Environmental Education as Liberation

By DONALD STOTLER

It seems likely that within 10 years the curriculum fabric at all levels will be largely woven from the woof of resources and the warp of population; for the fittest organism is not necessarily the one that is becoming dominant the fastest. The organisms most fit to survive are apparently those most nearly organized for reorganization in terms of problems as they arise. This kind of adaptability human society does not now have, but it could be developed.

Topia into Utopia

In order to be continuously organized for reorganization there must be continuous interaction between the topia (existing society) and utopias (possible ideal societies). This topia–utopia interaction was suggested by Karl Mannheim in *Ideology and Utopia* (1936: Harcourt, Brace, & Co., New York). It requires a curriculum that would involve all learners in the problems within the existing framework of society while at the same time encouraging learners to look at topian problems afresh—to look at utopian alternatives.

While it is generally believed that writers about utopias are impractical, Howard Ozman in *Utopias and Education* (1969: Burgess Publishing Co., Minneapolis) points out that " a review of even such a limited amount of utopian writing as presented in this anthology will serve to show the falsity of this belief." It was Anatole France who pointed out that "Without the utopias of other times, men would still live in caves, miserable and naked."

Today's topia on planet earth is described all too clearly by an anonymous writer:

> It seems incredible, but the world's average man represents two-thirds of mankind. Here is his picture:
> He lives in a hut.
> He cannot read or write.
> His energy is sapped by disease.
> He labors 15 hours a day.
> He works on land he does not own.
> He and his family are always hungry.
> He will die young.
> But he still has hope!

Hope lies in education, which can liberate mankind from the malfunction caused by disease, the malnutrition caused by starvation, the maltreatment caused by injustice, and the maladjustment caused by poor self-learning skill. The crux of the matter is the self-learning skill—for he who knows how to bring about change in himself and society by positive means will tend to do so; after all, it gives him the greatest reward. But violence can ensue when those who know how to bring about self-learning and social progress are continuously thwarted. It has been wisely stated that when change becomes impossible revolution becomes inevitable.

Utopian futures need not be born in complete packages; in fact they are usually born a piece at a time. This is why a topia–utopia thrust is feasible. Two examples may illustrate the point:

1. The United Nations Food and Agriculture Organization has now published—after five years of

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work and the expenditure of $6 million—a proposal entitled *Provisional Indicative World Plan for Agricultural Development.* The proposal (which weighs five pounds) is the first long-range strategy for bringing the food–population equation into balance. It projects that this could be done between 1975 and 1985 if the plan were implemented.

2. The March 7, 1970, issue of *Science News* presented the case of two scientists, Bernard J. Eastlund and William C. Gough, who played with the utopian idea of having plasma from a thermonuclear reactor in the year 2000 dispose of solid wastes by reducing them to their chemical elements. The system would not pollute the air, would not leave behind any ashes to be dumped, and would provide valuable salvage of minerals now being lost. They figured that by the year 2000 the U.S. alone will have to dispose of 400 million tons of solid waste a year. There isn't enough land to bury the wastes, and the ocean would be polluted if it were used as a disposal site. To burn the wastes would put 400 million tons of CO_2 into the atmosphere yearly. Eastlund and Gough calculated that not only could most of the garbage be disposed of by plasma but that it could be a free ride from the electrical output of the thermonuclear plants that should be in operation by the year 2000: the normal plasma leakage could be so directed as to dispose of the garbage.

The future is not hopeless unless we lose hope that problems can be solved by society and do not educate accordingly.

Program Environments—Not Learners

The history of man is written in the process of increasing and testing his environmental options. The endless frontiers are research, education, and recreation. Research is the process of increasing man's known alternatives; education is the process of utilizing man's known alternatives; and recreation is the process of involvement in diversionary experience.

If it were the goal of education (like the process of history) to generate, explore, and test alternatives, with the expectation that as a result value systems will evolve and knowledge systems grow, how would the environment be organized? The free-enterprise system offers some guidance here.

In former times clerks in stores stood behind a counter with a grid of salable items behind them. The consumer could not go behind the counter; if he inquired about an item the clerk described it or, at best, let the consumer examine it before making the purchase. Nowadays items are placed out where the consumer is, and he is actually enticed to handle the merchandise. The clerk is there to consult and help when requested by the consumer. Moreover, the supermarket concept makes easily accessible those items that used to be found in separate stores. Modern stores are not run for the convenience of the employees; they are run for the convenience of the consumer—the user.

Were learners presented the same opportunity, the teacher would move out from behind the lecture desk and the demonstration table, unlock the merchandise, and make it easily accessible. He also would be accessible as a helper when his help was needed—which would be frequently, in this "we're in it together" setup. Some abuse might occur, as in stores, but the increased "sales" would more than compensate. National leaders such as Jerrold Zacharias, at the Educational Research Center of MIT, and John Thompson, of the NSF-funded Earth Science Curriculum Project in Boulder, Colo., are experimenting with such modes of education and have had impressive preliminary success.

If we programmed learning environments rather than learners we would be able to develop a supermarket curriculum wherein the separate disciplines would be merged—simply because life is a multidiscipline. (Separate disciplines are merely convenient ways to store knowledge after the fact.) In a supermarket curriculum, what would happen to those things that we feel compelled to teach formally "for the child's own good"?

I feel strongly that anything that must be taught formally can be automated. The functions we share with animals, such as storage of data, sorting of data, and retrieval of data, should be automated. Data should be made easily and directly available to the learner on request, as part of his supermarket environment. If these functions were automated, about 80% of our traditional curriculum could go into computer storage. The additional time thus provided would enable the learner to work freely with people and materials in self-learning.

Self-Learning Through Interaction

If we stimulate environmental education by programming stimulating environments for learners in which they are liberated to self-learn, we may expect the learner to grow in his ability to interact with:

1. *Nature.* Bentley Glass has stated a goal of science for our open-ended era that could open many vistas. Science, he says, is primarily something *to do* rather than *to know.* The present new science curricula have far too little problem-seeking and far too much concern with closure upon prestated concepts. The enrollees in these approaches may be improving in knowledge and the solution of rather specifically staged problems, but it is doubtful if they are making great gains in the essence of research, which is the formulation of the research. Why not devise open-ended programs in which learners respond directly to the environment rather than to a book or a teacher? (The environment may be an enriched classroom, a slum, or an outdoor center.) Then let learners formulate their own problems and make their own judgments—and revise both in terms of feedback from their experiences.

2. *People.* The present new curricula may involve grouping, but this is largely done by the teacher. In contrast, a basic skill in a modern research lab is that of working by oneself when it seems more effec-

tive, teaming when it seems necessary (as when specialists in other disciplines are needed), and then upgrouping. This can only be learned by actual experience in real situations initiated by learners.

3. *Records.* The most damaging practice in education, in my opinion, is that of forcing a class to lockstep through the same material in a linear sequence. Most of us suffer from the Gutenberg Bible complex, in which anything that isn't stapled together in chronologic sequence is suspect. This practice continues virtually unchallenged. Youth is beginning to revolt against such impersonal educational practices; and we, the educators, can either bend or break.

The computer offers the greatest hope for permitting learning to become individualized. It should take over the functions we share with animals—storing, sorting, and retrieving—and thus liberate teachers and learners to interact in specially human ways. Anything that must be taught formally can and should be automated—made easily available as the learner develops the need.

The computer should be used as a bank with which teachers and students communicate through the use of the electric typewriter in combination with the cathode-ray tube. This is not so much a teaching-machine service as it is a mechanized resource-consultant. It would suggest suitable curriculum activities for a class or a small group; recommend "ball park" sets of books, equipment, and supplies; record student data; provide lists of speakers; and suggest places for field trips in terms of specific learning situations.

There is no reason why curricula that are almost infinitely branching rather than linear cannot be generated in time and prove to be far more personalized and effective. Considerable work in this direction has already been done in Portland, Ore., in science education with the Teachers' Automated Guide program.

The main problem, if the computer is used as a vast resource to which almost any kind of question can profitably be put, is whether or not users can ask appropriate questions. Some experience shows that even research scientists are not at first proficient in asking the computer the really pertinent questions. This, too, must be learned by experience.

4. *Values.* If the basic goal of science is *to do*, then alternatives must be sorted and values become more focal. In this way science may well earn the title of the New Humanism.

Also, cannot curricula be devised in which values inherent in process, such as honesty, idea-sharing, and humaneness, are learned without lecture? Cannot they be learned simply because they pay off? Cannot trips to the outdoors be used to do more than, say, study the ecology of the spot? Why not let students reason out the conditions under which they would or would not gather animal specimens, pick flowers, gather leaves, or walk on the grass? This would be far superior to having the world covered with general signs: "Don't pick flowers," "Don't . . . ," *ad infinitum*. Science processes should generate in each learner his own help–hurt criteria as part of its modern role.

Restating the Golden Rule

There is need for a Golden Rule for humaneness. The fact that the idea of treating other people as you yourself would be treated arose independently in several cultures attests pragmatically to its usefulness in the human arena. "Reverence for life" extends this idea to all living things. However, what of such violations as water and air pollution?

A Golden Rule involving the whole environment is needed. Since the observer–observed interaction lies at the heart of modern relativity theory, it may offer a clue. Since productivity in ideas and materials is perhaps the emerging value as we look to the 21st century, it, too, should be considered. Productivity in this sense is the process of creating new alternatives.

In these terms we may postulate a new Golden Rule: the productivity interaction. It states that at each decision point the observer acts in such a way that both he and the observed are made more productive. An illustration would be a camper who left the campsite a better place than he found it. He would have been renewed and made more productive by the camp experience, and in the process he would have made the campsite a more productive site for others.

An important part of environment is aesthetics. Studies shows that color, texture, and music affect morale and the desire to learn. The modern research laboratory is an example of modern architecture, and it contains varied and colorful art, rugs where feasible, comfortable furniture, varied lighting, and modern libraries. One of the sources of the inhuman image of the scientist is the traditional dungeon-like laboratory. Why should not the environment of the next round of revised curricula reflect the modern lab? Why shouldn't the learner go even farther and be responsible for creating and sustaining aesthetic environs? This would be a practical part of science as the New Humanism—to not only learn but to be responsible for sustaining appropriate environs for further learning.

All observers must be provided with continuous, convenient, lifelong opportunities to self-educate and increase in productivity—all this while being a mobile part of a highly mobile population. Moreover, the environment—especially man's institutions —must be highly flexible and subject to productive change. In a sense the observer can only be free to the extent that the observed is free: man's freedom consists of, in the words of Robert Frost, "lying loose in the harness."

An End to "Epicycling"

Our present bureau-centered plan of education has become as elaborate as Ptolemy's earth-centered plan of the solar system had become 600 years ago. Regrettably, it is being protected in much the same way.

Each time a new weakness was found in the Ptolemic system, great energy was expended to correct the weakness by inventing a new epicycle rather than by permitting the basic theory to be challenged.

We have been responding in a similar fashion. When a weakness in our educative maze is identified, great energy is expended to correct the weakness by inventing a new "epicycle" rather than by challenging the basic theory. We now have so many epicycles (textbooks, grades, departments, groups, remedials, etc.) that it is no wonder that many people feel we are making, at best, circuitous progress. It is time to try a more simplified version of education, such as helping the learner to explore multitudes of indoor and outdoor environments with the assistance of experts and automation on request.

TEENAGE PHOTOGRAPHY CONTEST

One of the best-known programs for the encouragement of young photographers is now under way for the 1970-71 school year. Teenagers across the country will again have the opportunity to win cash awards, gold achievement keys, and certificates of merit in the Scholastic Photography Awards program, which is conducted annually by Scholastic Magazines, Inc., and sponsored by Eastman Kodak Co.

Students in grades 7 through 12 in public, private, and parochial schools are invited to submit entries in black-and-white and color in various classifications. 224 cash awards, amounting to $6400, will be made. These include two special Kodak Awards, of $1,000 and $500, offered to college-bound seniors demonstrating outstanding photography ability and high academic standing.

The work of the national award-winners will be exhibited in New York City in the spring and will be shown in more than 6,000 museums, libraries, and schools as part of the Eastman Kodak Travel Exhibit.

The awards program is on the National Association of Secondary School Principals' Advisory List of Contests and Activities for 1970-71. Rules booklets are available on request from Scholastic Photography Awards, 50 W. 44th St., New York, N.Y. 10036.

BOOKLET ON LSD

LSD-25: a Factual Account, by the U.S. Bureau of Narcotics and Dangerous Drugs, discusses the actions of LSD in the body and brain; current research; and LSD abuse as a social problem. An appendix on the structural relations and a list of references are included. The 34-page booklet, costing $1.00, can be ordered from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402; specify catalog number J24.8:L99.

LAKE WASHINGTON PARTLY RESTORED

A University of Washington scientist has reported that counterpollution efforts in a large lake in Seattle have paid off with a decrease in the lake's alga-growing capability to a level nearly that of 35 years ago.

The result, said zoologist W. T. Edmondson, is that Seattle's 18-mile-long Lake Washington will probably be in better condition in 1971 than it was in 1950. In 1963, he noted, it was well on the way to becoming a biologic ruin because of its burgeoning algae.

Edmondson is keeping his hand on the "pulse" of the lake with the aid of grants from the National Science Foundation. His earlier studies and warnings concerning the future of the lake were instrumental in bringing together a number of Seattle communities with the goal of saving the lake.

Bordering Seattle on the east and surrounded by growing communities, Lake Washington is heavily used for recreational purposes. Its troubles stemmed from the "fertilizing" of its waters by the sewage effluent from 10 treatment plants serving the nearby communities. The effluent, laden with phosphorus and nitrogen, on which algae thrive, brought unpleasant odors and used oxygen at such great rates that some deep parts of the lake did not have enough oxygen for fish. The latter condition, said Edmondson, might well have spread widely in the lake had nothing been done.

National Science Foundation

NEW PLANTS BY INDUCED MUTATION

World food supplies will benefit from eight new strains of plants developed during the last two years by the use of nuclear radiation and chemicals. This was revealed at a meeting of plant geneticists from 14 countries, held in Vienna under the auspices of the International Atomic Energy Agency and the Food and Agriculture Organization of The United Nations.

Six of the new strains are already being grown commercially: early-maturing soybean and better-yielding rice in Japan; larger and early-ripening peaches in Argentina; higher-protein wheat in India; and improved barley and chrysanthemum in the U.S. They will be followed soon by a variety of wheat in Argentina and of barley in Sweden.

Except for the American barley, all were produced by mutation induced by nuclear radiation. The Argentine peach resulted from chronic exposure of growing trees to gamma radiation, and the Indian wheat resulted from exposure of seeds to ultraviolet and gamma radiation. The Swedish barley was the result of crossing a mutant produced by x-ray with a standard variety. The American barley was developed by the use of a radiomimetic chemical.