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"A society that will not conserve its topsoil cannot preserve social order for long. A society that wastes its natural heritage like a spendthrift heir can build only the most fleeting prosperity, leaving all who follow in perpetual misery. And those societies that disrupt the earth's biogeochemical balances and destroy its biota are the most radical of all. If not restrained, they could force all thereafter to live in ecological ruin and impoverishment that we can scarcely imagine."

"The ecological crisis is, in large part, a crisis of design. We've made things - farms, houses, cities, technologies, and whole economies - that do not fit harmoniously within their ecological context. One of the principal tasks of education in the coming century is to foster ecological design intelligence, which requires a careful meshing of human purposes with the larger patterns of the natural world."

- David W. Orr

This issue of **Reprint Mailing** is devoted to two essays by David W. Orr, professor and chair of the Environmental Studies Program at Oberlin College, and author of **Ecological Literacy** (SUNY, 1992) and **Earth in Mind** (Island Press, 1994). The essays are: "Conservation and Conservatism"* and "Educating for the Environment"**

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Conservation and Conservatism

By David W. Orr

The newly elected Speaker of the U.S. House of Representatives recently assigned a long reading list to his colleagues. In the same pedagogical spirit and armed with a similar faith in the educability of public officials, I would like to make several modest additions to the Speaker's list and to his colleagues' homework. Before doing so, however, I think it necessary to explain why the Speaker and his colleagues, in the full froth of political enthusiasm, should trouble themselves with further scholarly endeavors.

The problem, for which additional reading is admittedly a woefully inadequate response, is simply this: the philosophy of free-market conservatism has swept the political field virtually everywhere, and almost everywhere conservatives have been, in varying degrees, hostile to the cause of conservation. This is a problem of great consequence for the long-term human prospect because of the sheer political power of purportedly conservative governments. Further and better reading is intended to instruct in the hope that enlightenment might show that conservatism and conservation share more than a common linguistic heritage. Consistently applied they are, in fact, natural allies. To make such a case, however, it is necessary, first, to say what conservatism is.

Conservative philosopher, Russell Kirk, proposes six "first principles" of conservatism. Accordingly, true conservatives

- believe in a transcendent moral order;
- prefer social continuity, i.e., the "devil they know to the devil they don't know";
- believe in "the wisdom of our ancestors";
- are guided by prudence;
- "feel affection for the proliferating intricacy of long-established social institutions"; and
- believe that "human nature suffers irremediably from certain faults" (Kirk, xv–xvii).

For Kirk (1982) the essence of conservatism is the "love of order." Eighteenth century British philosopher and statesman Edmund Burke, the founding father of modern conservatism and as much admired as he is unread, defined the goal of order more specifically as one that harmonized the distant past with the distant future. To this end, Burke, like present-day Congressional Republicans, thought in terms of a contract, but not one about "things subservient only to the gross animal existence of a temporary and perishable nature." Burke's "societal" contract was not, in other words, about tax breaks, but about a partnership promoting science, art, virtue, and perfection, none of which could be achieved by a single generation without veneration for the past and a healthy regard for those to follow. Burke's contract, therefore, was between "those who are living, those who are dead, and those who are to be born ... linking the lower with the higher natures, connecting the visible and invisible world" (Burke 1790/1986: 194–195). The role of government, those "possessing any portion of power," in Burke's words, "ought to be strongly and awefully impressed with an idea that they act in trust" (Burke 1790/1986: 190). For Burke liberty in this contractual state was "not solitary, unconnected, individual, selfish Liberty. As if every man was to regulate the whole of his conduct by his own will." Rather, he defined liberty as "social freedom. It is that state of things in which liberty is secured by the equality of restraint" (O'Brien 1992: 390).

As the ecological shadow of the present over future generations has lengthened, the wisdom of Burke's concern for the welfare of future generations has become more evident. Moreover, if conservatism means anything at all, other than the preservation of the rules by which one class enriches itself at the expense of another, it means the conservation of what Burke called "an entailed inheritance derived to us from our forefathers, and to be transmitted to our posterity; as an estate belonging to the people" (Burke 1790/1986: 119). Were Burke alive today there can be no doubt that he would agree that this inheritance must include not only the laws, traditions, and customs of society, but also the ecological foundations on which law, tradition, custom, and public order inevitably depend. A society that will not conserve its topsoil cannot preserve social order for long. A society that wastes its natural heritage like a spendthrift heir can build only the most fleeting prosperity, leaving all who follow in perpetual misery. And those societies that disrupt the earth's biogeochemical balances and destroy its biota are the most radical of all. If not restrained, they could force all thereafter to live in ecological ruin

and impoverishment that we can scarcely imagine.

Taking Burke's view that "society is indeed a contract" between the living, the dead, and those to be born as the standard, what can be said about the conservatism of contemporary conservatives? What, for instance, is conservative about conservatives' support for below-market-cost grazing fees that federal agencies charge ranchers for their use of public lands? Welfare for ranchers runs against conservatives' supposed antipathy for handouts to anyone. But that's a quibble. The more serious issue concerns the ecological effects of overgrazing which result from underpricing the use of public lands. Throughout much of the American west the damage to the ecology of fragile ecosystems is serious and increasing, with worse yet to come. In a matter of decades these trends will jeopardize a way of life and a ranching economy that can be sustained for future generations only by astute husbandry of soils, wildlife, and biota of arid regions. The ruin now being visited on a large part of public lands for a short-lived gain for a few is a breach of trust with the future. There is nothing whatsoever conservative about a system that helps those who do not need it while failing to sustain the ecological basis for a ranching economy into the distant future.

What is conservative about the ongoing support many conservatives give to the Mining Law of 1872? That piece of archaic legislative banditry permits the destruction and looting of public lands in the service of private greed while requiring little or nothing in return. The results—economic profligacy and ecological ruin—meet no conceivable test of genuinely conservative ideals and philosophy. It is theft on a grand scale, permitted because of the political power of those doing the looting and the cowardice and shortsightedness of those doing the governing.

What is conservative about "getting government off the backs" of citizens while leaving corporations there? Burke, who had a healthy dislike for all abuses of power, would have wanted all tyranny curtailed, including that of corporations. How do price increases, for example, differ from tax increases? How do cancers caused by toxic emissions or deaths resulting from safety defects in automobiles differ from unjust executions? How does the ability of capital to abandon communities for others that it can exploit more thoroughly differ from government mismanagement? To those who suffer the consequences, such differences are largely academic. The point is lost, nonetheless, on most contemporary conservatives who often detect the sins of government in parts per billion while overlooking corporate malfeasance by the ton. Burke, in our time, would not have been so negligent about economic tyranny.

What is conservative about squandering for all time our biological heritage under the guise of protecting temporary property rights? Conservatives have long scorned public efforts, meager as they are, to protect endangered species because, on occasion, doing so may infringe on the ability of property owners to enrich themselves. Any restrictions on private property use, even those that are beneficial to the public and in the interest of posterity, they regard as an unlawful "taking" of property. But this view of property rights finds little defense in a careful reading of either John Locke, from whom we've derived much of our land-use law and philosophy (Caldwell & Shrader-Frechette 1993), or in the writings of Edmund Burke. For Locke, property rights were valid only as long as they did not infringe on the rights of others to have "enough and as good" (Locke 1690/1963). It is reasonable to believe that this ought to include the rights of future generations to a biota as abundant and as good as that which sustained earlier generations. And for Locke (Locke 1690/1963: 332) "nothing was made by God for Man to spoil or destroy," a line that has not yet been fully noted by many conservatives. The point is that John Locke did not regard property rights as absolute even in a world with a total population of less than one billion, and neither should we in a world of 5.7 billion.

What's conservative about conservatives' 20 years of opposition to national efforts to promote energy and resource efficiency? Even on narrow economic grounds efficiency has been shown to be economically advantageous. The fact that the United States is far less efficient in its use of energy than Japan and Germany, for instance, places it at a competitive disadvantage estimated to be between 5–8% for comparable goods and services. Economics aside, energy and resource profligacy is the driving force behind climatic change and the sharp decline in biological diversity worldwide. Nothing could be more deleterious to the interests of future generations than for this generation to leave behind an unstable climate and the possibility that those changes might be rapid and self-reinforcing. Short of nuclear war no act by the present generation would constitute a greater dereliction of duty or breech of trust with its descendants.

Regardless of whether climatic change occurs as many scientists believe it may, the willingness of many "conservatives" to accept the risk of catastrophic and irreversible global changes that would undermine the well-being of future generations is a profoundly imprudent precedent. We have no right to run such risks when the consequences will fall most heavily on those who can have no part in making the choice.

What is conservative about the extension of market philosophy and narrow economic standards into the realm of public policy? Many conservatives want to make government work just like business works. Gov-

ernment certainly ought to do its work efficiently, often much more efficiently than it now does. That much is common sense, but it is a far cry from believing that public affairs can be conducted as a business or that economic efficiency alone is an adequate substitute for farsighted public policy. Many good things, including compassion, justice, human dignity, environmental quality, the preservation of natural areas and wildlife, art, poetry, beautiful music, good libraries, stable communities, good education, and public spiritedness can never meet a narrow test of profitability, nor should they be required to do so. This, too, is common sense. These things are good in and of themselves and should not be subject to the same standards used for selling beer.

What is conservative about perpetual economic growth? Economic expansion has become the most radicalizing force for change in the modern world. Given enough time, it will first cheapen and then destroy the legacy we pass on to the future. The ecological results of economic growth at its present scale and velocity are pollution, resource exhaustion, climatic instability, and biotic impoverishment. Uncontrolled economic growth destroys communities, traditions, and cultural diversity, and through the sophisticated cultivation of the seven deadly sins of pride, envy, anger, sloth, avarice, gluttony, and lust it destroys the character and virtues of the people whose wants it purports to satisfy.

Conservatives (and liberals) have been unwilling to confront the difference between growth and real prosperity and to tally up the full costs of growth for our descendants. In the words of former Reagan administration Defense Department official, Fred Ikle, "Growth utopianism is a gigantic global Ponzi scheme (leading to) collapse, engulfing everyone in misery" (Ikle 1994: 44). Ikle continues with "The cause of this collapse would not be a shortage of material goods but the destruction of society's conservative conscience by our Jacobins of growth."

That conservatives, by and large, have been deeply hostile to evidence of ecological deterioration and to the cause of conservation is, I submit, profoundly unconservative. A genuine and consistent conservatism would aim to conserve the biological and ecological foundations of social order and pass both on as part of "an entailed inheritance derived to us from our forefathers and to be transmitted to our posterity." If words mean anything at all, there can be no other standard for an authentic conservatism.

Like that defined in Russell Kirk's "first principles," a genuine conservatism is grounded in the belief in a transcendent moral order in which our proper role is that of trustees subject to higher authority. It would honor and respect the need for both social *and* ecological continuity. It would respect the wisdom of past *and* also the biological wisdom contained in the past millions of years of evolution. A genuine conservatism would prudently avoid jeopardizing our legacy to future generations for any reason of temporary economic advantage. It would eschew cultural and technological homogeneity and conserve diversity of all kinds. Indeed a genuine conservatism, "chastened" by the recognition of human imperfectability, would not create technological, economic, and social conditions in which imperfect and ignorant humans might create ecological havoc.

An authentic conservatism has much to offer in the cause of conservation. Conservatives are right that markets, under some circumstances, can be more effective tools for conservation than government regulation. Conservatives' dislike of unwarranted taxation might be the basis on which to shift taxes from things we want, such as income, profit, and labor, to things we do not want, such as pollution and energy and resource inefficiency (von Weiszacker & Jesinghaus 1994). An authentic conservatism would encourage a sense of discipline, frugality, and thrift in the recognition, as Burke put it, that

> Men are qualified for civil liberty in exact proportion to their disposition to put moral chains upon their own appetites ... Society cannot exist unless a controlling power upon will and appetite be placed somewhere, and the less of it there is within, the more there must be without. It is ordained in the eternal constitution of things, that men of intemperate minds cannot be free. Their passions forge their fetters (Ophuls 1992).

A genuine conservatism would provide the philosophical bases and political arguments for prudence, precaution, and prevention in public policy and law. And a genuine conservatism would recognize that avoidance of some tragedies requires, in Garrett Hardin's phrase, "mutual coercion, mutually agreed upon" which, in turn, requires robust democratic institutions.

To the new Speaker's reading list for members of Congress, then, I would like to suggest the following additions:

- Aldo Leopold, *A Sand County Almanac* (1948)
- Rachel Carson, *Silent Spring* (1962)
- Wendell Berry, *The Unsettling of America* (1977)
- David Ehrenfeld, *The Arrogance of Humanism* (1978)
- Vaclav Havel, *Living in Truth* (1987)
- Herman Daly and John Cobb, *For the Common Good* (1989)
- Edward O. Wilson, *The Diversity of Life* (1992)

I would like to further challenge the conservative leadership of Congress to meet regularly with selected members of the Society for Conservation Biology in an effort to create a better understanding of what it will be necessary to do to pass on an entailed inheritance to our posterity.

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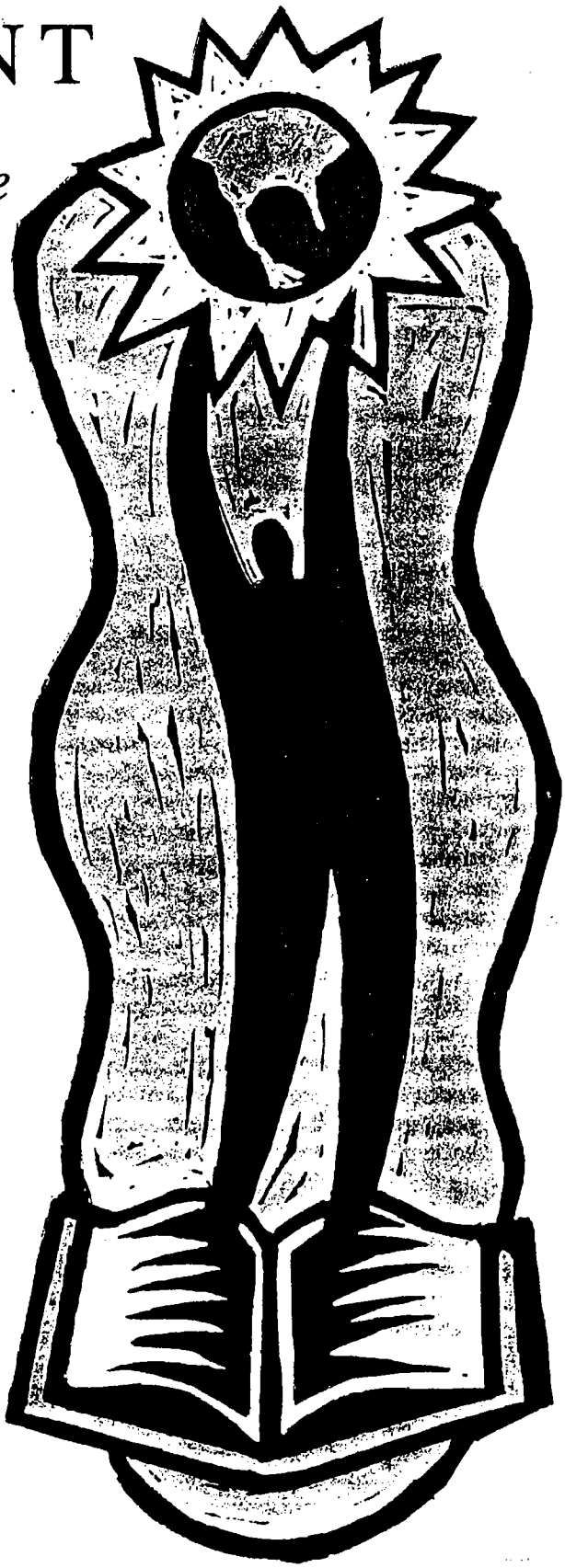
EDUCATING *for the* ENVIRONMENT

Higher Education's Challenge of the Next Century

BY DAVID W. ORR



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In *Earth in the Balance*, Vice President Al Gore proposes to make "the rescue of the environment the central organizing principle for civilization." If the environment and the human prospect that depends on it are to be rescued, however, those now being educated will have to do what the present generation has been unable or unwilling to do: stabilize world population, reduce the emission of greenhouse gases that threaten to change the climate—perhaps disastrously—protect biological diversity, reverse the destruction of forests everywhere, and conserve soils. They must learn how to use energy and materials with great efficiency. They must learn how to run civilization on sunlight. They must rebuild economies in order to eliminate waste and pollution. They must learn how to manage renewable resources for the long term. They must begin the great work of repairing, as much as possible, the damage done to the Earth in the past 150 years of industrialization. And they must do all of this while they reduce worsening social, ethnic, and racial inequities. No generation has ever faced a more daunting agenda.

A constituency able and willing to do these things must be *educated* into existence. That constituency must be smarter, better informed, more creative, and wiser than earlier generations. It must comprehend systems and patterns. It must be farsighted, yet practical. It must be able to tell the difference between ecological sense and nonsense. And it must be politically effective.

Much of the current debate about educational standards and reforms, however, is driven by an overarching belief that we must prepare the young only to compete effectively in the global economy; that done, all will be well, or so it is assumed. But there are better reasons to reform education that have to do with the rapid decline in the habitability of the Earth. The kind of discipline-centric education that enabled us to indus-

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trialize the Earth will not necessarily help us heal the damage caused by 150 years of industrialization. In his 1993 book, *Preparing for the 21st Century*, Paul Kennedy reaches broadly similar conclusions, calling for "nothing less than the re-education of humankind."

But we still educate the young for the most part as if there were no planetary emergency. It is widely assumed that environmental problems will be solved by technology of one sort or another. Better technology can indeed help, but the crisis is not first and foremost one of technology. Rather, it is one within the minds that develop and use technology. The disordering of ecological systems and of the great biogeochemical cycles of the Earth reflects a prior disorder in the thought, perception, imagination, intellectual priorities, and loyalties inherent in the industrial mind. Ultimately, then, the ecological crisis has to do with how we think and with the institutions that purport to shape and refine the capacity to think. The ecological crisis, in other words, is a crisis *of* education, not one *in* education; tinkering won't do.

Despite all of the clear evidence of spreading environmental problems, this message has not made much headway in the vast majority of colleges and universities. In the words of Dartmouth's Noel Perrin, "Most colleges act as though they have all the time in the world . . . neither trustees nor the administration seem to believe that a crisis is coming" (quoted in an October 28, 1992 article in the *Chronicle of Higher Education).* Historian Jaroslav Pelikan in *The Idea of the University* goes farther to question whether universities will ever "address the underlying intellectual issues and moral imperatives of having responsibility for the earth and to do so with an intensity and ingenuity matching that shown by previous generations in obeying the command to have dominion over the planet."

Why should institutions of higher education, full of smart and learned people, be so slow to respond to the largest issues on the human agenda for the coming century? There are, I think, three primary reasons, none of which is new.

First, we have organized both curriculum and research by fragments called disciplines, sub-disciplines, and departments, each of which deals only with small pieces of the total picture. This is fine until we need to understand patterns and whole systems, which is the business of no single discipline, department, or specialized field. As a result, larger trends and patterns tend to be ignored within a discipline-centric context. For example, from newspapers, journals, and books the following "random" facts recently crossed my desk:

- male sperm counts worldwide have fallen by 50 percent since 1938 and no one knows exactly why;
- human breast milk often contains more toxics than permissible in milk sold by dairies;
- at death human bodies often contain enough toxics and heavy metals to be classified as a hazardous waste;
- so too, the bodies of whales and dolphins that recently washed up on the banks of the St. Lawrence River and the Atlantic shore;
- fungi have declined throughout the world and no one knows why;
- the same is true of populations of amphibians worldwide, even where the pH of rainfall is normal;
- roughly 80 percent of European forests have been damaged by acid rain;
- according to Paul Hawken in *The Ecology of Commerce,* U. S. industry creates some 11.4 billion tons of hazardous wastes each year from mining and manufacturing; and
- ultraviolet radiation reaching the ground in Toronto is now increasing at 5 percent per year.

From the perspective of any single discipline, these facts appear to be random. In truth they are not random at all but part of a larger pattern that includes shopping malls and deforestation, glitzy suburbs and ozone holes, crowded freeways and climate change, overstocked supermarkets and soil erosion, a gross national product of $6.5 trillion and Superfund sites, technological wonders and insensate violence. In reality, there is no such thing as a "side effect" or an "externality." These things are threads of a whole cloth. The fact that we see them as disconnected events or fail to see them at all is evidence of a failure to educate people to think broadly, perceive systems and patterns, and live as whole persons.

There is a second and related reason having to do with the rise of discipline-based professionalization. Whatever the gains in standards and quantity of knowledge, the net effect of professionalism has been to narrow scholars' intellectual focus and encourage conformity with standards set by the elite in a particular field. Publication and research have come to be valued more highly than good teaching and service to the institution or the community. The full costs of professionalization, according to Alan Mermann of the Yale School of Medicine, include the failure to engage problems in the local community and a crippling "alienation from each other and from what is healthy for ourselves." The scholars described by Mermann tend to think of themselves as professionals, part of the established order, not critics of it. For the consummate professional scholar, under constant pressures to secure large grants, the rule of thumb is that if it has no obvious and quick professional payoff leading to tenure, promotion, higher salary, or higher standing in the profession, don't do it. The ideal of the broadly informed, renaissance mind has given way to the far smaller idea of the academic specialist. The resulting narrowness, "methodolatry," and careerism have rendered many unwilling and unfit to ask large and searching questions. In addition, whereas intellectuals once addressed the public, professional scholars now talk mostly to each other about matters of little or no consequence for the larger society. Moreover, the professionally induced fear of making a mistake or of being thought to lack rigor has rendered much of the professoriate toothless and confined to quibbles of great insignificance. One sure way for a young professor to risk being denied tenure is to practice what philosopher Mary Midgley calls "the virtue of controversial courage"—the very reason for which tenure was created.

Third, colleges and universities have not yet responded with "intensity and ingenuity" to the environmental crisis because their leaders have not been bold and visionary enough. This explains in part why institutions of higher education, in Stan Rowe's words, have shaped themselves "to an industrial ideal—the knowledge factory." Few of these (mostly male) shapers of the modern university bothered to question the foundational assumptions of higher education that dated back to Descartes and Bacon, the disciplinary structure of knowl-

edge, the growing dependence of higher education on corporate and government funding, or the implicit belief in the human domination of nature. Few, if any, asked how the knowledge that their institutions propagated and dispensed fit with our responsibility for the earth.

Liberal arts institutions have not been vigorous enough in their response to the rapid decline in the habitability of the Earth.

What would it mean for colleges and universities to respond with "intensity and ingenuity" to the ecological challenges looming ahead? The answer, I believe, has three parts.

It means, first, rethinking the foundational principles of higher education. In doing so we must recognize that all education is environmental education, by which I mean that students are taught in various and often unintended ways that they are part of, or apart from, natural systems. Furthermore, we must recognize that the goal of education is not the mastery of knowledge, but the mastery of self through knowledge—a different thing altogether. In the conduct of teaching, we must also acknowledge that the process of learning is often as important as the content, and that institutions teach by what they do as well as by what they say.

Second, an intense and ingenious response to environmental challenges requires rethinking the conventional curriculum. The ecological crisis is, in large part, a crisis of design. We've made things—farms, houses, cities, technologies, and whole economies—that do not fit harmoniously within their ecological context. One of the principal tasks of education in the coming century is to foster ecological design intelligence, which requires a careful meshing of human purposes with the larger patterns of the natural world. It also requires the careful study of those larger patterns to inform human purposes. The ecological design arts are the set of perceptual and analytic abilities, ecological wisdom, and practical wherewithal that will enable the young to make things that fit into a world of microbes, plants, animals, and entropy.

According to David Wann, author of *Biologic*, designing with nature means incorporating intelligence about how nature works into the way we build and live. Design applies to the making of nearly everything that directly or indirectly requires energy and materials including farms, houses, communities, neighborhoods, cities, transportation systems, technologies, economies, and energy policies. When human artifacts and systems are well designed, they are in harmony with the ecological patterns in which they are embedded. When poorly designed, they undermine those larger patterns creating pollution, higher costs, and social stress. Bad design is not simply an engineering problem, although better engineering would often help. Its roots go deeper.

Good design everywhere has certain common characteristics including

- right scale
- simplicity
- efficient use of resources
- a close fit between means and ends
- durability
- redundance
- resilience
- the solving of more than one problem

Moreover, good ecological design promotes human competence instead of consumer dependence. Where good design becomes part of the social fabric at all levels, unanticipated positive side effects (synergies) multiply. Good urban design, for example, minimizes the use of automobiles by putting jobs, recreation, schools, and shopping in close proximity. Fewer automobiles mean

- more people walk and bike, leading to a more physically fit population;
- less urban congestion, hence more civility;
- cleaner air, hence better health;
- lower emission of CO_2, hence less risk of climate change; and
- fewer accidents, hence lower insurance costs.

And by using less gasoline we will have fewer oil spills, which helps to preserve biological diversity, balance trade deficits, and improve the economy. When people fail to design with ecological competence, unwanted side effects and disasters multiply.

Ecological design requires the ability to comprehend patterns that connect, which means getting beyond the boxes we call disciplines to see things in their larger context. It requires, in other words, a liberal education. But nearly everywhere the liberal arts have become more specialized. Design competence requires the integration of first-hand experience and practical competence with theoretical knowledge, but the liberal arts have become more abstract, fragmented, and remote from lived reality. Design competence requires us to be students of the natural world, but the study of nature is being displaced by the effort to engineer nature to fit the economy instead of the other way around. Finally, design competence requires the ability to inquire deeply into the purposes and consequences of things, to know what's worth doing and what should not be done at all. But the ethical foundations of education have been diluted by the belief that values are merely personal opinions.

All of this is to say that liberal arts institutions have not been vigorous enough in their response to the rapid decline in the habitability of the Earth. A more adequate response would aim to equip students to do the work of rebuilding households, farms, institutions, communities, corporations, and economies that 1) do not emit carbon dioxide or other heat-trapping gasses; 2) operate on renewable energy; 3) do not reduce biological diversity; 3) use materials and water with high efficiency; 4) recycle materials and organic wastes; 5) restore damaged ecosystems, and 6) promote sustainable local and regional economies. These objectives will require significant changes in the skills, aptitudes, and abilities fostered in the conventional curriculum.

Third, an intense and ingenious response to the ecological challenges ahead means rethinking how institutions operate, buy, invest, and build.

Operations. The same institutions that purport to induct the young into responsible adulthood ought not to undermine the health and sustainability of the world their students will inherit through their daily operations. Colleges and universities take in vast amounts of energy, food, water, and materials, and they dispose of large amounts of waste in a variety of forms. Every institution ought to conduct an audit of these resource flows to determine its total environmental impact.

For example, how much CO_2 is emitted per student per year? How much paper is used? How much water is consumed? An audit will also indicate ways in which environmental impacts as well as costs can be reduced through greater efficiency in the use of resources and operational changes that close waste loops, eliminate hazardous chemicals, and adopt management practices with lower environmental impacts.

Purchasing. According to the 1992 *Almanac of Higher Education,* in the academic year 1987-88, colleges and universities bought $114 billion worth of goods and services. For the most part these expenditures were made without much thought for their environmental impacts. If environment is to become the "central organizing principle" for higher education, however, buying power should be used to leverage the development of sustainable local and regional economies. Food served on college campuses, for example, seldom comes from land farmed sustainably. Whatever the price paid by the institution, its real cost to society, measured in both ecological and human terms, is much higher. Buying food locally, on the other hand, encourages the development of sustainable agriculture in the surrounding region, improves the quality of food served in campus dining halls, promotes local economic development, and eliminates the economic and ecological costs of transportation, refrigeration, and processing. The same principles apply to many other institutional purchases whenever it becomes possible to substitute local resources, materials, and products for those imported from distant sources.

Investment. College and university endowment funds in 1993 totaled $73.9 billion, according to an October 1993 article in *The New York Times.* As with purchases, the vast majority of this money is invested without much regard for environmental impacts. An "intense and ingenious" response to looming ecological problems would require trustees and administrators to screen institutional investments to determine whether they promote the transition to a sustainable economy or not. Aside from the more obvious investment criteria having to do with the environmental practices of particular companies, there are good reasons to use a percentage of investments to leverage sustainable development throughout the region in which the institution is located. Investments in regional energy efficiency, in particular, may offer attractive opportunities for high returns with short payback times.

Campus Architecture. It is widely assumed that learning takes place in buildings but that none occurs as a result of how they are designed or by whom, how they are constructed and from what materials, how they fit their location, and how well they operate. Academic architecture is in fact a kind of crystallized pedagogy; buildings have their own hidden curriculum that teaches as effectively as any course taught in them. Students should be involved in the design, construction, and operation of academic buildings. That effort can be a liberal education in a microcosm that includes virtually every discipline in the catalog. The act of building is an opportunity to stretch the educational experience across disciplinary boundaries and across those dividing the realm of thought from that of application. It is an opportunity to work collectively on projects with practical import and to teach the art of good work. It is also an opportunity to lower life-cycle costs of buildings and to reduce a large amount of unnecessary damage to the natural world caused by careless design.

Increasingly, students realize that their inheritance is being spent carelessly and sometimes fraudulently.

As we approach the year 2000 the vital signs of the Earth are virtually everywhere in decline. The big numbers are working against us: population growth, the extinction of species, deforestation, desertification, soil loss, acid rain, toxics, and ahead, the possibility of rapid climate change. But these trends need not prove fatal to the human prospect if we are able to summon the courage and the moral energy necessary to respond with foresight and wisdom. For their part, however, colleges and universities have done little to prepare their graduates to deal with the challenges ahead. The question, still unanswered, is whether they are capable of responding with "intensity and ingenuity" at all.

To some, such a response to the challenges of the 21st century appears to be utterly unimaginable. To others, however, it looks a great deal like what Winston Churchill once called an "insurmountable opportunity." It is an opportunity to revitalize and enliven curriculum and pedagogy. It is an opportunity to create a genuinely interdisciplinary curriculum. It is an opportunity to redesign the campus to reduce costs, lower environmental impacts, and help catalyze sustainable economies.

In fact a revolution in education is gathering momentum. It is apparent in the conferences sponsored by the Student Environmental Action Coalition that have drawn thousands of students from campuses all over the United States. It was evident in the February 1994 conference sponsored by Yale University students who organized the "Campus Earth Summit." It is evident in the rapid growth of environmental studies programs on campuses virtually everywhere. It is evident in growing student enrollments in environmental studies courses and participation in campus environmental projects. Increasingly, students realize that their inheritance is being spent carelessly and sometimes fraudulently. But a sizable number know in their bones the truth of Goethe's words that "whatever you can do or dream you can, begin it, Boldness has genius, power, and magic in it."

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