

**An
Environmental
Ethic –
Its formulation
and implications**

SCAN INSIDE
FRONT & BACK
COLOR -

HC
120
E5
C28
no.2

The Canadian Environmental Advisory Council was established in 1972 by decision of the federal Cabinet, to advise the Minister of the Environment on:

- such matters as may specifically be referred to it by the Minister;
- the state of the environment and threats to it;
- priorities for action by the federal government or by the federal government jointly with the provinces;
- the effectiveness of activities of the Department of the Environment in restoring, preserving or enhancing the quality of the environment.

The Council is composed of up to sixteen members. It includes the Chairmen of the resource councils advisory to the Minister, plus members at large who serve in an individual capacity and are drawn from a wide cross-section of Canadian life and from all across Canada. Officials of the Department of the Environment are not members of the Council; however the Department provides a continuing Secretariat.

To carry out its functions the Council undertakes studies and reviews of matters of environmental concern and policy, holds regular meetings to consider progress and developments with regard to these concerns, and prepares comments, statements and reports as appropriate. The Council publishes an Annual Review which includes a summary of the state of the environment in Canada, and from time to time reports on other matters of general interest and importance.

Enquiries concerning the work of the Canadian Environmental Advisory Council should be addressed to:

The Executive Secretary,
Canadian Environmental Advisory Council,
c/o Department of the Environment,
Ottawa, Ontario.
K1A 0H3

Publications of the Council, when available, may be obtained through Information Canada, Ottawa, or from:

Publications Distribution Centre,
Environment Canada,
Ottawa, Canada
K1A 0H3

Cette publication est disponible en français sous le titre *L'éthique de l'environnement—son élaboration et ses implications*.

**Canadian
Environmental
Advisory
Council**

Report No. 2 January 1975

**An
Environmental
Ethic—
Its formulation
and implications**

Norman H. Morse
with a Preface by
Pierre Dansereau
and a Foreword by
Donald A. Chant

*Every person shall strive
to protect and enhance
the beautiful
everywhere his or her impact is felt,
and to maintain or increase
the functional diversity
of the environment in general*

Preface

The leverage that triggers decisions to use or to conserve resources is geared to social values. Wisdom in the allocation of water, soil, fuel, food, shelter, and transport stems from a knowledge of their quality, quantity, and renewability on the one hand and from a sense of equity on the other.

Differing in his outlook from the sociologist, the economist, the engineer, the biologist, and others who deal with resources, the environmentalist gets his bearings directly from the study of total ecosystems. His apprehension consists in identifying the processes whereby living agents transform resources into products. The relative harmony of the cycling systems is the subject of his ponderations.

Whereas the methodology and the theoretical background that permit such a study are derived from the spontaneous behaviour of wild plants and animals, an enlarged compass is needed in order to seize the management of ecosystems by man. It is not enough to recognize that swallows are architects, that termites are farmers, that beavers are engineers. Such foreshadowing of the human power to exploit soil and vegetation, to escape adversities, to modify the habitat, and even to manage large segments of the environment stops short of the complex motivation that governs the industrialized nations of our day.

And yet, the willingness to share and the way in which allocation is handled is essentially an environmental force that activates or blocks whole circuits of production and consumption. Thus from the food-chains of Canadian wildlife through the toils of the well-managed farmland to the smoking factories and the humming city a crescendo of energy flow is controlled by the standard of life of the people and by the values they assign to air, water, vegetation, animals, fields, houses, bread, and circuses. The prevalence of television over adequate housing and good food spreads signals over the land that slow down some circuits and activate others.

What are the needs of man? Of Canadian man, in particular? What needs create a right? Over and above a few absolute rights (quantitatively but not qualitatively contested) such as the right to breathe, to be free of bodily harm, to have some kind of shelter and food, there are a number of environmental products of extremely uneven accessibility, such as private transport and home ownership, travel, high-grade furnishings, clothes, food, etc.

The Four Horsemen of the Apocalypse have settled the problems of poverty, inequity, and injustice time and time again. Both Science and Religion have fought back: each time they have mastered one of the Horsemen they have somehow increased his strength, as witness the contemporary outbursts of Büchenwald, Hiroshima, and Ulster. If this be natural selection, it would seem that we are wont to inhibit its sway.

We therefore come full circle to resource allocation and to the social values that govern it. The ethic of this post-industrial society, although it need not turn its back upon Christian values and upon the desire for progress, has to be an environmental ethic, based upon our new-found experience of the limits of growth and the urgency of sharing.

Re-casting our moral apprehension of the world we live in so as to meet the challenge of the environmental crisis, we can only detect that we now stand beyond technological and economic systems that can really withstand the combined thrusts of demographic growth, resource tapping, and uncontrolled consumption. A new ethic, therefore, may well be more crucial than an improved technology or an enhanced productivity; it may well be the very condition of human survival itself.

We are very far from universal consensus on such an issue. In fact, it is only beginning to reach an explicit formulation. Its urgency is so apparent, however, and Canada's position in the world is so obviously privileged that the Canadian Environmental Advisory Council has felt bound to direct one of its major endeavours towards the discussion of environmental ethics.

Dr Norman H. Morse has borne responsibility for a working group on this subject that has involved much work, considerable thought, and a great deal of consultation. Although he does not come out with an "ecological bill of rights" or with a "blueprint for survival", he has cleared much ground and provided food for thought and discussion that places this paper as the first among many contributions to this topic.

Pierre Dansereau
Vice-Chairman
Canadian Environmental Advisory Council

Foreword

Life began on planet Earth about 4½ billion years ago. Today there are about 1½ million known species of organisms, but in the process of evolving to this point over such an unimaginable span of millennia, many more species than this are thought to have failed to meet the ever-changing challenge of their environment and to have become extinct. The complexity and composition of the natural system as we know it, therefore, is not an accident and it cannot properly be viewed other than holistically. The natural system itself has passed the harsh tests of survival, at least so far: no other system could have done so well in the environment presented by our planet, or it would have become pre-eminent and not the one we know. And every species comprising the system has passed the same sort of tests, drawing from the system as a whole to meet its own needs for survival and reproduction, and returning to the system what other entities and the system as a whole require.

Each species' survival and well-being is totally dependent on the survival and well-being of the entire system. No species can exist in a biological vacuum. Each species is dependent on others for food, for the breakdown of metabolic wastes and returning them to the cycle, and for creating the conditions that support life. And each is depended upon by other species for similar amenities. Each has its role to play; none is redundant or supernumerary. The most important single life process occurring in our natural system is that of photosynthesis, whereby green plants manufacture living material using energy from the sun, non-living elements, and water, and in the process give off the oxygen that supports all life. The living material so created is the basis for all other species; it provides the energy in the form of food that fuels the entire system from herbivores feeding directly on plant material through several levels of carnivores to the organisms of decay which return the basic elements and nutrients to the soil, where the plants can again take them up and begin the cycle anew.

One of the most striking characteristics of the undisturbed natural system is its overall stability. Both diversity and complexity of life are thought to contribute to this stability by providing great flexibility and resiliency, and the opportunity for multiple relationships between organisms. Great fluctuations may occur in the individual components of the system but the system itself remains stable. Changes of great magnitude undoubtedly occur over the millennia but always within certain boundaries of stability. As species rise in numbers, the forces of the environment become intensified and survival decreases, so that their numbers eventually once more subside: food becomes more scarce, space for living and reproducing becomes exhausted, enemies benefit from the increased supply of prey and themselves become more numerous, poisons from waste products accumulate. As the numbers fall, the intensity of such environmental pressures eases and in normal circumstances the species is not driven to extinction but recovers and once again begins to build its numbers. This process of homeostasis is endless.

The penalty for failure to live within these natural constraints is swift and sure; it is extinction. Countless species have paid this price in the past, through a failure to adapt as the milieu for life continually changed, through a failure to compete successfully with other organisms using the same resources, through a failure to adjust to the continually evolving strategies of its enemies, or by temporarily escaping from the normal checks and balances and becoming so numerous as to hopelessly over-exploit the resources on which it depends. Our own species probably has only narrowly avoided this fate at various times in our million or two years of history and all of our close relations, other hominid species, were unable to avoid it.

Another of the striking features of the natural system is that cause and effect relationships do not take place in simple, straight-line linear, mathematical fashion. Rather, such relationships frequently are best expressed in some curvilinear, or sigmoid form. And this creates the fact of threshold phenomena. As an example, consider the effect of a toxic substance, say a pesticide, on an organism.

There is a threshold dosage below which there is no effect. As this is exceeded, deaths begin to occur, presumably among the most susceptible or most exposed individuals. The curve of mortality increases exponentially over a range of increasing dosages up to a certain point at which the rate of increase slows. This is the point where all but the least susceptible, or least exposed, individuals have been eliminated. To obtain further mortality beyond this point requires massive dosages. It requires far more poison to kill the last 10% of the organism than the first 10%.

There is practically an infinity of thresholds in the natural system: a level of ocean contamination (one for each contaminant and one for groups of contaminants) above which marine organisms will begin to die and plankton will cease to produce oxygen; a minimum population below which reproduction is unlikely and a species inevitably and inexorably will become extinct; a level of air contamination above which carcinogenicity begins; a level of forestation below which animal habitats are not available and water can no longer be held in the soil. Examples are legion. The frightening fact is that although we are aware of these thresholds in principle, in very few instances can we pinpoint them exactly and say *this* is the level that under no circumstances must we exceed. The crossing of many thresholds is an irreversible process. When crossed, consciously or inadvertently, there is no turning back.

Finiteness is another feature of the natural system. It can be regarded in two ways. Thresholds are one measure of finiteness: they are quantifiable and measurable, they are real, and they put limits on processes of all sorts. However, there also are absolute limits to the *amounts* of all resources that are available and necessary to any organism, including mankind, for its survival and well-being. Our planet contains only certain definite amounts of minerals, and fossil fuels, and arable land, and all the other things that we now require. When they have all been used and the finite limit is reached, there is no more.

As our species emerged from the mists of prehistory, we were at first a species like all the rest. Our total dependency on the natural system was close and immediate and our survival was ruled by the availability of food and shelter, and by the abundance and effectiveness of our natural enemies: predators and disease. Gradually, however, unlike any other species, we used our unique intelligence and ability to conceptualize, to develop technologies that appeared to insulate us from this immediate and total dependency to a degree and to protect us from swift retribution for transgressions of the natural laws governing all other forms of life: fire, agriculture, methods of controlling disease, weapons, and all the rest. And somewhere along the way certain subcultures of our species picked up the notion that mankind is at the centre of the universe, that we stand apart from nature in a position of superiority, that we have dominion over all other forms of life, that Nature exists only to serve mankind. Some time later, during the scientific revolution of the 17th century, this same subculture also came to believe in the merits of increasing "progress", and progress to many came to be defined in purely material

ways. Human happiness and other benefits also were to be achieved by progress but they became distorted: for example, it was believed that happiness would increase with population size because there would then be more people to be happy; as if happiness came in people-units and could be accumulated like money in the bank. A million happy people gives more total happiness than a thousand happy people. The subculture that adopted these ideas became the dominant cultural influence in the world today: western man. Obviously these ideas conveyed certain competitive advantages, at least for a time.

These two notions, of dominance and of perpetual progress, more than any other have shaped and directed western man's relationships with the natural environment. They may be said to be the operative Environmental Ethic that has guided our behaviour with regard to all other forms of life and to the natural resources of the world around us. In other contexts, these notions perhaps have been greatly beneficial to our species: in the environmental context this "ethic" holds the seeds of disaster.

Compounding the environmental consequences of this "ethic" in recent decades has been the greatly accelerated rates at which all sorts of functions have changed. Exponential curves of increase, rather than arithmetic ones, can be seen on every hand: from per capita rates of consumption of electrical energy through our demands for fossil fuels to world population growth. There are few signs that we are attempting to control these rates of increase, in spite of our increasing awareness of the environmental impacts that attend many of them; in fact, it is doubtful if we really want to. Most planners still seem content to accept projections of exponential growth rates and to make their arrangements for the future on that basis.

It is worth noting that most of the functions that are increasing exponentially are those of demand, consumption, and waste. Functions of food production, resource discovery, and of waste assimilation and recycling are not increasing apace with the exponential functions.

In spite of the blinkers on our awareness imposed by this ethic of dominance and progress, the well-being and survival of mankind still depend utterly on the natural system. Technology has permitted us to escape from natural constraints for awhile but the facts of dependency on other organisms for food and oxygen, of threshold phenomena, and of finiteness still remain, and it will always be so. As we survey the natural system in the latter half of the 20th century, we can see many consequences of adherence to this ethic of ours: vanishing species, declining harvests of many species of food fish, outbreaks of competing "pest" organisms, devastated landscapes and denuded forests, polluted waters and dirty air, noise, congestion, and all the rest. And many knowledgeable people are now coming to believe that all of these phenomena are clear signs that we are beginning to push the outer limits of nature's resiliency and flexibility and that we shortly will experience the constraints imposed on any other species that over-exploits the natural system. Obviously, this ethic of the past has outworn its usefulness, if indeed it ever really had genuine utility. What is needed now is a new ethic, a modern Environmental Ethic, based on our increasing awareness and understanding of our dependency on the natural system, in all its intricacy and complexity and of the enormous risks we are running from the heavy destructive pressures we are now

placing on the system. This new Environmental Ethic must be based on harmonious relationships between mankind and the natural system, abandoning the dangerous arrogance and materialism that have influenced our behaviour for so long. The definition and adoption of such a new ethic is the only hope we have to ensure continuing survival and to avoid the catastrophes that any species, as intemperate as ours has been, inevitably will find falling down upon its head.

The conscious development of an environmental ethic is thoroughly "unnatural". It seems contrary to our cultural tradition. No other species consciously has done so. However, all other species already live by a particular environmental ethic—call it instinct. If they do not, retribution is terribly swift and certain, and they fail to survive. For our own part, our early ancestors also lived by an ethic or instinct, and for the same reasons. But, as we have pointed out, we grew away from it, indeed abandoned it, as we developed our technologies that seemed to render us immune to the hazards of living unguided by instinct or ethic. All we have really done is to defer the day of reckoning for a time, unless we now turn once again to our ethic, consciously refining and adapting it for our present circumstances and overtly adopting it as a credo, rather than simply being guided by it at the instinctive level. The time for blind instinct has passed. We have not been living immorally with regard to our environment, but amorally. And there is no engineering answer to a problem created by culture.

Albert Schweitzer wrote to the effect that the great fault of all ethics hitherto has been that they believed themselves to have to deal only with the relationships of man to man. For the first time, we must codify an ethic that deals not only with interhuman relationships but also with relationships between mankind and the rest of the natural system.

The Christian axiom that Nature exists only to serve mankind is a red herring to some degree. True, the word "only" clearly indicates a regrettably arrogant attitude. However, regardless of purpose, Nature *does* serve mankind in so many ways, as well as all other creatures, too. In attempting to subjugate all other species, we are simply harming and subjugating ourselves. For these reasons, our self-interest in preserving the integrity of the natural system is clear and self-interest can comfortably be the basis for defining a new environmental ethic because it and the interests of all other species are identical in most respects. The ethic, therefore, may be unashamedly man-centred.

Man to man and man to society ethics are reciprocal in nature. Man to nature ethics are not reciprocal in the same sense. However, in quite another sense and without the contractual implications of man to man ethics, nature will reciprocate to an environmental ethic by continuing to provide the amenities and services on which we depend.

Anthropocentricity is only one of many paths that will lead to a new environmental ethic. However, it is satisfying to note that other attractive paths, such as that of morality towards the lives of other creatures, of reverence for all forms of life, of the appreciation of the beauty of nature, all lead to the same ethic. Obviously these somewhat intangible, more esoteric values are highly compatible with the pragmatic self-interest of survival and this is further support of the axiom that "what is good for nature, is good for mankind".

An ethic is a moral principle, or a set of such principles. Aldo Leopold wrote that "an ethic may be regarded as a mode of guidance for meeting ecological situations so new or intimate or involving such deferred reactions that the path of social expediency is not discernible to the average individual". Animal instincts are just this. Ethics are possibly a kind of advanced social instinct in the making. Implicit in the definition of an environmental ethic is the assumption of a certain set of environmental values. But values have no intrinsic reality. The reality is our *actions* based on our values. A value is a motivation to achieve, it becomes a reason. Important concepts for the ethic are: reverence, responsibility, restraint, beauty, dignity, humility, and diversity. The paper which follows is an interesting and exciting attempt to give form and expression to such an ethic.

D.A. Chant,
Professor and Chairman,
Department of Zoology,
University of Toronto,
and Member, Canadian Environmental
Advisory Council.

Acknowledgements

I wish to acknowledge the assistance and encouragement I have received from members of the Canadian Environmental Advisory Council, and from others. In particular, I must express my thanks to Dr Pierre Dansereau, Vice-Chairman of the Council, and to Dr Donald A. Chant, a member of its Executive Committee, for their special interest and assistance. But others must also be identified. They include: Drs J.P. Nowlan and Ian McTaggart-Cowan, both of whom are members of the Council; Dr John A. Livingston, Faculty of Environmental Studies, York University; Dr Christopher Plowright, Department of Zoology, University of Toronto; Dr H.F. Fletcher, Environment Canada, and Dr Mervin Franklin, Dean of Science, University of New Brunswick. The latter two, together with Dr J.B. MacInnis, and Mr F.F. Todd, Council members, played an especially helpful role during the initial discussions and in no small way helped

to determine the nature of the final product. Last but not least, Professor John G. Head, Department of Economics, Dalhousie University, kindly served as mentor, supplying intellectual and moral support at critical stages.

Having such a battery of expertise at my disposal, I sincerely hope that this attempt to formulate an environmental ethic will not be proven futile but rather that it will contribute to a dialogue and actions that will result in benefits to mankind.

I, myself, must bear the responsibility for weaknesses that may be found in the argument and for achieving only partial success in overcoming certain problems of expression which are bound to cause difficulties for the reader.

N.H. Morse,
Professor of Economics,
Dalhousie University,
and Member, Canadian Environmental
Advisory Council.

Table of Contents

11	Introduction
11	Statement of the Problem
13	The Nature of an Environmental Ethic
14	An Environmental Ethic Formulated
16	Strategies for Action
18	Some Comments on the Canadian Case
19	Conclusions
20	References
20	Suggested Reading for Environmental Ethic

The Canadian Environmental Advisory Council is convinced that the escalating assault by man on the natural environment arises out of unrealized and unarticulated consequences of the attitudes of western society and the goals which it has accepted without serious question.

Our social ethic is pervaded by two notions: a) the dominance of man over the natural world in all its detail; and b) the desirability of perpetual progress by man in altering the world to his pattern in ways limited only by his ingenuity.

Under the circumstances of pre-industrial man these notions may have been greatly beneficial to our species. Today there is overwhelming evidence that they hold the seeds of disaster. This Environmental Ethic of use and dominance is further complicated by the greatly accelerating rates at which demand, consumption and the amount and complexity of waste are generated.

It is the view of Council that important as palliatives are, this response to our impact on the total environment of the world is a "band-aid" approach and that the real need is the formulation and acceptance of a totally new ethic. The great fault of all ethics hitherto is that they dealt only with the relationship of man to man. We now must codify an ethic that deals also with the relationships of mankind and the rest of the natural world.

The central issue is a moral one. Given the overwhelming predominance of mankind, what should be the nature of human wants and how should they be satisfied? The new ethic must contribute to a revision in the standards of human behaviour towards himself and the living world. We have formulated such an ethic in terms of "the beautiful", a comprehensive and compelling concept whose spirit and meaning highlight the need for all individuals and groups to take account of the moral implications of their actions. We draw our concept of "the beautiful" from the powerful consensus achieved at the Stockholm Conference on the Human Environment.

The Environmental Ethic which we urge can be expressed as follows: ***Every person shall strive to protect and enhance the beautiful everywhere his or her impact is felt, and to maintain or increase the functional diversity of the environment in general.***

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

It is one thing to articulate an ethic, it is quite another to arrange for it to permeate the structure of a society so as to radically alter long-held attitudes and derived practices.

It is essential to develop strategies that will facilitate the understanding, adaption and implementation of this environmental ethic by individuals and groups. As command institutions in Canadian society generally take the form of legislation and regulation it appears to us that strategies for action should include parliamentary debate and acceptance. In a real sense this ethic is an expansion of the doctrine of Human Rights. Without a change such as is inherent in our proposed 'Environmental Ethic of the Beautiful' future generations of men will be denied the full riches of opportunity that could be theirs. As a conjoined step the development of a comprehensive educational programme will be essential. Our document goes much further into the philosophy leading to our proposal and into the foreseen routes to implementation.

The Ethic of the Beautiful has world-wide applicability—so why should Canada take the lead? It is our opinion that Canada has many options open and has the opportunity to demonstrate the practicability and advantages of introducing completely new attitudes and derived procedures at all levels.

New settlements Canadians are planning should be sited and developed with an eye to beauty and environmental diversity; major new developments of all sorts should be examined and planned from the point of view of the new ethic; the restructuring of existing habitation and transportation is upon us and can be undertaken from a greatly improved point of view.

As the resolution of many urgent problems in all areas calls for the development of a higher individual and collective morality than is now frequently in evidence, Canadians are afforded unparalleled opportunity to provide leadership in formulating, accepting and putting an environmental ethic into practice. We can develop a society that exhibits, as one of its goals, the maintenance of the functional diversity of the natural environment to the lasting benefit of man. Canadians could then help others to do likewise.

An Environmental Ethic — Its formulation and implications

Introduction

Although varying degrees of cooperation and mutual support are discernible among living forms, nevertheless the earth's flora and fauna have evolved through a harsh competitiveness, first between primitive organic entities, and, later, between more complex forms. Constraints imposed by the inorganic world have always been significant, and the more complex organisms survived by the utilization of the more primitive or simple forms capable of existing more independently. During this process, thousands of unadaptable species disappeared, victims of a changing environment. Man, himself, has probably narrowly avoided this fate at various times, and sub-species of *Homo* have disappeared in different locations.

Over hundreds of millions of years, first one then another species became dominant, at least in localized areas. Many of these eventually succumbed to environmental change sometimes stemming from their own waste products or from unrestrained destruction of their main food sources. As the twentieth century passes, mankind, as yet another in the series, has achieved such a degree of dominance throughout the world that his assault on the environment is fraught with unknown consequences. Already many species have been exterminated by him and the survival of numerous others is at stake. Is this situation merely a contemporary manifestation of the competitive struggle, including a competitive struggle among men? Having developed a mastery in some directions, does man possess a morality that will assist him not only to avoid the fate of many other species but also to create conditions favourable to the development of human personality in the world at large?

Since such a morality is only vaguely articulated, the objective of this paper is to formulate an environmental ethic for our time and to examine some of its implications.

Statement of the Problem

Man's assault on the environment, those objects and processes constituting the setting for human action, is overwhelming.¹ It has at last resulted in what can aptly be called the contemporary human predicament, a situation which can be considered in terms of the extreme case and the general case. The extreme case pertains to the proximity of major environmental thresholds whose transgressions would be disastrous to man. The general case applies to circumstances where decisions concerning environmental use are made more on the basis of cultural considerations in the broadest sense than on the immediate presence of identified and significant thresholds. Resolution of the general case will automatically provide safeguards against the advent of the extreme case in so far as man has the power to determine his fate in that regard. The focus of this discussion will be on the general case, but the extreme case requires at least brief comment.

There is anxiety, even alarm, that the presence of man in such large and increasing numbers together with his overwhelming outreach will sooner rather than later bring to pass a cruel solution within a physical environment that is finite, that is, characterized as having thresholds beyond which the action of man cannot be accommodated without drastic environmental change that would be exceedingly harmful to him. The argument that thresholds exist is based upon our knowledge of environmental processes and our observation and measurement of the surpassing of the limits of environmental accommodation in specific instances, for example, in respect to toxicity stemming from the release of certain substances into the environment or the disappearance of species of flora and fauna, sometimes as a consequence of the actions of

man. By extrapolation, the conclusion follows that major thresholds, such as may pertain even to the atmosphere or the oceans, must also exist and that the natural environment cannot indefinitely accommodate increasing use without eventual drastic modification. No one would want to live on the edge of many of the thresholds that can be envisaged since environmental change at a major threshold must in general be more comprehensive than change in a single variable. The concept of simple, incremental change must be replaced by that of complex change and discontinuity. The thesis that near substitutes will always be found for that which has disappeared must be abandoned.

¹See Suggested Reading

The burden of proof that fears about the imminence of transgressing major environmental thresholds are unfounded must rest with those who seek to discredit these fears. The debunkers must explain how the environment can indefinitely withstand increasing use, or show that any threshold man will approach will be relatively insignificant, or that man can develop enough knowledge and know-how in advance to avoid disaster. Such knowledge and expertise are currently lacking, nor does it appear these deficiencies can be overcome in the foreseeable future. Furthermore, any attempt to offset or minimize the consternation cannot be founded on the argument that man's rise to pre-eminence and his contemporary behaviour are no more dis-equilibrating than environmental upheavals in the past. The two situations are not comparable owing to the differences in the role of man. And to state that man's rise to predominance is merely the continuing manifestation of the process of the survival of the fittest, a process in evidence over geological time that should be allowed to proceed, is an untestable hypothesis. This being the case, the exercise of caution is the better part of wisdom and appears the only means of buying time for an urgent reassessment of man's relation to the environment. The determination of appropriate limits to environmental use presents a challenge to the wisdom and statesmanship of man. The need for establishing limits to environmental use highlights the significance of the general case, a situation characterized more by environmental shortages than drastic environmental change deleterious to man. Concern about the current relation of man to environment within this framework stems from problems of fact and problems of value.

In respect to problems of fact, the impact of man on environment is determined by the number of men and the nature and extent of the average level of use. There is abundant evidence that even current levels of environmental use, quite apart from present exponential trends, are bringing us rapidly closer to thresholds, symptoms being the growing list of species of flora and fauna already rendered extinct or threatened by man. The implications of their disappearance are not fully understood, but it is evident that the loss of species closes evolutionary options probably forever. A justification for such losses is conspicuously lacking. Furthermore, heavy exploitation of particular resources, as evidenced, for example, by reliance on monoculture to enhance agricultural productivity, means diminished environmental diversity in many parts of the world. Diminished environmental diversity is frequently accompanied by diminished environmental stability and a resultant increased vulnerability of man. Man's vulnerability stems, therefore, from both his general pressure upon, and his manipulation of, the environment. There is no way of proving that history will continue to repeat itself and that technological solutions to environmental shortages will always be found. Already the world's population is becoming vulnerable in respect to the availability of food when major crop failures occur. And the future of the availability of energy, a key to lifting the burden of toil from man's shoulders, is uncertain. Accordingly, recognition of the need to maintain and enhance environmental diversity within the world may prove essential as a constraint upon, and safeguard for, mankind.

In respect to problems of value, we hold the view that both man's wants and the manner in which he seeks to satisfy them, frequently are morally wrong. The wants, or ends, of action may involve an individual's use of resources on a scale that cannot possibly be generalized, especially given the size of the world's population.

The manner, or means, of action also may be interpreted frequently as displaying a wanton destruction of environment. What is at issue is the extent to which one party should modify its behavior not only out of self-interest but also to accommodate the aims and feelings of others. There are principles at stake which, among other things, relate to the allocation of social costs over time. Social costs appear explicitly in at least two forms:

- a the experience of large numbers of people born under conditions where there is little or no opportunity for their development; and
- b the adverse effect on one party of environmental use by another.

A heightening conflict concerning environmental use exists among men. The dimensions of the conflict are much broader than any single discipline or any one culture or society. All of mankind is inextricably involved in determining what man's impact on environment is and should be. It is easy to say that the objective should be the optimizing of environmental use. The optimum will be governed by what man wants. What he wants will reveal his conception of himself and should be what he ought to want for the utmost development of human personality.

The fullest solution of the general case, and hence automatically of the extreme case, must entail the development of an environmental ethic. It is essential because of its prophylactic effect. The complexity of the situation and the urgency of a painstaking assessment of man's environmental impact, point to the need for a vigilant public morality. Without envisaging a Utopia or adhering to a dogma, an ethic can serve as a focus around which mankind can rally for general human improvement. It may be the only avenue for satisfactorily resolving the human predicament of which important elements are population increase, energy use, and adequacy of the food supply. The task is to develop an ethic that is acceptable, meaningful, comprehensive, and universal in its application over time.

The Nature of an Environmental Ethic

The development of an environmental ethic implies:

- a the development of a conception of man himself;
- b the acceptance of certain principles respecting the relation of man to man; and
- c the development of an approach by which to judge the acceptability of environmental use, the relation of man to nature.

Each of these components will be discussed in turn.

- a In respect to the first, man is regarded as an exceptional species with qualities and capabilities, for both good and ill, that distinguish him from all other living forms. In particular, he possesses the power to determine his own conception of himself. Therefore, the approach followed in this paper is basically man-centered, and this requires elaboration.

Different positions along a continuum can be specified as manifesting different conceptions of man. First, man can regard himself primarily as one of many species, each revealing adaptability to live as individuals and as a whole to survive as a species through successive generations. Under conditions of enlightened self-interest, man's conduct would be attuned to the goal of survival.

A second position on the continuum represents the condition of living today, highlighted by the production and consumption of a vast array of goods and services in the world at large. The high rate of per capita consumption, particularly in the West, and the large and growing populations, particularly in the developing countries, have together imposed heavy demands upon the environment. This situation has led to misgivings about environmental use and to the current warnings about the existence of environmental thresholds and the probable consequences of exceeding them.

A third position admits the sanctity of life in general, that all life is worthwhile, from which it follows that there is a moral obligation on the part of man to restrain his use of environment, especially when it endangers the survival of other kinds of living forms both as individual specimens and unequivocally as species. This approach is less man-centered than either of the previous two, and in the limiting case is not man-centered at all if man ranks himself on a par with all other forms of life. It becomes man-centered if what man wants is to recognize the sanctity of life, just as he may want food to satisfy hunger. The difficulty associated with this approach, however, is its indeterminacy concerning the extent that man should curtail his use of other living forms which themselves may compete with, and prey upon, one another. What is required is a principle or means of removing or reducing the indeterminacy. Nevertheless, the admission of the sanctity of life highlights the humaneness and sensitivity of man who has now become an environmental agent of such strength as to result in a qualitative shift in the relation of man to environment.

A comprehensive man-centered approach encompasses elements of all three positions. No other approach appears as satisfactory. Within a philosophical framework of free will that affords room for creativity, this approach is achieved by postulating that there is a general welfare function that is determined by all the forces and factors bearing on man's conception of himself and what he wants, whether it be survival, affluence, recognition of the sanctity of life in general, or some other consideration. The general welfare function as conceived here incorporates the moral dimension. It is subjective, somehow indicating man's conception of his own well-being as determined by the choices he makes in the course of being and acting. The difficulty is that the function at present is lacking in the moral dimension. It does not show that people on the whole are sufficiently attuned to what they ought to want and do as members of an increasingly numerous and dominant species.

The advantages of adopting a comprehensive approach are that: a) its focus is at a level above the mere survival of man; and b) its acceptability is enhanced since mankind is unlikely to respond spontaneously to a non-man-centered approach. The way can be opened for man to curb his steamroller assault on the environment. Whether he does so will depend upon whether he develops a public morality and enough judgment to make wise decisions. In modern times, Western society has proceeded largely along deductive, scientific, individualistic, and rationalistic lines whereas Eastern societies have tended to emphasize the intuitive and traditional aspects of living. It is unclear which type of society has had the better environmental influence. It is evident, nevertheless, that resolution of the global problem of environmental use will require resorting to all the relevant knowledge, experience, insights and techniques developed in both the East and the West to arrive at a fitting conception of man and thereby to move toward a reconciliation of *what is* with *what ought to be*.

If man regards himself solely as end, environment must serve as means. Whether man as end is interpreted within a framework of a conception of man as infinite appropriator and infinite consumer (as much of Western economic literature implies) or within an entirely different moral framework will govern the nature of environmental use. Furthermore, if the environment is regarded wholly as means, as distinct from proximate end, man places himself on a pedestal to the neglect of human and moral considerations and responsibilities. Among other things, such a philosophy is unlikely to lead to wonder over the mysteries of the origins and evolution of the Universe, and of man's place within it, and therefore unlikely to stimulate and nourish man's spiritual and much of his intellectual and emotional development, which are his most distinguishing

characteristics. Thus, man, though a dominant species, must behave as though he were not. Such an evaluation of himself and of his role must be incorporated in the general welfare function, whereupon environmental safeguards will automatically be built into the total socio-environmental system. The role of an environmental ethic is to point the way to the establishment of attitudes and modes of conduct that will contribute to the achievement of a conception of man in tune with the delicate balance that is being sought.

b Although different people evaluate benefits and costs differently, it appears nevertheless necessary, owing to the conception of man, to start from a position that regards all men as having an equal right, though not necessarily any absolute right whatsoever, to live in and enjoy what can be described as a clean and healthy environment and equal responsibility to ensure that such conditions prevail. Environmental use will inevitably generate social costs as well as social benefits in terms of the general welfare function. The generation of social benefits is desirable, although there may be some question concerning their distribution. They consist of the gains accruing to second and third parties as a consequence of environmental modification or use by the first. The generation of social costs is another matter. They comprise the inconveniences, hardships, even anguish and suffering, experienced by second and third parties in the wake of environmental use by the first. In these cases, problems arise in connection with the amount of self-restraint which the generators are prepared to impose upon themselves and the degree of tolerance which the bearers of those costs are prepared to exercise. Accordingly, questions arise concerning who is to serve as counterbalance or arbiter on whom, under what conditions, and by what means.

What is required is an ethic to supply a principle for the development and application of a heightened public morality in order to cope adequately with issues such as these. In the absence of an ethic, the search for a solution will provide grist for the mill of other disciplines, especially the social sciences which are concerned with problems of choice. However, such a course appears to lead not to a moral optimum but to a solution that is of the nature of a utilitarian or pragmatic second best.

c Implicit in the foregoing is a vision of the purposes of environmental use and of the requisite conditions for achieving them. In many instances, either insistence on the possession of absolute rights, apparently within the framework of the medieval conception of natural law, or adherence to least-cost criteria within a utilitarian-materialistic framework, have been overriding factors establishing the nature and extent of environmental use and seem to be root causes of important aspects of environmental degradation in our time. Since there is opportunity for debate at every stage in the means-ends hierarchy, a thrust of an environmental ethic must be towards the achievement of consensus about relationships among means and ends. The striving for such consensus will, like the leaven in the lump, increase man's awareness of himself and assist in making everybody everybody else's keeper, as well as the environment's keeper, without degenerating into fanaticism and platitudes. A consequence will be the melting away of problems that could otherwise lead to an impasse. An ethic must imply both the nature of the ends of action and of the principles to be followed in achieving them. Achievement of the goal of morally optimal environmental use is a tall order. Man can do no better than the best that he can.

An Environmental Ethic Formulated

Of the vast and growing literature on the subject of morally optimal environmental use, the *Declaration of the United Nations Conference on the Human Environment* provides an assessment of the relation of man to the environment and offers directives concerning appropriate courses of action. Although an objective of the Stockholm Conference was the improvement of the human environment, the centrality of the relation of man to the environment was emphasized.

A remarkable achievement of the Conference was the revelation of widespread awareness of the nature of the contemporary human predicament and of a desire to work towards the resolution of it. Consensus was achieved on several broad issues. Although an environmental ethic was not developed, it is obvious that one was implied in the *Declaration*.

The formulation of an environmental ethic involves the recognition of the contribution of the Greeks who sought to clarify the meaning of concepts such as "Virtue" and "The Good". An ethic appropriate for our time can be stated in terms of the "Beautiful", an all-encompassing concept that implies not only a moral conception of man and of principles respecting relations among men but also understanding by which to judge the acceptability of environmental modification, enhancement, and general use. Such an ethic can be expressed as follows: **Every person shall strive to protect and enhance the beautiful everywhere his or her impact is felt, and to maintain or increase the functional diversity of the environment in general.**

The ethic comprises two mutually related themes of which the latter in part serves as a constraint or safeguard, whereas the former not only recognizes the creativity of man but also implies an obligation to exercise it. The exhortation to maintain or enhance functional diversity in the environment establishes a proximate end which emphasizes the necessity for caution in the light of man's ignorance about many of the complexities of environmental processes. It implies constraints that would keep environmental options open until a conception of the beautiful is developed and widely accepted by mankind.

On the other hand, the beautiful is manifest, in part, through environmental diversity; for the beautiful is not only that which is aesthetically pleasing, but also that which is functional. The diversity of landscapes and of living forms is beautiful and functional. These qualities are experienced not only through the senses but are apprehended also with the mind. The beautiful is, for example, not just visual, as a sunset, since it comprises a dimension that captures the intellect. The beauty of complex natural macro- and micro-systems with all their interrelated components appeals to our sense of order and balance. Man can therefore accentuate the beautiful through the maintenance and enhancement of both the natural and the human environment. Man is dysfunctional when he destroys beauty and diminishes diversity, especially by endangering or destroying it totally within the world. Hence the maintenance of environmental diversity is an integral part of the ethic. However, when the conception of the beautiful becomes comprehensive enough, the ethic could be stated only in terms of "the maintenance and enhancement of the beautiful whenever man's impact is felt". The conception of the beautiful can be expected to be sharpened over time with the gaining of experience in coping with environmental issues.

From another point of view, the ethic is even broader than an environmental ethic. A wide range of actions, involving primarily relations among men, may result in only minor or inconsequential environmental impact, yet at the same time they may be extremely beautiful or un-beautiful morally. Egocentrism is un-beautiful and boorish. Various forms of oppression and exploitation of one group by another, and fanaticism, are un-beautiful owing to the perverse relations they reveal among men. On the other hand, in respect to environmental use, slums, debilitating poverty, overpopulation, polluted rivers and atmosphere, denuded land areas, and distracting noise reveal a relation of man to the environment that presses back on man himself in a manner that is inconsistent with the ethic.

It behooves man to develop an understanding of the beautiful, for he is one of its dimensions when he strives to make his behaviour consistent with it. Man and environment are then in a relationship to one another such that man achieves a moral conception of himself and of relations among men. It is evident that mankind already has developed some conception of the beautiful and does not have to start at point zero in interpreting and practicing the ethic. The objective, therefore, should be to strive for greater appreciation and enhancement of the beautiful without becoming disillusioned should progress be slow.

The ethic provides both principles to be followed and goals, or ends, to be achieved in any role that can be imagined for man whether it be procreator, consumer, worker, leader, follower, individual, or member of a group including nation states and mankind as a whole. It offers a basis for the development of a higher individual and public morality on such diverse matters as the exercise of responsibility, the size and distribution of the world's population, the nature of human settlements, the design and quality of artifacts, workmanship, the management

of natural resources, the maintenance of full genetic variability of all species of flora and fauna, the handling of contaminants, pollutants and wastes, and the allocation of social costs where they diverge from the private costs of environmental use. The ethic is applicable to the rich and the poor and to the developed and the developing countries. It does not mean that the poor man must build a temple as an abode, but that he should construct his hut with an eye to beauty and share responsibility with his fellow men in enhancing the beautiful and environmental diversity in general. The ethic provides safeguards for the use of common property and a basis for conduct respecting both work and pleasure within a private property context.

The thrust of the ethic is to avoid the frustrations of endless and debilitating debate over the specific nature of the ends and means of environmental use. Yet it is to be expected that in connection with the finer tuning, the conception of the beautiful will not be uniform in respect either to its revelation in the ends to be established or in the means of achieving them. Different people and different societies will hold different conceptions of the beautiful and hence different priorities. They will display different reactions to man's impact on the environment. Probably ample opportunity will always exist for the emergence of conflict. But the finer tuning loses significance if the ethic has been accepted because the general welfare function will be different when recognition is given to the desirability of striving to enhance the beautiful than when men have given little thought to the matter. A general striving to follow the ethic will be reassuring for all. The ethic, therefore, will assist in defusing any given problematic situation and in minimizing confrontation. At the same time a foundation will be laid for a reassessment and ranking of activities as requested by the United Nations Conference on the Human Environment.

Consequences of such assessment can be expected to involve not only modification of many activities now normally regarded either as consumption or production, but also some reclassification of activities out of the category of work and into the category of play as an accompaniment of attitudinal change.

Strategies for Action

It is essential to develop strategies that will facilitate the understanding, adoption, and implementation of an environmental ethic by individuals and groups. These strategies must also reveal the benefits and costs, and hence the magnitude of the trade-offs associated with the selection of one environmental option as compared to another within the limits of the environmental thresholds to be avoided. Three kinds of institutional arrangements have variously operated in different proportions in different societies for the organization and control of individual and group endeavours. They are: tradition; command; and markets.

The traditions, norms, or values of a society set limits beyond which individuals and groups will not normally go in their behaviour, for example, towards certain aspects of environmental use. However, there will usually exist a variation in human behaviour under any tradition. The thrust of a tradition may be to conserve wildlife yet the poacher may still seek to flourish. Murder and rape may be in violation of tradition yet these practices will be continued by some.

The development and implementation of a comprehensive educational program will be an essential complement to the acceptance of an environmental ethic and the building of a tradition consistent with that ethic. A tradition must be developed to enhance man's understanding and respect for the environment and to encourage restraint and caution regarding its use. If man is by nature infinite appropriator and infinite consumer an educational program must be all the more compelling, perhaps even supplemented with command institutions where they can be made acceptable, to attune man's values and limit his actions within the constraints of the contemporary predicament.

While they may have various other dimensions, command institutions in Canadian society generally take the form of legislation and regulations and their enforcement through political and legal processes. This strategy is adaptable, effective if it is generally acceptable, and in many respects constitutes a least-cost, direct means of setting limits to human behaviour for the achievement of immediate and longer-term goals. But laws reflect the traditions and norms of a society, certainly of its power structure, and, in a democracy with universal franchise, laws must normally be acceptable to a majority of the people. Otherwise, leaders would be very unlikely to obtain approval for them. The development of a politic-legal system is an evolving process. In one era a thief is put to death for stealing a sheep whereas, in another, capital punishment is abolished for all violations. The enforcement of laws is the easier the more widely are their objectives understood and accepted, for the purpose of laws is both to offer freedom to the individual or group where such freedom is deemed desirable and moral, and to limit it where such conditions are not met. In the contemporary situation where pressures on the environment can be overwhelming, the development of laws and regulations for establishing the limits of environmental use requires the development of an environmental ethic and the achievement of its acceptance as a complementary, even prior, endeavour.

Market mechanisms constitute an additional means of determining what people want, and how the benefits and costs associated with any option are distributed. Markets also are continuous and convenient ways of allocating and rationing resources and provide measures of how much of something people want and are prepared to pay to have supplied. Limitations of market institutions can be offset by resorting to other means such as legislation and tradition for the resolution of conflict. The modification of the general welfare function through the development and acceptance of an environmental ethic will influence individual and collective choice and will be reflected in the operation of market institutions where these means are employed to govern environmental use.

The development and acceptance of an environmental ethic is one problem, the selection of means of putting it into practice is another. It is at this stage that the potential contributions of social science and law may prove particularly useful, for these disciplines encompass analysis of institutional arrangements and rules of conduct, both of which are concerned with means. This is significant, for the goals of society possibly are not to be found in expressed agreement but in the rules that direct group behaviour (Neill 1972). Institutional arrangements and rules on conduct merit close examination owing to the nature of significant environmental problem areas, namely: the common property aspects of the environmental media, air and water; other common property such as wildlife; and situations where micro-decisions and actions within a private property market context may be inimical to the general interest. Private and common property and markets are institutional arrangements governing relations among men.

In addition, different aspects of the environment possess characteristics either of private or public goods. Perhaps the common-private property, public-private goods dichotomies can be linked to the three strategies of tradition, command, and markets so that environmental management problems can be resolved in superior rather than inferior ways. It seems appropriate to attempt to do so, especially if the welfare function reflects the influence of the ethic.

Private property is defined as that to which an individual or group obtains exclusive user rights within the law, whereas common property is that to which no one possesses such rights². Sometimes it is said that common property is everybody's property, but frequently it appears much better to say that common property is nobody's property even though everyone may enjoy the privilege of access to it on equal terms. A farmer's land can serve as an example of private property and a fish stock of common property.

A private good is one to which the principle of exclusion can be applied and a public good is one to which it cannot. What is private property must also carry the characteristics of private goods, that is, the exclusive user rights of the owner are such that he can, within the law, exclude others. Thus in Canada a farmer can legally prevent others from destroying his crops. A common example of a pure public good is defence, to which the principle of exclusion cannot be applied. Moreover, there is jointness in consumption in the sense that one person's consumption of defence does not reduce the quantity available for another. Perhaps a parallel example of jointness in consumption associated with environmental use is bird watching. One person's viewing, which does not frighten birds away, does not reduce the quantity of birds to be seen by another.

What is common property sometimes carries characteristics of private goods; that is, the principle of exclusion can be applied so that only those who fulfill certain conditions are admitted to access. For example, a fish stock which is common property may have assigned to it the characteristics of a private good. Access may be permitted only to licence holders, as in many domestic fisheries. It is in respect to the common property aspects of the environment that much but not all of the so-called decline in environmental quality occurs. Whereas under private property managed within a market framework the level of rent determines the quality of a resource that it is economic to maintain, comparable information is not generated by common property exploited essentially within a non-market framework. As a consequence, the use of common property is frequently accompanied by the generation of social costs stemming from resource depletion or deterioration. Institutional change involving greater use of market mechanisms comprises one of several alternative strategies to counteract these tendencies. Where this approach is not practicable, limits to environmental use can be established by legislation buttressed by tradition that incorporates the environmental ethic. Whatever set of institutional arrangements is decided upon, the outcome will reflect the extent to which the environmental ethic is accepted and practiced.

²As Coase has pointed out, it is rights, never objects, that are owned, and the rights themselves are always limited by law; "outright" ownership can never, by definition, extend to the uses of an asset for illegal purposes (Dales 1973).

The application of the environmental ethic, within a common-private property, public-private good framework, by means of a selected combination of strategies, such as tradition, command and markets, can be made to pave the way for mankind's coming to grips with emerging and urgent environmental issues. Although an approach such as this may seem very diffuse, it nevertheless recognizes that environmental management must be a creative process requiring continuing resolution. An aim must be to develop a central tendency in the management of the environment in order to keep open environmental options and optional methods of environmental use. As a consequence, different societies will continue to enjoy both social and environmental beauty and diversity, because the striving to enhance the beautiful and to maintain environmental diversity in the world at large will be rendered the more effective.

Some Comments on the Canadian Case

If Canadian citizens and Canadian governments are serious about the development and application of an environmental ethic such as has been suggested, environmental use and environmental management in Canada must be consistent with the interpretation that is placed upon it. There is evidence that pressures on Canadian renewable and non-renewable resources will mount. Accordingly, it is expected that Canadians will in future experience a relative shift in demand towards the products of their resource industries and towards the use of Canadian space for travel, recreation, and a place to live. In short, there will be heightened land use, broadly defined, for business, pleasure, and habitation in Canada.

The kinds of issues that are emerging and can be expected to become rather crucial can be illustrated.

- a Because much of the northland of the world lies within Canadian jurisdiction, the environmental ethic means that whatever development takes place in the north should occur with a view to the enhancement of the beautiful and the maintenance of functional diversity within the natural and human environment within the world. The meeting of these criteria involves the resolution of a wide range of social and environmental issues. On the one hand, development of the north will impinge on native peoples. Resolution of relations among peoples should be consistent with the concept of the beautiful, with no one claiming inalienable or absolute rights unless these are established by convention consistent with the ethic. On the other hand, the north, having a harsh climate, is characterized by delicate ecosystems which require a long period to repair themselves if disturbed by man. Since the full consequences of such disturbances are unknown, at least the exercise of caution appears very much in order.

Perhaps, the more the north is opened the greater will be the desire to preserve certain areas undeveloped; indeed, it may eventually become a necessity to leave some areas untouched. Whatever happens, it is evident that the common property resources of any development region should not be exploited irresponsibly, certainly not to the point of extinction if they are the only world specimens. New settlements should be sited and planned with an eye to beauty and diversity and the inhabitants encouraged to develop a sense of belonging. An upshot would be that here, as elsewhere where the ethic exerts an influence, unpaid-for social costs would automatically be kept low.

General utilization of resources should also be conducted with regard to the beautiful and the functional diversity of environment on the whole. For example, wheat land will not also carry buffalo, but buffalo will not be exterminated, hence environmental diversity is maintained. The production and export of food, having the effect of alleviating food shortages and accompanying unbeautiful conditions elsewhere, can be judged consistent with the ethic. On the other hand, exports of food that foster world population growth may eventually cut both ways as all mankind moves to a more vulnerable position respecting world supplies of food as man's numbers increase. An unbeautiful situation with serious implications for the maintenance of the functional diversity of the environment can be envisaged. It would be consistent to export food to ward off hunger abroad, yet at the same time to officially express reservations or misgivings about exponential expansion in the world's population, given its present size.

c Similarly, in respect to the utilization of other renewable and non-renewable resources, what is the justification for continued exponential use without a reassessment of the implications? Why should it be a goal to seek to use all renewable resources up to full capacity, as it were? Is not this moving towards the edge of an environmental threshold? And why should the supplying of non-renewable resources, such as minerals and fossil fuels, be determined so largely by the nature of existing demand? Where it seems justifiable to argue that the throughput should be minimized rather than maximized, Canadians themselves and through their governments, should convey their misgivings to others and to one another. Since there are so many instances where it unambiguously appears that the level of per capita consumption of many items can be reduced and at the same time the quality of life improved, it is a duty to encourage a dialogue on individual and social priorities. While it is neither expedient nor justifiable for Canadians to seek to live to themselves in a world apart, they should not be denied the privilege of exercising wisdom over environmental use even if others do not, although it is possible that in a tense situation such freedom would be denied them.

d The ethic carries implications for the nature and location of human settlements,

the size and distribution of the Canadian population, and the nature of environmental use mainly for domestic purposes. Food can be shipped abroad to relieve hunger, or people admitted into Canada where the food is grown and available. Large metropolitan areas can be encouraged to grow in certain locations and the countryside reserved for other uses in addition to primary industry, or vice versa. Many of these problems require a consideration of proportions and trade-offs and rather specific guidelines for development. But if an environmental ethic is universally accepted in principle by Canadians, developments would take place differently than if it is not.

If pollution in any particular form, for example, is deemed unbeautiful, polluters would themselves be striving for ways to prevent it. Users also would reconsider their level of use of the product or service that generates it. The full implications of the current high per capita use of energy calls for a reconsideration of priorities as individual responsibilities become more explicitly recognized. In particular, what Canadians seem to be doing without full knowledge of the consequences is to proceed with the harnessing of remaining major river systems in the midnorth and north for the generation of electrical energy at a time which appears to be ushering in the nuclear age. Canadians will be confronted with altered rivers and ecosystems in addition to the problems of the nuclear age.

Conclusion

The environmental ethic advanced in this paper has not been addressed solely to Canadians. Instead, an earnest desire has been to formulate an ethic that will be generally accepted and put into practice by the many peoples throughout the world. Nevertheless, Canadians do occupy a favourable position respecting environmental use, since they have jurisdiction over a rich and extensive natural environment. They also have made great strides in developing their society, or what may be called their human environment. In addition, Canadians have a deep interest, extending beyond the limits of national jurisdiction, in the management of certain general, yet vital, aspects of the natural environment, such as the atmosphere and the oceans, where questions of national jurisdiction over environmental utilization have not been wholly settled by international agreement. As the resolution of many urgent problems in all these areas calls for the development of a higher individual and collective morality than is now frequently in evidence, Canadians are afforded a golden opportunity to provide leadership in formulating, accepting, and putting an environmental ethic into practice. The way is open for them to proceed towards the development of a beautiful society that exhibits as one of its purposes the maintenance of the functional diversity of the natural environment. Canadians also can assist others to do likewise. However, the organization to accomplish these tasks has yet to be developed.

References

Suggested Reading for Environmental Ethic

Coase, Ronald. 1960. Problem of social cost. *In* Journal of Law and Economics. October 1960, 1-44. Reprinted in *Readings in micro-economics*. W. Breit and H.M. Hochman (eds). pp. 423-456. Holt, Rinehart & Winston, New York.

Dales, J.H. 1973. Land, water, and ownership. *In* The Canadian Journal of Economics. Vol. 1, No. 4, p. 795.

Neill, Robin. 1972. A new theory of value. The Canadian Economics of H.A. Innis. University of Toronto Press, Toronto. 9:26.

Brinkhurst, R.O. and D.A. Chant. 1971. This good good earth. Macmillan Co. of Canada, Toronto. 174 pp.

Dansereau, Pierre (Editor). 1970. Challenge for survival. Land, Air, and Water for Man in Megalopolis. Columbia University Press, New York and London. 235 pp.

_____. 1973. Inscape and landscape. Massey Lectures. Twelfth Series. Canadian Broadcasting Corporation. 118 pp.

Dubos, R. 1968. So human and animal. Charles Scribner's Sons, New York. 267 pp.

Ehrlich, Paul and Anne Ehrlich. 1970. Population, resources, environment. W.H. Freeman and Co., San Francisco. 509 pp.

Elder, F. 1970. Crisis in Eden. Abingdon Press, Nashville. 272 pp.

Leopold, Aldo. 1949. A Sand County almanac. Oxford University Press, New York. 295 pp.

Livingston, J.A. 1973. One cosmic instant. McClelland and Stewart Ltd., Toronto. 243 pp.

Meadows, D.H. and D.L. Meadows. 1972. Limits to growth. Universe Books, New York. 205 pp.

McHarg, Ian. 1969. Design with nature. Falcon Press, Philadelphia. 195 pp.

Ward, B. and R. Dubos. 1972. Only one earth. G. McLeod Ltd., Toronto. 225 pp.

Canadian Environmental Advisory Council

Members (April 1975)

Arthur Porter
University of Toronto
Toronto, Ontario
Chairman

Pierre Dansereau
Université du Québec à Montréal
Montréal, Québec
Vice-Chairman

Donald A. Chant
University of Toronto
Toronto, Ontario

H. E. Duckworth
University of Winnipeg
Winnipeg, Manitoba

Moir Dunbar
Defence Research Establishment
Department of National Defence
Ottawa, Ontario

Irving K. Fox
University of British Columbia
Vancouver, British Columbia

Philippe Garigue
Université de Montréal
Montréal, Québec

Eric Gourdeau
Courville, Québec

Ross H. Hall
McMaster University
Hamilton, Ontario

F. Kenneth Hare
University of Toronto
Toronto, Ontario

Guy R. Legault
Ville de Montréal
Montréal, Québec

Ian McTaggart-Cowan
University of British Columbia
Vancouver, British Columbia

Donovan F. Miller
The Canadian Fishing Co. Ltd.
Vancouver, British Columbia
*Chairman, Canadian Fisheries
Advisory Council*

Norman H. Morse
Dalhousie University
Halifax, Nova Scotia

James P. Nowlan,
Halifax, Nova Scotia

Robert G. Rogers
Crown Zellerbach Ltd.
Vancouver, British Columbia
*Chairman, Canadian Forestry
Advisory Council*

Secretariat

E. Fred Roots
Environment Canada
Ottawa, Ontario
Executive Secretary

J. Keith Fraser
Environment Canada
Ottawa, Ontario
Associate Secretary

Environment Canada Library Burlington



3 9055 1017 1864 0

Other publications of the Canadian Environmental Advisory Council.

*Annual Review 1973-1974. Part A:
Activities 1973-1974, A. Porter. Part B:
Problems and priorities in the Canadian
environment, P. Dansereau.*

*An environmental impact assessment
process for Canada: Council Report No. 1,
February 1974.*