A CRITICAL ANALYSIS OF SELECTED ASPECTS OF ENVIRONMENTAL EDUCATION

by

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A Critical Analysis of Selected Aspects of Environmental Education

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ABSTRACT

This thesis attempts to examine critically some of the underlying assumptions and central dilemmas in the field of environmental education.

Chapter I presents a representative picture of the field of environmental education. It outlines the major concerns of its advocates and practitioners, their selection criteria, major goals/objectives and methods.

Chapter II deals with problems of epistemology. Specifically, how do we determine and assess the arguments of proof, the goals and the various methods within environmental education. The goals and methods of the field are then critically examined in light of selected assumptions implicit in the literature.

Chapter III explores implications of the distinction between concern and competency. An attempt is made to go beyond an assessment of the seriousness of problems to an appraisal of the prospect of mounting an adequate response. Goals and methods are re-examined in light of the preceding appraisal.

Chapter IV examines the action-oriented stance toward problems and injustices evident in the environmental education literature. Two opposing perspectives are presented on the issue of control. The implications of each are then considered.

This thesis concludes that many calls for action to exercise control over present and future environmental/social problems are based on a severe lack of consideration of the multiple levels of complexities involved in such a monumental and all inclusive enterprise. It questions our ability to formulate appropriate goals and implement effective plans at a societal/ecosystematic level given the arbitrariness of experience, human subjectivity, the enormous latitude of private theories and the infinite epistemologies for one reality.

DEDICATION

This thesis is dedicated to my parents, Irene and Clarke Kennedy. It is also dedicated to my dear eccentric uncle, Donald Hoggarth who died shortly before this thesis was completed but who continues to offer his support to me.

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INTRODUCTION

Environmental education is a relatively new area of interest in education. Its historical roots begin at the turn of the twentieth century and include wilderness protection, resource management, nature education, conservation education, the camping movement, parks interpretation programs, outdoor education and most recently the environmental quality movement which began in the 1960's. Prompted by increasing concern about environmental quality, environmental education was initiated as an educational endeavour to deal directly with human-environment relationships. The term environmental education was first used in 1968 by Clay Schoenfeld in the Educational Record. In 1969 a group of educators at the University of Michigan delineated the concepts and purposes of environmental education (Hart, 1979). In the following years a flurry of activity was initiated in the name of environmental quality and environmental education: research, publications, public hearings, legislation, creation of government offices, allocation of funds for related projects, national and international conferences, media coverage, pre- and inservice teacher education and curriculum development. By the late 1970's environmental education had become "a large and widely scattered enterprise" (Hart, 1979, p. 1). Hart (1979) designed a study "to identify the characteristics of environmental education and to develop a meaningful organizational

framework for examination of their possible interrelationships" (p. iii). His extensive literature search revealed twenty-five major elements characterizing environmental education. He then organized these in a curricular framework to facilitate systematic examination of the program components.

Much emphasis has been placed on the "internal organization" and refinement of environmental education regarding the clarification of its concepts and purposes; seldom is sustained consideration given to an assessment of the field and its enterprises as an appropriate endeavour.

Wilden (1980) argues the importance of evaluating the products of the academic discourse and developing a "self-critical" viewpoint. de Castell (1982) explains that developing critical consciousness "involves questioning the taken for granted assumptions within one's lived environment" (p. 17).

Thus this thesis attempts to examine critically some of the underlying assumptions and central dilemmas in the field of environmental education.

Chapter I presents a representative picture of the field of environmental education. It attempts to outline the major concerns of its advocates and practitioners, the type of evidence they put forth to validate their claims, the major goals/objectives of the field and the methods suggested to achieve those goals/objectives. The remaining chapters examine some of the central dilemmas left

unresolved concerning the field of environmental education as summarized in Chapter I.

Chapter II deals with problems of epistemology. Specifically, how do we determine and assess the arguments of proof, the goals and the various methods for environmental education? The ensuing discussion suggests the importance of distinguishing the existence, truth and significance of an idea or ideas. A comparison of two authors' views on a particular issue is presented for illustrative purposes. The goals and methods of environmental education are then examined critically in light of selected assumptions implicit in the literature.

Chapter III explores some implications of the distinction between concern and competency. An attempt is made to go beyond an assessment of the seriousness of environmental/social problems to an appraisal of the prospect of mounting a response adequate to those problems. The views presented should cause the reader to seriously ponder the severe problems to be faced in attempting the planned control of complex systems be they human, social or ecosystems. Several of the goals and methods of environmental education are re-examined in light of the preceding views.

Chapter IV examines the action-oriented stance toward problems and injustices evident in the environmental education literature. Two opposing perspectives are presented on the issue of control. The implications of each perspective for the environmental educator is

then addressed.

This thesis concludes that 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. There is a dearth of detailed understanding of the multiple levels of complexities endemic to such intricately interrelated phenomena as pollution, poverty, population growth, and human action. We do not assign sufficient concern to our vast areas of ignorance or to the implications of that ignorance. Possibly it is a disservice to persons and to serious thought about these problems to urge action that well may be unattainable and futile.

CHAPTER I

ESTABLISHING THE FIELD OF ENVIRONMENTAL EDUCATION

The purpose of this chapter is to develop a representative picture of the field of environmental education by examining selected writings recognized as influential in the field. It presents the substantive views of that literature in response to the four questions which I pose. The materials chosen for consideration were government legislation and charters or declarations from international conferences as well as their supporting documents and publications. Spokespeople were defined as individuals who have contributed to national or international conferences on environmental education, have published goal and objective statements in national or international referred journals and whose writings related to environmental education have been cited by others. From an initial list of ten names the three individuals most often cited according to the Social Science Citation Index (1970 - 1980 inclusive) were selected as spokespeople. The intent, then, is to present a representative picture of the field of Environmental Education with respect to problem identification, selection criteria, goals/ objectives and methods. On the basis of my study I have decided to structure this chapter as a mock question and answer situation. In some instances I shall summarize the authors' position but when possible I let them

speak directly for themselves.[1]

Question: What are the types of problems that concern environmental educators?

William Stapp[2]: The increase in world population, the mismanagement and unequal distribution of resources and the growth of urbanization in the United States over the past fifty years.

> The independent rural-oriented living that once characterized this country's social and political heritage is no longer a dominating influence in the lives of most Americans....As man became progressively urbanized, his intimate association and interaction with natural resources diminished and, with it, his awareness of his dependency ... upon the proper

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[1]I concur with the following observation:
Throughout this thesis I have used quotations which employ third person pronouns and collective nouns in the masculine gender. It is unfortunate that there is no way of modifying these quotations to include the feminine gender without creating confusion or impeding the flow of language. This problem illustrates the success of the dominant male code in subverting women's being. I ask the reader, when encountering these quotations, to be aware of this most serious and debilitating contradiction. (Hammer, 1981, p. 1)

[2]William Stapp has had several years of experience in serving as a conservation and environmental consultant with several states and individual school systems. He is interested in the design and implementation of environmental curriculum for primary and secondary schools. His other experiences most often acknowledged in the literature include Professor of Resource Planning and Conservation at the University of Michigan School of Natural Resources, Director of its Environmental Education program, Director of Environmental Education for UNESCO in Paris, France (1975), and Chairperson of the Governor's Environmental Education task force during the development of Michigan's Master plan.

> management and use of these resources. (Stapp, 1969, p. 30)
>
> Urban areas are plagued with complex biological-physical-social problems, such as the lack of comprehensive environmental planning, inadequate housing, community blight, air and water pollution, traffic congestion, and the lack of institutional arrangements needed to cope effectively with problems. (Stapp, 1974a, p. 48)
>
> We are vitally concerned with the social implication of environmental decisions, particularly those involving equitable distribution of socio-economic costs and benefits (Stapp, 1974a, p. 47)

James Swan:[3]

> Broadly defined, a problem is perceived as a discrepancy between reality and our expectations of what could be (Swan, 1974a, p. 19)
>
> A problem is something that blocks or hinders man's wishes. Environmental problems, then are those conditions in the biophysical environment which hinder the satisfaction of man's needs for health and happiness. (Swan, 1974a, p. 18)
>
> Neither conservation nor outdoor education as they are now practiced have the necessary orientation to meet the urgent needs of today's society....Traditionally conservation education has concerned itself with 'basic' resources such as forestry, games and soils. While there is still a great need to conserve these

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[3]James Swan has been a conservation consultant for the Ann Arbor Public Schools, Lecturer in the Department of Resources Planning and Conservation at the University of Michigan, editor of the journal Environment and Behaviour and Assistant Professor of Community Service and Public Affairs at the University of Oregon. His doctoral research examined perceptions and attitudes regarding water and air pollution. One of his interests lies in the application of psychology to environmental problems. In 1975 he taught courses on self-awareness through environmental experiences and had a small practice in body awareness work.

> resources, the most pressing problems which directly affect the overwhelming majority of Americans are problems of the manmade environment: air and water pollution, urban blight, traffic congestion, indiscriminate use of pesticides and the like (Swan, 1969, p. 27)

Robert Roth:[4]

> There are several that come to mind immediately.
>
> 1. Only about one-fourth of the world is in land area. Therefore. we have only ten acres per person on the world scale. But four acres are too cold, three are too dry, two are too steep. That leaves only one acre per person as cropland for food production. Thus we have 2,400 million people in the world who are undernourished, and only 450 million who are well fed.
> 2. We make heavy demands on the world supply of natural resources. One white anglo-saxon protestant American child, or Catholic (or any other denomination) uses enough natural resources during his life span of seventy years to support 23 to 25 children in India. Is one American child worth twenty-five Indian children?
> 3. Another 'problem' is that of the biophysical condition of our environment. We individually produce about four to five pounds of waste materials every day. These solid wastes must be disposed of somewhere. But where and at what costs?
> 4. Our air and water ways are becoming so fouled that as much as five years are being removed from the life expectancy of the residents of our metropolitan centers....
> 5. Finally we can look at the destructively analytical process of science and the ways our politico-economic institutions operate and see the destructive influence on the finite world on which we all must live... (Roth, 1971, p. 22)

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[4]Robert Roth has been Associate Professor of Environmental Education, School of Natural Resources at Ohio State University and consulting editor of the Journal of Environmental Education. He was a member of the National Advisory Committee which assisted with the planning of the National Conference on Environmental Education in Wisconsin 1970.

The Environmental Education Act:[5]

> Growing problems of pollution, overpopulation and mismanagement of natural resources that are seriously affecting the quality of life... (Department of Health, Education and Welfare, 1972, p. 31)

The Belgrade Charter:[6]

> Our generation has witnessed unprecedented economic growth and technological progress which, while bringing benefits to many people, have also caused severe social and environmental consequences. Inequality between the poor and the rich among nations and within nations is growing and there is evidence of increasing deterioration of the physical environment in some forms of a

---

[5]The Environmental Education Act was enacted by the 91st Congress of the United States in October 1970 with the proclaimed intent to help meet the need for a well-informed public capable of understanding and appreciating important environmental issues as a basis for public support of a meaningful national environmental policy (Grimes, 1973). "Speakers" for the act include Howard Baker Jr., Senior Senator from Tennessee, chairperson of the secretary of State Advisory Committee on the UN Conference on the Human Environment and delegate to the conference; R. E. Train, R. Cahn and G. MacDonald, members of the Council on Environmental Quality; Walter Steide, Legislative Planning Officer in the Bureau of Elementary and Secondary Education for U. S. Office of Education; and excerpts from the U. S. Office of Education's Environmental Education Handbook by Walter Bogan Jr. which describes programs under Public Law 910516, the Environmental Education Act.

[6]A general plan for developing a cooperative international programme in Environmental Education occurred in five stages: preparation of documents for an international workshop; an International EE Workshop at Belgrade, Yugoslavia in October 1975; initiation and evaluation of environmental education within formal education and out-of-school programmes; regional seminars; and a world-wide Intergovernmental Conference in Tbilisi, USSR in October 1977. The Belgrade Charter was adopted at the 1975 Workshop and The Tbilisi Declaration at the 1977 conference. Margaret Gillett (referred to in the dialogue) was a professor of education and delegate to the latter conference.

> world-wide scale. This condition, although primarily caused by a relatively small number of nations, affects all of humanity. (Unesco-Unep, 1976, p. 1)

Question: What criteria or body of evidence do you use to select these problem areas?

William Stapp: Government documents, personal publications, selected articles and books in conservation and education, discussions with colleagues and graduate students, graduate research and my experiences as a conservation and environmental education consultant.

James Swan: Articles and books from social science, natural science and education, the Gallup Reporter, government documents, personal research on pollution, ... "good toxicological data" and discussions with colleagues.

> It has been known for centuries ... that air pollution is harmful to health. Now we know just how harmful it is because of increasing new data from scientific research, sophisticated instrumentation and scientists' understanding of how ecosystems function. (Swan, 1974a, p. 20)

Moreover, environmental quality is not an "ephemeral issue".

> The shelves of bookstores are stocked with numerous accounts of ecocatastrophes, analyses of the origins of the environmental crisis, proposals for cleaning up the environment, suggestions for living more ecologically, instructions for building compost piles and guides for

> living off the land. Outside of the bookstores new government agencies are enforcing stronger laws against polluters, for example, Consolidated Edison in New York has been fined 1.6 million dollars for a fish kill caused by one of its power plants; bicycles are nearly outselling automobiles; DDT has virtually been banned in the United States; the national birth rate has dropped to nearly the level necessary to achieve stabilization and the United Nations has held the first world conference on environmental problems. (Swan, 1974a, p. 15)

Robert Roth: Generally, my bibliographies consist of articles from education and my graduate research.

The Environmental Education Act: [President Nixon] outlined these problems ... "in two State of the Union addresses and two special messages on the State of the Environment ... [making] ... what he called a national commitment to environmental enhancement and improvement" (Marland, 1971, p. 6). These problems were also presented in the president's message to Congress regarding the first annual report on his Council on Environmental Quality in August 1970 and discussed in their second report, The President's 1971 Environmental Program (Train, Cahn, & MacDonald, 1971). These problems have been identified in the testimony of witnesses at public hearings, for example, the U. S. Congress Senate Joint House-Senate colloquium to discuss a national policy for the environment hearings, Committee on Interior and Insular Affairs and Committee on Science and Astronautics, 90th Congress, 2nd session, July 17, 1968 (Baker, 1973,

p. 6) and "... in the summer of 1970 there was nearly unparalleled migration of educators and environmentalists to Washington's Capital Hill to testify at Congressional Hearings on the proposed Environmental Education Act on behalf of the proposed legislation" (Marland, 1971, p. 8). They have also been presented in briefs to the President, for example, the Citizens Advisory Committee on Environmental Quality's Report to the President and to the President's Council on Environmental Quality, August 1969 (Baker, 1973), and also in research reports from governmental agencies.

The Belgrade Charter: There are no criteria stated directly in the writings of the conference. The sixteen trend papers of the Belgrade conference (Unesco, 1977) focus more on the development and implementation of environmental education programs rather than delineation of the problems. However, this UN International workshop was a direct result of recommendation #96 of the UN Conference on the Human Environment. The declaration adopted at that conference acknowledged the existence of the above mentioned problems (United Nations, 1973, pp. 3-4). Input into the conference on the Human Environment included reports by member state governmental and private task groups prepared prior to the conference and participant committees working during the conference. The former included information summarized from national/regional conferences, governmental agencies and departments, public

hearings, individual written briefs and research papers.[7]

Question: What are the goals of environmental education?

William Stapp:

> 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 solution.
> The major objectives of environmental education are to help individuals acquire:
> 1. A clear understanding that man is an inseparable part of a system, consisting of man, culture, and the biophysical environment, and that man has the ability to alter the interrelationships of this system.
> 2. A broad understanding of the biophysical environment, both natural and man-made, and its role in contemporary society.
> 3. A fundamental understanding of the biophysical environmental problems confronting man, how these problems can be solved, and the responsibility of citizens and government to work toward their solution.
> 4. Attitudes of concern for the quality of the biophysical environment that will motivate citizens to participate in biophysical environment problem-solving.... The word 'attitude' ... implies a combination of factual knowledge and motivating emotional concern, which result in a tendency to act (Stapp et al., 1969, p. 31)
>
> It is committed to the enrichment of the lives of people from all socioeconomic classes. (Stapp, 1974a, p. 47)
>
> The ultimate goal of environmental education is the development and maintenance of a high-quality system in

[7] For examples of these documents see (United States, 1971; Maini, J. S., 1971; Environment Canada, 1972; Inger, Bormann and Blair, 1972; Baker, H. J., 1972; United Nations, 1973.

> which man interacts through culture on the biophysical environment to advance human welfare. (Stapp et al., 1969, p. 31)

James Swan:

> The long range goal of environmental education ... should be to develop a citizenry which is knowledgeable about the biophysical environment and its associated problems, is aware of how to become effectively involved in working toward the development of a more livable future, and is motivated to do so (from Stapp et al., 1970). Implicit in this goal is the assumption that there is a direct relationship between the character of the biophysical environment and the quality of man's life, which of course is the basic principle of the science of ecology. (Swan, 1974b, p. 25)
>
> Some interpret the environmental movement as a frantic grasp for survival. I disagree. It is true that without an environmental movement our chances for achieving a more livable future are slim. Yet, on the other hand, the social consensus for the need for environmental quality improvement may be the basis for achieving a society that can truly be at peace with itself and the environment. Ultimately, that is the goal of environmental education. (Swan, 1974a, p. 24)
>
> The environmental movement is and should be a positive movement seeking to bring man into harmony with himself, his fellow men, and his environment. (Swan, 1974b, p. 40)

Robert Roth:

> A major goal is to encourage the individual to develop the ability to make thoughtful decisions which will create an environment that allows him to live a quality life ... which can be interpreted as the individual's conception of the 'good life'. (Roth, 1973, p. 38)
>
> 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 (modified after Stapp, and others).

'Optimum environment' - Potter (4) '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 responses within his rapidly increasing and eventually declining capabilities (Roth, 1969, p. 65)

The Environmental Education Act:

> To eliminate air and water pollution, noise, and the blight on the land caused by solid waste disposal, strip mining, and other abuses. (Baker, 1973, p. 4)

> One of the chief goals of environmental education is to help us learn how to proceed as a society toward a condition of 'productive harmony' with our environment, where destructive change is minimized and healthy change can proceed. (Bogan, 1973, p. 3)

The Belgrade Charter:

> 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. (Unesco-Unep, 1976, p. 2)

Question: What are the methods you advocate to reach those goals?

William Stapp:

> The quest for environmental quality needs to be deeply rooted in the American education system and integrated into the consciousness of everyone. (Stapp, 1974, p. 48)
>
> If an important root cause of our environmental crisis is people's life styles, then schools should become a forum for youth to develop and clarify the beliefs, attitudes and values that are compatible with each individual living harmoniously with his environment. (Stapp, 1974b, p. 51)

The methods that I advocate for achieving the goals focus on environmental education programs in school systems and teacher pre-service education. For school systems I have written a ten-phase plan. The first phase is the establishment of a committee to develop, implement and evaluate environmental education programs. Other steps include the formulation of goals and objectives, curriculum development emphasizing problem-solving and values clarification processes, teacher in-service workshops and evaluation instruments. I stress a kindergarten to grade twelve interdisciplinary, future oriented, global approach. I offer examples of lessons which include behavioural objectives, student activities and questions teachers may ask. The entire process is summarized in an environmental education model (Stapp, 1974b, pp. 50-89).

Teachers and students should comprehend more clearly the concepts that undergird environmental education. Several colleagues and I developed six major concept headings, ie. the biosphere, closed

systems, human populations, economics and technology, environmental decisions and environmental ethics, and twenty-nine subconcepts. I have outlined areas in which teachers specifically must obtain training. These include thirty university courses in six theoretical foundation areas, ie. ecological, economic, policy, human ecosystems, psychological-sociological and educational plus environmental education skills courses in audio-visuals, school site planning and development, values and teaching, program evaluation and community environmental education issues (Stapp, 1975, pp. 57-63).

James Swan:

> In the short run there is no question that we will have to legislate a social and ecological conscience in those individuals and corporations who fail to recognize their moral responsibility to the rest of society. (Swan, 1971, p. 42)
>
> Only when we base our attack on environmental problems on the creation of a new ethic of social and environmental responsibility will we ever be able to develop a truly quality environment. Our only hope for resolving pollution in the long run is to create a mechanism for developing this new social ethic. Our school systems certainly offer an important opportunity for creating this ethic ... (Swan, 1971a, p. 40)
>
> Presently [1969] in the Ann Arbor school system, where we are beginning to implement the environmental education philosophy, 14 different schools are involved in school-site development projects. In every case development is being planned by an individual school committee composed of teachers, administrators, ground keepers, and most importantly, students.
> Typical activities of these school-site development programs are planting of windbreaks, planting shrubs

> and trees for beautification and to attract wildlife, constructing ponds, and building mounds to add diversity to the site and increase opportunities for creative play.
> Moving into the secondary grades, we are beginning to study local environmental problems throughout the community. Art classes are currently working on developing a proposal for beautifying an old bridge. Conservation classes have a small lake on the high school grounds at their disposal, and they are currently studying the problems of developing an urban fishery.
> Recently, a ninth grade social studies class spent two weeks studying such local problems as water pollution, the proposal to build a dam nearby, air pollution, Ann Arbor's sign ordinance, and local recreation problems. In every case the issue was presented; then students explored how governmental agencies attack such problems and how citizens can be of help in coping with them. (Swan, 1969, p. 28)

From my analysis of the social basis for environmental problems I recommend that first, we adopt a definition of environmental education which will be generally accepted by most people. Over the years my colleagues and I have developed a definition of environmental education. The strength of this definition is that it is based upon the structural composition of attitudes/values, cognitive development and an emotional concern "which will create a tendency to act and motivate an individual to become involved in problem-solving" (Swan, 1971, p. 45). Second, I recommend the development of techniques for assessing the present state of environmental attitudes and the success of our environmental education programs. Third, I recommend directing research attention to environmental perception and evaluative techniques toward measuring behaviours (Swan, 1971a, pp. 44-46).

According to my current understanding of human attitude formation and change I have formulated four principles for developing environmental education programs: first, place a strong emphasis on programs for very young children; second, reinforce environmental attitudes in every area of education; third, create educational situations that ensure students will want to learn; and fourth, provide activities that are relevant to the learners. (Swan, 1971a, pp. 46-48).

I also propose five specific skills of modern man which should be the objectives of environmental programs: first, the utilization of extraperceptual information. An understanding of how to use scientific methodologies for independent monitoring is an important tool to offer today's youth. It will allow them to rely less upon the media in forming their own opinions about the quality of the environment; second, sensory awareness which would provide opportunities for students to explore a wide variety of different environments, for example, through an urban-rural educational exchange. However, students first require an openness, a willingness to experience, and the ability to use their senses. Books by Van Matre and Gunther offer assistance to teachers regarding the development of those qualities in students (Swan, 1974b, pp. 26-30); third the relationship of oneself to society, because

> It is imperative that future generations in our technologically advancing society be more aware of the

> impact of their personal decisions upon society as a whole.
> There is more rhetoric than work in the area of teaching social responsibility. It would appear, however, that the use of games and simulations holds much promise, for they are capable of teaching abstract concepts and condensing time-space relationships. (Swan, 1974b, p. 31)

Fourth, I advocate the teaching of ecological thinking, that is, teaching people "how to think" not "what to think" and assisting students' development of thinking processes that could be more effective in resolving complex problems. Ecological thinking also includes development of a future perspective. For example,

> At the national level, a change in thinking about the future has come with the National Environmental Policy Act of 1970's provision for requiring environmental impact statements. This focuses attention on the future and forces us to do some hard thinking about the outcome of present actions. This sort of thinking is badly needed on an individual level as well. (Swan, 1974b, p. 33)

Fifth is value development and clarification. I remind the reader that forcing values upon people will not work. Individuals must be allowed to develop their own values of their own free will. The task of the teacher in this process is to "make certain that students learn the correct process of value clarification" (Swan, 1974b, p. 37). For specific techniques in this area I refer the reader to the excellent work of Raths et al. and Metcalfe as guides for teaching values.

Robert Roth:

> It may be that we need one world economic system, one world judiciary and legal system or, in short, a world form of government. (Roth, 1971a, p. 23)

> Before the land ethic attitude can be built it seems probable that ideas will have to be formulated in the cognitive or verbal level. Emotionalism or affectivity per se will not do the job in the present state of the Art ... past failures in Conservation Education indicate this....The only effective programs have been those that began in the knowledge area and then proceeded to blend with the emotional. (Roth, 1972, p. 45)

> The question: "What should our citizens know about environmental management?" is prerequisite to developing meaningful environmental education programs and curricula for children and adults. Regardless of the educational procedures adopted relative to environmental management education there are several needs that must be fulfilled for an effective program: 1. The concepts important to an understanding of environmental management must be identified. 2. Identified concepts must be coordinated with existing school courses, and 3. Concept grade placement must be determined. (Roth, 1969, p. 65)

> A first step toward the development of an agreed upon body of concepts appropriate for environmental education was taken when a list of 112 concepts was produced at the University of Wisconsin....Scholars from forty professional areas and twelve ecological regions in the United States agreed on the majority of concepts to be emphasized.
> Knowledge of the concepts contained in the taxonomic list developed in this study is therefore considered to be basic to an understanding of environmental management and appropriate for use in public schools throughout the United States. (Roth, 1971, pp. 24-25)

> The concepts important to know in environmental education were grouped in four categories: biophysical, socio-cultural, environmental management, and

> change....Broadening the scope of understanding contained in the conceptual representation of each area should enable the individual to more knowledgeable select and control the way in which he lives and interacts with 'spaceship earth'....As his attitudes are reflected in information democratic processes, both in the polling booth and in the market place, man must recognize that whatever happens or is not permitted to happen to his world can be substantially influenced by a majority vote. (Roth, 1973, p. 39)
>
> Each environmental educator will have to 'grow his own' teaching activities that fit the environmental example and the personality of the teacher. (Roth, 1971, p. 29)

The Environmental Education Act:

> The Act will provide for making grants to and contracts with state departments of education, local school districts, organizations, and institutions to support research demonstration and conduct pilot projects designed to educate the public about the problems of the environment.
> Money received through grants or contracts may be used to:
>
> 1. Develop curricula which may involve several disciplines and are directed to preserving and enhancing environmental quality and ecological balance;
> 2. Disseminate information relating to curricula and to environmental education;
> 3. Support environmental education programs at the elementary and secondary education level;
> 4. Permit perservice and inservice training programs including fellowship programs, institutes, workshops, symposia, and seminars on the teaching of environmental education;
> 5. Plan for outdoor ecological study centers;
> 6. Produce community education programs focusing on environmental quality;
> 7. Prepare and distribute materials to the mass media on topics relating to environmental quality. (Steidle, 1971, p. 22)
>
> Environmental education is the process that fosters

greater understanding of society's environmental problems and also the processes of environmental problem-solving and decision-making. This is accomplished by teaching the ecological relationships and principles that underlie these problems and showing the nature of the possible alternative approaches and solutions. (Bogan, 1973, p. 1)

For there are many additional ways [besides citizen education re immediate problems or understanding NEPA] to impart and acquire the kinds of information, perspectives and techniques that are essential in developing the environmental awareness and skills that our society needs. Many of these ways involve an emphasis on learner-directed and discovery-guided inquiry; some involve innovative and integrative learning outside the classroom. But in certain cases, environmental education must operate through more traditional approaches, such as lecture, classroom activities, and other nonexperience-oriented educational methods if the learner is to attain some of the essential skills, concepts and facts he needs. (Bogan, 1973, p. 2)

Of course, curriculum materials must be prepared, but the long-range objective must be to bring concepts of environmental education into virtually every aspect of learning....Even as attitudes of individual worth, free agency, democratic consent, and cooperative effort are learned subconsciously in many parts of the public school curriculum, so must new attitudes of environmental concern pervade each subject, each course, and each discipline...
Immediately we perceive that every educational mechanism and institution in our society is and must be involved in environmental education. (Marland, 1971, p. 8)

The coordinated approach to environmental concerns must involve more than traditional State government. While there are State agencies involved in education, health, natural resources, and conservation, so, too, are there numerous private and semiprivate agencies equally involved. The Izaak Walton League and Audubon Society must find common ground with the Fish and Game Commission. Federal agencies - such as Interior, Agriculture, HEW, HUD, National Science Foundation, and

> the new Environmental Protection Agency - must work with them all. Business, industry, and labor must find reconcilation with community interests and the trade-offs must be faced by all concerned. (Marland, 1971, p. 9)
>
> The responsibility is not merely that of the Federal Government or of the State and local school system, but it is shared by the church, professional associations, civic organizations, voluntary agencies, and the family. (Marland, 1971, p. 8)

The Belgrade Charter:

> The reform of educational processes and systems is central to the building of this new development ethic and world economic order. Governments and policy-makers can order changes, and new development approaches can begin to improve the world's condition - but all of these are no more than short-term solutions, unless the youth of the world receives a new kind of education. This will require new and productive relationships between students and teachers, between schools and communities, and between the education system and society at large.
> It is within this context [of the new development ethic and world economic order] that the foundations must be laid for a world-wide environmental education programme.... The principal audience of environmental education is the general public which includes the major categories of the formal education sector and non-formal sector. (Unesco-Unep, 1976, p. 2)

The Tbilisi Declaration suggests that Member States

> Include in their educational policies measures designed to introduce environmental concerns, activities and contents into their education system....that educational authorities promote and intensify thinking, research and innovation in regard to environmental education....
> That Member States collaborate in this field, in particular by exchanging experiences, research findings,

> documentation and materials and by making their training facilities widely available to teachers and specialists from other countries;...
> Lastly that the international community give generously of its aid in order to strengthen this collaboration in a field which symbolizes the need for solidarity of all peoples and may be regarded as particularly conducive to the promotion of international understanding and to the cause of peace. (Gillett, 1977, p. 245)

> Implementation of recommended policies will follow the Intergovernmental Conference, [Tbilisi] as well as many activities which constitute the establishment of (1) a comprehensive world network system and newsletter (Connect) to further the international exchange of ideas and information, needs and services, as well as (2) a mechanism for forming a regional network linking and promoting national activities.
> There will be continuing research ... and support ...
> Since the exchange of ideas and information, needs and services is central to the success of environmental education on a global level, Unesco has underway a project to establish an international network of communication in cooperation with the International Referral System...
> The long-range, post-Intergovernmental Conference actions of the International EE Programme will involve more funds and support for action programmes from government and non-government bodies with a special effort made to identify and commit funding organizations and institutions throughout the world to new and existing EE developments. (Unesco-Unep, 1976, p. 8)

Summary

According to a selected sample of its advocates and practitioners the problems that environmental education seeks to address are the global mismanagement of natural resources, the unequal distribution of natural resources (including food supplies and socioeconomic costs and benefits) among and within nations, urban congestion and blight, waste

disposal, indiscriminate use of pesticides, air, water and noise pollution and the lack of institutional arrangements to deal effectively with the problems. The evidence they put forth to justify these as issues warranting our attention include government documents, testimony at public hearings, reports from regional/national conferences, selected books, articles and research papers from the social sciences, natural sciences and education, personal publications/research, discussion with colleagues and personal experience.

The major goal of environmental education is to produce informed citizens who have acquired knowledge of the biophysical and socio-cultural environment and awareness of its problems, are motivated to act by attitudes of concern and are committed to working towards solutions to environmental and societal problems. The more ambitious goals include the elimination of air, water and noise pollution, a society at peace with itself and its environment and a productive, harmonious person-environment relationship in which humans as cultural agents utilize the natural environment to advance their welfare.

The methods suggested to achieve these goals range from classroom activities to the creation of a world government. Methods directly related to the public education system include curriculum development, teacher inservice and preservice training, an emphasis upon young children, the creation of motivating learning environments for students, concept acquisition regarding ecological principles and

relationships, sensory awareness activities, problem-solving processes, and values clarification.[8] Other methods involve the development of ecological centres, government legislation, allocation of funds for pilot projects, government interlevel and interdepartmental coordination, cooperation among all education mechanisms and institutions in society, and financial support from the international community.

In the remaining chapters of this thesis I intend to identify and examine some of the central dilemmas that I believe are left unresolved concerning the identification of problems warranting attention and many of the goals and methods of environmental education as outlined in this chapter.

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[8] For an extensive and systematic organization of these elements see Hart (1979) and Appendix A.

CHAPTER 2

IS THERE ANY WAY TO KNOW WHICH PROBLEMS ARE MOST SERIOUS AND WHAT IF ANYTHING NEEDS TO BE DONE?

> It then occurred to me that this was not the first time I had been given a map which failed to show many things I could see right in front of my eyes. All through school and university I had been given maps of life and knowledge on which there was hardly a trace of many of the things that I most cared about and that seemed to me to be of the greatest possible importance to the conduct of my life. I remembered that for many years my perplexity had been complete; and no interpreter had come along to help me. It remained complete until I ceased to suspect the sanity of my perceptions and began, instead, to suspect the soundness of the maps. (E. F. Schumacher, A Guide For the Perplexed, 1977)

> You can't depend upon your eyes when your imagination is out of focus. (Mark Twain, A Connecticut Yankee in King Arthur's Court, 1889)

> If it is not the way I want it, I will prove it. (Andrew Feldmar, 1981)

Bateson (1971) argues that "... living man is ... bound within a net of epistemological and ontological premises which -- regardless of the ultimate truth or falsity -- become partially self-validating for him" (p. 4). This chapter deals with problems of epistemology.[1] Specifically, how do we assess arguments/evidence/paradigms? Because theory often works independent of reality, we need a way to examine

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[1] Bateson (1979) defines epistemology as science and philosophy. It is "the study of how particular organisms know, think and decide ... [and] ... the necessary limits and other characteristics of the processes of knowing, thinking and deciding." (p. 228)

and test our intellectually acquired beliefs and solutions. However, the issue becomes rather slippery due to its circular and self-validating aspects. Facts do not "speak for themselves" independent of our personal histories, hopes, aspirations, fears and long held prejudices (Bateson, 1972, 1979; Etzioni, 1968; Hammer, 1981; Kelly, 1955; Laing, 1966; Rokeach, 1960; Wilden, 1980). Thus it becomes important to distinguish as best we can the existence, truth and significance of an idea or ideas.

Thus the three major sections of this chapter explore the following questions respectively: How is the evidence put forward in the assessment of problems? How do we know which goals are attainable and at what costs? How do we assess the multiple methods advocated by environmental educators? Concluding remarks constitute the fourth section.

How Is the Evidence Put Forward In The Assessment of Problems?

Examination of the environmental education literature revealed that for the most part authors listed the problems in a general introduction with no or little specific reference to why they chose those particular problems. By omission, these authors seemed to be agreeing with Ivany's (1972) prefacing comment in a book of readings on environmental education that "there is no longer any serious debate against the proposition that the environment of planet Earth is rapidly deteriorating" (p. 1). Ivany's statement may free the

advocate from the necessity of developing a defensible argument but it does not contribute to the credibility of environmental education outside of the field.

This section examines the question: How can one judge the worth of ideas of arguments rather than assuming the problems are self-evident? It presents the major types of arguments that environmental educators use to support their identification of the problems that warrant attention. It also includes a comparison between the views of two authors for illustrative purposes.

I. The Argument From Authority

This argument is most evident in the writings related to the Environmental Education Act and the Belgrade Charter. Maini (1971), United States (1971) and Inger, Hasler, Bormann and Blair (1972) all point out that the individuals who contributed to the reports were members of particular organizations, for example government departments, Library of Congress, Smithsonian Institute, National Science Foundation, National Research Council of Canada and university faculties. Most of the individuals on the list of witnesses "invited" to testify at the U. S. Hearings of the Advisory Committee on the United Nations had a title of some sort attached to their name (eg. chairperson, director, president, professor, senator, scientific administrator). Marland (1971) opens his article by pointing out that problems related to environmental quality were outlined in two State

of the Union addresses and two special messages on the State of the Environment by President Nixon in which he made a national commitment to environmental improvement. Are there any particular reasons (other than blind faith in authority) why we should assume that these people are telling the truth? Reference to Nixon is an obvious case in point. Any person who would lie about a cover-up might also lie about pesticides. It also seemed curious to me that the articles by Marland (1971) and Roth (1973) both contain a lengthy identical paragraph with no reference cited. In a book review on The Poverty of Power Kenneth Boulding (1977) points out that its author, Barry Commoner, "offers sensible conclusions derived from specious and fallacious arguments" (p. 38). Kuhn (1970) and Ellerbroek (1978) suggest that those not qualified to speak as experts (ie. the rebels or the unorthodox) often contribute to major breakthroughs because "they lack la déformation professionelle ... [and] ... may remain able to see errors in basic assumptions" (Ellerbroek, 1978, p. 30). O'Riordan (1971) points out that under sufficient political pressure the decision-maker will contact professional experts as to possible alternative courses of action. He states that these experts "normally ... limited both in terms of reference and in the cost ceilings of their proposals, and, due to the specialized nature of their training, or the traditional practices of the organizations for which they work, offer a relatively narrow range of alternatives" (p. 201). However, I also realize that from a political standpoint the reputation of certain people, deserved

or not, plays a role in the political process and because of this, experts will continue to be called upon.

A subset of the "Argument From Authority" is Citing Publications, Government Documents and Distinguished Colleagues. Most of the references in the materials I examined were drawn from the fields of science, resource planning and conservation and education. The authors seemed unable to apply to their own writing the "multidisciplinary approach" that they consistently call for in environmental education programs. Moreover, the fact that an article appears in a journal is not an indication of the truth or validity of the ideas presented. Rather it may represent the degree to which the article falls within the parameters of acceptability explicitly or implicitly held by the selection committee, or in the case of a "con- flicting view", the reputation of the author in the academic heirarchy or political arena.[2]

Quoting government documents is effective in convincing those who assume that "government" is a unified entity in which the right hand knows and agrees with recommendations and decisions of the left hand and that those recommendations and decisions are based upon profes-

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[2]Apparently, neither is the selection committee accountable in terms of explicating their reasons for rejecting an article. Recently a professor in the Faculty of Education received a letter of rejection for an article she submitted to an educational journal. They stated that, "your article ... does not meet our editorial needs at this time. We receive between 15 and 20 unsolicited manuscripts for every one we accept. Under these circumstances, it is not feasible for us to explain our reasons for rejecting each manuscript. The crucial factor in most cases is simply a lack of space."

sional pristine investigations. It does not hold as much weight for those who have experienced the contradictions and conflicts within government departments. Starr and Carlson (1968) present one of many such examples in their discussion of the water depollution program in the United States in which government experts present diametrically opposed courses of action.

When I initially selected the "recognized spokespeople" in the field of environmental education I consulted three comprehensive papers summarizing various definitions and elements of environmental education and identified the most frequently cited authors through the Social Citation Index. Later I began to learn about the connections among those authors. For example, Schoenfeld, the first editor of the Journal of Environmental Education is from the University of Wisconsin. Roth, the winner of the first Annual Publisher's Award for "the most compelling" paper published in the Journal of Environmental Education", was identified as a Professor of Conservation Education at Ohio State University. His doctoral study which the paper was based upon had been carried out at the University of Wisconsin. Swan conducted his doctoral work at the University of Michigan and later was a member of Bennett's doctoral committee along with Wm. B. Stapp, also at the University of Michigan. This type of informal network, often not made explicit, creates a situation of mutual quotation in much of the literature. Thus many of the citations indicate an agreement between like minds working together in an area of

professional/personal interest rather than evidence of validity.

A revealing statment that should be added to the title of the last argument is: "Citing Publications, Government Documents and Distinguished Colleagues that Agree With My Point of View". Rarely will you find authors who cite articles, government documents or distinguished colleagues that are opposed to the ideas or perspectives they are presenting.

II. The "Everyone Says Its A Problem" Argument

Swan (1974a) points out that "the shelves of bookstores are stocked with numerous accounts of ecocatastrophes ... and ... analyses of the origins of the environmental crises ..." (p. 15); Marland (1971) that "during the summer of 1970 there was nearly unparalleled migration of educators and environmentalists to Washington's Capitol Hill to testify" (p. 7); Unesco (1976) that "the most striking was the sense of unanimity ... cutting across natural and cultural frontiers among the ninety-six participants and observers from some sixty countries" (p. 3); and Baker (1972) that the summary and recommendations presented by the Advisory Committee on the United States Conference on the Human Environment "represented input from a series of public hearings ... in eight cities across the United States ... which involved one hundred and seventy witnesses as well as three hundred written briefs" (p. 1). Quantity of responses may substantiate the existence of an idea but it does not necessarily indicate

the validity of an idea. There are many people who would question, as de Castell (1982) does "the validity of a theory of rationality which ties consensus together with truth" (p. 15).

III. The Moral Imperatives Argument

This argument includes all those stirring but ill-defined words and phrases infused into the writings (eg. absolutely vital, insist, imperative, commitment, sense of responsibility, benefit all of humanity, striving toward harmony and peace, improving the quality of life for all people, crusade, sense of history, fulfilling, pervading the spirit of all teaching, this vision). They suggest an urgency and moral obligation to become involved in (and thus accept) environmental issues. The existence of such adjectives and adverbs in a conversation does not increase the validity of the idea. Rather it indicates the areas that are particularly important to the speaker at that point in time. For those of us who have a marked tendency to be influenced by such arguments the following tale is useful:

> A monk enters a teahouse and states:
> 'My master taught me to spread the word that mankind will never be fulfilled until the man who has not been wronged is as indignant about a wrong as the man who actually has been wronged.'
> The assembly is momentarily impressed. Then Nasrudin speaks:
> 'My master taught me that nobody at all should become indignant about anything until he is sure that what he thinks is a wrong is in fact a wrong - and not a blessing in disguise!' (Shah, 1971, p. 66)

In summary, just as the truth of an argument can be distinguished from its source, so the validity of an individual's argument is in no way established by their previous publications, degrees or positions. Various types of evidence, arguments or criteria can be presented to support particular concerns but there is no ultimate criterion acceptable to all people for the selection of problems most deserving our attention. This line of thought is not meant to dissuade or render futile any attempts to assess problems and set priorities. Rather it suggests to me the necessity of distinguishing between the existence, the truth and the significance of an idea. An example of my application of this approach is presented in the following comparison of the views of Swan and Downs.

Swan (1974a) and Downs (1972) present the idea that in the early seventies environmental issues had assumed a high priority among domestic concerns in the United States. Both agree that the sudden shift in public attention reflects a change in people's perceptions and attention more than it reflects a change in real conditions. They differ in their explanation of why this high level of concern has developed and in the significance of this phenomena.

Swan (1971) points out that "the legitimacy of the environment as a high priority domestic issue is more attributable to human decisions and their two components - information and values" (p. 223). Elsewhere (Swan, 1974a) he discusses the contemporary activities related to environmental quality in terms of human problem-solving which has

three phases: awareness, identification of root causes and generation of solutions. He offers examples of activities representing each phase (e.g. Earth Day 1970, Barry Commoner's book The Closing Circle and the banning of high phosphate detergents in some cities, respectively) and thus suggests implicitly that the process is underway. However his examples lack continuity through the three phases. They are isolated activities carried out by different individuals and groups in different parts of the country. Swan (1974a) states that "greater insight into contemporary concern for the environment shows that in recent years both our concepts of reality and our expectancies about what could be have changed dramatically" (p. 19). He reasons that this change has resulted from a growth in scientific reasearch ie. "good toxicological data"; the fact that more people are appreciating quality environments as indicated by the number of recreational vehicles on the road, the increase in the number of people visiting parks and the interest in recreational homes and new towns in the mountains; the media's coverage of nonpolluted environments and its suggestions that people "use their leisure time to travel and experience new environments"; and finally the good health of the American society as indicated by Maslow's hierarchy of needs. Swan appears to assume that there is a direct communication link between the scientific research community and the general public and that the high level of concern among the public indicates an informed response to scientific data. He also assumes that producers

and consumers in American society are guided by good intentions and thoughtful, rational choices. Thus he concludes that if there are "3,500,000 recreational camper-type vehicles on the road" it indicates that people are gaining a greater appreciation of environmental quality. He does not entertain the idea that perhaps it indicates the effectiveness of a multi-million dollar advertising industry coupled with a preoccupation about accumulating material possessions that pervades North American society. He bases his assessment of the health of the American society on the work of Abraham Maslow. Specifically,

> His theory of human behaviour based upon the notion that humans seek to acquire happiness and meaning from life through striving to satisfy their needs. Further, these needs can be identified and ordered in a hierarachy according to their immediate importance for survival.... Maslow also notes that it is a human tendency to 'grumble' about unfulfilled needs and therefore by listening to the level of grumble it is possible to determine how well off an individual is. (Swan, 1974a, p. 23)

Swan (1974a) then applies the "grumble theory" to society in order to determine the level of grumble of the environmental movement. He concludes that "clearly this tells us that the 'environmental movement' with such a strong future orientation to both quality and quantity of the environment, could not exist unless we had been successful in creating a society which had succeeded in satisfying basic human needs for a major segment of society" (p. 24). I am not as confident as Swan about the validity of applying a psychological

theory based on individual needs at a societal level. I also question the phrase "unless we had been successful in creating a society". Who is the "we" who can take credit for the "creation" of the American society? The word "create" connotes a degree of conscious effort or planning that I believe is misleading.

Downs (1972) discusses the high level of public interest in environmental quality from the point of view of the "issue-attention cycle". He believes that the public perception of most "crises" in America, including the environmental crisis, "reflects the operation of a systematic cycle of heightening public interest and then increasing boredom with major issues" (p. 39). The five stages of the cycle are "the pre-problem stage" in which the undesirable condition exists but has not captured public attention; the "alarmed discovery and euphoric enthusiasm" in which the public becomes aware of the problem and is enthusiastic about society's ability to solve the problem; the "gradual decline of intense public interest" in which people become either discouraged, threatened or bored; and finally the "post-problem stage" in which the issue has been replaced or has faded somewhat from public attention and one can identify remnants of the intense interest phase in the form of new institutions, programs or policies that were created to help solve the problem.

Similar to Swan, Downs states that one of the causes of the greater level of concern is an increase in our aspirations and standards concerning what our environment ought to be like. Unlike

Swan, he states explicitly that the "escalation of our environmental aspirations is more selective than might at first appear" (Downs, 1971, p. 45). We often tend to focus on particular issues that attract our attention irrespective of their seriousness in relation to other issues (for example, the conservationists concern over the extinction of the whooping crane rather than the massacre of thousands of Indians in Brazil). Both Swan and Downs acknowledge the role that an increase in environmental information from experts has played in creating the current level of concern. Swan emphasized the improved "systems of data collection on health conditions and growing scientific understanding" while Downs refers to the "explosion of alarmist rhetoric on this subject ... based on some well-publicized experts".

Swan (1974b) points out that "we have environmental problems because of the way we presently try to meet our personal and social needs" (p. 17) and that they "stem from our inability to develop a system of social values, life styles and institutions which enable us to live in harmony with our environment" (p. 25). He discusses the projected exponential growth rate demand for electricity and questions the argument that calls for increased development of nuclear power, stripmining and northern pipelines. He asks that we consider

> The <u>basic</u> [my emphasis] issue of do we really need that extra energy? Is it not true that electrical-energy-consuming machines are contributing to unemployment? Is it not also true that many labor-saving devices have created problems of boredom in other occupations? (Swan, 1974a, p. 17)

Swan's (1972) identification of the "basic" issue is questionable in light of Downs' observation that "many of our environmental problems have been caused by developments highly valued by most Americans" (p. 43). It seems to me that a more basic issue than "do we need extra energy" would be a consideration of the direct linkage of environmental pollution with the material advantages most citizens enjoy and the rising living standards. Another cause of environmental deterioration which Downs suggests and Swan ignores is the "democratization of privilege". This means that "many more Americans are now able to participate in certain activities that were formerly available only to a small, wealthy minority" (1972, p. 44). It contributes to traffic congestion, overcrowding in National Parks and the transformation of farmlands into new subdivisions. Swan (1974b) believes that "environmentalists should have as a major goal the creation of a society that can insure people that these [basic] needs will be fulfilled" (p. 38). Downs' (1972) statement that "the elite's environmental deterioration is often the common man's improved standard of living" (p. 44) begs the question of Swan: Who should/will define those basic needs?

Swan and Downs come to different conclusions concerning the significance of the present level of public concern over the quality of the environment. Swan (1974a) believes that it is not an

"ephemeral issue"[3] and that "as research accumulates showing the degree of stress which noise and air pollutants actually place on the lives of many citizens there is little doubt that environmental quality will continue to be a high priority social issue" (p. 21). When Swan emphasizes the "problem" aspect of our present state he leaves one with the impression that people will be willing to embrace environmental education programs because they have been developed "to better prepare people for living in harmony with the environment and themselves" (p. 18). Downs (1972) believes that "certain characteristics of the issue will protect it from the rapid decline in public interest typical of many other recent issues" (p. 46) but that in the long run "there is good reason to believe that the bundle of issues called 'improving the environment' will also suffer the gradual loss of public attention characteristic of the later stages of the 'issue-attention' cycle" (p. 50).

How Do We Know Which Goals Are Attainable And At What Costs?

Normally a goal is defined as "the end toward which effort is

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[3]One piece of evidence Swan (1974a) offers to substantiate his claim that environmental quality is not an ephemeral issue is the fact that "new government agencies are enforcing stronger laws against pollutors (Consolidated Edison in New York has been fined $1.6 million for a fish kill caused by its power plants) ..." (p. 15). The strength of this evidence diminishes somewhat in light of Freeman and Haven's (1972) appraisal of the effectiveness of water pollution control policy in the U. S. from 1956 - 1972. They discuss its "record of failure" and point out that under some provisions only one case ever got to court.

directed". Kristol (1971), Lewin (1968) and Iklé (1967) establish the importance of clear goals and objectives in setting priorities for action and in evaluating progress. When I attempted to extract answers to my question, What are the goals of environmental education?, I found the responses in the literature fuzzy at best and irresponsible at worst. I will discuss the shortcomings with respect to clarity of terminology, specificity and feasibility.

When I examined the literature I discovered that my initial approach of attempting to group the goals and objectives in some type of rank order was not possible. Only one source (Unesco-Unep, 1976) explicitly differentiated between the goals of environmental action and the goals of environmental education. The others used the terms environmental action, environmental quality movement and environmental education interchangeably, and the descriptors ultimate, long-range, major, chief and preliminary for goals and objectives indiscriminately.[4] It became clearer to me that one person's (group's) means was another person's (group's) first step; that one person's "ultimate goal" of "the development and maintenance of a high-quality system in

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[4]This confusion among writers in the field of environmental education renders the valiant attempts of an academic to present an orderly, concise, tidy definition as somewhat futile. I am thinking specifically of the definition of "optimum environment" that Roth (1969) presents 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 responses within his rapidly increasing and eventually declining capabilities." (p. 15) He has done an excellent job of portraying an intriguing, messy, complex life process as a clinical, sterile abstract concept.

which man interacts through culture on the biophysical environment to advance human welfare" (Stapp et al., 1969, p. 31) is another person's first step:

> As a first step to facilitate these changes in our economic, political and social systems ... I suggest that we drop all currently existing descriptive 'isms' ... and strive toward a new system called 'environmentalism' which is defined as that society that is designed to provide all its inhabitants with the highest possible quality of life. (Swan, 1971, p. 43)

This particular approach ie. the greatest good for the greatest number neglects to consider several questions: How does one determine the optimum ratio of quality/quantity? At what point do the greater numbers diminish or cancel the quality of the "goods"? For example, if you have one hundred dollars do you give two people fifty dollars, ten people ten dollars, one hundred people one dollar, or one thousand people ten cents?

Lewin (1968) points out that in several fields of social management, for example education, "we lack signposts of exactly where we are and in what direction we are moving with what velocity" (p. 442). Sewell (1971) states that

> Thus far reliance has been placed mainly on the technical elite - the biologists, medical officers, foresters, engineers and architects - as to what the goals of environmental quality management should be. It should be noted however that the goals or 'standards' which they suggest are often established with little knowledge of public acceptability. This

> accounts of course for the fact that they are frequently ignored or that they result in behaviour which was not intended. (p. 120)

Goal statements in the field of environmental education tend to exacerbate the dilemma: if you don't know where you are going how will you know when you get there? What does "a society at peace with itself and its environment" look like? What time perspective do we use to assess an "advancement in human welfare" or "destructive" as opposed to "healthy change"? Whose criteria should we use to determine when a "clear understanding, a broad understanding and a fundamental understanding" have been achieved by the citizenry? Even scholars who have studied a particular area for years are hesitant about claiming such understanding.

Closer inspection reveals a particular form of information in the literature which seems to "fall between the cracks" of goals and methods. This includes all the statements containing phrases such as "environmental education should consider, should be, should emphasize, should examine", intransitive verbs such as "the resources of the world should be developed in ways which benefit all of humanity, a new set of societal values needs to be deeply rooted into the American consciousness, curriculum materials must be prepared, funds must be redirected" and the elusive "we", for example, "we will have to legislate a social and ecological consciousness, it may be that we need one world economic system, our moral responsibility to treat other members of society and the environment in a humane manner"

(Swan, 1971, p. 40). This is empty information because it does not specify who the doers of the action are, or how they can do it.

Another area of consideration with respect to the goals of environmental education is the feasibility of the goals. There are two goal areas. One is that of developing an aware, concerned, knowledgeable citizenry working on solutions to the social and environmental problems identified by environmental educators. A second group includes, peace, harmony, an environment that allows individuals to live a quality life and the enrichment of the lives of all people.

In the first goal area environmental educators make the assumption, "If I explain what needs to be done then everyone will share my views"; and, "If a job is worth doing then everyone should do it." Do environmental educators seriously entertain the possibility of two hundred million people (in the case of the United States and several billion in the case of a global citizenry) embracing the arduous task of assessing, prioritizing and solving societal and environmental problems? Would parents gladly pay for day care in order to free the hours they require to pour over scientific data, follow false leads, sit on committees, write reports, present briefs and monitor public meetings? Will companies offer information to citizens for environmental assessments that may escalate their costs? Environmental educators would lead us to believe that several million people can problem-solve their way to peace and are offering a problem

free future if we all work hard and follow their advice. However, there are no real people in their system with either desires, skills or previous knowledge. It is not surprising then that some of their statements are viewed as simplistic and condescending. For example:

> Instead of pointing the finger of guilt at the housewife who fills her kitchen with electric appliances, why not explain to her how too much technology in her life can rob her of opportunities for creativity. (Swan, 1974b, p. 40)

Another assumption made by environmental educators is "The Unicorn Conundrum". This is exemplified by "a biologist who argues that because unicorns can be imagined they must exist, despite the remarkable absence of empirical evidence for their existence" (Boulding, 1977, p. 37). They want to advance the welfare of humankind, increase the quality of individual and environmental life and create peace and harmony. Moreover, by omission of any consistent ranking, they imply that these goals can be pursued simultaneously. Environmental educators seem optimistic about the possibility of increasing the advantages in life and distributing them more evenly throughout the world. Often when one can cite many achievements from the recent past there is a tendency to believe in a future with limitless horizons for the improvement of what we call the human condition. Perhaps environmental educators have developed an optimistic outlook because of their individual success, their position of privilege and a tendency to project the immediate past into the

future. If asked directly, they may deny the fact that they tend to project past trends into the future. On the contrary, they call for many changes in the present economic, political and educational structures. However, the fact that they would even entertain such possibilities suggests strong influence from the recent past.

A useful question to consider here is: What would be the effect of X on their vision? X, for example being (a) a recent report on the CBC that "even Britain, which has been an advocate of unfettered free trade in the past is now calling for protectionist measures"; or (b) a report in the United States that "patience is wearing thin" ...

> Representatives from the United States, the Soviet Union and Great Britain lodged complaints about the world body's steadily rising budget - and their share of the burden. The rare Unanimity among superpowers was sparked by Washington's growing disenchantment about the UN and a gnawing sense in big capitals that many small nations in the General Assembly readily vote to fund conferences, experts and new programs, secure in the knowledge that they will not have to bear much of the cost. (Michael, 1982)

Some environmental educators fail to acknowledge that humanitarian rhetoric and assistance may diminish as problems increase. The extent to which nations are willing to share or help others is dependent upon their own situation.

Discussion of goals in the environmental education literature fails to consider the powerful role of the "material base" of society and the difficulties that may arise due to "the real amount of

conflict that is both latent and overt in most societies most of the time (Buckley, 1968, p. 384). Roth's (1973) suggestion that "'quality of life' ... can be interpreted as the individual's conception of the 'good life'" (p. 38) becomes erroneous and unaccept- able considering the following views:

> The elite's environmental deterioration is often the common man's improved standard of living. (Downs, 1972, p. 44)
>
> In other words, to what extent are our social dilemmas the traditional ones - now writ large - of the interactions of individuals having diverse wants ... (Bell & Kristol, 1971, p. 60)

There is reason to be skeptical of calls for peace and harmony from the academic elite according to Jean Vanier:

> Peace ... Peace, all men aspire to peace. But peace for the man without work, who has not enough to feed his wife and children, peace for the immigrant alone without friends, peace for the people living under tyranny or in slums is quite different from the peace sought by the affluent. For them peace means: 'Leave me in peace ... do not touch my things'. (Vanier, 1972)

Perhaps a case could be made for the environmental educators if one assumes that their unsubstantiated promises of long term harmony and stability will be sufficient motivation to offset people's perceptions of advantage and gain. This seems highly unlikely as it does not appear to be enough to offset even "one of the committed's"

perceptions of needs versus wants. Swan states that,

> If a family needs two cars to live in a community and maintain a household then it should not feel guilty about doing so. (Swan, 1974b, p. 39)
>
> Maslow's (1970) studies on self-actualization show that some women self-actualize as mothers. To deprive such people of their right to be a full human being is as criminal as many acts of pollution. (Swan, 1974b, p. 40)

Some environmental educators hold the belief that the personal and institutional changes necessary to orchestrate a more equitable distribution of resources and privileges on a societal and global level can be achieved while retaining individual liberty, autonomy and democratic institutions.

Generally the delineation of goals is such that even a person sympathetic to the goals may have difficulties in understanding or justifying them. For example, the Belgrade Charter states that there are two <u>preliminary</u> [my emphasis] objectives to the goal of environmental action:

> 1. For each nation, according to its culture, to clarify for itself the meaning of such basic concepts as 'quality of life' and 'human happiness' in the context of the total environment, with an extension of the clarification and appreciation to other cultures, beyond one's own national boundaries.
> 2. To identify which actions will ensure the preservation and improvement of humanity's potentials and develop social and individual well-being in harmony with the biophysical and man-made environment. (Unesco-Unep, 1976, p. 2)

It is not clear whether these two "preliminary" objectives are to precede or to be undertaken simultaneously with the goal of environmental education,

> 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. (Unesco-Unep, 1976, p. 2)

However, the latter may become a non-issue if one examines even the first 'preliminary' object more closely. The details of its implementation alone are staggering if not impossible.

Some environmental educators have conceded that there are disagreements in the field (Hart, 1979) but they add that this is understandable because the field is new and "there is no specific research in the area" (Swan, 1969, p. 28). However, even if environmental educators could clarify and prioritize their goals they would still be faced with the problem of assessing whether the means they suggest will indeed achieve their ends, as illustrated in the following tale:

> On one occasion a neighbor found him [Nasrudin] down on his knees looking for something.
> 'What have you lost, Mulla?'
> 'My key', said Nasrudin.
> After a few minutes of searching, the other man said,
> 'Where did you drop it?'
> 'At home.'
> 'Then why, for heaven's sake, are you looking here?'
> 'There is more light here.'

Assessing The Multiple Methods Advocated By Environmental Educators

Generally, the methods suggested in the environmental education literature call for more -- more of the same kinds of things that many other causes demand. These include national and international cooperation and agencies, technical and financial assistance, accumulation of information through research development and design, data collection and analysis, and the establishment of standards, regulations and controls. Activities particular to education include teacher preservice and inservice training, institutes, workshops, seminars, curriculum development and dissemination of materials for public information. It is informative to connect the methods with the real-life people who are advocating them rather than an objective pristine printed page. Here McDermott's (1978) observation that "the generation of knowledge is normally undertaken to benefit the sponsors of knowledge" (p. 17) becomes significant. In the case of environmental education it could be expanded to include knowledge, materials and services. I find myself wondering to what extent environmental educators are developing an "environmental problems industry" similar to the "housing problem industry" identified by Colin Ward in his preface to Turner's book:

> The moment that housing, a universal human activity becomes defined as a problem, a housing problems industry is born, with an army of experts, bureaucrats and researchers whose existence is a guarantee that the problem won't go away. (Turner, 1976, p. 4)

There is cause for skepticism regarding the validity and significance of suggestions where Stapp states that,

> In developing an environmental education program for a school system, an environmental education consultant should be retained. The consultant provides the leadership and guidelines essential to the success of the program. (Stapp, 1974, p. 55)

It is interesting to note that Stapp is a professional environmental education consultant. Evidently environmental educators are immune from accusations of defending their own vested interests. This is not meant as a charge of dishonesty against Stapp, but suggests that the implications of such information are useful to consider.

The major vehicles envisioned by environmental educators for implementing their methods are the political and educational processes. Regarding the former, they explain that,

> Citizens make these decisions [that affect their environment] as they cast votes on community issues; as they elect representatives to policy-making bodies ... (Stapp et al., 1969, p. 30)

> As his attitudes are reflected in informed democratic processes, both in the polling booth and in the market-place, man must recognize that whatever happens or is not permitted to happen to his world can be substantially influenced by a majority vote. (Marland, 1971, p. 8) and (Roth, 1973, p. 39)

Shubik (1967) points out that many such views of the political process are based on a model of human beings as rational, motivated,

informed decision-makers with freedom of choice under conditions of complete information. He elaborates upon some of the "unfortunate facts of life" that complicate the relative simplicity of such models. Freeman and Haveman (1972) state that "it is in the American tradition to create regulatory agencies to deal with problems" and that the existence of such agencies is sufficient to convince most people that the problems are being solved, and that the offenders are being regulated in the public interest. They point out however that this naive view of the regulatory process is not true.

> The reality is quite different. Regulatory agencies have substantial discretionary power concerning the interpretation and application of their rule-making and enforcement powers. As a consequence, regulation/enforcement becomes essentially a political process entailing bargaining between parties of unequal power. In this process the real issues are camouflaged in technical jargon, and the regulators are largely isolated from political accountability for their actions....At every stage of this multi-level bargaining process those being regulated have a lot at stake, while the public interest is diffuse, poorly organized, and poorly represented. Predictably, the bargains struck favor those being regulated.
>
> (Freeman & Haveman, 1972, p. 57)

They conclude that,

> Viewed in this light, the most formidable barrier to controlling pollution is probably not technology, population, or public attitudes, but rather the politics of power in our pluralistic democracy. (Freeman & Haveman, 1972, p. 65)

As we saw earlier, one person's problem is often another person's gain or profit. Many individuals and groups benefit directly and immediately from assaults on the environment or on people. If certain powerful groups which control or impede change oppose a particular solution then it probably will not be undertaken regardless of its effectiveness. The political ability to interfere with current advantages in society is questionable.

In the area of education and schooling environmental educators make the assumption that education within the institution of schooling is a means to social and individual change. This line of thought "presumes the independence of schools from society" and ignores the "distorting effects wrought upon [even] enlightened intentions by the institution" (deCastell, 1982, p. 11 and 23). Schelling (1971) suggests that because our institutions were developed and evolved under very different conditions than we presently face (ie. scarcity of goods rather than plethora of bads and slower rate of growth of information) they contribute more to the problem than to the solutions. Hall (1977) presents the synonymous structures of culture and education as "not so much content as how learning is organized, how it is presented, its setting, the language used, the people who teach it and the rules they play by as well as the institutions themselves" (p. 206). He goes on to state that,

> Those features of education that are synonymous with culture are very unlikely to change when educators

> start innovating ... and that educators ... like the missionaries in the past, practice an unconscious form of cultural imperialism which they impose indiscriminately on others ... (Hall, 1977, p. 206)

Such is the case in environmental education where the methods to achieve the goals of global reordering, institutional restructuring, peace and harmony are still the familiar workshop, curriculum development, lesson plans with objectives, activities and evaluation, teacher preservice and inservice and university courses - only packaged differently in environmental quality rather than conservation education, outdoor education, open education, middle school, multicultural education, Head Start, etc. Others do not even attempt to disguise the old in the new but rather state openly that "in certain cases environmental education must operate through more traditional approaches such as lectures, classroom activities and other non-experience-oriented educational methods" (Bogan, 1973, p. 2).

Environmental educators concede that technical or legislative techniques can improve the world situation but add that "all of these are no more than short-term or stop-gap" solutions. For truly effective, long term change they call for 'a new kind of education for the youth of the world', 'deep-rooted' attitudinal changes and 'the creation of a new social ethic' through the school system. Etzioni (1968) shared a similar belief that technical solutions were superficial and did not address the deep-seated sociological and psychological roots of the problem. However he was forced to reassess that

view when confronted by the situation that "the resources needed to transform the 'basic conditions' in contemporary America are unavailable and unlikely to be available in the near future" (Etzioni, 1968, p. 41). As he searched out the evidence to substantiate his former belief he found a lack of relevant information. He discusses various social problems such as crime, drug-abuse, unemployment and population. Based upon his studies generally and with specific reference to an analysis of rival programs in the prevention of 'motor vehicle injuries' he suggests that "technical devices are much less expensive - per life saved - than the deeper educational approaches" (p. 49). He points out that in reality, the choice seems to be "not between symptomatic (superficial) treatment and 'cause' (full) treatment, but between treatment of synmptoms or no treatment at all" (p. 48).

Most of the writers in the field of environmental education envision a citizenry engaged in the process of solving environmental and social problems. McDermott (1980) discusses four reasons why the intellectual elite's problem-solving approach may be difficult. One reason emphasizes a particular aspect of human adaptation: the way in which people come to terms with reality when it is inconsistent with their needs and preferences. There is a tendency to "adjust social perceptions to fit not only objective reality but also what suits wishes and needs" and to "misinterpret rather than face up to an opposing set of facts" (Berelsen & Steiner, 1964, p. 664). Also the pathological nature of learning allows humans to adjust in small steps

over time to conditions that were earlier considered to be intolerable. Several authors suggest that humans have an immense capacity for self-deception and accepting the unacceptable (Dubos, 1969, Sewell & Foster, 1971, Berelson & Steiner, 1964; Beer, 1975).

A second reason is the nature of contemporary change. Perhaps we do not have sufficient adaptability to deal with the accelerating rate of change or the varying directions of different processes of change. The concept of adaption borrowed from biology entails changes in populations over thousands of years but we use that concept to assume individual humans are infinitely adaptable without looking at the specifics of the situation. Most people involved in the decision-making processes are overloaded. Moreoever, technological advances seem unable to alleviate the phenomena. Shubik (1967) points out that "in spite of growth in communications ... there has not been considerable change in the number of individuals that a person can get to know well" (p. 773). People's time and energy is a matter of arithmetic growth while problems and information grow exponentially.

A third reason is the scale/size of institutions or what one social scientist calls "the dinosaur problem of social organizations". Many of the institutions in our society have outgrown their usefulness. They have become so large and cumbersome that they are no longer able to serve the purpose for which they were created. Freeman and Haveman (1972) discuss the enormous administrative difficulties arising from just one Federal Bill dealing with water pollution

control policies. People tend to believe that because an organization or institution has a name it is one entity. As a result they are disillusioned when they undertake a task or cause and later experience confrontations among members of the organization or movement as it becomes larger and more complex. A further dilemma encountered is described as the "law of the vanishing control point". Particularly for the kinds of problems that environmental educators ask people to solve there will always be someone or something outside their control boundaries that will be doing things that effect their situation. The initial tendency is to extend the boundaries, to become multilevel, interdisciplinary and global in the approach. This leads to the problem of size -- a situation becomes unwieldy and a call goes up to return to smaller units, to work at the grassroots or local level.

A final difficulty is specificity. Lewin discusses this from a cybernetic perspective:

> Planned social action usually emerges from a more or less vague 'idea'. An objective appears in the form of a dream or wish which can hardly be called a goal. To become real, to be able to steer action, something has to be developed which might be called a 'plan' ... which corresponds to a field which contains the structure of the goal and the steps to the goal in sufficient detail to serve as a blueprint for action. (Lewin, 1968, p. 441)

Not only do we need to know what type of action is vital, who must practise it and for what duration of time, but we must also be able to calculate the consequences of various individuals, groups and

even nations refusing to participate properly.

Most people agree on principles in the abstract but they disagree strongly with specific practices. They seldom examine or specify what it costs to pursue their preference or what the practical problems or consequences of application will be. For example, the implementation and success of most plans generated at conferences, institutes and hearings eventually funnel through various levels to the classroom teacher. And this occurs not only for environmental quality but for all other social causes with educational implications. Lewin's (1968) work suggests the importance of specific goal and method statements for effective social action. He points out that unless you can specify where you are, in what direction you are moving and what you need to do, "there is nothing to prevent us from making the wrong conclusions and to encourage wrong work habits" (p. 442).

In Conclusion

A survey of the historical development of environmental education (Stapp, 1974b; Hart, 1979) from Jackson's Nature Study in 1891 through Conservation Education, Outdoor Education to Environmental Education reveals an interesting pattern. Each field claimed to have crucial relevance for society at that time, and each called for similar measures (ie. produce publications, convene conferences, develop media, educate teachers and the public and obtain government assistance). There seemed to be an exchange of stirring appeals every

few years on the need to take immediate action to control our destiny. It appears that for any problem or issue X that attracts the attention of certain individuals (presently referred to as environmental educators), they will advocate measures W, Y and Z.

This chapter has attempted to explore some of the dilemmas surrounding the assessment of problems, the goals and the methods in the field of environmental education. Particularly the selection of issues warranting attention, the relativity of perceptions of truth and arguments of proof, and the difficulties inherent in collective goals and solutions. It suggests that because we happen to feel strongly about an idea or issue we should not assume that these feelings are an accurate guide to the importance of the issue or a precise indication of what we might do about it. The degree to which our personal experiences contaminate more than clarify our thinking should give us pause. For example, we each hold certain ideas/beliefs which have such personal importance that it is doubtful whether any type or amount of evidence could dislodge us from our convictions. In summary I offer the following tale:

A SUFI TALE

My friend, a man once hurt his leg. He had to walk with a crutch. This crutch was very useful to him, both for walking and for many other purposes. He taught all his family to use crutches, and they became a part of normal life. It was part of everyone's ambition to have a crutch. Some were made of ivory, others adorned with gold. Schools were opened to train people in their use, university chairs endowed to deal with the higher aspects of this science. A few, a very few people started to walk without crutches. This was considered scandalous, absurd. Besides, there were so many uses for crutches. Some of them replied, and were punished. They tried to show that a crutch could be used sometimes, when needed. Or that many of the uses to which a crutch was put could be supplied in other ways. Few listened. In order to overcome the prejudices, some of the people who could walk without support began to behave in a way totally different from established society. Still they remained a few.

When it was found that, having used crutches for so many generations, few people could in fact walk without crutches, the majority 'proved' that they were necessary. 'Here', they said, 'here is a man. Try to make him walk without a crutch. See? He cannot.' 'But we are walking without crutches,' the ordinary walkers reminded them. 'This is not true; merely a fancy of your own,' said the cripples -- because by that time they were becoming blind as well; blind because they would not see.

(Shah, 1971, pp. 353-354)

CHAPTER III

IMPLICATIONS ARISING FROM THE CONCERN/ COMPETENCY DISTINCTION

> Men and women are creatures built on a certain scale. We do not easily understand, because we do not directly perceive, either the very small or the very large. This fact profoundly affects our purposes and our competence. (Beer, 1975, p. 348)

One of the notions that emerged from the previous chapter is that because we happen to feel strongly about an idea we should not assume that these same feelings are an accurate guide to the importance of the issue or a precise indication of what we might do about the matter. Caring about the present and future condition of the biosphere and urging others to be concerned must be distinguished from the special kinds of competencies necessary to identify, to evaluate and to work on various types of issues in the field of environmental education. Lacking specific knowledge about these matters we are prey to the trap of overreacting to the perceived situation of the hour. Stirring appeals are made on the need to take immediate action to control our destiny. Methods are formulated without consideration of the preparation of the individuals involved.

Forrester (1971) states that many activities accepted as common practice in the social sciences and government appear to be based upon two questionable assumptions. One is that the major difficulty

is shortage of information and data. The other is that "once data is collected people feel confident in interpreting the implications" (Forrester, 1971, p. 3). A major goal of environmental education is to produce informed citizens who can then apply their knowledge of the biophysical and social environment to environmental/social problem-solving. Hart (1979) cites several authors who tend to attribute many environmental problems to human beliefs and values. He identifies 'values clarification' as a major component of environmental education. Thus methods within the field focus upon the acquisition of biophysical and sociocultural knowledge, awareness, attitudes of concern and problem-solving skills. This emphasis in the environmental education literature suggests that the strategic factors are motivation and insufficient information rather than capability; that people are unaware and unwilling rather than unable to take appropriate action; and that the conditions for effective action prevail.

The main purpose of this chapter is to explore these latter notions of capacity, competence, and requisite conditions and thus follow Heilbroner's (1975) suggestion that "we must go beyond an appraisal of the seriousness of these problems [population growth, war, environmental degradation] to an estimate of the likelihood of mounting a response adequate to them, and not least to some consideration of the price that may have to be paid to muster such a response" (p. 61). In this chapter I will present the views of

selected writers that should cause us to seriously ponder the severe problems to be faced in attempting the planned control of complex systems, be they individual, societal or ecosystems. The first section will focus upon the ability of social organizations or social systems to respond. The second section will focus upon our individual capabilities to respond as it relates to our ability to change and adapt.

Social Organizations or Social Systems

Shubik (1967) presents some of the assumptions, both implicit and explicit that surround much of the economic and political thought in the United States. He characterizes such thinking as devoted faith to "free-enterprise democracy". Some may presume such faith to be an anachronism but there is ample evidence of it in the environmental education literature. Shubik lists and examines the special conditions that have to prevail if the market mechanism and voting procedures are to succeed. He doubts that the conditions have ever applied to a major segment of any society. Further, he states that because of the nature of modern society, the growth of information technologies, populations and cities, the chances of the conditions to ever hold are very slim. Shubik also discusses what he believes to be one of the central problems of the social sciences: the "aggregation of individual wants and powers into social wants and powers" (p. 774). Historically we have turned to social organizations or institutional

arrangements to satisfy the relation between the individual and her society: "to help people do what individually they wouldn't but collectively they may wish to do" (Schelling, 1971, p. 68). Shubik does not completely exclude the possibility of constructing institutions to deal with the problems in contemporary society. However he does point out that "it is neither obvious nor true that there may be any institutions that enable our desires for decentralization, dispersion of power and equality (or equity) of distribution to be simultaneously satisfied" (p. 775).

A project undertaken at Harvard University generated several papers which probed the following:

> 1. To what extent are the present day difficulties of our society inherent in the very size of this society ie. in the consequences of individual behaviour becoming exaggerated through massive aggregation? In other words, to what extent are our social dilemmas the traditional ones - now writ large - of the interactions of individuals having diverse wants?
>
> 2. To what extent do the problems we face reside primarily in given institutional arrangements, particularly the role of large organizations in society?
>
> (Bell & Kristol, 1971, p. 60)

Schelling's (1971) essay is one of the papers addressing those questions. He presents several familiar examples including expressway traffic, congested roads through the wilderness, brown outs, suburban water conservation, population control and various situations of segregation to illustrate common situations of individual decision and

collective interest. Accepting the fact that "most people are more concerned with their own affairs than with the affairs of others, and more aware of their concerns than the concerns of others" (p. 67), Schelling suggests that social organization may be more pertinent than human nature. Schelling argues that the interdependence of individuals in a tightly-packed urban society itself produces a set of new and major problems that cannot be solved by conventional economic or administrative methods. Many decisions are exceedingly individual but the consequences are aggregate. Moreover, there is a magnification of small, insignificant actions or decisions into massive, often harmful results. Schelling points out that the "inertia of social decisions is impressive and some times exasperating" (p. 63). He explains that our present institutions developed during a period of "scarcity of goods". This is in contrast to the major contemporary environmental issues which result from a "plethora of bads". He states that "for the most part our institutions were developed to help us keep things, not to make us keep them; to economize scarce goods, not to suppress the bads; to keep others from removing what we wanted, not from leaving behind what they were through with" (p. 78). He sees two inadequacies of our "inherited institutions". One is that they have poor systems of accountability. Thus, even though "some among us care about the nuisances they generate they do not have to care" (p. 78). For the most part our institutions do not reward conserver behaviour. The

second inadequacy is that there are few if any mechanisms that inform individuals about the aggregate consequences to which their individual actions are a contributing factor. Schelling notes that even if we can identify environmental degradation we "still have to organize our behaviour to bring our by-products under the 'social contract' that long ago began to govern the goods themselves" (p. 79).

Schelling (1971) illustrates the organizational aspects of the social problem of segregation through a simple but enlightening exercise involving a checkboard, pennies and dimes (representing the two homogeneous groups -- men and women, blacks and whites, students and faculty, swimmers and surfers), and a few rules.[1] He demonstrates how a moderate urge to avoid small minority status may cause a nearly integrated pattern to unravel and a highly segregated neighbourhood to form. People will often choose the way that reinforces polarization. Schelling's striking finding is that, "an aggregation of many 'micro-motives' can result in a society of tolerant, rational individuals creating more social or racial segregation than any single member desires or than the society itself deems socially desirable" (Bell & Kristol, 1971, p. 60). With respect to the many "tantalizing and familiar problems" he presents, Schelling concludes that "some severe problems result not from the evil of people but from their helplessness as individuals" (p. 90) in the face of "the relation of molecular incentives to molar results" (p. 98).

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[1] For a complete explanation of the exercise see Appendix B.

Hardin's (1968b) article "The Tragedy of the Commons", now widely reprinted and acquiring the status of a classic, describes the tragedy "that lies in the remorseless working of things". He offers several examples to describe how the tragedy of the common develops. Due to the nature of the system which includes individuals and a commons area, "ruin is the destination toward which all men rush each pursuing his own best interest in a society that believes in the freedom of the commons" (Hardin, 1968b, p. 1245). The inherent logic and structure of the situation generates tragedy. Hardin argues the need for new social arrangements -- "mutual coercion, mutually agreed upon".

Crowe (1977) states that Hardin (1968b) makes three assumptions when he turns from the technical to the political and social realm for solutions to a particular subset of problems (ie. population, atomic war, and environmental corruption). He further states that these three assumptions are necessary if the tragedy is to be avoided. Crowe believes that the "remorseless working of things" in contemporary society is the erosion of three social myths which form the basis for Hardin's assumptions: the myth of the common value system; the myth of the monopoly of coercive force; and the myth of administrators of the commons. Crowe cites several examples that illustrate the presence of a hierarchy of a number of conflicting values in American society. He suggests that civil rights conflicts in the South, in urban ghettos, in the streets of Chicago and on college campuses, and the Vietnam war, to mention a few, have

diminished belief in a centralized "coercive" force. He does not believe that the majority is capable of enforcing the type of social constraints necessary to avoid the commons strategy. The third myth is just that in Crowe's mind. He is very skeptical about the ability of "the administrative arm" to legislate temperance or anyone to invent the corrective feedback measures "to keep the custodians honest". Crowe points out that the rhetoric from "the custodians of the commons" to the large but unorganized groups in America is reassuring but the daily operation is very different. In reality the regulating agency usually fosters and legitimates the interests of the regulated. Crowe states that "this process has been so widely commented upon that one writer has postulated a common cycle for all attempts to develop regulatory policies ... which ends with the staff of the regulating agency being drawn from the ranks of the regulated" (p. 61). In his concluding section Crowe admits that

> earlier in this article I agreed that perhaps until very recently, there existed a set of conditions which made the solution of Hardin's problem subset possible; now I suggest that the concession is questionable. There is evidence of structural as well as value problems which make comprehensive solutions impossible and these conditions have been present for some time. (p. 61)

As examples of the structural problems Crowe offers the operation of a sequential and incremental rationality as evidenced in the governmental budgetary process and the American involvement in

Vietnam. He assigns the budgetary process a central role in responding to the problems in contemporary America by viewing "politics as process by which the government mobilizes resources to meet pressing problems" (p. 61). He questions whether this incremental rationality is sufficient to deal with twentieth century problems which require a more comprehensive response. Crowe leaves us with the question of "whether there are solutions to any of the major problems in modern society" when he points out that "the operational requirements of modern institutions make incremental rationality the only viable form of decision making" (p. 62).

Heilbroner (1975) discusses the problem of response "in terms of the flexibility of the social organizations that mobilize human effort and that powerfully influence human activity" (p. 62). He examines our collective capacity for responding to the environmental/social problems by considering the adaptive properties of the two major contemporary socio-economic systems -- capitalism and socialism. At the outset Heilbroner addresses the difficulty of identifying a "typical" capitalist or socialist nation for analysis. He implies that his definition of the terms (and subsequent choice of the U. S. and Russia) permits a suitable level of abstraction and that "it is the behaviour of general socio-economic systems in which we are interested, not the behaviour of particular examples of those systems" (p. 63). Also, by discussing two terms so commonly used in day-to-day and scholarly conventions "it at least forces us to examine the

specificity that can be given to them even if it turns out to be very small" (p. 66). A second reason given in support of his choice is that "for all the variety in national forms, both systems must cope with common problems rooted in their economic and social underpinnings" (p. 66).

Heilbroner illustrates that historically there are "surprising" similarities in terms of outcomes between these two systems which are otherwise widely different. This leads him to suggest that the adaptability of both systems is affected by common elements. He identifies these common elements as "the forces and structures of scientific technology on which both systems depend for their momentum" (p. 76). Despite the many characteristics peculiar to each system, Heilbroner asserts that by looking more deeply "we can find a substratum of common problems that spring from the industrial civilization of both systems" (p. 77). Next Heilbroner examines the ability of both systems to cope with several problems converging in the future: population growth and accompanying social pressures, dwindling resources, extremely unequal distribution of global resources, threats of war and nuclear blackmail, and environmental degradation. He concludes that the challenges ahead will affect the two systems differently in the short run but similarly over the long run. In the short run for example, he expresses serious doubts whether the political freedoms and representative democratic political approaches could be maintained considering the severity of the

economic and social changes necessary to deal with the problems outlined earlier. Generally he is skeptical about the ability of either socio-economic system to weather the transformations ahead. In summarizing his lengthy analysis of capitalism and Western socialism Heilbroner points out that his conclusions

> rest on the central place which we have assigned to industrial technology, the source of social and economic pressures that impose common problems on both social orders, regardless of their different institutions and ideologies. Beyond that conclusion, however, our analysis becomes blurred. The logic of socio-economic analysis takes us a certain distance, and then leaves us with a sense of indeterminacy and incompletion. (p. 99).

The reason for the "sense of incompleteness" is because the political aspect has not been addressed directly. Heilbroner's consideration of the political and psychological dimensions of the human capacity for response will be presented in the second section of this chapter.

Several authors examine social planning and control from a general systems perspective. Lewin (1968) discusses the feedback problems of social diagnosis and action. He states that the transition from an idea of planned social action to the actual plan requires goal statements in sufficient detail to serve as a "blueprint of action", an assessment of the present situation and feedback mechanisms to determine if in fact a given action moves one in the intended or appropriate direction. He asserts that in a good number of social management situations (for example those dealing with

minority problems, education, conducting conferences or committees) "the effort might lead to the satisfaction of action" but not actually reach the objective. Along similar lines, Hardin (1968a) states that "systems analysis points out in the clearest way the virtual irrelevance of good intentions in determining the consequences of altering a system" (p. 457). Lewin concludes that social management in the various areas of modern society faces a tremendous task because "its solution presupposes social fact-finding of an unheard magnitude" (p. 444).

Maruyama (1968) speaks to the issue of controlling complex systems by discussing the cybernetic principle of "deviation-amplifying mutual causal relationships". Mutual causal systems are those in which the elements within a system influence each other simultaneously or alternatingly. This influence can be in two directions. "Deviation-amplifying" systems have mutual positive feedbacks among the elements while "deviation-counteracting" systems have mutual negative feedbacks among the elements. Although the systems that Maruyama discusses exhibit both types of feedback he focuses his discussion on the former because its implications have been lost in the predominate study of the latter. Systems in which the mutual causal effects are deviation-amplifying include accumulation of capital in industry, evolution of living organisms, the rise of cultures of various types, interpersonal processes which produce mental illness, international conflicts and the processes that

are loosely termed as "vicious circles" and "compound interest". In these situations an insignificant or accidental "initial kick" (action) builds up (or amplifies) deviations and diverges from the initial condition -- often in drastic or unexpected ways. It is the process itself that generates and determines the complex structure of the situation rather than the initial condition or act. This has the potential for positive implications regarding social management if we could ensure that the process, once underway, would work for us. However the greater the complexity of the system the more difficult it becomes to determine the direction of the deviation. In non-cybernetic language, collective solutions to social/environmental problems that include attempts to control complex systems are inherently unstable and will continually produce unanticipated results.

Rather than directly answering the question "Is good planning possible?" and thereby adding to the plethora of literature supporting and condemning planning, Hardin (1968a) chooses a different approach. He leaves the principle question and asks a second question: "If successful planning is possible, what are the preconditions?" (p. 458). He presents eight major points that seems to be at issue through the following questions:

1. Can it be shown, before instituting a plan, that all significant factors have been taken into account?
2. Are we sure that we can predict all possible interactions of factors, even when we have complete

knowledge of them?
3. Granted that we can predict a new and better stable system, can we also devise an acceptable transition?
4. Can we take adequate account of the reflexive effect of knowledge and planning on the actions of the planned and the planners?
5. Can it be shown that programming, in the light of the reflexive effect of knowledge, does not lead to some sort of infinite regress?
6. Can the calculations be carried out fast enough?
7. Can we persuade men to accept change?
8. Will any plan we adopt have adequate self-correcting mechanisms built into it?

(p. 458)

Question number two above is the least disturbing for Hardin because of the advances in computer technology. He is doubtful concerning the rest. Regarding the design of an acceptable transition, for example Hardin reminds us that available historical information indicates that transitions procure an immense wastage of human resources and much suffering. In general "transitions seem more feasible for small populations than large -- but will small populations ever exist again?" (p. 458). Regarding question seven he points out that "a casual survey of important reforms effected in the recent past shows that each of them took about seventy-five to one-hundred years for completion" (p. 458). It seems to Hardin that the rate at which problems appear is now accelerating and that there is little indication that the rate of solutions is accelerating.

Forrester (1971) attempts to "give a glimpse of the nature of multiloop non-linear feedback systems, a class to which social systems belong" (p. 16). He draws upon examples from his direct work

experiences within corporations and urban systems and from computer models of world systems. His main points are: one, the human mind is not adapted to interpreting how social systems behave; two, there are characteristics inherent in our present social systems that mislead people. He states that "there are orderly processes at work in the creation of human judgement and intuition that frequently lead people to wrong decisions when faced with complex and highly interacting systems" (p. 1). Forrester explains that for the most part the mental models or images constructed by humans are fuzzy, incomplete, imprecisely stated and contain differing fundamental assumptions -- "goals are different and remain unstated". Usually there is an internal contradiction between the assumed structure and the assumed future consequences. The human mind is usually not successful in determining "the dynamic consequences when the assumptions within the model [situation or scenario] interact with one another" (p. 2).

Forrester (1971) presents three characteristics of social systems that tend to mislead people. The first characteristic is a result of our past experience which has been developed from contact with simple systems. Thus, "a social system tends to draw our attention to the very points at which an attempt to intervene will fail" (p. 7). In the urban system for example, Forrester explains that

> we see human suffering in the cities; we observe that it is accompanied (some think caused) by inadequate housing. We increase the housing and the population rises to compensate for the effort. More people are

> drawn into and trapped in the depressed social system. (p. 7)

A second characteristic of social systems is that all of them seem to have few sensitive influence points. And even if one can identify a particular point of influence in a system "the chances are still that a person guided by intuition and judgement will alter the system in a wrong direction" (p. 7). A third characteristic is that within social systems there is usually a fundamental conflict between the short-term and long-term consequences of a policy change. Forrester points out that this is "especially treacherous" because the short-run is more visible, more compelling and speaks loudly for immediate action. Many of the problems we face today are the result of well-meaning short-term measures taken two or three decades ago. Perhaps it is this realization that prompts environmental educators to call for a present/future orientation. What they fail to address however is what time frame or whose criteria we are to use to distinguish the short-term from the long-term. How do we determine whether a particular "problem" is a matter of short term suffering that we must endure in order to reach long term gains or whether it is a long-term consequence of earlier short-term actions and one which, unless we "understand and begin to take action soon" will produce irreversible global consequences? Moreover, in light of contemporary institutional mobility and the rate of social change how can we expect to monitor or maintain the implementation procedures necessary for long-term

policies over fifty, twenty or even ten years?

In the latter part of his paper Forrester (1971) describes his work with a project sponsored by the Club of Rome in which an international group attempted to gain a global perspective of social systems by working computer models at the world level. With their particular model the computer calculates and plots the results that unfold through time, given a set of beginning conditions and assumptions about the system. Forrester presents his analyses of the effects of changing population and economic growth factors over the next fifty years. It shows the interrelation of five "system levels": populations, capital investment, natural resources, pollution and the fraction of capital devoted to agriculture. He discusses several examples and points out processes "wherein a program aimed at one trouble symptom results in creating a new set of troubles somewhere else in the system" (p. 12); or, where "incipient success can set in motion forces to defeat the initial effort" (p. 12). His work also suggests a cautious approach to programs based on "short-term humanitarian impulses" specifically and on raising or improving the quality of life generally.

Human Systems

Paul MacLean's research and resulting view of the brain questions the long held assumption that the more advanced parts of the brain must be primarily responsible for the behaviour of man. MacLean has

demonstrated that man has not one brain but three; an old reptilian brain, an old mammalian brain and a more recent (in evolutionary terms) mammalian brain called the neocortex. They are extensively interconnected but are capable of functioning somewhat independently and are often "out of step" with each other. The following description of the "triune brain" is summarized from Hall (1973), Holden (1979), Long (1980), McClaren and Logelin (1981) and MacLean (1973). The old reptilian brain or R-complex takes care of the vital functions and is basic for such genetically constituted or instinctive behaviours as territoriality, mating, insistence on routine, social conformity and other ritualistic, imitative behaviours. Evidence suggests that nature economically uses the reptilian brain as a storage mechanism for parroting learned forms of emotional and intellectual behaviour acquired through the limbic and neocortical systems. This is exemplified by the phenomena of having once acquired a verbal or other skill we can later repeat it, so to speak, almost instinctively or mechanically.

Between the old reptilian brain and the new mammalian brain lies the old mammalian brain or limbic lobe. MacLean (1973) suggests the term "limbic system" for the limbic cortex and structures of the brain stem with which it has primary connections. The limbic system evolved in response to evolutionary pressures for birds and mammals to live in group. The limbic system makes it possible to experience emotions and to read significance into the environment. In fact, according to

MacLean one of the most fundamental things learned about the nervous system to date is that "the only part of the brain that can tell us what we perceive to be real things is the limbic brain" (Holden, 1979, p. 1068). It guides behaviour required for self-preservation, preservation of the species and procreation. It plays an important role in refining observation in order to handle increasing environmental complexities. Limbic discharges may result in feelings of depersonalization, distortion of perception, paranoid delusion and hallucinations. As well, the limbic system appears to provide "the ingredients for the strong affective feelings of conviction that we attach to our beliefs, regardless of whether they are true or false" (MacLean, 1973, p. 123).

The third brain -- the new mammalian brain, neocortex or cerebral cortex -- lies on top of and surrounds the other brains and has much to do with the human capacity for logic, language and other symbolic behaviour. The fact that the neocortex receives signals mainly from the visual auditory and somatic systems suggests that it is primarily oriented to the external environment. Clinical evidence indicates that the reptilian and old mammalian-type brains lack "the neural machinery for verbal communication with the neocortex" (MacLean, 1973, p. 123). This incapacity for verbal communication creates a "generation-gap" which often results in their working at cross purposes. MacLean's research findings strike a blow to the supremacy of the neocortex. From his perspective, people "enamoured of

theorizing" on the differences between the right and left cerebral hemispheres are "off track" somewhat. MacLean explains that "many of the creative, emotional and spiritual impulses ascribed to the right hemisphere are more properly attributable to the limbic system" (Holden, 1979, p. 1060).

MacLean (1973) discusses the implications of his research for contemporary society by pointing out that there is abundant evidence from animal behaviour studies to show that crowding is conducive to aggressive and combative behaviour. The most disturbing factor for him at the international level is "the problem of controlling man's reptilian intolerance and reptilian struggle for territory while at the same time finding a means of regulating our soaring population" (p. 124). However, he states that the greatest difficulty has to do with our "getting out of step with our animalities". To MacLean it seems that

> ever since Sputnik our educational leaders have been planning our existence as though we had to satisfy our neocortex only. Designed to come up with new ideas, the neocortex appears to thrive on change. With its imagination that exceeds the speed of light, the neocortex may be able to keep up with the present accelerated tempo of life through speed reading, help of computers, and other contrivances, but the two animal brains which are our constant companions move at their own slow space. They have their own biological clocks and their own sequential, ritualistic ways of doing things that cannot be hurried.
>
> (p. 124)

Gevarter (1975) integrates brain research and cybernetics in

order to explore the degree of our freedom to act. He begins by sketching a way of looking at the brain based on a new brain-old brain division. He compares the brain to a computer that is programmed biologically, socially and via trial and error. Human behaviour appears to be related to the internal brain mechanisms associated with this programming.[2] The brain models events in order to minimize the input data requirements to the brain. It only needs partial information (cues) to construct the complete perceived event. There is a tendency to distort the input of perceived reality when it deviates from the model(s) in the brain. Regarding output, Gevarter states that "for nonhabitual responses, the brain acts in an operations research fashion to produce automatically a response based upon a weighted integration of one's true values (old brain values), one's knowledge of the situation and one's internal psychological stress" (pp. 81-82). There is a heavy bias toward present needs particularly under stress. Gevarter summarizes his model through the following postulates:

1. The rational portion (conscious cognitive portion) of one's thought occurs primarily in the cerebral cortex (new brain).
2. What one really believes is centered in the old brain. Here is contained the basic value system (rules for survival) upon which one acts automatically and which gives rise to actions and emotions.
3. The new brain evolves its ideas and value system primarily by the use of consciousness (and intuitive

[2] Authors that discuss the "programming" aspect in more detail include Deutsch (1968), Hart (1975) and Laing (1967).

cognitive thought processes).

4. The models of reality centered in the old brain are relatively coarse (undetailed), dealing primarily with how people relate to themselves (in terms of their self-concepts and expectations), to others, and to the world.
5. The old brain evolves its value system primarily by direct (consciously uninterpreted) experience -- that which has emotional impact. This is in contrast to the new brain which evolves its value system through rational interpretation of experience and through cognitive acts.
6. The old brain programming becomes relatively permanent as the individual matures.
7. There is a low transference of ideas and values accepted by the rational faculty from the new brain to the old brain.
8. The new brain programs can be changed with new perceptions.

(pp. 80-81)

Gevarter then attempts to subsume the views of Gobel (1971), Maslow (1970), Skinner (1971) and the ideologists (the latter seeing humans motivated primarily by their learned ideologies) into a more "wholistic picture which also fits the postulated physiologically based model of brain function" (p. 83). He lists six factors that affect the programming of individuals: their basic genetic endowment, their chance to develop physiologically and emotionally, their need level, their experience, their teaching and the environment about them. He suggests that in the early years children build a basic value system in the old brain. Because of the nature of the old brain, those ideas/models are "absorbed" relatively uncritically. He concedes that in large measure individuals are a product of this programming and that "people are not completely free". Delgado (1969)

indicates how this might affect adult life:

> We may disagree with the system of values and ideology given to us and subsequently we may espouse a different philosophy and try to assume another identity. Great alternations are possible, and we may cherish or curse our past, but its cultural elements will be forever our frame of reference. In the depth of our minds we are going to discover only the remains of what we have learned and experienced ... Basic emotional patterns of response were established during early childhood and their later changes are limited. This fact is in part to the progressive loss of neuronal plasticity through age. (Delgado, 1969, in Gevarter, 1975, p. 86)

Bowlby (1969) utilizes cybernetics and information theory to examine behavioural systems mediated by instinctive behaviours. He integrates biology and psychological analysis in his work on attachment, separation and loss in human infants. The stance taken in this thesis is that these behavioural systems account for a significant portion of human behaviour and are particularly influential in the early development of human beings. Thus some understanding of the nature of these systems is relevant to the major question being pursued regarding the human capabilities for change. His work also demonstrates the incredible complexity of behavioural systems and subsystems.

Bowlby (1969)[3] describes various types of behavioural systems ranging from simple to sophisticated. One of the simpler types of systems governs a "fixed action pattern". Fixed action patterns appear somewhat similar to a reflex but differ radically in that the threshold activation of a reflex is constant while the threshold activation of the former varies according to the state of the organism. Higher primates including humans are poorly equipped with this type compared to other species. Examples in humans are yawning, sneezing and in infants, rooting, grasping, crying and smiling. The latter group plays an important part in the earliest phases of interaction. Behaviour that is one degree more flexible than the fixed action pattern occurs when a fixed action pattern is combined with a simple sequence of movement that is dependent upon feedback from the environment. These more flexible behavioural systems can lead to two sorts of predictable outcomes; set goals and those that

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[3] The aspect of Bowlby's work summarized in this section comes from his chapter examining the means whereby patterned movements are oriented in space and structured so that predictable outcomes are reached, and the principles by which a number of behavioural systems come to be organized and coordinated over a span of time. In later chapters he discusses the activation and termination of behavioural systems which gives rise to a different set of issues. As well he points to ways in which the different types of behavioural systems account for different aspects of human infant behaviour in relation to the mother. He also extends his discussion of "model making in the brain" by advancing the theory that much psychopathology is regarded as being due to models that are in greater or lesser degree inadequate or inaccurate. In Volume II of his work he discusses the pathological consequence of separation and bereavement in these terms.

are not set goals[4]. A set goal is "not an object in the environment but is either a specified motor performance ... or the achievement of a specified relation of short or long duration between the animal and some object in or component of the environment" (Bowlby, 1969, p. 69). Bowlby focuses on the former and chooses the term "goal-corrected" rather than "goal-directed" to describe behavioural systems structured in terms of set goals. What characterizes a "goal-corrected system" is not that it reaches a predictable outcome but that it does so by a special process. Bowlby explains that process:

> From a large repertoire of stereotyped or variable movements the system selects movements in a nonrandom manner and in such a way that they bring the animal progressively nearer the set goal. The more sophisticated the process the more economical the behaviour. Efficient goal-corrected behaviour is valuable, not necessarily in the sorts of behaviour used, but in the large number of starting points from which the set-goal can be reached.
> (p. 70)

Following his examination of different types of behavioural system, Bowlby discusses three of a number of different ways in which their activities can be co-ordinated: chain, causal hierarchy and plan hierarchy. One of the simplest methods of organizing behaviour that has to change in a specified way over time is by means of a chain,

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[4] Bowlby (1969) explains that "both sorts of outcome can, however be referred to generically as 'predictable outcomes', provided it is realized that the prediction is contingent on a number of conditions and that, if these change, the prediction is falsified. The term 'predictable outcome' must therefore always be read as short for 'conditionally predictable outcome' (p. 70).

each link of which is a behavioural system. Chain linked organization can be made more flexible by the presence of alternate links at any point in the chain. Then, whenever activation of the first of a set of behavioural systems fails to achieve results that activate the succeeding system in the chain, one of the other systems becomes active. Further, any particular link in a chain can be a behavioural system of any degree of complexity.

A second method of organization is one in which all the behavioural systems concerned share a common causal factor. Such a causal factor might be the level in the body of a particular hormone or the sight in the environment of a particular object. An understanding of this mode of organization entails consideration of the factors that activate or terminate behavioural systems. Bowlby takes his lead from the work of Miller, Galanter and Pribram (1967) in naming the third method "planned hierarchy". Bowlby (1969) summarizes their work as follows:

> They have shown how some of the most complex and flexible sequences of behaviour could in principle be organized by means of a hierarchy of systems, the highest of which, the plan, is always goal-corrected and many of the subordinates of which are likely to be so as well.... The illustration drawn from learned behaviour is the kind of routine each of as follows on rising of a morning.... In a hierarchical system of this sort, each plan and sub-plan is to be regarded as a set of instructions for action. As in the case of a military operation, the master plan gives only main objective and general strategy; each commander down the hierarchy is then expected to make more detailed plans and to issue more detailed instructions for the

> execution of his part in the master plan.... Yet even when behaviour is organised as a plan hierarchy there is a limit to the extent to which deviations of environment can be coped with. When the environment deviates too greatly from that presupposed by the master plan ... the plan cannot be executed.
> (pp. 77-79)

What is significant here is that most of the sub-plans involved in our daily routines are carried out with little conscious awareness on our part.

Moving into a discussion of higher processes of integration and control Bowlby takes the position that in order to understand human behaviour it is not only reasonable but necessary to postulate that the brain builds up working models. He states that individuals require two working models if they are to frame effective plans: an environment model which includes knowledge of their world and an organismic model which is knowledge of their capabilities in terms of behavioural skills and potentialities. Further, he presents three measures that are required if an organism is to exploit a working model usefully:

> First a model must be build in accordance with such data as are or can be made available. Secondly, if the model is to be of use in novel situations, it must be extended imaginatively to cover potential realities as well as experienced ones. Thirdly, any model whether applicable to an experienced world or to a potential one, must be tested for internal consistency.
> (p. 81)

These measures do not "naturally" occur in the development of human beings. Bowlby points out that as a rule keeping models up to date requires only a continuous feeding in of small modifications, usually so gradually that it is hardly noticeable. Radical changes of a model are called for if some major change in the environment or the organism occurs. Bowlby's clinical evidence suggests to him that the necessary revisions of models are not always easy to achieve. He states that usually the revisions "are completed but only slowly, often they are done imperfectly and sometimes done not at all" (p. 82). Bowlby briefly mentions language as a special and unique feature of human behavioural equipment. In terms of his discussion, "the possession of language enables the organization of behavioural systems in planned hierarchies to be carried to astonishing lengths" (p. 83).

Bowlby emphasizes that a very great deal of human behaviour "cannot by any stretch of the term be called instinctive". But neither does it follow for him that because much adult behaviour is organized in "complex learned hierarchical integrates", there are no simpler, more environmentally stable chain-linked systems present. He points to the neurophysiologists' contribution that the central nervous system of higher species are built on conservative lines. Bowlby suggests that rather than the neural equipment of early design being scrapped it is more likely that "the neural equipment of higher species incorporates within itself all the earlier design features and then adds to it new systems that modify and sometimes override the

activities of the old" (p. 84). Following that, he concludes the chapter by relating the study of behavioural equipment to the study of human behaviour. Bowlby (1969) suggests that

> if the early and simpler versions of neural equipment are an integral part of neural equipment of advanced design, it is more than likely that the same applies to behavioural equipment. It would indeed be very strange if, even in the most advanced behavioural equipment of which we know, early design features did not play a significant part ... There is in fact good reason to think that in the early infancy of man most of the behavioural systems in working order are simple ones and integrated chains. As development goes forward, goal-corrected systems become more evident ... environmental and organismic models are elaborated. (p. 84)

Reynolds' (1976) book attempts to bring together a series of arguments and bodies of data relevant to the description and understanding of human action. Part I presents a set of ideas and supporting evidence about the biology of human action. It critically reviews the concept of biological determinism. The chapters in Part II formulate a speculative argument on the evolution of conceptual thought. It emphasizes the conceptualization by individuals of their life situations and ideas of what is appropriate for them to do rather than inner causal mechanisms in the exploration of social action. Part III and Part IV exposes some of the foundations that have been laid thus far concerning the manner of functioning on the growing human organism. The former presents the "harder" evidence on physical development and attempts to clarify levels of inference in this area,

ie. "you cannot jump from genes to actions". The latter examines psychological and social development drawing upon the work of child ethologists and child psychologists. The concluding Part V returns to the theme of Part II: humans acting in the world of their own construction. In the first chapter in Part V Reynolds discusses the "biosociology of knowledge" and looks at the world of ideas we, in modern Western industrial societies, inhabit. He argues against the idea that "there is something within man's nature or 'biogrammar' that in some way structures his social dimensions" and argues that "there is something in social structures and structures of thought that provide a more or less workable matrix for the physiology of the human nervous system and other systems of the body" (p. 212).[5] His final chapter, which is an "effort at a synthesis" of the organic and psycho-socio-cultural aspects, examines our limits of flexibility.

In this last chapter Reynolds introduces an important corollary to his hypothesis of social knowledge as the matrix for biological functioning. He states this corollary as follows:

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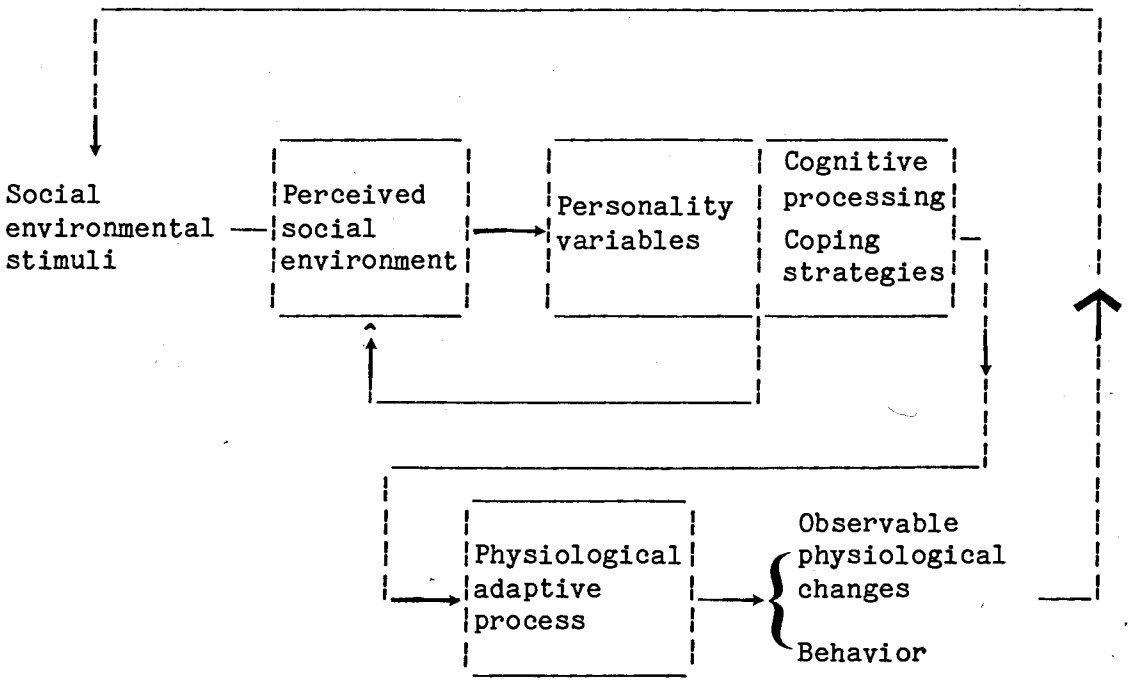
[5] Along similar lines Bateson (1979) explains: "The individual body undergoes adaptive change under external pressure, but natural selection acts upon the gene pool of the <u>population</u>. But note this principle which biologists commonly overlook, that it is an acquired characteristic called 'working in the coal mines' <u>which sets the context for the selection</u> [my emphasis] of the genetic changes called 'increased propensity for developing stronger shoulders.' The acquired characteristics do not become unimportant by not being carried in and passed on by DNA. It is still <u>habits</u> which set the conditions for natural selection." (p. 220)

> Even if a highly structured social thought-world provides the matrix for adequate social action and physiological functioning, this still does not tell us whether there might not be possible social conditions that were unworkable, i.e. that did not permit or bring about a coherent world-view and thus with which the body could not cope.
>
> (p. 213)

This line of thought suggests that "the physiological house is not simply the dependent variable adjusting itself to the social matrix, but has its own limits of flexibility beyond which it cannot be pushed without breaking down" (p. 213). This leads Reynolds to view the biology of social action as "a part of a set of variables forming a system full of homeostatic mechanisms" (p. 214). For example, a change in the social world, say a major economic change from an agricultural to an urban-commercial-industrial way of life will upset and reorder the world of knowledge about how to live. Reynolds draws upon the work of several authors in order to outline the parts of this system. They include: Rahe (1975) whose study of naval personnel showed that sickness was more frequent in individuals who have had major changes in their social circumstances than those who had not: Kiritz and Moos (1974) whose literature review examined the physiological effects of social environments; and Lumsden (1975) whose study examined the adjustment involved in individuals' adaptation to new socio-economic circumstances. Reynolds utilizes the model by Kiritz and Moos (1974) to show how the parts of the system relate to one another (see Figure 1). He outlines the steps involved in their



(Adapted from Reynolds, 1976)

Figure 1. Conceptual Model for the Relationship Between Social Environmental Stimuli and Physiological Changes.

system as follows:

> (a) the conversion of an 'actual' social environment into a perceived social environment within the mind of the individual;
> (b) the sorting or evaluation process in the individual mind, which on the basis of prior inputs, organizes the perceptions and plans for action;
> (c) consequent physical changes in body processes;
> (d) action;
> (e) changes in the 'actual' social environment brought about by action, leading back to (a) above.
>
> (p. 221)

It is significant to consider the hundreds of times these steps are carried out in our daily functioning, few of which we are consciously aware.

Reynolds' differentiation between a biologist's perspective and a moral philosopher's perspective should serve to clarify and temper out expectations somewhat. He illustrates the difference by examining Satre's dictum" 'l'existence précède l'essence'. Reynolds explains that Satre's "existence" does not mean social conformity but rather individual choice and responsibility. It is not the uncritical acceptance of social knowledge or socially sanctioned actions that constitutes humanitarian "existence" but choosing between alternative possibilities of action, conceived by each one of us in his or her own way. In order to prevent an unthinking conformist society individuals must confront their lives and decisions daily, with the aims of humanitarianism at the forefront of their minds, not the dictates of society. Satre expects people to tolerate the anguish of choice.

Reynolds then presents what he calls "a biologist's perspective" by stating that

> Satre is right in principle in what he expects, but he is wrong in thinking that we have all got the mental and physical resources to draw on. If we had been brought up to work out our problems in this way all might be different. But most of us have been reared in starkly authoritarian, institution-oriented, conformist ways that have in the last analysis to do with the power structure of modern states. To go back to individual choice-making of the real kind advocated by Satre must remain an object the means to which we can dimly perceive on the horizon but which, except for a few, must remain a distant prospect.
> (p. 224)

Reynolds lists other areas of research, still in the early stages, that examine the nature and extent of the human being's capacity to adjust to prevailing social conditions. These areas include breakdown of mental competence, the relation of neuro-endocrine mechanisms to psycho-social stress, and the existence of metabolic pathways linking the sedentary/high-stress life-style, and its accompanying dietary and personality components, with early death from heart disease (p. 227). He refers to the work of two researchers in particular who have studied the "tolerance limits" of humans in modern society. Lipowski (1971 and 1973) presents the relationship between symbolic stimuli provided by the social environment, their psychological effects and consequent changes in health. He attempts to integrate data from empirical studies and draw a complete picture of the causes and effects of overstimulation. Lipowski establishes

the role of social stimuli as contributing factors to morbidity in the highly complex, affluent technological societies. Frankenhaeuser (1974) discusses two limitations in particular: "cognitive saturation and emotional saturation" which result from over-stimulation in relation to the rate of change of the surrounding environment. Regarding these two concepts Frankenhaeuser states that,

> Another example of the risks due to over-stimulation involves our reactions to the information flow. Man's ability to receive and handle information is much more limited than one would generally imagine. Experimental studies of decision-making show that increasing the number of information units tends to impair the ability to reach decision ...
> In the long run, perhaps the gravest consequences of straining human tolerance lies on the emotional level, in the process of habituation which is our most effective means of coping with overstimulation. When we are bombarded with excessively many, excessively strong or all too frequent stimuli, the response of the nervous system gradually weakens -- the stimuli lose their impact and the reactions are toned down. The physiological stress effects become less intense and feelings of aversion and discomfort fade, but so do feelings such as involvement, understanding, consideration and sympathy. This attrition of feeling comes about stealthily, without warning signals, because the mechanism of habitation involves a blunting of emotions, a reduction of sensitivity and reactivity. Consequently overstimulation may form part of a general process towards passivity. (Frankenhaeuser, 1974, in Reynolds, 1976, p. 227)

In summary, Reynolds' concluding chapter argues that "our social forms and structures, the world of ideas, and its technological outgrowths that we have created as an environment to live in, can get the better of us, and the limitations of which we speak are the limits

of the flexibility of the mental and physical machinery within each one of us" (p. 229).

Thus far our discussion of the human ability for response and change has emphasized physiological aspects of human action. Closer inspection of the single term 'action' (or behaviour or doing) has revealed a substratum of intricate, complex, interconnected processes, most of which we are totally unaware and ignorant. Notions of constraint, hierarchical organization and ranges of flexibility have emerged. Specific examples have been presented that suggest some practical implications of the view that 'organisms are an integral part of their environment'. Inevitably, an examination of human behavioural systems leads us outside the arbitrarily designated boundary of the skin and into those areas traditionally identified with psychology, sociology and anthropology.

Schelling (1980) examines the issues surrounding the modification of habits, values or "other deep-seated matters" by focusing on individual rather than societal problems (to the extent that the two can be separated). In his discussion on the problem of self-management Schelling points to those "more mundane issues familiar to us all". His countless examples are 'close to home' and include smoking, eating habits, drinking, exercise, personal budgeting, being on time, gambling, procrastination, loss of temper and mannerisms. He states that "it seems difficult for many of us -- on matters great or small -- to do the things we decide to do or quit

the things we decide to quit" (p. 95). Schelling's perspective should cause us to reconsider the human ability to control the social and biophysical worlds when we find so difficult to control ourselves individually from day to day.

Etzioni (1972) examines one of his core assumptions which is "shared by many social scientists", that "man can be taught almost anything and quite readily". He does not deny that people can be taught many things, for example, "speed reading, belly-dancing and Serbo-Croatian". However, when he considers "the modification of ingrown habits, of basic values, of personality traits or of other deep-seated matters the impact is usually much less noticeable" (p. 45). Etzioni discusses various campaigns or programs to decrease smoking, rehabilitate criminals and heroin addicts and reduce the death toll on American highways. The attempts he examined were generally characterized as "rather monumental, perhaps impossible, educational missions". It has become increasingly apparent to Etzioni that "to solve social problems by changing people is more expensive and usually less productive than approaches that accept people as they are and seek to mend not them but the circumstances around them" (p. 45). Although most of his examples are drawn from adult education programs Etzioni states that his views hold true for children also, but only to a lesser degree. His example of the failure of intensive educational campaigns in the United States to help children from disadvantaged backgrounds "catch-up" illustrates his point that most

policy-makers and the general public "enormously overestimate what the education of children can achieve" (p. 47).

Heilbroner (1975) outlines the major "external challenges" facing humankind as the pressures from population growth, diminishing natural resources and the threat of nuclear war and/or blackmail. He argues that industrial nations will face mounting tensions and eventual major transformations. After examining the socio-economic capabilities for response (presented in section I of this chapter) he turns to the "political dimension" and further argues that because of the nature of these problems the "boldest and most far-reaching" exercise of political power will be necessary. Heilbroner singles out two attributes of "human nature" which he states are "the necessary preconditions for the successful functioning of political institutions in mobilizing individuals for tasks of peace and war" (p. 104): obedience and national identification. His choice of these attributes stresses the psychological underpinnings of political life. Heilbroner begins by focusing attention "on a central fact of human existence -- the extended period of helplessness and development through which all human beings must pass and in which the elements of their adult personalities are first molded" (p. 103). He points to the expressions of obedience (easier to locate in earlier years) in adult behaviour as the "normal willing acquiescence of man in the exercise of political authority itself" (p. 105). Legitimation of the acceptance of this authority usually focuses on objective

purposes such as the preservation of property, the conduct of war, the establishment of law or the safeguarding of a society threatened by the environment. Heilbroner adds a latent function of political authority, namely, "to provide a sense of psychological security by re-creating the accustomed relationships of sub- and superordination to which our long period of helplessness dependency has accustomed us" (p. 105). Heilbroner does concede that the early conditioning period is also a source of self-assertion drives, that a general tendency towards obedience finds manifold expressions in adult behaviour and that stressing the biopsychological underpinnings of political submissiveness does not deny the importance of other influencing elements. But he still contends that the object purposes are not sufficient to explain "the perplexing readiness, even eagerness, with which authority is accepted by the vast majority" (p. 107). He argues that in times of war, civil commotion or general anxiety the pressure of political movement pushes in the direction of authority. The implications of this line of thought do not bode well for democratic governments. Heilbroner suggests that "the passage through the gauntlet ahead may be possible only under governments capable of rallying obedience far more effectively than would be possible in a democratic setting" (p. 110). However his intention is not to justify authoritarian governments but to "provide a basis for understanding the critical support that they may be able to provide for a people who will need, over and above a solution of their difficulties, a

mitigation of their existential anxieties" (p. 110).

Many of the solutions to contemporary environmental problems presented in the environmental literature revolve around the importance of identifying with future generations. The second "primal element" that Heilbroner presents as a shaping force in the political future is the capacity for identification -- national identification -- in particular. Heilbroner explains that as a child ages, her capacity to empathize widens and becomes more discriminatingly applied, but that there seems to be "a limit beyond which this general identificatory impulse is blocked" (p. 111). He questions our capacity to form a collective bond with future generations and concludes that

> Contemporary industrial man, his appetite for the present whetted by the values of a high-consumption society and his attitude toward the future influenced by the prevailing canons of self-concern, has but a limited motivation to form such bonds. There are many who would sacrifice much for their children; fewer who would do so for their grandchildren.
> (p. 115)

Edward Hall complements and expands Heilbroner's attempt "to take the measure of man as a creature of his socio-economic arrangements and political bonds" (p. 124). Hall (1977) offers several examples from his cross-cultural work to illustrate the limitations or "hidden constraints" that culture imposes upon individuals. For the most part people are unaware of the pervasiveness of these constraints in their

daily lives. Hall explains that "the most important paradigms or rules governing behaviour, the ones that control our lives, function below the level of conscious awareness and are generally not available for analysis" (p. 43). One reason for this suggested by Hall is because "much of the truly integrative behaviour that falls under the rubric of culture is under the control of those parts of the brain that are not concerned with speech" (p. 153). A second reason is related to the process of learning or absorbing cultural norms in the formative years of the individual's development and to the way the information-processing and control mechanisms of the brain and the central nervous system operate. Hall acknowledges that indeed humans are malleable because much of what "they are and do" is modified by learning. However, he points out that once the behaviour patterns, habitual responses or ways of interacting are learned they "gradually sink below the surface of the mind and, like the admiral of a submerged submarine fleet, control from the depths" (p. 42). Moreover, because they are are ubiquitous and habitual, the "hidden controls" are usually experienced as though they are innate. Hall summarizes the work of Lashley (1929), Pietch (1972 and 1972b) and Pribram (1969 and 1971) on memory which he defines as "the storage and synthesis of information for future use" (p. 195). Hall concludes that their work goes a long way in explaining "the conservatism, one programmed by culture, not only of individual human beings but of whole cultures as well" (p. 196). Their work also explains to Hall

why behaviour, once formed, is so difficult to change and why so much time is required for those changes that do occur.

In his chapter on 'Culture and Identification' Hall discusses two forms of identification: as an individual dynamism that is more or less unique or characteristic of a particular person; and as a manifestation of culture. Because behaviours associated with the two types of the identification process normally operate out of awareness or unconsciously they are resistant to change and tend to persist. Hall explains that the group identification process is "one of the strongest cements that bind cultures together as a whole" (p. 237). Cultural identification is exemplified by people who are insistent that others conform to the mores of the group and who become uncomfortable and anxious if they don't. The process serves a useful purpose (for example, transmitting culture from generation to generation) when change is slow but "wreaks havoc" in times of rapid change. In the contemporary context of an accelerating rate of change Hall asserts that the process of cultural identification "is most certainly a major impediment to cross-cultural understanding and effective relations among peoples of the world" (p. 240).

Summary

The views presented in the preceding section outline various problems to be faced in our attempts to manage or control environmental/social problems. They question the ability of

contemporary social organizations and humans to respond to those complex, converging problems.

Section one focused upon socio-political institutions, the conditions necessary for effective planning and social action, and the phenomenon of individual behaviour becoming exaggerated through massive aggregation or deviation amplification. Several authors (Bell & Kristol, 1971; Heilbroner, 1975; Schelling, 1971; and Shubik, 1967) examined the ability of contemporary institutions to respond by focusing upon the shortcomings that reside in the very size and structure of the institutions themselves. Crowe (1977), Hardin (1968a) and Shubik (1967) delineated the conditions necessary for effective action in the political and social realms. They suggested that those conditions do not presently exist and that there is not a great deal of evidence that they will exist in the near future. The third issue outlined in section one was that an action which initially or from an individual perspective is deemed logical, rational and appropriate may result in greater problems which no one desired or could have anticipated (Forrester, 1971; Hardin, 1968b; Maruyama, 1968, and Schelling, 1971).

Section two focused upon the individual capacity for response as it relates to the ability to change and adapt under various conditions. Several authors discussed the influence of the formative years in human development. They argued that many habitual responses and strategic beliefs are shaped by our social relations and cultural

context. For the most part these responses and beliefs are not subject to critical examination during their formation. Moreover these early acquisitions influence adult behaviour and choice in ways unknown to each of us (Delgado, 1969; Gevarter, 1975; Hall, 1977; and Heilbroner, 1975). A major portion of human behaviour is carried out by a substratum of intricate physiological subsystems (Bowlby, 1969) and guided by the less advanced (in evolutionary terms) nonverbal portions of the brain (MacLean, 1973). The latter may also influence that which we focus our attention upon or deem important to a greater extent than the more advanced portions of the brain (Gevarter, 1975; and MacLean, 1973). The human brain has a tendency to distort input which fails to coincide with its present models of reality. Its responses are heavily biased toward present needs, particularly when under stress, and toward these people within our immediate social context (Hall, 1977; and Heilbroner, 1975). Several authors discussed the limits of human flexibility with respect to behavioural systems (Bowlby, 1969), the brain's ability to significantly alter its basic models of reality (Bowlby, 1969; Gevarter, 1975; and Hall, 1977) and emotional/cognitive tolerance levels within a highly complex, affluent, industrial society (Lipowski, 1971, 1973; and Reynolds, 1976). The human mind is very limited in its capacity to interpret how contemporary social systems behave because of characteristics inherent in those systems (Forrester, 1971). Individually humans can learn many things but the modification of ingrown habits and values

seems to be extremely difficult and sometimes impossible. Moreover, attempts to change people through educational programs may be less effective than other approaches (Etzioni, 1968, 1973; Schelling, 1980).

One purpose of this chapter is to explore the implications of the distinction between concern and competency. Accepting that a number of people are genuinely concerned about environmental/social problems, the preceding sections have explored the issue of competency. That is, the ability of contemporary institutions and human beings to respond to those converging, interrelated problems. Individually each argument is informative, somewhat problematic but surmountable. Collectively however they seriously question the goals and methods of the field of environmental education which focus upon contemporary political and educational institutions as implementation vehicles; upon the ability of a majority of individuals living in a highly complex, affluent, industrial context to make particular changes and adaptations; and upon individuals assessing problems and formulating action plans concerning the management of social/ecosystems. The point is that we may be concerned about particular problems and we may feel a need to do something about them but we may be more handicapped in our ability to do so than we normally concede.

Further Examination of the Goals and Methods of Environmental Education

We have now reached a point of departure whereby the discussion initiated in chapter two regarding the appropriateness of various goals and methods of environmental education can be elaborated upon and extended. The foregoing sections of this chapter have offered an interesting contrast in assumptions about human learning and competency upon which to base such a discussion.

Hart (1979) states that

> The principal feature in the philosophy of environmental education is that man is an integral part of a system consisting of man, culture and the biophysical environment and that man has the ability to alter the interrelationships of the system. Thus we require a broad understanding of the role of both natural and man made environments and attitudes of concern for environmental quality that will motivate participation in environmental problem solving.
> (p. 35)

The views presented in this chapter do not question the fact that humans affect and are affected by their environment. However they do question whether it is reasonable to further presume that humans can consciously direct their effect and control complex systems, that they have the capacity to determine and carry out appropriate action, that our social systems and institutions can respond to contemporary problems and that the problems of concern identified by environmental educators can be solved. They also question the linear relationship

evidenced in the environmental education literature that knowledge, awareness and attitudes of concern lead to action.

In this section, particular elements or characteristics of environmental education selected from those identified by Hart (1979)[6] will be further examined in light of the views presented in the preceding sections. In some cases additional views will be presented for illustrative purposes.

Global View - Holistic Thinking - Present/Future Perspective

From his study of the environmental education literature Hart (1979) lists the following characteristics of these elements as,

> the ability to see more clearly the properties of whole systems and the interlinked patterns that connect things; learning to deal with the structures and dynamics of complex systems; understanding the causes and consequences of growth in a finite world; understanding the global process and its relation to human thought and action; understanding the basic concepts and fundamental processes of communication, control and learning; definition of long term global goals and appropriate effective means for pursuing them; and the skill and desire to constantly question the present based on images of alternative futures.
> (pp. 91-92 and 105)

The views presented in this chapter suggest that perhaps human beings are not biologically predisposed to or consistently capable of developing the kind of far-sighted, comprehensive practices called for

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[6] For a complete list of the elements identified by Hart (1979) see Appendix B.

by environmental educators (Forrester, 1971; Hall, 1977; Heilbroner, 1975; and Reynolds, 1976). Their attempts to conceptualize and explain these elements are admirable and may be useful for research of the field. The major difficulties lie in the practical application of these concepts. Consider for example holistic/systems thinking. Hart (1979) lists twenty sources, including Swan, that identify the development of holistic thinking as an important element in environmental education. Patton (1980) describes the difference between hypothetico-deductive and holistic-inductive research methods. The former paradigm emphasizes prediction of social phenomena and utilizes quantitative measures, experimental design, specification of main variables and the statement of specific research hypotheses before data collection, and multivariate, parametric statistical analysis. The latter paradigm emphasizes understanding of social phenomena and utilizes qualitative data (i.e. detailed description derived from close contact with targets of study, collected by in-depth, open-ended interviews and personal observations) and holistic analysis. Data collection is open-ended in order to find out what people's lives, experiences and interactions mean to them in their own terms and own setting. Patton explains that there is an attempt "to understand the multiple interrelationships among dimensions which emerge from the data without making prior assumptions regarding the linear or corrective relationships among narrowly defined operationalized variables" (p. 40). Patton also points out

that it is not a question of which method is better but which is most appropriate to the situation. One might reasonably conclude that the "holistic-inductive" research method would be more appropriate to the concerns and investigations of environmental educators. An assessment of the doctoral research of Swan (1970) and Bennett (1974) based on Patton's criteria places both studies in the "hypothetico-deductive" paradigm.

Awareness and Understanding of Basic Ecological Concepts

Hart's (1979) summary of Willard (1976) suggests that a conceptual understanding of the principles and organizational frameworks that undergird the operations of environmental education will enable students to be more effective[7] throughout life. Thus it is implied that awareness and understanding of basic ecological concepts can serve as guidelines for effective action. Conceptual

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[7] This begs the questions: What constitutes effective? Who will define 'effectiveness' -- the individual, the academic, the group? Along similar lines de Castell (1982) questions the objective of "developing competencies in youth to cope with the responsibilities of adulthood" in her critique of "self-education". She raises several issues in the following comments: "Obviously the acceptability of one's achievements requires a judgement of value, but acceptability defined by what happens to be valued within one's particular society is not only dangerous (as it was in Nazi Germany), it also presupposes a degree of consensus which one could possibly expect to find with in a totalitarian state but not within a pluralistic democratic one. Thus when the crucial question is asked, 'What are the basic competencies that an adolescent will have to develop in order to cope with the responsibilities of adulthood in our technological society?' we have to ask by whom such competencies are to be defined, what is meant by 'coping' with society, and who determines the responsibilities an individual ought to accept?"

understanding is a conscious activity most often associated with the neocortex or 'new brain'. However discussions of the multiple complex factors influencing human action (Bowlby, 1969; Gevarter, 1975; Hall, 1977; Heilbroner, 1975; MacLean, 1973; and Reynolds, 1976) suggest that the neocortex plays a somewhat limited role in determining human behaviour. Thus, individuals may be unable to translate conceptual into practical action. Also, consider the previous discussion of MacLean's research, in particular its implication for him that "since our 'rational' perceptions of truth are merely cortical rationalizations for feelings welling up from the limbic pool, 'I sometimes can't see my way around this life being no more than a cruel hoax'" (Holden, 1979, p. 1068). His views tend to attenuate somewhat the contribution of conceptual understanding to effective living.

Development of Cognitive, Affective and Skill Behaviour

Hart (1979) states that "in general environmental educators agree ... that affective processes (i.e. interests, attitudes, values) are inseparable from cognitive and psychomotor or skill behaviour processes" (p. 95). This idea is somewhat unclear: inseparable from each other? within an individual? under all conditions? in theory or in practice? They may be inseparable if you are attempting (as environmental educators are) to facilitate a particular linear relationship which assumes that knowledge and awareness create attitudes that motivate people to act. Perhaps they should be equally

nurtured in "the best of all educational worlds". Perhaps they would be inseparable in an individual who had achieved transcendence. But the reality that confronts us daily includes a plethora of situations in which individual attitudes, interests, values, cognitions and psychomotor activities are not only separated but often contradictory.

Taking another approach, perhaps the confusion arises from the language or terms themselves. In light of neurophysiological information, it may be that the terms cognitive, affective and psychomotor as presently defined are no longer sufficient or appropriate.

Multilevel

Tanner (1974) suggests that there is a consensus among environmental educators that environmental education should be multilevel. Based upon his study, Hart (1979) states that when environmental educators define environmental education as multilevel "they are saying that it should be treated as a K-12 [kindergarten to grade 12] or even K-16 concern in the school system" (p. 90). They are advocating a continuity in learning that proceeds from kindergarten through grade 12 and beyond. Considering the shortcomings that reside in the very size and structure of contemporary institutions (Bell & Kristol, 1971; Heilbroner, 1975; Schelling, 1971; and Shubik, 1967), the conflicting values within society and the administrative difficulties of regulation (Crowe,

1977) one might question whether the mechanisms or conditions required to achieve this continuity exists. Specifically, how does one orchestrate thousands of diverse, complex human beings over several years in a heterogeneous schooling system within a multifarious, rapidly changing society? Continuity of this breadth would require a uniformity and centralized organization which simply do not exist.

Interdisciplinary - Problem Solving Approach

Hart (1979) states that by advocating interdisciplinarity, environmental educators are attempting to "unite the separateness that marks a disciplinary approach to knowing" (p. 88). Hart presents the argument that many ill-advised decisions about man-environment transactions are due to a perceptual inability to perceive wholeness resulting from that separateness. An interdisciplinary approach should utilize whatever particular areas of knowledge are useful and valuable to the problem objectives at hand. Problem-solving in environmental education includes attempts to find solutions to complex environmental issues and thus draws upon methodologies from a variety of disciplines. Stapp (1971) suggests that once conclusions are drawn regarding an environmental problem, political insight is necessary to institute a solution. Some of the difficulties of the problem-solving approach were presented in chapter two of this thesis. The following views from the preceding sections present further difficulties. Heilbroner (1975) questions the ability of contemporary political

organizations to respond to environmental/social problems and to cope with several converging problems. Forrester (1971) argued that the human mind is not adapted to interpreting how social systems behave and that contemporary social systems mislead people. Maruyama (1968) states that in complex systems an initial action can build up deviations and produce drastic, unexpected results. Lewin (1968) outlines the tremendous task that social management or problem-solving faces due to the magnitude of social fact-finding it requires. In addition, consider a specific example in which an interdisciplinary, problem-solving approach was undertaken in response to a relatively "straight-forward", easily identified environmental problem: automotive emissions pollution. White (1973) followed the process and writes that

> after 2 months exposure to hearings, testimonies and intensive lobbying, Wm. D. Ruckelshaus, Administrator of the Environmental Protection Agency (EPA), decided on April 11 to suspend for one year the 1975 federal standards on automotive pollution and to replace them with interim standards. Among the participants in the previous 2 months activities had been the auto manufacturers, pollution control equipment manufacturers, petroleum companies, environmentalists and even the United Auto Workers. Appeals to the courts and to Congress are likely to follow and it is clear that the issue of automotive pollution controls will continue to command the attention of the executive, legislative and judicial branches of the federal government and of many state and city governments for the next few years.... What is much less clear is what kind of government action is best in the present circumstances.
>
> (p. 97)

In theory, an interdisciplinary approach seems logical and appropriate. It becomes less so when we turn to its practical application. The contemporary growth in the number and complexities of issues is exceeded only by the torrents of writing in which an individual may bury herself if she so chooses. Relative to the amount of knowledge being generated, even the well-educated and area specialists remain woefully underinformed. Moreover, this exponential growth of knowledge inevitably creates areas of increasing ignorance which may be more significant that we normally concede.

Values Clarification

Hart's (1979) review of the environmental education literature revealed that values are a central concern in the field. It also offered evidence that indicates that most environmental educators who have addressed the issue of values have adopted the values clarification process of Raths, Harmin, and Simon (1966). Kirschenbaum (1981) explains that values clarification is a process that is intended to help an individual (or group) increase the likelihood that their decisions and living will become more personally satisfying and socially constructive (the latter meaning to act in ways that "promote the values of life, liberty, justice, equality and the pursuit of happiness for all" (p. 272)). According to Kirschenbaum the valuing process consists of choosing, prizing and acting. Choosing should be freely done, in an environment that is

open and free from threat, from alternatives and after thoughtful consideration of each alternative. Prizing involves cherishing and being happy with the choice and a willingness to affirm the choice publicly. Acting consists of doing something with the choice and doing it repeatedly in some life pattern. The role of the teacher is to help students become aware and appreciative of their value positions by eliciting value statements from students, accepting their ideas nonjudgementally and raising questions which will help them think about their values (pp. 271-273).

This approach presents a view of humans as logical, rational and capable of consistency if only they would keep clarifying. It does not address the implications of psychological denial and distortion mentioned above. It does not acknowledge the political context of schooling, the fact that attendance is compulsory and that students are at the bottom of a power hierarchy. It also assumes that individuals can pursue self-selected, meaningful goals and achieve social harmony and happiness simultaneously. The error in this thinking has been discussed earlier (Crowe, 1977; Hardin, 1968b; Schelling, 1971; Shubik, 1967). The emphasis on verbal clarification and explanation ignores the nonverbal parts of the brain which seem to play a major role in human behaviour and Hall's (1977) point that "the most important paradigms or rules governing behaviour, the ones that control our lives, function below the level of conscious awareness and are generally not available for analysis" (p. 43).

Kelman (1981) interviewed the most active Washington-based participants in environmental policy formation outside the Environmental Protection Agency. The three groups of participants included Congressional staffs for appropriate subcommittees and the personal staff of subcommittee members, staff of environmental organizations, and staff of trade associations who dealt with environmental affairs. Kelman's interview data suggests that members of all three groups react to economists' proposals to improve air and water quality in terms of "a different set of concerns that is more important to them, and in the light of which they tend to reinterpret the economists' words" (p. 108). As a group, the environmentalists' comments and arguments revealed a significant element of general philosophy or ideology rather than specific reference to the particular proposal under consideration. Kelman concluded that the environmentalists tend to combine general, widely shared concerns with specific values. The three general concerns identified by Kelman are: one, they care about the kind of attitudes society takes toward certain behaviour; two, they care about the motivations people have when they behave the way they do; and three, they are worried about the consequences of placing previously non-priced things into a market of buying and selling (p. 113). Kelman further suggests that environmentalists interviewed apply these general concerns to specific values or issues; in this case specifically to environmental quality to which they attach a high value. He concludes that "few

environmentalists are willing to be non-judgemental" on issues of environmental quality. At this point one might ask 'To what extent are environmental educators (or anyone else for that matter) willing or able to forgo their personal preferences and concerns and support a proposal or plan with which they philosophically disagree but which may in fact achieve the goal of decreasing air and water pollution?' There seems to be a tendency for most of us to respond to particular issues emotionally or in terms of our general concerns. This blanket response to an issue blocks our thinking and prevents us from viewing certain issues in a different way.

In Conclusion

The first section of this chapter presented the views of selected authors in order to examine the capacity of socio-cultural systems or organizations to respond to the challenges and problems outlined in the environmental education literature. The types of problems to be faced in attempting to control complex social systems were also considered. It was suggested that many contemporary problems are organizational rather than moral issues -- that they develop because of characteristics inherent in the nature of systems, not because people "don't care". The human system was the focus of section two which examined the human capacity for response and change. It attempted to emphasize the tremendous complexity of factors that underlie human action: the nature of behavioural systems, the

'programmed' aspects of our nervous system, and the extent to which our behaviour and thoughts are culture bound and guided by a substratum of psychological and physiological mechanisms. The limitations of human flexibility and tolerance levels, particularly within a highly complex, affluent, industrial society were discussed. The texture of human action that emerged was intricate and intriguing. Section three was a further examination of the goals and methods of environmental education in light of the views presented in sections one and two. Serious doubts were cast upon their appropriateness and effectiveness.

An underlying purpose of this chapter has been to distinguish between the ability to define or identify a problem and the ability to solve the problem or specify appropriate action. The preceding discussion suggests that most 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. In the case of environmental education we may be able to conceptualize and espouse what should, ought, needs to be done but unable to translate that into practical, effective human action. This outlook is <u>not</u> meant to generate an "all or nothing" attitude to social/environmental action, ie. because we do not have complete knowledge/understanding and cannot manage reality according to our wishes we should not attempt particular kinds of action. Rather it is meant to sensitize us to the fact that our attempts to

solve problems in one part of the system will only produce unanticipated problems elsewhere in the system. Further, it is meant to remind us that we do not (and perhaps cannot) comprehend what is involved in controlling such intricately interrelated phenomena as poverty, population growth, pollution, resource distribution, hunger and human action. And finally, it requires one to examine the ways in which we think about the issue of control.

CHAPTER IV

THE ISSUE OF CONTROL

> Mourn not the dead that in the cool earth lie ...
> Dust unto dust ...
> The calm, sweet earth that mothers all who die
> But rather mourn the apathetic throng ---
> The cowed and the meek ---
> Who see the world's great anguish and its wrong
> And dare not speak!

The above quote aptly expresses our action-oriented stance toward problems, injustices and that which constitutes effective living generally. In an industrial society that prides itself on freedom and individuality it is not surprising to find this orientation in much of the literature on social management and personal change. Nor is it surprising that attempts to doubt this conventional wisdom engenders severe conflict within the doubter as well invites condemnation by activists of all ideological tendencies.

It is generally agreed that understanding is a precondition for the exercise of proper control. The dilemma emerges when one attempts to specify the precise nature of that understanding and control. Environmental eductors assume that increased understanding of the complexity and seriousness of different problems will inevitably lead to greater control over them. In his literature review Hart (1979) concluded that,

> The principal feature in the philosophy of environmental education is that man is an integral part of a system consisting of man, culture and the biophysical environment and that man has the ability to alter the interrelationship of the system. Thus [my emphasis] we require a broad understanding of the role of both natural and man-made environments and attitudes of concern for environmental quality that will motivate participation in environmental problem-solving. (p. 35)

That humans affect their environment is not in question. What is in question is whether it is reasonable to further presume that humans can control and direct their effect in the ways in which they desire.

> Using an analogy from the ballet, as the set becomes more complex and the dancers more numerous, the choreography required to maintain a given level of coordination becomes far more refined and difficult. (Shubik, 1967, p. 777)

The point of departure of this chapter is that we do not give serious consideration to what is involved in the very concept of control itself. Exploration of the topic is open to endless debate. Nevertheless, it is necessary to begin to consider differing viewpoints and their implications on control by presenting the ways in which individuals think and talk about this concept with respect to the salient themes of communication change/evolution, knowledge and

brain/mind/consciousness.[1] By necessity such a discussion will be illustrative not exhaustive. It will attempt to outline various trails of evidence pursued and interpretations made. Specifically my intent is to present two opposing perspectives on control and to suggest the implications of each for environmental educators.

Perspective A

> For the first time in history, humankind has come upon the control panel of change ... we are not victims, not pawns, not limited by conditions or conditioning. (Ferguson, 1980, p. 29)
>
> We are incredibly powerful as individuals. We can change the world. (Joel Schatz, Keynote speaker at 1982 Environmental Education Conferences in B. C. and Alberta.)

The principles of human behaviour summarized by Hanna (1979) focus upon the functions of living, adapting human beings that have emerged along the evolutionary continuum. He states that each new feature evolved because it was a functional improvement in terms of

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[1] Because of the wide ranging use of the term and the diversity of research and theories generated in the name of "consciousness", it is not surprising that we find a variety of definitions of the term, or as often as not, no explanation at all. See for example Hampden-Turner's (1981) Maps of the Mind in which he differentiates among sixty concepts of mind and/or consciousness from the fields of historical and religious philosophy, psychoanalysis, physiology, psychosocial development, the paradigmatic mind, and mythic and structural thought.

chances for survival over what had come before. He presents nine essays as evidence that this "somatic viewpoint" can be developed from a variety of scientific fields: from physics and cybernetics (Moshe Feldenkrais), psychoanalysis (Alexander Lowen), biochemistry (Ida Rolf), proprioception (Charlotte Selver and Charles Brooks), psychophysiology (Barbara Brown), physical anthropology (Ashley Montagu), neuropsychology (Karl Pribram), psychotherapy (Carl Rogers) and cultural anthropology (Margaret Mead). In his introduction to these essays Hanna outlines the following assumptions that have "gradually established themselves during the course of this century" and which are central to the views presented in his book:

1. Life is historical ... Humans are viewed transparently in terms of the layers of genetic history that are reflected in the structure of the function of Homo sapiens ...

2. All life is individual ... Life must form itself into the unified structure of a cell; whether it be a single-celled animal or a higher-order protozoan animal assembling millions of cells, the identifiable animal is a unified body of functions enclosed within a single membrane ... any scientific theory or political practice that ignores this individuality is unhealthy ...

3. Individual life is autonomous ... living, individual creatures are self-governing ... In the human species this self-balancing and self-adjusting ability has immediate application to the way humans are educated, healed, and socialized ... According to this view, there is a phylogenetic basis to Jefferson's claim that all humans are free and possess inalienable rights ...

4. Individuals are temporal beings in process ... they continuously create the fact of temporality, always

moving, always flowing, always adapting until the moment of death ...

5. Life is predominantly functional rather than structural ... An organism may look like a physical object but this is an illusion. Beneath the flowing contours of the bodily processes are stable functions, represented in the central nervous system, which create this illusion of physical substantiality. This is not to say that human functions are independent of bodily structure but rather that they have a primacy in the process of human life.

6. Self-consciousness is body-consciousness ... self-awareness is body-awareness -- it is the awareness of the ongoing, stable process of our bodily structure. What other 'self' is there to be aware of, other than our embodied self?

7. All living beings seek to grow ... This theme can be viewed 'en large' in terms of the total history of evolved life, or it can be focused on the growth of individuals. In either, the observation is the same: Life seeks to differentiate itself into newness and greater complexity ... newness is life's most precious creation... (pp. 8-15)

Land (1973) proposes a theory of human behaviour and evolution which he describes as a "general system theory". That is, in his Transformation Theory he "sets out to cover an extremely broad range of phenomena in many interrelated areas with a minimum number of postulates" (p. xiv). His unit of analysis or behaviour is the system. Thus the growth behaviour of atoms, molecules, and cells becomes a template for individual and social behaviour. "Grow or die" is the mandate of Nature he observes. In his text he describes the stages of growth of unicellular systems (a single level): first, accretive growth which is self-expanding (eg. an enlarging cell);

second, replicative growth which is self-duplicating (eg. asexual reproduction); and third, mutual growth (sexual fusion and recombination). He cites several examples from "larger biological systems" to illustrate how the growth dynamics of unicellular systems are re-expressed by plants, animals and individual human beings. He suggests a continuum of growth over time that moves through the three stages of growth at one level reaching the highest form of mutuality possible for that level. At this point a "discontinuum of growth", "transition phase" or "leap" occurs as the three stage process of growth is replicated or re-expressed at the next level of organization. As example, he explains that at the inorganic level, crystal growth in heteropolymeric molecules represents the highest level of mutuality. At this point a transition phase occurs and "the leap" is made to stage one accretive growth at the new, and different level of single cells. Land concludes that "the tendency to mutualism and cooperation is one of the most ancient and certainly the most vital of Nature's processes" (p. 27). He further argues that "psychological processes are on a continuum with biological systems and are isomorphic with them" (p. 75). In his discussion of psychological and social behaviour of humans the stages of biological growth forms are extended to: Accretive-Inclusion through sameness (identicality and complementarity); Replicative-Influential affiliation through similarity; Mutual-Attraction through differentness (p. 197). In chapter eight he develops the idea that "many dualisms of behaviour

and value, often represented as polar opposites (eg. security and danger, humour and ridicule, beauty and ugliness) in truth are simply different manifestations of growth" (p. 141). For example, he explains sadism as accretive growth resulting from the more mutualistic growth of affiliation and love. Self-sacrifice for one's friends or for a cause is at least replicative and in many cases mutualistic growth.

Land offers his theory of transformation as "a tenable scientific basis" to support the various philosophical concepts; in particular, evolution to mutualism: an evolving natural ethic. He explains that among other processes "natural selection has decided in favour of" (p. 158) that process in which man is motivated to use his imagination to constantly reformulate his world. During the broad course of evolution this process has been deemed a "desirable improvement in the course of life" and is "as empirically real and factual as is Man's response to food when he is hungry" (p. 158). Land offers a brief examination of the growth of the human systems of economics, politics, law and organizational development as evidence of "the natural transformation into mutualistic values". In nature also there is "abundant testimony" that "the rules of natural selection and evolution actually do not permit the ceaseless and bloody struggle that is often seen as evolutionary and behavioural process" (p. 162). He further asserts that the lower forms of growth "cannot be maintained when the demands of evolution by natural selection always

press for the realization of the benefits of mutual facilitation" (p. 160). As example, he explains that although low level ways of growth are evident in our ancestors "by far the preponderance of human behaviour has evolved into inter and intrasocial cooperation, and on a fantastic scale" (p. 162).

In the latter portion of his book Land speculates on the implications of his transformation postulates for human behaviour:

> To look upon Man as a determined being is to exclude his primary function as an evolutionary agent. He is not limited to the rigid and fixed genetic patterns of animals who will perform their specific growth tasks, whether they want to or not. Man, as a much condensed and amplified evolutionary mechanism, is not satisfied to simply go from A to B, but will continually evoke new alternatives to do it better. Rather than being determined, Man is determining. His creativity is the transformative evolutionary function of creative alternatives and naturally selecting among them to bring about new pieces of the growing mosaic of life. (p. 164)

> As the evolved mechanism for evolution, Man is therefore the sole agent responsible to and for his species and environment. As an emerging megamutualistic species, we can thus continue to transform our environment through new growth processes and products and select our nonmutual expressions of technology and society at ever increasing rates. We can safely assume that in our evolution there is no finite or visualizable end to growth or to transformations to unique levels of growth on the part of each individual and of a total culture. (p. 194)

Jantsch's (1975) examination of the design, regulation and restructuring of dynamically evolving systems emphasizes the "self-organizing", "self-realizing", "self-balancing", and "self-regulating"

aspects of those systems. The basis of his inquiry into the evolution of human systems is the research of Illya Prigogine and his coworkers in the field of nonequilibrium thermodynamics (Prigogine, 1972, 1973a, 1973b, 1974a, 1974b; Prigogine & Nicolis, 1971; Prigogine, Nicolis & Bablogantz, 1972). Jantsch (1975) summarizes their mathematically formulated principle of "order through fluctuation" as follows:

> If systems of any kind are in a sufficiently nonequilibrium state, have many degrees of freedom and are partially open to the inflow of energy information and/or matter, the ensuing instabilities do not lead to random behaviour (even if the initiating fluctuations and the mutations as such are random); instead they tend to drive the system to a new dynamic regime which corresponds to a new state of complexity. In such a transition, the system acquires new margins to produce entropy, new possibilities for action ... Such systems [partially open nonequilibrium systems] are characterized by a high degree of energy exchange with the environment and are therefore called <u>dissipative structures</u>. Thus nonequilibrium thermodynamics is leading toward a theory of self organization of physical systems. (p. 37)

Jantsch suggests that "order through fluctuation" seems to govern the evolution of physical as well as biological systems. In his book he attempts to apply that principle to human systems, in particular social and cultural systems, but also to knowledge systems, to the development of human consciousness and to the human design process. In his early chapters, Jantsch develops a typology of human systems for which he defines man's total space as threefold: physical, social, spiritual (pp. 50-75). He then turns to one of the basic

concepts used throughout his discussion: "the triplicate structure of levels of perception or inquiry". He lists and defines these levels:

- The rational approach assumes separation between the observed, and focuses on an impersonal "it" which is supposed to be assessed objectively and without involvement by an outside observer; the basic organizing principle here is logic; the results are expressed in quantitative or structural terms, and the dynamic aspects are perceived as change.

- The mythological approach establishes a feedback link between the observer and the observed, and focuses on the relationship between a personal "I" and a personal "Thou". Its basic organizing principle is feeling, the results are obtained in qualitative terms, and the dynamic aspects are perceived as process, or order of change.

- The evolutionary approach establishes union between the observer and the observed and focuses on the "we", on the identity of the forces acting in the observer and the observed world; the organizing principle is "tuning-in" by virtue of this identity, and the results are expressed in terms of sharing in a universal order of process (namely evolution).

(p. 84)

He illustrates how these levels of inquiry correspond to the various types of systems presented earlier and to concepts of human and social dynamics[2]: Rational approach - mechanistic system, behaviour, causality; Mythological approach - adaptive system, action, homeostastis; Evolutionary approach - inventive system, regulation,

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[2] Regarding the physical domain, Jantsch points out that Prigogine's deterministic level, thermodynamic level and the level of dissipative structures correspond to the rationale, mythical and evolutionary levels respectively.

homeorhesis[3]. Design makes use of all three levels or approaches. Jantsch explains that in times of slow changes (as was the case in the past) "REACTION to changes in the relations to the environment and the limitations coming into effect" (p. 93) was a viable regulatory response. However, in terms of rapid change (such as we are experiencing) "complex systems of intermeshing feedback loops" can only be regulated through ANTICIPATORY action which is characteristic of the evolutionary perspective. Thus Jantsch explains how effective planning and proper energy use are linked:

> - At the rational level, we perceive energy as the force causing an object to move (causing a specific effect); force is strictly on an ad hoc view of energy.
>
> - At the mythological level, we give energy a direction; we may also say, we convert available free energy into power, or action.
>
> - At the evolutionary level, we regulate energy flows and conversion processes between equivalents -- energy, matter, complexity, information (negentropy), motivation, etc. Regulation, within a framework of human scope -- in particular, regulation of the energy processes in the physical, social, and spiritual domains on our planet -- is man's chief contribution to evolution.

Jantsch then proceeds to develop a model of the basic human design process which he graphically depicts as the "interaction of

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[3] Jantsch defines homeorhesis from Waddington (1970) "... the preservation, not of a stationary state (as in homeostasis), but of a flow-process. Disturbances are counteracted so as to bring back the process, not to where it was when disturbed, but to where it would have progressed if left undisturbed." (Jantsch, 1970, p. 92).

processes in a toroidal model" (p. 102). The model is composed of elements that are arranged in "two planes as tenary systems" (p. 110). One plane links the physical, social and spiritual domains; the other links "consciousness", the "appreciated world" and "reality" (p. 115) in each of the above domains. In the last half of his book Jantsch elaborates upon and intricately extends the elements of the latter tenary systems.

Some of the implications of a view of evolution based upon the unifying principle of "order through fluctuation" for Jantsch are:

> Open, or partially open systems in all domains -- from atoms to galaxies, bio- to social organisms, human consciousness to cultures and mind at large -- will then be carriers of an overall evolution which ensures that life continues, that a nonequilibrium world evolves to ever newer dynamic regimes of complexity ... [It provides] ... a modern foundation for a profound truth ... that the evolution of mankind forms a meaningful and integral part of a universal evolution -- that mankind is an agent of this universal evolution, and even an important one. (p. xvi)

> It will be man's role to design his world in consonance with evolution, to regulate it in such a way that the cultural mutations become conscious and a matter for design, too, and the whole process of stepping up becomes smoother.... In other words I believe that the phase of evolution on earth ... includes an active role of man in designing and furthering evolution -- in becoming, individually and through ever more complex human systems, the spearhead of evolution of this planet. (p. 296)

The theme of Ferguson's book The Aquarian Conspiracy (1980) is personal and social transformation. She announces the existence of a

"leaderless but powerful network" in the United States whose "members have broken with some key elements of Western thought" and are working to bring about radical change. Their message is that

> You can break through old limits, past inertia and fear, to levels of fulfillment that once seemed impossible ... to richness of choice, freedom, human closeness. Problems can be experienced as challenges, a chance for renewal, rather than stress. Habitual defensiveness and worry can fall away. It can all be otherwise. (Ferguson, 1980, p. 24)

Ferguson argues that we are in the midst of a paradigm shift. She bases her discussion of this concept on the work of Thomas Kuhn (1962). Ferguson defines a paradigm as "a framework for thought ... a scheme for thought ... a scheme for understanding and explaining certain aspects of reality" (p. 26). Ferguson sees Kuhn's ideas as "enormously helpful" because they "arm us with a more sophisticated understanding of how change occurs" (p. 29). They explain how new views emerge and the reasons they are invariably resisted for some time. She states that the new emerging Aquarian Conspiracy paradigm

> sees mankind embedded in nature. It promotes the autonomous individual in a decentralized society. It sees us as stewards of all our resources, inner and outer. It says we are not victims, not pawns, not limited by conditions or conditioning. Heirs to evolutionary riches we are capable of imagination, invention and experiences we have only glimpsed. (p. 29)

Ferguson (1980) argues for the idea that a conspiracy (ie. a

movement, a group of men and women with a new perspective) can generate a new society, by outlining its historic roots. She points out that many of history's[4] most gifted thinkers, artists and visionaries have articulated the idea of a rapid transformation of the human species. She describes them as "the few, the lonely, the misunderstood". They were individuals who believed that "people might somebody transcend 'narrow' normal consciousness -- "that a minority of individuals would someday be yeast enough to leaven a whole society" (p. 45). They said that "humankind might recognize the subtle veils imposed on seeing; might awaken to the screen of custom, the prison of language and culture, the hands of circumstance" (p. 46). Ferguson explains that prior to the invention of the moveable type in the midfifteenth century the themes and traditions of transformation were transmitted intimately by alchemists, Gnostics, cabalists and hermetics. With moveable type they become an "open secret" available to the literate few. She quotes some of the "bold and isolated voices" of churchmen and mystics from the 14th century Meister Eckhart through to the 19th century William Blake. In 1836 a small group of American intellectuals formed the nucleus of the American Transcendentalist movement as a result of their mutual

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[4] Ferguson does not clarify "whose history". Popper (1962) reminds us that "there is no history of mankind, there is only an indefinite number of histories of all kinds of aspects of human life" (p. 270). We have recently seen history rewritten by various groups eg. Women's Movement ("herstory"), Blacks, Native Indians and Japanese-Canadians.

interest in and excitement about new philosophical trends. The "transformative vision" became more credible as a steadily increasing number of influential thinkers speculated on the possibilities. The idea of expanding powers of mind unfolded in the literature also. Samples of these ideas constitute the remainder of her chapter. For example Ferguson points out that in 1901 Richard Bucke wrote "This new race is in the act of being born from us"; in 1902 William James stated that "Man alone is the architect of his destiny."; in 1925 Herman Hesse's story narrator said that "We are not separated from the majority of men by a boundary but simply by another mode of visions."; in 1928 H. G. Wells "proposed that 'the time was nearly ripe for a coalescence of small groups into a flexible network that could spawn global change"; Carl Jung "introduced the idea of the collective unconscious"; Pierre Teilhard de Chardin was "inspired by his growing conviction of 'the cumulative order of the collective soul"; Martin Buber "sensed a rising hunger for relatedness"; David Riesman "speculated that the trance of alienation and conformity that he described might be broken"; Marshall McLuhan "saw that 'increasing numbers were aspiring to wholeness ... deeper awareness ... wanting people to be open'" (pp. 47-58). For the most recent descriptions of an imminent transformation by "distinguished thinkers" from many disciplines Ferguson quotes George Leonard, Gregory Bateson, Charles Reich, Jacob Needleman professor of philosophy, Willis Harmon director of policy research at Stanford Research Institute, George Cabot Lodge

statesman and Harvard business professor, William Tiller Stanford physicist, Jose Arguelles art historian, Arthur Clarke, Carl Rogers and Theodore Roszak. She asserts that a growing number of individuals were linking up through the process of "networking" which included conferences, phone calls, air travel, books, phantom organizations, papers, pamphleteering, photo copying, lectures, workshops, parties, grapevines, mutual friends, summit meetings, coalitions, tapes and newsletters. Ferguson closes the chapter with the proclamation that,

> In the late 1970's the circles began closing rapidly. The networks overlapped, linked. There was an alarming, exhilarating conviction that something significant was coming together ... A series of resounding clicks and the networks became the long-prophesied conspiracy. (p. 63)

Ferguson explains that when she speaks of the transformation of people she specifically means "the transformation of consciousness" (p. 68). Consciousness does not mean "simple waking awareness" but refers to "the state of being conscious of one's consciousness" (p. 68). Because most people go through their waking hours with little notice of their thought processes, it becomes "absurdly easy" to initiate personal transformation simply by paying attention to the flow of attention itself.

> Immediately we have added a new perspective. Mind can then observe its many moods, its body tensions, the flux of attention, its choices and impasses, hurting and wishing, tasting and touching.... In mystical

> tradition, the mind-behind-the-scenes, the part that watches the watcher is called the Witness. Identifying with a wider dimension than our usual fragmented consciousness, this center is freer and better informed. (p. 68)

Ferguson outlines the four basic ways in which people change their minds when they receive new and conflicting information: change by exception in which old beliefs remain intact but allow for a few anomalies; incremental change when the individual is not aware she has changed bit by bit; pendulum change in which a person abandons one cult or organized system of thought for another; and paradigm change or transformation when a new perspective or sudden shift of pattern occurs within the individual that allows the information to come together in a new form or structure (Ferguson, 1980, pp. 71-73). She further asserts that people have wide options of consciousness open to them, that the human brain and behaviour are almost unbelievably plastic, that the human brain has boundless capacities for paradigm shifts given the proper circumstances, that personal and collective stress can be agents of transformation, that "ironically ... the turbulent twentieth century may be driving us into the change and creativity dreamt of through the ages" (p. 73) and that "we live by what we see" (p. 83). Ferguson identifies and lists nearly one hundred "intentional triggers of transformative experience" (p. 85) reported to her through a questionnaire she distributed and collated. These "psychotechnologies" are tools for greatly accelerating the process of insight and "offer us passage to creativity, healing and

choice" (p. 32).

In her chapter entitled Liberating Knowledge: News from the Frontiers of Science, Ferguson presents discoveries from many realms of science (eg. brain research, physics, molecular biology, research on learning and consciousness, anthropology and psychophysiology).[5] The models of nature that are emerging are "the pattern of the new world ... [and] ... promise a new age of discovery" (p. 41). Under brain and consciousness research she points to the phenomena of biofeedback , split-brain research and chemical transmitters in the brain. For Ferguson it suggests that "intention is more powerful than anyone guessed" (p. 154); "that whole brain knowing is more than the sum of its parts and different from either" (p. 81). Our true center or mind transcends the split of the right and left hemisphere. There is "something in us [that] is wiser and better informed than our ordinary consciousness" (p. 81). The theory of evolution known as punctuated equilibrium proposed by Steven Jay Gould and Niles Eldredge suggests to Ferguson that severe stress "punctuates" the equilibrium of life from time to time and that at such times favourable variations

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[5] Ferguson is a reporter and a journalist -- not a researcher. Thus she "keeps technical terms to a minimum so that the 'story line' can be pursued" (Ferguson, 1980, p. 150). In the back of her book she includes a general reference list for each author discussed in the chapter. However, the reader has no way of ascertaining which information in the main text came from which article, lecture, interview or book. Nor is it clear in some instances if ideas presented are those of the author under discussion or Ferguson's. Thus, for the purposes of this discussion I have decided to focus upon the conclusions that Ferguson draws from the work of various individuals.

spread quickly. New species do not evolve gradually by the steady change of its ancestors but "all at once and fully formed" (p. 159). Ferguson states that

> The new paradigm attributes evolution to periodic leaps by small groups. This changing view ... (1) requires a mechanism for biological change more powerful than chance mutation and (2) it opens us up to the possibility of rapid evolution in our own time. (p. 159)

The work of biochemist Albert Szent-Gyorgi suggests to her that "living matter has an inherent drive to perfect itself" (p. 161). General Systems Theory suggests wholeness and self-organization at all systems levels -- from cellular processes to population dynamics; from problems of physics to problems of politics (p. 157). Prigogine's theory of dissipative structure emerges as an explanation for rapid biological, cultural and personal evolution. It "offers a scientific model for the transformation of society by a dissident minority like the Aquarian Conspiracy" (p. 166). Viewing the brain as a dissipative structure explains the transformative power of psychotechnologies -- "why they can break conditioning that is firmly resistant to change in ordinary states of consciousness" (p. 168). From the research and speculations of Karl Pribram, Paul Pietsch, Lyall Watson and David Bohm on holograms, Ferguson presents the "holographic super theory in a nutshell":

> Our brains mathematically construct 'hard' reality by interpreting frequencies from a dimension transcending time and space. The brain is a hologram interpreting a holographic universe ... [Individual brains] have access under certain conditions to all the information in the total cybernetic system ... access to a domain transcending time and space. (pp. 182-183)

In closing this chapter Ferguson emphasizes that we must integrate this new knowledge in our lives. Our failure to understand in the past has caused us to continually work "against the grain" (p. 187).

In the area of communication, Perspective A tends to emphasize the recent advances in computer technology and telecommunications. Vast amounts of data, previously unavailable, can quickly be gathered, stored, processed and transmitted on a world-wide basis. Ferguson's comments are illustrative of this view:

> We are benefiting from the phenomenon predicted in 1964 by Marshall McLuhan; the <u>implosion</u> of information. The planet is indeed a global village. No one anticipated how quickly technology would be put to work in the service of the individual, how quickly we would be able to communicate and agree. The conformity that grieved Tocqueville is giving way to a rising authenticity, an epidemic unparalleled in history.
>
> Now we can indeed find each other. We can tell each other what we have abandoned, what we now believe. We can conspire against the old, deadly assumptions. We can <u>live</u> against them.
>
> Global communications have encircled our world beyond any possibility of retreat. Now the whole planet is alive with instantaneous links, networks of people poised for communication and cooperation.
>
> Those of like mind can join forces as quickly as you can photocopy a letter, quick-print a flyer, dial a

> telephone, design a bumper sticker, drive across town, form a coalition, paint a poster, fly to a meeting ... or simply live openly in accordance with your change of heart. (p. 35)

Perspective B

"Dominance mediates behaviour."
(Anthony Wilden, 1981)

> The belief in self-regulation runs into the same difficulties that plague the idea of self-determination -- the impossibility of finding a "self" to do the regulating. (Garry Wills, 1970)

> In a cybernetic system, when a part exerts itself against the larger part, the end result is tragedy.
> (Andrew Feldmar, 1981)

The work of Laing (1967) and Laing, Phillipson and Lee (1966) discusses the constraints imposed upon Western people because of our context, the characteristics that distinguish relations of person from relations of non-person systems, and a myriad of communicational complexities. Laing (1967) begins by differentiating between behaviour and experience. We can observe another person's behaviour but not their experience. Experience entails the perception of an act and the interpretation of it. Person A's behaviour is an experience of person B. By describing experience as "invisible to the other" Laing does not mean to imply therefore that experience is subjective rather than objective, process rather than praxis, psychic rather than

somatic, inner rather outer. However he does concede that for the most part we do "seem to live in two worlds, and many people are aware only of the 'outer' rump" (p. 6). Thus, "inner and outer" can be useful in serving our purpose "as long as we remember that the 'inner' world is not some space 'inside' the body or mind" (p. 6). With that understanding then, "inner" is described as "our personal idiom of experiencing our bodies, other people, the animate and inanimate world: imagination, dreams, fantasy, and beyond that to even further reaches of experience" (p. 6). Laing then presents a twofold definition of a person: one, in terms of experience, "as a centre of orientation of the objective universe", and two, in terms of behaviour, "as the origin of action" (p. 8). In contrast to studies of the behaviour of "nonpersonal objects", it is axiomatic in a science of persons that "behaviour is a function of experience and both experience and behaviour are always in relation to someone or something other than self" (p. 9). Laing explains that

> When two (or more) persons are in relation, the behavior of each towards the other is mediated by the experience by each of the other, and the experience of each is mediated by the behavior of each. There is no contiguity between the behavior of one person and that of the other. Much human behavior can be seen as a unilateral or bilateral <u>attempt</u> to eliminate experience. A person may treat another <u>as though</u> he were not a person, and he may act himself <u>as though</u> he were not a person. There is no contiguity between one person's experience and another's. My experience of you is always mediated through your <u>behavior</u>. Behavior that is the direct consequence of impact, of one billiard ball hitting another, or experience directly

> transmitted to experience, as in the possible cases of extrasensory perception, is not personal. (p. 10)

Because people are related to each other through their experience and behaviour we require concepts that acknowledge both the interaction and interexperience of two persons as well as an understanding of the processes that influence the meeting of human beings. Examples of the latter include "... the props, masks, roles, lies, defenses, anxieties, projections and introjections, in short, all the carryovers from the past, transference and counter transference, that we use by habit and collusion, wittingly or unwittingly, as our currency for relationships" (Laing, 1967, p. 29).

Fantasy is described by Laing as the way we experience the world in the early years of life. Although this modality of experience has its own validity and own rationality we become alienated from its true function. For the most part fantasy is experienced as an intrusive, sabotaging infantile nuisance dissociated from mature, sane, rational adult experience. The significance of fantasy as a mode of experience is not acknowledged. In fact,

> for most of our social life, we largely gloss over this underlying fantasy level of our relationship.
>
> Fantasy is a particular way of relating to the world. It is part of, sometimes an essential part of, the meaning or sense ... implicit in action. As relationship we may be dissociated from it; as meaning we may not grasp it; as experience it may escape our notice in different ways. That is, it is possible to speak of fantasy as being unconscious ... [ie.] ... we

> may be unaware of experience in this mode, or refuse to admit that our behaviour implies an experiential relationship or relational experience that gives it meaning, often apparent to others if not ourselves (Laing, 1967, pp. 14-15).

So too with our various defense mechanisms (eg. expression, denial, splitting, projection, introjection) which represent ways in which a person becomes alienated from herself. Most of the time we are unaware of them but "even when a person develops sufficient insight to see that 'splitting', for example is going on, he usually experiences this splitting as indeed a mechanism, an impersonal process, so to speak, which has taken over and which he can observe but cannot control or stop" (Laing, 1967, p. 17).

The failure to see the behaviour of one person in relation to the behaviour of the other leads to much confusion. Laing et al. (1966) explains that for a given interaction between A and B, ie. A_1 --> B_1 --> A_2 --> B_2 --> A_3 --> B_3, the behaviour of A is examined in isolation. Direct links are made between A_1 --> A_2 --> A_3 and this artificially derived sequence becomes an entity in itself, one which is thus studied out of context.

The specific human quality of a "personal" relationship is that it is transactional as well as transexperiential. Transaction can occur and games can be played in and between electronic and physiological systems. But they are not persons and that implies a significant qualitative difference to Laing. He explains that in theories of the relation between people

> We are not concerned with the interaction of two objects, nor with their transactions within a dyadic system; we are not concerned with the communication patterns within a system comprising two computer-like subsystems that receive and process input and emit outgoing signals. Our concern is with two origins of experience in relation. (Laing, 1967, p. 32)

Laing's (1967) argument that "our experience and action occur in a social field of reciprocal influence and interaction" (p. 9) has implications for theories of the individual. It counters our temptation to entertain notions of a singular personality, a particular set of different roles, or constant emotions such as love, hate, anger, trust or mistrust. It suggests that "there are no 'basic' emotions, instincts or personality, outside of the relationships a person has within one or another social context" (p. 67).

Laing (1967) and Laing et al. (1966) elaborate upon the nature of certain relations within our specific social context. Their work focuses upon what we do to ourselves as well as what we do to each other. Laing (1967) asserts that "we must know about relations and communication" (p. 33) and that if we do explore their human reality we will discover disturbed and disturbing patterns. This should not be surprising or shocking if one accepts that human processes reflect their context. Laing concedes that "personal action can either open out possibilities of enriched experience or it can shut off possibilities" (p. 17). However he adds that in a world such as ours where the normal condition is alienation most personal interaction must be destructive. Our social context is that of an industrial-

military complex -- we are all implicated in this state of affairs. In order to rationalize it we have to destroy out capacity to see clearly any more what is in front of, and to imagine what is beyond, our noses. For "long before a thermonuclear war can come about, we have had to lay waste to our own insanity" (Laing, 1967, p. 36). Laing emphasizes the function of the family as an agent of socialization. Out of the whole range of possibilities or potentialities we are born with, we are taught what to experience, how to move, how to speak, how to feel and how "to see" in ways that are appropriate and normal in our social context. Laing states that the condition of normal man is "the condition of alienation, of being asleep, of being unconscious, of being out of one's mind" (p. 11).

The layers of complexity of interpersonal communication become more apparent as Laing (1967) explains that "we act not only in terms of our own experience, but of what we think they experience, and how we think they think we experience and so on in a logically vertiginous spiral to infinity" (p. 51). Laing (1967) summarizes this state of affairs as follows:

> On level 1, two people or two groups, may agree or disagree. As we say, they see eye to eye or otherwise. They share a common point of view. But on level 2 they may or may not think they agree or disagree, and they may or may not be correct in either case. Whereas level 1 is concerned with agreement or disagreement, level 2 is concerned with understanding or misunderstanding. Level 3 is concerned with a third level of awareness: what do I think you think I think? That is, with realization of or failure to realize second-

> level understanding or misunderstanding on the basis of first-level agreement or disagreement. (p. 52)

This spiral of reciprocal perspectives has relevance in the international sphere also. It is a useful but somewhat unnverving schema for viewing the East-West armament relations. Laing et al. (1966) explain it this way:

> The West reasons: We do not want to make the first move, but we are not sure whether East may think that we do, so in order to forestall us, East may make the first move. If West thinks East thinks that West thinks that East thinks the West is going to move first, the West may move first to prevent East moving first ... The future of East and West depends upon East-West finding some way of resolving their reciprocal mistrust enough for each to throw away their means of deterrence. The behavior of both seems, however, designed to maximize terror rather than mitigate it. (pp. 138-139)

One of Gregory Bateson's chief pursuits was the delineation of pattern in life, including pattern interaction and pattern control. He has researched and published extensively in the areas of zoology, anthropology, animal communication (in particular cretacean), and human communication (in particular schizophrenia). The work of Bateson summarized in this section presents an understanding of mind, self, human relationship and power which has emerged from cybernetics and systems theory. This understanding views words such as "discipline" or "self-control" with respect to changes of "self" as lineal (Bateson, 1979, p. 140). Further, it views "the division

between conscious will or "self" and the remainder of the personality ... [as a] ... disastrous variant of the Cartesian dualism: the division between Mind and Matter " (Bateson, 1971, p. 3). His discussion of the epistemology of cybernetics begins with the ancient question of whether the mind is immanent or transcendent. A cybernetic view suggests the former. Bateson (1971) explains that mental characteristics will be shown in "... any on-going ensemble or events which has the appropriate complexity of causal circuits ...", ie. circular or more complex chains of determination, "... and the appropriate energy relations..." (p. 4), which require collateral energy. Such a system "... will compare, that is, be responsive to difference (in addition to being affected by ordinary physical 'causes' such impact or force), ... will 'process information' and will inevitably be self-corrective either toward homestatic optima or toward the maximization of certain variables" (pp. 4-5). A simplified illustration of this central image in cybernetics of a circular system that corrects itself is the steam engine with a governor. In this machine we distinguish, say, four parts: flywheel, governor, fuel, cylinder. Its two connections with the outside world are through "energy input" and "load". The more power delivered to the flywheel, the faster the flywheel moves, the faster the governor spins, the more the weighted arms of the governor diverge, the less the fuel supply which feeds the cylinder which in turn drives the flywheel. Other typical examples of this control are found throughout ecological

balance (eg. sheep and their grazing pastures). It is this circular interaction of the message-systems (eg. sheep and grass) that can be understood as "mental". Elsewhere, Bateson (1979, pp. 91-128) presents a detailed explanation of these criteria of mind, but what is most relevant to the present discussion is that the mental characteristics are inherent or immanent in the ensemble as a whole, not in some part. According to Bateson (1971), "... no part of such an internally interactive system can have unilateral control over the remainder or over any other part" (p. 5). The significance of Bateson's conclusion appears when we return to the notions of human decisions and action. In this regard Bateson (1971) states that,

> The total self-corrective unit which processes information, or, as I say, "thinks" and "acts" and "decides", is a <u>system</u> whose boundaries do not at all coincide with the boundaries either of the body or of what is popularly called the "self" or "consciousness"; and it is important to notice that there are <u>multiple</u> differences between the thinking system and the "self" as popularly conceived:
>
> (1) The system is not a transcendent entity as the "self" is commonly supposed to be.
>
> (2) The ideas are immanent in a network of causal pathways along which transforms of difference are conducted. The "ideas" of the system are in all cases at least binary in structure. They are not "impulses" but "information".
>
> (3) This network of pathways is not bounded with consciousness but extends to include the pathways of all unconscious mentation -- both autonomic and repressed, neural and hormonal.
>
> (4) The network is not bounded by the skin but

> includes all external pathways along which information can travel. It also includes those effective differences which are immanent in the "objects" of such information. It includes the pathways of sound and light along which travel transforms of differences originally immanent in things and other people -- and especially <u>in our own actions</u>.
>
> (p. 7)

Bateson (1972) asserts that "human affairs are patterned upon purpose, means and ends, connotation and satisfaction" (p. 160). Indeed, "consciousness and purpose have been characteristics of man for at least a million years" (p. 434).

In his discussion of the effects of conscious purpose on human adaptation, Bateson points to a central problem in the adaptation of man to societies and ecosystems: the coupling together of self-corrective systems. Given the nature of contemporary society he questions whether the information processed through consciousness is adequate and appropriate for the task. Bateson explains that because of the whole/part relationship we must resign ourselves to the very limited nature of consciousness. But the content of consciousness is not simply a random sampling of activities occurring in the remainder of the mind.

> Rather, the content of the screen of consciousness is systematically selected from the enormously great plethora of mental events. But of the rules and preferences to this selection, very little is known.... However it appears that the system of selection, is importantly related to 'purpose', 'attention' and similar phenomena.... The argument of purpose tends to take the form 'D is desirable; B leads to C; C leads to

> D; so D can be achieved by way of B and C'. But if the total mind and outer world do not, in general have this lineal structure, then by forcing the structure upon them we become blind to the cybernetic circularities of the self and the external world. (Bateson, 1972, pp. 444-445)

Throughout their history, humans have been "consciously" organizing their lives and interacting with their environment in terms of purpose with varying degrees of "success". Moreover it is not a revelation that human decisions and actions are often based upon incomplete, distorted or inappropriate information. After all, nobody is perfect. However particular circumstances make the investigation of this phenomenon a more urgent matter than in the past. One of these circumstances is that "the power ratio between purposive consciousness and the environment has changed" (p. 446). In the past, conscious man was a changer of his environment. Today he is fully able to destroy that environment "with the very best of conscious intentions" (p. 446). Implementation of conscious purposes by increasingly effective machinery, transportation systems, airplanes, weaponry, medicine and pesticides threatens the balance of the earth systems.

In the introduction to his book System and Structure Wilden (1980) discusses the question of evaluating the products of the academic discourse. The question is relevant within an industrial capitalist society particularly for those who seek to apply information from that discourse to ecological/social problems and

human action. Wilden argues that the expressed epistemology of the scientific (academic) discourse has always been constrained by the dominant ideology of the social discourse which itself is constrained by socioeconomic reality. By evaluation, he is not referring simply to our being on guard for "individual bias" or "disciplinary imperialism". Wilden explains,

> the significant problem of evaluation and effect lie at the level of the deep structures or codes from which the messages of the scientific discourse are constructed, not in the particular messages as such which these codes permit individuals and individual bias to invent. These codings, which constrain the actual messages they permit, are commonly shared by the arts, by the sciences, by the humanities and by society as a whole. (p. xxv)

Thus Wilden does not view "the paradigm shifts" described by Thomas Kuhn as evidence of significant, dramatic change. He describes Kuhn's history of science as an "idealist interpretation" because "the overt discontinuities of the Kuhnian 'paradigms' all depend for their existence on an essentially continuous epistemological and ideological agreement about the nature and goals of the scientific enterprise" (p. xxii). The paradigm shifts did not put science and its enterprise into question.

The development of his arguments and analysis regarding the scientific discourse brings Wilden to consider the nature and function of knowledge as represented by academic discourse. He summarizes his views as follows:

> In retrospect, it seems clear that the so-called 'knowledge explosion' of the past thirty years or so has little to do with knowledge as such. It has primarily to do with knowledge as a commodity produced by the 'knowledge industry' (Clark Kerr). And like every other form of industrial production in North America today, its most significant side-effect is pollution: the pollution of minds. This explosion is an 'information explosion' only in the sense that the contemporary organization of the academic establishment depends upon everyone finding SOME-THING to exchange and communicate in order to obtain funds and to maintain and reproduce the system. (p. 1)

Wilden also comments on some of the current uses of the term "system". He advises readers "to beware" of the term and its "associated jargon" because

> for many who refer to themselves as 'system theorists' today, systems are as mechanical as they were for Adam Smith and Isaac Newton's followers. For others, the term 'system' and 'environment' reveal by their use that they are simply the familiar 'subject' and 'object' of traditional Cartesianism of psychology and 'social' but now in a new disguise. In other versions the system itself is viewed as an object, and moreover as an object to be viewed or even 'controlled' from an imaginary 'outside' (p. xxxviii).

One constantly recurring question for a critical and ecosystemic viewpoint that Wilden presents is the question of CONTEXT. Many of the interpretive or explanatory models of the human condition related to a "cybernetic" or "systems approach", "... take the open system out of its real biological and socio economic context, treating the

relational realities we call 'individual', 'self,'[6] or 'mind' (for example) as if they were isolates" (p. xix). This leads many to propose goals of reconciliation that are somewhat utopian or romantic forms of philosophical idealism. Wilden describes this type of liberation as spiritual rather than actual:

> 'Authenticity' in the sense of a personal, spiritual liberation becomes the Imaginary value of life in a society in which the real relationships of class, race, economics, power and responsibility are constantly disavowed, to be replaced by idealistic and essentially SCHIZOID values of equality and personal responsibility. (p. 86)

The contemporary categorical imperative becomes "You can do your own thing."

Wilden points out that many people profoundly misconstrue particular system-environment relationships by failing "to recognize the realities of LEVEL OF RELATION and of RELATIONS BETWEEN LEVELS in open systems, in their environments and above all, between system and environment" (p. xxxiii). For example, in most cases, "...the environment of a given open system is of a different and more

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[6] Wilden explains that, "[T]he expression 'self' is a problematical one ... [in that] ... self-referring terms ... [are] ... increasingly inappropriate metaphors to use in the context of an ecosystemic perspective.... Indeed, many of the terms beginning with 'self' -- such as the 'self-regulation' and 'self-differentiation' used so enthusiastically in 'cybernetic viewpoints' (including this one) -- do tend to imply an ecological absurdity: the direct and unmediated reference of 'self' to 'self' in an Imaginary short-circuit of actual environmental relations... (pp. xx-xxi)

inclusive level of relation (or LOGICAL TYPE)[7] than the system it supports" (p. xxxiii). He discusses the process of SYMMETRIZATION which "involves the ideological and epistemological process of making hierarchically distinct levels of relationship appear to be 'equal' or on the same level, when in reality one class is of a different logical type than another" (Hammer, 1981, p. 52). As an example, Wilden points to the "... traditional (binary) 'opposition' between 'nature' and 'culture', or that between 'nature' and 'society' ... (p. xxxiii) Wilden's views suggest that it may be a fundamental error to extrapolate guidelines for human action and potentialities from

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[7] Hammer (1981) provides an explanation of the term: "The Theory of Logical Types ... begins ... with the concept of a collection of 'things' which are united by a common characteristic. The components of this 'totality' are called members ... [and] ... the 'totality' itself is defined as a class ... What this theory maintains is that whatever involves all the collection (all the members) - i.e., the class - must not be any of the collection. (For example, ants are a member of the class of Insects; therefore, Insects cannot be a member of that - its own - class).

The Theory of Logical Types, then is dealing with hierarchies of 'levels of abstraction' or logical types -- "discussed in terms of classes and members of classes .... It is when the 'rules' of the Theory of Logical Types are contravened that confusion and contradiction and/or paradox will arise.... [eg.] ... the behaviour of the population of a large city cannot be understood in terms of the behaviour of one inhabitant, multiplied by, say four million ..." (pp. 39-40).

Bateson (1972) states that "The central thesis of this theory is that there is a discontinuity between a class and its member." (p. 202). He explains that "The effect of any such jumping of levels, upward or downward, is that information appropriate as a basis for decision at one level will be used as a basis for decision at some other level, a common error in logical typing." (Bateson, 1979, p. 220).

physical and ecosystems[8] because they are different logical types and subject to different levels of constraint within the hierarchy of constraint.[9]

> Humanists and social scientists [often] confuse the physical order of relationships with the socioeconomic order [and] commonly end up by doing physicists the disservice of translating physics directly (if unconsciously) into ideology .... [for example] ... the relativists fail to recognize that the physicists' relativity and indeterminacy are significant and useful ONLY in contexts where the sociohistorical context is not. (Wilden, 1980, p. xlvii).

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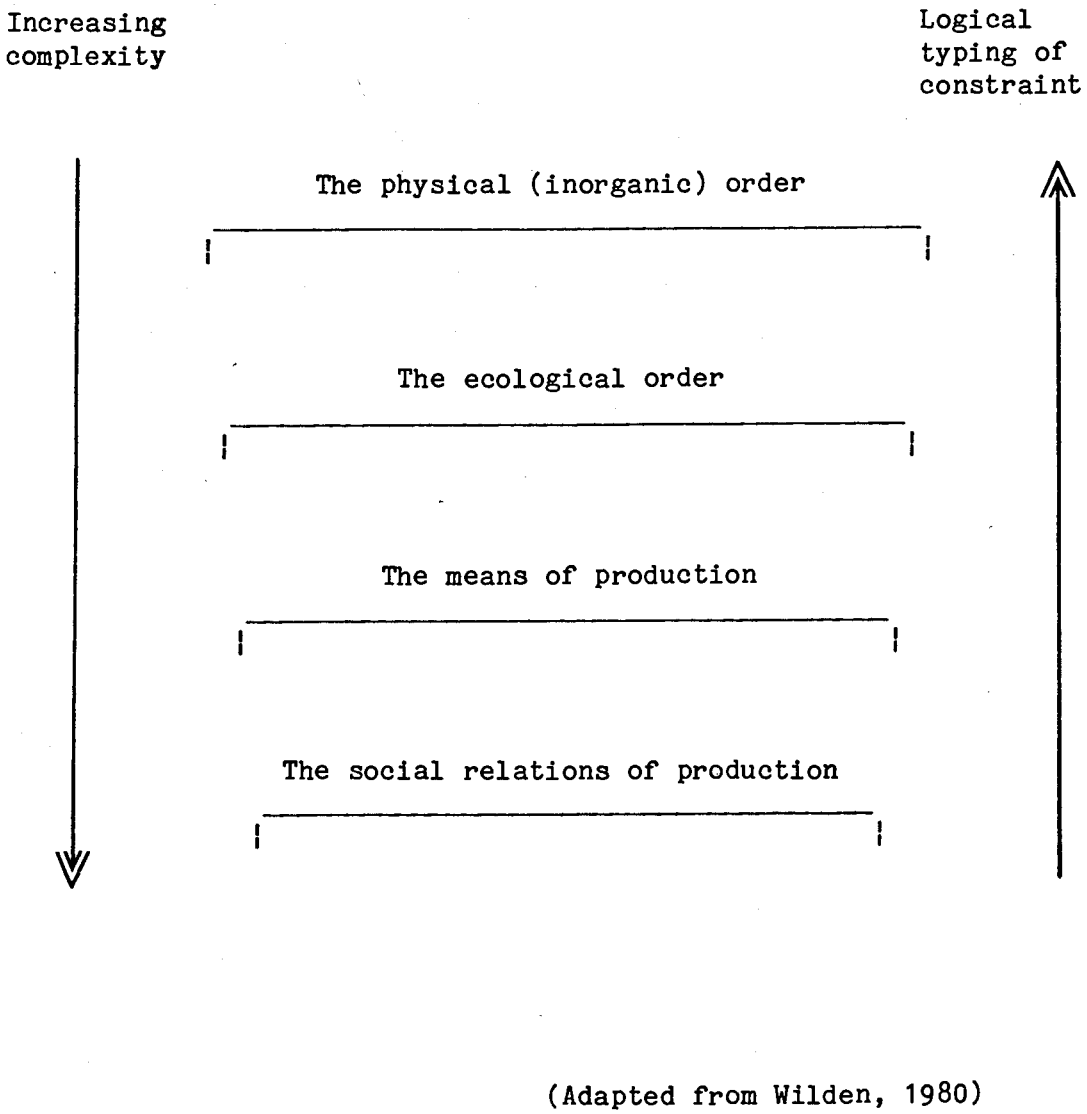
[8] Along similar lines, Tinker (1974) discusses the limitations of projecting characteristics of physiological systems onto social systems. In his review of Stafford Beer's book Brain of the Firm, Tinker explains that, "from an exhausive examination of the structure and function of the brain in Parts Two and Three, Beer outlines a model of organization of a viable system composed of a hierarchy of five sub-systems or control functions... Given the combined weight of Beer's imagination and enthusiasm, it would seem that only an academic spoil sport would ask how such a model could be tested empirically. Such a question reveals however a rather fundamental difficulty with the model. The sub-systems are characterized mainly in terms of functions. Their structure or process-form may only be inferred with reference to the neurophysiological model. Consequently the correspondence between the conceptual model and empirical situations tends to be ambiguous. Clearly this is problematic both for the manager as well as the scientist. (p. 70)

[9] Hammer (1981, p. 32) explains that "this hierarchy of discrete and interacting levels can best be understood if we imagine hierarchies as a set of Chinese boxes, each box enclosing another box... The notion of levels of constraint (cf. Appendix III) is thus made clearer. For rather than picturing a linear model, we can picture a type of vertical schema, with the "boxes" operating in a structural relationship of constraint to one another. Each 'larger' box constrains the activities we define as being 'enclosed' by all the boxes which are smaller than it is.

Wilden (1980) outlines one way "of considering major aspects of the hierarchy of constraints, at distinct levels of complexity, which makes the activities of human beings in society possible" (p. 517). Three distinct ORDERS of complexity are represented: the physical (inorganic), the ecological (the organic) and the social. The latter is divided into two major levels: the 'means of production' and the 'social relations of production'. Note also that "each one of these orders and levels is itself made up of hierarchies of constraint" (p. 517) (see Figure 2).

This aspect of Wilden's work raises some doubts about those perspectives that explicitly or implicitly link greater degrees of complexity with greater degrees of freedom and conscious control.

P. O. Ouspensky studied with G. T. Gurdjieff for several years and later wrote about his learnings (Ouspensky, 1977). Gurdjieff draws upon "an ancient teaching" to explain the sequence of development possible for man, as he understands it. It consists of a gradual shift from the physical body reacting to external influences (which accounts for contradictory desires and emotions within individuals) toward the development of a single consciousness or unity which then enables action. Many other systems, old and new, reflect parallel developments -- that is, they recognize "something more" in humans than their physical bodies. Gurdjieff emphasizes a critical feature: the latter stages of development are not preconditions for survival and do not evolve naturally in humans. Moreover, "... even



(Adapted from Wilden, 1980)

Figure 2. Hierarchical Relations of Complexity and Constraint

the clearest understanding of his possibilities will not bring man any nearer to their realization" (p. 61). It is at this point that they begin to diverge from many thinkers about human development. Gurdjieff uses a machine metaphor to illustrate the normal conditions of humans. He then reminds us that "... in speaking of machines one cannot begin with their morality and spirituality but with their mechanicalness" (p. 349). Both men rejected the idea that a person could be substantially different right now if only he desired, because they were convinced that the necessary preparation for personal change involves much more than periodic or momentary motivation.

Some of the fundamental points of Gurdjieff's perspective described by Ouspensky are the absence of unity in man, his mechanicalness, and his having no choice -- being unable to do. Regarding the former Gurdjieff states that "it is the greatest mistake to think that man is always one and the same..." (p. 53); that he has a permanent and unchangeable I. Rather,

> Every thought, every mood, every desire, every sensation says 'I'. And in each case it seems to be taken for granted that this I belongs to the Whole, to the whole man, and that a thought, a desire, or an aversion is expressed by this Whole. In actual fact there is no foundation whatever for this assumption. Man's every thought and desire appears and lives quite separately and independently of the Whole. And the Whole never expresses itself, for the simple reason that it exists, as such, only physically as a thing, and in the abstract as a concept. Man has no individual I. But there are instead, hundreds and thousands of separate small I's, very often entirely unknown to one another, never coming into contact, or,

> on the contrary, hostile to each other, mutually exclusive and incompatible. Each minute, each moment, man is saying or thinking 'I'. And each time his I is different. Just now it was a thought, now it is a desire, now a sensation, now another thought and so on, endlessly. Man is a plurality. Man's name is legion. (Ouspensky 1977, p. 59)

Gurdjieff saw our wants, desires and feelings wavering with such great inconsistency that they could never provide an adequate basis upon which to build a new kind of understanding and control over our regular reactions.

Gurdjieff describes man as mechanical[10] to illustrate the degree to which our activities are controlled by external influences. He asserts that man "cannot stop the flow of his thoughts, he cannot control his imagination, his emotions or his attention" (p. 143). Many people find these ideas offensive because we tend to consider ourselves to be conscious beings governing our life. "Facts that contradict that [are] considered to be accidental or temporary, which will change by themselves" (p. 145). Gurdjieff maintains that "a chief feature of a modern man's being which explains everything else that is lacking is sleep" (p. 66). Both men were concerned about

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[10] Hall (1976) was amazed by the degree to which Americans use time, not only to structure lives, but as a contexting communication system as well. He studied this phenomenon by observing the way in which he and his countrymen coped with time systems of different cultures. He concluded that "behaviour of this type is so stereotyped that once the pattern is perceived, observing it is a little bit like pressing a button on a machine and watching the lights go on" (p. 48). He also argues that "people primarily spend their lives managing their inputs (the reverse of the popular notion)" (p. 54).

human susceptibility to propaganda, fear and even hatred; about the suffering we create in others and in ourselves, albeit unconsciously. No person who is alert to her essential connectedness to other people could, in their view, voluntarily and consciously engage in the typical exchange of misery and suffering that characterize a considerable portion of at least recorded history. For a large portion of daily lives we are not aware of our activities, reactions, and thoughts. We do not "remember" ourselves. Gurdjieff contends that this will become clear to people who undertake self-study through self-observation, i.e. recording over several months particular aspects of ourselves. Self observation will reveal one of man's great illusions: the belief that his normal education or preparation easily provide him with a degree of competency in life that he could exercise at will whenever he so desired. This assumption of premature competency contributes to the cyclic nature of failure in our emotional and psychological lives. Gurdjieff considers "... the chief obstacle in the way of acquiring consciousness is that they think they possess it" (p. 142). Thus he suggests that only the proper type of discouragement and disappointment in life is likely to induce a person to seek the learning necessary for proper understanding and control of her responses. He illustrates this idea with the metaphor that "a man may be born, but in order to be born he must first die, and in order

to die he must first awaken" (p. 217).[11] Long and hard work is necessary in order to awaken. Gurdjieff speaks of the "shocks and clocks" that can help awaken man. This practical approach tends to counter the belief of a rugged-individualism and self-determination.[12]

Two final Gurdjieffian ideas pertinent to this perspective are the materiality of certain processes and the relationship among knowledge, being and understanding. Gurdjieff explains that "the complete materiality of all the psychic, intellectual, emotional, volitional and other inner processes, including the most exalted poetic inspirations, religious ecstasies, and mystical revelations ... means their dependence upon the quality of the material or substance used upon them" (p. 197). This notion emphasizes the importance of the environment or "influences" surrounding humans and the kinds of

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[11] Drawing from his research on the "logic of alcoholic addiction", Bateson puts forth the idea that an experience of defeat not only convinces a person that change is necessary ... "it is the first step in that change" (Bateson, 1971, p. 3). This experience breaks the myth of self-power. Looking at it philosophically, Bateson points out that this defeat "... is not a surrender; it is simply a change in epistemology, a change in how to know about the personality-in-the-world."

[12] Wills (1970) presents a commentary on the ideology of self-determination, self-control and associated slogans in the United States. He views these as key concepts in American liberalism. He states that liberalism is "... the philosophy of the market place, and America is distinguished by a 'market' mode of thought in all its public (and even private) life" (p. ix). He argues "that American liberalism and the emulative ethic [i.e. 'earning ethic'] cohere-inhere, rather, in each other" (p. 583). He traces the origins of liberalism and examines "how it lingers in our institutions, haunts our language [and] forms our assumptions" (p. ix) in four areas: national and international politics, education, business and individuals.

impressions we receive with respect to its implications for our present condition and capabilities. It also draws attention to consideration of the major types of impressions received by each individual as a result of his/her preparation. Practically speaking it is a nutrition problem. The quality of food/intake affects body development, structure and function. This is generally acknowledged regarding human performance and capability in the "physical" domain but much less so in the "emotional" and "intellectual" domains.

With respect to knowledge, being and understanding Gurdjieff states that,

> In ordinary thinking, people do not distinguish understanding from knowledge. They think that greater understanding depends on greater knowledge. Therefore they accumulate knowledge, or that which they call knowledge, but they do not know how to accumulate understanding and do not bother about it.... People of Western culture put a great deal of value on the level of a man's knowledge but they do not value the level of a man's being and are not ashamed of the low level of their own being. They do not even understand what it means.... Knowledge by itself does not give understanding. Nor is understanding increased by an increase in knowledge alone. Understanding depends upon the relation of knowledge to being. Understanding is the resultant of knowledge and being. And knowledge and being must not diverge too far, otherwise understanding will prove to be far removed from either. At the same time the relation of knowledge to being does not change with a mere growth of knowledge. It changes only when being grows simultaneously with knowledge. In other words, understanding grows only with the growth of being. (pp. 65 and 67)

Summary

Both perspectives include models of human development that acknowledge a potential for individual growth beyond normal physical/psychological growth toward a 'more desirable' state of understanding and harmony. They view human behaviour as a dynamic, complex process and look to "systems theory" for the theoretical constructs and language to discuss that complexity. Both perspectives deal with the structure and functions of systems and with levels of systems.

Perspective A focuses upon physical and organic systems in nature, in particular the aspects of self-regulation, self-organization, growth, adaptation and degrees of complexity. Nature is saturated with order and alive with pattern. This perspective tends to conceptualize evolution as having a grand direction or destination that exists somehow separately from the individuals involved. It is a linear process, (albeit one that acknowledges levels and cycles), of adaptation, change and continuous growth toward greater/higher levels of complexity and organization. It is implied that this growth is of a positive nature and in some way 'better' than that which came before. General characteristics of systems (i.e., importation of energy, throughput, output, information processing, homeostasis, feedback loops, vibrations and frequencies) lead to notions of wholeness, unity and the oneness of all systems from the physical systems of physics to the social systems of sociology and anthropology. Thus human beings are connected to

'natural systems' and so ideas about individual behaviour are extrapolated from them. In doing so, Perspective A often fails to differentiate the innate from the acquired (i.e., culturally determined). Humans are autonomous individuals embedded in nature. They have a healthy, wise inner core or centre that is simply waiting to be discovered and released. Their "mind" has a transcendent quality. They are agents in the evolutionary process. These human qualities coupled with the vast increase in scientific research knowledge and the technological advances in communication systems suggest positive outcomes from people 'taking charge of their lives and environment' at this point in time. Moreover, individual transformation will spread to and affect societal transformation.

Perspective B focuses upon open systems in context. It concedes that there are intricate systems of regulation, balance and organization in the form of cybernetic feedback loops (both negative and positive). It adds the phenomenon of escalation and runaway systems due to positive feedback. It also stresses that self-regulation and control are not attributable to one part of the system but is immanent in the organism-environment system as a whole. Yes, human systems share certain characteristics of other biological and physical systems -- the most critical being that systems are constrained by the larger system which is their environment. Perspective B examines the implications of context for human systems in light of the notions of levels of relationships, logical types, and

hierarchies of constraint. The "rationality" and order of the natural world is less evident in our human social context which is plagued by many problems. Perspective B attempts to take human subjectivity seriously. Thus, believing has more to do with seeing than the converse.[13] While it appears that we see and live what we believe, our beliefs themselves are influenced in large part by our previous preparation. Moreover, some of the most powerful and strategic 'beliefs' that guide our choices reside in areas of our being distant from conscious awareness. There is not a unified core of beliefs in humans but multiple, contradictory desires, emotions and thoughts. Thus the exciting journey of inner discovery may reveal a shriveled, desiccated fragment of what a person can be. Perspective B emphasizes quality not quantity of knowledge; not how much we know today but rather what we need to know in order to live more effectively in our contemporary context. Knowledge per se is insufficient. One must

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[13] Berelson and Steiner (1964) conclude that "In his quest for satisfaction, man is not just a seeker of truth, but of deceptions, of himself as well as others.... When man can come to grips with his needs by actually changing the environment, he does so. But when he cannot achieve such 'realistic' satisfaction, he tends to take the other path: to modify what he seeks to be the case, what he thinks he wants, what he thinks the others want. Thus, he adjusts his social perception to fit not only the objective reality but also what suits his wishes and his needs; he tends to remember what fits his needs and expectations, or what he thinks others will want to hear; he not only works for what he wants to work for;... in the mass media he tends to hear and see not simply what is there but what he prefers to be told, and he will misinterpret rather than face up to an opposing set of facts or point of view; he avoids the conflicts of issues and ideals whenever he can by changing the people around him rather than his mind and when he cannot, private fantasies can lighten the load and carry him through." (p. 663-664)

consider the role of the individual in interpreting/distorting 'the facts' as well as the specific conditions under which the knowledge might be applied. In the area of communication Perspective B looks to human abilities and interactions. Computers have enormously increased information collection, storage and processing. However there is no indication that human perception and ability to make judgements have improved concomitantly. In fact as the speed of transmission of stimuli and the volume of new stimuli increases, the limitations of the individual become more marked relative to society as a whole. Nor has there been any indication that interpersonal communication has improved. It is more likely that the complexity and accelerating rate of change of contemporary society may have actually hindered it.

Various arguments and counter-arguments could be presented in support of Perspective A or Perspective B. In the final analysis the issue cannot be resolved. There are no arguments or evidence that will be equally convincing to all people. Thus we return to the epistemological dilemma and practical problems of assessment and judgement that an individual faces. For each perspective suggests implications for the environmental educator. Perspective A encourages individuals to begin to identify problems, to inquire, to generate alternatives, to choose and to act; the implication being that some progress will be made. It supports the accumulation, organization,

dissemination and application of knowledge of the biophysical and sociocultural environment through conferences, workshops, seminars, pre- and inservice training, curriculum development and the processes of problem solving and values clarification.

Perspective B does not necessarily denounce such an approach but rather views it as premature. Until we have a reliable framework for ascertaining which of our thoughts, feelings and desires we should pay attention to, we will continue in a cycle of reaction rather than action confusing variety with progress. Perspective B does not ascribe a central role to the individual as a change agent, particularly at a societal level. It supports the accumulation of specific knowledge on the 'information' that initiates and terminates behaviour within the organism-environment system.

CHAPTER V

CONCLUSION

We must continually
learn to unlearn
much that we have learned
and
learn to learn
that which we have not been taught.

(Feldmar, 1981, quoting Bateson)

This thesis has attempted to examine critically selected aspects of environmental education. Chapter I introduced the salient features of the field with respect to problems of concern, selection criteria, goals/objectives and methods. Chapter II identified the dilemmas surrounding problem identification and validation. These included the relativity of perceptions of truth and arguments of proof, and the degree to which our previous experience sets the stage for what we will think worth doing as well as what we are able to do. These notions were further developed in Chapters III and IV wherein the ramifications of an affluent, industrial context upon human attitudes and competence were considered. An examination of the difficulties inherent in collective goals and solutions was initiated in Chapter II and continued in Chapter III. Serious doubts were cast upon the ability of socio-cultural systems or organizations to respond to the external challenges of population growth, pollution, natural resource

depletion and war. An assessment of the human capacity for response and change revealed multiple levels of complex factors underlying human action. It acknowledged certain limitations upon human flexibility and tolerance levels particularly within a highly complex, affluent industrial society. In the latter sections of Chapter II and III selected goals and methods advocated by environmental educators were examined critically. Severe doubts were cast upon their appropriateness and effectiveness. In order to counter the cries of "conservative", "reactionary" or "passivity" that the preceding may have evoked, chapter IV dealt with the issue of control. It examined the action-oriented stance to problems and injustices evident in the environmental education literature. Two opposing perspectives on control were presented with no resolution intended. Some implications of each perspective for environmental educators were suggested.

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> A sort of freedom comes from recognizing what is necessarily so. After that is recognized, comes a knowledge of how to act. You can ride a bicycle only after your partly unconscious reflexes acknowledge the laws of its moving equilibrium.
> (Bateson, 1979, p. 219)

Humanity as an organism is very young and characteristically egocentric. Our scientific knowledge and technological toys have

enabled us to instigate certain actions but ecologically we remain ignorant and thus unable to control or contain the effects of those actions. Problems of scale and perception render us incapable of giving sustained, serious consideration to events that do not touch us directly -- neither the very large nor the very small. Thus "individual comfort and discomfort become the only criteria for choice and the basic contrast of logical typing between the member and the category is forgotten until new discomforts are (inevitably) created by a new state of affairs" (Bateson, 1979, p. 222). Context may add further to our handicap.

A notion that has been developed in this thesis is the way in which human consciousness is influenced by the conditions in which we find ourselves. Forrester (1971) suggests that industrialism (including medicine and public health) "... may be a more fundamentally disturbing force in world ecology than is population" (p. 14). Gregg (1977) would include each of us as a part of industrialization because he views it as "... no mere exterior organization ... [it] ... consists of a spirit and attitude and habitual actions in and among all of us" (p. 24). Further, we are creatures of our formative years and interpersonal relations. Each of us, to varying degrees, is susceptible to propaganda, distraction, self-deception and denial. We cannot deal with "facts" independently of our hopes, aspirations, fears, hunger or stress. Our thoughts, desires and feelings waver with greater inconsistency than we are

normally willing to concede. We speak about controlling war, poverty and pollution when we are unable to control our personal reactions and addictions. Humans seem to be singularly well-equipped to deal with situations of physical hardship and deprivation but singularly ill-equipped to deal with situations that threaten the validity of (or reduce to absurdity) our basic perceptions of the world.

At one level, this thesis argues that many calls for action to exercise control over present and future environmental/social problems are based on a severe lack of consideration of the multiple levels of complexities involved in such a monumental and all inclusive enterprise. Moreover, even an understanding of the complexity is insufficient in terms of practical application. There is a significant distinction between the ability to identify a problem and an ability to formulate and implement ameliorative measures. A candid assessment of the task suggests that people are unable to control environmental/social problems in the ways in which proponents of environmental education desire. Thus it may be a disservice to persons and to serious thought about these problems to urge action that is unattainable and futile.

At the personal level, there is a process of human development beyond physical growth which is our prerogative to earn. This "timeless" perspective on human development suggests that through proper understanding and precise effort humans can learn to experience life rather differently than is "normally" expected. It requires

unlearning -- that is, separating ourselves from the influences that have come to dominate our consciousness. It involves a lengthy painstaking process of detailed self-observation; of viewing oneself as a sensitive recording device and making note of particular reactions and tendencies to escalate.

A central task of this thesis has been to explore some of the ways in which individuals think about certain issues surrounding the field of environmental education, not to arrive at solutions ...

> "Would you tell me, please, which way I ought to go from here?"
>
> "That depends a good deal on where you want to get to", said the Cat.
>
> Lewis Carroll, Alice's Adventure in Wonderland (1865)

Appendix A

(Adapted from Hart, 1979)

Elements of Environmental Education

Macrocurricular	Microcurricular
- Interdisciplinary - Multilevel - Global view	- Awareness and understanding of basic concepts - Development of processes (cognitive/affective/skills)
Methods and Materials	**Roles and Relationships**
- Problem solving - Values clarifying - System thinking - Firsthand experiences - Environmental issues oriented - Present-future oriented	- Active participation - Individual learning - Team approach to teaching/ learning - New productive student-teacher relationship
Context	
- Community oriented - Field studies (urban and natural environments	- Communications networking - Coordination and cooperation
Organization	
- Flexible administrative organizational patterns	- Reform of educational processes and systems

Appendix B

Exercise from Schelling (1971), pp. 82 - 88.

TIME: 30 minutes (minimum)

MATERIALS: 1 roll of pennies
1 roll of dimes
ruled sheet of paper divided into 64 one-inch squares in eight rows and eight columns

PREPARATION: Find a device for selecting squares randomly (eg. a table of two-digit random numbers, the digits identifying row and column, dice, coins, roulette wheel, deck of cards or some type of spinning device to generate quasi-probable number selections to determine row and column.

Place dimes and pennies on some of the square and suppose them to represent the members of two homogenous groups (eg. men and women, blacks and whites), French-speaking and English-speaking, officers and enlisted men, students and faculty). You may use equal numbers of dimes and pennies or let one be a minority. Define each individual's neighbourhood as the square territory surrounding her. She is the centre of a 3x3 neighbourhood.

RULES FOR INDIVIDUAL DECISION

Example A: Begin with 30 dimes and 30 pennies. Suppose that the demands of each are "moderate" -- more than one-third neighbours like herself. Specification of demands: if a person has one neighbour, she must be the same colour; of two neighbours, one must be her colour; of three, four, or five neighbours, two must be her colour; and of six, seven or eight neighbours, she wants at least three. It is possible to form a pattern that is regularly "integrated" and in which everyone is satisfied.

Example B: Remove 20 of the 60 coins on the board using a table of random digits. Pick 5 empty squares at random and replace a dime or a penny with a 50/50 chance. The result is a board with 64 cells, 45 occupied and 19 blank. Forty individuals are just where they were before we removed 20 neighbours and added 5 new ones. The problem now is to satisfy a function of the # and 0's who are not discontent with their neighbour by letting them move somewhere among the 19 blank cells. Anybody who moves leaves a blank cell that somebody can move into.

In a hour or so you can trace through several outcomes and experiment with different rules of behaviour, sizes and shapes of boards and subgroups (the latter can be identified by turning some of the coins heads and some tails). Changing the neighbourhood demands or using twice as many dimes as pennies will drastically affect the results; but for any given set of numbers and demands, the results are fairly stable. Shelling (1971) presents examples of outcomes in which all the people are content but are more segregated. In his discussion of the exercise he cautions readers about propositions that begin, "It stands to reason that ..." Although he reminds readers that "the results are only suggestive because few of live in square cells on a checkerboard" (p. 85). He concludes that "we can at least persuade ourselves that certain mechanisms could work, and that observable aggregate phenomena could be compatible with types of 'molecular movement' that do not closely resemble the aggregate outcomes that they determine" (p. 86).

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