

"The Educational Significance of the Ecological Revolution" treats the contemporary environmental crisis as a scientific-social revolution of the first magnitude which encompasses the transformation of the cultural base of industrial civilization. Programs in environmental education have for the most part failed to perceive the dimensions of the ecological revolution, and their educational recommendations show little promise of success. Only as education receives broad governmental and industrial support can it promote the kind of criticism of social goals that is requisite for enabling men to learn the meaning of ecological sanity.

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The Educational Significance of the Ecological Revolution

Despite the enormous popularity of the ecological revolution throughout the world today, there is little evidence that American educators have reacted very positively to its challenge and begun the hard work of determining its significance for the activities of schooling. This is not to imply complete inactivity on their part. Many national groups (e.g., the NEA, National Parks Service, and the Audubon Society) and local school districts, as well as numerous individual teachers in both secondary and higher education are busy developing or have already developed proposals for environmental education. Nor is it the case that educators have been unresponsive personally and individually to the theme of environmental crisis. They have shared as fully as other Americans the mixture of shock, indignation, and enthusiastic optimism in the possibilities of environmental redress which the ecological revolution brought in its wake. Still we have experienced nothing like the wave of widespread educational reform so characteristic of the Sputnik era, or the more recent reform efforts of the 60's. By and large the effects of the ecological revolution on education have been superficial: the celebration of Earth Day; the addition of courses on "environmental awareness", or the beefing up of existing courses by adding units in ecology; the establishment in Universities of interdisciplinary departments or even separate environmental "centers" to handle the environmental theme; and the appropriation into educational vocabularies, and their use in a variety of frequently ungainly contexts, of a host of ecologically "in" terms — like "ecology", "environment", "Nature", and so on. While these efforts

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are always well intended and often energetically pursued, they only scratch the surface of the challenge and the opportunity which today's environmental revolution holds for education.

Perhaps the very popularity of ecology has led educators, along with the general public, to the conclusion that with so much talk about the environmental crisis, amelioration of its dysfunctional aspects will surely follow, so that educators are relieved of any major role in promoting knowledge of the subject. This view would seem to be reinforced by the very prevalent (and very false) notion that the environmental crisis is little more than the problem of finding the appropriate technological cures for the various forms of pollution and environmental mismanagement that presently bedevil us, by "cleaning up" the sources of pollution and eliminating deleterious practices from our present system of corporate and individual life. It may be, on the other hand that many educators are more deeply aware of the seriousness of the environmental crisis than the above view gives them credit for, and while they might earnestly desire to implement sweeping changes in their school programs which reflect and incorporate the ecological theme, they feel stymied and discouraged by the obdurateness of "the system" and settle for whatever modicum of ecological relevance they can introduce into their work. Still a third possibility is that educators do not sufficiently understand the fundamental nature of the ecological revolution and its profound implications for modern civilization to be able to imaginatively conceive of either its theoretical or practical implications for education. This view is lent plausibility by the fact that so much popular ecological discussion has focused the public eye on environmental dysfunction, on effects and their immediate causes (belching smokestacks, dying fish, noise levels, etc), that it has been very easy to nod one's head in agreement without understanding systematic causation.

Having mentioned these three explanations for educators' general failure to introduce ecology more forcibly and extensively into the educational arena — and undoubtedly still other such explanations could be offered — I make no brief for the adequacy of any one. But to the extent that this essay will offer an account of the fundamental meaning of the ecological revolution for our time, and for education in particular, it assumes that the last explanation cited is by no means unimportant.

The Ecological Revolution

What must be understood about the ecological revolution is that it constitutes a full scale scientific revolution with strong social overtones which in importance can best be likened to the Copernician Revolution. In many ways the important thing about the Copernican Revolution was not simply the discovery of the heliocentric theory of the universe, but rather the profound psychological impact on man which came from its elaboration at a time of scientific and cultural change. Man, though for centuries buffeted mercilessly in a precarious world, possessed at least

the ultimate security that he was resident of a planet which God had placed at the center of all universal existence. When that security was challenged and ultimately shaken by the Copernican movement, there began a series of efforts to explore anew and reinterpret the scope, significance and foundations of human knowledge. Central to the new philosophical undertaking which thus began was a concern with the establishment of adequate grounds of self-knowledge appropriate to human knowing and practice in the world opened up by the New Science. We may see this concern at work most representatively in the work of Descartes, whose fanciful reflections on his own existence and the validity of his beliefs were anything but fanciful, but rather a serious attempt to found a theory of knowing that could serve the plight of science and the individual whose assumptions had been upturned by the Copernican discovery. Today we seldom realize that our contemporary preoccupation with subjective awareness, relative values and personal identity has its historical roots in the "shock of recognition" that accompanied the impact of a new theory of planetary motion at the dawn of the modern world.

The ecological revolution offers the same kind of challenge to man's fundamental assumptions about his relations to the world as did the Copernican Revolution, though its subject-matter is not planetary motion. Interestingly, the most important of these assumptions were set by the Copernican age itself. They are the bifurcation of man from Nature, and the atomization or particularization of natural processes.

That man is separate from Nature seemed obvious enough on common sense grounds to an Enlightenment Age flush with confidence in science and the unaided mind to control the course of Nature for human benefit. As the accomplishments of science and technology grew, the belief in man's superior distinctness from an essentially dumb and inert natural world became unquestioned, and provided the basis for the extraordinary technological achievements of the 19th and 20th Centuries. Only in poetry or oratory was man's membership in a larger Nature stressed. But this membership was really secondary to the professed destiny of man in the machine age: control over Nature.

With Nature playing an adversary role, it became easy under the man-Nature dualism to conceive of her as an assemblage of parts whose range of interconnections was limited to specific functions at hand, usually those defined by a narrow technological or socially utilitarian aim. Natural processes thus tended to be atomized or fragmented. Even with the demise of particle mechanics, the increased specialization and abstraction of physical theory tended to make even more difficult a view of natural processes in more extensive duration.

To point out that ecology contradicts the first of these assumptions with the flat assertion that man *is* a part of Nature, and offers a supplementary way of investigating natural processes that utilizes and builds upon the findings of the physical sciences, does not, however, adequately

convey the revolutionary posture of ecology in the modern world. This posture cannot fully be appreciated unless it is realized that the ecological revolution encompasses much more than the science of ecology. Fundamentally, the ecological revolution is a phenomenon of modern industrial civilization, a matter of the consequences of our technological way of life. What is revolutionary in the ecological revolution is the perception that environmental dysfunction is systemic to the basic procedures and modes of institutional activity which characterize worldwide technological society. These procedures are all based on one fundamental principle: that the goods and resources of the non-human natural world may be utilized "efficiently" for the promotion of human ends whose constitution need not involve any consideration of the worth of those same non-human natural goods and resources beyond whatever requirements for their integrity and welfare may permit their continued "efficient" utilization. On this principle, which may be called the principle of least natural regard, the entire edifice of modern civilization has been, and is still being built. Yet the consequences of following this principle are now leading us to see its invalidity. For its continued application is creating one of the most tragic paradoxes in human history: further growth and development in its behalf is increasingly producing destruction of both man and Nature. Part of this tragedy is that man, creature of habit that he is, is so deeply wedded to the conditions of the present that he cannot let himself see or believe the ecological destructiveness of contemporary civilization, with the result that he rationalizes acts of environmental degradation under the rubric of progress. The more he surrenders to the seeming inevitability of present growth trends, the more he becomes accustomed to servitude to an Orwellian lie: progress = destruction.

Because environmental dysfunction is an expression of the controlling forces of industrial civilization, the ecological revolution is identical to the process of a developing industrial civilization undergoing the tension and opposition between the environmental consequences of its activity and the ostensible goals and aims which propel it forward. Real revolution is never outside the social body. Many people have failed to understand this about the ecological revolution. They have regarded environmental dysfunction as a noisome malady peripheral to the central workings of modern society, an outlook which undoubtedly helps to explain the many overconfident appeals to technology as a source of easy if not sure remediation. But in fact the ecological revolution is the hard clash between our most cherished notions of sustaining life on earth and their consequences.

If the ecological revolution can be seen as a total process of transformation involving man and his institutions and their effects on the rest of Nature, part of this process has included the emergence of the science of ecology. Ecology has come into its own as a response to the forces that have shaped the environmental revolution. And with its help we have been able to chart the revolutions course, understand

its movements, and seek guidance for the future. Ecology is an instrument of human science which, while it did not cause the ecological revolution, is nevertheless very much a part of it as one of its phases or components whose function is to attain understanding.

The chief contribution of ecology to a world in the throes of environmental revolution has been to proffer conceptual frameworks and criteria for evaluating environmental dysfunction both causally and normatively. Nature viewed ecologically is the dynamically evolving totality of all earth phenomena, living and non-living, human and non-human, which constitutes a by no means harmonious unity by virtue of the relative stability of a multitude of functional interrelationships which all existing things hold to each other. Each individual thing, family, community, population or species has a peculiar chain or network of these interrelationships on which it relies for food, energy, habitat, etc. These networks are called ecosystems, and ecosystemic relationships are the chief concern of ecologists. They enable the ecologist to view complex patterns of interconnection which extend through or across behavioral fields. Paul Shepard has strikingly described the quality of this kind of ecosystemic vision as applied to man:

Ecological thinking . . . requires a kind of vision across boundaries. The epidermis of the skin is ecologically like a pond surface or a forest soil, not a shell so much as a delicate interpenetration. It reveals the self enobled and extended rather than threatened as part of the landscape and ecosystem.¹

Shepard's analogy of the human skin with pond surface and forest soil is a most telling one, and suggests better than any other example I have come across not only the unique sort of perception of relation between phenomena which ecology affords, but also the existing potential of its application to man's relationships with his natural surroundings — including other men. If man "interpenetrates" with the natural world, he does more than simply interact with it. As John Dewey pointed out long ago, man lives *through* an environment by having transactions with it. Dewey's notion of transaction I find to be practically identical to the base meaning of "interpenetration" and "cutting across boundaries" as used by Shepard. The notion of ecosystemic interrelation is essentially transactional and *vice versa*.

To view phenomena ecosystemically is to view them in terms of those extensive environmental conditions which are requisite to their well-being; it is to view them in terms of the *system* of environing forces of which they are a part. In human social study, this requires the inclusion into social subject-matter of environmental features which are frequently ignored. Social science has shown that it is not free from the man-Nature dualism in its concentration on the proximate and efficient causation of the merely social. While we have learned much

¹Paul Shepard, Introduction to *The Subversive Science: Essays Toward an Ecology of Man*, ed. Paul Shepard and David McKinley (Boston: Houghton Mifflin Co., 1969), p. 2.

about the natural world itself, the study of man has rarely emphasized man in his transactions with a full behavioral field in which physical and social variables are interrelated. This is the important point about the transactional-ecosystemic approach. It necessarily takes man out of an interactional framework (man *and* the world) and places him in a framework where the object of inquiry is man-in-and-through-the-world. This shift is of tremendous importance, and is perhaps the outstanding contribution of ecology to modern thought. For its effect is to de-anthropomorphize both the study of man and the world of Nature. Both have up to now been studied interactionally — that is, we have tried to investigate each more or less separately and *then* view their interrelations. But the ecosystemic approach places man in an environmental field or situation where he is himself a natural phenomenon among the many others which compose that situation. As a result of this the intellectual question shifts from “What is good, or what is to be derived from any situation *for man?*” to the question “What is good, or what is to be derived from the situation *for the benefit of the situation itself?*” These two questions are profoundly different in their substantiative and methodological import. The first reflects the kind of man-centered approach to knowledge of the world that is typical of our era’s obsession with control over Nature. The second suggests an ecological approach to knowledge of the world. The difference between the two is that with the former, one component of the system Nature is separated out from it and given a selective and controlling emphasis, while with the latter there is no such separation and all components of the system Nature are viewed on an equally inclusive basis. Thus with the former, intellectual questions (by which I mean questions as to truth, knowledge and values) are decided on the basis of the degree to which they satisfy the putative needs and requirements of the selected component (man), whereas in the latter, intellectual questions are decided on the basis of the degree to which they satisfy the needs and requirements of the system Nature itself. The former emphasizes respect for man at the expense of Nature; the latter emphasizes that it is only through respect for the system Nature that genuine respect for man is possible. The former is anthropocentric; the latter ecocentric.

Thus we are brought back to the Copernican effect of the ecological revolution. Just as the Copernican Revolution revealed to man the depth of his ignorance in thinking the earth flat and man the center of the universe, so the ecological revolution is revealing to us today the depth of our ignorance in thinking that man occupied so elevated a position on earth that he could apply the principle of least natural regard on so vast and destructive a scale. The Copernican effect of the ecological revolution lies then in its deflation of man’s ego-centeredness, a deflation which produces a profound sense of shock and loss for modern man, not so much intellectually but emotionally. For it is through emotional habituation that we are personally implicated in the complex

institutional systems of modern life, all of which have been brought about, and continue to sustain us, according to the principle of least natural regard. But if the principle of least natural regard is ecologically unsound, and if the good for man has to be framed in the larger knowledge of what most benefits the total system of Nature, then the upshot of the ecological revolution is that radical reform of existing social institutions is an ecological imperative. Thus it is that ecology has been called "the subversive science," and radical reformers of various persuasions have found ecological thinking so much to their liking. Unfortunately, most of them have focused on those features of ecology which they think justifies an ideology developed antecedently to an ecological perspective. This includes capitalism and socialism since both are equally though rather differently committed to a political economy of growth with its corollary of the principle of least natural regard. Though it is pure speculation at this point, it is more reasonable to expect that a social order reconstructed on the basis of ecological principles would differ markedly from the major political economies which vie for world allegiance today.

The task of social reform posed by the ecological revolution is enormous and may well be more than we can bear. For one thing it presupposes an exceptional degree of faith in the ability of man to effect this change rationally and at the level of his most cherished attachments and principles. But the prospects of ecological catastrophe are no less unsettling, and it may be that continued failure and disillusion with present social systems will work hand in hand with the introduction of ecologically derived social structures capable of inspiring a degree of social unity heretofore lacking. In any event, the fundamental challenge of the ecological revolution remains a difficult one: to find ways of formulating new social goals which embody sound ecological principles capable of directing the ordered reconstruction of society. Men do not like to entertain new goals especially when the ones they hold have been adopted uncritically. It is always so much easier to stray from the search for new goals to the recommendation of new techniques designed to revitalize the old goals. We see this in evidence today as technocrats and apologists of the establishment frantically strive to manipulate technology to the advantage of goals that are under fire from ecologists and conservationists. But while technological refinement is of course vitally necessary, it is not a sufficient condition of environmental reform, though this necessity is so often hopefully translated into sufficiency. As long as goal criticism is avoided in the futile attempt to save principles and policies that are hopelessly at odds with ecosystem science, there can be little hope of clearing away the many intractable social and environmental problems confronting us now. For these problems have come about not merely from the utilization of the wrong kind of technology, but from following the wrong goals.

Education

In what I have said about the ecological revolution I have tried to make clear that its dimensions are no less than to require us to conceive of an entirely new relationship of man to Nature, and that such an undertaking in turn calls for the planned redesign of our economic and social institutions in accordance with the principles and findings of ecosystem science. Though these are staggering prospects, I think they accurately convey the proportions of the ecological revolution, at least if my analysis of it is correct. It follows that these two concerns define the framework within which education must operate in the future. Education must become the practice of midwifery in assisting the transformation of man-centered social systems to ecocentered systems. It must become the central agency of culture which provides leadership in the discovery of the conditions under which men may be helped to work through the excruciatingly hard adjustment that search for new modes of relationship to both physical and social environment is bound to entail.

Whether these large purposes are shared by those who are currently designing programs in environmental education is not clear. But I think it can be seen from the shape of these programs that they will fail to significantly contribute to the realization of these purposes, and may even hinder them. I suspect the difficulty is that educators have not sufficiently realized the enormousness of the undertaking, that to tackle environmental education is to tackle something much larger than can be handled through addition to curricula of units in ecology or environmental awareness, or a tramp through the marsh in back of the school to clean up the local stream that winds through it. These activities are important in themselves, but unless they are made integral parts of a much larger effort in environmental education, they will surely falter and fall by the wayside, largely out of disinterest and disillusionment, in the manner of Earth Day.

A number of proposals have been offered to provide a broader context for environmental studies, so that they would be reinforced by a larger share of school offerings. The most sweeping of these is John Fisher's proposal for universities² that the theme of survival be made the central locus of all academic work, and whatever subject is not found relevant to survival be discarded. This has the merit of impressing upon us the possibilities of curriculum unification, but it suffers from an arbitrariness characteristic of single-theme approaches in education. Both students and faculty in their desire for relevance frequently exercise a degree of censorial editing which eliminates material of the greatest value to the determination of the quality of life. The classics of many disciplines, for example, are frequently shunted to the side because they

²John Fisher, "Survival U: Prospectives for a Really Relevant University," in Garrett DeBell, ed., *The Environmental Handbook* (New York: Ballentine Books, 1970), pp. 134-146.

are thought not to speak to today's problems. But classics are invaluable guides to the present because they force us to look at ourselves from vantage points which differ markedly from our own. This acts to counter the tyranny of familiarity which, under the banner of relevancy, eliminates a richness in perspective, nuance, and counter-challenge we cannot afford to miss.

However, inclusion of classics and other materials distinctive of the special disciplines need not be incompatible with a problem centered approach to environmental questions. The world is organized in terms of problems and this has led many to favor an interdisciplinary approach which would enable the findings of specific disciplines to be related to the study of manifest problems. Indeed, it is held that interdisciplinarity is especially appropriate to environmental studies because it reflects the emphasis on cross-cutting interrelationships found in ecosystem analysis. While the numerous experiments with the interdisciplinary approach have not resulted in an impressive record of success, interdisciplinarity is nevertheless a highly promising structure for promoting environmental investigations both in lower schools and in the university. But it suffers from much the same difficulties which I pointed out made the ordinary "add-on" environmental curriculum so potentially ineffective. Even if they could be properly staffed and funded, interdisciplinary courses tend to be ignored by remaining departments and faculties in the schools, so that while they might be highly successful internally, they fail to gain the necessary external reinforcement in over-all school programs which gives them a balance, and most importantly, tends to lead their participants to see how traditional subject-matter can be utilized in the solution of social and environmental problems. This is undoubtedly more a recognition of the shortcomings of traditional education than the interdisciplinary mode — though interdisciplinarity is not without its own shortcomings especially when it is construed in such a way as to restrict certain of the disciplines, or more likely, exclude their findings from the gamut of interdisciplinary study. Interdisciplinary education is a ready victim of the tyranny of the familiar. Even so, I do not think these shortcomings are in principle insoluble, and interdisciplinary programs are worthy of pursuit at all levels and situations where feasible. I would think them especially suitable when they are based on communication between the sciences and humanities.

There is another curriculum approach to environmental studies which has not been taken seriously. That is to maintain frankly disciplinary curriculum structures which however emphasize the pertinency of ecological considerations within each specialized offering without making the unpopular "cuts" or "deletions" of materials found in more avowedly relevant courses. This approach, while it presupposes an inordinate faith in the ability of tradition-bound teachers, especially in highly specialized university departments, to become persuaded that their field should lend itself to the ecologically minded, does make it possible for students to

explore the wealth of disciplinary detail for its bearing on the ecological revolution. Still, it cannot be denied that as many disciplinary studies are taught, they grossly ignore environmental dimensions. History, for example is generally taught as a man-centered subject: the exclusive record of human achievements, with natural environment viewed, if at all, as a secondary backdrop to the main spectacle. And of course the sciences, even when they touch on environment, are notorious for relegating human-social interplay to the back seat. Whether traditional discipline-oriented fields could sufficiently reconstruct their offerings to their own and the environmentalists satisfaction is an open question. But I do not see any objection in principle to their doing so.

Whatever else may be said in favor of or against these or other alternative modes of curriculum organization, it is probably true that the attempt to elect any one as the best for the purposes of environmental education is not only futile but undesirable. Education, like Nature, thrives on diversity and variety. Still, by far the greater emphasis in the design and teaching of curriculum and courses ought to be given to structures which, if not openly interdisciplinary, at least are problem-centered, and initiate the student into a process of search, at first for solutions to the practical problems of his relatively immediate environment, but ultimately for broad contacts with, and understandings of the larger community and world. Full scope should be allowed for idle speculation, and consideration of deliberately unfamiliar, time-worn, and foolish notions as means of counteracting the tyranny of familiarity. Education would then become an exploration of environment both physical and social in the attempt to understand it and utilize it intelligently for human purposes.

The mention of human purposes raises the old question of the inherent subjectivity of any problem solving approach — that is, the danger that problem solving amounts to little more than a process of satisfying the bias of the problem solver, so that there is no way, short of an appeal to standards or values outside the process of problem solving, of knowing whether solutions found are desirable in themselves or are merely reflections of individual wishes. I believe that if problem solving is placed in an ecological context, this serious difficulty can be adequately handled. For in stressing the necessity of probing physical as well as social environment, a standard of evaluation is introduced into the problem solving process that is beyond any human factor, yet is still part of the empirical natural world. Ecological problem solving points to the dependence of any human design or contrivance on non-human natural relations, on the system of Nature with its many complex ecosystems in a constant flux that is held in balance by systematic open steady-state operation. While the ultimate dependency of man on Nature, and most importantly, an appreciation of his own naturalness as subject to the same systematic regularities which hold Nature in balance, cannot be grasped as a precondition of problem solving activities, it can be approached gradually

from a variety of routes, and will begin to serve as a corrective mechanism to man's impetuousness and self-centered aspirations. Herein lies the solution of the philosophical problem of subjectivity, a problem which any problem-centered or inquiry pedagogy must face. In the process of coming to realize his inclusion in, and dependence on natural processes, the problem solver's initial subjectivity is transformed or conditioned as he learns that solutions to *his* problems depend on satisfying the objective conditions which maintain the other ecosystems in the system Nature and not just his own.

A problem centered ecological education would therefore strive to promote an understanding of the ways in which human purposes are extensions and outgrowths of the larger natural world, instead of their standing forever in opposition to it, with all the resultant crises of subjectivism and relativism which usually attends such opposition. When the ecological examination of the consequences of current dominant social purposes is made part of school studies — i.e., when these consequences are looked at ecosystemically, with attention to the ways they affect both physical and social interrelations in the human ecosystem and ultimately the entire biosphere — it is inevitable that students would be led to see the inadequacies (as well as the strengths) of many human goals and purposes and the behaviors they entail. The direction of learning is secured with the proffering of alternative hypotheses as to goals and social arrangements designed to bring human behavior more closely into accord with the total behavior of the system Nature. Thus goal criticism should be one of the outstanding features of ecological education.

Of course goal criticism may occur without the presence of a conscious ecological concern. It is therefore important to realize that the ecological dimension in education extends the scope of present goal criticism by taking it out of its largely social framework and placing it in an integrated social-physical framework. Telic criticism then proceeds not simply in terms of social forces, but by noting the ways in which physical activities and structures underly and are intertwined with social purposes. Our conception of the "social" or "social problems" has been largely deficient by excluding variables of the physical environment from its purview. This has led to the rather strange view that human social behavior can be understood in relative independence of physical surroundings. But this seems not to take account of the fact that the physical environment, in so far as it has been subject to human intervention, is also a social product,³ that its present shape or form expresses the human goals which have inspired its alteration. Since human social activity is lived through these physical environments, in a real sense they become inseparable parts of man's social world. Thus genuine social understanding, genuine learning about the world cannot exclude their critical consideration.

³For a fascinating illustration of this point, cf. W. G. Haskins, *The Making of the English Landscape* (Baltimore, Md.: Penguin Books, 1970).

A good example of how ecological learning requires the criticism of the physical components of environment is provided by today's urban environment. It is assumed by most proponents of urban education that the chief function of education in an urban world is to provide the learner with the knowledge and skills which make possible his adjustment to the urban environment. But this view assumes the environmental adequacy of extant urban physical structures. Yet the study of urban man can never be carried on successfully apart from his physical surroundings. The size of cities alone would seem to reveal the consequences of man's pursuit of the principle of least natural regard and unlimited growth. Yet our cavalier disregard of urban size can hardly be justified scientifically because very little social research recognizes the question of optimum size as a significant problem. A thoroughgoing ecological education would engender criticism of urban physical characteristics precisely because they constitute the environment through which social purposes are necessarily transacted. And it would aim at the cultivation of alternative urban physical environments more in keeping with the requirements of *all* of Nature, and not man alone. The continued acceptance by educators of the basic pattern of urban existence, with its supposed inevitabilities of massive size, congestion, and corporate inefficiency, is surely one of the greatest obstacles to making cities fit for continued human habitation. The contribution of an ecologically inspired education to this end is that it places within the subject-matter of education variables of the physical environment without which competent social knowledge cannot be produced.

The Ultimate Challenge

In this account of the influence of ecology on education, no attempt has been made to prescribe a comprehensive educational program based on ecological principles. The various examples, arguments and questions explored have been designed to convey only representative implications for education and not necessarily exclusive possibilities. But given the conservatism of teachers and schools today, it is difficult to be sanguine about the possibility of influencing present education in any way remotely resembling the suggestions presented here. Added to this is an even greater obstacle beyond the schools. No curriculum, no teacher, no amount of goal criticism will suffice without broad support from community and government. The ultimate challenge to all those who seek to improve man's relationship to his environment through education, is the glaring contradiction between whatever, and however well we may teach in the spirit of ecology, and the examples of destructiveness to Nature that are daily before our eyes and to which we have in some important ways already become insensitized and accommodated. How to teach principles of ecosystem and open steady-state when the daily means of our existence so often depend on their violation?

I do not see how educators unaided can cope with this contradiction. The introduction of environmental education in whatever way or form

will not, I think, gain notable success in the achievement of ecological sanity for modern industrial societies unless it is accompanied by the boldest and most informed efforts of government and industry to rectify the ecological imbalance and record of destruction that has already been wrought on this earth. Thus, the educational solution is dependent on the political solution. But in the furtherance of political enlightenment, educators can join ranks and take stands on the great political and economic issues of our time far more than they have been used to doing. They can lobby, protest and petition, and support legislation and candidates for office who share the vision of a radical ecological reconstruction of the human community. Until educators forcefully persuade the controlling institutions of society that the leadership they take in their own self-reform is at the same time the greatest means to educational reform, our efforts to convey to the young the profound vision of ecology will be lost in the deafening roar of the advance of a mindless civilization.