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ABSTRACT

Contributions derived from ESEA Title III funds to the new environmental thrusts in American education are portrayed in this quarterly journal. These funds have provided opportunities for development of innovative, model environmental education programs in many local school districts. Responding to new educational needs, the projects have sought to frame new objectives, cognitive goals, attitudinal change strategies, lesson plans, teaching materials, and/or evaluation instruments. Resumes of selected projects may serve as sources of information to school administrators who are thinking of adding environmental education programs and to teachers who are seeking ways to give their students environmental experiences. Model projects reviewed include: Project ECO, Ames, Iowa, a community program in environmental education; Project ICE, Green Bay, Wisconsin, a regional approach to environmental education; and the Maine Environmental Education Project, a statewide strategy for environmental education. Accomplishments of the New Jersey State Council for Environmental Education and its master plan for statewide environmental education are enumerated, together with brief descriptions of four projects citing ways and means of implementing environmental philosophies and objectives and 15 projects addressing problems common to many programs and states. Statements from four environmental leaders on "Why Environmental Education?" conclude the document. (BL)

The Title III Quarterly Spring 1972

Title III in Environmental Education

NATIONAL ADVISORY COUNCIL ON SUPPLEMENTARY CENTERS AND SERVICES

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Title III

in

Environmental Education

National Advisory Council on Supplementary Centers and Services
Program of Policy Studies in Science and Technology
The George Washington University
2100 Pennsylvania Avenue, N.W. / Suite 818
Washington, D.C. 20037 (202) 676-7255

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Title III and Environmental Education

Mrs. Janet Borgen
Member, National Advisory Council

Educators are being asked to create a new academic discipline, to do it immediately, to integrate it throughout the curriculum, and to call it environmental education.

In a field which hardly existed five years ago, we are now expecting global objectives, cognitive goals, attitudinal change strategies, lesson plans, teaching materials and evaluation instruments.

This is a very large order, reflecting the uneasiness we feel, that the time we have in which to teach our children how to survive on their planet is not unlimited. It is important that each child be reached in his own environment, helped to become aware of the marvelous complexity of that environment, and led to see the relationship it bears to the universe of which he is a part.

To accomplish this objective we cannot deal in facts alone, but must deal in sensitivity, awareness and perception. Environmental education is not a body of information but a process which should arouse interest, stimulate inquiry and motivate action.

As a member of the National Advisory Council, I am proud of the fact that Title III of ESEA is contributing to the new environmental thrust in American education. It is characteristic of Title III that it can respond easily and rapidly to new educational needs. The program is flexible and its funds can be allocated to whatever programs are felt to be most urgent.

As early as 1968, local school districts were given $970,000 to develop environmental education programs with Title III funds. This figure has steadily risen in the years since, with $1,000,000 spent in 1969; $1,800,000 in 1970; and $2,500,000 in 1971 for 57 innovative model programs.

In addition to this commitment being made to environmental education by the states under Title III, the Office of Education has funded 16 environmental projects under the Commissioner's discretionary 15 per cent of Title III funds, with a total of $2,828,000 committed to these projects.

The National Advisory Council is dedicating this second issue of its *Title III Quarterly* to environmental education as a tribute to the pioneering work being done in this field by many American educators and as a stimulus to further growth and development. We hope that the projects described and those listed at the end of the publication will serve as valuable sources of information to school administrators who are thinking of adding environmental education programs and to teachers who are seeking ways to give their students environmental experiences.

Project ECO, Ames, Iowa

A Community Program in Environmental Education

Schools, as they have been organized traditionally, have emphasized abstract learning in fabricated situations. Our message to students has been that learning is something that happens inside schools. Rather than take advantage of adventures in reality we have found it easier to have students listen, or read, or look at pictures.

This basic method of operation found in most schools creates a serious impediment when the subject is environmental education. The "ecological facts of life" must be woven into the fabric of every child's education, and education's responsibility begins as the child enters school. Environmental education is rapidly becoming recognized as our nation's major curriculum concern. The intent of *Project ECO* to increase the student's involvement with the natural environment in an organized manner and with some identifiable learning outcomes seems consistent with the major concerns of our society.

Project ECO, an environmental curriculum opportunity for the Ames, Iowa, community schools, is nearing the end of its first year of funding under Title III, ESEA. The purpose of the project is to broaden and enrich the base of activities in the Ames community schools, both elementary and secondary, related to the understanding and preservation of the environment. The major emphasis is to develop a controlled system that provides for learning outside the classroom.

This system can be conceptualized as a series of concentric circles beginning with the student and reaching outward in an ever-increasing involvement with the environment. The school site, with its daily impact on each student, must be utilized in the educational experiences of students. Other opportunities within a community, such as parks and natural areas, must be included in the plans of educators if we are to bring environmental awareness to students.

At the next level of involvement are areas outside each immediate community but within a short driving distance that provide excellent examples of representative ecological environments. Longer trips to unique "environments" are appropriate for older students who can spend several weeks in relatively sophisticated field study. Student awareness of the complexity of the environment should be increased. It has been said that awareness is a prerequisite to commitment and, commitment is a prerequisite to action.

The specific components which have been developed in Project ECO to provide for such "awareness" are

1. An outdoor, living "laboratory" on a school site. Upon completion of the planting of the grass, shrubs and trees, the Fellows Elementary School site will not only be enriched for the present and future school populations, but will also serve as an example of the importance of preserving and supplementing the natural aspects of a school site.
2. A student transportation unit. This unit is a combination bus for thirty students and a mini-science lab. It serves as a link between the school and various sites in the greater community. It supports and encourages a greater variety of field excursions of short duration as well as the work of the more sophisticated mobile laboratory.
3. A mobile laboratory for use at major sites utilized as important ecological examples. This mobile unit includes equipment and personnel which can support on-site student investigations into various environments.
4. Teacher inservice training. In order to utilize the full range of possibilities for educational experiences inherent in the first three components, teacher skills, awareness, and appreciation of environmental education are targets for action in the project.

This project has at least four goals uniquely reached by these components. These goals would be to

1. Use the natural environment as a teaching device,
2. Use community resources in science education,
3. Provide opportunity for stud in a variety of field locations, and
4. Supplement the local district science education program.

This article was written for the Title III Quarterly by Dr. Luther Kiser, Director, Project ECO, Ames, Iowa.

A.

The importance of the first component, the improved and diversified school site, is best stated in *Information Bulletin #26* published by the Nature Conservancy:

> . . . educators are increasingly feeling the need for school sites which provide true-life situations for outdoor education closely correlated with classroom studies. For instance, it is now realized that two weeks at a school camp once or twice in twelve years of schooling (as in the few schools which have made this much progress) is no adequate substitute for day-to-day study of natural resources on the school grounds or at an area close by which is under permanent school control. Schools need much more diversification of their grounds for outdoor studies correlated with many classroom subjects.[1]

Student involvement in the project activities, starting with the plantings during May, 1971, has supported the

[1] *National Committee for Natural Areas for Schools*, The Site for the New School, *Information Bulletin #26 revised (Washington: Nature Conservancy).*

A. This class of 5th graders is using the mobile lab at lunch time. Hot dogs and hot chocolate are cooked out of doors and eaten in doors when the weather is cold or rainy. It is often difficult to determine where lunch leaves off and scientific investigations begin (note the microscope in the foreground).

B. These 7th grade girls are collecting data on the depth of the lake and the distance to which the light penetrates. The lake is covered with about four inches of fresh snow and the temperature is —7°. The instrument that they are using is called a Secchi disk.

C. These 9th graders are collecting data which will be used to construct a contour map. This activity took place in January—one of the coldest months in Iowa. After data was collected, the information was put together in the mobile lab and sent back to the classroom for further use in the Earth Science course the students are taking.

D. Another group of 7th graders are collecting plankton through a hole in the ice. The students were amazed at the life found beneath the ice of a lake. This sample was taken back to the mobile lab for species identification work under the microscope.

E. Project ECO goes on field trips in all kinds of weather. These 5th graders have been collecting materials to be used in connection with an art project. There is about 8 inches of snow on the ground, and the temperature is considerably below freezing. The students go out, collect material or data and return to the mobile lab for further processing of the media.

F. 9th grade students take a rest with their instructor, Mr. Frazier, Project ECO Coordinator. The students have been collecting data which will be used to construct their contour map. All the equipment used with this project is homemade and when used properly is quite accurate.

B.

E.

C.

D.

F.

beliefs of the originators of the project. The care of plants through the fall and winter has been accomplished with student help. Some staff members were prepared to wait for significant results in terms of student involvement until the plants had gained some maturity, possibly a few years. This has not been the case. Most children do not have the opportunities for the experiences that Fellows students have had this year. Their natural environment has truly been utilized as a part of their learning experiences. In order to insure that this opportunity is fully utilized, a faculty-student committee has been given certain responsibilities relative to the project. They are assisting in the communication of the needs of the project as these change through the year and years. At this time they are particularly concerned with the care and protection of plants necessary to facilitate normal growth. Children and their parents tell us they value the opportunities they have had, and one can observe the attitude that the children have as they go about on the school grounds.

Components two and three, the bus mini-lab and the mobile science lab, are essential as support facilities for utilization in environments away from the immediate school site. Although the major concern for providing mobility in *Project ECO* was to involve a variety of sites for student field study, another fact of which we were only aware has become increasingly important. The mobility of equipment on a study site allows us to vary the "stress" placed on any one environment. Public areas which support camping activities often are barren of grass, other small plants and animals as large numbers of people trample the areas. The mobile lab allows *Project ECO* to avoid such situations as the lab is moved every two or three weeks.

The variety of sites appropriate for study and available near many communities is almost limitless. Specific sites utilized in *Project ECO* include two lake areas developed by the Story County Conservation Commission, the Ledges State Park, and the Preston Branch area of the Saylorville Lake Project for which *Project ECO* has an educational-use permit from the U.S. Corps of Engineers. This latter area is particularly rich geologically and biologically, and its availability prior to completion of the lake project is an excellent example of cooperation between governmental agencies for resource utilization.

One major or global objective with an important subobjective is identified in the original *Project ECO* proposal:

1. Students will engage in activities appropriate to their level of maturation which will include observation, investigation and evaluation of a variety of ecological relationships and conservation practices in central Iowa in order to develop the concept of stewardship of natural resources.
2. Teachers will support the major objective and assist in its accomplishment as a result of the activities of this project.

The second objective here provides the impetus for the development of the fourth component, teacher in-service education. Each teacher involved in the project this year has spent four hours at the field site prior to the trip with his class. This experience is led by the project staff and prepares the teacher for the work with the class on an all-day trip. The in-service advantage of the student field trip is that it provides the teachers with the "model" behavior of the project staff. At the end of this year the teachers involved in the project will have accumulated thirty field-trip hours.

This last component embodies the area in which we have found impact beyond our original expectations. Teachers have reported to us that they now have confidence in themselves and their ability to function with a class in the field as they provide significant learning experiences for the students. It would appear that it is now easier for a teacher to "see" the opportunities for learning outside the classroom. This positive change in attitude on their part is reflected in the student enjoyment and approval of the project, and in particular in the effect that the project has had on the large segment of students who could be described as quiet, almost withdrawn; slow learners; lacking high personal motivation. These students who apparently were not functioning well in the classroom reversed their position on the field trips. This newly-found status was carried back to their classrooms to the benefit of the entire group. A specific example is the story of one nine-year old boy who early in the year was considered to have such serious problems that his continuation in the public school was questioned. He was so successful as a good worker on the *ECO* field trips that he was recognized by the project staff with a certificate of merit. The teacher contends that his involvement in the project has given the boy a basis for working out his other problems, and he is making excellent progress in his class. This example, though dramatic, is just one of several that might be reported.

Specific data will be gathered at the end of this year relative to the attitude and knowledge of teachers. However, a mid-year questionnaire was given to teachers which asked the question, "What do you like about *Project ECO*?" The project staff believes that the answers to that question give strong evidence that teachers appreciated the opportunity to work with students in the different setting. A sampling of comments follows:

> Open atmosphere, fresh air, spirit of adventure and discovery, lot of fun, opportunities to work in small groups and individualize more.
>
> It gives children an opportunity to study nature first-hand, individually or in small groups. It encourages them to be observant, make discoveries, and summarize their findings.
>
> Unstructured atmosphere—seeing my students who so often are not successful, so interested.
>
> The exposure to outdoor living and communication that develops because of it.

The key to good learning situations lies with the teacher. If the teacher feels confident in what he is doing, the children learn with confidence. If the teacher is eager about learning, the children are eager about learning. If the teacher is excited about discovery, the children are excited about discovery. We believe that *Project ECO* is making a positive contribution to education through the lives of a group of teachers.

Project ICE, Green Bay, Wisconsin

A Regional Approach to Environmental Education

Can teachers ensure human survival? Yes, by penetrating all grades and all subjects with environmental concern. Attitudes and values take time to nurture; environmental literacy is no short course but an interdisciplinary, long-range program. This tenet vitalizes the ESEA Title III program, *Project ICE* (Instructional-Curriculum-Environment) serving 7,500 teachers and 164,000 students in 53 public school districts and 124 private schools of Northeastern Wisconsin's Area "B". The ICE program is one of eight Regional Centers in Wisconsin established under Title III to assist larger areas in developing and implementing "need-fulfilling" programs, and the only one whose thrust is K-12 environmental education.

Project ICE has these imperative objectives:

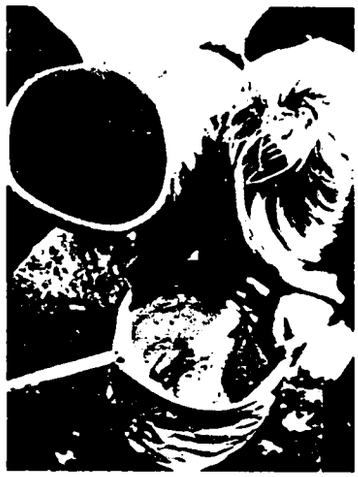
- Demonstrate techniques for instructional and curriculum improvement.
- Develop, implement, and evaluate supplementary curriculum materials—using environmental concern as a model.
- Develop community resource potential for teachers and students.
- Coordinate regional efforts through teacher committees, inservice, Project Resource Center services, and involvement with civic and community groups as well as teacher-training institutions.

During its first year of operation, 1970-71, the project created supplementary environmental curriculum guides for language arts, social studies, and sciences, and placed over 17,000 of them in the hands of area teachers—kindergarten through 12th grade—by the opening of the school year in September of 1971. The guides stress high student involvement, suggest a variety of learning activities keyed to appropriate grades, and list outside or community resources to reinforce in-class lessons. Studying the environment "where it is," teachers use local, nearby areas, personnel, and the school itself more extensively than ever. Any teacher can adapt these guides to suit his

situation and his students. This is possible because these materials are the product of a year's work by university consultants and 100 classroom teachers. During 1970-71, the teacher committee members met ten times for three-hour night work sessions and a three-week summer institute at the University of Wisconsin in Green Bay.

Unifying and making the supplementary guides usable are the "dynamic dozen" major ecological concepts. These concepts were selected by university consultants,

This article was written for the Title III Quarterly *by Mr. Robert Kellner, Assistant Director, Project ICE, Green Bay, Wisconsin.*



are non-technically stated, remain constant K-12, and adapt easily to existing curriculum. They are:

1. Energy from the sun is converted by plants into a form that all living things can use for life processes.
2. All living systems interact among themselves and their environment, forming an ecosystem.
3. Environmental factors are limiting on the number of organisms living within their influence, thus each environment has a carrying capacity.
4. An adequate supply of pure water is essential to life.
5. An adequate supply of clean air is essential for life.
6. Natural resources are unequally distributed over the earth or time, and affect the quality of life.
7. Factors such as facilitating transportation, economic conditions, population growth, and increased leisure time have a great influence on land use and population centers.
8. Cultural, economic, social and political factors determine the status of man's values and attitudes toward his environment.
9. Man has the ability to manage, manipulate, and change his environment.
10. Short-term economic gains may produce long-term environmental losses.
11. Individual acts, duplicated or compounded, produce significant environmental alterations over time.
12. Private ownership should not encroach upon or violate the right of others.

By suiting these concepts, the guides, and nearby resources to their students, teachers are improving instruction with more student involvement and are overhauling curriculum with realistic environmental concern.

To foster the ICE program's multi-interdisciplinary, long-range vision, 75 teachers are now developing supplementary curriculum guides for business education, math, basic and advanced industrial arts, physical education, home economics, music, art, and agriculture. Such materials will be available for Northeastern Wisconsin teachers in September, 1972. This date will mark environmental coverage of the major curriculum areas, K thru 12.

Teachers As Change Agents

Concepts and curriculum materials need the magic of personal touch. The 175 teacher committee members who have participated in developing the supplementary guides add a forceful, personal touch as change agents within the 53 districts and 124 private schools of Area "B". These teachers are spokesmen for the ICE guides, salesmen for the concepts, liaison between school needs and the project's staff, and especially public relations catalysts, communicating environmental concern via local media, staff inservice, and curriculum revision.

Staff Services—Beyond Paper

To support its "personal catalysts," ICE offers the services of an environmental education specialist, a field man who works closely with teachers. He encourages wider use of school grounds, prompts development of outdoor study areas, and engages students or teachers to test classroom learning with outside or community experiences. To further this involvement, he identifies and contacts local, community resources or personnel, and may tap university consultants, elected officials, park supervisors, district superintendents, conservation and agricultural agents—depending on the teacher's needs or requests.

Project Resources

The Project's Resource Center further aids teachers. An extensive array of audio-visual materials is available to public and private school teachers in Area "B". School libraries and teacher change agents have copies of the ICE bibliography listing such materials. For efficiency, the Project Center is located at a geographic midpoint of the project area. Materials find direct use in classrooms and serve as a reference base for teacher committee members who develop the supplementary curriculum materials.

Environmental Excitement for Students

As a mini-illustration of common occurrences in many area schools, cooperation between a private school and a public school district meant two all-day field trips for grades 5-8. A seventy-year-old abandoned schoolhouse and nearby trout stream were new ecosystems as students chose from a long list of activities. Students picked forty-five minute slots filled with variety, packed with duties and clear objectives. The project teachers and environmentalist devised each slot.

Here is a student's-eye view of such a field trip.

For science: Wade into a trout stream. First, fill out a questionnaire; sit bankside and note the stream's location, adjacent land forms, and local nomenclature. Now, with overshoes afoot, slide carefully into the creek. Avoid jumping, for safety's sake, and watch your footing to prevent eroding, even slightly, the bankside. Use both dip and plankton nets. With your partner, move safely next to weed beds, shallow pools, and midstream. Lift rocks and debris while you investigate. Identify, collect, and bottle your specimens; you'll report and demonstrate these live trophies next day back in school.

For math: With a teacher-made instrument, measure land areas, tree heights, slopes. No bluffing, either; the teacher is checking and tells the group about many objects in and around school they will be measuring. Math makes more sense this way; the book isn't enough.

For creative writing: sit on the stairs of the old schoolhouse and on its rusty swings; explore its dingy one room. Use narration, description, nostalgia, and personification to put into words what these make you feel.

For art: in sun and shade, feel, see, smell new objects for sketching, color study, seasonal detail, object collages, or leaf collections.

Local land forms, nearby plots, nature centers, even the school building or its grounds give students fresh avenues for exploring human-animal-plant ecosystems, air or water supplies and problems, aesthetic effects, sun and energy sources, and man's past, present, and possible future manipulations of the environment. With such purposeful outdoor activities, in-class lessons take on valuable reinforcement, realism, and ultimate environmental impact.

Region B's teachers are integrating subjects, working together more closely, discovering and using outdoor study areas—from urban asphalt to school playgrounds or nearby parks. Teachers capitalize on students' interests, needs, and abilities, while students explore their daily links to both man-made and natural environments.

Teacher adaptations abound. For example, after ten days of bad weather, one teacher knew how to use the sun's first big day. Her third-graders pantomimed seeds affected by wind, rain, and sun. Later, they drew and wrote about sunny days. They tape-recorded bird songs in the small plot behind the school, and in the hallway they talked about the sun's energy. They didn't know it was *ICE* concept #1; they didn't have to know. Instead, they had seen, heard, smelled, and felt the sun's work in many new ways.

A monthly newsletter sent to area teachers tells of countless similar adaptations.

The multidisciplinary teacher-written supplementary curriculum guides which have been produced by *Project ICE* underscore the reality that no individual school district could support or sustain a program of such wide dimensions. Because of ESEA Title III, teacher adaptations of the unified supplementary guides, together with extensive use of staff personnel and resources, are meeting an imperative educational need. Knowledge, reason, and growing student involvement are nurturing environmental concern in all subjects and grades. *Project ICE*—its programs and services, its teacher-change-agents, and its 7,500 teacher-adapters—has taken a regional first step in the 1,000-mile-long journey of human survival.

The Maine Environmental Education Project

A Statewide Strategy for Environmental Education

It was around 1967 when the term environmental education was first conceived. Since then increasing numbers of schools and educators across the country have become involved in planning and implementing environmental education programs. More and more teachers appear to be recognizing the educational opportunities in first-hand environmental studies and activities. In one respect the current interest in environmental education may be viewed as a response to a recognized need for educational change. In another it is seen as an educational response to the need for a long-range approach to develop responsible environmentally concerned and active citizens. It was perhaps a combination of these two responses which in 1968 prompted the administration and teachers of Yarmouth, Maine, a small coastal community, to encourage and support a K-12 program in environmental education.

Program Philosophy and Objectives

During the first year of the pilot program in Yarmouth the philosophy, objectives and teaching strategies were developed and tested. These served to provide the foundation for a program which today is becoming statewide in scope. The goal of the program is expressed by a definition similar to one developed at the University of Michigan: environmental education is a process aimed at producing a citizenry that is knowledgeable concerning the total environment and the role of man, able to participate in activities for monitoring and improving the quality of the environment while meeting human needs, and motivated to do so.

From this major goal the following three subgoals have been identified:

Affective Subgoal: To help individuals acquire strong feelings fundamental to developing a concern for the environment and a motivation to participate in activities for maintaining and improving the quality of the total environment.

Cognitive Subgoal: To help individuals acquire basic understandings of the total environment, their relationship with this environment, and associated environmental problems.

Behavioral-Skill Subgoal: To help individuals develop the necessary thinking and behavioral skills for the prevention of environmental degradation, correction of environmental abuses, and creation of a functional and quality environment through successful investigation, evaluation, and problem-solving activities.

The goals suggested a program possessing two major characteristics. First, environmental education, because of its scope, should not be a separate subject area but an *emphasis* in the curriculum, directed to the task of relating all disciplines to the natural and man-made environment, man's relationship with his environment, and associated environmental problems. In particular, it should stress first-hand experiences involving students with their immediate surroundings and the local community as a classroom.

Secondly, environmental education should be viewed as a *process* in which students participate in three levels of learning experiences with the following behavioral objectives:

Discovery-Inquiry

Behavioral objective: The student will be able to and will seek to discover and investigate the components and characteristics of his total environment and the relationship of man with his environment.

In this phase the student investigates his total environment including: a) natural components—land, water, air, plants, animals, and energy, b) man or human populations—population size, distribution, and physical, psychological, social, political, and economic factors, and c) man-made components—production areas, human settlement areas, open-space areas, transportation and circulation areas, recreational areas, and community service and utility areas.

This article was written for the Title III Quarterly by Mr. Dean Bennett, Director, Maine Environmental Education Project, Yarmouth, Maine.

Evaluation and Problem Identification

Behavioral objective: The student will be able to and will develop criteria to evaluate data related to his total environment and human processes and identify opportunities for maintaining and improving his environment.

It is in this phase that students develop criteria upon which to assess their data gathered through investigation. Criteria relate to ecological and human, physical, psychological, and social needs. It is at this point that opportunities for maintaining or enhancing the quality of the environment are identified.

Problem Solving

Behavioral objective: The student will be able to and will participate in carrying out successful environmental problem-solving activities involving the prevention and resolution of environmental problems and the creation and development of resource use and environmental improvement projects.

In this phase the student participates in a problem-solving process in which he may directly act on his environment to resolve a problem or create an improvement or he may indirectly communicate a concern to others to encourage their involvement.

The three phases involve both classroom and on-site experiences. This approach to environmental education provides an interdisciplinary means of developing values, attitudes, conceptual understandings, and critical thinking and behavioral skills.

Teaching Organization and Implementation

In the Yarmouth program a curriculum emphasis was developed in which students participate in a sequential and expanding program based heavily upon the local environment. At each elementary grade level a study environment provides a central focus—grades K-1, the school; grades 2-3, the neighborhood; grades 4-5, the community; and grade 6, the region. At grades 7-12, studies and activities relate to all these as well as to topics, issues and problems of a statewide, nationwide, and worldwide scope.

At each grade level, K-6, the suggested sequence of implementation is as follows:

1. Grade-level inservice workshop for teachers and volunteer field trip guides to familiarize them with the program and the field trip which they will help lead. (The use of citizen volunteers for field trips is important since they allow the class to be broken down into small groups—a key to taking successful field trips in the outdoors. The use of citizens also allows direct community participation and input in the educational process.);
2. Classroom presentation and field trip orientation;
3. Field trip in the study environment; and
4. Follow-up investigation, evaluation, and problem-solving activities.

At grade levels 7 through 12 the program is flexible, involving students in both group and independent activities related to investigation, evaluation, problem identification, and problem solving. Such activities are carried out in the classroom and on-site as well as within a subject area and across subject areas.

Supporting the curriculum emphasis is a resource center. From here a wealth of publications, charts, maps, games, field equipment, audio-visual aids, and mounted specimens is dispensed to teachers and students. Another area of related activity involves the identification and development of school and community sites. These provide direct opportunities for students to engage in the three learning phases of the process.

From the beginning of the Yarmouth program, the person providing direction for organization and operation has been a full-time coordinator. This person has been entirely financed by local funds. Working with him has been a half-time secretary-teaching assistant and community volunteers.

Program Expansion

After the initial pilot year, three other nearby communities—Falmouth, Freeport, and Cumberland-North Yarmouth—decided to participate and share program expenses. It was during this time that a grant was received by Yarmouth through Title III of the Elementary and Secondary Education Act to expand the program statewide through the *Maine Environmental Education Project*.

The objectives of the project are

- to develop a resource center at the model program in the Yarmouth area and establish four other coordinator-implemented K-12 demonstration programs in environmental education covering a wide geographic area of Maine,
- to assist schools and communities establish committee-implemented K-12 demonstration programs in environmental education covering a wide geographic area of Maine,
- to initiate contacts with schools and communities throughout Maine for the purpose of beginning to stimulate a widespread integration of environmental education learning experiences into curriculums which may eventually affect all youth,
- to stimulate the development of and assist in the implementation of teacher education programs in environmental education at undergraduate and graduate levels, and
- to strengthen the concept and contribution of environmental education in Maine and elsewhere through an exchange of information and ideas with related programs and activities.

During the first year of the project school systems covering a wide geographic area of Maine were selected for participation in the project. The school systems were Kennebunk-Kennebunkport, Oxford Hills, and the city of Bangor. Each of these made a strong commitment to finance all on-going expenses of demonstration programs when they became operative a year later. From each system a qualified and experienced teacher was selected and trained at The University of Michigan in a Master's Degree program specializing in environmental education.

In the fall of 1971 the three coordinators returned to their school systems where each is now developing a program tailored to his own community. Currently the demonstration programs are serving a valuable function through the development of curriculum materials and testing of teaching strategies.

During this second year of the project, the Director and a Field Consultant are now beginning to work with other communities throughout Maine using a variety of approaches including a committee approach or organization of a nucleus of people to establish a curriculum emphasis. The staff has been working with local conservation commissions (municipal agencies which make recommendations regarding the best use of the community's natural resources), community officials, school administrators and teachers, as well as with members of business, public, and private organizations and individual citizens. Once a number of people have been identified, the project's personnel provide assistance in the areas of general consultation including: committee organization and operation; planning and carrying out a community inventory; school site planning, development, and utilization; planning and implementing a resource center; curriculum planning, implementation, and evaluation; organization and implementation of a teacher workshop and/or inservice course; and specific project resources, including preliminary school site concept plans illustrating ideas for outdoor environmental education laboratories, slide sets (35 mm) of community or school site, and curriculum materials for participating teachers.

Again the emphasis in this approach is encouraging teachers to relate their subjects to the local environment where students may participate in first-hand learning experiences. Basic to this approach is the community environmental inventory. A set of guidelines is being made available to provide direction in gathering and compiling information on the community which can be put into resource manual form for use by teachers, students, and community government personnel. Another resource for a program is information and plans on school and community study sites. The project staff is available to assist schools in analyzing and developing concept plans for identified sites.

An approach of this kind requires the support and cooperation of many people. The project has made contacts with representatives of business and industry, public education, resource agencies and planning agencies at the federal, state, and local levels, organizations such as soil and water conservation districts, service clubs, and youth groups, as well as with private citizens.

Other directions of the project involve undergraduate and graduate teacher education. This year another coordinator, from the community of Cape Elizabeth, is being trained in a special Master's Degree program the project helped to establish with the University of Maine at Orono. The program offers teachers an opportunity to specialize in environmental education by electing a broad range of courses in community government, resource economics, planning, natural and human ecology, natural resources, psychology, and related education areas.

At the undergraduate level the project has worked with the University of Maine system in developing a pilot field campus course for student teachers and a preprofessional experience program for undergraduates working in the Regional Environmental Education Program in the Yarmouth area.

As the project enters its third and final year, continuation plans are in effect. The demonstration programs are already financed by local funds. The project personnel are serving among the membership of a State Plan Writing Committee which is formulating recommendations which if acted upon may see much of the work of the project continued as an integral part of the State Department of Education and the State University system. Plans are also being currently explored on the feasibility of another alternative, that of a private coordinating organization contracting with various groups and agencies to offer services to communities and schools. In the meantime, it is hoped that the project is beginning to lay a foundation for a sound environmental education emphasis in the schools of Maine.

The New Jersey Story

In 1967, with funds from Title III of ESEA, New Jersey created a State Council for Environmental Education, a statewide planning and research project designed to assess the Title III environmental education projects then operating in New Jersey, to inventory all environmental education in the state, to determine how inner-city youth might best be served by environmental education, to create an awareness of the value of environmental education in the general public, to develop an evaluation instrument for environmental education programs, and, most importantly, to design a statewide master plan for environmental education.

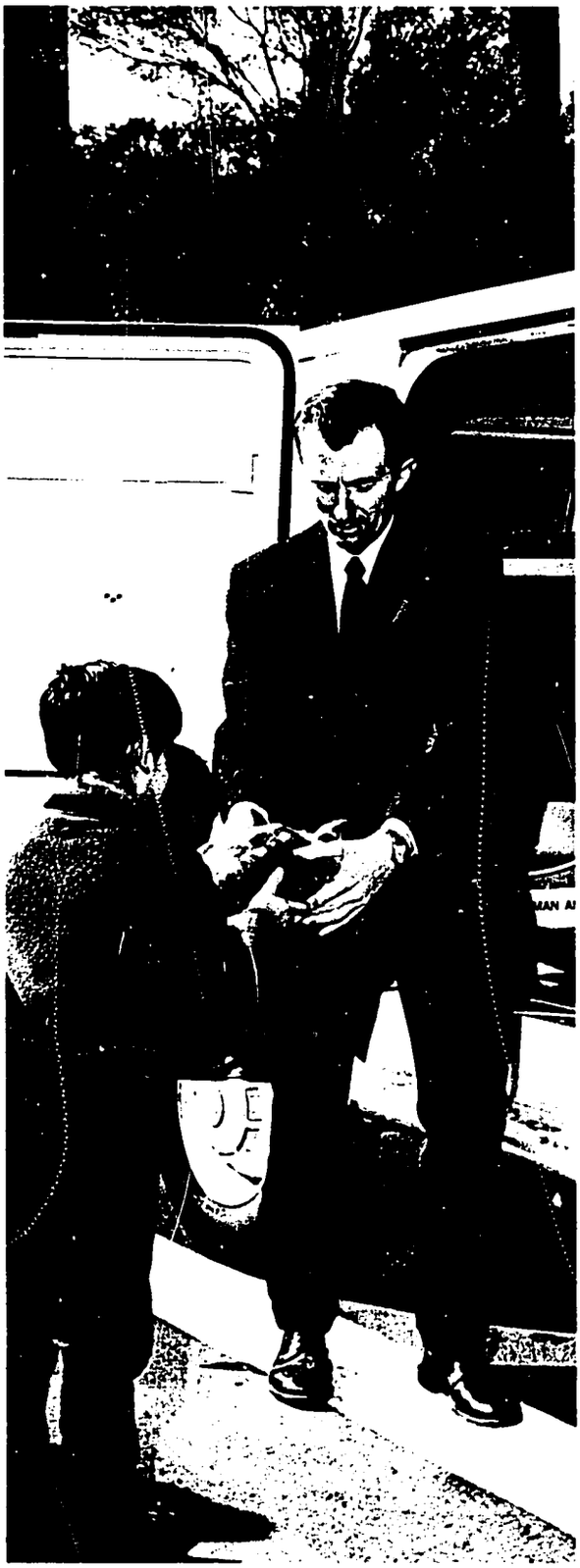
This extensive mandate to the Council built upon a history of conservation and outdoor education in New Jersey, a state more acutely plagued by environmental problems than any other in the nation. In the earliest years of Title III, the state had assigned funds to environmental projects. At Trenton's *Action Bound School-Within-A-School*, gifted but underachieving male high school students were experiencing outdoor, conservation-oriented activities to develop academic skills and self-awareness. The *Stepping Stone Environmental Center* operated both resident and day-use programs on 28 acres of land in state forest, open on a subscription basis to all New Jersey school districts. The *Shore and Marine Environmental Program* made science-oriented use of the marine environment at Sandy Hook. Fifth- and sixth-grade students in Union County were served by the *Outdoor Education Center*, headquartered in the historic Deserted Village in the 2000-acre Wachtung Reservation. A cranberry bog, purchased by the state, was leased to the *Conservation and Environmental Studies Center*. A K-12 program, *A Classroom of Today's World*, offered learning experiences in the physical and social environments to students in Madison Township. The *Learning Camp* of the Kearny school system was designed to give fifth-graders resident experience in outdoor living.

Against this background, the Council set about fulfilling the responsibilities assigned to it, and when federal funding came to an end in 1970, a master plan for statewide environmental education—the first in the nation—had been prepared. A five-year program of implementation of the master plan began in July, 1971, under a new grant from Section 306 of Title III, together with financial resources from the state's newly enacted Environmental Eduction Act. The primary objective of the plan is to create in the most rapid and efficient way possible an environmentally literate citizenry, motivated and able to solve existing problems and prevent future ones. To these ends, the plan includes

- a Technical Advisory Committee to advise the Commissioner of Education;
- local school district citizen committees on environmental education;
- a network of environmental education centers;
- support for legislation;
- development of guidelines and multi-media curricula materials for elementary and secondary schools, adult continuing-education programs, business, industry, and labor, government agencies, community action groups, community planners, public officials, and others; and
- training programs for school personnel, business, industry, and labor management personnel, and public service personnel in government agencies on local, county, and state levels.

Central to the plan is the Technical Advisory Committee, with some 21 members appointed by the Commissioner of Education to three-year terms. The Committee reviews existing programs, suggests ways to improve cooperation between groups, and facilitates the flow of information into curricula. It devises means to coordinate the capabilities of educational agencies with business, civic, and federal agencies based in the state and also considers additional regional centers and research and curriculum development centers. Citizen committees for each school district serve as liaison between environmental organizations, local government agencies, and the schools and assist school districts in the development and selection of new curriculum materials.

This article was written for the Title III Quarterly by Dr. Edward J. Ambry, Director, The New Jersey State Council for Environmental Education, *Professor of Education, Montclair State College.*



The cutting edge of the curriculum will be the application of environmental concepts to the solution of real environmental problems. It is envisioned, for example, that a new type of homework would involve parents and other adults with students in collecting data relating to a local environmental problem, leading to suggestions for its solution. Students could measure pollution of air and water, predict the life expectancy of existing solid waste disposal areas, conduct land-use surveys, study the history and design of zoning, health, and conservation ordinances, evaluate present and predict future water needs, and engage in real-life educational ventures.

The plan also provides for reaching the adult community through existing programs. It is recommended that a course which begins with general environmental principles and progresses, through the use of local examples, to a consideration of specific environmental issues of nation, state, and community, should be made part of every adult education program throughout the state.

Regional Environmental Education Centers will assist each school district. Instruction at these centers will include the study of man and his environment, and problems of environmental pollution, erosion and survival as these relate to all the sciences and the humanities. Here, three of the original Title III centers established in the state continue to serve as elements in the master plan. *Stepping Stone*, *Sandy Hook*, and the *Conservation and Environmental Studies Center*, now being developed in a permanent site at Whitesbog in the cranberry bog, have become curriculum research and development centers.

The four other Title III projects created in New Jersey in 1967 have all become components of their local school districts, supported by local funds, and continue to provide environmental education even beyond their original sites. The state has also funded another Title III project, the *Pollution Control Education Center* at Union, which has become a fourth development center under the statewide master plan.

New Jersey is often referred to as a microcosm of the nation in terms of its population, industrial development, and environmental pollution problems. It is now where all of the nation may soon be. The New Jersey Master Plan for Environmental Education lays out a broad course of action which will unify in a cooperative effort the many isolated environmental education activities now going on in the state, to result in a comprehensive program of elementary and secondary, adult, and higher education. When the plan is fully activated, New Jersey may also be a microcosm of the nation in terms of citizen effort to understand and solve environmental problems. If this should occur, the catalytic effect of the Title III program, both state and federal, will have been a major factor. The ability of Title III to respond to new educational needs as they arise, combined with the efforts of state and local educators, is producing the New Jersey story.

New Jersey Environmental Education Act

The following Environmental Education Act was passed August 4, 1971, by the General Assembly of the State of New Jersey.

AN ACT providing for the promotion, establishment, and operation of local school district environmental education programs, the establishment and operation of a network of Regional Environmental Education Facilities and Centers for the purpose of providing environmental education programs for public and non-profit school students and teachers, for the establishment and operation of a network of Environmental Education Curriculum Research and Development Centers, and making an appropriation.

BE IT ENACTED by the Senate and General Assembly of the State of New Jersey:

1. This act shall be known as the "Environmental Education Act."

2. The Legislature finds and declares:

a. The concern for the environment of man has become a dominant social issue of our time;

b. Since New Jersey is the most highly urbanized and the most industrialized State in the Nation, it serves as a microcosm of the entire country, and shows abundant evidence of environmental breakdown,

c. New Jersey's environmental crisis is not limited to tangible pollution problems;

d. The State Departments of Education and Environmental Protection have specific interest in improving education as a force for environmental quality;

e. The public and Legislature have expressed their concern by the passage of the Green Acres Bond Act of 1961, the Water Bond Act of 1969 and the establishment of a Department of Environmental Protection; and

f. It is a prime objective to create an environmentally literate citizenry who understand their interdependence with and responsibility for the total environment, and who possess the knowledge and concern to solve existing problems and to prevent future ones.

3. The Commissioner of Education is hereby authorized and directed to promote the establishment and operation of local public and non-profit elementary and secondary school environmental education programs, and to assist in the development of such programs.

4. The Commissioner of Education in consultation with the Commissioner of Environmental Protection is hereby authorized to designate and operate and develop Regional Environmental Education Centers and facilities for the purposes of assisting in the development of environmental education programs in each school district and providing environmental education instruction to public and non-profit elementary and secondary students and teachers.

5. Any public or non-profit educational agency may apply to the Commissioner of Education for designation as a Regional Environmental Education Center.

6. Courses of study and schedules of fees of Regional Environmental Education Centers shall be subject to the approval of the Commissioner of Education and the State Board.

7. Instruction at Regional Environmental Education Centers shall include, but not be limited to the study of man and his environments, and problems of environmental pollution, erosion and survival as they relate to the fields of ecology and other sciences, social sciences, language arts, mathematics, the arts and humanities.

8. Any public or non-profit school in the State may arrange its schedule in accordance with rules of the Commissioner of Education so that all elementary and secondary school pupils may utilize the services and facilities of an environmental education center; and any school, except such school as is operated for profit in whole or in part, may, upon application, cause its pupils to utilize the services and facilities of a Regional Environmental Education Center.

9. Upon proper application submitted to the Commissioner of Education by the local school district, the Commissioner is authorized, subject to available appropriations, to enter into agreements with, and to make cost sharing grants of money to local school districts New Jersey Public Broadcasting Authority or Regional Environmental Education Centers for the purposes of assisting in the costs of services for local student participation and other education services provided by the Regional Environmental Education Centers and the New Jersey Public Broadcasting Authority.

10. Upon proper application submitted to the Commissioner of Education by a local school district, the Commissioner is authorized, subject to available appropriations to enter into agreements with, and to make grants of money to such local school district for the purpose of paying half of the cost of constructing and equipping local environmental education facilities.

11. Stepping Stone Environmental Education Center at Branchville, the Conservation and Environmental Studies Center at Browns Mills, and the Sandy Hook Environmental Education Center, by virtue of their long standing and demonstrated capability aided by nearly $2,000,000.00 in Federal grants, are hereby designated as Environmental Education Curriculum Research and Development Centers for the purpose of providing to local, public and non-profit school districts services such as, but not limited to, development and dissemination of curriculum materials, teacher training, demonstration pilot programs, guidance in facility development and use, and consultative services to municipal conservation commissions and other environmental interest groups. The Environmental Education Curriculum Research ond Development Centers shall concentrate their research and curriculum development efforts on problems related to pollution, erosion, land use, ecology, survival and related natural, physical and social sciences.

12. The Commissioner of Education with the approval of the State Board of Education shall:

a. Make rules and regulations for the establishment and operation of the Environmental Education Curriculum Research and Development Centers for the purpose of providing for local, public and non-profit school services such as, but not limited to, development and dissemination of curriculum materials, teacher training, demonstration pilot programs, guidance in facility development and use, and consultative services to municipal conservation commissions and other environmental interest groups. The Environmental Education Curriculum Research and Development Centers shall concentrate their research and curriculum development efforts on problems related to pollution, erosion, land use, ecology, survival and related natural, physical and social sciences.

b. Employ such personnel as may be necessary to carry out the purposes of the act.

13. There is hereby appropriated to the Department of Education the sum of $100,000.00 for the purpose of carrying out the purposes of this act through June 30, 1972, the expenditure of which shall be conditioned upon approval of at least an equal amount of Federal funds.

14. This act shall take effect immediately.

New Jersey State Council for Environmental Education
Overall Project Objectives

CURRICULUM COMPONENT

1. By May 31, 1972, a K-12 curriculum guideline in environmental education will be completed, consistent with research on learning, decision-making and environmental concepts related to urban, suburban and rural environments.

2. By December 31, 1972, a data bank of necessary production research information will be gathered for use in curriculum development decision-making catalogued as follows: publishers, media producers, computer use, copyright regulation and costs, public domain information and free and inexpensive information.

3. By May 31, 1973, appropriate suppliers will be contacted and agreements reached regarding acquisition and diffusion of environmental education curriculum materials.

4. By May 31, 1973, analysis and evaluation of production research data will be made for production and marketing decision.

5. By May 31, 1973, initial contractual agreements and resource allocations will be made to accomplish and implement marketing production decisions resulting from Objective 4.

6. By May 31, 1974, a K-12 curriculum in environmental education will have been developed and field-tested.

7. By August 31, 1973, a program for in-service teacher training relative to implementation of the curriculum will be developed.

8. By May 31, 1975, 70 percent of the districts in New Jersey will have installed the K-12 curriculum developed by the Project or will have installed an alternative K-12 curriculum.

9. By May 31, 1974, an undergraduate curriculum for all colleges and universities in New Jersey will have been developed in cooperation with these institutions. (If funds are available.)

10. By May 31, 1974, undergraduate curriculum will have been installed in 75 percent of all colleges and universities. (If funds are available.)

11. By May, 1975, contingent upon funding there will be teacher programs in environmental education based on performance objectives in at least five colleges.

12. By May 31, 1974, 40 percent of the students majoring in teacher education, in New Jersey colleges, will be prepared to teach an environmental education program in schools. (If funds are available.)

13. By May 31, 1975, colleges, industries, and other agencies will have developed environmental internships and work-study for 500 students each year.

14. By May 31, 1973, a variety of programs in environmental education for adults will have been developed and put into practice for groups such as (a) middle management employees in business and industry, (b) members of municipal agencies such as planning boards, (c) special interest citizen organizations, (d) continuing education centers, (e) Concerned Citizens Committees for environmental education (CCCs).

TRAINING COMPONENT

15. By May 31, 1975, 12,000 classroom teachers a year will have completed a training program in environmental education and will have completed some project in their classroom to improve environmental quality.

16. By May 31, 1975, 20 percent of students in New Jersey will have been involved in some community agency dealing with the environment such as conservation commissions, model cities, zoning boards, through work-study programs and independent study.

17. By May 1973, 2,000 teachers will demonstrate their ability to use at least one pollution monitoring test as a result of their training.

18. By May 31, 1975, 50 percent of the students in 75 percent of all districts will have provided accurate environmental information for the Council's curriculum planning by collecting data in direct environmental monitoring activities.

19. As a result of training, new learning environments will have been identified and utilized by more than 90 percent of schools in New Jersey, by May 31, 1976.

20. By May 31, 1975, CCCs will be developed in all municipalities.

21. By May 31, 1975, at least five colleges will assist in development of teacher training programs at the graduate level.

22. By May 31, 1972, working agreements to exchange assistance in the form of personnel, property, and equipment for environmental education programs will have been developed with the Departments of Environmental Protection and Agriculture, the Association of Conservation Commissions, and others.

23. By May 31, 1974, school construction guidelines will include specific environmental standards.

ADMINISTRATION COMPONENT

24. The Council will assist the Commissioner of Education and the Technical Advisory Committee in reviewing environmental education programs and proposals; anticipating future needs; locating resources to strengthen state efforts; and advising on methods for extending the goals of the New Jersey State Master Plan (through May 31, 1976).

25. By May 31, 1976, identify and fill positions with leaders who have the ability to focus on, plan for, and implement short and long-range programs.

26. Through Ma/31, 1976, coordinate the implementation of environmental programs within the state.

27. By May 31, 1973, administer appropriate programs in environmental education in the areas of curriculum development and evaluation, training, research and development, as called for under Chapter 279, Laws of 1971.

28. By May 31, 1973, act as a statewide Clearinghouse providing: a central register of environmental education consultants; information on environmental education materials, extant programs, and developmental efforts; evaluation instruments for programs and materials; and dissemination strategies.

29. Submit an approvable continuation proposal on an annual basis through May 1, 1975.

30. Maintain a continuous equipment and materials inventory reflecting funding source and origin of all equipment and supplies maintained and housed by the Project through May 31, 1976.

31. Maintain personnel records and other Project records through May 31, 1976.

32. Produce reports related to Council management and activities through May 31, 1976.

33. Through May 31, 1976, implement a plan for meeting communications objectives of the Council.

34. By May 31, 1973, obtain resources for unfunded objectives of current proposal and for additional needs identified in the Master Plan.

35. Through May 31, 1976, implement a plan for meeting intra-Council communication needs.

36. Through May 31, 1976, identify and engage evaluation consultants and complete acceptable evaluation reports according to current evaluation design.

37. By November 15, 1971, develop a detailed overall project evaluation design which is acceptable to the funding source and program auditor.

38. By July 31, 1972, execute a contract with an educational auditor.

39. Through May 31, 1976, coordinate program auditor and evaluator roles with project activities.

40. By May 31, 1972, DDD (Development, Demonstration, and Diffusion) units will be organized, initial staff employed and some facilities will be operating.

41. By May 31, 1972, DDD units will be demonstrating environmental education program on request for the Central Unit.

42. By May 31, 1973, the DDD units will be field testing new curricular materials and activities on request for the Central Unit.

43. By May 31, 1973, DDD units will conduct training programs for teachers, students and adults.

44. By May 31, 1973, DDD units will serve as local foci for facilitating community efforts and programs in environmental endeavors.

45. By May 31, 1973, DDD units will assist and coordinate local Concerned Citizens Committees for Environmental Education in developing and implementing curricular materials and activities.

46. By May 31, 1973, develop and implement an evaluation design and/or criteria which tests Council projects/activities to ascertain whether or not they meet the "urban relevancy" policy.

Ways and Means

Many states have identified environmental education as a critical need and have allocated Title III funds to pilot programs in this field. These projects are examples of educational management by objectives, since in environmental education, the underlying philosophy and the objectives to be attained have been clear almost from the beginning. What remains is to develop the techniques and tools for implementing philosophy and objectives. In ways as diverse as the localities in which they operate, the state-funded projects described here are contributing to the development of a major new area of American education.

■ *The Environmental Studies Program*, St. Thomas and St. John, Virgin Islands, is an interisland, interagency, interdisciplinary pilot program of environmental studies. The overall objective of the program is to help the Virgin Islands elementary school child "fit himself into a fit environment" by giving him opportunities to observe the quality of his natural surroundings, note the rapid changes that threaten the health of these surroundings, and learn what he can do to direct and control these changes. The concept of Environmental Strands, first developed for the NEED programs in National Parks, have been adapted for use in the Virgin Islands, where students observe interaction and interdependence, variety and similarity, patterns, change and continuity, and adaptation and evolution at Salt Pond Bay and Reef Bay. A Guide to the Natural History of St. John tells what to "wear, eat, and leave alone" when you visit an environmental studies area, and includes a check list of St. John birds and 133 plants found in and around the study areas.

The Virgin Islands Daily News publishes one chapter each week of the adventures of Ivan Environman as part of a new reader for the Virgin Islands Language Arts Curriculum for elementary pupils in the *Environmental Studies Program*. Some of the stories are written by students, others are based on experiences of children in the ESP, and all tell of the experiences of Ivan with his environment. A Calendar of Virgin Islands Cultural and Natural History intersperses such information as February 24th's item that "From 1960 to 1969 the V.I. population doubled, exceeding the growth rate of India!" and a December first reminder of the 1956 dedication of Virgin Islands National Park, with observations that garbage should not be pitched overboard "even in water 15,000 feet deep like it is in the V.I. Basin, south of the western end of St. Thomas." and "Black wattle leaves make a delicious and refreshing tea which is also reputed to be good for colds." The calendar has helped the project to raise several hundred dollars, and, has involved local businesses and service organizations in the program.

The projects described in this article are listed under their respective states on Pages 31-33. Requests for information concerning any of the projects should be addressed to the project director.

Ivan Environman is an eleven-year-old Virgin Islander born and raised and living happily ever after on the Island of St. John. Ivan has family and friends of all ages on St. Thomas, St. Croix, and Tortola, but mostly on St. John.

Ivan encounters his Virgin Islands environment with his eyes, ears, and nostrils wide open like the observant eyes, ears, and nostrils of the faces carved in stone at Reef Bay where Ivan and his friends like to go.

Ivan notices the patterns of the things he watches, their likenesses and differences, how plants and animals in different places on land and sea adapt to their surroundings. Ivan notices how things around him change. Most of all he studies all the ways that he and everyone else interact with each other and other things, like the Bell Apple depends on a butterfly to pollinate it or a gobi depends on a bat to pollinate, or the Virgin Islands depend on Ivan and his generation to know enough and do enough to keep bats, butterflies, gobis, and Virgin Islanders living a good life, Westindian style!

....A Calendar of Virgin Islands
Cultural and Natural History
Environmental Studies Program
Cruz Bay, Virgin Islands

■ *Project OUTREACH*, Phoenix, Arizona, is creating an environmental education program which emphasizes teacher training and the integration of environmental studies into existing curriculum. Extension classes during the school year and summer seminars and institutes are offered to Phoenix teachers through a cooperative arrangement with Arizona State University. The project's emphasis upon an interdisciplinary, multi-curricular approach is illustrated in a volume of materials for specific classroom application, prepared by high school teachers from disciplines as varied as chemistry, journalism, physical education, biology, government, English, French, political science, counseling, drafting, and mathematics during a summer session in 1971. A French teacher explores with her classes a comparison of cultural differences in man's use of personal space. Basing her teaching unit upon her philosophy that students must be involved in deciding what they will study, a counselor offers an unstructured inquiry into the concept that an individual is the product of his heredity and his environment. A biology teacher uses selections from provocative articles by current writers on environmental matters to stimulate discussion in her classes, when presented in connection with questions which she formulates. Another biology instructor focuses on air pollution and gives her students an in-depth scientific experience ranging from the composition of clean air to the illnesses produced by pollutants. The teaching guide which includes these and other classroom techniques is available to teachers in Arizona through *OUTREACH*.

A sound filmstrip, "A Time To Be," designed for use in grades 7-12, resulted from teacher and student development of materials from classroom activities on the environment. The music and lyrics were written by students, who also sing and accompany themselves throughout the presentation. Woven into the text are the disciplines of economics, history, theology, science, art, music, communications arts, and health education, to stimulate the student to examine his relationship to the natural environment. When the filmstrip is supplied to teachers for showing, it is accompanied by a written copy of the text for each student, so that students may follow it with understanding and discuss it thoughtfully.

Man consists of sinew, muscle, bone, flesh and nerve arranged in marvellous complexity and built from living cells. Cells are built from atoms. What are atoms? They are

Energy in motion. Trees and leaves, rocks and streams—mountains are also composed of atoms. Thus they are also composed of energy in motion. We are made of the same; we are at one with the environment. The unity is real. We are not born into the world. We grow out of it.

...."A Time To Be"
Written by Students in
Project OUTREACH,
Phoenix, Arizona

A series of ten half-hour programs on "The Environment" was sponsored by *OUTREACH* on a local radio station, with topics including:

The Condition of the World Environment
This Finite Earth
Economics and the Environment
Politics and the Environment
Law and the Environment
Current Developments in Environmental Law
Technology and the Environment
Federal Environmental Involvement and the Predicament of Man
The Consumers' Interest in the Environment
Aesthetics for the Future

■ In fiscal 1972, the State of California awarded "incentive grants" to two Title III environmental education projects which had been in operation for three years and were judged worthy of local expansion and adoption and statewide dissemination. The two projects take wholly dissimilar approaches to environmental study; in one, the environment is utilized to "make schools more responsive to the concerns, old and new, of our times and thus more responsive to our needs," and in the other, the environment is the object of study designed to develop in students appreciation of and skill in the scientific method. The noteworthy fact is that in both instances, student environmental sensitivity results.

The *Urban Studies Project* involves some 5,000 fifth- and sixth-grade students from 13 contiguous school districts in the East Bay Region of California. The environmental program is a part of an approach to urban education which integrates pupils through problem-solving instructional activities. The programs at ten centers in the San Francisco Bay area focus on science/ecology, and those at six other centers relate to cultural/urban dynamics. There is extensive school/community involvement, with high school and college students and parents serving as teaching assistants.

After being prepared for field experiences by their teachers, who have participated in an inservice training program, students are transported from their districts to the Urban Studies Center on the grounds of Oakland's Chabot Science Center. There, according to predetermined arrangement by the project staff, they are placed in heterogeneous "project classes," composed of students from a variety of ethnic, religious, cultural and economic backgrounds, and are transported to field-work sites in the East Bay Region. Environmental sites include an agricultural research center where students learn about vacant lot and farm weeds, farm crops, farm plant and animal pests, the plant kingdom and its origins, and at least six orders of insects, their names and identification; an ecology museum where children are brought into close proximity with small native animals and learn to construct closed-system terraria; a 150-acre brackish water wildlife sanctuary fed by creeks and a series of tidal floodgates

and inhabited by a unique variety of vertebrate and invertebrate animals; a research station on San Francisco Bay where students engage in shoreline and laboratory activities; an environmental protection agency where children in small groups work with scientists to gain understanding of pollution problems; and the University of California Botanical Gardens in Berkeley and the nursery and hothouse of the Oakland Public Schools, where students identify and care for plants. In another component of the program, upper elementary grade students are taught how to operate simple Polaroid cameras and work in teams of two photographing bird life and natural and man-made surroundings in the refuge area.

In recommending the *Urban Educational Problems* project as replicable and adaptable, the California ESEA office says that learning centers can be established and staffed in cooperation with community agencies and organizations (e.g., transportation and park authorities, colleges, courts), and the instructional program of the centers can be adapted easily. Program operation requires a staff coordinator and bus transportation.

An Environmental Approach to Investigation and Inquiry in Science, Barstow, California, aims to motivate students to use scientific research approaches through the selection of environmental problems and the formulation of experimental designs. Each student selects a problem, develops a hypothesis, researches the problem at school, travels to a research station to conduct his experiment, and analyzes the data in relation to the hypothesis. Each year, over 6,600 students in grades 5 through 12 study environmental problems at a research station on a 120-acre desert site, which has a well-equipped laboratory and a nature trail.

Students who used the research station made substantial gains compared to other students in the use and interpretation of data. Many students continue their research beyond the time provided by the regular school program and work voluntarily when school is not in session on long-term research problems. The program underlines for students the concept of painstaking scientific research in relation to the solution of environmental problems.

Although the Barstow project has access to federally owned land as its investigation site, the project staff emphasizes that any piece of land of any ecological type and any size, urban or rural, can be utilized for the same kind of environmental science study.

■ The *Oak Ridge (Tenn.) Schools' Phase II Simulation Project* translates environmental concerns from a global level to a highly specific local issue. The basic intent of the simulation activity is to focus community attention on the impact of a decision to site and construct school facilities, with special emphasis on the environmental effects and problems. In the simulation, community participants assume the role of members of the School Building Program Committee and work with an extensive three-dimensional geographic array which represents the entire expanse of the Oak Ridge community and becomes the focal point for discussion of available alternatives. Enlarged aerial photographs of the specific sites and a data pack are also an integral part of the simulation materials. Decision data are derived from the actual sources used by the Board of Education and city planners. Census track graphs, cost estimates, charts and maps are the ones currently in use by the city officials.

> **Educators have many options which must be exercised now to stimulate the development of a generation of concerned citizens whose vision and actions will reestablish a quality of life for all.**
>
> **. . . Center for Inservice Education**
> **Oak Ridge, Tennessee**

Operated as part of an extensive inservice training program under a Title III grant, the school site simulation is a step toward meeting public demand for more extensive participation in decision making. It is an example of a technique for involving the community in environmental problem solving.

National Models

Sixteen environmental education projects funded by the United States Office of Education under Section 306 of Title III address problems common to all or many of the states. Section 306 provides that 15 per cent of all Title III appropriations is to be reserved for use by the United States Commissioner of Education for programs of national educational significance.

Criteria developed by the Office of Education for model environmental education programs include the following:

- Environmental education is defined as people-centered, as distinguished from conservation education;
- The student's immediate environment is the basis of his study, and both urban and rural environments are examined;
- There is student and community involvement at all stages of project development;
- Learning is on a discovery-inquiry problem solving model;
- Curriculum is interdisciplinary;
- Programs lead to student responsibility for some aspects of environmental control and improvement.

Each of the Section 306 environmental projects which follow began operation in 1971 and is planned to continue for three years. Total funding assigned to the projects in fiscal 1972 was $2,828,000.

■ *A Model Educational Program in Ecology, Kindergarten Through Adult Education*, Los Angeles, California, is creating an educational development model for environmental studies which includes design, development, and evaluation of learning activity modules for an interdisciplinary curriculum. Randomly selected classes receiving the regular instructional program in four school districts are compared with randomly selected classes in the *Model Educational Program* to assess the validity of the curriculum materials. Each module contains a teacher's guide with behavioral objectives, lesson plans and teaching strategies, and laboratory and manipulative materials. Each also includes some combination of the following: written materials for pupils, multi-media materials such as film strips or specimen displays, schedules of auxiliary services such as field trips, and reference books and pamphlets. Approximately 2,800 pupils and 90 teachers are involved directly in the evaluation of experimental programs at all grade levels in the four school complexes, with 30 teachers engaged in writing and producing materials.

■ *A Model Strategy for an Effective Environmental Education Program*, Fort Myers, Florida, is combining existing curriculum materials and newly created curricula into a sequential working package, with concepts pinpointed by grade levels. Emphasis is on inter- or multi-disciplinary teaching, on- and off-campus field experience, and student responsibility for program inputs. Relevant student involvement in local environmental problems is encouraged by a program in which students prepare proposals and submit them to civic organizations for mini-grants of from $25 to $100 to fund their investigations. Students planning a study write an outline stating the problem they wish to investigate, the basic procedures they will utilize, a projected time schedule for completion, and a list of equipment and supplies, including an estimated budget. An organization which funds such a proposal develops a vested interest in a group of young people, and a direct avenue of communication is opened between community and school. The students have responsibility to make a competent effort, since they must submit a final report in person to the civic group (thereby providing the adults an environmental education experience) and to their peers in school.

To meet the problem of giving students successful field trip experience when the large size of the group makes traditional teacher- or expert-led activities impractical, Fort Myers is developing semi-programmed, illustrated field texts. In advance of a trip, the teacher is provided with a field guide and logistics manual which describes and defines basic environmental concepts involved in the program and suggests site locations. Field texts are then

The Section 306 projects described in this article are listed under their respective states on Pages 31-33. The New Jersey project described on Pages 15-19 is also funded under Section 306. Requests for information concerning any of these projects should be addressed to the project director.

supplied to students to guide them by a series of questions through a conceptual learning experience in a specific environment. This allows the teacher to assume a management-consultant role, relieved of the need to be all-knowing about the site under study.

■ *Woodstock Environmental Education Project*, Woodstock, Illinois, is creating an environmental curriculum model in a conceptual framework. The program is based on the belief that the teaching of facts does not in itself change attitudes, but concepts do; and therefore the attitudinal changes which are sought in environmental education can only be brought about by a conceptual approach. The interest of the project staff in conceptual teaching has stimulated examination of the Woodstock curriculum as a whole. A summer workshop of teachers is writing an overall curriculum guide in conceptual form, with environmental education incorporated as an integral part of the instructional program. Woodstock is a community near but not contiguous to the Chicago metropolitan area; it is historically environmentally aware and has strong environmental protection ordinances.

■ *Cooperative Learning Through Environmental Activities in Nature (Project CLEAN)*, Shawnee Mission, Kansas, is developing curriculum materials by performance-contracting with teachers to write teaching modules and test them in their own classrooms. The project advertised in the school district for teachers interested in writing curriculum and selected the most promising applicants. Specifications for materials include that they must be interdisciplinary in approach, encompass five to ten hours of teaching time, and provide for pre- and posttesting of students. The teacher uses the materials which she has developed in her own class, and they are then field tested by three other teachers at the same grade level. Advice and assistance is provided by consultant specialists employed by the project. Shawnee Mission is developing curriculum for 40,000 students, grades kindergarten through 12.

■ *Environmental Education Demonstration Project*, Topeka, Kansas, is building curriculum around three broad topics: planning for increased population, pollution and the balance of nature. The project is targeted to sixth-grade elementary students and junior and senior high school science students in its first year and will extend to fourth-graders and secondary school social studies classes in the second year. Special education environmental curriculum is being developed to meet the needs of individual classes. The *Demonstration Project* stresses evaluation and accountability as integral parts of classroom application of the curriculum. Teachers administer pre- and posttests and receive test results in the form of computer printouts. The familiarity with evaluation procedures which this is creating has affected teacher attitudes toward accountability in other curriculum areas as well.

An active community council takes responsibility for recruiting volunteers from the Topeka community to serve as field trip aides and also participates in development of curriculum. The project makes extensive use of Topeka industrial plants as field sites, and the community council has solicited public support for development of a natural area on a 20-acre portion of a Veterans Administration Hospital site.

■ *Strategies for Environmental Education (Project SEE)*, Wyandotte, Michigan, aims to create a process model for environmental education. To do so, the project brought 30 students, equally divided between elementary, junior high, and senior high levels, together in a QUEST team, which was given summer work in geology and biology at Eastern Michigan University, followed by intensive field experience in Wyandotte and throughout Michigan. The students then spent half of each day during the school year with the project, the secondary students receiving appropriate credit for these hours. They photographed and processed more than 5,000 slides illustrating environmental concepts, created overhead visuals, and wrote and printed handout materials. If a Wyandotte kindergarten teacher wanted to give her class an environmental experience, she could ask the QUEST team to present its unit on, for example, litter. The students would come to the class with a presentation which showed the kindergartners their own school and their own neighborhood. During the year, QUEST teams, each consisting of three students, made more than 500 presentations to some 15,000 people in the schools and the community. The students have given their presentations a name—they are GREEPS (Groovy Environmental Education Packages). In the second and third years of the project, larger numbers of students will be involved in the QUEST teams, and beyond that the project envisions a time when a kindergarten teacher who wants to present an environmental unit will set her students to creating a GREEP of their own.

■ *Community Environmental Studies Program*, Golden Valley, Minnesota, is encouraging students, teachers, and community members to develop environmental study materials that focus on their communities. Procedures used while cooperating with three types of communities in Minnesota—urban-suburban, agri-business, and natural-resources-dependent—are being documented and summarized in a curriculum development model which will be made available to other communities throughout the state. The project staff, made up of teachers whose experience is in English, the humanities, ecology, science, foreign languages, social studies, and special education, works with participating students and teachers in grades 5-12, in many subject areas. Each interested individual or group is seen as an environmental student whose experience can be conserved in curricular form. During the project's first year, about one-half of the teacher participants developed CESM's (Community Environmental Study Materials), which were submitted to a panel of 15 reviewers before being edited and illustrated. These materials will be available for trial use in classrooms during the coming school year. Students were directly responsible for a number of CESM's, and others were written by special education teachers for use in special education classes. A 26-member community advisory council is active in working with students, teachers, and *CESP* staff in such projects as a "Transportation Fair," the focus of which was

a local controversy related to an interstate highway, and an urban-suburban cleanup of a local watershed area.

■ *The Area Education Agency's Role in Developing Environmental Stewardship (Project ECOS)*, in Putnam and Northern Westchester Counties in New York State, is a multi-faceted action-oriented program which serves 70,000 students in 18 school districts. Coordinating activities and information through an *ECOS* regional council composed of delegates from participating schools, students have surveyed the tonnage and use of newspapers in the two-county area, have studied the volume and handling of solid waste, and set up a regional recycling center with the cooperation of industry and local governments. On the basis that collecting precise information about one's surroundings is a good starting point for attacking environmental problems, ECOS is developing a student environmental monitoring and data collection network and has suggested to the United Nations that such a network could extend to students all over the world. Emphasizing involvement with the community, *ECOS* sponsors such programs as a three-months seminar for teachers conducted by their community's urban renewal director; a high school course taught by a county planner, in which students assist with land-use surveys and mapping; and a course in which students are studying and documenting a town's need to adopt a wetlands ordinance. The project staff is available to assist the faculties of member schools in the districts to create environmental projects and curriculum.

Almost everyone you meet has an opinion about what's wrong with the environment, but facts are harder to come by. Not only are there relatively few people measuring what's going on now, but information about conditions ten, twenty, or fifty years ago hardly exists. Because of this, it's difficult to judge whether things are getting worse, or better, or just holding their own.

So a logical starting point for tackling environmental problems is to start collecting precise information about our surroundings. Only in this way will we and people all over the world begin to find out what's really happening. This poses a problem, however. A world-wide environmental monitoring network will require money and trained people. Both of these commodities happen to be in short supply.

Perhaps the most promising possibility on the immediate horizon is that students could cooperate and get the job done; that the costs of data collection, monitoring, and communication would be included in the costs of a good education. The Secretary-General of the United Nations Conference on Human Environment says:

"The setting up of a voluntary international student environmental data collection and monitoring program has great appeal. Such information, collected in a disciplined and controlled manner, could be of definite value, since funds and manpower for such in-depth effort could never be made available if it had to be remunerated."

. . . Project ECOS
Putnam and Northern Westchester Counties, New York

■ *School-Community Cooperative Environmental Studies Project*, Beaufort, North Carolina, defines "environment" as everything which influences the way people live. In this context, students at East and West Carteret High Schools select for study such subjects as the city sewage treatment plant, premarital pregnancies in the schools, the history of an offshore island, drug use and abuse, and the Civil War history of the county. The project combines many of the current priorities of education, stressing student self-directedness, student involvement in all phases of the educational process, openness of classroom space as well as in the relationships between staff and students, fluidity of curriculum to meet needs, and involvement with the community. Ninety students at one school and 60 in another meet with ten teachers for three hours each morning. A student is on his own in deciding what to do; each must conceive of and decide how to pursue his own activity. The half-day course replaces regular English, social studies, and advanced biology courses, and students receive credit for these three subjects. Movie-making and still photography are used extensively in documenting student investigations.

■ *Knowledgeable Action to Restore Our Environment (Project KARE)* is a regional effort in urban-suburban cooperation designed to strengthen environmental education in five intermediate educational units in southeastern Pennsylvania. Local action programs are the main thrust of the project. Seventeen schools selected from 67 applicants received grants of up to $7,000 each in January of 1972, for the period January to June. Students identified the enviromental problems of greatest concern to them and outlined the manner in which they would attack them. Student task forces were mobilized in one innercity Philadelphia school to locate the causes of air, water, and noise pollution and to bring pressure to bear on community and state agencies for corrective action. In a suburban high school, students concerned about effluents entering streams tributary to a major creek are monitoring the streams in their neighborhood in conjunction with monitoring of the creek itself by students in an urban high school. Overcrowded living, crime, exploitation, pest infestation, lack of political awareness, and poor health conditions are the concerns of students in the Philadelphia Model Cities area. A private school in a rural section of Chester County is maintaining a variety of natural habitats on its school campus, for use by students from other schools in the area as well as by the school's own students, To support the local action programs, *KARE* maintains a staff training effort, consultant services, a curriculum design program, a resource center, and a dissemination service which includes a speaker's bureau.

■ *An Interdisciplinary Problem-Solving Approach in Environmental Education*, Berks County, Pennsylvania, utilizes 644 wooded acres recently acquired as a state forest by the Pennsylvania Department of Environmental Resources as an instructional center for students from eleven Pennsylvania counties who live within a travel distance of 60 miles. Development of overnight and extended-use

facilities is expected to extend the project's services to an additional 19 counties. The program is building an environmental curriculum based on use of the Environmental Education Center and the surrounding community, on the theory that by learning about the natural environment and doing something to and with that environment, individuals perceive relationships between natural and man-made environments and can be motivated to rectify the imbalances man has created by offering solutions of their own. Curriculum deals with five major areas: water, earth, biology, meteorology, and heritage, with each of these concepts developed on eight levels of sophistication, preschool through adult education. The program includes orientation and inservice training of teachers and community users of the site, follow-up programs at the local level for participants in site activities, and evaluation and dissemination of curriculum as it is developed.

■ *An Environmental-Ecological Education Center*, Anderson, South Carolina, is developing a comprehensive environmental education program for all grade levels, based on the "People and Their Environment" instructional materials developed in South Carolina and now distributed to schools throughout the state. This series, consisting of eight volumes of learning activity modules, K-12, was created at a writing conference sponsored by the South Carolina Conservation Curriculum Improvement Project in cooperation with the School of Education of the University of South Carolina. The learning activity modules incorporate lesson objectives, pre-site, on-site, and follow-up instructional materials; and evaluation. The project utilizes a 45-acre lake shore site which includes a weather station, forest and wildlife management areas, a marine biology station, an outdoor theatre, a soil conservation study site, and an arboretum. Handicapped children in the Anderson school system are given special opportunities to use the site, and a nature trail for the blind has been developed.

■ *Urban-Suburban Environmental Studies Program (Project USE)* operates under a Title III grant to the Bellevue (Washington) Public Schools, to develop a cooperative program in which suburban Bellevue and urban Seattle school children study both the physical environment and intercultural relationships. When a Bellevue school bus carrying youngsters to an environmental field trip swings into Seattle to pick up an equal number of innercity children, all the students have already had an experience in human relations in their classrooms. Among the first materials developed by the project were guidance units for use by classroom teachers to acquaint children with prejudice and the myths of prejudice. Conflict of values is regarded as a central concept in the attitudes of ethnic and socio-economic groups toward one another, as well as in man's use of his physical environment. The project is targeted initially to grades five, six, and seven, largely because one component of the program is a week-long residential experience, for which fifth-grade has been found to be the youngest practical age. The community is actively involved in development of the program, and high school students from both school areas serve as field trip leaders.

■ *Master Plan for Environmental Education in the Milwaukee Public Schools* has responsibility for developing an environmental education program for all students in a city-wide school system. A group of teachers selected in the initial stage of the project to attend a leadership conference now constitutes a cadre of change agents in the schools, stimulating interest and coordinating activities in environmental education. An open-ended school action component makes funds available to schools which suggest innovative ways of attacking specific environmental problems. In a mini-grant procedure, students themselves are able to submit proposals and obtain money and assistance for their projects. A major local industry gives financial support to the student-grant activity. A state-owned demonstration farm is available to the project for student experiences in doing farm work and studying farm operation. Curriculum is being developed in workshop sessions for teachers, a field trip pilot program has been set up, and television presentations are being used effectively in orientation and inservice training of teachers.

■ *ECO Curriculum Development and Learning Laboratory*, Cheyenne, Wyoming, is developing an environmental curriculum which is based on experiences in the natural environment but goes beyond conservation or outdoor education as it has been practiced in the past. The hub of the program's activities is the ECO-Lab, a 40-acre, county-owned parcel of land within the city limits of Cheyenne, which contains stream, marsh, and prairie land. Curriculum based on this natural resource was developed by teachers from the Laramie County schools, instructors and students from the local community college and the University of Wyoming, and Model Cities representatives. In the first year, curriculum was targeted at grades kindergarten through six and included a component for Head Start children. The second year will concentrate on grades seven to nine, and in the third year a curriculum emphasizing mini-courses will be developed for senior high school. At all levels, curriculum deals with man's relationship with his surroundings, incorporating questions of resource management and depletion, transportation, technology, and planning. Instruction is integrated into the existing arts, sports, communications skills, mathematics, and social science programs.

Why Environmental Education?

Congressman John Brademas
Chairman, Select Subcommittee on Education

I believe—and I do not think champions of clean air, land and water will disagree—that if we are to make substantial progress in meeting the ecological crisis, we must have a citizenry informed and educated about the whole spectrum of issues called environmental.

That is why, in February 1970, several colleagues and I in the House of Representatives introduced the Environmental Education Act, a bill to authorize Federal funds to support elementary and secondary school courses on ecology, as well as curriculum development and teacher training for environmental studies, community conferences on the environment, and the preparation of material on the environment for use by the mass media.

Congress overwhelmingly approved our bill and it is now law. Although there have been difficulties in effectively implementing the new programs, Congress has insisted that we begin.

The Federal government has, therefore, now made a legal—and moral—commitment to supporting education about the environment.

Those of us in Congress who in 1965 wrote Title III of the Elementary and Secondary Education Act intended that it be used to supplement the customary programs of the schools and, hopefully, to stimulate innovative ways of teaching and learning. Clearly Title III can play a role in enabling schools and the communities of which they are a part help teach about the environment. Although the Environmental Education Act is the principal authority under which schools carry out environmental programs, it is apparent that the funds available under the Act are not sufficient to meet the extraordinary need. Therefore, to the extent possible, it is appropriate that Title III be used to supplement the Environmental Education Act.

Two themes that emerged again and again during the hearings of the House Select Education Subcommittee on the Environmental Education Act were these: first, that we must have basic changes in our values and in our attitudes toward the environment of which we are a part; and, second, that education, especially in our schools, must play a significant part in shaping those values and attitudes. With passage of the Environmental Education Act, the Congress of the United States has responded to the challenge of these themes. I am confident that in the years ahead Congress will give still greater support to the education of Americans about our environment.

Robert P. Long
Chairman, Connecticut State ESEA Title III Advisory Council

The typical American's satisfaction with, and unquestioning faith in, our technological capabilities to provide for human needs has resulted in a complacent disregard for the future. Such complacency may be identified when one examines the content and purposes of education as it has been practiced for many years.

Briefly described, educational programs have consisted of isolated disciplines geared to reviewing the accumulation of past knowledge, with little thought given to the social, economic, physical, and political utility of such knowledge in the solution of human problems. We have discovered that educational practice, as it is presently directed, is an inadequate preparation for coping with the awesome proportions and urgencies of environmental problems forecast for the future.

Environmental education offers some hope for a brighter forecast of man's chances of survival. First of all, it relates accumulated knowledge to the future, imparting a focus and an impact that lends a more meaningful and useful service to that knowledge.

Second, environmental education provides thematic arrangement, by which the several disciplines can be removed from their present isolation and organized for a concerted consideration of man's environmental problems.

Third, environmental education encourages the student to examine events and conditions in a critical manner. Thus he shifts the exercise of some of his scholastic energy from the quantitative absorption of knowledge about them to the qualitative analysis of these events and conditions.

Last, environmental education is oriented toward problem-solving. This increases the student's ability to approach the resolution of a problem systematically and objectively.

When knowledge becomes more meaningful and useful to man's critical judgment of his existence and serves as a background for the solution of problems related to his existence, knowledge becomes a change agent. Environmental education lends this vital characterictic to knowledge.

Wilhelmina Hill
Environmental Education Specialist
U.S. Office of Education

The need for innovative programs of environmental education has become so evident as to be widely held as crucial for American schools. Pollution and resource use problems have increased seriously with population growth and technological development. The quality of environments in which people live and interact must be raised to a satisfactory or high level. To help children and young people assume their responsibilities toward environmental quality, school programs must provide numerous environmental learning experiences which are people centered, urban as well as rural, and have community involvement.

Title III, ESEA, has played a significant role in the development of this newly emerging curriculum area. The flexibility of Title III made it possible for school systems in its early years to develop over a hundred environmental education projects. These were sufficiently innovative in nature to result in new techniques and directions in response to the needs of the times. Currently, sixteen environmental education projects supported under Section 306 of Title III are developing models and preparing innovative curriculum materials. I have visited most of these project centers and believe that their achievements will provide widespread assistance and direction for environmental education as their achievements become known. Other environmental education projects are being developed through that part of Title III administered by the States.

As waves of interest and more environmental education projects become activated from the Title III centers, the impact on American school programs is magnified. Let's keep these Environmental Education waves of action moving!

Dennis M. Wint
Director
Center for the Development of
Environmental Curriculum
Willoughby, Ohio

Basic to the questions: "Why the schools?" and "What can the schools do?" with respect to environmental education is the assumption that unless certain basic individual values which are currently held are modified, the environmental problem will not be solved. No social problem can be solved unless individuals voluntarily participate in the solution; participate because they believe the problem is wrong and are committed to its correction. It is the process of education, more than any other process in society, which concerns itself with developing this voluntary. disposition of behavior. The school's special role in the correction of social problems is with the way the next generation of adults develops. It is only formal education, i.e., the school, which is likely to intentionally and deliberately take upon itself the task of bringing about a new set of values that will effectively reinforce whatever legal changes are made regarding the behavior of individuals in our society.

From these assumptions—that an environmental problem exists, that the schools should be involved in its solution because they do something that is considered unique, and that education is a process which attempts to influence the way people think—one can arrive at the philosophical purpose of environmental education. That is to develop in the individual the ability and desire to think critically and independently about man's use of the environment. Because of constant changes in the condition of environment and of knowledge in general, current beliefs and standards may not be applicable to future problems. Therefore, it seems a better course of action to equip the individual with the talent to develop his own position rather than require acceptance of a current position. In the process of learning to think critically the student must be aware of the criteria that can be used for making judgments, must look for ambiguities in thought and fact, must be interested in the validity of facts and in whether there is a cause and effect relationship between statements. In summary, the school can make its maximum contribution by developing a certain kind of individual, namely, one that arrives at his own views about the environment based upon his own critical assessment of the issues which are involved.

ESEA Title III Projects for Environmental Education

ALASKA

The Kenai Environmental Education Program, Mr. Peter Larson, Kenai Peninsula Borough School District, Environmental Education Program, P.O. Box 1266, Soldotna, Alaska 99669

ARIZONA

Project OUTREACH, Dr. Paul Plath, 2042 W. Thomas Road, Phoenix, Arizona 85015

CALIFORNIA

A Model Educational Program in Ecology, Kindergarten Through Adult, Mr. Grant R. Cary, 1044 N. Hayworth, Los Angeles, California 90046

An Environmental Approach to Investigation and Inquiry in Science, Mr. Leon Hunter, Barstow Unified School District, 551 South H Street, Barstow, California 92311

Planning Solutions to Urban Educational Problems, Mr. William Webster, 1025 Second Avenue, Oakland, California 94606

COLORADO

Cultural Relationship of Man to His Environment—Past-Present-Future, M. C. Kreutz, Route 1, Box 66, Delta, Colorado 81416

CONNECTICUT

Pratt Outdoor Center, Dr. Daniel Hart, Paper Mill Road, New Milford, Connecticut 06776

Project Outdoors, Mrs. Norman B. Newton, Natural Science Center, 269 Oak Grove Street, Manchester, Connecticut 06040

Talcott Mt. Science Center, Mr. Donald La Salle, Montevideo Road, Avon, Connecticut 06001

DELAWARE

Environmental Laboratory, Mr. Hess G. Wilson, New Castle-Gunning Bedford School District, Blound Road, New Castle, Delaware 19720

DISTRICT OF COLUMBIA

Model Comprehensive Program in Urban Environmental Education, Mr. Rueben Pierce, Department of Science, Presidential Building, 415 - 12th Street, N.W., Washington D. C.

FLORIDA

Broad Spectrum Environmental Education Program, Dr. Clair Bemiss, 705 Avocado Avenue, Cocoa, Florida 32922

Interdisciplinary Environmental Education K-12, Mr. John Arena, 3600 S.W. 70th Avenue, Ft. Lauderdale, Florida 33314

Environmental Learning Laboratory, Mr. John A. Reynolds, P. O. Box 759, Arcadia, Florida 33821

Environmental Sensitivity Project, Mr. Roy Hyatt, Environmental Studies Center, 2501 North Hayne Street, Pensacola, Florida 32503

Model Strategy for an Effective Environmental Education Program, Mr. William F. Hammond, Gwynne Institute, 2266 Second Street, Ft. Myers, Florida 33901

Resource-Use Outdoor Education Center, Mr. James M. Phillips, P. O. Box 539, Perry, Florida 32347

GEORGIA

Student-Teacher Environmental Relationships Investigations, Mr. Fred Schlein, Savannah Youth Museum, 4405 Paulsen Street, Savannah, Georgia 31405

ILLINOIS

Woodstock Environmental Education Project, Mr. James Hires, Woodstock School, 14124 South Street Rd., Woodstock, Illinois 60098

Operation Survival Through Environmental Education, Mr. Ray Miller, Box 122, Grafton, Illinois 62052

SELL: Student Endowment Learning to Live, Barry Gowin, Superintendent, Meridian Community Unit School District 101, Mounds, Illinois 62964

IOWA

Project ECO, Dr. Luther Kiser, 120 S. Kellogg, Ames, Iowa 50010

KANSAS

Cooperative Learning Through Environmental Activities in Nature (Project CLEAN), Mr. Ernie Kumpf, 7235 Antioch Street, Shawnee Mission, Kansas 66204

Environmental Education Demonstration Project, Mr. Donald French, 1601 Van Buren, Topeka, Kansas 66612

KENTUCKY

Environmental Education, Mr. Harold Grooms, Bourbon County Board of Education, Paris, Kentucky 40361

MAINE

Maine Environmental Education Project, Mr. Dean Bennett, Intermediate School, Yarmouth, Maine 04096

MARYLAND

Environment—A Basis for Curriculum, Mr. Ernest Spoerlein, Garrett County Board of Education, 40 S. Fourth Street, Oakland, Maryland 21550

MASSACHUSETTS

Project SCENIC, Mr. Paul Lemire, Randall School, West Street, Auburn, Massachusetts 01501

Project SURVIVAL, Mr. Richard Todd, Locke Junior High, Allen Road, Billerica, Massachusetts 01821

Project QUEST (Quality Urban Environment Studies Training), Mr. Bill White, Brockton High School, Brockton, Massachusetts 02402

Project ECOS (Environmental Center for Our Schools), Mr. Clifford Phaneuf, 195 State Street, Springfield, Massachusetts 00108

MICHIGAN

Strategies for Environmental Education, Mr. Thomas Sparrow, 639 Oak Street, Wyandotte, Michigan 48192

MINNESOTA

Environmental Learning Center, Mr. Gerald Foldenauer, Cook County High School, Grand Marais, Minnesota 55604

Education in the Natural Environment, Mr. Robert Block, 820 Pokegama Avenue North, Grand Rapids, Michigan 55744

Inter-disciplinary Environmental Workshop, Mr. Robert Hofflander, Box 152, Windom, Minnesota 56101

Environmental Science Center, Mr. Richard Myshak, Independent School District No. 275, 5400 Glenwood Avenue, Minneapolis, Minnesota 55422

Community Environmental Study Project, Mr. Mike Naylon, 5400 Glenwood Avenue, Golden Valley, Minnesota 55422

Mobile Science Laboratory, Mr. Charles Carpenter, Brookside Junior High School, 1209 Columbus Street, Albert Lea, Minnesota 56007

Environmental Mobile Laboratory, Mr. Sherwood Cleveland, Box 191, Anoka, Minnesota 55303

MISSOURI

Environmental Ecological Education Program, Mr. Verlin Abbott, Parkway School District, 455 North Woods Mill Road, Chesterfield, Missouri 63017

MONTANA

Powell County Environmental Curriculum Center, Mr. Gary Swant, Powell County High School, Deer Lodge, Montana 59722

Environmental Education Curriculum Project, Mr. John Smith, 408 Daly Avenue, Hamilton, Montana 59840

NEVADA

Verdi Outdoor Education Facility, Mr. Brian Wise, Verdi Elementary School, Verdi, Nevada 89439

NEW HAMPSHIRE

Nature Study Center, Mr. Emile Rocheleau, Monadnock Regional High School, RFD #1, Keene, New Hampshire 03431

Squam Lakes Science Center, Mr. Gilbert Merrill, Holderness, New Hampshire 03245

Dartmouth Outward Bound Center, Mr. Frederick S. Bartlett, P. O. Box 481, College Hall, Hanover, New Hampshire 03755

NEW JERSEY

Pollution Control Education Center, Dr. James M. Caufield, Union Public Schools, 2369 Morris Avenue, Union, New Jersey

Implementation of the New Jersey State Master Plan for Environmental Education, Dr. Edward Ambry, New Jersey State Council for Environmental Education, Montclair State College, Upper Montclair, New Jersey 07043

NEW MEXICO

Outdoor Education, Mr. John Cox, 724 Maple, S.E., Albuquerque, New Mexico 87103

NEW YORK

The Area Education Agency's Role in Environmental Stewardship, Dr. Frank Thompson, 42 Triangle Center, Yorktown Heights, New York 10598

NORTH CAROLINA

Environmental/Ecological Education, Mr. Earl Whitener, Burke County Schools, Drawer 989, Morganton, North Carolina 28655

School/Community Cooperative Environmental Studies, Mr. Will Hon, Courthouse Annex, Beaufort, North Carolina 28516

Environmental/Ecological Education, Dr. Larry Liggett, Environmental Education Center, 13 Veterans Drive, Oteen, North Carolina 28805

Environmental Science Study Curriculum, Mr. William Moffitt, Washington City Schools, P.O. Box 466, Washington, North Carolina 27889

OHIO

Center for the Development of Environmental Curriculum, Mr. Dennis M. Wint, 37047 Ridge Road, Willoughby, Ohio 44094

PENNSYLVANIA

Knowledgeable Action to Restore Our Environment (Project KARE), Dr. Donald L. Wright, Colony Office Building, Route 7 & Butler Pike, Blue Bell, Pennsylvania 19422

An Interdisciplinary Problem-Solving Approach in Environmental Education, Mr. Louis Ritrovato, Nolde Forest State Park, Box 392 —R. D. 1, Reading (Cumru), Pennsylvania 19601

Tayamentasachta, Mr. Fred C. Kaley, Greencastle Antrim S.D., 370 S. Ridge Avenue, Greencastle, Pennsylvania 17225

Transdisciplinary Involvement Program, Mr. Frank Christy, Fox Chapel Area S.D., 611 Field Club Road, Pittsburgh, Pennsylvania 15238

Environmental Education Program, Dr. Robert C. Campbell, State College Area S.D., 131 W. Nittany Avenue, State College, Pennsylvania

Living Instruction for Ecology, Mrs. Alberta R. Covert, Central Green S.D., Waynesburg, Pennsylvania 15370

SOUTH CAROLINA

Oceanographic Science Conceptual Schemes Project, Gary Awkerman, 3 Chisolm Street, Charleston, South Carolina

An Environmental-Ecological Education Center, Mr. Ryan Faulkenberry, Anderson County School District #5, P.O. Drawer 439, Anderson, South Carolina 29621

SOUTH DAKOTA

Inter-Lakes Environmental and Outdoor Education K-8, Mr. Major Boddicker, Chester Area School District, Chester, South Dakota 57017

Environmental Education K-12, Dr. E. R. McLaughlin, Instructional Materials Center, 827 Franklin Street, Rapid City, South Dakota 57701

TENNESSEE

Oak Ridge Schools Phase II Simulation Project, Mr. Peter H. Cohan, Cooperative Science Center, Inc., 156 Adams Lane, Oak Ridge, Tennessee 37830

TEXAS

Living Curriculum, 5th Grade, 3210 W. Lancaster, Fort Worth, Texas 76107

Study of Ecology of Lower Rio Grande Valley, 1409 E. Harrison Street, Harlingen, Texas 78550

VERMONT

Development of Outdoor Ecological Laboratory, Mr. William Lienhard, Atkinson Street, Bellows Falls, Vermont 05101

VIRGINIA

Craig County Conservation and Recreation Exploration (CARE), Mr. Walton F. Mitchell, Jr., P. O. Box 245, New Castle, Virginia 24127

WASHINGTON

Weather Satellite Station, Mr. Clayton Lanum, Lake Washington School District, Box 619, Kirkland, Washington 98033

Center for Ecological Studies, Mr. Patrick Hayden, Mount Vernon School District, 1219 E. Division Street, Mount Vernon, Washington 98273

A Model Marine Science Lab, Mr. Andrew Driscoll, School of Marine Science, Route 1, Box 631, Poulsbo, Washington 98370

WISCONSIN

ICE—Instruction, Curriculum, Environment, Mr. Robert J. Warpinski, CESA #9, 1927 Main Street, Green Bay, Wisconsin 54301

K-12—Environmental Education Curriculum, Mr. David Schiotz, Menomonie Public Schools, 718 North Broadway, Menomonie, Wisconsin 54751

WYOMING

Conservation Center for Creative Learning, Mr. Robert Legoski, Starrett Junior High School, Lander, Wyoming 82520

Kemmerer Outdoor Lab, Mr. Bill Mowry, Kemmerer Junior High School, Kemmerer, Wyoming 83101

ECO Curriculum Development and Learning Laboratory, Dr. Bill Edwards, Rural Route 1, Box 550A, Cheyenne, Wyoming 82001

PUERTO RICO

San Cristobal: Environmental Studies, Mrs. Ines Julia Guzman de Perez, Social Studies Program, Department of Education, Hato Rey, Puerto Rico 00919

VIRGIN ISLANDS

Environmental Studies Program, Mrs. Doris Jadan, Outdoor Education Teacher, Department of Education, P .O. Box 630, St. Thomas, Virgin Islands 00801