culling, but learning and development. Competition is put in balance with cooperation. Student and teacher ideas have status and are given attention in the course of learning. Everyone is a learner at some time; everyone may potentially be a teacher at other times.

F. Sequence

Stapp's curricular work often suggests particular procedures which are better carried out in certain sequences than in others. However, the need for particular sequences is invested in the nature of particular techniques or problem situations rather than in theories about hierarchies of skill and knowledge. It may well be better to put on one's pants before putting on one's shoes, but that has to do with the nature and structure of the clothing rather than some idea that pants are better than or necessary to shoes. Thus, Stapp and his colleagues regularly emphasize that while the materials suggest sequences, as in the CPS part of the AR-CPS process, teachers and students should see themselves as being the ultimate decision-makers regarding the sequences and the timing of the phases in the problem solving system.

G. Perspective on Action

The description of Section II provides a fairly detailed outline of the assumptions and structures of Stapp's approaches to action, in particular with reference to action within the AR-CPS process. This approach is unlike other action programs based upon behaviorism, or information acquisition and conceptualization, which require students to proceed through a sequence of formal learning experiences that are designed to provide them with requisite knowledge and action skills before they engage actual problem exploration and action plan development and implementation.

The AR-CPS premise is that students and teachers, as the learners, should determine the field for action and design the action plan by engaging with the problem, drawing initially from their prior knowledge and then from their growing common experience as they become familiar with the problem or issue. In the Stapp model there are necessary structures and boundaries established to provide safety, and support the logistics, organization and management tasks of the students and teachers as they engage in the investigative effort. Students and teachers are basically the designers of the action work while the teachers serve as facilitators, coaches, mentors in the process, introducing useful tool skills when they are needed. The experience of the model's developers has affirmed that a totally open ended, structureless process is likely to be ineffective and highly conducive to failure or low efficacy. Motivation alone is not enough. In the course of five years of praxis with the AR-CPS approach in different settings, with different learners and problems of varying complexity, a balance between openness and structure in guiding the process is sought (Stapp & Wals, 1994).

The entire AR-CPS process acknowledges all three action orientations: learning about action, learning through action, and learning from action (Hammond, 1997a, 1997b). It is also important to note that from his early days as a curriculum writer Stapp has never treated action projects as exercises. He has always believed that environmental education should place students in real problem situations and engage them in action work to address problems. Over the three decades of his career he has progressively refined his concepts of education about, through, and from action, but he has never backed away from engaging students and teachers in real projects as opposed to elaborate planning exercises which are never implemented or simulations, role plays, or other substitutes for real action work. Stapp appears to recognize that although there are always risks when students leave the comparative safety and predictability of the classroom and attempt to actually change things in the world, but he appears to believe that the risks which arise from not inviting people to become actively involved in problem solutions is greater. His manuals and curriculum materials contain many examples of projects which have been conducted in many different countries. The projects vary from short term to long, simple to complex, technical to political/social in nature. But they all share a common feature: they are all projects conducted in the world, the larger community beyond the classroom walls.

H. Ethics

There is little formal attention to the concerns of environmental ethics in these programs. The implicit view is that humans are unique among all other life forms in having culture, consciousness, and rationality and therefore they have a responsibility to act as stewards and managers of the environment, not only in their self interest, but also in the interests of other life forms and the integrity of the ecosystem. There is a considerable strand of pragmatism running through the writing, especially in the earlier materials in which the environment as a means of meeting human needs is given emphasis and there are frequent examples of the need to restore drinking water supplies and crop lands for human use. Some ethicists and environmentalists are quite critical of the ecomanagement/stewardship orientation on the grounds that it misrepresents the state of human knowledge of the environment and the capacity of humans to assess what is even in their own best interests in the long term. These questions are not given any extensive formal consideration in these materials. They might well arise in the course of the entire AR-CPS process or other learner-directed programs, but the materials do not make any attempt to place these concepts directly on the agenda.

There is also the matter of research ethics. There is a high probability that students or community teams in the course of the AR-CPS process will want to conduct research in their

communities. This research might take the form of interviews, questionnaire surveys, or other forms of data collection from human subjects. Most research institutions now have ethical guidelines concerning how data is to be collected, and handled after collection, and about consent from subjects, privacy concerns, etc. I have already raised this issue in my discussion of Harold Hungerford's curriculum in Chapter 5, but it should be noted for the Stapp program as well.

I. Fit With Schools

The early Stapp curriculum materials, especially the water quality monitoring programs, were designed to be used in schools as means to supplement or enrich the regular curriculum. They fit well with existing curriculum content in high school science, geography, or social studies programs. If teachers desired they could create special theme-based integrated programs using these materials as a framework.

However, as Stapp's approach to curriculum development has evolved it has begun to take a more socially critical stance and increasingly represents EE as an item in a larger agenda of social reconstruction and radical reform. In **EE for empowerment**, for example, there is a strong critique of the notion that schools should socialize students to current social norms. Schools are not seen as places to change behaviors for responsible citizenship. Instead, they should engage students in critical thinking and action taking with the criticism and action focused on social and environmental issues and problems. Stapp, Wals and Stankorb (1996) also maintain that schools should not shy away from controversy, but rather consider it an opportunity to grow and learn (p.24). The authors state that whether we like it or not students will be exposed to societal controversies and they should be taught the skills they need to address them in later life rather than being protected or sheltered. Schools should also engage students in the examination of values. Many of these items will make some teachers and school administrators very uncomfortable, as will the highly learner directed approaches that are also proposed, to say nothing of the critique of conventional systems of evaluation and assessment. While some of the more recent Stapp materials take a much less critical approach to the role of schools, other materials are clearly moving in the social reconstruction/critical praxis direction. I will consider the implications of these different orientations in the final section of this chapter.

IV. Stapp's Curriculum Proposals Reviewed in the Light of the Focusing Questions

A. How Does the Curriculum Address the Concept of Education Within the Context of Environmental Education

In common with many other environmental education program definitions and descriptions, Stapp's early definition seemed to assume that the concept of education within the term environmental education was largely unproblematic. EE was seen as aimed at accomplishing particular ends: knowledge of the biophysical environment, awareness of problems in that environment and the development of a motivation to act to solve the problems. These purposes were simply taken as educational. Furthermore the concept of environmental education was based on the premise that there were serious environmental problems and that they could and should be addressed in the ways outlined in descriptions of EE. Little or nothing was said about conducting any sort of radical critique of the assumptions implicit in descriptions of the origins, nature and scope of humankind's apparent environmental problems.

As discussed above, a review of Stapp's accumulated work shows a trend from viewing environmental education as another tool in the kit of resource managers toward environmental education as an element in a program of radical social criticism and school change. Thus, the curriculum developer is no longer the outside expert who develops materials for teachers to implement in school programs, but now becomes part of a school-community process of creating a curriculum which emerges from praxis focused on local environmental problems. Furthermore, since the environment is no longer simply biophysical, as it was in Stapp's 1969 description, but also incorporates economic, political and social elements, environmental problems and sociopolitical or economic problems are necessarily interconnected. The entire development of environmentalism as described in Chapter 3 has been to move away from "putting out environmental fires" toward seeing environmental problems as part of a larger syndrome of economic and social problems and as interactive with issues of human rights, women's rights, the treatment of indigenous and rural peoples, poverty, and illiteracy. As part of the trend toward social reconstruction or a socially critical orientation to EE, schooling and the nature and purposes of education also become foci for criticism. Education, within environmental education, is therefore viewed as equipping students for civic participation, not by adapting them to social norms, but by making them capable of engaging in a social critique and social reform. This approach to environmental education is consistent with views held by, Milbrath (1989), Orr (1992), Roszak (1992) and others who hold a deep ecology or ecological sustainability orientation and propose that fundamental societal changes will be required world wide in order to make the transition to

a truly sustainable relationship between humankind and the rest of the biogeosphere. The problem that confronts those who equate education with social criticism and activism is that while they call for a radical critique, meaning to go to the roots of things, and for an examination of all the assumptions which frame our views of reality and discourse, they seem at times not to include the assumptions of social criticism per se in the critique. As Courtenay Hall (1996) remarks, even very thoughtful critics like Orr often present proposals without discussion of the assumptions which frame them.

The second difficulty which confronts the view of education (and schools) as a means to conscientization and liberation or empowerment is that it seems to entail automatic rejection of the notion of expertise. Experts are technocrats situated within the industrial, modernist, corporate society which is to be viewed with suspicion. The curriculum "expert" oppresses teachers, students, and parents by imposing modules and models (or IRP's) on the schools. The teacher is a mentor, facilitator, partner in inquiry, and so on, but under no circumstances would it seem possible to regard teachers as possibly knowing more about a subject or having more skill than the students. The emphasis is on equality and a concept of democracy and these ideas are to be joined to education in a manner which requires classes to become committees, work groups, teams, forums, and so on. To be fair, Stapp and his co-authors in **EE for empowerment** do think that teachers should be able to assist students in forming learning plans, developing research strategies, and developing action plans, but the emphasis is on students directing their learning, becoming active participants in defining and developing curricular purposes. Forms of knowledge and disciplines such as science, mathematics, philosophy and so forth are to be encountered by students but the forms are somehow separated from their contents, or certainly from any particular set of exemplary content. The forms of knowledge and disciplines are to be encountered as required in the process of action research and community problem solving. If a student needs to determine the dissolved oxygen of water to assess the pollution in a pond, that is the time for him or her to learn some chemistry. In order to read the manual in the water test kit the student will have to practice his/her reading skills and be committed to looking up new terms, and developing an understanding of content.

These ideas are often associated with the progressive education movement and are joined to Dewey's philosophy (which is acknowledged by Stapp, Wells & Stankorb, 1996). The argument frequently made to support them is that they make the curriculum relevant. Barrow (1981) has made an effective critique of this idea by noting that arguments that educational merit or curricular priority should be assessed in terms of utility (usefulness), relevance, or reality, are of little help because the terms are meaningless without considering the values they imply and their

context, including time. What is viewed by one person as useful, may be seen as a useless waste of time by another; what seems irrelevant today may prove to be very relevant tomorrow or in the future. Reality, if it is taken to mean what actually exists in the present, can be used to ground schools and curricula in the here and now and the widely accepted or conventional simply on the grounds that these are realities. But Barrow notes that his comments do not constitute a claim that the curriculum should be irrelevant, useless, unreal or disconnected from current situations. However, he notes that schools and education should do more than simply accept and reinforce what currently is and is needed or useful. Education is an idealistic notion, as is schooling. "...schooling makes a major contribution to shaping the future as well as providing for it" (Barrow, 1981, p.37).

There is a difficult balance to be obtained here. Critics of the academic rationalist orientation to curriculum contend that it disempowers many people, especially poor people and the members of minority groups, by basing curriculum entirely in examples of knowledge which are outside their own lives or realities. Native children who never have native teachers, never encounter any art work from their own culture, are never allowed to speak their own languages, and are not told their great stories are disenfranchised. On the other hand, the academic rationalists criticize the personal relevance and social reconstruction curriculum orientations because they can easily narrow the horizons and ideals of people and lock them into their present situation by never allowing the curriculum to present ideas outside their own immediate experiences and traditions. Radical critics tend to assume that small local communities and indigenous cultures are better than large cosmopolitan cities and international or transnational culture. As Low (personal communication, May, 1997) has put it, there must be a balance between affirmation and innovation. Students should be able to use studies of their own situations and local problems as a focus for education, but they should also be permitted to broaden their horizons and understand how other communities, other cultures, in other times have addressed similar or different problems. Literature and history are rich in such accounts, as is published science.

When environmental education focuses on local environmental issues and problems and takes a wide view of the domain of environmental problems, the educational challenge to be addressed involves reaching a balance between the knowledge which is to be constructed as students and teachers engage with their chosen problems and the realm of cultural knowledge represented in works of science, art, literature, history, mathematics and so on. These past experiences may well have something to contribute to an understanding of the current situation. Furthermore, there is also a balance to be found between the expertise which can be developed in praxis or discovered in local communities, including the school community, and that which is

available in the larger world community. Finally, while seeing how forms of knowledge like science apply to actual problem situations directly experienced by students adds vitality to a student's education, and can make the curriculum more meaningful, there is also a balance to be established between knowledge grounded in local contexts and knowledge which is not directly connected to the local situation but which is presented to open new possibilities and awaken new ideas. Sometimes, no matter how well we analyze a problem situation we don't know what we need to know. When we have a broad educational experience, even though we've never applied some it, there is a greater possibility of asking the right or most interesting questions and making unexpected and highly useful connections. The practical sometimes is discovered in the most surprising places. If student's store of knowledge is restricted to what they have needed to know in problem solving situations they may be at a real disadvantage in other unfamiliar situations, to say nothing, of course about larger quality of life issues which have nothing at all to do with solving problems, but which may have a lot to do with our understanding of the environment and our place in it.

Finally, some of the recent Stapp materials are quite critical of so-called generic or generalizable models. In the view of the authors (Stapp and Wals, 1994 ; Stapp, Wals & Stankorb, 1996) the notion of generic models disenfranchises local communities and students who are seen only as consumers and users of methodologies rather than inventors of their own tools and procedures. But there is a strange tension here between a program which advances a "model" of environmental education in the form of the AR-CPS approach that is claimed to have great power in almost any problem situation, but disparages so-called generic models. To be fair again, Stapp and Wals (1994) are aware of this problem. They attempt to resolve it by claiming that teachers and students are absolutely free to modify the approach in any way they wish. Even so, they do offer a procedure with definite, clearly described elements, arranged in particular sequences. Every problem situation is somewhat unique. This probably doesn't indicate that there are no skills, procedures, or knowledge which might have application over a wide range of settings. Many professionals and trade people make regular recourse to standardized procedures which have been developed and refined both through research and in the course of practice. This doesn't imply that each situation isn't different, but only that there is sufficient similarity with other cases to make it possible to approach a particular case in the same manner as others. Moreover, many now standard procedures have been developed by research or prototyping and then refined in practice. When practitioners compare notes it is helpful to have some basis for comparison and common, widely used procedures offer this opportunity.

The real issue below the surface of many of the educational proposals in the AR-CPS materials seems to be authority: who should decide what teachers teach, how classrooms oper-

ate, and what is taught. If authority, educational or otherwise, is seen as the source of current environmental problems then it should be critiqued or resisted. If that authority supports “positivism in the sciences and behaviorism in the behavioral sciences” (Wals & van der Leij, 1997a, p.53) which the advocates of socially critical paradigms of education believe to lie at the “very root of the exploitation of people and natural resources” then there is all the more reason to resist such programs and approaches. “It is our belief that it is the same world of positivism that allowed for environmental deterioration at its current pace and scope in the first place!” (Wals & van der Leij, 1997a, p.53). There is clearly more here than a simple disagreement about curricular approaches. I will return to this issue in Chapter 8.

B. How Does the Program Address the Concept of Environment and In Particular the Nature of Human-Environment Interactions

I have already given this matter considerable attention in the descriptive, analytical and interpretive phases of this chapter. Stapp’s curriculum materials broadly reflect an ecomanagement orientation to environmental problems and human-environment relations. Humans have a responsibility to manage the environment in ways which will sustain human life and maintain the capacity of the biosphere to sustain the lives of all species. By using a variety of approaches we can develop a better understanding of our environmental problems and of how to solve them. The approaches range from relatively simple monitoring activities to measuring environmental pollutants or determining the effectiveness of control and remediation efforts, through to community development which addresses root causes of environmental deterioration in social inequities, abuses of human rights, oppression of women, poverty and illiteracy. The more technical approaches may be combined with the social, political and cultural approaches. The environment is not only biophysical, but also includes the economic, political, and social elements of human culture. Pollution can be cleaned up immediately while efforts are made to go to the source of overpopulation or bad agricultural practices. But the major orientation of Stapp’s program of environmental education is toward problems in human-environment relationships and to problem solving. His program does not attend to human-environment interactions which occur outside the ambit of problem situations. In tone, the programs generally present a situation which is serious, perhaps even gravely so in places, but amenable to improvement through the exercise of intelligent concern and effective, appropriate actions, linked to a larger, long range program to empower people and release them from the intellectual and physical bonds of industrialism, positivism, and behaviorism.

C. How Does the Program Address Environmental Action as an Educational or Curricular Purpose

As I have demonstrated above, Stapp's orientation is to environmental education incorporates action to address environmental problems as its focus for the development of knowledge, skills, and attitudes. Actions are not addressed to simulated situations or exercises, but to actual environmental problems in the communities of students and teachers. The program incorporates learning about action strategies, learning through action projects, and learning from them in a process which can be iterative or spiral so that experience gained through and from can initiate a search for new knowledge about action which in turn leads to renewed and revised activity in which a new cycle of learning from and through occurs (Figure 6.1). In Stapp's orientation education isn't about action, or for action, but is inseparable from action. Praxis is an important source of educational development. In the course of action students see what knowledge and skills are needed and how they can contribute to the project. To tap the full potential of the approach, however, students must be involved in the formulation of the problem and the development of action plans from the outset. The actions which form the focus of the educational program arise from students' encounters with problems in their own communities.

A position held by Stapp and his co-workers which underlies their programs' intense focus on environmental action as an integral element of the education and school experience is reflected in three passages selected from the writings of Eliot Wigginton and Alvin Toffler and included in the foreword to **Education in Action** (Bull, et al, 1988):

Schools (mine included) have dealt with students who still have fire and spirit not by channelling that fire in constructive, creative directions, but by pouring water on the very fire that could make them great. Eliot Wigginton

The secret message communicated to young people today by society around them is that they are not needed, that the society will run itself quite nicely until they—at some distant point in the future—take over the reins. Yet the fact remains that the society is not running itself nicely, and indeed, there may be little of value left for them to take over in the future, unless we reconceptualize the role of youth in the social order...the rest of us need all the energy, brains, imagination and talent that young people can bring to bear on our difficulties. For the society to attempt to solve its desperate problems without the full participation of even very young people is imbecile. Alvin Toffler

But most important [the project] is run by. . .students— students who are going on. . .knowing that they can be forces for constructive change; knowing that they can act responsibly and effectively rather than always being acted upon. Eliot Wigginton (Bull, et al., 1988, p.ix)

Thus, linking education to environmental action and making such action a central element of the school curriculum is seen as a means of empowering young people, of extending their socialization in positive ways, and of re-engaging youth who have become disengaged or discouraged and who feel powerless and unwanted. The implicit message of the Stapp program is that young people must be part of the solution to environmental problems, their efforts are welcomed and needed, and they will learn a lot in the process, thereby contributing to their education.

D. What relationship does the curriculum propose or imply between its purposes and those of schools

The Stapp program materials take a variety of views toward schools. Some such as **Investigating streams and rivers** (Stapp, Cromwell, Schmidt, & Alm, 1996a) and **Air pollution** (Frank et al, 1996) are intended for incorporation in school programs in existing schools in North America. They make no mention of the socially critical concepts which are found in **Education for action** (Bull et al, 1988) or **EE for empowerment** (Stapp, Wals, & Stankorb, 1996). The latter two programs on the other hand take a different view of the purposes of schools in the context of environmental education. In these programs schools as they are to be found today are largely elements of the overall environmental problem and fundamental changes are required to how they operate if there is to be real progress. Moreover, the authors of these programs reject the notion that schools should socialize students to fit in with today's society. If they do this they are simply enforcing the same sort of conditions which are causing environmental deterioration. This view is clearly expressed in a Foreword to Chapter 2 of **EE for Empowerment**:

The plush suburban community has plush schools; students in these schools may value good grades over experience, so that they can go to college and emulate their parents, who value two cars and a large home.... If a society is prejudiced and bigoted, we see prejudice and bigotry in the schools. How, then, do school programs advance to improve the quality of life? It is in part a chicken-and-egg problem; do we improve society to improve schools, or do we improve schools so that the graduates move out to improve society? Where do we break the circle? (Novak, 1977, cited in Stapp, Wals & Stankorb, 1996, **EE for empowerment**, p.11)

This is a pretty concise summary of the authors' own views of schools and their relationship to society. Their critique of schools is grounded in the question, "If school is a reflection of the larger society in which it exists, what kind of societal vision are children developing?" (p.11). If socialization is one of the purposes of schooling (Barrow, 1984, Goodlad, 1984), then the question is socialization to what? Stapp, Wals, and Stankorb (1996) describe three broad school objectives within three larger curriculum orientations: Vocational/neoclassical, Liberal/Progressive, and Socially Critical. In the first the purposes of schools are vocational preparation and the development of a work ethic and work skills; in the second schools accomplish preparation for life; in the third schools are to engage students in critical thinking and action. Stapp et al note that in most schools one can find all three orientations in operation, although one may be more dominant than the others depending on the teachers, community, students, and so on. They comment, however, that "we see schools as moving towards the socially/critical orientation as society as a whole begins to view itself more holistically" (Stapp, Wals & Stankorb, p.15). Unfortunately they don't offer any evidence in support of the claim that society is making such a shift, nor do they explain what it entails, except to suggest that it means developing a more global and systems based view of social and ecological problems as it is realized that most environmental difficulties are multidimensional, transnational, and complex. The authors go on to criticize the dominant paradigm of curriculum development which they term the scientific research, development, dissemination, and adoption model (RDDA). In its place they propose a participatory model for curriculum development which is very similar to action research. In that approach the distinction between development and evaluation disappears and the two merge to become research while educational change is driven by practice "rather than theory".

The authors seem to assume that if the RDDA paradigm of educational change is replaced by the participatory model then schools will change in the directions they believe are necessary to make them compatible with a socially critical form of environmental education. In their view the schools as reformed through action research participatory change processes would be interdisciplinary, replacing the current discipline based approaches which they contend fosters better thinking about environment-human relationships, which "transcend" disciplinary boundaries. The reformed schools will also foster student directed learning, group decision making, cooperation instead of competition. They summarize their views of how schools should function as follows:

Schools are a reflection of the society and the communities that support them. In a world in which ecological and social problems seem to be rapidly increasing in scope and complexity, our educational institutions should turn toward approaches that generate solutions to these problems.

The main thrust of these proposed shifts is that schools should encourage students at an early age to develop **critical-thinking skills and to examine values**. Students should no longer be looked upon as youngsters who need to be trained to develop into diligent and obedient citizens, but as people with their own ideas and concerns who have something to contribute. Teachers, at the same time, should be given the flexibility to adapt curriculum to the specific needs of students and to the characteristics of the school community. Rather than having outsiders design, implement, and evaluate curriculums, members of the school community should play a larger role in the shaping of school and curriculum.” (Stapp, Wals, & Stankorb, pp. 25-26, emphases mine)

There are a lot of assumptions about communities, teachers, and even students contained in these statements and those which precede the passages. If schools were in effect turned over to the “participatory” control of teachers, students, and their communities, would these various players in fact move them in the directions which are seen as desirable. Many teachers might well feel that the students already have too much control and choice and return the program to a more tightly structured discipline based approach. Parents (if they constitute the community) might well seek similar approaches or advocate a return to “basics” usually not including any form of direct attention to the environment or environmental education. If the community contained critics such as Sanera and Shaw (1996), mentioned in Chapter 4, would he and his associates promote EE and schools as agents of a critical critique of contemporary American society. What would the citizens of Birmingham Alabama in the early ‘50’s have desired for their schools had they been given the sort of participatory control of the curriculum advocated here. Stapp, Wals, and Stankorb (1996) offer no comment on questions such as these. They appear to assume that freed from the constraints imposed by outside authority and expert scientific curriculum makers teachers, students and communities would eventually create the sort of schools they believe are required. This is a pretty optimistic view of human nature. Most critics such as Friere note that the process of radical social change entails restructuring the power relationships in society so that people are free to speak and participate and all voices are heard at the table. They also suggest that the program may take a lot of time. This is not easy in a society where many people don’t have the time, resources, or opportunity, let alone the desire to spend years reinventing schools from the ground up.

V. Summary

Bill Stapp has created an impressive body of curriculum work in environmental education. His intent is to bridge the gaps between the need to address environmental problems and the need for students to attain an education and become effective, valued contributors to their society. He tried to make environmental action the unifying agent among the purposes of environmental restoration and conservation, education, and schooling. His views of teachers, students, and communities are strongly grounded in concepts of democracy which both enable and require active participation in decision making and he extends these concepts into school programs so that students and teachers gain a strong voice in structuring the curriculum.

He views environmental education as a change agent in society at large and in schools in particular. But he has also maintained a practical orientation to environmental education in which he offers sound ideas about how to understand and monitor environmental problems in water and air pollution combined with the use of modern communications systems like computer networking. He has an international, multicultural perspective on the requirements for and needs of environmental education around the world. He has developed approaches to EE that are intended for the relatively affluent school-based programs of the western world and for village-based action projects in third world rural communities. While he supports a deep radical critique of society, fostered by the schools, he is willing to accommodate current realities and provide support for teachers and students who are working within the system to address problems in their neighborhoods. His program materials reflect this eclecticism. He accepts the need to accommodate a wide diversity of perspectives about how to approach environmental education, but maintains a clear view of the need for it to be developed through a focus on local environmental action.

Chapter 7

Correcting Culture's Flawed Maps of Reality: The Environmental Education Proposals of Michael J. Cohen

I. Introduction and Context

Michael J. Cohen is an environmental educator whose career in the field encompasses more than thirty five years. He began by working with youth in a hostel program in New York city, while playing folk music in small clubs and cabarets at night. However, New York was not a comfortable place:

Living there, away from nature, sometimes made me nervous and I found that city life often enervated and frightened me. If I let my guard down and felt attached to something, I usually received frustration from some disrupting or opposing factor. I was a success, but each day was often an unfulfilling series of compromises. (Cohen, 1989, p.35)

After a conflict with the president of the American Youth Hostels (AYH) concerning a failed winter ski program, he decided to leave his position and strike out on his own. He summarizes his experiences at AYH and his final break with the organization:

I'd end up with profit in a not-for-profit organization and rather than be celebrated I'd be incinerated. Such was existence in mainstream's mediated stress-filled house that so many of us call home. Its one thing to get on an amusement park roller coaster knowing that the ride won't last long. But its quite another to continuously live your daily life with disruptions often out of your control. You're never sure how long you'll last. I had been playing the game because I didn't know better. (Cohen, 1989, p.36)

Thus, on May 8, 1959 Cohen left the traditional worlds of "science, teaching, counseling, traditional music and administration" to found a new program that would allow him to use his skills outdoors, away from the city. He borrowed money to start a outdoor travel and camping program and became a wildlife sanctuary owner and program director as well. Ultimately his program became the **National Audubon Society Expedition Institute**. For the next thirty years Cohen spent the majority of his time, "camped out year round, sleeping in tents, sometimes on the ground, often under brilliant winter stars....I chose for my laboratory the face of

North America, for my teacher the life experiences in the wilderness and sub-cultural settings which my students and I visit, from Newfoundland to California” (Cohen, 1989):

A one-room schoolhouse on wheels, the Audubon Expedition Institute is a small group of inquiring high school, college, and graduate students and staff members who travel across the country as a learning community. As they camp out September through May and summers, hiking, canoeing, and skiing, the Expedition visits peoples and places in order to observe, discover, question and develop a practical awareness of deep relationships within and between America’s ecosystems, cultures, and history.

Our classroom is Wild America. You can’t fully learn about the environment or environmental careers by sitting in a classroom. That’s why the Expedition uses a hands-on approach. We’ll teach you practical skills in ecology, community development, conservation, human relationships, energy use, nutrition, as well as the academics of the natural and social sciences, music and art, education and personal psychology. (Cohen, 1989, p.255)

The Expedition Institute was essentially a school in a bus, in which a small group of students, accompanied by two or three teachers, spent months travelling North America in search of educational experiences. Of the program, Cohen writes further:

We eat shoreline mussels, clams, periwinkles, fish, seaweed and plants. We drink from rainwater puddles, streams and rock seeps. Uncaged from traditional classrooms, nurtured by the living seacoast, our solos, meetings and seminars produce thoughts like: “Maybe we can’t fully define life with words because, like this coastline and ourselves, life is an act. Since we are living beings, let’s identify life by recognizing our life sensations and processes where they exist. (Cohen, 1989, p.56)

...on our expeditions and real-life encounters we camp out year round, we learn to emulate both the global life system’s ways and the traditional knowledge disclosed by our back country visits. Our community survives by being open and honest and is much closer and more supportive than most families. For a year at a time, we learn experientially from our actions, senses, and feelings. We learn from the people we meet, the places to which we travel, books in libraries all across the country, our classmates’ and guides reactions to us, our knowledge from previous years and the sensations of nature. (Cohen, 1989, p.41)

As indicated by the above passages , an important aspect of the intense travel experience embodied by the Expedition Institutes was the interpersonal communication and reciprocal teaching which occurred among the members of the Expedition group, including, of course, the teachers. Of this aspect of the Expedition program Cohen writes:

At the Institute, as we recognize society's negative impacts, **we help each other** design custom-made means of dealing with our personal and collective problems. To accomplish this, we allow our Inner Nature to express itself without harm. Otherwise, it remains hidden and unreadable. By contrast, openness and honesty make it possible for us to choose habit-forming green relationships.... (Cohen, 1989, p.243 emphasis mine)

...get to know each other better than we've ever known anyone, even our family. We discover new depths and meanings to ourselves. We learn peaceful coexistence by building it...Far from a collection of unrelated academic subjects, our small consensus-based expedition communities organize their intense encounters to cover most disciplines. They find new values in living, learning, and community, and although it's challenging, hard-but-fun work, they systematically explore the immense land and diverse people that make up America. (Cohen, 1989, p.42)

For the next three decades Cohen and several co-workers developed the Audubon Expedition Institutes and he pursued his own passion for outdoor living. His later work written work in environmental education, which is the focus of this chapter, has clearly been influenced by his long experience with the Audubon Expedition Institute program.

Recently (1995) Cohen has left the Audubon Expedition Institutes as an active member of the Faculty and devoted more time to **Project NatureConnect** and to various writing projects. He describes himself as "an outdoor educator, counsellor and traditional folk singer, musician, and dancer....I use my science, education, counselling and musical expertise to catalyze responsible, enjoyable relationships with the nature in people and places....The process is a celebration in and of itself." He attributes his current view of environmental education to six major experiences (Cohen, 1989):

His background in a family of first generation immigrants from Russia, a family which was musical and committed to camping and outdoor experiences;

His left-handedness, which resulted in a very difficult early schooling in which his teachers tried to make him change to

writing with the right hand;

The fact that his parents decided to teach him 4th grade mathematics at their summer camp rather than sending him to summer school to remedy math deficiencies;

His meeting, at age 11, with Burl Ives, a well-known country and folk singer and musician who encouraged him to concentrate on traditional and folk music;

His first work experiences in a “windowless basement office” in New York;

A “transformational” experience which occurred during a thunderstorm in the Grand Canyon National Park.

Cohen believes that these experiences taught him several important things which have become the core of his personal view of human nature and relationships between the environment and humans. First, he learned to trust his “natural” senses or capacities and not to permit societal directives and entrapments convince him to ignore them (a view based on the attempt, and failure of his teachers to correct his left-handedness). Second, the contrast between school learning and outdoor experiences, reinforced by the summer he spent learning math in the mornings and the afternoons exploring and playing in the woods nurtured the belief that natural experiences had at least as much to teach us as the formal agenda of schools. Of these early life experiences he (Cohen, 1989) writes: “In retrospect my early years could have been a life-experience course entitled ‘Natural Feelings are Trustworthy Facts.’ That’s why I could start my own program in 1959. I trusted how I felt about Nature and about being outdoors.” (Cohen, 1989, p.40)

Third, after the New York city experience he became committed to living outdoors as much as possible and determined to create educational programs which largely occurred outdoors. Even now, although he owns a house in Washington state he maintains a teepee on the property where he sleeps and spends most of his time:

During the past three decades I have not been separated from Nature. Uniquely, I have lived outdoors through the seasons. I have slept under the stars while developing educational programs that establish close, healthy, person-planet relationships. I learned, and have come to teach Nature’s language. (Cohen, 1989, pp.1-2)

Finally, the experience in the storm shaped his belief that the Earth behaved like a living organism and that this was a more useful way to think about it than viewing it as a collection of mechanisms. He states, “most of my work since then has come out of that realization” (Project NatureConnect WWW site, 1997). In the course of this somewhat unorthodox career and life experience, he accumulated conventional academic credentials including degrees in environmental psychology, education, and biological sciences and did a term of military service in the U.S. Army.

Cohen is a prolific writer who has published a number of books and articles. He has been a frequent contributor to conferences and journals of the Association for Experiential Education, the N.Y. State Outdoor Education Association, the New England Alliance for Environmental Education, and the North American Association for Environmental Education. He was co-organizer of the 1985 “Is Earth a Living Organism Conference” sponsored by the Audubon Society. That conference brought the work of James Lovelock, developer of the Gaia Hypothesis, to greater attention in North America. Lovelock’s metaphysical position and epistemological critique continue to exercise an influence in debates regarding the place of humankind in nature. Since leaving the Audubon Society’s Expedition Institute program he has devoted most of his time to developing a body of curriculum work under the auspices of Project NatureConnect, a non-profit educational foundation which operates from Washington State. He travels widely giving workshops, short courses, and other programs to teachers, naturalists, counsellors, and a range of other professionals. His most recent work is (1997) **Reconnecting with nature: Finding wellness through restoring your bond with the Earth.**

II. Descriptive Overview

This section attempts to provide a rich description of Cohen’s curricular work. The critical framework will be applied in Section III, below. I have deliberately made extensive direct citation from Cohen’s writings in order to provide the reader with a sense of his style and to allow him to “speak” in his own voice. In that way I hope to offer a sounder basis from which the reader can judge the adequacy of my analysis, interpretation, and evaluation. The section draws exclusively on his written work with some support from materials published electronically at the Project NatureConnect WWW site. The program materials and books which Cohen has written since leaving the Audubon Expedition Institutes clearly reflect his lengthy experience in that program. He makes frequent references to the Institute experiences in **How Nature works** (Cohen, 1988), the book which forms the foundation for much of his subsequent work. This description is largely based on **How Nature works, connecting with Nature** (Cohen, 1989) and **Reconnecting with Nature** (1997).

Michael Cohen's entire 35 year career has been concerned with how humans relate to nature. His writings leave little doubt concerning his view of the current state of human environment relationships:

It is now 1997. We continue to abuse the world and ourselves. As human populations soar, seventy percent of the world's bird populations are declining. Species, habitats, topsoil and interpersonal integrity are disappearing at an alarming rate....Runaway stress, greed, violence, crime, AIDS, and substance abuse continue to plague us. So do our runaway costs to contain these problems. People have little hope for living in an economically and environmentally sound, safe society. (Cohen, 1997, p.63)

This line of thought is extended:

These evils have one thing in common. All of them are unknown in natural areas. Their root is not nature. Their root is our thinking's estrangement from nature's ways. (Cohen, 1997, p.63, emphasis mine).

We are, he believes, a society "hell-bent on conquering nature". Perhaps the most concise statement of his position is found in the quote selected for the preface to **Connecting With Nature** (Cohen, 1989), a handbook of activities subtitled *Creating moments that let Earth teach*. It is taken from Gregory Bateson's (1979) **Mind and Nature: A Necessary Unity**: "The major problems in the world are the result of the difference between how nature works and the way people think" (Bateson, 1979).

In essence, the thesis that shapes Cohen's curricular work is that modern humans (with the possible exception of some indigenous and rural peoples) have been conditioned by contemporary culture to accept a view of the biosphere in which:

- 1.) humans live on the planet, not in it; the planet is essentially inert matter or mindless living objects available for exploitation by humankind;
- 2.) our use of language, especially our use of names, separates us from nature because it extends the tendency to describe processes as things or objects rather than as systems in a state of constant change and development;
- 3.) our separation from nature, combined with cultural patterns of

language use have resulted in the serious impoverishment of our capacity to sense the environment, restricting us to the culturally accepted 5 senses rather than permitting us to acknowledge and attend to information from a much wider array of senses;

- 4.) the concept of scientific objectivity has led us to accept a view of life (including our own lives) as being random, purposeless, and directionless within a random, directionless universe. His contention is that this style of thinking creates a view of both the biosphere and ourselves as passive objects available to exploitation by those having power and/or capital. (Cohen, 1989; 1990; 1997)

We, and the rest of life on the planet which suffers from our actions, are the victims of a flawed metaphysics and epistemology which reinforce each other in a viscous spiral: “As we grow up in our excessively violent, environmentally unsound modern society home, **our ingrained thoughts and feelings bear the warp of its foundation.** And as we reap its distortions, we foster its problems.” (Cohen, 1989, p.10, emphasis mine)

He broadens these concepts as follows:

- As we discern the Planet as laws of Nature, we have in turn become subjects of these laws instead of fully free organisms.
- As we perceive the Planet as natural resources, we become resourceful exploiters of Nature and each other, instead of cooperative members of a supportive Earth community.
- As Nature becomes vulnerable to the objectivity of science, we lose the value of our feelings.
- As Nature succumbs to our power, we become subservient to those in power.
- As we destroy Nature’s community, we lose our sense of community; as we alienate ourselves from Nature, we alienate ourselves from each other.
- As we capitalize on Nature, we become more capitalistic and less humane.

- As we compete for Nature's raw materials, we learn to relate competitively.
- As we treat Nature as grist for our civilization, we learn to treat each other uncivilly.
- As we identify ourselves as masters of the Planet, we lose our sense of place.
- As we act like a toxic, runaway cancer, eating the Planet's life away . (Cohen, 1989, pp.220-221)

The notion that there is a linkage between how we treat each other and how we treat the planet and between our environmentally degrading activities and the state of our physical and psychological health is not unique to Cohen. Bateson (1979), Berry (1991) Roszak (1992), and a number of ecofeminist writers have all developed this thesis (Courtenay Hall, 1996). Cohen's analysis of the fundamental causes of our behavior is interesting. First, he claims that we are engaged in trying to recreate our sub-tropical species origins through the use of modern technology. We are, in effect, remaking the entire planet over in the image of the warmer, sunnier climes in which humans seem to have first appeared. Cohen calls this tropic-making. Thus we regulate the temperature of our buildings, wear clothing to keep warmer, take vacations to warm and sunny spots, build shopping malls and other indoor environments rich in bright lights, tropical foliage, warm colors, and splashing fountains and pools. We live most of our lives in these artificial environments and in the process of doing so, we become progressively disconnected from nature while our senses are numbed.

Like too many government surveys, the AEC study confirms what you and I already know. We are born and raised indoors, artificially closeted from the natural world. Our closeted environment usually consists of the house, school, car, bathroom and office....Our habits form from contact with these indoor surroundings, not from Nature's wonders. The indoors conditions our thoughts and feelings. It programs us. Our separation from the pulse of snow, wind, rain, temperature, clouds and sunlight robs us of their life values. We know the natural world not by our ingrained experience with it but by a mediated lifetime of words and images describing it. (Cohen, 1989, p.17)

It should be noted that human constructions are, in Cohen's view, part of our culture. As such, they are simply another way in which culture disconnects us from nature or distorts our understanding of it.

The second source of our discontent is also a component of human culture, namely the

use of language and other symbols. Cohen refers to these under the broad umbrella of map-making:

....The major difference between humanity and Nature is that people have the natural capacity to communicate and relate verbally. We interact through spoken and written language. The remainder of Nature achieves its beauty and perfection through non-language communication and relationships.

.... industrial society uses that gift to create stories that separate us from nature. We actually teach ourselves to think in language while every other species, and many other cultures, think in non-language ways. We don't learn to think the way nature works, even though we are born with that capacity. **Our personal and global problems result because our language stories define our destiny and they are disconnected from nature's wisdom.**_(Cohen, 1997, No page, emphasis mine)

He continues this line of thought in the following statements:

As members of modern society, at home and in school, we learn to label. In time, excessive labelling replaces our experiences. We get to know the song of our lives by its words, but without its music. (Cohen, 1989, p.12)

...Our values, labels and imagery separate Nature into imaginary parts. They disconnect and hide the total design of the whole. In this way, we enter the picture and distort its design by mediating it with labels. (1989, p.23)

...the less I know of the mountain as a personal life relationship, the more comfortable I am with it as a negotiable label. Labels, however, often subdivide reality's wholeness and design. (1989, p.27)

This commentary on the power of language over thinking and understanding is also not unique to Cohen. In fact, Gregory Bateson, whose work he frequently acknowledges, described the problem in a chapter of *Mind and Nature* (1979) entitled Every Schoolboy Knows.... under the heading of map-territory confusion. However, the idea that there may be a disjunction between things and their names was expressed by Shakespeare long before that: A rose by any other name..... and Frederick the Great is said to have remarked on the difference between maps and territories. Cohen is grappling with long standing problems in philosophy, linguistics, and psychology concerning the influence of human symbol systems and language on our thoughts and actions. In his use of the term a map is a pattern of thinking which shapes human behavior. In cognitive psychological parlance it could be considered a conceptual schema or

cognitive structure (West, Farmer and Wolff, 1991). Metaphorically, his use of the term is similar to that of a lens or optical system through which a person might look at the world to create an understanding of it. In turn, this understanding would affect how he or she acted upon it. Given the power of maps and metaphors over human thinking Cohen argues that they tend to reinforce or actually create our models of reality. We see what we expect to see—a phenomenon long understood and exploited by stage magicians. It is Cohen's contention that our flawed maps of Nature's reality lead to actions which damage nature and cause suffering to ourselves:

Life is more than our mental or written word-image maps. It is the total experience of creating and sustaining local and global survival relationships through thoughts, feelings and actions. Life falters in their absence, like a gobble without a turkey. Our upbringing's word-image map contains part but not all of the global life process. The increasingly chaotic state of the world testifies to the flaws in our conceptual schemes. To make them harmonious, we must incorporate the knowledge that the Earth functions like a living organism. That helps us to know the full design. (Cohen, 1989, p.73)

The most serious map problem is that our map doesn't have marked on it the more harmonious place where we want to go. Using our present map, therefore, try as we may, life can become more stressful. For example, writing left-handed was not on the map that was used during my childhood. That's why the map gave problems to my teachers, my parents and myself, and vice versa. (1989, p.197)

The battle that is causing global destruction originates in each person's mind map. (1989, p.250)

Cohen's work is also characterized by ambivalence about modern science. On the one hand he believes that the epistemology of science as a form of knowledge objectifies nature and is part of our overall cultural disconnection from both ourselves and the non-human natural world:

It is no accident that in the 1500's, the Living Earth conceptual scheme disappeared from our culture's consciousness, while at the same time, our modern problems started. We can cut, blast and plunder a dead planet with ease, but not a Living Earth-Mother that nurtures us. Instinctively, we respect that a mother knows best, and even humans don't normally bite the hand that feeds them. Cohen, 1989, p.64

By the 1700s, immediate, not long-term, qualifying and quantifying became the accepted means of knowing the environment and the universe. In turn, the Earth became more known for its immediate qualities and quantities rather than as a

unified, timeless whole. Leading thinkers like Hobbes, Descartes, Bacon and Newton were rewarded for mentally subdividing the Planet into its mechanical, measurable parts. ... the Living Earth disappeared into a series of repeatable facts and figures, and in the process, Western consciousness lost sight of the Earth's life attributes and integrity. (1989, pp.80-81)

On the other hand, when he turns to his own programmatic approaches to address these problems he gives his claims a scientific flavor:

Scientifically, life experiences far surpass simply abstracting the way the world works, for their fullness conveys more truth about Nature than do mere words. They reinforce the value of life and, as the following chapters show, they open important vistas that might otherwise remain unrecognized. **I guarantee that the methods, facts and findings you will discover within this book are more accurate, objective, testable, repeatable and complete than most of those that ordinarily guide your daily life. That has been my experience, and hopefully, through this book, you will allow yourself to make it your experience as well.** (Cohen, 1989, p.44, emphasis mine)

Another important element of Cohen's underlying theory is his claim that humans have access to a far greater range of sensory information about their surroundings than that provided by the traditional 5 or 6 senses. Our acculturation teaches us to ignore the other senses. Cohen maintains that we have as many as 53 senses, although he uses the word in a very unconventional fashion, as we shall see:

In the army, my platoon jested that the food was lousy because the cook's taste buds were shot off during the war. During our education to conquer nature, most of our 53 natural sensory "taste buds" are shot off with respect to walking our talk about relating responsibly. You may easily test this allegation. You already know your 5 natural senses: touch taste, smell, sight and sound. Ask yourself this: what is your 18th, your 28th or your 39th natural sense? If nothing comes to mind it suggests that either you don't have a working knowledge of your natural sensory self or that these senses are my fantasy and don't really exist. (Cohen, 1996, No page)

The numbers included in this passage refer to "senses" in Cohen's usage of the word. He advances the view that because humans are inseparably part of nature, even if modern civilization is attempting to teach us otherwise, we cannot really escape the information the many other senses bring to us, even when it remains largely below consciousness. Thus, we feel happy when the information from the full spectrum of our senses tells us that we are behaving in

conformity with natural processes and rhythms; on the other hand, when we ignore that information we are stressed and may become diseased. As Cohen states the case:

Each natural sense is Nature speaking to you, for each sense evolved in you to keep you connected with your rejuvenating origins in Nature. For example, the water in your body is part of the replenishing waters of the planet.; you sense their disconnections as thirst. Oxygen in your body is part of the replenishing air of the atmosphere; you sense their disconnection as suffocation. Natural sensations are communicating connectors. (Cohen, 1989, p.3, emphases in the original)

Over the aeons, through the natural senses, our mind and body have developed as part of Nature's global self-organization, perpetuation, and regeneration system. These natural senses exist throughout our body and are entirely alive, remaining so throughout life if constantly used. **They are Nature connecting with itself in you. Sensations connect us to Nature, but they weaken or die if not exercised...** You are a sentient being. All sentient beings deserve to have good feelings, for in Nature good feelings indicate ongoing survival. To gain them, sentient beings trust **how they feel and act to sustain those feelings which are most comfortable.** Your natural sensations and feelings are important survivalwise because they call your attention to the entities or situations that aroused them. Learn to trust and understand your sensations and feelings in order to gain their guidance. They are Nature....Neither scientists, politicians, religious leaders, nor educators invented sensations. Nature did. **When you experience sensation you experience Nature in action.** (Cohen, 1989, pp.3-4, Emphases in the original)

In other words when we feel good it is because our senses tell us that we are in a congruent, deeply harmonious relationship with the natural world around us. We can't have freedom from stress or gain inner peace and be at war with nature, whether our own inner nature or that surrounding us.

In Cohen's diagnosis of our situation one of the major causes of our disconnection from nature is the institutional structure of modern education. He makes no attempt to distinguish schooling from education. In spite of his own extensive formal schooling (or perhaps because of it) his criticism of "education" can be quite harsh:

Education is a pawn of society. In your school, did they teach you how to use nature's multisensory intelligence? Even if we learn this fact cognitively, it does not mean we will actually feel the natural senses we have buried in us. We need to learn how to rejuvenate them and bring them feelingly back into our consciousness. Then we can think with them. Without them, we will continue to

lose our joys, sense of wonder and responsibility. (Cohen, 1997, No page)

He continues this line of thought:

We **educate** ourselves to think and relate differently than how nature works within and around us. We have **taught ourselves** to hurt what we instinctively love.

Your state-required school attendance represents an eighteen thousand-hour imprisonment indoors, fortified by law from Nature's callings. Like requiring me to write right-handed, our society's artificial, left-brained, tropicmaking meanings replace our inherited whole-brained global consciousness. **This makes us cause our seemingly insoluble environmental problems.** From womb to tomb, we discipline the natural world, as our Inner Nature is disciplined for tropicmaking. (Cohen, 1989, p.169, emphasis mine)

We recognize that for ourselves, although our upbringing may be different, its outcome is the same. **All modern children know more at birth about coexistence and communion with our Living Planet than they know after their high school education.** (1989, p.183, emphasis mine)

Even traditional outdoor school or experiential education programs do not fare well in Cohen's critique:

As long as objective science, or anything else we use, negates our Inner Nature, it becomes part of the stress problem. **Even outdoor education's artificial stress settings, which give people social confidence by conquering Nature, are misguided.** They don't fully recognize that our disorders stem from our Inner and Outer Nature already being hurtfully conquered. That's the stress we must label and address. Without identifying this truth, we overlook it to our cost." (p.187, emphasis mine)

Thus, schools teach us away from our own nature and obscure sources of insight that might guide us in constructing a more appropriate relationship with the ecosystem. In his writings Cohen frequently voices the view that humans do not want to damage the planet; they do so because they have been miseducated and cut off from nature's intelligence:

A wise, vital aspect of natural life is missing from our mentality. We have taught ourselves to disconnect from and assault the natural intelligence of life that sustains life in balance, peace and beauty. That natural wisdom lies buried alive within us, suffocating. It only fully expresses itself in natural areas and natural

people for there it is safe to do so. Globally, that intelligence knows how to support and sustain itself. Throughout Earth it pervades nature and us. It manifests its sensibility in us through at least 53 natural senses, senses I and many other researchers have identified. At any given moment in our life our every thought, feeling and act, consciously or subconsciously, results from the motivating intelligence or hurt coming from one or more of these senses. (Cohen, 1997, No page)

While Cohen is disturbed by the current state of human affairs, he also feels that many people share his concern and want to put things right in their own lives and in the world at large. This view is expressed in the following:

A majority of the world is discouraged by the costly isolation, violence, and hatred growing in industrial society. The destruction of our forests, wildlife and oceans distresses most people. Each of us would like to help heal the wounds we inflict on our planet, communities and selves....

He continues....

Our vast discontent constitutes a major motivating force for recovery if we empower and guide it wisely...My work shows that people have the innate ability to co-create with nature and sustain responsible relationships. We can produce a way of relating that organizes, preserves and regenerates itself to produce an optimum of life, diversity and beauty. We can do this without producing excessive garbage or pollution. People and things need not be left out or toxified. Society does not have to produce for war, insanity or excessive violence. Doesn't that model sound worthwhile? (Levine, 1996.)

Cohen therefore believes that humans have a deep-seated longing not to destroy nature. He believes that humans innately appreciate that actions which damage nature are not in the human interest in the long term. He also contends that the stresses in human relationships reflect our distorted relationships with nature, thus, changing our way of working in the world is essential to peace at the personal and international levels.

The consequences of our life style are to be found not only in the ways in which we abuse the planet, ourselves, and others, but also in a general, broad discontent with the quality of our lives. Cohen characterizes modern life as frantic, confused, disconnected, and even violent. He is, however, optimistic that there is a way out, and that as we have been taught our bad habits of thinking, so too can we learn other ways of perceiving and thinking. We can deconstruct the cultural maps or filters with which we interpret/create experience. What exactly does Cohen

offer as a path to this new awareness and understanding. In **Connecting With Nature** (1989) he claims, "...the activities in this book reconnect you with nature's balance. They enable you to bond with the natural world." (Cohen, 1989, p.1)

Connecting with Nature scientifically teaches our senses of rationality and language to enjoy relationships with our many other natural senses. This introduces Nature's balance into our frantic lives. (1989, p.2)

This book augments and enriches our limited symbol and image notions of how Nature works. From them, we will map a more realistic view of our relationship with the natural world, a map my students and I use to incorporate Nature in resolving problems. (1989, p.28)

Cohen is not modest about the claims he makes for his program:

Reconnecting with nature activities effectively reverse our destructive separation from nature...The reconnecting with nature process does exactly the same thing with respect to our extremely nature-separated psyche and thinking. Its techniques create potent nature connected short periods of time and space in natural areas that lets nature rejuvenate our injured natural senses and teach us its wisdom. Because thinking and feeling this way is sensible, fun and feels good, we bond to it. It fulfils our natural senses of play (#29) and reason (#42). It becomes part of us...This reconnecting with nature process connects, fulfils and renews our thinking. It fills us with the natural world's beauty, wisdom and peace. We naturally feel rejuvenated, more colorful (#3) and thankful (#34) and these feelings give us additional support. They nurture us, they satisfy our deepest natural wants. As we satisfy them and speak their truth, we remove the aggravated stress (#51) and pain (#25) that fuel our disorders. Greed and disorders dissolve. The process triggers thinking that values natural sensory relationships with people and places. It empowers us to create stories that are congruent with nature. It regenerates natural connections and community within ourselves and with others and the land. We habitually feel content. We actively, safely form relationships from this resiliency. We responsibly seek and sustain our feelings of well being.... (Cohen, 1997: The numbers in the passage refer to a complete list of human senses.)

There is clearly a particular theory at work here. Its basic elements are that human beings coevolved in the fabric of life on Earth. Thus, we are an extension of the entire evolutionary story and our senses, feelings, thoughts, and behaviors cannot be disconnected from that story. When we behave in ways which are in conflict with the life processes of the planet our senses bring us information that causes stress, discomfort, and disease. When we feel unhappy

it is for powerful, biologically based reasons; on the other hand, when we feel happy it signals that we are in harmony with our biological nature. Each condition is illustrated in the following passages:

Lying beneath our band-aid solutions, painfully writhes our desire to be true to the world and ourselves. Daily we watch Earth boil in response to our deceitful cover-ups and rejection of its harmonious ways. Our home is a disaster area. However, a springtime of awareness has arrived and it's time to straighten out the house. (Cohen, 1989, p.10)

Have you ever sat near a roaring brook and felt refreshed, been cheered by the vibrant song of a thrush or renewed by a sea breeze? Does a wildflower's fragrance bring you joy, a whale or snowcapped peak charge your senses? Do you like pets, house plants or heart to heart talks; to be hugged and honored by others; to live in a supportive community? **You did not take a class to learn to feel these innate joys. We are born with them.** As natural beings, that is how we are designed to know life and our life.... **In these enjoyable non-language instants** our natural attraction senses safely awaken, play and intensify. (Cohen, 1997, emphasis mine, no page)

Thus, Cohen's theory presents a clear view of human nature and offers root causes for happiness and the causes of disease and distress. A pretty ambitious theoretical undertaking. But what, exactly, is his program to address these matters in a curricular sense. He offers a definite, quite highly structured methodology based on the work of another well-known American environmental and outdoor educator, Clifford Knapp (1985) (Cohen fully acknowledges Knapp's contribution). The system is known by an acronym made up from its component strategies: SEVMRATC, a term comprised of the first letters of the processes of Sensing, Enjoying, Validating, Matching, Resonating, Appreciating, Trusting, and Celebrating. Figure 7.1 summarizes the process within the context of an example in which a user of the **Connecting with Nature** workbook (1989) applies the SEVMRATC process to the experience of colors in an outdoor setting. In his preface to the example given on pp. 9-11 of **Connecting with Nature** (1989), Cohen states:

T.H. Huxley suggested that you ' sit down before fact like a little child, and be prepared to give up every preconceived notion, follow humbly to wherever and whatever abyss Nature leads, or you shall learn nothing.' SEVMRATC makes space for you to do this. It asks your best qualities to intensify your natural senses and inject them into your awareness." (Cohen, 1989, p.9)

In the remaining sections of **Connecting With Nature** the SEVMRATC process is the

dominant approach to processing the experiences presented in a series of activities termed Connectors. **Connecting With Nature** (1989), for example, contains 110 Connector activities. The process, also entails users keeping a reflective journal, termed a SEVMRATC notebook. The journal offers a focus for reflections about the stages of the SEVMRATC procedure as the student engages with them in the various Connectors. SEVMRATC is a sequential process in which the user/participant senses attractive elements of his/her environment and focuses on one particular aspect (sensing). He/she then spends some time simply enjoying that aspect, for example the colors of a deciduous glade in the fall of the year (enjoying). Having enjoyed the sensation of color, the user is then invited to acknowledge his/her enjoyment and attraction, a phase of the process termed validation. Having validated his/her feelings the user is supposed to associate the colors of the environment and the feelings they evoke, with previous experiences of color and recall the emotional tone of those experiences, a phase termed matching. The matching phase can include movement in ways which literally or metaphorically connect the student to both the present environment and to remembered environmental experiences.

The next phase, resonating, is similar to the matching phase in that the user/participant is invited to associate a chosen aspect of the environment with a quality of affect expressed as a musical tone, a poem, a sketch, or a dance movement. This phase of the process is succeeded by appreciating and honoring in which the participant is to express his/her appreciation for the particular affinity or environmental element in some tangible way, ie. by writing in a journal, or by some symbolically celebratory act. It is Cohen's view that our affinities for the elements of nature which we enjoy or which excite and fascinate us are expressions of the underlying congruence between human nature and nature at large. Thus, the SEVMRATC process is a way of recognizing our affinities and bringing into consciousness the degree to which our life styles are either in harmony or conflict with nature. This concept is emphasized in the penultimate stage of the SEVMRATC process, Trust, in which the participant is asked to trust emotions and feelings generated by natural settings and/or elements of natural settings and to understand these not as irrational, but as indications of a deeper, truer rationality than that associated with contemporary western ideas about intellect, emotion, and perception.

The final stage of the SEVMRATC process is that of Celebration. It invites participants to write a short poem or Haiku concerning the connections which they have made between themselves and the element of the environment on which they have focused the process (color in the case of the example illustrated in Figure 7.1). It also asks participants to assume and briefly hold a posture which physically expresses their feelings. In closing his discussion of this phase of the process (**Connecting with nature**, p.11) Cohen cites Rollo May : "If you do not listen to

your own being you will have betrayed yourself.” Finally, participants are asked to summarize their feelings about the exercise in their SEVMRATC reflective journals.

The SEVMRATC process, after it is introduced in the early pages of **Connecting with nature** is employed repeatedly as the foundation of other connecting activities under the themes of the handbook. SEVMRATC may be viewed as a system for focusing attention on elements of the environment, especially non-built, “Natural” environments, and of recognizing our individual attitudes and affinities toward the elements of Nature.

However, as noted previously, if the SEVMRATC process is a means of opening new channels of sensory awareness. It is important to understand what Cohen considers to constitute awareness, especially since he claims that there are 53 senses, including the conventionally accepted five. Cohen considers a sense to be a connection between the external environment, nature in his use of the word, and a person. It is nature’s way of speaking to us. Each sense is a connection between ourselves and our “rejuvenating origins”. The water in our bodies is part of the water cycle of the planet. When we are aware of being thirsty we are sensing a need to reconnect to the water component of nature. Our bodies also require oxygen and we have evolved to use it in our cellular metabolism. If we are deprived of oxygen, even for a short time, the “sense” of suffocation causes us to breath, to gasp for air. All of the senses (thirst, need for oxygen, etc.) have high survival value which is why we possess them. “Natural sensations are communicating connectors” (Cohen, 1989, p.3.)

The next part of Cohen’s theory of the senses claims that while the senses connect us to nature they weaken or are lost if not used. He maintains that all sentient beings desire to have good feelings, because these feelings are an inner barometer of our relationship with the environment. When things are appropriate for our on-going survival, we feel good; otherwise, we are uncomfortable. If we learn to pay attention to the full range of senses we have a powerful means of determining whether things are going well, or not, and what may require attention. Unfortunately, we have been acculturated and educated away from many of our senses so we do not pay attention to them, even when they are sending signals that things are awry. Thus, Cohen’s use of the SEVMRATC process is designed to bring back to conscious awareness those sense signals which we have come to ignore or been taught to repress. This idea makes contact with two statements of Bateson’s: “information is news of a difference” and “consciousness is what we pay attention to” (Bateson, 1979), but elements of it are found in the traditions of many other cultures (Pope and Singer, 1978).

Cohen's theory of the operation and role of the senses is similar to the psychological notion of the pleasure principle. According to this concept humans (and other life forms) are the results of biological evolution. In evolutionary terms success is measured by whether or not an individual survives to reproduce. Thus, survival-fostering behaviors are reinforced through pleasurable sensations while behaviors which are destructive generate pain or some other negative result which, if not circumvented or ignored, will result in cessation or modification of the behavior. Human beings, however, sometimes engage in behaviors which appear to have negative consequences for individual survival: substance abuse, poor eating habits, physical self abuse, and even acts of self-sacrifice. These apparently maladaptive behaviors have puzzled psychologists, geneticists, and sociobiologists. E.O. Wilson, one of the founders of sociobiology, devotes a chapter of **On Human Nature** (1978) to a discussion of the possible biological roots of altruistic behaviors in humans and other animals. In Cohen's conceptual scheme positive affects (affinities) are cues which reinforce our connections to Nature:

Near where you stand the natural world produces hundreds of stimuli which touch various senses in you. It is worth repeating here that Nature's stimuli, sometimes called, **entities, moods, atmosphere, or vibrations**, connect with natural parts of you **that are continuations of them**.For your survival, each of these natural senses connects you to a part of Nature from which you biologically originated. (Cohen, 1989, p.7, emphasis in the original)

Thus, a sense is a connection between human nature and the larger fabric of the biogeosphere which has nurtured life on the planet for millennia. When we feel an affinity between ourselves and the natural world that feeling is an expression of our deep, non-verbal appreciation and understanding of nature and of our connections to it through our sensory apparatus. Cohen's classification of senses includes a set of broad categories, each of which contains a number of more specific affinities or senses, for example:

The Radiation Senses such as

1. Sense of light and sight, including polarized light.
2. Sense of seeing without eyes such as heliotropism or the sun sense of plants.
3. Sense of color.

The Feeling Senses

13. The sense of excretion for waste elimination and protection from enemies.
14. Feel, particularly touch on the skin.
15. Sense of weight, gravity and balance.

16. Space or proximity sense.

The Chemical Senses

19. Smell with and beyond the nose.

20. Taste with and beyond the tongue.

21. Appetite and hunger.

The Mental Senses

31. Sense of time.

32. Sense of electromagnetic fields.

33. Sense of weather changes.

34. Sense of emotional place, of community, belonging, support, trust and thankfulness.

35. Sense of self, including friendship, companionship and power.

36. Domineering and territorial sense.

This is a partial listing of the entire set of 53 described in **Connecting with Nature** (Cohen, 1989). It is intended only to give the reader a sense of Cohen's use of the term.

The expanded sensorium thus connects humans to nature. Affinities are ways in which we recognize the connections and the signals being processed by the senses. According to Cohen, another way in which we gain awareness of our connection to Nature is in the form of the interaction between Tension and Release (T-R). In **How Nature works** (1988), Cohen uses the example of a person who holds his/her breath, with a resultant increase in the desire to breathe, that is, an increase in tension. When finally the person takes a breath the tension is released and the person feels relief. Cohen notes that even if a person held his/her breath long enough to pass out from lack of oxygen, the first unconscious response would be to breathe. Thus, he claims, even without conscious attention our bodies work within the framework of tension and release to restore natural breathing. Tension therefore has great survival value as long as it is acknowledged as a source of information concerning what should be done to gain release from it:

In this Nature-governed relationship, the Earth calls the signals. Breathing is not my decision....The encounter helps me to sense great truths. It makes me aware that to sustain my life, the Planet communicates erotically through some level of immediate tension-producing and tension-relaxing suffocation feelings or sensations (T-R). T-R has so sustained life since its beginnings....T-R underlies life's ever changing pulse and fluctuations....Nature, not people, invented feelings and sensations. Yes we modify them, or attach them to objects, situations, symbols and images. But invent them? Never! The planet did that. (Cohen, 1989, p.109)

SENSE

Check out different parts of your surroundings and move to the point that seems most attractive to you in terms of COLOR.

ENJOY

Spend 1 minute enjoying your chosen place's or thing's COLOR. Complete the sentence "I enjoy this (----)'s COLOR because it makes me feel....."

VALIDATE

Acknowledge to yourself that you are someone who finds this particular thing/place's COLOR attractive and enjoys it. Write a short statement to this effect in your journal.

MATCH

Match this COLOR with the same color that you might see or feel within you: your color memories, moods, associations.... Write down the parts of your personality that ARE this color.

RESONATE

Hum or sing a musical note that resonantly expresses your feelings while experiencing this COLOR (you may also resonate through graphic arts, poetry, writing, dance....)

APPRECIATE & HONOR

In writing THANK this COLOR mood which has attracted you for having given your life so much color and feeling. Honor the entity/place with some physical act, gift, or spoken words.

TRUST

Trust the feelings and rationality you obtain from this experience.

CELEBRATE

In your journal write a short poem or Haiku which expresses your thoughts and feelings about connecting with a color. Assume a posture or motion which you feel states your good feelings about this experience. Hold your positions or motions for at least 1 minute. Share your poem. Review your journal entries for the experience and write a few summary sentences.

(Note: the process in the example focuses on the experience of color in nature, but it can be applied to any of the 53 senses as Cohen uses the term.)

Figure 7.1: An Outline of the SEVMRATC Process as Used by Michael J.Cohen in **Connecting With Nature** (1989).

Tension-release and affinity relationships form the basis for the self-regulating mechanisms which coordinate life on Earth. The biogeosphere is essentially a set of complex T-R and affinity relationships.

Throughout the pages of **Connecting with nature** Cohen applies his concepts of affinity relationships, T-R dynamics and of an enlarged range of senses through a series of Connector activities. Cohen emphasizes that these activities will not generate the desired increase in awareness and understanding if the user only reads about them—he or she must actually participate in the activities in a chosen setting or context. While Cohen appears to prefer that the activities be undertaken in non-built settings, he offers users the option of performing them anywhere.

In the closing chapter of **Connecting with nature**, entitled Author's Observations, Cohen restates and summarizes his claims for the Connecting activities and his rationale for writing the handbook:

...Nature within and around us is biologically an unbroken seamless continuum. It is built from ancient affinity relationship, bonds that exist in and between all entities. Over the millenniums, these affinities grew and evolved the natural world, the embodying and enveloping global life community. We experience many of Earth's life-giving bonds as sensations and feelings such as hunger, sight, thirst, love, community and trust.

Although many signals from Nature escape our perception, our life affinities exist on all levels. In as many as 53 different ways, we might sense the natural environment because we are a continuum of it. It is in us. Our natural senses are our felt kinship with Earth and each other. They are an unexplored road to personal and global sanity.

As our common culture strives to survive by changing Nature into artifacts, it destructively breaks natural affinity bonds within and about us...As R.D. Laing noted, "Insanity is a perfectly rational adjustment to an insane world." Stripped of nurturing and love from the global life community, acting out of frustrated anger becomes our civilization's Nature. ...Modern insanity persists as long as we don't eliminate its source. ...Separated from Nature, our fulfilling love for natural life has become our insatiable love for substitutes: money, power, and materials. Our legacy is the polluted, violent juggernaut our excesses create....

By living Nature-separated lives, we teach the more modern intellectual 15% of our brain to reject our natural intelligence, the sensate-feeling 85 % of our mind that evolved with the natural world and responds to its guiding tensions....Education that reconnects us with Nature's balanced ways is needed to break the spell. To cope with our runaway madness we must deal with its source in our injured affinity emotions. Modern insanity stops when with strong community support, we risk liberating our natural survival feelings from their bonding to our culture's destructive ways. That support and hurt can then motivate us to safely reattach these feelings to the nurturing harmonic integrity of Nature within and without....

To achieve sanity we need rebonding to Nature's balance. **Connecting with Nature** enables us to respond....

By providing the space and guidance needed to reconnect our natural affinities back to the natural world, we can heal the madness of America. There are many good jobs and a thriving, sane economy available by injecting Nature's balance into our modern lives. (Cohen, 1989, pp.79-81)

This is an eloquent summary of his concepts of environmental education. In this section I have tried to avoid making evaluative comments and interpreting the curricular implications of Cohen's work. Again, I've tried to let him speak for himself. While the selected passages are a small segment of his overall body of writing, the themes it contains are recurrent in **How Nature Works** (1988) **Connecting with Nature** (1989), through to the most recent **Reconnecting with Nature** (1997). Even the titles echo the thread of Cohen's thought. In Section III I will now apply the organizing framework proposed in Chapter 2 to his work. But before doing so it is worth noting that while Cohen maintains that his program can be used in schools and colleges, he also views it as a form of self-improvement. Clearly, he has a theory of environmental education and he offers a methodology for achieving its purposes. But whether a workbook, or series of experiences can be termed a curriculum is open to critical consideration. As I have noted in the preceding chapters, this problem is generic to many written environmental education materials. I will return to this issue at the close of this chapter.

III. Application of the Inquiry Framework

A. Metaphysical and Epistemological Considerations

Cohen's writings blend both metaphysical and epistemological positions. In concise terms he contends that our view of the Earth and ourselves in it is a cultural construction, heav-

ily influenced by our use of language, spoken and written, and by the scientific form of knowledge, especially the science of Newton, Copernicus, Kepler, and Galileo which emphasized the mechanics of nature. Cohen's interpretation of this form of science is that it objectifies nature and separates humans from it. The institutions of culture, including schools, teach us away from nature and reinforce the separation by making us spend most of our time indoors in built environments. Even when we are outdoors we often try to reshape nature to an idealized tropical form, an activity Cohen terms "tropicmaking". Moreover, the world view we construct empirically through our senses is impoverished because we are taught to pay conscious attention to and acknowledge information from only the traditional five senses. We ignore a much wider spectrum of information from a total of 53 senses, although the inputs from the ignored sensory channels still exerts a deep influence on us. Additionally, formal institutions of education are one of the cultural mechanisms which teach and reinforce our flawed world view. In Cohen's view some indigenous peoples have escaped the traps of language, science, and schooling, remaining highly connected to nature and regarding themselves as part of its fabric.

Cohen leaves no doubt concerning his view of our current environmental situation. We are actively engaged in damaging nature and our activities threaten the life sustaining capacities of the biogeosphere. His list of environmental problems is familiar to most environmentalists and includes loss of habitats and biological diversity, rising world population, and soil erosion, as well as associated societal problems like stress, consumerism, violence, crime, substance abuse, and the spread of diseases. In his view none of these problems is natural—they all result from human interventions and activities and these in turn result because of our disconnection from nature.

Cohen's epistemology is highly empirical and experiential. We can only fully know that which we experience for ourselves. There is simply no substitute for direct experience. However, because we are using only a very small proportion of our available sensory channels even the world view we construct from direct experience is limited. The problem is aggravated by the fact that we spend very little time outside our constructed environments and they are pallid reflections of the natural world.

There are a number of conceptual difficulties in Cohen's metaphysical and epistemological premises. The first concerns the use of the word "natural". The major issue here is that while Cohen considers humans to be inseparable parts of nature, human society and constructions are unnatural. The observation can be made that when sharks, elephants, pandas or ragweeds behave in certain ways their behaviors are taken to be natural but when humans be-

have in ways which Cohen doesn't commend they are being unnatural, even when it is claimed that humans are inseparable parts of nature. Another way of putting this argument is, "sharks make teeth, loggers make chainsaws"—each according to its nature. There is no mistaking the value Cohen attaches to places which are not constructed by humans, to living and playing outdoors. His own lifestyle affirms the importance of these values for him. But this orientation seems to leave him to devalue human constructions, and therefore to place them in the category of things which are unnatural and which disconnect us from nature, meaning unbuilt places. One of the criticisms sometimes levelled at environmentalists is that they are misanthropic: they have come to value other life forms more than human life or to regard humans as a "plague" on the earth. At times, Cohen's writings have this tone, although, as shown in Section II, he believes that humans are not naturally damaging to the Earth, but have been miseducated and maladapted by culture.

A possible resolution of this problem would be to note that many species, while doing what comes naturally to them as mice, dandelions, or blue jays nevertheless engage in behaviors which are not in the interests of their long term survival, at least in the short term. But biologists are always wary of placing human interpretations on the survival value of the behaviors of other species. It is, however, a fact that there have been many species in the past, long before the appearance of the first humans, which for various reasons (many poorly understood) have become extinct. Did doing what came naturally for them (and they had no language or culture to separate them from nature) lead them nevertheless into evolutionary dead ends. The point here is not to engage in the interesting and important discussion of the place of humankind in nature, but merely to note that in Cohen's world view there are certain unquestioned assumptions, apparently viewed as self-evident truths:

Humans are governed by the process of evolution, which generated our species in the first place;

Humans are engaging in behaviors which are destructive to the biosphere because they are taught to ignore the full range of available sensory (empirical) information and have constructed environments which poorly represent larger biogeochemical processes or hide them from us;

Human psychology and behavior reflects our evolutionary past and must be understood in terms of adaptation and survival

Any one of these points might be used as rich focus for debate and critical thought. Not

one of them is considered unproblematic. By treating them as self-evident truths Cohen apparently assumes that students will also accept them as such, or if not, that their dissent would reflect the problems of acculturation which he describes.

The second problem area concerns Cohen's view of science or of rationality. Because he makes essentially no mention of other forms of knowledge and focuses both his criticism of contemporary reality and his proposals for reform on science, he appears to believe that science is an important, if not the only significant form of knowledge. The problem is not science, but bad science. Bad science objectifies the world and humans in it and is overly dependent on mechanistic and deterministic styles of thought. Good science is exemplified in the work of post-Newtonian scientists like Einstein, Bohm, Prigogine, and Lovelock. In particular, good Earth science will be based on the metaphor of the Earth as a living organism rather than a machine. Again, however, these are not presented as issues for thoughtful consideration but as givens. Even within the dualism between bad and good science outlined above, Cohen still subscribes to the concept of objectivity, but an objectivity informed by recognition of the full range of empirical information. He even suggests, although it is a minor note in his work, that his proposed set of senses could be experimentally validated. Of course, experimental investigations of human perception and of the influence of forces such as electromagnetic fields or magnetism have been underway for many years. In the view of conventional scientists the process of scientific inquiry entails constantly asking interesting questions and thinking about ways of investigating them (Somerville, 1996).

The final problem I will consider here concerns Cohen's critique of human dependence on language or symbol-making as an abstraction from genuine experience. Embedded in his analysis is the problem of "what is natural" which I have briefly described above. He recognizes this difficulty in an interview conducted with him by Daniel Levine (1996):

MJC: Although we are part of Nature, just as every species is different from each other, we are different, too. The major difference between humanity and Nature is that people have the **natural capacity to communicate and relate verbally**. We interact through spoken and written language. The remainder of Nature achieves its beauty and perfection through non-language communication and relationships.

DL: Isn't our language capacity a gift from nature?

MJC: Absolutely, but industrial society uses that gift to create stories that separate us from nature. We actually teach ourselves to think in language while

every other species, and many other cultures, think in non-language ways. **We don't learn to think the way nature works, even though we are born with that capacity. Our personal and global problems result because our language stories define our destiny and they are disconnected from nature's wisdom.** (Levine, 1996, [On-line], emphasis mine)

From this passage it would seem that the problem is not so much language, but the stories about nature which we tell ourselves and the ways in which we use language. But if language use tends to result in abstraction from experience and a tendency to categorize and classify nature into artificial compartments, it seems strange that Cohen later places great emphasis on narrating, communicating, and writing about the experiences which are organized in his program. Although he does urge creative uses of language and the use of graphic and movement metaphors to represent experience, he still also makes extensive use of spoken and written communication as means of sharing experiences. Moreover, his entire list of senses might be seen as a rather arbitrary way of categorizing and enumerating the flow of consciousness (Pope and Singer, 1978). It seems somehow contradictory to his advocacy of holistic philosophies like that of Lovelock (1991), although Cohen offers the explanation that because of our commitment to symbolic systems we won't believe the other senses are real unless they are given names (Cohen, 1997).

There is, however, little doubt that the main focus of Cohen's work is to deconstruct conventional metaphysics and develop a reformed scientific epistemology. By changing our view of how the world works and ourselves as part of it we will change how we act on and in it, thereby going to the root causes of our environmental problems and improving our lives in the process:

Contrary to popular belief the most important question of our time is not the scientific accuracy of the information we receive. It is whether the state of the world and our lives satisfy us. Are we happy with modern destructiveness. I, for one, am not. (Cohen, 1989, p.63)

B. Structure and Curricular Approach

After offering a diagnosis of the human condition Cohen advances a definite program by which to address it. The program, which is contained in **Connecting with Nature** (Cohen, 1989), **Well mind-well Earth** (Cohen, 1990), and **Reconnecting with Nature** (Cohen, 1995; Cohen, 1997) has a clear and detailed structure. Essentially the program entails a

series of exercises which may be undertaken in virtually any setting. The core of the approach is the SEVMRATC methodology developed by Knapp (1985). As outlined in section II, the acronym is comprised of the first letters of the words: Sensing, Enjoying, Validating, Matching, Resonating, Appreciating, Trusting, and Celebrating. The **Connecting With Nature** workbook is a good illustration of how Cohen organizes the approach. It is broken into nine themes: Experiencing, Sensing, Thinking, Embracing, Joining, Discovering, Unifying, Avoiding, and Spacemaking. In turn, each theme is organized around a set of activities, known as Connectors. (Connecting contains 110 of them.) In the second section of the **Connecting** workbook, sensing, the student is introduced to Cohen's 53 affinities or senses and to the SEVMRATC process (pp.7-9). From that point on, frequent use is made of the approach in other sections of the book, although not all Connector activities explicitly mention it. For example, Connector 23 (**Connecting**, p.13) is entitled "Sleeping Outside". Its instructions state:

Whenever weather and insects permit, sleep on the ground under the stars and clouds. The great out of doors makes a glorious bedroom whose ancient vibrancy, songs, and perfumes touch you, asleep or awake.

Of course the student could process the experience by means of the SEVMRATC framework. by working through some or all of the stages of sensing, enjoying, validating, matching, resonating, appreciating, trusting, and celebrating. Again, Cohen appears to feel no contradiction in moving from the categorizing and classifying systems of industrial civilization to this alternative means of framing experience and developing appreciation and understanding of it. He prefaces his introduction to SEVMRATC with a passage taken from T.H. Huxley:

“...sit down before fact like a little child, and be prepared to give up every preconceived notion, follow humbly to whatever abyss Nature leads you, or you shall learn nothing.” (Cohen, 1989, p.9)

I wonder whether Huxley might not have seen the SEVMRATC process as a “preconception”. The organization of Cohen's program is therefore to take the learners to a setting, or series of settings in which they undertake various experiences contained in the Connectors (**Connecting with Nature**, 1989) or Activities (**Reconnecting with Nature**, 1997). An important tool for processing experience is the SEVMRATC, although the books make frequent use of open-ended discussion, movement as metaphors for experience, reflective journal writing, and graphic arts activities for appreciating, recording, and communicating. While **Connecting with Nature** is clearly written as a workbook for either teachers or students to use, later books, especially **Reconnecting with Nature** (Cohen,1997), blend exposition of Cohen's theoretical

position with a description of methodologies for learning and instruction. This probably reflects the realities of Cohen's work, in which he is self-employed as a writer, teacher, and counselor, so his books can serve the needs of different audiences and users.

There is very little indication in any of Cohen's books regarding how long an entire sequence of experiences might take or how they might be presented over time. Most of the Connectors or Activities are designed to be done in a short period, from a few minutes to less than 30 minutes. However, Cohen makes the observation that it took him more than thirty years to learn to "read" nature, so presumably his work really entails developing an approach which can be used in any and all life experiences, even if the format of some of the books suggests a Kit or Package which can be accomplished and completed.

C. Approach to Knowledge and Skills

Cohen's program is high in process. It has no clear disciplinary structure nor does it seem designed to develop purposes associated with the core curricula of most schools. The process is the product, and vice versa, in that the goal of the program is greater knowledge of one's experiencing of the environment and thus enhanced awareness of nature and human impacts on it. Skill is to be gained by repeated, frequent experience in many different environments, although Cohen clearly favors experiences in non-built settings in which the student applies the techniques of SEVMRATC, Tension-Release, and affinity recognition in order to develop an improved ability to sense not only the elements of the environment but the responses they evoke in us. While the program could be readily placed at the service of conventional curricular purposes such as creative writing, drama, dance, or graphic arts, Cohen makes no clear attempt to make these connections to school programs. This may reflect his own somewhat dyspeptic views of traditional schooling. The skill requirements of the SEVMRATC process are low in terms of techniques which need to be taught and practised, equipment employed, and so on. There is no highly structured, disciplined regimen. The entire program is quite informal and there is a lot of room to exploit opportunities as they are presented. This approach is consistent with the emergent nature of the Audubon Expedition program where the curriculum developed as things happened in the course of the class' journey.

If there is an area of Cohen's work where there is a fairly high skill requirement it is in how teachers or facilitators help students to process experiences in ways consistent with Cohen's theoretical viewpoint. **Reconnecting with Nature** (1997) contains a number of passages which illustrate, from real situations, dialogues between students and teachers, including interactions among students as well. As noted above, Cohen has a considerable background in psychology

and counselling and he brings these skills in questioning and dialogue to his work. He may, in fact, take them too much for granted because his works provide very little advice to teachers who might try his approaches with classes. While this is consistent with his rather nondirective and informal overall structure, it may represent a barrier to teachers who doubt whether they have the experience required. The teacher doesn't have to be a content expert; he or she doesn't need to have an extensive background in biology or natural history to process student's experiences with elements of the environment during field excursions, but they do need to have excellent capacities to listen, reflect, and clarify. There is some similarity between many of the process examples in Cohen's writing and the valuing concepts of Louis Rath's especially in the SEVMRATC phase of things. This may be partially explained by the fact that Cliff Knapp who developed the process has worked with Sid Simon, who collaborated extensively with Rath's (Rath's, Harmin, and Simon, 1966).

Rath's claimed that whether or not an affect was actually a value was determined by whether it was freely chosen, prized and affirmed. In the overall SEVMRATC process participants are free to choose elements of the surrounding environment which attract them or capture attention in some generally pleasurable way. They are then invited to show their affinity for these elements through expressions in written, musical, movement, or graphical form and finally to formally acknowledge the sources of their affinities and to represent their value for both the element which forms the subject of the process and for the process itself through some open, tangible, celebratory act which may then be repeated or in some way become part of the daily life of the participant (affirmed). Cohen also states that participants should be willing to defend themselves from those who might criticize them as "unscientific" or "spiritual", to declare their independence, and to protect their right to pursue happiness by connecting to nature. These requirements can entail considerable teaching expertise.

D. Problem Solving

Cohen's programmatic approach is not organized around a syntax of problem solving, although the problem he intends to address is in resides the general interaction between humans and nature.

This problem, however, is not to be addressed through any definite series of steps or single interventions, but by a more fundamental reorientation of perspective, as described above:

From the “connector” activities and experiences students gain new insights, rethink previous perspectives and knowledge, and reconceptualize their perspectives. “These natural sensations and feelings are “inventions” of Nature, not culture. Nature seldom works with words and beliefs. Sensitivity to natural senses is how Nature intelligently solves problems, grows, and survives. (Cohen, 1988, p.132)

This does not mean that Cohen sees no need for people to make wiser environmental choices or to engage in action projects (see below). Nor does his program necessarily preclude the use of problem solving approaches like those described in Stapp and Hungerford in the previous chapters. However, he doesn’t advance particular problem solving strategies and his style doesn’t have a problem solving tone in any conventional sense.

E. Roles of Teacher and Student

Cohen’s program structure is very similar to Schubert’s (1986) category of the experientialist curriculum orientation. Of it he writes:

The experiential approach to curriculum acknowledges the essential goodness of each individual. It holds that as individuals reflect on their own experience, they are drawn together in sharing with others who are embarked on similar journeys. This makes all persons, not just experts, agents of their own learning. When each person’s learning grows from his or her own experience, when its direction or purpose is conceived by the individual or group in question, only then can it truly be for that learner or community. (Schubert, 1986, p.17)

As has been noted already Cohen’s work at Project NatureConnect has been shaped by his experiences at the Audubon Expedition Institute (AEI) over more than 20 years. The Institute experience was intended to foster the concept of a community of learners in which the role of teacher and student were often exchanged. However, while Cohen’s style of presentation is informal and experiential, there is still a considerable amount of teacher direction, even when it is subtle. Because many of the learning experiences are undertaken outside classrooms there is no architectural reinforcement of conventional instructional arrangements. But the instructor still is the one who decides which activity to select, how to present it, how long to allow for the experience, and how to negotiate discussions:

Instructors provide direct experiences in out-of-doors natural settings as often as possible. “These can be: wilderness, backyards, terrariums, or person to person — anywhere people can sense nature’s attractions” (Cohen, 1988, p131)

Students and instructors are guided by a series of more than 104 activities that are called “connectors” which are designed to, “create teachable moments in which the natural world resonates in us the ensuing thoughts, feelings and reactions trigger more discussion, sharing, and analysis.” (Cohen, 1988, p.131)

Because each setting will be different, and because students will process their experiences in diverse ways, even within the broad outlines of approaches like SEVMRATC, instructors can expect to encounter a wide range of student questions, statements, and discussions. Here again, however, teaching experience will be an asset.

In Joyce and Weil’s classification system of Models of Teaching, Cohen’s work would appear to lie in the Personal Family of Teaching Models and in the category of Non-Directive Teaching Models. Joyce and Weil (1972) describe this model as follows:

....(the model) focuses on facilitating learning. The primary goal of non directive teaching is to assist students in attaining greater personal integration, effectiveness, and realistic self-appraisal. A related goal is to create a learning environment conducive to the process of stimulating, examining, and evaluating new perceptions. A re-examination of needs and values— their sources and outcomes— is crucial to personal integration. (Joyce & Weil, 1972, p.144)

The fit between this description and Cohen’s writings is apparent. The materials of Project NatureConnect can be used by an individual learner without an instructor, but because of the importance placed on discussing the experiences in groups it will be difficult for a solo learner using the written program to achieve the benefits that arise from dialogue and debate in the debriefing phase. Cohen (1988) further describes some of the things which are expected of students during the learning experience as follows:

The activities ask learners to think critically and to articulate their natural connections, what they sense and feel while in a natural area or while in contact with the inner nature of another person. Some activities require learners to spend time in a natural area with others engaged in the following pursuits: Learning how to make their mind “blank” in order to sense, without words or reasoning, the attractions they discover in a natural place and/or in a person’s inner nature (inner child)— attractions such as colors, moods, motions, feelings, textures, fragrances, designs, beauty, and so forth. Labelling what they experience as connections rather than objects. For example, an attraction to the color, motion, or sound of a person, waterfall, or a bird is termed a natural connection or natural attraction rather than a person, place, or thing. Validating that each natural connection feels good; a natural nonlanguage experience is enjoyable and nurturing; the existence of their attraction to a natural object is as natural and

factual as the object itself; writing about, reading about, or discussing these attractions feels comfortable and creates interpersonal connections....

From the “connector” activities and experiences students gain new insights, rethink previous perspectives and knowledge, and reconceptualize their perspectives. (1988, p.131)

While the overall tone of Cohen’s curricular writing is rather informal, there is nevertheless a definite structure within which teachers and students have responsibilities and are expected to undertake tasks. Of course, the underlying assumption of the entire body of work is that students will voluntarily engage with the program, rather than being assigned to it. One aspect of many modern program structures which is clearly missing from Cohen’s writing is any suggestion of the teacher performing a role as evaluator. This does not mean that teachers might not ask questions and encourage further critical thought or discussion, but any notion of the teacher as controller of certificates or issuer of grades is missing.

F. Sequence

Of Cohen’s curriculum work, **Connecting with Nature** (1989) is the most clearly sequenced. However, even works such as **Reconnecting with Nature** (1997) which blend theoretical and practical materials still contain activities which are organized in numerical series. Furthermore, the SEVMRATC process has a definite sequence which is represented as the correct way in which to proceed. Moreover, each element of the sequence is seen as being important, so there is no expectation that a teacher or student would not undertake one of the steps. **The Secrets of Nature Trail** (Cohen,1996) takes a different approach in that the sequence is arranged along a nature trail. Clearly, in that material each station is meant to be encountered in a particular sequence along the path, although the teachers who set up the trail will have to decide on the exact location of each station on any given trail, and how far apart to space each one. While the affinities or senses are given numbers, and grouped into broad categories, they are not presented in any hierarchical or sequential arrangement. Aside from these constraints, it is possible for a teacher or student to modify the sequence of activities in some of the materials, or to decide to omit activities and connectors entirely, although very little is said about this.

G. Perspective on Action

Cohen’s program proposals embody two concepts of environmental action. The first is at the foundations of the entire program: the first venue for action is personal change. In other words, we are the source of environmental problems which result from the flaws in our under-

standing of the nature of human-environment interactions and our place in nature. The only way to correct this situation is to learn our way out, to deconstruct the inappropriate world views and concepts and construct a new way of living in the world. Cohen's theory of the senses as a series of affinities with nature and his approach to developing awareness, described above, is intended to go to the roots of these fundamental problems. The action which is taken focuses on personal transformation.

The second form of action is more conventional to programs of environmental education and it involves the sort of changes in daily patterns of consumption, energy use, and waste disposal recommended in any number of lists of practical personal, family, or community action projects. In Chapter 8 of the Connector activities (grouped under the theme, Avoiding) Cohen (1989) provides a set of possible environmental actions, reprinted from *IN CONTEXT* magazine, a Quarterly of Humane Sustainable Culture. The list, entitled Replenishing: 101 Ways to Heal the Earth, reflects four major themes for action: 1. reduced energy use; 2. protection and restoration of the environment with particular reference to regenerating natural ecosystems and regional biodiversity to offset the impacts of human activities which are affecting global climate changes; 3. increased personal participation in governmental and economic decisions; and 4. development of a deep personal commitment to caring for the Earth (Cohen, 1989, pp.69-71). The list contains many ideas which are common to other handbooks on environmental action, including retrofitting home insulation, turning down the household thermostat, recycling household wastes, reducing use of automobile transportation, and composting kitchen wastes. Mixed among these rather practical suggestions are political actions like urging parents to teach their children to ask that schools operate in an environmentally responsible fashion, or organizing demonstrations at factories which use or manufacture CFC (chlorofluorocarbon) containing chemicals. In addition, some of the suggestions entail skill development: "92. Learn how to lobby. Lobby your local, state, and national elected officials for action on climate change and environmental issues" (Cohen, 1989, p.71.) On the whole, the list of action suggestions seems rather prosaic compared to Cohen's analysis of the current state of human-environment interactions and the changes needed to improve it. Also, as Kennedy (1983) has observed about other environmental action lists, there is no priority given to particular actions over others. Apparently recycling kitchen scraps and lobbying to have schools operate as models of environmental management have the same importance.

In the closing lines of *How Nature Works* (1988) Cohen summarizes his view of action as follows:

The true peaceful value of our green thoughts, feelings, actions, aesthetics and prayers is proven when they actualize healthy natural land, air, and water areas, not before. If they don't vitalize and regenerate natural areas, they are misleading pacifiers that are part of the problem....The battle that is causing global destruction originates in each person's mind map. It can be won in the golden arena by recognizing that Earth is a living organism which we embody, transferring our survival feelings back to it and then acting accordingly. We must treasure green relationships and places. They are survival. Our lives should be their statement, rather than that of destructive tropicmaking. Let us become as one with Earth and enjoy its pulse. After all, if we don't learn to live with the natural world and the Earth gives out, where can we go? The moon? The moon looks like we've been there already. (Cohen, 1989, p.250)

Thus, while there are immediate and practical steps which can be chosen to correct some of the consequences of our flawed ways of thinking about nature, and it is possible to define a set of goals for daily living which can guide our daily conduct, the ultimate roots of the environmental problem arises in our personal mind maps. We must work to change these by reconnecting with nature through extended, repeated experiences in natural places and with the diverse life forms which inhabit the Earth.

H. Ethical Perspectives

Environmental ethics address how we develop criteria to guide our decisions about our interactions with nature. Ethics is concerned with questions of morality, of right and wrong, especially in the context of making decisions and choices. In **How Nature Works and Connecting with Nature** Cohen advances a strategy which focuses on the personal decision making and choosing which is a component of ethical behavior. The strategy is entitled "I choose to.....". Using the words I choose to in the context of making choices and decisions, implies that we are not "forced to....", "made to.....", "used to (doing)..." and that we have considered a particular feeling or behavior from among a range of options. For this to be so, however, we must empower ourselves or give ourselves permission to choose and act in particular ways. Its intent is to make people avoid use of expressions such as "It is necessary to...." or "We have to....." or "They say...." all of which tend to remove the locus of control from ourselves and assign responsibility to an unknown, nameless, faceless, impersonal they or we. Cohen's claim is that by deliberately using the words, "I choose to....." in our speech when we are describing our personal decisions and choices we have to think about what we are really choosing to do, and consider the consequences of our choices. This form of speaking also implies consideration of the values we are apparently choosing to affirm through or by our actions.

However, the I choose to.... strategy still doesn't address the issue of how we might develop criteria to guide our environmental choices. What sort of general moral principles would be consistent with a belief that humans should not damage the environment and should respect the diversity of other life forms. How would these principles be applied in making decisions. Educational consideration of ethical issues is not so much concerned with the promotion of particular ethics but with considering how ethical principles are arrived at in the first place and whether or not they are consistent with other knowledge, beliefs, values, and so on.

Cohen appears to hold the view that by reconnecting with nature at the deep sense-affinity level we will be able to employ our feelings as a guide to action and choice. If we are fully aware of nature and our place in it we will not be comfortable making choices which damage it or which are self destructive. Our moral compass will be based on this enhanced awareness. Such a view is consistent with Cohen's highly empirical philosophy.

At this point I will not consider the ethical questions which might be raised concerning the overall approach of the program in terms of its handling of questions of education. I will, however, return to this issue when I assess the worth of the Cohen's program in terms of the four focal questions of this inquiry.

I. Fit With the Institutions of Schooling

In view of the passages cited above it would seem apparent that Cohen's program is not designed for implementation in conventional schools. Its structure and content reflect the influence of the AEI, a highly alternative form of schooling. Moreover, Cohen's theoretical position concerning the negative influence of culture on thought and behavior places schooling among the list of factors contributing to our malaise. Cohen makes no attempt to articulate his proposals with contemporary curriculum standards or to suggest how it might be implemented in regular K-12 classrooms, even as a form of enrichment program. Cohen makes no apologies for his own opinion that schools are, as he found them in his own life, "rigid, upsetting, and tedious." Small wonder, therefore that while he does in-service workshops with teachers and has incorporated his program in several alternative college level programs, his work is used more frequently by churches, youth camps, naturalists and nature interpreters than by regular schools.

Let me now turn to the four key focusing questions using the information gained both from the descriptive phase of the inquiry (Section II) and the analytical and interpretive phases organized by the framework of this section, although elements of analysis and interpretation will surely continue below as well.

IV. Cohen's Work in Light of the Focusing Questions

A. How Does the Cohen's Curriculum Address the Concept of Education In the Context of Environmental Education

As noted above, Cohen makes essentially no attempt to distinguish schools from education. It seems as if the word education is inseparable from the institution of school. While, as I have tried to show above, he sees schools as one of the contributors to our culture-driven separation from nature, he gives no account either of the nature of education or the purposes of schools. He doesn't use the term environment frequently either, preferring instead to write of nature or the Earth, which he regards as a living organism.

The consequences of this lack of attention to the meaning of education and the purposes of schools is to present his program as the answer to our current problems, almost a panacea. There are several aspects to this: first, his analysis of the environmental situation and the current human condition is put forward as a simple matter of fact, not a personal interpretation or as a subject for thoughtful consideration. Cohen has arrived at his view of things after a long life experience. He has put his personal belief system into action in his own daily life. He has, therefore, the clarity of a true believer. Second, he interprets argument and evidence through the lens of his preconceptions, so he presents the findings of scientific research which are consistent with his views; he does not present findings which might disagree or support different conclusions. In fact, while he clearly considers science to be an important form of knowledge, perhaps the most important form in that he makes no explicit mention of others, he dismisses a large amount of the findings of modern science on the grounds that it has been generated by the old, bad, objective, positivist science and not by the new science of Lovelock, Einstein and others who claims take a more holistic, subjective, and qualitative approach and acknowledge ideas about chaos and uncertainty. This approach is a considerable simplification of the philosophy of science and the arguments among scientists themselves regarding the limits of scientific knowledge.

While Cohen claims to value human diversity his writings give very little evidence of valuing a diversity of viewpoints. It is clear that Cohen places great value on the outdoors and on living in places where humans have had little impact. Given a choice between a walk in a forest or a visit to an Art Gallery there seems little doubt that Cohen would prefer the former. As a focus for educational consideration the issue of human constructions as part of our environment is worthwhile, but that sort of consideration can't begin unless the possibility of various

views is recognized. The problem with Cohen's analysis of our situation is that it differentiates people into two broad classes: those who are aware, and those who are not and who still have their cultural blinkers firmly in place. Issues such as how cities could be made more livable, how we could design with nature, how we could create Earth-friendly cities are not raised. People who are aware, who have constructed the new sensitivity to nature that Cohen proposes to cultivate, will prefer to be outside, away from buildings.

This treatment of these questions reflects a problem inherent in Cohen's use of the term natural and his idea of what is natural and what is not. Cities are not natural; forests and ocean shores are. So people are better off if they live outdoors as much as possible and avoid urban settings. Of course, not all people share this perspective. Cohen's own experiences in New York in his early days seem to have colored his appreciation of urban environments ever since. In fact, he says as much, although he is not so much running away from cities as toward wilderness and rural settings.

To be fair, it may be thought that once people open themselves to a fuller awareness of the information available to them from the broad spectrum of senses Cohen proposes they will redesign urban environments to eliminate the unhealthy and stress producing elements of city life. But even here there are value judgments in operation and no attention directed at diverse perceptions about a quality life. While Cohen may find it strange, or a sign of derangement (insanity is the only response to an insane world he states, after Laing), some people actually find city life, with all its frantic pace, noise, smells, and clutter invigorating. Cohen assumes that other people share his aversion to these things and find them evidence of our fundamentally flawed metaphysics. But, of course, many don't. The point is not whether Cohen is entitled to his view of things, but whether if he has educational intentions in mind he should allow various views to be given attention in ways which nurture critical thinking, an understanding of how such different views arise in the first place, and why different people respond differently to the same experience or environment and assign different values to it.

To have educational merit Cohen doesn't have to abandon his own perspective, but he has to present that perspective as just that, a point of view, arrived at through a rich life experience and considered thoughtfully. In such a presentation it becomes an invitation to thinking about the different ways people come to understand the environment. Then, the processes of awareness themselves can also become a subject for educational inquiry.

Cohen presents his concept of awareness and his description of senses also as if they were revealed truths rather than a focus for questioning and further inquiry. The topics of consciousness and awareness are rich in educational potential. They have long been matters for philosophical and psychological debate; certainly the field of consciousness is currently under active reconsideration resulting from the impact of new fields such as artificial intelligence and software design. It may well be, as Cohen contends, that our current notion of the range of our sensory apparatus is too narrow and that we do in fact have more senses. It may also be that our definition of the word sense is itself restrictive. Furthermore, the notion that it is possible to train awareness, to become direct attention to the flow of consciousness has a very long history in cultures outside the modern west. Is the SEVMRATC system the best way to approach this problem; is it the only way? Is the topic important at all, or merely a diversion from getting on with more practical approaches to addressing environmental problems. These are all topics with educational potential, but that potential can't be realized unless they are approached in an educational manner as the foci of critical inquiry, of reflection concerning how different forms of knowledge might or have contributed to our understanding of them, or have shaped our inquiry into them. If modern epistemology is at the root of our problem, exactly how has the formal science of the Age of Reason been a contributor. Much has been written about these issues and they are worth thinking about.

B. How Does Cohen's Curriculum Address the Concept of Environment, and in Particular the Topic of Human-Environment Interactions

As noted previously, Cohen makes slight use of the term environment in his writing. Instead he prefers to use the term nature or the Earth (referred to as a living entity). Cohen's curricular work embodies a number of contradictions in respect to humanity's place in nature. First, Cohen's work, including the titles and sub-titles of many of his books, stress reconnecting or connecting to nature. Human beings, he seems to believe, are part of nature. They are living organisms and the human species is the result of biological evolution. Our bodies are intimately connected to the workings of the planet; we breath in oxygen and release carbon dioxide; we drink water and perspire and excrete water. We take in preassembled carbon compounds which store solar energy in chemical bonds. We use this energy to do biological and mechanical work. When we die, our bodies are recycled. These are all familiar biological concepts. They have been used by many environmental writers and ecologists to make connections between us and the material and energy cycles of the biogeosphere. Furthermore, according to the theory of

evolution by natural selection, which is still the dominant biological theory, we, and all the other life forms on Earth are the result of an evolutionary process. Our genes are little different from those of other primates, and even only slightly more removed from those of a field mouse or bony fish. Our cells conduct the same basic metabolic processes that are found in, and regulated by the genes of every other living thing. All of this is considered to represent foundational knowledge in the science of modern biology. There are, of course, still many people who do not accept this view, even if it is supported by large amounts of empirical evidence. The theory of biological evolution, at least if it is considered to include humans, is controversial in many religious belief systems. Even among biological scientists the role of evolution by natural selection in human culture is problematic.

Cohen's theoretical position, and it is the basis for much of his approach to developing awareness, is that human psychology is natural and therefore the elements of our psychological functioning, including emotions, intellect, and perception are all the products of our evolutionary heritage. They are present because they have been proven to have survival value for our species. They aren't simply preferences, or the results of acculturation. In fact, cultural influences operate on top of these deeper, evolution-based psychological structures. Our problem, in Cohen's view, is that we ignore the messages from the full array of our senses (or emotions/feelings/affinities) or have been taught to repress them, or regard them as irrational. In Cohen's view the only path to full rationality lies in bringing back to full consciousness our feelings concerning the environment, including ourselves and other people. If we do this, he believes we will become aware of how stressed, or distressed we are and how these stresses affect our destructive behavior both toward the rest of life and ourselves.

This is an interesting theoretical position. The problem with it is that it contains a set of implicit values, Cohen's values, concerning what is natural. Thus, Cohen's awareness makes him feel happy and comfortable in natural settings, by which is meant settings that are not built or which show little human impact. These feelings of happiness and comfort are cues that he is behaving in ways which are congruent with his evolutionary connection to the biological world. On the other hand, if he were to smoke a cigarette, or get caught in a traffic jam, or go to a crowded night club he would feel uncomfortable and these feelings are cues not to a personal preference or value structure, but to the fact that these situations are unnatural and should be avoided, not just by Mike Cohen, but by everyone. Thus, the entire edifice of human culture has largely been built in opposition to human biological nature. This is a fairly broad indictment.

To take this issue further, and to connect it to the preceding focal question concerning the educational dimensions of Cohen's work, let us consider a situation in which Cohen took a class of students to a forest glade. By introducing the activities in *Connecting With Nature* he invites the students to develop a response to their setting and to become conscious of their emotions. In his construction, students who respond positively to the natural place are getting in touch with their deeply buried evolution based perceptions. On the other hand, if a student is very uncomfortable in the outdoors and is distressed this is a sign that this student has been the victim of contemporary culture and if they could only strip away this superficial response they would also discover much better, more harmonious feelings below the surface. In some of Cohen's writings (*Reconnecting with Nature*, 1997) he draws quite heavily on MacLean's (1973) concept of the triune brain, in which the ancient brain, anatomically the top of the spinal cord and brain stem still has deep connections to our biological roots, while the neocortex, the large, dominant human new brain is the site of our learned and culturally conditioned behaviors. The older portions of the brain still exert an active influence on our behavior and physiology, even if that influence is largely unconscious. Modern civilization is an artifact of the neocortex. What is required is to recognize and reintegrate the old, biological, genetic knowledge from the old brain into the our new brain thinking. This is all very interesting and the subject of a lot of psychological and neuroanatomical debate, as well as many popular books, but it still doesn't address the real problem: what is natural, at least for humans. Are we to believe that because cities cause some people distress, and because there are certainly environmental problems in them and created by them, that they are unnatural? Is the student who prefers sitting in a coffee shop drinking a latté less natural than one who want to hike in the woods and sleep under the stars? In Cohen's view, the answer would appear to be yes. But the neocortex itself reflects human evolution. Is it to be taken as an failed experiment, or viewed as maladapted? Is it too early to say? Perhaps all the attributes we consider to be intelligence will not prove to have survival value for our species in the longer term. Evolutionary history is filled with surprises, and many apparently dominant and successful species have ended up on the biological scrap heap.

The point of all this is that the issue of what constitutes nature, and what is natural for humans, is itself grist for educational consideration. But again, that can't happen if the preconceived position is that human constructions and culture are mainly unnatural, while wilderness (itself a value-laden term) is natural and that humans should feel happier in natural settings than they do in cities because those feelings are an indication of our true nature and a guide to how we should behave. Given this position it will be difficult for a student who doesn't feel "happy" outdoors to offer her views, especially if many other students are offering glowing testimonials to the joy they are experiencing.

C. How Does Cohen's Program Address Environmental Action as an Educational or Curricular Purpose

I have really already addressed this question in the course of using the framework for description and analysis. Cohen's approach emphasizes personal change, change in patterns of perceiving and thinking as its focus. While some of his materials offer some practical suggestions for personal actions such as recycling and energy conservation, the thrust of the program is directed at expanding and enhancing awareness of our sensory or emotional response to the environment and at reconnecting within nature. The premise is that unless we change our mode of perceiving and knowing other environmental action projects are likely to be trivial or even misdirected. This does not imply that there is nothing we can do to lessen our environmental impacts while we are on the road to personal transformation, but the main goal must be that. As Cohen notes, it took him more than 30 years to learn to listen to and learn from nature. While he doesn't clearly address the question, a few days of awareness activities, no matter how effective, are unlikely to affect the sort of fundamental change in world view which his analysis of our current environmental situation seems to entail.

D. What Relationship does Cohen's Program Describe or Imply Between its Purposes and Those of Schools

Again, this question has been partially addressed in the analysis and description of Section III. Cohen's own early school experience was clearly unhappy. He says very little about his later experiences beyond describing the limitations of academic knowledge. His long experience with the Audubon Expedition Institute gave him a chance to develop his ideas in the context of a very alternative form of school. As Cohen notes, his years with the AEI had a considerable influence on his later program development work. The AEI program itself has been the focus of some summative evaluation. In 1994 Ben Williams, a Ph.D. candidate in the Harvard Graduate School of Education undertook a survey study of graduates of the National Audubon Society Expedition Institute as a project in a course in Quantitative Research Methods (Williams, 1994). While the study is by the author's own admission somewhat limited in scope given the time and resources available, it does offer some evidence concerning the impacts of the Expedition Institute program on the participants over the long term. When Williams undertook his study the Expedition Institute program was in its 25th year, so almost 800 graduates were potentially available for the survey. Moreover, the graduates ranged from those who had recently completed the Institute to those from the first student group twenty five years ago. Without going into detail about methodology and results, Williams found that many of the

graduates of the AEI program held very positive views of the experience, even years after graduating. In addition, many believed that the program had been a significant influence on their lives.

Williams also found that there was a general trend for high scores in response to items which addressed the power of experiences such as travel, group dynamics, hiking, or sleeping outdoors. Respondents also often responded that these experiences maintained their importance in their post program lives. In general, former students did not rate the actual academic components of the AEI program as highly as the structural aspects. Anthropology was given the highest importance score, while Natural History, English, and History, were assigned lower values. Williams notes that the respondents frequently modified the response forms and added their own editorial additions and comments, indicating a high degree of involvement with the survey and apparent active recall of course experiences and philosophy.

In terms of the constellation of research questions addressing the overall structure and character of the program and the most durable experiences, Williams (1994) notes the comments of respondents concerning the meaning and significance of the program to their lives, listing comments such as:

‘Everything in the world’;

‘Breaking away from convenient and conventional thinking;’

‘I was introduced to and guided down a path of deep questioning, I was introduced to a coherent environmental philosophy;’

‘Developed very different relationships with myself, earth, and other people. Had fun while learning.’ (Williams, 1994, p.21)

However, in spite of these generally positive remarks, respondents were divided concerning the value of group dynamics experiences, structured vs unstructured learning, travelling, and community life. Students also indicated that the lack of “hard science”, academic structure, and educational philosophy were weaknesses in the program (this in spite of their low ratings of some disciplines in responses to Part 1 of the survey.) Williams, and an interrator both agreed that the general feeling toward the overall program was extremely positive. Both agree that while respondents did make comments concerning needed improvements they did so to add to the power of an already highly valued experience. As one respondent noted: “Don’t bother fixing what isn’t broken.”

Nevertheless, Williams states that students, despite their general strong support for the program, still are concerned about the role of conventional disciplines in its operation and organization. He closes his summary as follows: "...whatever you call the mixture or alchemy that happens within the program it seems to work. "(Williams, 1994, p.25).

I include Williams' work here only because it represents a long term evaluative study of a program in which Cohen both developed and applied many of the approaches he has now incorporated into Project NatureConnect. It indicates that although the AEI program was clearly alternative in structure the students still were concerned about the possible lack of attention to disciplinary knowledge in the course of the overall experience. Even so, the power which students assign to the AEI cannot be neglected either, although Williams' work relies on student perceptions of the educational merits of the program without attempting to determine whether the students had a commonly shared perspective of the meaning of the term.

It seems most likely that Cohen's generally negative view of schools as institutions and the somewhat controversial nature of his theoretical perspective will mean that his work will not be widely used in conventional school programs. It is more likely that his ideas will be employed in whole or part in outdoor schools and outdoor recreation programs, in counselling settings, or as part of natural history and nature interpretation in outdoor settings such as parks, nature preserves, and so on. Although its approach to developing awareness might be used in respect to cities and built environments, the heavy orientation toward non-built settings evident in the program materials will likely mean that it will not be used in this context either.

V. Summary

Michael Cohen's curricular work clearly takes a different approach from those of Hungerford et al and Stapp and his associates. With those program authors he shares a common perception that humanity's current environmental situation is grave and urgent. His approach, however, focuses not on the external landscape of the problem, but on the interior, intellectual or conceptual landscape which he contends is at the foundation of our current environmental problematique. Unlike Hungerford and his co-workers he not only considers bonding with nature to be essential to environmental understanding, but he considers it to be amenable to curricular attention. He offers a psychological, or biopsychological theory of perception and provides a set of methods to allow people to widen their perceptual horizons and reconnect to

nature. His theoretical perspective makes contact with ecopsychology, ethnobotany, and sociobiology as represented by the work of Abram (1997), Wilson, and others. In common with Bateson, Orr, Roszak, Wals and van der Leij, and Weston he believes that a radical curricular approach is necessary in order to address our understanding of the environment and the ways we choose to interact with it. Included in that perspective is the view of the institutions of schooling as contributors to our current environmental malaise.

Cohen's curricular theory is based on more than thirty years of life experience, much of it in the context of very alternative program structures outside regular schools. He has developed and strengthened his views in the context of that experience and it richly informs his life and curricular work. Unfortunately, the major deficit of his program lies in his own commitment to a theory and set of beliefs. The results are expressed in the failure of the program to present questions as such, instead turning ideas into declarations, propositions into truisms. While his orientation is toward democratic interactions with students, the power of his convictions permits little room in which to raise important questions having educational potential. They include questions regarding human nature and evolution, the relationship between the built and the non-built environments in terms of human health and well-being, the sources of environmental misconceptions, and the interaction between the genetic and learned elements of human behavior. There is great educational potential here. But it can only be realized if there is a radical change in instructional approach, one which entails not the making of converts but the nurture of informed concern, intelligent skepticism, and a lively dialogue among diverse perspectives about the human condition.

Chapter 8

Curricular Diversity and Common Concern: A Consideration of the Curricular Issues in Environmental Education as Revealed by the Inquiry

I. The Syntax of Environmental Education

The *Gage Canadian Dictionary* (de Wolf, Gregg, Harris, & Scargill, 1997) defines syntax as the arrangement of words to form sentences, clauses, or phrases; sentence structure (p.1485). In Chapter 1 I have made the claim that curricula in environmental education represent or reflect a common underlying syntax. In the dictionary sense of the word this would imply a sentence structure with subject, verb, object, and so on. In broader terms a sentence is really a short narrative, with a particular structure. In Chapter 3 I provided the context of the narrative and in Chapter 4 I developed its structure. I now return to consider the narrative or syntactical structure of common descriptions of EE as revealed by the three critiqued programs.

In chapter 4 I proposed that the general syntax of environmental education curriculum proposals was: Environmental education (should)....

Followed by a verb (foster, promote, aim to, etc.)....

Followed by a Noun (citizens, environmentally literate citizens, learners, etc.)....

Who are/can/will.....

Do Certain things or possess certain attributes: knowledgeable, skilled, motivated, take action...

Which will be achieved by (certain learning experiences, instructional strategies, support systems.

I left the matter of environmental issues or problems implicit in this sequence, taking it essentially as the reason for the whole sentence in the first place. However, as I think Chapters 5, 6, and 7 demonstrate, a more accurate way of stating the syntax would be as a sentence having the form:

There are ENVIRONMENTAL PROBLEMS which can be addressed by (PEOPLE, CITIZENS, STUDENTS...) who will need (CERTAIN CAPABILITIES, ATTRIBUTES, KNOWLEDGE...) which are to be gained by or through (CURRICULAR ARRANGEMENTS) in order to (ACT) to resolve/ solve/ avoid/mitigate THE PROBLEMS.

The three programs reviewed here, while differing in a number of significant ways, nevertheless share a common view that there are environmental problems and, furthermore, that they should and must be addressed or they will become more serious, even to the point of threatening the life sustaining capacities of the Earth's biogeosphere. None of the authors believes that the environmental problems arising from human activities can be ignored, or even that they are seriously overstated, as some critics of environmental education maintain. Thus, each program starts its curricular proposal from this common assumption. Many other environmental educators also begin their works with some form of problem statement. Consider for example the following from Chapter 1 of David Orr's influential 1992 *Ecological literacy*.

If today is a typical day on planet earth, humans will add fifteen million tons of carbon to the atmosphere, destroy 115 square miles of tropical rain forest, create seventy-two square miles of desert, eliminate between forty to one hundred species, erode seventy-one million tons of topsoil, add twenty-seven hundred tons of CFCs to the stratosphere, and increase their population by 263,000. Yesterday, today, and tomorrow. By year's end the total numbers will be staggering: an area of tropical rain forest the size of the state of Kansas lost; seven to ten billion tons of carbon added to the atmosphere; a total population increase of ninety million. Looking further into the future, three crises are looming. The first is a food crisis evident in two curves that intersect in the not too distant future: one showing worldwide soil losses of twenty-four billion tons, the other a rapidly rising world population. The second crisis on the horizon is that caused by the end of the era of cheap energy. We are in a race between the exhaustion of fossil fuels, global warming, and the transition to a new era based on efficiency and solar energy. The third crisis, perhaps best symbolized by the looming prospect of a global climate change, has to do with ecological thresholds and the limits of natural systems. We can no longer assume that nature will be either bountiful or stable or that the earth will remain hospitable to civilization as we know it. These three crises feed upon each other. They are interactive in ways that we cannot fully anticipate. Together they constitute the first planetary crisis, one that will either spur humans to a much higher state or cause our demise. **It is not too much to say that the decisions about how or whether life will be lived in the next century are being made now. We have a decade or two in which we must make unprecedented changes in the way we relate to each other and to nature.** (Orr, 1992, p.3, emphasis mine)

This is a strong statement intended to persuade the reader that there are environmental problems, that are caused by humankind's activities, which are serious and urgent. But they are not hopeless if we make the right decisions within the next two decades. Many readers will agree with Orr. There is a substantial body of scholarly opinion which agrees, even if scholars might dispute his exact figures or argue over how time sensitive the problems are. Many governments also appear to agree. There is some evidence that people in the general public in the U.S. subscribe to this view also (Canadian Council of Ministers of the Environment, 1993; Kempton, Boster, and Hartley, 1996). But there is also considerable evidence to suggest that there are those who dissent from this position, whether in academic circles (Ausubel, 1996; Simon, 1981), or among the general public (Sanera, 1996). A recent (1998) survey of nearly 350,000 US college and university students found that they were generally much less interested in social issues than their predecessors and that those who intended to become involved in environmental cleanup or restoration work fell from 34% of the sample in 1992 to 19% in 1997 (A long way from flower power, 1998). The most important objective identified was "to be very well off financially" (75%). Of course, this doesn't mean that the students wouldn't agree with Orr's statement, or even his analysis of the three crises, but they don't appear to be willing to make a personal investment in order to deal with the problems. They may think the problems are serious, but either there is nothing they can do about them, or that they will escape the consequences, perhaps by getting rich. Surveys, of course, can be misleading and much depends on the nature of the questions. With such a large sample the data were likely collected by questionnaire, or telephone polls which asked respondents a few short questions. But the survey was conducted by the **Higher Education Research Institute** at the University of California and sponsored by the **American Council on Education**, both reputable bodies. But why does any of this matter for consideration of the nature of the syntax of curriculum proposals in environmental education?

I think it may matter for several reasons. First, as Sauv  (1996) has suggested, viewing the environment as a problem is only one way of approaching environmental education. Unfortunately, placing the environment in the domain of problems and focusing environmental education only on that perspective to the essential exclusion of other views may have negative consequences. We may in fact do exactly as Sanera suggests and frighten students, especially younger ones so much that they are overwhelmed or simply move away from the source of their fears and avoid it thereafter. This does not constitute an argument for wistful thinking or creating curricula which focus solely on "nature as a cathedral" as Suav  puts it, but the curriculum theorist and developer should at least consider what is intended, not in any mechanistic, behavioral outcomes sense, but in broad terms. Do we want people to think of the environment as a bag of

problems and complexities, a source of potential disasters, a threat to health and life, as fragile and needing constant vigilant attention? Are these appropriate or even entirely accurate views? Might a focus on the environment as a problem lead to the view that humans are the problem and foster misanthropic ideas about humanity. Orr even states that the environment is not the problem, we are the problem. This might imply that the Earth would be better off without us. Which is another way of taking humanity out of nature. Thus, I suggest that environmental educators need to give much more consideration to how they frame their curricular purposes, to the rationale for their work, than they tend to do by uncritically accepting an issues and problem focus as the only or most important orientation for their programs.

Second, presenting the environment as a problem in environmental education curricula is often done in such a way as to assume agreement with both a diagnosis of the problem and possibly particular prescriptions on the part of students, their families, teachers, and communities at large. This can easily be seen as indoctrination, and in fact it may be just that. There is also a tendency to reason to “shoulds” and “oughts” from “is” premises (Schubert, 1986). Many scientists may decide, on the basis of the best available scientific evidence that human activities are having a “discernible” effect on the climate, as they have done (Somerville, 1996). But most scientists are very cautious about stating what should be done on the basis of this finding, if they are willing to make any such statements at all. They recognize that these decisions will be made on the basis of more than scientific information and will involve values, economics, politics, beliefs, power, and so on. David Orr’s list of things that are does not compile automatically into a prescription for what should or must be done. Even among scientists there are disagreements about what might be done to address the problems latent in their descriptions of environmental problems, and thoughtful environmental scientists like Somerville take care to note that the majority view does not constitute truth or correct and useful theory.

Educators aren’t required to present nice, safe, uncontroversial, well established ideas and information, but if they are educators, they are required to present controversies and opinions as matters for critical thought and inquiry. Sometimes even discussion of these matters will offend parents or community members who view it as a potential or actual challenge to their beliefs. Educators need to consider the consequences of choosing to make these topics part of a curriculum, but the more important issue is whether they can be addressed in schools in a manner compatible with general concepts of education if they are claimed to be part of the educational program of the school. Barrow (1981) takes a very broad view of curriculum as the content or what is taught in schools. One may differ with this definition but Barrow very clearly does not consider the curriculum to be equivalent to education and he uses the term education in

a more restricted sense (Barrow, 1984). If environmental educators make a claim to address educational purposes they must define what they mean by the word and then produce curricular proposals consistent with that definition or meaning. It appears that early debates about the definition of environmental education became mired in problems of deciding both what was meant by education and what was meant by environment. Those who were concerned about the urgency of environmental problems became concerned that Rome was burning while the fiddlers played (Schafer, 1979; Hungerford, Peyton, & Wilke, 1983) and urged moving on past definitional problems (Jickling, 1991). Unfortunately, these issues have been resurrected by those who claim that EE is only indoctrination to an ideology dressed up as education. It would be educationally appropriate for environmental education programs to treat claims concerning the status of environmental problems as invitations to critical thinking as opposed to occasions for affirmational chirping or weeping. All too often, in programs proposed by those who subscribe to or dissent from the majority view of humankind's environmental situation, this is not done. Advocacy is different from education (Stapp, 1970).

To summarize so far an examination of the first claim presents EE as problem focused. This perspective often assumes agreement about the nature, urgency, and scope of the problem (referring in general terms to the entire set of activities through which humans change the environment) as well as often implying agreement with a prescription, even if it is stated or implied in very general terms. I contend that the claim that human activities are damaging the environment in ways that require urgent attention and action deserves to be treated as a focus for critical inquiry rather than being presented as the environmentalist creed, at least if environmental educators claim to be educating students about human-environment interactions. Further, the examination of the three programs in Chapters 5, 6, and 7 suggests that they all fail to meet this test of educational merit. Note here however that I am not suggesting that many environmental problems are not grave and urgent, but only that students should be invited to consider this as a claim or proposition to be assessed in terms of the forms of knowledge it uses, the logic of its arguments, and so on. Then they will have an opportunity to develop both understanding and critical thought.

In the context of the first claim it is important to note that the inquiry of Chapters 5-7 appears at first sight to suggest that the programs are quite different in their approaches to epistemology. In fact, I maintain that the review reveals important similarities and that these also reflect the influence of the problem solving syntax outlined above. Both Hungerford and Stapp's overall approach to environmental education is grounded in a scientific epistemology, even when claiming to focus on matters normally viewed as outside the domain of science as a form

of knowledge. Much of Stapp's early work focuses on student monitoring of environmental changes wrought by human activities. The tools, procedures, and interpretations are grounded in biological, chemical and physical science-based means of understanding the environment. The students' environmental encounters are informed by scientific methodology. The later stages of the AR/CPS methodology appear to draw on the insights of other knowledge forms, but the way the whole process is presented and proposed to be managed is characterized by flow charts, sequence diagrams, feedback loops, and other mechanistic interpretations. While the authors disparage positivism and systems of classification and categorization, they make ready recourse to classification systems, taxonomies, and process analysis. These contradictions have become a focus for debate among environmental educators (McClaren, 1997; Roth, R.E., 1997; Wals & van der Leij, 1997a, 1997b). Hungerford's approach (although not referred to by his name) is criticized by the members of Stapp's group because its behaviorist terminology seems to place it firmly in the positivist, reductionist tradition (Stapp & Wals, 1994; Wals & van der Leij, 1997a). As shown in Chapter 5, Hungerford treats human behavior as a matter for scientific inquiry and explanation and even opinions and values are seen as amenable to quantification. In fact, a theme running through his approach is that quantitative research is superior to qualitative approaches. Thus, in his model of problem solving action plans arise after quantitative surveys of community opinions regarding environmental issues. Where the majority of members of a community are found to hold opinions and beliefs at odds with ecological knowledge, action is supposed to focus on changing these ideas by providing better information. The notion that actions might be driven by aesthetic considerations, or by beliefs and values whether or not they were shared by a majority, seems in conflict with Hungerford et al's image of rational behavior. People should work inside the system, as it is revealed quantitatively. Social science is science, and precise description and analysis of variables are its goals.

However, the approach to environmental education offered by Michael Cohen might seem to be quite distinct from those of Hungerford and Stapp. But deeper examination of his program reveals that it is simultaneously critical of scientific epistemology and an advocate for so-called new science or holistic science approaches. The mechanistic Earth of Newton and Kelvin is metaphysically flawed, but Lovelock's (1991) organic one is correct. Both are scientific views nevertheless. They are each grounded in scientific inquiry although their hypotheses are different. Lovelock himself has suggested that he didn't advance his Gaia Hypothesis so much because he saw it as literally correct, but because he wanted to invite researchers to frame their inquiries in a different set of assumptions. The value of the hypothesis for Lovelock is in offering a new direction for ecological inquiry, not a rejection of science *per se*. Cohen grounds his approach in scientific epistemology, although the theories he favors are different from those

of the mainstream of current scientific thought. He bases his model of perception and awareness on evolutionary theory, although he disputes the notion that competition is as important in the process of biological evolution as he believes Darwin thought it to be. He even claims that his activities are more objective and scientific than other approaches to developing environmental understanding. Moreover, like Stapp and Hungerford, he also has a "system" for addressing environmental problems, even though his analysis of their roots differs in some ways (although not as much as the different writing styles would suggest) from those of Stapp or Hungerford.

All three programs share a profound belief in the power of description and analysis: all are highly empirical in their approach. Direct experience is seen as the best basis for ideas and knowledge. Although the three programs process experiences in very different ways, they are all experience based and they all believe in the power of science as a means, if not even the best means of making sense of experience. None seems to assign great importance to religious, philosophical or aesthetic approaches to environmental understanding unless they are first grounded in scientific empiricism and merely elaborate or supplement it.

The point of these comments is that in the problem-based syntax of environmental education the form of knowledge which is regarded as having most power in problem-solving and understanding is science, although other forms are paid cursory attention. In the modern world-view science has great explanatory power. Hence, it seems sensible that environmental educators would turn to science as a focus for understanding human environment interactions and addressing environmental problems. But environmental education is not concerned as much with the environment, as with human interactions on and through it. A painter who paints a landscape is interacting with the environment. A poet inspired by a sunset or filled with apprehension by a polluted, spoiled landscape is also interacting with the environment. The artist's perceptions are richly qualitative and highly influenced by language, culture, and experience. Scientific knowledge may enrich and shape the process also, as may aesthetics, religion, philosophy, and literature. The point of focus for environmental education is not the landscape, or the poet, but the relationship between them and what it means to the nature of human experience. By treating human-environment relationships as problems to be solved (although some painters might consider the rendering of the landscape as a problem to be solved artistically but that would likely form a lesser part of the artistic experience) there is a tendency to emphasize science because it has had great power in solving problems (more appropriately answering questions) in the external world. But if education involves conceptual finesse (Barrow, 1984) that means more than a one dimensional way of looking at things and entails recognizing the limitations and differences among forms of knowledge.

In 1976 Harvey attempted to create a general definition of environmental education based on an extensive “key word” analysis of the EE literature to that date. The definition he offered was environmental education is:

...the process of developing an environmentally literate, competent, and dedicated citizenry which actively strives to resolve values conflicts in the man-environment relationship, in a manner which is ecologically and humanistically sound, in order to reach the superordinate goal of a homeostasis between quality of life and quality of the environment. (Harvey, 1976, p.189)

Although Harvey’s definition never achieved the wide acceptance he had hoped, it does differ from the more popular definitions in focusing on the resolution of value conflicts, a type of relationship between humans and the environment. It may be an attribute of curriculum goal statements and other documents which define curricular purposes that it is easier to focus on states than on processes, objects rather than interactions, sustainability, rather than developing the concept of sustainability.

To summarize my argument to this point, I contend that to address educational development through environmental education students must not be presented with claims, opinions and propositions as statements of absolute truth. Rather, students should be encouraged to examine how humans develop understanding and appreciation of the environment through various forms of knowledge, including science, rather than having human-environment relations presented as a form of science, or as best or solely understood scientifically. In terms of the claims I proposed to defend in Chapter 1 I believe I have supported the first, that there is a broadly similar syntax underlying curriculum proposals for environmental education, a syntax which treats human-environment relations as an issue or problem to be solved by particular means. I have also examined some of the constraints this syntax imposes on thought about curriculum in environmental education. Let me now examine the second claim that while environmental education curricula are broadly grounded in a common syntax they differ significantly in the ways in which they resolve questions concerning the nature of education in general, the educational relevance and potential of environmental education, and the functions of environmental education in schools with special reference to their views of the nature and purposes of environmental action projects. In the section which follows I will draw upon the detailed reviews of the three critiqued programs which are found respectively in Chapters 5, 6, and 7.

II. Diversity and Common Ground

In Chapter i proposed that while many EE programs are grounded in the common syntax or narrative structure, they differ in ways which are important to an appreciation of curricular issues in environmental education. Three widely known, published curriculum programs were chosen for critical review here as a means of exploring this claim. Because I have examined the three programs in detail in Chapters 5, 6, and 7, I will not give revisit their descriptions here. Table 8.1 summarizes the major characteristics in terms of several of the categories employed in the framework of my separate critiques. Let me now consider how the three programs resolve (or at least address) the key questions of this inquiry and identify some conceptual problems in environmental education curriculum. The key questions were as follows.

How do the programs view education in the context of environmental education; that is, do they advance a concept of education and its purposes?

How do the programs address the idea of environment; that is, do they offer a concept of environment and of humanity's place and role in it?

How do the programs address the concept of environmental action as a purpose for environmental education; that is, how does their concept of action connect with their views of education and schooling?

Do the programs have a concept of the purposes of schools or of the nature of schooling, and more particularly, how do they see environmental education within that concept?

A. How do the Three Programs Conceive Education as a Purpose of Environmental Education

First, as Table 8.1 summarises, and as Chapters 5, 6, and 7 describe in detail, the three programs have different concepts of education. I should be clear however that my inquiry found that none of the three offered a direct definition of education. Furthermore, while they hold different views of schooling, they don't distinguish education from schooling. One can only infer what the program authors mean in general by education through reviewing their ideas

	Epistemology Metaphysics	Environmental Situation	Curriculum Focus	Approach to Action	Approach to Schools	Student/ Teacher Roles	Fit With Schools
Hungerford	Human behavior can be understood scientifically; Behaviorist Positivist Empirical Science Knowl is Preferred ov. other frms.	Problems arise from egocentrism and lack of knowledge. Better management and applied science can remediate.	Behav.change through structured skill development and social sc.based issue investigation. Curriculum as technology	Issue investigation through structured process. Development of Action plans. Implementation Optional. Learning ABOUT Action.	Work within the system. School program should be team taught, multi or interdisciplinary.	Teacher directed moving toward the teacher as team leader in a research process.	Fairly good. Requires teaming and interdisciplinary/integrated approaches.
Stapp	Science knowl..of environment supported by other discipils: politics,economics, sociology.Problems arise from inequities, poverty, illiteracy. Focus on social justice. Democratic values.	Environment is biophysical, social, political, economic. Problems result from population pressures, resources use, but are grounded in social injustice.	Encounters with environmental problems and a process of action research-community problem solving. Social reconstruction and critical praxis.	Learning THROUGH and FROM action in a cycle of Action Research and Community Problem Solving. Networking, Social partnerships.	Eclectic Approach from Work within the system to a democratic, learner centered progressive approach with the school seen as a locus for community action and social critique.	Eclectic. Moves from teacher directed to egalitarian, teacher as facilitator, guide,mentor, etc. Learner self directed using learning plans. Cooperation replaces competition.	Ranges from good to poor. AR/CPS approach requires fundamental changes in structures and roles.
Cohen	Environ Problems result from cultural disconnection from nature. Language and symbolism must be deconstructed. Behavior and perception must be understood in terms of evolution. Focus on awareness	Serious env. problems: species loss, habitat destruction, population pressures, etc. Social problems ARE environmental problems--result from common source--disconnection from nature.	Personal awareness, expanded consciousness. Wellness. Person Centered	Personal change in awareness and consciousness is THE action project.	Schools are part of the environmental problem. Need fundamentally different approaches. Deschool--alternative ed., Focus on experience in the environment.	You must be your own teacher, others can facilitate. The ultimate teacher is NATURE	No real fit at all, unless in a highly alternative school program.

TABLE 8.1. Comparison Among the Programs of Hungerford, Stapp, and Cohen on Major Elements of the Descriptive Framework.

about how an environmentally educated person will behave differently, what capacities and skills they will possess, or what new knowledge they will have gained. Furthermore, they generally make no distinction between learning and education, skills and education, and training and education.

Of the three program authors Hungerford is possibly the most explicit about stating purposes for education. Its ultimate aim is changing human behavior. The purpose of schools is to make sure that behavior changes in desirable ways, ie. to educate (Hungerford & Volk, 1990). This position has generated a lot of critical comment from other environmental educators who decry it as positivistic, reductionist, behaviorist, and so on, and even go so far as to see Hungerford's world view as identical to that of those responsible for the environmental crisis (Wals & van Der Leij, 1997a, 1997b). I have shown in Chapter 5 that Hungerford and his coworkers are clearly of the view that human behavior, while complex, can nevertheless be understood scientifically, or psychologically at any rate. They also believe that once the determinants of behavior are understood, it should be possible to influence it in desired directions. But, as I have also noted, Hungerford and his co-workers sometimes have a rather strange way of defining behavior, in that the development of knowledge is referred to as a behavior change. This is quite different from, and even antithetical to the behaviorism of the mid 20th century which focused away from phenomenology or mental states to emphasize behaviors which were observable, measurable, and could be manipulated through various systems of response and reinforcement.

If education should shape human behavior toward desirable ends, what are they? For Hungerford and his associates the behaviors (using the term in his broad sense) associated with education are the ability to analyze problems, especially by use of quantitative approaches, the ability to plan based on analysis and description, the ability to conduct research in the sense of social science research. These attributes are to be supported by a foundation of scientific knowledge. These behaviors are identified with critical thinking, although sometimes critical thinking is listed as a separate behavior on its own. In a broad sense, Hungerford's ideal of the (environmentally) educated person is one who is concerned about the environment, committed to acting to address environmental problems, and able and willing to apply analytical approaches based in social science methods to understanding behavior and values (their own and those of others) in order to develop action plans to resolve environmental problems. The educated person knows how to analyze a problem, figure out its components, identify how people view the problem, and how their views differ. By using the information so-gained he or she will be able to develop a plan of action. The educated person is skilled in the techniques of problem description and

analysis, and action planning. Because the educated person will apply knowledge and skill within a community in which they are an active participant he/she will demonstrate citizenship (behaviors) by doing so. Hungerford's educated person is a group member, because groups are instruments for effective action. But the group is seen as a collection of powerful individuals who work together on a common project. In Hungerford's view of education, the educated person is an active member of the polity, a citizen. To be educated is to manifest these behaviors and the process of education is directed at their development.

For Stapp the ideal (environmentally) educated person is one who also knows how to analyze problems, again using scientific or social science methods, but with much less emphasis on quantitative survey devices as a means of assessing community opinion and foundational science knowledge. The educated person is first and foremost a "team player" or group member. He or she is committed to working cooperatively with others. Understanding and knowledge are seen as socially constructed, so it is necessary for a person to be part of a group in order to become truly educated. The educated person engages in critical thinking, but the meaning of the term here is not strictly analytical, as it seems to be in Hungerford's usage. Critical thought means the ability to develop a phenomenological critique of one's situation, to become fully aware of constraining or oppressing forces. To do this one must be reflective. Education is about empowerment, at both the personal and community level. The educated person, therefore, should be able to develop action plans, implement them, and then learn through and from the work as it progresses. Again, the group of which he or she is a part will make an important contribution to learning. Knowledge is also an attribute of the educated person, but it is to be gained in context, as need arises, not in the abstract. The educated person is one who has charge of his or her education: he or she decides, possibly in consultation with teachers and colleagues, what is to be learned, when, and how. He or she is self-directed.

Cohen has a very ambivalent view of education. In Cohen's view most conventional schooling is a form of miseducation. Schools are part of culture and culture is the main source of humankind's environmental problems. So the education offered in schools is dysfunctional of a sounder relationship between humans and nature. But it also seems that Cohen believes re-education or a form of genuine education is possible. While never offers a precise description of this concept of authentic education, it can be inferred from his writings. The educated person is one who has cast off the blinkers imposed by culture and learned how to use the full range of senses to construct a new understanding of his or her connection to nature. People who do this become aware of a wealth of new information which guides behavior and affects life style choices in profound ways. The task of becoming educated is one of personal transformation and

awakening. Part of the process involves deconstructing language and other symbolic abstractions which maintain and reinforce our cultural disconnection from nature, including our own human nature. The educational process can be nurtured in groups and communities, but it is essentially personal. Sharing perceptions and experiences can be important aides to deconstructing culture's blinkers. The process can be facilitated by a teacher or guide who helps students become fully aware of how language constrains consciousness. In terms of environmental action Cohen's focus is personal change. To change the damaging ways in which we are acting toward the planet we must change the way we perceive the world and think about it and ourselves in it. The most important environmental action project is the development of full personal awareness.

In summary, for Hungerford education entails the acquisition of knowledge and skill, with an emphasis on developing techniques coupled with an analytical system for understanding problems and developing plans to solve them. For Stapp education entails knowledge and skill directed at personal empowerment and social criticism. Education is personal liberation and the capacity to critique, transform, emancipate, and construct society. For Cohen education means the deconstruction of cultural patterns of thought and language in order to develop a much more complete awareness of oneself and one's place in nature. In the cases of Hungerford and Stapp education is a means to an end, it has instrumental value. The end is environmental problem solving and/or community development. Cohen's position views educational development, in his sense of the term, as a life long, intrinsically valuable process. In other words, one doesn't become educated as much to connect to nature as by connecting to nature. People who are so-educated, in Cohen's view, will have a clear and fundamental understanding of what needs to be done to address current environmental problems.

B. How do the Three Programs View the Environment

I have addressed this matter in chapters 5, 6, and 7 in the context of each of the curricula, so my comments here constitute a summary. For Hungerford the environment is the biogeosphere or ecosystem. To fully understand it one must have basic ecological concepts and be able to apply them in addressing problems. Environmental problems arise from ecological illiteracy, which results in misconceptions, inappropriate values, and false beliefs and subsequent destructive behaviors. However, Hungerford also attributes responsibility for environmental problems to human greed and egoism (Hungerford, 1997), neither of which can reasonably be seen solely as the consequences of ecological misconceptions or illiteracy. Humans are viewed actors within the environment. The environment is an object of research inquiry and a locus for action to address problems.

For Stapp the environment is biophysical, political, economic, and social. Environmental problems arise as a complex of human interactions in all four domains. Humans are different from other species by having language, culture and consciousness. This means that they have particular responsibilities to manage the environment well and practice effective stewardship. There is no meaningful separation between environmental and socioeconomic problems: they are simply different aspects of a common set of problems arising from outmoded modernist epistemologies, a view expressed most clearly in Stapp's recent collaborative work with Wals (Stapp, Wals, & Stankorb, 1996). The awakening of critical social conscience is an aspect of developing environmental understanding.

In Cohen's perspective of the environment humans coevolved with other life forms in the biosphere, they are fully part of the fabric of nature and cannot be separated from it. The apparent separation of humankind from nature is an artifact of modern culture reinforced by map- and symbol making activities, including language. While our language using attributes are natural, they have been warped by industrialism and objectivist science. Because language shapes thought we must deconstruct language to develop a true understanding of our place in nature. If we can open ourselves to nature we will be able to address most problems of modern society.

It is evident that these are quite different perspectives. They are reflected in the curriculum proposals generated by the three authors. For Hungerford the environment is a research project or a problem to be solved. For Stapp the environment is a problem to be addressed through community action, so it is also a community project. For Cohen we are the environment, but we don't appreciate that, so we must learn how to reconnect before we can heal ourselves and restore the planet.

There are some important metaphysical and epistemological difficulties here. A major issue concerns the definition of nature, or of what is natural, and what is human nature. These are issues that have concerned philosophers for centuries, and they return to haunt us here. Precisely because they are important philosophical problems environmental educators have a chance to engage students with philosophy as a form of knowledge and to invite them to appreciate the logical and other difficulties presented by different ideas and beliefs about humans in nature. I have mentioned previously the tendency to view the environment-modifying behaviors of other species as natural while viewing similar human activities as unnatural. If humans are natural, and inseparably part of nature, how can our activities be unnatural. Of course, there are also heavy value overtones in many descriptions of ecologically appropriate behavior. Cohen at least tries to address this question by treating environmentally and socially destructive behaviors

as evidence of a pathology arising as a result of our disconnection from nature through language and culture.

By viewing the term environment within environmental education as not worthy of serious consideration, or as uncontentious, curricularists have deprived themselves of a significant educational opportunity. Environmental education programs should invite students to consider consequences of different ways of viewing the environment, both in a historical sense within western culture, and from a multicultural perspective. Do students, for example, fully appreciate that their own bodies are constructed and renewed every day with materials taken from the environment. Do they appreciate what actually happens when we inhale oxygen and exhale carbon dioxide, or that the carbon compounds we eat in the various foods we consume are a form of stored solar energy. In a real sense, we are the environment. The **Private Universe Project** (Harvard Smithsonian Center for Astrophysics, 1995) asked recent graduates of the Massachusetts Institute of Technology to explain a simple set of physical phenomena. The grads were shown the seed of a large woody tree species and were also shown a large branch taken from a mature, fully grown tree of the same species. They were asked to explain how the tiny seed grew into the very large and massive adult plant. In other words, where did all the material that comprised the mature plant come from. A significant number of those polled displayed major areas of confusion and important misconceptions. In some cases, even when confronted with the (correct) idea that the great majority of the carbon-containing material in the wood of the tree came from the carbon dioxide in the air, fixed through photosynthesis, the grads denied this possibility. It is interesting to consider the implications of these environmental misconceptions among a highly educated group of students graduating from one of the finest universities, many from science and engineering programs. There would seem to be a wealth of educational opportunities in the environment side of the environmental education relationship.

C. How do the Three Programs Address Environmental Action as a Purpose of Environmental Education

I have also discussed this question in the context of the three separate programs so I will not enter into a detailed review here. All three programs reflect the problem-oriented syntax or narrative, although they develop their stories differently. In each action is seen as required to address environmental problems and it is incorporated into the curriculum proposals. In Hungerford's system before one should act it is necessary to develop a full understanding of the problem, analyze and describe it in precise terms, develop and refine plans to address it, and ultimately implement a solution. Stapp's approach also considers action as needed to address

problems, but the problem solving process is much more cybernetic or iterative in nature. His approach assumes that it is not possible to understand a problem fully until and unless one begins to act on it. One can study a problem before acting, and develop possible solutions, but once action is undertaken the proposed solutions often have to be changed because new information is gained in the course of the work (through action). After reflecting on the action experience plans can be modified and new approaches developed which can then be tried, and so on....the cycle may repeat many times, hopefully with closer and closer approximations to a desired solution. Because the environment has biophysical, social, economic, and political aspects action may also be directed at biophysical, social, economic, and/or political elements of a problem. In fact, as action work is undertaken people engage in a social critique which may reveal deeper, radical causes of environmental problems.

Cohen's approach to action is quite different from that of Hungerford or Stapp. In his view there are environmental problems and we need to address them, but the root causes of the problems arise from our consciousness of nature so we have to change that in order to fully appreciate what must be done to address environmental problems. For Cohen, social problems are just another form of environmental problem. We can take practical actions to address environmental problems in terms of our own lives and communities, but the important radical inquiry project is our own awareness. Unless we address the personal sources of our problems most of our solutions will only be band-aids.

I should note again that in Hungerford's model action plans do not have to actually be implemented. As a consequence, students may learn about action, but they will have no opportunity to learn through and from it. In Stapp's system the action project is the venue for environmental education, inseparable from it. EE occurs through action research and community problem solving. In Cohen's system the required action is personal transformation so it is meaningless to talk about it without attempting it. The time frame of the project is life long, but while transforming oneself it is possible to engage in other forms of action. The project of personal transformation doesn't have to be complete before one can act externally.

The educational potential of these three approaches to action can only be reached if the problem situation, assumptions about the need for action, and the possible varieties of action are themselves made foci of educational consideration. Included in this consideration should be the forms of knowledge that have, or might be used to frame the problem in the first place, and what forms of knowledge have, or might be applied to solve it. How different forms of knowledge might result in different perceptions of a problem, its nature, and possible solutions is also

a fruitful topic for educational attention. These questions have educational merit. All three models have the capacity to foster educational development through action projects, but whether or not this happens will require more careful thought about how to engage students in the sort of inquiry outlined above than so far appears in any of the materials.

D. How do the Programs Address the Concept of the Purposes of Schools, the Nature of Schooling, and the Place of Environmental Education within Schools

The three programs hold quite different views of the purposes and nature of schooling. Of the three, Stapp's position is the most eclectic, reflecting the diversity among his collaborators and co-workers. Hungerford sees schools as agents of society responsible for changing student behavior in desirable ways. He doesn't question the right of societies to do this, nor does he question how they decide which behaviors are desirable. Education and socialisation are essentially the same in his view. His curriculum materials offer the best fit with the structure of contemporary public schools. They are organized in modules, broken into sections, and can easily be used in the schedules of most schools. His concept of action projects is that students should work within the system, although he does contemplate consumerism, persuasion, and political actions as possibilities (at least in the context of action plans).

Stapp's view of schools is that they are agents of education. Neither he nor Hungerford make a clear distinction between educational purposes and schooling. Presumably everything which goes on in schools is or should be educational. Some of the Stapp program materials are also organized into handbooks and kits which are easily used in conventional school programs, especially those which involve students doing environmental monitoring work. But some of the most recent materials like **Environmental Education for empowerment** (Stapp, Wals, & Stankorb, 1996) are organized entirely around the AR-CPS approach and will be quite difficult for many teachers to use, especially those working on their own. In these materials schools are viewed not only as agents of education but also as levers for social reform and reconstruction. Schools should engage young people, teachers, and members of the community at large in the process of social criticism and action research. Because the materials link environmental education to social, political, and economic issues they see poverty, racism, illiteracy, the oppression of minorities and women as integral elements of the overall environmental problematique. They also advance the position that contemporary schools are socializing students to a fundamentally flawed society. The way to escape this inappropriate socialisation is to engage in a radical critique in order to understand how we are being mystified and oppressed so we can take action for liberation at both the personal and community levels. Furthermore, the Stapp materials which

take this perspective on schooling see the curriculum as emergent in the course of praxis, with written materials only providing a starting point from which teachers and students control and develop the program. They regard the idea of centrally developed, and distributed curriculum designed to be adopted and implemented by teachers while being evaluated by outside experts as antithetical to democracy and empowerment.

For Cohen schools are part of the overall problem of acculturation. They separate students from nature and they (mis)educate them to believe in that separation and narrow their range of perception and awareness. It is possible to have environmental education within a school, but only in one which is highly alternative in form, as was the Audubon Society Expedition Institute in which Cohen taught for more than 20 years. In such a school the curriculum is also emergent and arises not only from the transactions among students and teachers, but also from continually changing encounters with different environments, communities, and people. Experiences are the teachers, although human teachers can help students mediate experience. The role of teacher and student can be exchanged, as they can in Stapp's AR-CPS programs. But for Cohen conventional schooling is part of the overall problem in human-environment interactions. While elements of his program might be used by particular teachers in some school programs, he has made little or no effort to adapt his approach to the requirements of schools.

From its very early days environmental education has been described as interdisciplinary in nature. As a result it has often had difficulty fitting in to the subject- and discipline-based curriculum in schools. The structure is further enforced by the school schedule, making it very difficult for teachers in separate subject areas to collaborate around common topics or themes. Furthermore, especially in secondary schools, each subject curriculum is developed by different agencies, often with little or no appreciation of what is being done in other areas. Thus, the geography committee develops the geography course while the science committee develops the biology course. Although each course may have some environmental or ecological topics, they are often scheduled and arranged in ways which make it very difficult for students or teachers to connect the separate subject boxes. This problem afflicts both Hungerford and Stapp. Both programs are inherently multi or interdisciplinary, and this fact will not gain them easy acceptance in conventional schools.

Orr (1992) suggests that fundamental environmental education challenges the entire direction of the modern world. Inasmuch as schools are agencies of that world, and socialize students for it, they are headed in the opposite direction from genuine environmental education. He proposes that this issue should become a focus for environmental education in schools: the

framing question being how to operate the physical facility and the school program in ways which reflect ecological principles. The question could have educative power, as long as it is not framed as a proposition rather than a fact.

Social reconstructionists often view schools as agents of the societies they want to replace or reform. To the extent that environmental education has a social reconstruction orientation there will always be a tension between it and conventional schooling. There are two broadly different ways of viewing this problem: first, the conventional curriculum organized as it is around subject compartments and specializations may be seen as exemplifying a flawed epistemology. The traditional "forms of knowledge" view of education is an aspect of this. In turn it has shaped the curriculum. For radical critics what is required is a fundamentally revised curriculum based on new forms of knowledge, new epistemologies. Some post modernists hold this position (Weston, 1996a, and 1996b for example, exemplifies it for EE). However, the critics have yet to offer a clear and convincing alternative. What, exactly, would a fundamentally transformed curriculum for environmental education be like. Could it be activated in an institution anything like current schools, or must society be de-schooled if real environmental education is to be possible?

A different perspective is that the traditional forms of knowledge are valid and useful in understanding our environmental and social situation, but the curriculum must be reoriented to enable them to be brought to bear on contemporary problems and to facilitate students making distinctions among them. Truly interdisciplinary approaches don't create a forms of knowledge soup (or curricular stew); they present interesting questions and engage with them using different forms and seeing what each contributes to understanding, how they are differ, and what their limits are. David Orr (1992) exemplifies this point of view and even offers a comprehensive list of the books required on a reading list to nurture ecological literacy. As Barrow (1984) notes, the description and definition of different forms of knowledge, as proposed by Hirst and others doesn't require division of the school program into boxes representing each form, or for that matter, any other particular pattern of school organization. The modern secondary school timetable has been noted to closely reflect the work patterns and schedule of the industrial assembly line. It is quite likely that it was influenced by the same ideas about efficiency. This structure and schedule may be convenient, and it has certainly become conventional, but it isn't the only or necessarily the best way to nurture educational purposes. It may even have become dysfunctional if intrinsically interdisciplinary fields like environmental education are to find a place in school programs.

III. Closing the Critique

In the previous section, as in Chapters 5, 6, and 7 I have defended the claim that while the three programs forming the focus of this inquiry share a common syntax or narrative structure, they part company in other important ways. While each program addresses the issues which focus this inquiry, each also fails to address them. If environmental education is to be educational curriculum theorists in the field must develop concepts of education. To be useful those concepts must permit us to distinguish education from schooling, and from life experience or just living. Barrow proposes that education has to do with the development of mind in terms of the ability to understand different forms of knowledge, the capacity to make logical distinctions, and the ability to appreciate different forms of discourse in the context of a range of situations and to understand how different forms test or establish the truth of statements. His concept of education does not consider it to be merely a bag of facts or skills, or credentials. It is a manner of thinking which helps avoid misconception and error, matters quite different, as Barrow notes, from lacking information. In fact, in a world deluged by information, the sheer volume of content is probably a barrier to understanding (McClaren, 1990).

By failing to think clearly about what is meant, or should be meant by education environmental educators place themselves in a difficult position. It simply isn't helpful to declare that all education is environmental or to claim that environmental problems are so urgent that we haven't time to play "word games". I believe we do in fact have serious environmental problems. They result from some of the ways, but not all the ways, that humans interact with the environment. I am convinced that if we are to address them effectively we will need to think about them clearly, and this implies a commitment to education. From a curriculum standpoint environmental education is a means of bringing questions concerning how humans experience, understand, and act on the environment to the service of education. The topic is complex, rich, and interesting. It is relevant, and important. It calls out for engagement through forms of knowledge such as the natural sciences, mathematics, religion, philosophy, literature, or the arts. It inherently contacts interpersonal concerns as well. Such studies should be absorbing and challenging. By bringing educated habits of mind to bear on action projects in communities we have a chance to reinforce the value of those habits, and to show that they are not merely abstractions, or academic exercises, but ways of enriching life. It is also possible to demonstrate that education can have great practical value. It might be empowering, but the term is meaningless without a context.

A truly educational environmental education should, I contend, be a part of the core curriculum of schools. If it doesn't fit well with the way schools are now organized, this is a comment on the organization, not the validity of the topic of human-environment experience as a focus for education. If students view schools as making no serious contact with their lives and experiences, with the issues and problems which concern or interest them, then schools lose force. This isn't an argument that only the here-and-now and local should be included in a school curriculum, nor does it imply that environmental education should focus solely on local and immediate problems. But there should be an important place for these matters in the overall school program. I believe that environmental action projects approached in an educationally sound manner can make an important contribution to all the purposes of schools in a democracy.

I have tried to demonstrate here that there is still considerable curriculum theoretical work to be done in environmental education. For those who view theory as impractical or divorced from reality and daily life this will not seem of importance, or may be viewed as distracting from the serious work of saving the planet through environmental education. But there is nothing so practical as a well made theory. By failing to address curriculum theoretical questions seriously we risk putting environmental education at the service of those with particular ideological agendas, or giving power to irresponsible, anti-intellectual, and malicious critics. More important, the matter of humanity's place in the ecosystem is of great importance, and urgency. It deserves educated attention and thoughtful action. A renewed effort at developing an adequate curriculum theory in environmental education could make a contribution to these purposes. I hope that this thesis supports such an effort. In Chapter 4 I made a first approximation at developing a set of general criteria by which the adequacy of curriculum theory in environmental education might be judged. They were that a satisfactory curriculum theory should offer a clear position on the nature of education; should treat human-environment relationships as a subject for inquiry rather than a set of ideological propositions; and finally, should help educators think about the place of environmental education in the context of the larger purposes of schools. I believe that this inquiry reveals that to the extent that Hungerford, Stapp, and Cohen offer curriculum theories of environmental education, and I believe they do, they fail to adequately address the four criteria of this inquiry. This is not to condemn their works, but rather to point to directions for further effort and improvement as well as to a need for environmental education curricularists in general to think more clearly about the nature of the field in curriculum theoretical terms.

IV. Methodological Questions and Future Directions for Curriculum Inquiry

This thesis is a contribution to curriculum theory in the field of environmental education. It has employed written curriculum documents as its focus. The three curricula selected are published, widely circulated, and represent the theoretical positions of three well-known environmental educators. There are, however, important limitations to the development of a complete understanding of any curriculum are imposed by limiting attention to written curriculum proposals. In a sense, a written curriculum is a plan for action: for instruction, learning experiences, the deployment of resource and support materials, the sequencing of content, and the assessment and evaluation of results. When the plan is actually put in place by teachers with their classes, with real students in schools and communities, the intentions of the plan's authors are likely to be modified. Some curriculum theorists view the concept of curriculum as meaningful only in the context of the work of teachers and students. Curriculum is emergent from the transactions among the written or planned curriculum, teachers, students, and others involved in the course of instruction and learning, and relevant experiences, whether planned or not. How Hungerford, Stapp, and Cohen's materials are used by teachers and students will reveal a great deal more about the meaning of their designs than can any consideration of them as written works.

But within these limitations written curriculum documents are still important to curriculum theorising. They afford a publicly accessible basis for communication about curricular ideas. In fact, the current debates about guidelines and standards for environmental education, outlined in Chapter 4, are grounded in written curriculum proposals and other written descriptions of EE. Those who fear the rush to develop guidelines or standards represents an attempt to centralise and control environmental education and impose serious restrictions on the freedom of teachers, schools, and local communities to develop their own programs of environmental education are still responding to a particular genre of curriculum statements in the field.

In Chapter 2 I described the significant influence which has been exerted on curriculum theory by the concept of the curriculum as a set of questions or items on a check list of procedures, Tyler's curriculum questions and Rugg's curriculum categories. My own framework reflects the influence of this way of thinking about curriculum. In some senses it is very difficult to escape these categories because like the basic elements of any design, they must ultimately be addressed by the designer in order to create a practical plan, capable of being implemented. In the field of architecture a designer may have a theoretical orientation toward the relationships between constructed forms, spaces, and people. The theory may be influenced by the history,

philosophy, and aesthetics of architecture, but in the final analysis the architect, like the curriculum designer, wants to see his or her plans given form in the world. For this to happen the architect must give some thought to structure, materials, construction processes, technologies, and other requirements of implementation. This does not mean that the boundaries of design must be constrained by the limitations of current technology, materials, and procedure. A challenging design concept may in fact force people to look for new solutions and approaches, to invent new technologies and materials. To reject a curriculum design or theoretical concept on the grounds that it is not capable of being implemented in today's schools denies the possibility that it may be necessary to rethink current assumptions. In short, there is a necessary tension between proposal, possibility, and actuality. In examining the three programs reviewed here through application of the framework for inquiry developed in Chapter 2 this tension becomes more or less apparent in their designs. Cohen doesn't attempt to accommodate the realities of modern schooling. He believes that there are alternative ways of arranging education, and his own life experiences affirm that possibility. He believes that schools enforce a particular set of assumptions about human beings and nature which he finds unacceptable. But he doesn't reject the idea that people can be taught learn different assumptions. His curriculum is not a fully developed plan for an alternative environmental education. It might be better seen as a sketch, with some parts rendered in greater detail than others. In his case some of the elements of the framework for description really don't fit well. The entire field of ecopsychology which forms part of his theory of education is new and very much under development. Whether or not it can have, or should have any import for the educational or other functions of schools remains to be seen. Cohen is foremost among environmental educators in giving it consideration in his work.

Hungerford's proposals on the other hand seem designed to meet the current curriculum building code, so the framework for description works well when applied to his written materials. He addresses issues concerning the role of teachers, the role of students, sequence, required skills, and so on. His materials seem written with contemporary schools in mind. His designs can be fairly readily used by teachers with current knowledge, skills, and procedures. Stapp's materials most clearly embody the tension between a theory and current practices, although his total portfolio of curriculum designs is very eclectic, with some being relatively comfortable in current school programs and others highly challenging to them.

Of the three modes of sense making in curriculum inquiry described by Werner (1978) and Thomas (1985), my choice of framework elements clearly falls in the Critical Interpretive genre (Table 2.1). I have sought to explicate the writer's perspectives of humankind, knowledge, the environment and education. I have also tried to discover the social relationships (and human-

nature relationships) legitimatised and supported, as well as challenged, through the program structures. Where possible I have also tried to bring to the critique the writings of the authors which reveal the sources of their perspectives, their consequences for some of the design decisions which appear to have been made, and to explicate some alternatives which might have been considered. In these tasks I believe my critique has succeeded, although it might have been strengthened in the latter category of critical tasks.

The focal questions have, I believe, extended the description and analyses offered through application of the framework and have helped reveal the meaning of these curricula for environmental education. They have been useful as a tool for thinking about the nature of environmental education, about what such a term really implies, or should imply. They also present some possible directions for further curriculum theoretical work as well as some challenges to curriculum designers.

If, as I and others have suggested (Courtenay Hall, 1996; Jickling, 1991) environmental education has been driven by a problem-solving focus or narrative structure with consequent failure to make the nature of human-environment interactions a subject for educational inquiry, what can be done to develop a different sort of prescriptive and descriptive theory of environmental education, one which can accommodate a broad spectrum of interactions and perceptions. Suavé's (1996) typology of environmental perspectives found in EE programs suggests that while not all EE curricula fall within the problem solving or community project orientations, few, if any, provide a full spectrum of perspectives, or more important, make the issue of differing perspectives as such a focus for inquiry. The problem-solving syntax has seriously narrowed thinking about how different forms of knowledge might contribute to environmental education, with a resulting overemphasis on science. Even today, critics of environmental education still view science (including economics in their definition of the sciences) as the only truly legitimate form of environmental knowledge and the only valid foundation for policy or action. Curriculum theorists have a considerable way to go to widen these views. If it accomplished nothing else I believe that this inquiry reveals that questions about the nature, definition, and purposes of environmental education are far from resolved or unproblematic. Furthermore, they are not matters of academic speculation and debate divorced from practical significance. Quite the opposite, the only effective way to address current criticisms of environmental education is not to react by defining a detailed list of curriculum standards which harden the current syntax and constrain creative theoretical work, but instead to develop curriculum theories which can help all those who are concerned about environmental education think clearly about its central requirements while enabling a diversity of approaches to meeting them.

V. Afterword.

What might this thesis mean to some of the different groups who are stakeholders in environmental education. As an experienced environmental educator who has worked as a teacher, school district curriculum developer, and member of a number of national-level curriculum projects I believe its findings have significance as follows.

For curriculum developers and professional environmental educators the thesis suggests that while EE has been defined as interdisciplinary in nature since its inception it has been professionalized, becoming a specialty in its own right. As such the field of EE has lost touch with many of the disciplines, forms of knowledge and alternative perceptions of human-environment interactions that have much to contribute to its development and which might serve to broaden its perspective beyond the environmental problem focus. Moreover, there must be a commitment to reexamining the nature of education within environmental education as well as its role in the total public educational endeavor as difficult and annoying as that may be for some practitioners who feel that this question has been fully resolved. I believe this thesis provides ample grounds for rejecting that point of view.

Pre-service teacher education also has to be strengthened to enable new teachers to engage with topics in human-environment interactions in ways that foster understanding and the development of critical and creative thinking about the domain of human-environment interactions rather than the simple transfer of information, skill development, indoctrination or advocacy to certain views.

For school boards and trustees the thesis implies that as major employers in many communities and a major force in the lives of young people schools provide potentially powerful examples of effective, ecological sound ways of relating to the environment. School district environmental practices in their entirety, including recycling, energy use, school ground landscaping and building design and operation, down to the level of cafeteria food services can be made a venue for critical inquiry concerning human-environment interactions. As David Orr (1992) has noted in detail, many schools and colleges do not practice what they preach when it comes to their own environmental management policies. This is not to suggest that students should be confronted with a set of practices which are uncritically taken to be environmentally appropriate but rather that the operations of the institutions within which they and their teachers work should be made subjects of investigation, research, policy development and action within a larger framework of educational development.

The role of school trustees is to create the policy frameworks which support and enable environmental education as a powerful element of an overall program of education and an asset to the achievement of the other major functions of schools.

For school district administrators the touch stone for environmental education should not be to seek programs which avoid all mention of controversial views on environmental issues, but rather to employ and develop programs which engage students and teachers in discussion and inquiry into the nature of environment-human interactions in the widest sense. Too often it would seem that calls for balance or fairness in environmental education are actual proposals to remove any hint of controversy from school programs and to make certain that students never engage directly with important issues in their communities. The challenge for administrators is to make certain that controversial and contentious questions become the means of sharpening students' habits of critical thought and their ability to assess the logic and adequacy of claims rather than being presented in ways which indoctrinate students to particular points of view or courses of action. This means that teachers will need in-service education to reinforce their abilities to develop students' capacities for critical thinking and constructive actions.

For school administrators this thesis suggests that there should be attention to developing school wide approaches to the theme of human-environment interactions in ways which make contact with all elements of the curriculum and foster all the purposes of schooling, including socialization, physical, emotional and moral development and education. This should move school-based environmental education beyond single issue, one-shot, once-a-year field trip approaches or the expectation that environment is adequately covered in science classes. Effective environmental education in schools requires a reconsideration of the traditional school time table and time allocation to accommodate more extended field investigations, student community action projects and inter- or multidisciplinary teaching arrangements.

For teachers this thesis implies that the topic of human-environment interactions can be a means of bringing life and relevance to any curriculum field or subject area. Teachers will need to emphasize developing student abilities to appreciate how different forms of knowledge contribute to an understanding of human-environment interactions. Teachers will also need to help students develop appropriate and constructive plans for personal and community environmental actions while making sure that the planning and process enables the expression of a variety of responsible, reasoned, and well researched action projects rather than the recruitment of entire classes of students to favorite causes. For this to happen teachers must become knowledgeable and develop skill in facilitative leadership in engaging learners in critical inquiry,

and community based investigations and action projects. The three major programs examined in this thesis provide some useful starting points for classroom based environmental education but they also illustrate the need for teachers to modify and adapt programs to fit particular contexts and students and to ensure their educational validity. Teachers need to think critically about their own practices in order to guarantee that environmental education is not an oxymoron.

For students the thesis suggests there is a need for greater opportunities to broaden their appreciation of the ways humans interact with the environment and add to their ability to sense the environment as a source of inspiration, esthetically rich, a “place” to which they are intellectually and emotionally bonded, examine things ethically and morally, as well as recognize them as an essential basis for human well-being and economic prosperity. Students should have opportunities to learn from active engagement with their communities (rather than solely from abstract and virtual sources) in ways that foster the construction of meaning from experience and foster intellectual independence. This will entail developing the ability to examine diverse information and value positions and to formulate well reasoned, rational positions on questions concerning human-environment relationships.

Finally, for communities effective and valid environmental education should engage learners in their communities through active learning programs that include student environmental action components. This program will provide the stimulus for young people to bond to their communities in terms of sense of place and ownership within the community. By actively participating in the education of learners in schools community elements of many different persuasions, whether corporate, organizational or individual, will have an opportunity to ensure that students experience the wide range of views and diverse value positions concerning environmental questions. In this way the members of the community at large can act as a check and balance system against the indoctrination of learners to particular viewpoints. However, this is not to suggest that school environmental education programs should solely be used as forums for debate over environmental problems. As suggested above, environmental education has a much greater scope than environmental issues and problems. Hence, members of the community should be invited into schools to share their love of the outdoors, their appreciation for the esthetics of nature, their joy in recreation, their desire to create enhanced urban spaces, and their concern for environmental ethics. Ultimately, effective environmental citizenship entails more than activism on issues, as important or necessary as this may be. Active concern for the environment should be grounded on a wide base of interest and appreciation in the environment, not as a problem but as the ground on which our future well being as a species rests.

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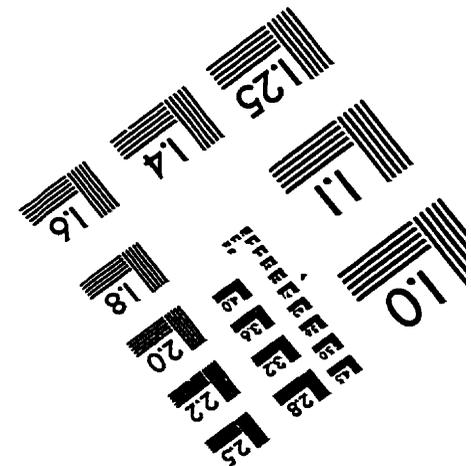
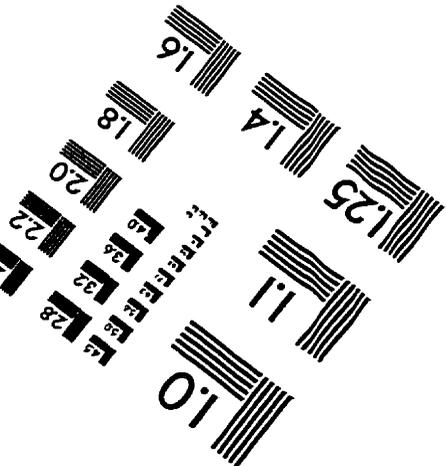
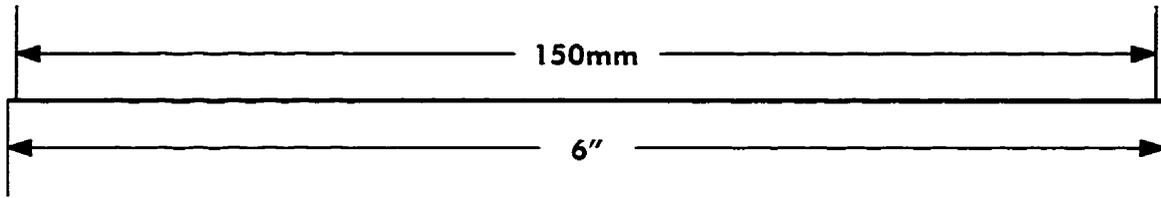
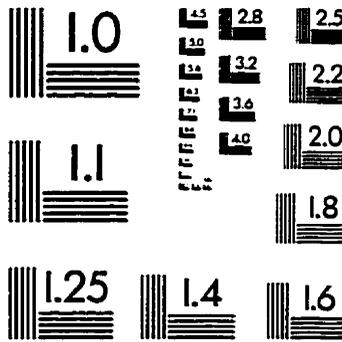
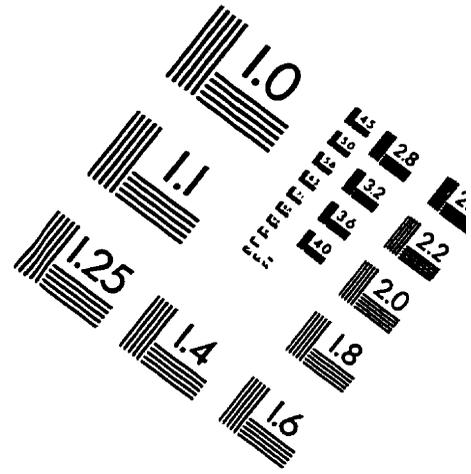
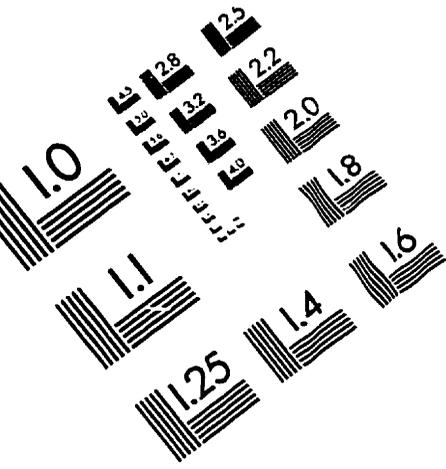
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IMAGE EVALUATION TEST TARGET (QA-3)



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