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ENVIRONMENTAL QUALITY EDUCATION ACT

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HEARINGS

BEFORE THE

COMMITTEE ON EDUCATION

OF THE

COMMITTEE ON

LABOR AND PUBLIC WELFARE

UNITED STATES SENATE

NINETY-FIRST CONGRESS

SECOND SESSION

ON

S. 3151

TO AUTHORIZE THE U.S. COMMISSIONER OF EDUCATION TO
ESTABLISH EDUCATION PROGRAMS TO ENCOURAGE UN-
DERSTANDING OF POLICIES AND SUPPORT OF ACTIVITIES
DESIGNED TO ENHANCE ENVIRONMENTAL QUALITY AND
MAINTAIN ECOLOGICAL BALANCE

S. 3237

TO AUTHORIZE THE SECRETARY OF HEALTH, EDUCATION,
AND WELFARE TO MAKE GRANTS TO CONDUCT SPECIAL
EDUCATIONAL PROGRAMS AND ACTIVITIES CONCERNING
ECOLOGICAL-ENVIRONMENTAL EDUCATION, AND TO ES-
TABLISH A NATIONAL ADVISORY COMMISSION ON TECH-
NOLOGY AND THE ENVIRONMENT

S. 3809

TO AUTHORIZE THE COMMISSIONER OF EDUCATION TO
AWARD FELLOWSHIPS TO PERSONS PREPARING FOR
ENVIRONMENTAL CAREERS

MAY 19 AND 20, 1970

Printed for the use of the
Committee on Labor and Public Welfare



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HEARINGS BEFORE THE SUBCOMMITTEE ON EDUCATION OF THE COMMITTEE ON LABOR AND PUBLIC WELFARE UNITED STATES SENATE

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U.S. GOVERNMENT PRINTING OFFICE

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THE UNIVERSITY OF CHICAGO
CHICAGO, ILLINOIS
JANUARY 1900

TO THE EDITOR OF THE JOURNAL OF THE
ROYAL ANTHROPOLOGICAL INSTITUTE
LONDON

SIR,

I have the honor to acknowledge the receipt of your letter of the 10th inst. in relation to the article on the "Prehistoric Man of the Cave of Vache" which appeared in the issue of the Journal for the month of December, 1899.

I am sorry to hear that you are not satisfied with the article, and I am sure that I shall be glad to make such corrections as may be suggested.

I am, Sir, very respectfully,
Yours truly,
J. H. R. KELLOGG

ENVIRONMENTAL QUALITY EDUCATION ACT

TUESDAY, MAY 19, 1970

U.S. SENATE,
SUBCOMMITTEE ON EDUCATION OF THE COMMITTEE
ON LABOR AND PUBLIC WELFARE,
Washington, D.C.

The subcommittee met at 10 a.m., pursuant to notice, in room 1114, New Senate Office Building, Senator Claiborne Pell (chairman of the subcommittee) presiding.

Present: Senators Pell (presiding), Randolph, and Nelson.

Committee staff present: Stephen J. Wexler, counsel; Richard D. Smith, associate counsel; and Roy H. Millenson, minority professional staff member.

Senator PELL. The Subcommittee on Education will come to order. Today we start 2 days of hearings on Senator Gaylord Nelson's bill on environmental education S. 3151, and the bill introduced by Mr. Goodell S. 3237. We also have before the committee Senator Nelson's Environmental Career Fellowship Act, S. 3809.

(The text of the bills follow:)

(1)

91st CONGRESS
1st Session

S. 3151

IN THE SENATE OF THE UNITED STATES

NOVEMBER 19, 1969

Mr. NELSON (for himself, Mr. BAYH, Mr. CHURCH, Mr. CRANSTON, Mr. DODD, Mr. EAGLETON, Mr. GRAVEL, Mr. HARRIS, Mr. HART, Mr. HARTKE, Mr. HUGHES, Mr. INOUE, Mr. JACKSON, Mr. KENNEDY, Mr. MCGEE, Mr. MCINTYRE, Mr. MANSFIELD, Mr. MONDALE, Mr. MOSS, Mr. PROUTY, Mr. PROXMIRE, Mr. RIBICOFF, Mr. TYDINGS, Mr. WILLIAMS of New Jersey, and Mr. YOUNG of Ohio) introduced the following bill; which was read twice and referred to the Committee on Labor and Public Welfare

A BILL

To authorize the United States Commissioner of Education to establish educational programs to encourage understanding of policies and support of activities designed to enhance environmental quality and maintain ecological balance.

- 1 *Be it enacted by the Senate and House of Representa-*
- 2 *tives of the United States of America in Congress assembled,*
- 3 That this Act may be cited as the "Environmental Quality
- 4 Education Act".

5 STATEMENT OF FINDINGS AND PURPOSE

- 6 SEC. 2. (a) The Congress of the United States finds that
- 7 the deterioration of the quality of the Nation's environment
- 8 and of its ecological balance is in part due to poor under-
- 9 standing by citizens of the Nation's environment and of the

1 need for ecological balance; that presently there do not exist
2 adequate resources for educating citizens in these areas, and
3 that concerted efforts in educating citizens about environ-
4 mental quality and ecological balance are therefore necessary.

5 (b) It is the purpose of this Act to encourage and sup-
6 port the development of new and improved curriculums to
7 encourage understanding of policies, and support of activities
8 designed to enhance environmental quality and maintain eco-
9 logical balance; to demonstrate the use of such curriculums in
10 model educational programs and to evaluate the effectiveness
11 thereof; to disseminate curricular materials and information
12 for use in educational programs throughout the Nation; to
13 provide training programs for teachers, other educational
14 personnel, public service personnel, and community and in-
15 dustrial business leaders and employees, and government
16 employees at State, Federal, and local levels; to provide for
17 community education programs on preserving and enhancing
18 environmental quality and maintaining ecological balance.

19 USES OF FUNDS

20 SEC. 3. (a) From the sums appropriated, the United
21 States Commissioner of Education, hereinafter referred to
22 in this Act as the "Commissioner", shall assist in educating
23 the public on the problems of environmental quality and
24 ecological balance by:

25 (1) Making grants to or entering into contracts with

1 institutions of higher education and other public or private
2 agencies, institutions, or organizations for:

3 (a) Projects for the development of curriculums to
4 encourage preserving and enhancing environmental qual-
5 ity and maintaining ecological balance.

6 (b) Pilot projects designed to demonstrate and test
7 the effectiveness of the curriculums described in clause

8 (a) whether developed with assistance under this Act
9 or otherwise.

10 (c) In the case of applicants who have conducted
11 pilot projects under clause (b), projects for the dissemi-
12 nation of curricular materials and other information
13 regarding the environment and ecology.

14 (2) Undertaking directly or through contract or other
15 arrangements with institutions of higher education or other
16 public or private agencies, institutions, or organizations eval-
17 uations of the effectiveness of curriculums tested in use in ele-
18 mentary, secondary, college, and adult education programs
19 involved in pilot projects described in paragraph 1 (b).

20 (3) Making grants to institutions of higher education,
21 local educational agencies, and other public or private orga-
22 nizations to provide preservice and inservice training pro-
23 grams on environmental quality and ecology (including
24 courses of study, symposiums, and workshops, institutes,
25 seminars, conferences) for teachers, other educational person-

nel, public service personnel, and community, business, and industrial leaders and employees, and government employees at State, Federal, and local levels.

(4) Making grants to local educational, municipal, and State agencies and other public and private nonprofit organizations for community education on environmental quality and ecology, especially for adults.

(5) Making grants for preparation and distribution of materials suitable for use by mass media in dealing with the environment and ecology.

APPROVAL OF APPLICATIONS

SEC. 4. (a) Financial assistance for a prospect under this Act may be made only upon application at such time or times, in such manner, and containing or accompanied by such information as the Commissioner deems necessary, and only if such application—

(1) provides that the activities and services for which assistance under this title is sought will be administered by or under the supervision of the applicant;

(2) sets forth a program for carrying out the purposes set forth in section 3 and provides for such methods of administration as are necessary for the proper and efficient operation of such programs;

(3) sets forth policies and procedures which assure that Federal funds made available under this Act for any

1 fiscal year will be so used as to supplement and, to the
2 extent practical, increase the level of funds that would,
3 in the absence of such Federal funds, be made available
4 by the applicant for the purposes described in section 3,
5 and in no case supplant such funds.

6 (4) provides for such fiscal control and fund ac-
7 counting procedures as may be necessary to assure
8 proper disbursement of and accounting for Federal funds
9 paid to the applicant under this title; and

10 (5) provides for making an annual report and such
11 other reports, in such form and containing such informa-
12 tion, as the Commissioner may reasonably require and
13 for keeping such records, and for affording such access
14 thereto as the Commissioner may find necessary to as-
15 sure the correctness and verification of such reports.

16 (b) Applications from local educational agencies for
17 financial assistance under this Act may be approved by the
18 Commissioner only if the State educational agency has been
19 notified of the application and been given the opportunity
20 to offer recommendations.

21 (c) Amendments of applications shall, except as the
22 Commissioner may otherwise provide by or pursuant to regu-
23 lation, be subject to approval in the same manner as original
24 applications.

1 ADVISORY COMMITTEE ON ENVIRONMENTAL QUALITY
2 EDUCATION

3 SEC. 5. (a) The Secretary of Health, Education, and
4 Welfare shall appoint an Advisory Committee on Environ-
5 mental Quality Education which shall—

6 (1) advise the Secretary concerning the adminis-
7 tration of, preparation of, preparation of general regula-
8 tions for, and operation of, programs supported with
9 assistance under this Act;

10 (2) make recommendations regarding the alloca-
11 tion of the funds under this Act among the various pur-
12 poses set forth in section 3 and the criteria for estab-
13 lishing priorities in deciding which applications to ap-
14 prove, including criteria designed to achieve an appro-
15 priate geographical distribution of approved projects
16 throughout all regions of the Nation;

17 (3) review applications and make recommendations
18 thereon;

19 (4) review the administration and operation of
20 projects and programs under this Act, including the
21 effectiveness of such projects and programs in meeting
22 the purposes for which they are established and oper-
23 ated, make recommendations with respect thereto, and
24 make annual reports of its findings and recommendations
25 (including recommendations for improvements in this

1 Act) to the Secretary for transmittal to the Congress;
2 and

3 (5) evaluate programs and projects carried out
4 under this Act and disseminate the results of such
5 evaluations.

6 (b) The Advisory Committee on Environmental Qual-
7 ity Education shall be appointed by the Secretary without
8 regard to the civil service laws and shall consist of twenty-
9 one members. The Secretary shall appoint one member as
10 Chairman. The Committee shall consist of persons familiar
11 with education, information media, and the relationship of
12 man as producer, consumer, and citizen to his environment
13 and the Nation's ecology. The Committee shall meet at the
14 call of the Chairman or of the Secretary.

15 (c) Members of the Advisory Committee shall, while
16 serving on the business of the Advisory Committee, be en-
17 titled to receive compensation at rates fixed by the Secretary,
18 but not exceeding \$100 per day, including travel time; and
19 while so serving away from their homes or regular places of
20 business, they may be allowed travel expenses, including per
21 diem in lieu of subsistence, as authorized by section 5703 of
22 title 5 of the United States Code for persons in the Govern-
23 ment service employed intermittently.

24 TECHNICAL ASSISTANCE

25 SEC. 6. The Secretary, in cooperation with other Cabi-

1 net officers with relevant jurisdiction, shall, upon request,
2 render technical assistance to local educational agencies,
3 public and private nonprofit organizations, private profit-
4 making organizations, institutions of higher learning, agencies
5 of local, State, and Federal Government and other agencies
6 deemed by the Secretary to play a role in preserving and
7 enhancing environmental quality and maintaining ecological
8 balance. The technical assistance shall be designed to enable
9 the recipient agency to carry on education programs which
10 deal with environmental quality and ecology and (2) deal
11 with environmental and ecological problems pertinent to the
12 recipient agency.

13 PAYMENTS

14 SEC. 7. Payments under this Act may be made in install-
15 ments and in advance or by way of reimbursement, with
16 necessary adjustments on account of overpayments or under-
17 payments.

18 ADMINISTRATION

19 SEC. 8. In administering the provisions of this Act,
20 the Secretary is authorized to utilize the services and facili-
21 ties of any agency of the Federal Government and of any
22 other public or private agency or institution in accordance
23 with appropriate agreements, and to pay for such services
24 either in advance or by way of reimbursement, as may be
25 agreed upon.

1

AUTHORIZATION

2

SEC. 9. There is authorized to be appropriated for the

3

fiscal year ending June 30, 1970, for carrying out the

4

purposes of this Act such sums as Congress may deem

5

necessary.

91ST CONGRESS
2^D SESSION

S. 3151

IN THE SENATE OF THE UNITED STATES

MAY 6 (legislative day, MAY 5), 1970

Referred to the Committee on Labor and Public Welfare and ordered to be printed

AMENDMENTS

Intended to be proposed by Mr. PELL to S. 3151, a bill to authorize the United States Commissioner of Education to establish educational programs to encourage understanding of policies and support of activities designed to enhance environmental quality and maintain ecological balance, viz:

1 On page 2, strike out all that appears on line 19 and all
2 that follows down through line 23 on page 7 and insert in
3 lieu thereof the following:

4 “PROJECTS IN ENVIRONMENTAL EDUCATION

5 “SEC. 3. (a) Sections 803, 805, 807, 808, and 809
6 of title VIII of the Elementary and Secondary Education
7 Act of 1965, and all references thereto, are redesignated
8 as sections 802, 803, 804, 805, and 806, respectively. Such

Amdt. No. 613

1 title VIII is further amended by inserting after section 806
2 (as so redesignated) the following new section:

3 “ENVIRONMENTAL EDUCATION

4 “SEC. 807. (a) There is established, within the Office
5 of Education an Office of Environmental Education (re-
6 ferred to in this section as the “Office”) which, under the
7 supervision of the Commissioner, shall be responsible for
8 the administration of the program authorized by subsection
9 (b). The Office shall be headed by a Director who shall
10 be compensated at the rate prescribed for grade GS-17 in
11 section 5332 of title 5, United States Code.

12 “(b) (1) The Commissioner shall carry out a pro-
13 gram of making grants to, and contracts with, institutions
14 of higher education, State and local education agencies, and
15 other public and private nonprofit educational and re-
16 search agencies and organizations to support research,
17 demonstration, and pilot projects designed to educate the
18 public on the problems of environmental quality and eco-
19 logical balance.

20 “(2) Funds appropriated pursuant to subsection (d)
21 shall be available for such activities as—

22 “(A) the development of curriculums in the
23 preservation and enhancement of environmental quality
24 and ecological balance;

25 “(B) projects designed to demonstrate and test
26 the effectiveness of such curriculums;

1 “(C) dissemination of information relating to such
2 curriculum and to environmental education, generally;

3 “(D) preservice and inservice training programs
4 on environmental quality and ecology for teachers and
5 other education personnel, public service personnel and
6 government employees, and business and industrial
7 leaders and employees; and

8 “(E) community education programs.

9 In addition to the activities specified in the first sentence
10 of this paragraph, such funds may be used for evaluation of
11 the effectiveness of any such activities.

12 “(3) Financial assistance under this subsection may be
13 made available only upon application to the Commissioner.
14 Applications under this subsection shall be submitted at such
15 time, in such form, and containing such information as the
16 Commissioner shall prescribe by regulation and shall be ap-
17 proved only if it—

18 “(A) provides that the activities for which assist-
19 ance is sought will be administered by, or under the
20 supervision of, the applicant;

21 “(B) describes a program for carrying out one
22 or more of the purposes set forth in the first sentence of
23 paragraph (2) which holds promise of making a sub-
24 stantial contribution toward attaining the purposes of
25 this section; and

1 “(C) sets forth such policies and procedures as will
2 insure adequate evaluation of the activities intended to
3 be carried out under the application.

4 “(c) (1) There is hereby established an Advisory
5 Council on Environmental Quality Education consisting of
6 twenty-one members appointed by the Secretary who shall
7 be persons who are familiar with education, information
8 media, and the problems of environment and ecological bal-
9 ance.

10 “(2) The Advisory Council shall—

11 “(A) advise the Commissioner and the Office con-
12 cerning the administration of, preparation of general
13 regulations for, and operation of programs assisted under
14 this section;

15 “(B) make recommendations to the Office with
16 respect to the allocation of funds appropriated pursuant
17 to subsection (d) among the purposes set forth in para-
18 graph (2) of subsection (b) and the criteria to be used
19 in approving applications, which criteria shall insure an
20 appropriate geographical distribution of approved pro-
21 grams and projects through the Nation;

22 “(C) review applications and make recommenda-
23 tions respecting their dispositions; and

24 “(D) evaluate programs and projects assisted
25 under this section and disseminate the results thereof.

1 “(d) For the purpose of carrying out the provisions of
2 this section, there is hereby authorized to be appropriated
3 \$2,000,000 for the fiscal year ending June 30, 1971, and
4 \$10,000,000 for each of the succeeding fiscal years ending
5 prior to July 1, 1973.’”

6 On page 7, redesignate section 6 as section 4.

7 On page 8, strike out all that appears on line 13 and all
8 that follows down through line 5 on page 5.

91ST CONGRESS
2D SESSION

S. 3151

IN THE SENATE OF THE UNITED STATES

MAY 6 (legislative day, MAY 5), 1970

Referred to the Committee on Labor and Public Welfare and ordered to be printed

AMENDMENTS

Intended to be proposed by Mr. CRANSTON to S. 3151, a bill to authorize the United States Commissioner of Education to establish educational programs to encourage understanding of policies and support of activities designed to enhance environmental quality and maintain ecological balance, viz:

1 On page 8, after line 25, insert the following:

2 "POPULATION FACTOR

3 "SEC. 9. In carrying out the purposes of this Act to en-
4 hance environmental quality and maintain ecological bal-
5 ance, the Commissioner shall insure that full consideration
6 is afforded to the relationship of population to environmental
7 deterioration and ecological imbalance."

8 On page 9, line 2, strike out "SEC. 9" and insert in lieu
9 thereof "SEC. 10".

Amdt. No. 614

91ST CONGRESS
1ST SESSION

S. 3237

IN THE SENATE OF THE UNITED STATES

DECEMBER 11, 1969

Mr. GOODELL (for himself, Mr. BROOKE, Mr. CANNON, Mr. HATFIELD, Mr. JAVITS, Mr. PACKWOOD, Mr. PERCY, Mr. SAXBE, and Mr. SCOTT) introduced the following bill; which was read twice and referred to the Committee on Labor and Public Welfare

A BILL

To authorize the Secretary of Health, Education, and Welfare to make grants to conduct special educational programs and activities concerning ecological-environmental education, and to establish a National Advisory Commission on Technology and the Environment.

- 1 *Be it enacted by the Senate and House of Representa-*
- 2 *tives of the United States of America in Congress assembled,*
- 3 That this Act may be cited as the "Environmental Reclama-
- 4 tion Education Act of 1969".

VII—O

TITLE I—ECOLOGICAL-ENVIRONMENTAL
EDUCATION PROGRAMS

STATEMENT OF PURPOSE

SEC. 101. (a) The Congress hereby finds and declares that air and water pollution, environmental debasement, industrial and technological development which interferes with the ecological cycle, and the denuding of our land poses a serious threat to the health, strength, and vitality of the people of our Nation, the propagation and protection of plant and animal life and the protection of property and other resources; that the tremendous growth of population and industry has resulted in substantial increases in atmospheric waste, and air and water pollution throughout the United States; that such abuse of the environment and interference with the ecological cycle is increasing, particularly in our urban and suburban areas; that there is a lack of authoritative information and creative projects designed to educate the American people about meeting the threat posed to our environment and to life itself, by industrialization and technological development, undertaken without regard to their long-term effects and upon our environment and the ecological cycle; and that public support and understanding of the need for prevention and control of such environmental abuse requires intensive and coordinated efforts on the part of Federal, State, and local governmental agencies, business

1 and other private organizations, and community action
2 groups.

3 (b) It is the purpose of this title to encourage the
4 development of new and improved programs in the field of
5 ecological-environmental education for use in State and local
6 school systems, institutions of higher education, adult educa-
7 tion courses, community action programs, and in educational
8 television programing; to encourage the development of
9 curricula and teacher training programs in such field at all
10 educational levels, including community education programs;
11 and to demonstrate the use of such curricula in model edu-
12 cational programs and to evaluate the effectiveness thereof.

13 AUTHORIZATION OF APPROPRIATIONS

14 SEC. 102. There are hereby authorized to be appropri-
15 ated \$10,000,000 for the fiscal year beginning July 1, 1970,
16 \$12,000,000 for the fiscal year beginning July 1, 1971,
17 and \$15,000,000 for the fiscal year beginning July 1, 1972,
18 for the purposes of carrying out this title. Sums appropriated
19 pursuant to this section shall remain available until expended.

20 USES OF FUNDS

21 SEC. 103. From the sums appropriated pursuant to sec-
22 tion 102, the Secretary of Health, Education, and Welfare,
23 hereinafter referred to in this Act as the "Secretary," shall
24 assist in educating the American people on the problems of
25 environmental abuse and the long-term consequences of

1 advertent and inadvertent interference with the ecological
2 cycle by—

3 (1) making grants to or entering into contracts
4 with institutions of higher education and other public
5 and private agencies, institutions, or organizations, for—

6 (A) the development and implementation of
7 ecological-environmental education programs, in-
8 cluding curriculum development, for use in State and
9 local school systems, institutions of higher education,
10 community education programs, including seminars,
11 workshops, conferences and summer camps, and in
12 educational television;

13 (B) the formulation and organization within
14 institutions of higher education of integrated courses
15 of study in the field of ecological-environmental edu-
16 cation leading toward the establishment of degree-
17 granting programs in such field;

18 (C) the development of specialized teacher
19 training program in the field of ecological-enviro-
20 nmental education at all educational levels;

21 (D) the establishment of a system of regional
22 ecological-environmental education centers, which
23 shall develop, collect, and disseminate to the general
24 public information, materials, data, and statistics
25 concerning—

- 1 (i) the specific ecological-environmental
- 2 problems peculiar to their particular regions;
- 3 (ii) the nature, sources, causes, extent,
- 4 prevention, control, and abatement of air and
- 5 water pollution and activities affecting undesir-
- 6 able environmental and ecologic change;
- 7 (iii) established requirements for the con-
- 8 trol of emissions of air contaminants and water
- 9 pollutants, including relevant State and local
- 10 laws and public hearing requirements, and the
- 11 enforcement thereof;
- 12 (iv) the present and prospective impact of
- 13 technology upon the environment and the eco-
- 14 logical cycle;
- 15 (v) methods for monitoring atmospheric
- 16 waste, the measurement and forecasting of air
- 17 and water pollution and the identification of
- 18 significant meteorological, geographical and eco-
- 19 logical factors within their particular regions;
- 20 and
- 21 (vi) environmental and ecological factors
- 22 related to long term urban and regional plan-
- 23 ning; and
- 24 (E) the establishment of State and local coun-

1 cils to encourage ecological-environmental education
2 among the general public; utilizing the resources of
3 institutions of higher education, schools and regional
4 education centers created pursuant to clause 1 (D)
5 of this section; and

6 (2) undertaking, directly or through contracts or
7 other arrangements with institutions of higher education,
8 and public and private agencies, institutions and organi-
9 zations, evaluation of the effectiveness and relevance of
10 the program funded pursuant to clause (1) of this
11 section.

12 ADVISORY COUNCIL ON ECOLOGICAL-ENVIRONMENTAL
13 EDUCATION

14 SEC. 104. (a) An Advisory Council on Ecological-
15 Environmental Education (hereinafter referred to as the
16 "Council") is hereby created to—

17 (1) advise the Secretary concerning the prepara-
18 tion and implementation of regulations and criteria gov-
19 erning programs funded pursuant to the provisions of this
20 title; including criteria designed to achieve an appropri-
21 ate geographical distribution of funded projects through-
22 out all regions of the nation;

23 (2) evaluate such applications for grants and con-
24 tracts made pursuant to the provisions of this title as the
25 Secretary may direct, and make recommendations to the

1 Secretary concerning approval or disapproval of such
2 applications;

3 (3) review the administration and operation of
4 programs funded pursuant to this title, including the
5 effectiveness of such programs in meeting the purposes
6 for which they are established and operated, making
7 recommendations with respect thereto, and making
8 annual reports of its findings and recommendations to the
9 Secretary;

10 (4) receive and review progress and evaluation re-
11 ports on programs and projects carried out under this
12 title; and

13 (5) propose comprehensive ecological-envi-
14 ronmental education goals toward which unified national
15 action can be directed.

16 (b) The Council shall consist of twenty-one members,
17 including the Secretary of Housing and Urban Development,
18 the Secretary of Transportation, and the Secretary of the In-
19 terior or their duly designated nominees, the Science Adviser
20 to the President, the Chairman, President's Council on En-
21 vironmental Quality, the United States Commissioner of Ed-
22 ucation, the Surgeon General of the United States, the Direc-
23 tor, United States Public Health Service, the Director, Na-
24 tional Institute of Mental Health and twelve other persons
25 appointed by the President who shall select such persons from

1 the public and private sector with due regard to their fitness,
2 knowledge and experience in academic, scientific, medical,
3 legal, conservation, urban and regional planning, and informa-
4 tion media activities, as they relate to our industrialized con-
5 sumer-oriented society, and its effect upon our environment
6 and the ecologic balance.

7 (c) Members of the Council not regularly employed by
8 the Federal Government shall, while serving on the business
9 of the Council, be entitled to receive compensation at rates
10 fixed by the Secretary, but not exceeding \$125 per day, in-
11 cluding travel time; and while so serving away from their
12 homes or regular places of business, they may be allowed
13 travel expenses, including per diem in lieu of subsistence, as
14 authorized by section 5703 of title 5 of the United States
15 Code for persons in the Government service employed
16 intermittently.

17 TECHNICAL ASSISTANCE

18 SEC. 105. The Secretary shall, when requested, render
19 technical assistance to local educational agencies, public and
20 private nonprofit organizations and institutions of higher
21 education in the development and implementation of pro-
22 grams of ecological-environmental education. Such technical
23 assistance may, among other activities, include making avail-
24 able to such agencies, organizations, or institutions personnel
25 of the Department of Health, Education, and Welfare or

1 other persons qualified to advise and assist the development
2 and carrying out of such education programs.

3 PAYMENTS

4 SEC. 106. Payments under this title may be made in
5 installments and in advance or by way of reimbursement,
6 with necessary adjustments on account of overpayments or
7 underpayments.

8 ADMINISTRATION

9 SEC. 107. In administering the provisions of this title,
10 the Secretary is authorized to utilize the services and facilities
11 of any agency of the Federal Government and of any other
12 public or private agency or institution in accordance with
13 appropriate agreements, and to pay for such services either
14 in advance or by way of reimbursement, as may be agreed
15 upon.

16 TITLE II—NATIONAL ADVISORY COMMISSION ON
17 TECHNOLOGY AND THE ENVIRONMENT

18 STATEMENT OF PURPOSE

19 SEC. 201. (a) The Congress hereby finds and declares
20 that American technology has contributed significantly to
21 the unprecedented economic and social progress of the United
22 States and its people; that technological advancement has
23 proceeded without adequate consideration of its consequences
24 upon the human environment; that industrial and techno-
25 logical advancement has created certain adverse effects upon

1 our environment and the ecological cycle upon which all life
2 depends; that new, independent, institutionalized organiza-
3 tions are needed within the Federal Government to assess on
4 a continuing basis the impact of the growth and spread of
5 various technologies upon national environmental goals and
6 resources; that decisions affecting the course of technology
7 and its long-term effects upon environment require the broad-
8 est possible public participation, and should not be delegated
9 solely to governmental, business, scientific, and political in-
10 terests; and that American technology can best promote the
11 continued economic and social advancement of the Nation, if
12 systematic assessment of the nature and effects of its develop-
13 ment is undertaken.

14 (b) It is the purpose of this title to create an advisory
15 commission to investigate, analyze, and recommend methods
16 to identify deficiencies in existing processes of assessment and
17 governmental decisionmaking with respect to the evolution of
18 technology and its adverse effect upon environmental quality
19 and ecological regimes.

20 ESTABLISHMENT OF COMMISSION

21 SEC. 202. There is hereby established an Advisory
22 Commission on Technology and the Environment (herein-
23 after referred to as the "Commission").

24 MEMBERSHIP

25 SEC. 203. (a) The Commission shall be composed of
26 twenty-one members to be appointed by the President from

1 the public and private sector with due regard to their fitness,
2 knowledge, and experience in scientific, medical, legal, public
3 administration, social and physical science, business, and
4 local, State, and Federal government activities. Representa-
5 tives of the public at large shall be included. Not more than
6 eight members shall be full-time employees of the United
7 States.

8 (b) Any vacancy in the Commission shall not affect its
9 powers.

10 (c) The President shall designate one of the members
11 to serve as Chairman and one to serve as Vice Chairman of
12 the Commission.

13 (d) Eleven members of the Commission shall consti-
14 tute a quorum.

15 DUTIES OF THE COMMISSION

16 SEC. 104. (a) The Commission shall undertake a com-
17 prehensive investigation and study of the present and pros-
18 pective impact of technology upon the environment and the
19 ecological cycle, and the existing governmental processes of
20 assessment and decisionmaking with respect to the evolu-
21 tion of technology in the United States as it relates to en-
22 vironmental quality. It shall include without being limited
23 to—

24 (1) an analysis and evaluation of particular areas
25 of technology by contracting with institutions of higher

12

1 learning and other private, nonprofit organizations to
2 undertake studies of specific problems defined and se-
3 lected by it, except that such problems shall involve
4 technological developments or applications that are spon-
5 sored by the Federal Government or are otherwise af-
6 fected in a direct way by Federal activity or regulation;

7 (2) an analysis, review, and evaluation of basic
8 research on the subject of technological development and
9 its impact upon the environment;

10 (3) a review and evaluation of specific assess-
11 ments of present and future technological impact upon
12 the environment made by Government agencies and de-
13 partments, including criteria and procedures employed
14 in the assessment process, the nature and technical ade-
15 quacy of the evidence relied upon, and the representa-
16 tion of potentially affected interests; and

17 (4) an analysis and evaluation of continuing assess-
18 ment systems in relevant departments and agencies of
19 the Federal Government and in the Congress.

20 (b) The Commission shall transmit to the President and
21 to the Congress interim reports and, not later than three years
22 after the first meeting of the Commission, one final report,
23 containing detailed statements of the findings and conclu-
24 sions of the Commission, together with its recommendations,

1 including such recommendations for legislation and adminis-
2 trative action as it deems advisable.

3 POWERS OF THE COMMISSION

4 SEC. 205. (a) The Commission or, on the authorization
5 of the Commission, any subcommittee or members thereof,
6 may, for the purpose of carrying out the provisions of this
7 title, hold such hearings, take such testimony, and sit and act
8 at such times and places as the Commission deems advisable.

9 (b) Each department, agency, and instrumentality of
10 the executive branch of the Government, including inde-
11 pendent agencies, is authorized and directed to furnish to the
12 Commission, upon request made by the Chairman or Vice
13 Chairman, such information as the Commission deems neces-
14 sary to carry out its functions under this title.

15 (c) Subject to such rules and regulations as may be
16 adopted by the Commission, the Chairman shall have the
17 power to—

18 (1) appoint and fix the compensation of an Execu-
19 tive Director, and such additional staff personnel as he
20 deems necessary, without regard to the provisions of
21 title 5, United States Code, governing appointments in
22 the competitive service, and without regard to the pro-
23 visions of chapter 51 and subchapter III of chapter 53
24 of such title relating to classification and General Sched-

1 ule pay rates, but at rates not in excess of the maxi-
2 mum rate for GS-18 of General Schedule under section
3 5332 of such title, and

4 (2) procure temporary and intermittent services of
5 the same as is authorized by section 3109 of title 5,
6 United States Code, but at rates not to exceed \$50 a
7 day for individuals.

8 (d) The Commission is authorized to enter into contracts
9 with Federal or State agencies, private firms, institutions, and
10 individuals for the conduct of research or surveys, the prep-
11 aration of reports, and other activities necessary to the dis-
12 charge of its duties.

13 COMPENSATION OF MEMBERS

14 SEC. 206. Members of the Commission not otherwise
15 employed by the Federal Government shall receive compen-
16 sation at the rate of \$100 per day for each day they are
17 engaged in the performance of their duties as members of the
18 Commission. All members shall be entitled to reimbursement
19 for travel, subsistence, and other necessary expenses incurred
20 by them in the performance of their duties as members of
21 the Commission.

22 APPROPRIATIONS AUTHORIZED

23 SEC. 207. There is hereby authorized to be appropriated
24 for the purpose of this title the sum of \$1,000,000 for the
25 fiscal year beginning July 1, 1970; \$1,000,000 for the fiscal

1 year beginning July 1, 1971; and \$1,000,000 for the fiscal
2 year beginning July 1, 1972.

3 TERMINATION

4 SEC. 208. On the ninetieth day after the date of sub-
5 mission of its final report to the President, the Commission
6 shall cease to exist.

91ST CONGRESS
2D SESSION

S. 3809

IN THE SENATE OF THE UNITED STATES

MAY 6 (legislative day, MAY 5), 1970

MR. NELSON introduced the following bill; which was read twice and referred to the Committee on Labor and Public Welfare

A BILL

To authorize the Commissioner of Education to award fellowships to persons preparing for environmental careers.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*
3 That this Act may be cited as the "Environmental Career
4 Fellowships Act".

5 AWARD OF FELLOWSHIPS

6 SEC. 2. The Commissioner of Education is authorized
7 to award fellowships in accordance with the provisions of this
8 Act for graduate or professional study for persons who plan
9 to pursue environmental careers, in such fields as ecology,
10 hydrology, chemistry, biology, and engineering related to the
11 control of environmental pollution.

1 ALLOCATION OF FELLOWSHIPS

2 SEC. 3. The Commissioner shall allocate fellowships
3 under this Act among institutions of higher education with
4 programs approved under the provisions of this Act for the
5 use of individuals accepted for study in such programs, in such
6 manner and according to such plan as will insofar as practi-
7 cable provide for an equitable distribution of such fellowships
8 throughout all regions of the Nation.

9 APPROVAL OF PROGRAMS

10 SEC. 4. The Commissioner may approve a program of
11 study as eligible for fellowships under this Act only upon
12 application by an institution of higher education and only
13 upon his finding—

14 (1) that such program has as a principal or signifi-
15 cant objective the education of persons for environmental
16 careers, including professional or technical occupations
17 for which there is a significant need in environmental
18 fields;

19 (2) that such program will expand opportunities
20 for persons to undertake graduate or professional study
21 in preparation for environmental careers;

22 (3) that such program is in effect and of high qual-
23 ity, or can readily be put into effect and may reasonably
24 be expected to be of high quality;

25 (4) that the institution provides satisfactory assur-

1 ance that it will recommend to the Commissioner, for the
2 award of fellowships under this Act, only persons who
3 have demonstrated to the satisfaction of the institution a
4 serious intent to pursue an environmental career upon
5 completing the program; and

6 (5) that such institution agrees to accept the cost-
7 of-education allowance provided under section 6(b) of
8 this Act in lieu of any tuition or fees which would other-
9 wise be charged to fellowship recipients for their course
10 of study.

11 PROGRAM DEVELOPMENT GRANTS

12 SEC. 5. In order to expand the number of opportunities
13 for graduate and professional study for persons preparing to
14 serve in environmental careers and to achieve an appropriate
15 geographical distribution of high quality programs offering
16 such opportunities, the Commissioner is authorized to make
17 grants to or contracts with institutions of higher education to
18 pay part of the cost of developing or strengthening pro-
19 grams of graduate or professional study which meet, or as a
20 result of the assistance received under this section will be
21 enabled to meet, the requirements for an approved fellow-
22 ship program in accordance with section 4 of this Act.

23 STIPENDS AND COST-OF-EDUCATION ALLOWANCES

24 SEC. 6. (a) The Commissioner shall pay persons
25 awarded fellowships under this Act such stipends (including

1 such allowances for subsistence and other expenses for such
2 persons and their dependents) as he may determine to be
3 consistent with prevailing practices under comparable fed-
4 erally supported programs.

5 (b) The Commissioner shall (in addition to the stipends
6 paid to persons under subsection (a)) pay to the institution
7 of higher education at which such person is pursuing his
8 course of study a cost-of-education allowance of such amount
9 as the Commissioner may determine to be consistent with
10 prevailing practices under comparable federally supported
11 programs.

12 AUTHORIZATION OF APPROPRIATIONS

13 SEC. 7. For the purpose of carrying out this Act, there
14 are authorized to be appropriated \$50,000,000 for the fiscal
15 year ending June 30, 1971, \$100,000,000 for the fiscal year
16 ending June 30, 1972, \$150,000,000 for the fiscal year
17 ending June 30, 1973, and \$200,000,000 for each succeed-
18 ing fiscal year.

Senator PELL. The first witness today is Senator Nelson who is a member of the full Labor and Public Welfare Committee. I hope that he will participate in these subcommittee hearings. I will ask him to open as he sees fit.

**STATEMENT OF HON. GAYLORD NELSON, A U.S. SENATOR FROM
THE STATE OF WISCONSIN**

Senator NELSON. Thank you very much, Mr. Chairman.

I wish to comment on two acts that are before your subcommittee. They are S. 3151, the Environmental Quality Education Act, as amended by yourself, Mr. Chairman, and others, and S. 3809, the Environmental Careers Fellowship Act. If both were enacted, they would provide the Office of Education with a firm mandate for a new thrust in the national education field.

The objective of the Environmental Quality Education Act is to establish an education program that will develop an awareness and understanding that man is very much a part of the world in which he lives and that if he degrades, diminishes, wastes or misuses the earth's vital resources he threatens his survival and that of all living things.

The issue is not only one of survival but the quality of the environment in which we do survive.

The quality of that survival is inextricably bound to the science of ecology which is concerned with all the ramifications of all the relationships of all living things to each other and their environment.

It is a concern with the total ecosystem not just of how we dispose of tin cans, bottles, and garbage. It is concerned with the habitat of marine creatures, animals, birds, and man. Our goal is not just the environment of clean air and water and scenic beauty while forgetting about the Appalachias and the ghettos where our citizens live in America's worst environment.

Our goal must be an environment of decency, quality, and mutual respect for all living creatures.

It will not, however, be possible to understand much less develop these broad national environmental policies until the relationship between man, nature, and the artificial world are totally reexamined.

Our attitudes, values, and modes of behavior need to be modified but that cannot be accomplished until we face the new realities of a society in danger from its own environmental destruction.

The educational process is the only way to develop that understanding and commitment. The world is no longer a limitless frontier and man no longer has the luxury of stripping one site of its resources to move on to the next virgin territory.

Unfortunately that has been man's way for too long and it comes most naturally to him. To change his attitudes and develop a conscious ethic which says man must not destroy and despoil his environment because he is only a part of the delicate balance will require a major educational effort.

Mr. Chairman, I would like to ask that the full statement be printed in the record and that I may just read some excerpts from it. I also request that responses to questioning on environmental education submitted to me be printed in the hearing record.

Senator PELL. It will be printed in the record.

(The statements referred to follow the testimony; the responses to the questionnaire will be found at the end of the hearing record:)

PREPARED STATEMENT BY HON. GAYLORD NELSON, A U.S. SENATOR FROM THE STATE OF WISCONSIN

Mr. Chairman, it is a pleasure to appear before the Subcommittee on Education and testify on the subject of environmental education. The two bills which I have introduced, S. 3151, the Environmental Quality Education Act, as amended by yourself and others and, S. 3809, the Environmental Careers Fellowship Act, would, if enacted, provide the Office of Education with a firm mandate for a new thrust in national education. At present this agency does not have any congressional recognition in the field of environmental studies—without such a commitment the intentions of today could fade tomorrow.

The objective of the environmental education act is to establish an education program that will develop an awareness and understanding that man is very much a part of the world in which he lives and that if he degrades, diminishes, wastes, or misuses the earth's vital resources he threatens his survival and that of all living things. The issue is not only one of survival but the quality of the environment in which we survive.

And the quality of that survival is inextricably bound to the science of ecology which is concerned with all the ramifications of all the relationships of all living things to each other and their environment. It is concerned with the total ecosystem, not just how we dispose of our tin cans, bottles, and sewage. It is concerned with the habitat of marine creatures, animals, birds and man. And our goal is not just an environment of clean air and water and scenic beauty, while forgetting the Appalachians and the ghettos where our citizens live in America's worst environment.

Our goal must be an environment of decency, quality, and mutual respect for all living creatures.

It will not, however, be possible to understand, much less develop these broad national environmental policies until the relationships between man, nature, and the artificial world are totally reexamined. Our attitudes, values, and modes of behavior will need to be modified, but that cannot be accomplished until we face the new realities of a society in danger from its own environmental destruction. The educational process is the only way to develop that understanding and commitment.

The world is no longer a limitless frontier and man no longer has the luxury of stripping one site of its resources, to move on the next virgin territory. Unfortunately, that has been man's way for too long and it comes most naturally to him. To change his attitudes and to develop a conscious ethic that says man must not destroy and despoil his environment because he is only a part of the delicate balance, will require a major educational effort.

The beginning of such an educational effort started in April. Last September, I proposed that April 22 be set aside as a day for a national educational effort called Earth Day. The idea of Earth Day was to make the question of the environmental crisis—the pollution of the air and water, the wasting of the natural resources and the ugliness of waste and unplanning—an educational experience for Americans.

There was a tremendous response to Earth Day. Millions of people on and off the college campuses began expressing their concern in a multitude of ways. In New York City, for example, Mayor Lindsay ordered motorized traffic from the streets along a section of Fifth Avenue, and thousands promenaded in a happy, festive air. Parades and demonstrations were held and a few State legislatures began working on important environmental legislation. In all, it was estimated that more than 2,000 colleges, 10,000 high schools and uncounted thousands of community organizations participated in the new educational process with plans to continue and learn more to become active participants in restoring and saving the environment. The turnout was a clear mandate for Congress, the administration, and the country that the staggering challenge of environmental reform and protection was a goal for which people of vastly differing viewpoints, philosophies and ideas were ready to join in fighting.

On November 19 of last year, I introduced the Environmental Quality Education Act. The measure, which now has 24 cosponsors, was drafted and first introduced in the Congress by Congressman John Brademas. As chairman of the House Select Subcommittee on Education, Mr. Brademas has held extensive hearings

on the bill during March, April, and May. If enacted, the proposal would be a first step toward making every day a national environmental teach-in day. In general the act authorizes the Commissioner of Education to establish educational programs to encourage understanding of policies and support of activities designed to enhance environmental quality and maintain ecological balance. Congress recognizes, of course, that the great dirge about the deteriorating environment stands in sharp contrast to the lack of understanding and the inadequate resources—both human and physical—for educating citizens in this area. The purpose of the Environmental Quality Act is to offer programs from the preschool to senior citizen level available to all social and economic classes along with training programs for teachers, and other personnel in the public and private sectors.

Specifically, the Commissioner can fund proposals from institutions of higher learning and other public or private agencies for the development of environmental curricula for elementary, secondary, university, and adult and community education programs. These curricula will necessarily deal with the important relationships between man, nature and the manmade world. They will use the environment more as a teaching resource than it generally has been used in the past.

Curricula demonstration, evaluation and dissemination of materials and other information fill out the role of the Office of Education in this area. Obviously any effective curricula, regardless of where it was designed or developed should be made available by the Office of Education to other sections of the country.

Preservice and inservice teacher training programs come under the authority of the act in a variety of ways, summer workshops, new courses of study, symposiums, seminars and conferences. Without adequate teacher training the best curriculum will never be used. The act would be particularly helpful to the Office of Education since it has virtually no authority to prepare undergraduate teachers. The mass media also has a role. Materials such as video tapes, films, and related teaching guides can, through TV, for example, get the message across in imaginative and useful ways.

The Environmental Quality Education Act would also create an Advisory Committee on Environmental Education, composed of 21 distinguished persons who are familiar with education, information media, and the problems of environment and ecological balance. The Committee would advise on the administration of the program, make recommendations on the allocation of funds, review applications and evaluate programs and projects carried out under the act.

On May 6, the same day, Mr. Chairman, that you offered your amendment to S. 3151, I introduced S. 3809, the Environment Careers Fellowship Act. If enacted, the Commissioner is authorized to award fellowships for professional study for persons who plan to pursue environmental careers. Such new fields as urban ecology and environmental law are within the scope of this legislation as are the more traditional disciplines of hydrology, chemistry, biology and the science of ecology. In order for students to obtain a fellowship they must be entering a program that has the depth and the quality that will produce a polished, sophisticated professional.

In addition the Office of Education can pay part of the cost of developing or strengthening programs of graduate study. These developmental grants would increase the number of institutions in the Nation that would qualify under the provisions of the act and, therefore, achieve a more appropriate geographical distribution of high quality programs. The measure calls for authorizations, beginning with fiscal year 1971 of \$50 million, \$100 million, \$150 million and \$200 million for each succeeding year.

A survey published in the May 1967 issue of Occupational Outlook Quarterly projected an increase in just state and local requirements for sanitation engineers, hydrologists, chemists and biologists from 172,000 in 1964 to 320,000 in 1975. This is a single indication of the great need for more professional environmentalists to serve in universities, public agencies and with private industry. The groundswell of concern in the deteriorating environment can subside if adequate manpower resources are available.

In response to a questionnaire on environmental education, which was submitted to individuals and organizations, many brief but incisive replies have been received. They include examples of many promising projects underway, that could be duplicated in other places. I request that these replies be made a part of the hearing record.

Environmental education is viewed from many perspectives in these replies. Overall there is a common concern shared by all; environmental education is not an isolated discipline. The primary bill before the committee, S. 3151, is designed to draw together existing knowledge to form a new foundation for education. Again and again in discussions and correspondence with experts in the field, I have found an emphasis on the need for not merely new knowledge, but for new attitudes and outlooks which will integrate existing knowledge across conventional disciplinary lines to focus on the many facets of specific environmental problems. New attitudes toward the very purposes of man on this planet will be required.

Environmental education, if it is to be fully effective, cannot be limited to the traditional study of nature and natural resources, but must also concern itself with the manmade environment and the balance between the two. The problems of our cities and rural area are intimately intertwined, as is the relationship of human endeavors to the natural environment.

Rachel Carson's theme of "reverence for life" is becoming less mystical and of more substance as our eyes are opened to havoc we have wrought under the guise of progress. A strong congressional commitment to an all-embracing program of environmental education will help us to find the new working definition of progress that is a prerequisite to the continued presence of life on this planet.

Senator NELSON. On November 19, S. 3151 was introduced. This measure now has 24 cosponsors. It was drafted and first introduced in Congress by Congressman John Brademas. As chairman of the House Select Committee on Education, Mr. Brademas has held extensive hearings on the bill during March and April and May. If enacted the proposal would be a first step toward making every day a national environmental teach-in day. In general the act authorizes the Commissioner of Education to establish educational programs to encourage understanding of policies and support of activities designed to enhance environmental quality and maintain ecological balance.

Congress recognizes, of course, that the great surge about the deteriorating environment stands in sharp contrast to the lack of understanding and the inadequate resources, both human and physical, for educating citizens in this area.

The purpose of the Environmental Quality Education Act is to offer programs from the preschool to the senior citizen level available to all social and economic groups along with training programs for teachers and other personnel in private sectors.

Specifically, the Commissioner can fund proposals from institutions of higher learning and other public or private agencies for the development of environmental curricula for elementary and secondary, university, and adult community education programs.

These curriculums will necessarily deal with the important relationships between man, nature, and the man-made world. They will use the environment more as a teaching resource than it generally has been used in the past.

Preservice and inservice teacher training programs come under the authority of the act in a variety of ways: summer workshops, new courses of study, symposiums, seminars and conferences. I might say, Mr. Chairman, I would call to your attention—I have discussed it with the Commissioner of Education, who will be testifying in a few minutes—that under subsection 3 at the bottom of page 3 the bill reads:

Making grants to institutions of higher education, local educational agencies, and other public and private organizations to provide preservice and inservice training programs on environmental quality and ecology—including courses of study, symposiums, and workshops, institutes, seminars, conferences—for teach-

ers, other educational personnel, public service personnel and community, business and industrial leaders and employees and governmental employees at State, Federal and local levels.

I believe very strongly, and I believe the Commissioner agrees with me, that it should be clear in here that this would authorize the Commissioner to give grants, stipends, tuition payments to grade school and high school teachers so that they may attend, for example, summer courses of say 3 months at an institution of higher learning to broaden their understanding of environmental education.

I think that is the intent of Congressman Brademas, I think that is the intent of the bill. But I am not sure that it is spelled out clearly enough. The Commissioner told me he would comment on it also when he testified.

If not, I would hope perhaps we could work out a perfecting amendment and submit it so that we are sure that a grade-school teacher can get an opportunity for some financial support for summer studies at institutions of higher education. I would consider that to be a very important objective in any environmental education act.

Senator PELL. When the amendment is submitted we will consider it, both in these hearings and in the executive session.

Senator NELSON. I would be glad to submit one or maybe the Commissioner would like to submit a clarification.

This act will also create an Advisory Committee on Environmental Education composed of 21 distinguished persons who are familiar with education, information media, and the problems of the environment.

On May 6, I introduced S. 3809, the Environmental Careers Fellowship Act. The objective of that is to grant fellowships to students in various scientific disciplines who are attending or who are committed to attend and will attend institutions that have broad environmental educational programs with the objective of training these students for environmental careers. Mr. Chairman, that concludes my remarks on the two bills.

Senator PELL. I thank you very much. I am particularly glad that these hearings are being held because Senator Nelson has long taken the lead in environmental problems long before it became synonymous with "Apple Pie" and "Motherhood."

He is to be congratulated by the whole community of our country as the drafter of this bill and as the organizer of Earth Day.

At this point in the record we will receive the statement of the junior Senator from Oregon, Mr. Packwood.

STATEMENT OF HON. ROBERT W. PACKWOOD, A U.S. SENATOR FROM THE STATE OF OREGON

Senator PACKWOOD. Mr. Chairman, we are considering here legislation that is absolutely essential if we are to squarely face the challenge of environmental deterioration. As you know, I cosponsored S. 3237, the bill introduced by Senator Goodell, the Environmental Reclamation Education Act of 1969.

It is significant that we have two proposals before this committee that reach to the very core of the problem facing us—education of a Nation about how to meet and conquer the enemies of pollution. The question is, "What is the best approach?"

One of the reasons I cosponsored the Goodell bill is that it named specific objectives and attacked the problems at a much higher level. For example, the program would be administered by the Secretary of Health, Education, and Welfare, and would involve, in the Advisory Council, many Cabinet and sub-Cabinet level officials. And here I would add that the Secretary of Agriculture, because of that Department's deep interest and involvement in our natural resources, should be included and indeed considered an important member of that Advisory Council. We are all familiar with the work being accomplished in the ecological and environmental areas by the Federal Extension Service and the cooperative extension services in the States in furthering education within the communities. S. 3237 would also establish regional centers for "community action and education."

However, whatever may be determined as the best method, I believe it is imperative that we do take positive action on legislation providing assistance to environmental education. There will be little gain if we merely appropriate money for research and construction, and legislate penalties, if we fail to meet the need of educating our people on this critically important subject.

Let my statement to this committee then be that regardless of what parts of the two proposals may be meshed together, I fully support the idea and urge immediate action on legislation to provide adequate assistance to environmental education at all levels. And I further believe that the subject of "population" cannot be separated from the whole topic of "environment" and so would support and urge adoption of the amendment offered by Senator Cranston to S. 3151.

Senator PELL. The next witness is Commissioner Allen, who I hope will extend our regrets to the Secretary. There are reports in the press that he is ill. I hope he is back soon.

Would you introduce the people with you?

STATEMENT OF HON. JAMES E. ALLEN, JR., COMMISSIONER OF EDUCATION; ACCOMPANIED BY DR. JOHN J. HANLON, ACTING ADMINISTRATOR, ENVIRONMENTAL HEALTH SERVICES; DR. ALBERT L. ALFORD, ASSISTANT COMMISSIONER FOR LEGISLATION; AND LOGAN SALLADA, SPECIAL ASSISTANT TO THE COMMISSIONER

Commissioner ALLEN. Thank you, Mr. Chairman, and Senator Nelson. May I present to the committee on my left Dr. Alford, Assistant Commissioner for Legislation, and on my right Mr. Logan Sallada, Special Assistant and who is heading a task force in the Office of Education on the Environmental Education, and Dr. John Hanlon, Executive Administrator of Environmental Health Services in HEW.

Mr. Chairman, I would like the privilege, if it is all right with you, to submit my full testimony for the record and then to summarize it and move quickly to the question and answer period.

Senator PELL. Without objection, that will be done.

(The prepared statement of Mr. Allen follows:)

Statement by
Honorable James E. Allen, Jr.
Assistant Secretary for Education
and
U.S. Commissioner of Education

Mr. Chairman and Members of the Subcommittee:

I welcome this opportunity to discuss the interests and activities of the United States Office of Education in environmental and ecological education, and to give my strong support to the purposes of S. 3151.

You, Mr. Chairman, and other members of the Senate are to be highly commended for the concern and leadership which you have shown with respect to the need for more intensive efforts to establish educational programs to encourage understanding of policies and support of activities designed to enhance environmental quality and maintain ecological balance.

As you know, the President has stated that--"The 1970's absolutely must be the years when America pays its debt to the past by reclaiming the purity of its air, its waters, and our living environment. It is literally now or never." Thus, the Administration is dedicated in full measure to saving and rehabilitating our fragile, threatened environment--on which our very survival depends.

The Office of Education has a special responsibility in this regard, for one of the keys to survival is education. I would like to tell the subcommittee something of our activities and plans.

Soon after I took office as Commissioner of Education, my attention was particularly drawn to the growing seriousness of the pollution problem by a very excellent short film produced by a group of our summer interns. Entitled "Crisis in the Capital: When Will We Ever Learn?", this film portrayed dramatically the serious pollution problems in the District of Columbia area. This film increased my concern about what our schools and

colleges were doing to educate our young people, and the public generally, to the tragedy of our deteriorating environment, and, more particularly, what the Office of Education was doing to encourage and promote efforts to educate for environmental improvement.

In order to have an answer to my question, I asked one of my young assistants, Mr. Logan Sallada, to chair a task force composed of staff members in the Office and to report to me on their findings.

As you might expect, the task force found the Office was supporting through its various funds a variety of programs, ranging from the most elementary forms of traditional conservation education to new efforts in life and earth sciences.

Their survey showed that one of the major sources of authority for the support of environmental-related activities was Title III of the Elementary and Secondary Education Act. Although evaluations of the ESEA title III conservation and outdoor education projects have not been completed, we do know that a number of these have emphasized the interrelationships and interdependencies of the elements of the environment and the changes resulting from man's activities. A list of those identified thus far is available for the record.

Another major source of authority is Title I of the Higher Education Act. The Office had supported over \$330,000 in projects which could reasonably be identified as making a contribution to a better understanding of our environment under this authority. These included in FY 1969, for example,

grants to Bowdoin College to produce a film on community land use in Maine; to Boston Architectural Center for a study of environmental design in community planning; and to New Mexico State University for a citizens conference on water resources.

In addition to these programs, monies provided from other OE programs, such as teacher training, manpower development, curriculum development, and graduate study have included projects related to environmental education.

In an attempt to encourage the educational community throughout the Nation to assess its responsibilities in this vital area, I addressed the American Council of Learned Societies on January 23 on this topic. In February I sent a special message to Chief State School Officers suggesting specific activities for the encouragement of environmental education which they might undertake at the State and local levels, including the development of comprehensive State plans. I should like the privilege of inserting a copy of this message in the record. In response to these actions, we have received numerous letters, telephone calls, and visits from educators and local administrators expressing strong support of our position and interest in participating in activities planned by the Office. I have been pleased to note how far some States -- California, New Jersey, Pennsylvania, and South Carolina, for example -- have gone on their own to develop State programs in environmental education.

The New Jersey plan, for example, calls for: the establishment of a State advisory committee on environmental education to advise the State Commissioner of Education on the implementation of a State-wide program; strengthening the network of State environmental education centers (they currently have four centers); and new legislation for the support of environmental education throughout the educational continuum.

South Carolina is probably farthest advanced in its efforts to develop a State-wide curriculum. The State Department of Education, in cooperation with the University of South Carolina, has just completed a six-year conservation curriculum improvement project. This project produced eight teacher's guides for grades 1-12, in science, social studies, home economics, and outdoor education. A testing program has been set up to evaluate the effectiveness of the program.

Although we did not have much latitude with FY 1970 funds, we have redirected moneys wherever possible into projects in support of environmental education. The research training program initiated a new effort to design innovative training programs for educational researchers, developers, disseminators, and evaluators to work on high priority educational programs. We have sent out requests for proposals which encourage the design and implementation of training programs in a number of substantive areas, including environmental education. We anticipate that a few such proposals will be funded in FY 70 and that others will be funded for operation in FY 71.

We have negotiated a contract with the Corporation for Public Broadcasting for the production of an important new effort in environmental education. The details of this project will be announced at a joint press conference next week.

In FY 1971 we plan to set aside \$350,000 of Cooperative Research funds for the support of a number of proposals for curriculum development and demonstration projects.

We also plan to spend a minimum of \$4 million for new efforts in environmental education. This will include an educational information dissemination and technical assistance program; the training of educational personnel; and the development of supplementary teaching materials.

In September we hope to have a major conference on environmental education resources and needs.

Last month, the Office of Education and the Department of the Interior, through its National Park Service, entered into a cooperative agreement to make optimal use of the cultural and natural resources available through that Department. We feel that this agreement will help to provide an important component in our plans for environmental education. I would request that a copy of that agreement be included in the record.

Elsewhere within HEW, the Environmental Health Service, which administers the various environmental control programs of HEW, has broad responsibilities and demonstrated capability for educating the public in ecologic problems and policies and stimulating ecological awareness throughout our society. Public education is an integral part of the agency's mission, and is being carried

on successfully.

For example, in recognition of the great need for educational curricula, EHS has awarded a contract to the Department of Health Education of the Lankenau Hospital in Philadelphia for two sets of curriculum materials to serve both elementary and secondary schools and adults. These materials are designed specifically to reflect the interrelationships involved in environmental problems and to stimulate ecological awareness in students. In addition, a contract with the American Association of Museums supports the development of museum educational techniques in human ecology.

The EHS has made a concerted effort to foster public understanding through labor, management, women's groups and service organizations, as well as conservation and health groups. It is currently working closely with the American Association of University Women, the General Federation of Women Clubs, the Federation of Public and Professional Women and the League of Women Voters to stimulate the broadest possible understanding of ecological problems. Contracts have been awarded to League of Women Voters and to the Conservation Foundation for public education in air pollution. The League has indicated its desire to extend its activities to the broader field of human ecology; and, if resources become available, this is regarded by EHS as a most valuable mechanism. Seminars sponsored with the cooperation of public service organizations have been designed, for example, to increase the understanding of student leaders; to create ecological awareness in officials dealing with housing problems, and among officials in industry and schools; and to promote broader understanding of arctic and Appalachian environmental problems.

The Administrator and his staff further the public education effort by speaking to a wide range of groups. A small staff works directly with local

organizations in regional educational activities. Various publications are reproduced to serve the needs of public education. Inexpensive educational documents were made available in quantities for the April 22 Earth Day activities. In the course of its regular public information activities, EHS works continuously with radio, TV and press to stimulate public understanding and to encourage environmental citizenship. The EHS has provided most of the information that has gone into recent TV documentaries, books and magazine articles on environmental problems. It has now in preparation a professionally produced film on man and his environment for broad public presentation. Finally, the EHS distributes numerous spot announcements for radio and TV.

In a related and important field, the Environmental Health Service is supporting a broad array of training programs to provide training for specialists in research and for professionals and technicians in the control of environmental hazards related to air pollution, solid waste management, water supply, occupational safety and health, and radiological health. This training provides for a range of occupations and is offered by colleges and universities, community colleges, and other educational institutions. In FY 69, the EHS supported 119 curriculum development grants. In addition, stipends were awarded to over 1,040 students.

The EHS also offers topical short course training in its own facilities and at field locations. These latter courses are intended primarily to update technical specialists in these fields.

Additional orientation seminars are offered for community leaders in field locations to apprise them of the nature, extent, effects and control features of environmental problems. In FY 69 over 1,200 persons received training in

air pollution subjects, 1,900 persons received training in radiological health subjects and 3,700 received training in solid waste management, water supply, occupational health and safety and other subjects. These educational and training programs represent almost 50% of the total Federal effort in the preparation of environmental workers.

Dr. Hanlon is with me **this morning** to discuss the activities of the EHS, and I'm certain that he'd be happy to answer any questions about these programs.

Turning outside the Department of Health, Education, and Welfare, I would point out the contributions the National Science Foundation is making to environmental education under its broad authority to support research and education in the sciences. The Foundation is currently financing a broad range of activities in environmental sciences. Furthermore, with a focus in its FY 71 budget on problem-oriented activities, environmental programs will receive additional emphasis. I would like to include as a part of my testimony at this point an enumeration of some of the specific National Science Foundation programs in this field.

Our current efforts, significant as they are, are but the start of what must be a prolonged and consistent drive to improve the world in which we live. I believe there is much more we need to do to stimulate and assist the education institutions in the Nation to meet the challenge of educating for environmental quality and ecological balance.

My staff has examined S. 3151, Mr. Chairman, in relation to existing authority, particularly EPDA, the Cooperative Research Act, and the Public Health Service Act. It appears that we already have most of the necessary authority to carry out the purposes of S. 3151; nevertheless, I am pleased

to tell you that the Administration does not oppose the enactment of S. 3151. We would like to propose a few amendments, however, and we will send these comments to you by letter shortly. One of the amendments will relate to the location of authority for administration of the programs under the bill. We believe that the authority should be placed in the Secretary because of the broadly based authority in this area in the Department as illustrated by the Environmental Health Service activities mentioned above.

Whether or not this particular bill is passed, however, we in the Office of Education are committed to move forward in our efforts to promote environmental education programs wherever we can.

Toward this end, I intend to ask for \$15 million in the Fiscal Year 1972 budget specifically for environmental education. Our planning at this stage calls for these funds to be allocated tentatively as follows; \$5 million for dissemination activities under Title IV, ESEA; \$7 million for the Cooperative Research Act (General Research); \$2 million for EPDA; and \$1 million for Innovative Vocational Education. These funds would be in addition to the sums already committed under these authorities for environmental education or environmental-related activities.

We will also continue to urge that State and local educational leadership focus increased attention on this field.

We will continue to coordinate our resources with those of other Federal agencies to assure the greatest possible support of environmental education. As mentioned above, we have already initiated a closer relationship with the Department of the Interior to carry out this coordination.

Again, let me express my appreciation for the attention which this committee is focusing on the urgent need to encourage increased educational activity with respect to understanding the current plight of our environment.

Commissioner ALLEN. May I say again I welcome this opportunity to just talk about this program and matters of mutual interest relating to environmental education. I certainly commend this committee for its attention to this subject. You Mr. Chairman, and of course, in particular Senator Nelson, more than any other citizen in this country have awakened the Nation's conscience to this important problem and I am delighted to have the privilege of coming before you this morning.

I also note that Senator Goodell is to be here and has supported programs in this field and he, too, has made a substantial contribution to increasing concern for environmental education and for a general attack on the problems of the environment. Certainly an attack on environmental problems is a matter of high priority in this administration. The President has made that very clear in his address of last January and with other actions he has taken.

Education is a key to the effort and the Office of Education has made environmental education a major objective. As I have indicated, I have a task force in the office that has now been operating for several months headed by Mr. Logan Sallada.

This task force has been coordinating the efforts of the office in this field and has recently put together a report for me on the concepts of environmental education and some of the direction which we ought to take. I am going to ask the privilege of submitting a copy of this report Mr. Chairman, to this committee.

Senator PELL. How long a report is it?

Commissioner ALLEN. It is a rather extensive report, something of this size. But we will submit it for your staff and you may decide what you wish to do with it.

Senator PELL. Fine, and if it is not too long we will put it in the Record.

(The information referred to follows:)

A NEW ROLE
FOR
AMERICAN EDUCATION

MAY 19, 1970

OFFICE OF EDUCATION
DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
WASHINGTON, D.C. 20202

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I. MAN AND HIS ENVIRONMENT

At first man lived in harmony with his environment and was governed by it. Then he acquired tools and fire and he began to change the world about himself, for his own purposes and to his own end. While his numbers were few, his environment was sufficiently flexible to restore itself after his passage. Then man discovered agriculture and gained a relative abundance of food and clothing, and he established homes and then cities. With the beginnings of civilization and his growing weight, in numbers and influence, man changed his environment irrevocably.

Babylon and Nineveh rose to dizzy heights and then fell into ruins because their inhabitants lost their agricultural base through erosion and leaching of the soil and siltation of irrigation systems. The great centers of Mayan learning reverted to jungle for these or some other ecological reasons. The story was repeated in Africa and Asia. Civilization never struck a balance with its environment (except in a few instances and to some degree, as in pre-industrial Japan).

The lessons of history are learned slowly. In America, our teachers have included Henry David Thoreau, John Muir, Theodore Roosevelt, and Aldo Leopold. Their message is that our environment is fragile, our resources are finite. Through our great numbers and insatiable demands, and with the power of science and technology, we disrupt the essential balance and interdependence of life. Black smoke and yellow fumes have polluted our atmosphere. Our lakes and rivers die from phosphates in household wastes and nitrates washed from the soil. We cover the Earth with concrete and steel. For many millions of people, living has become mere existence. Many "lesser" species have become extinct, and mankind (seemingly) races toward the same fate.

The ultimate problem (when we consider the awesome potentials of atomic devices) is survival. The immediate goal is humane living. The issue is learning about man's relationships with nature, his dependence upon his environment, the effect of his decisions and his actions upon his world. We must acknowledge and accept the need for new attitudes, a new philosophy of life, and new ways to live. These are the dictates of human ecology.

A. Overwhelming Technology

Science and technology have given us the capability of radically changing our environment. Today we have many well known examples, ranging from the effects of strip mining in Pennsylvania and West Virginia to the surprising tenacity and spread of DDT. DDT, principally used on agricultural land in the United States, is now found in the tissues of penguins at the South Pole and in polar bears at the North Pole. The watertable in many areas continues to fall, not merely from water-use but because we divert rain runoff to the sea. A large region in the Atlantic, off New York, is without life as a result of dumping sewage. Oxygen recycling plankton in vast areas of the ocean have died abruptly from herbicides and pesticides washed off the land.

Catastrophes greater than these have been projected, and the possibilities are real. The sobering truth is, as Garrett Hardin of the University of California writes, "We can never do merely one thing." The reactions and interactions of everything mankind does are great and can never be known fully.

B. American Consumerism.

Two hundred million high-living Americans consume half of the world's harvest of resources. As a people, we recklessly and thoughtlessly consume our natural birthright in land, water, air and minerals without much thought for tomorrow. We seem to believe that new resources will be found and corrective and recycling technologies developed to solve our problems and fill our needs. With 70,000,000 autos and trucks in the United States, the environmental burden goes far beyond the materials used in their manufacture and affects the quality of life through stress, usurpation of space, and pollution (each year these cars put in the air a hundred million tons of carbon monoxide).

The importance of wise decision making, reflecting an understanding of the effects of technology and consumerism and the realities of human ecology and environment, must be recognized and understood by each one of us. It is our individual decision on each everyday matter which adds up to become national problems...or answers. For example, when we purchase detergent we should stop to consider

its phosphate content. When we start out to go some place by car, we should remind ourselves of the alternatives (walking may be more healthful, and mass transportation is ultimately the best way to go to work in the inner city).

The problem is our present way of life. A new life style is called for, based on the requirements of "human ecology," and we must learn to live in harmony with nature and with our world. Finding the way is not the government's responsibility. It is not merely our neighbor's attitude and manner of living which needs alteration, it is our own. As Pogo says: "The enemy is us."

II. ENVIRONMENTAL/ECOLOGICAL EDUCATION

As man is the only living thing which can consciously manipulate, control, wisely use, preserve or destroy his environment, it is vital that he gain a knowledge of his actions--and their environmental consequences --from his formal and nonformal education.

Today we have the scientific and technological "know-how" to solve most if not all of our environmental problems. But decisions regarding man's use of his environment are seldom based on purely scientific knowledge. Virtually all of our decisions are based on economic feasibility, political expediency, social desirability, or religious belief. It has now become impossible to make wise decisions about our environment without an understanding of economics, political science, sociology, and the humanities, as well as science.

For this reason, concerned educators have begun to use the term environmental education in lieu of the long-standing "conservation education", "outdoor education", and "resource management". To use this new term is to take a holistic or integrated approach, to include interdisciplinary or multidisciplinary concepts, methods, innovations, and institutions.

The Office of Education has chosen the broader term "Environmental/Ecological Education" (EEE), free of bias and conventional symbols, to describe the new thinking. EEE is the way to increase the individual's awareness, appreciation, understanding, motivation for action, and skills necessary to maintain his world and to enjoy life. To be successful in this important mission, American education must formulate a strategy that is addressed to the individual in his own environment. Such a strategy will require an increase in the level of wise and progressive decision making by all citizens in all communities on all issues.

Tomorrow's education must do more than develop a keener perception of the environment, it must also persuade a generation to be so conditioned to their ecosystem that their behavior will clearly indicate a high sensitivity to any activity which is potentially harmful to the environment. This conditioned response has to function as successfully as the psychomotor mechanism we use when we automatically stop our car at a red light or when we make a split-second decision concerning a yellow traffic signal.

All Americans should be given the opportunity through programs of environmental education to develop ecological values that are equal to or greater than the political, social, economic and religious values that have been the

basis for human decision-making processes. Changes in attitudes and behavior must come as expressions of individual choice, and hopefully our educational programs will provide sufficient information to create awareness of environmentally desirable options.

As we develop national goals, objectives and strategies in environmental/ecological education (accepting the need for developing a new philosophy of life and new life styles) our political heritage calls for two major assumptions. They are:

- o Educational activity must work within the framework of democratic government, which has as its tenet the freedom of individual choice and respect for the individual person.
- o Efforts in environmental/ecological education will not be dogmatic with respect to existing social or religious values--or coerce behavior-- but will offer alternatives in a context of balance and perspective which may lead to better decision making.

III. THE ENVIRONMENTAL/ECOLOGICAL EDUCATION CONTINUUM

The environmental/ecological education continuum is a term that is used to describe the range of teaching-learning activities at each level of education that should be initiated if America is to learn to live within an ecologically sound context.

There is no question that such an environmental approach to education is underway throughout the Nation. Some individuals and communities working to accomplish an almost universally felt need in this area are well-informed, competent, confident and inventive in their approach. Most of these new educational activities, therefore, may and should be initiated at the local and State level. Initiation and coordination of some activities will be appropriate for regional and national effort.

Many sources are available to assist local and State planning efforts in environmental/ecological education. One of these is the Environmental Policy Act (P.L. 91-190), which has specified four comprehensive objectives:

- o Promote harmony between man and his environment.
- o Reverse the degradation of our environment and biosphere.
- o Stimulate the health and welfare of man.
- o Enrich the understanding of the ecological system and

natural resources important to the nation.

Each of these objectives has an educational component, either in the area of general education or for vocational and technical education. They serve as points of reference for development of neighborhood, community, county, State, regional and national goals.

A. Programs of Environmental Education

Programs of Environmental/Ecological Education will involve the entire American educational system, both formal and nonformal. A formal educational system in this context is one which is targeted on specific student-teacher relationships, through specific curricula. A nonformal system is less definitive and structured and is directed toward the public at large, or particular segments of the general public.

1. Formal Education: The formal education system, from pre-school through continuing education, will directly affect over 50 percent of the American population in this decade. Initially, the principal effort in environmental education should be that of developing supplementary materials that are designed

for the traditional curricula such as English, biology, mathematics and history. In addition, the development of new curricula for nearly all teaching and learning situations should be initiated. The approach is to infuse environmental/ecological concepts into all studies which lend themselves to changing man's life style to one of harmony with his world.

Another approach for school systems might be that of developing a special environmental curriculum through which the traditional subjects would be learned. A third approach, but less desirable at the primary and secondary level, would be the creation of a new course called environmental studies.

The challenge for formal education is the establishment of curricula with relevant ecological content, presented in a way to meet the present high motivation of students. This means that we must take advantage of all opportunities to relate learning experiences to actual environmental improvement

and problem solving in the community (frequently referred to as "issue orientation").

The school must divorce itself from the traditional classroom concept and expand its frame of reference to make full use of all community resources in the curriculum. Environmental study areas, museums, libraries, business and industry, and local government agencies all have a role to play in formal education. The school administrators and teachers should orchestrate these resources into a workable curriculum rather than concentrating on classroom materials. To accomplish this, it is imperative that a close working relationship (and frequent dialogue) be established among students, educators, businessmen, union leaders, and representatives of government at the local, State and regional levels. This will assist in formulating educational programs and activities that are relevant to real life issues...and give students the values, attitudes, and methods they will need to

solve present and future problems deriving from pollution, increasing population, growing technology, and other environmental issues.

If the schools do not accomplish these reforms, educators will continue to look on in dismay as highly active youth take to the streets in their frustration. "Confrontation" is a phenomenon which stems directly from the belief of young people that decisions affecting their lives and their future are being made by an establishment out of touch with the realities of human ecology.

As the implementation of Environmental/Ecological Education requires reform in our present formal system, we may wish to review some of the issues currently being considered.

These include:

- o School programs would relate positively to local and national problems.
- o Education would become more problem-oriented (and objective-oriented) rather than discipline-oriented.

- o Processes of teaching and learning would be more important than content.
- o Most effective learning may occur outside of the schoolroom, in business offices, industrial plants, parks, museums, and facilities of local and State agencies, with the school serving as the coordinating center.
- o Education may be released from the dictates of credentials and time orientation.
- o The "system" would increasingly reflect integration, continuity, flexibility, openness, feedback, experimentation, and acceptance of change.
- o Education would accept accountability for its product: balanced and informed citizens who are capable of functioning effectively in society.

2. Nonformal Education: Reaching important segments of the general public (and in some cases the entire population of a locality) with Environmental/Ecological Education programs is a major responsibility of local and national media, volunteer agencies, business and

industry, and other private organizations.

It is essential that both local and network television, radio, film studios, newspapers, magazines, and book publishers contribute increasingly to informing the public about critical environmental problems and their possible solutions. In addition, the advertising and promotional resources of business and industry may be directed toward environmental/ecological issues.

Many private and volunteer organizations look to school facilities and personnel--as well as to the children, their parents, youth, and others directly related to the educational activities of the schools--for full utilization of the programs and activities these groups offer. These programs presently include square dances, spring and winter festivals, musical and dramatic productions, nature hikes and bird walks, and similar activities. In addition, museums and libraries frequently arrange for special exhibits, films, or discussions of interest to general or special groups. Increasingly, as part of a comprehensive effort in environmental

education, these voluntary and private agencies may wish to orient their programs toward EEE objectives and to plan them in cooperation with local schools and colleges capable of providing assistance and publicity.

It would be desirable for a national organization to accept as its primary task the creative role of encouraging, advising and assisting private organizations and business to orient their considerable resources in nonformal education, information, promotion and advertising toward EEE objectives.

The role of the local school system as coordinator of nonformal education should be emphasized. Everyone can recall situations in their hometowns and communities where administrative staff and teachers of local schools have contributed their talents and services, as well as the school facilities, to worthwhile community projects such as curtailing drug abuse. A vastly broadened activity of this nature is called for if all the varied educational resources of any community are

to be coordinated in a nonformal EEE effort.

Nonformal environmental education, sparked by local schools, may include sponsorship of seminars, briefings for businessmen and community leaders, public forums and exhibits, informational programs and contributions to media, operation of centers for volunteer activities, and development of clearing-houses for environmental information. Correlation is the key to full utilization of community resources, and the local school system may be the best or only public agency available to carry out the responsibility.

B. Training Programs

The need for trained personnel in all branches of EEE is critical. This includes the training of educational personnel, environmental management technicians, and other professions in general.

1. Educational Personnel Training: Environmental education has emerged as the synthesis of widely diverse disciplines. The preparation of educational personnel requires recognition of the opportunity and the unique circumstances surrounding the

potentials for environmental education.

The present generation of educators faces a challenge in environmental education which is typical of this age. Frequently, students are as concerned, committed, and knowledgeable as their teachers. Through TV and other media, they may learn even faster than their teachers. This calls for a new learning-teaching style, a more informal instructional setting which is conducive to problem-solving approaches to learning, and, finally, extensive cooperation among all staff members of the school.

Teachers must be aware of environmental/ecological concepts and issues, and should be given the opportunity to develop necessary skills through in-service training programs. They should also be involved directly in the development of environmental curricula. Teacher training programs must also be redesigned to prepare new teachers for the challenge and responsibility of EEE. To be effective in this new role, the teacher must render support to and be supported from three areas:

- o Administrators and Supervisors must be attuned to the new strategies required

in EEE. Well prepared teachers cannot work effectively if the system does not support them. This calls for a flexibility of response from the system and from individual administrators.

- o The librarian must be prepared to keep the teacher informed of current, as well as new and developing resources in EEE. This is a necessary link between the individual school building and the local, State and national network of dissemination.
- o The paraprofessional can provide valuable support both as a direct link to the community and as an informed assistant in a variety of roles within EEE. Whether they function as assistants in the library, in administration, in resource centers or in the classroom, they must attain basic awareness of the broad goals and objectives of EEE and of the significance of their task in the total program.

2. Manpower Training: The Administration has called for an expenditure of 10 billion dollars for the 1970's in the Nation's battle against pollution.

Most of these funds will go into construction and other forms of physical capital. If we are to utilize effectively these new facilities, we must make the decision now to invest in the training of people who will not only operate new plants but who are also capable of working effectively across the entire field of environmental management.

What is needed are carefully prepared short and long-range plans that examine the manpower need in qualitative terms, as well as evaluating present and required sources of supply. There is no single agency with clear authority for developing environmental manpower at the Federal level. Perhaps there shouldn't be. But there is certainly a need for coordination of the efforts in this critical field. Not to coordinate is to risk a serious duplication of efforts and resources and we have too few resources to waste.

Another aspect of the environmental manpower problem concerns the experience, training and educational requirements for employment in this rapidly emerging career field. Institutions are

doing an excellent job of training young men for productive employment in many technical fields, but the emphasis is on specific problem solving and analysis in very narrow areas. This is precisely what must be avoided in preparing people for careers that require a broad environmental perspective. Introducing change in a successful but specialized system is a difficult but necessary task.

OE must be prepared to search out and consider a number of alternative paths for developing this critical manpower. Therefore, research, evaluation and focusing a national spotlight on new, inventive and successful programs in the field of environmental manpower development will be emphasized by OE.

3. Environment and the Professions: An EEE dimension is also a necessity for professional education. As government has begun to adopt environmental quality legislation, the legal profession is now faced with an immediate need for specialized programs in environmental law in order to cope with the resulting litigation.

Certainly, those in the medical professions, the engineers, the economists, and the city planners will all need an understanding of the ecological principles that interface with their particular disciplines.

Since most professions have organized themselves into associations which hold conferences and exchange ideas in professional journals, the practicing professional can probably best be reached through his professional association.

Developing the curriculum base for the education of undergraduate and graduate degree candidates is, however, a much longer-range undertaking. Initial emphasis will be directed toward multidisciplinary change as well as the evolution of new undergraduate and graduate programs.

C. Determining Priorities

A year ago, few people recognized the full potential of the growing phenomena of environmental awareness. Fewer recognized the complexity of Environmental/Ecological

Education. The Commissioner of Education, in anticipation of the public's growing concern, called for a program of action. However, if the Office of Education and American education are to take full advantage of this unique opportunity, it is essential that the few who understand this complex field be identified and recruited to assist others to comprehend the problems and the opportunities. Those who best understand the problems and opportunities are distributed throughout the country in elementary and secondary school systems, on college or university faculties, in foundations, in business and labor, and in numerous voluntary organizations. Therefore, States should be encouraged to emphasize:

- Assessment of local education resources in and out of the school system
- Development of community/State/regional plans which will reflect the major needs of the regions.

To assist planning at the local level, OE recommends that early consideration be given to:

- o Elementary and secondary education: supplementary materials, in-service teacher training curriculum development and demonstration projects.
- o Preschool, middle school, and adult education: supplementary materials and teacher training.
- o Public awareness (becoming more observant and sensitive to ecological problems, partly through reading, listening and reviewing of media materials on the environment), especially for age 14 and above.
- o Environmental manpower development (vocational and technical) at institutions of higher education awarding two-year degrees.
- o Basic environmental education courses for college freshmen and sophomores.
- o Introduction of environmental/ecological concepts to professionals who will need to relate to these ideas (lawyers, engineers, city planners, etc.) in continuing educational programs.

Additional areas of concern are in the development of educational personnel to reach professionals in need of

environmental/ecological orientation; to develop an environmental/ecological consciousness in undergraduate and graduate students of the various professions; to assist in curriculum development and demonstration projects at the preschool, middle school and adult level; to conduct programs of environmental awareness for pre-school and elementary children; and to carry out retraining programs for environmental manpower technicians.

The Educational Continuum-Environmental/Ecological Education
(for States to use to identify their existing resources and future priorities)

Grade Level Activity	Pre- School to K	1-6	7-9	10-12	13, 14	15, 16	17-19	Con- tinuing
Supplementary Materials								
Curriculum Development								
Pilot Demonstration Projects								
Environmental Awareness					↔			
Teacher Training								
Educational Personnel Development								
Environmental Manpower Development								
Environmental Professional Development								

IV. DEVELOPING AN EDUCATIONAL RESPONSE TO THE PROBLEM

The Office of Education has taken steps toward defining its leadership role in the area of Environmental/Ecological Education. On January 23, 1970, Commissioner Allen expressed his understanding of the urgency of the problem and the necessity for an educational thrust toward its resolution. In a speech delivered before the American Council of Learned Societies, Commissioner Allen stated that: "The key to human survival is education." He stated further: "The responsibility of the government (national, State and local) is to lead...to set an example, to encourage the growth of public understanding of its activities, of public concern, of public participation...to educate, to replace confusion with knowledge, to replace concern with commitment and action." In addition to government, he said, participation of scientists, social scientists and humanists is needed.

He thus urged the establishment of Environmental/Ecological Education as a national priority, reflecting his belief that maintenance of "Quality of life" is a goal so crucial it must be addressed by all levels of the population and through all types of formal and nonformal education.

The Commissioner made Environmental/Ecological Education an agency priority and implemented this policy decision by establishing an EEE Studies Staff, a planning group to establish a five-year plan, and a temporary Task Force composed of representatives from each of the offices and operating Bureaus.

The EEE Studies Staff and the planning group have carried out a general assessment of education activities related to the goals and objectives of Environmental/Ecological Education. Experts in this field have been consulted and tentative plans developed. It has become increasingly clear to observers at the national level that considerable activity and innovation had already been initiated at the local school and community level all across the country.

Many of the most highly innovative projects at the local level deserve being called to the attention of educators in other parts of the country. The identification and spotlighting of many of these special projects, to serve as models for national consideration, sets the stage for a major role for OE in the year ahead. This approach also encourages greater participation at the local level in the vital creative and developmental aspects of environmental education.

However, if individual communities are to achieve the recognition they deserve at the State and Federal level, it is essential to provide mechanisms that reflect their interests, needs and resources. Recognizing this, Commissioner Allen invited each State to develop its own State Plan for Environmental/Ecological Education.

A. The State Plan for EEE

Increasing the level of participation at the local level achieves two specific objectives. It emphasizes the need to develop Environmental/Ecological Education that is relevant to the particular needs of the community, and-- at the same time--it carries out the mandate of the President and Congress to decentralize governmental structure (while giving coherence to the great variety of programs of the Federal agencies now involved in environmental education). The State plan should, as a beginning:

- o Provide comprehensive State recognition and support for local models by clearly defining the support and coordination activities that can be provided by State, national and other organizations.

- Develop priorities within the State for local, State and Federal funding.
- Develop programs to increase environmental awareness and disseminate information developed by other school systems.
- Coordinate all governmental and private environment activities, such as volunteer youth projects, with formal and nonformal environmental education activities of school and colleges.

B. School Systems

Each school system within a State will be asked to originate action-oriented environmental education curricula that will involve the entire range of community resources (the school system itself, local government, community organizations, and business and industry) and, where feasible, such area resources as State and National Parks, reclaimed open space in urban areas, and community colleges and universities.

A number of school systems within a State where there are promising programs may be designated as demonstration projects to serve as models.

Each school system will undoubtedly want to coordinate its activities with local or area plans for environmental action and manpower training, in order to benefit from resources which may be identified in a State plan for curriculum development activities and teacher training.

C. Environmental Action

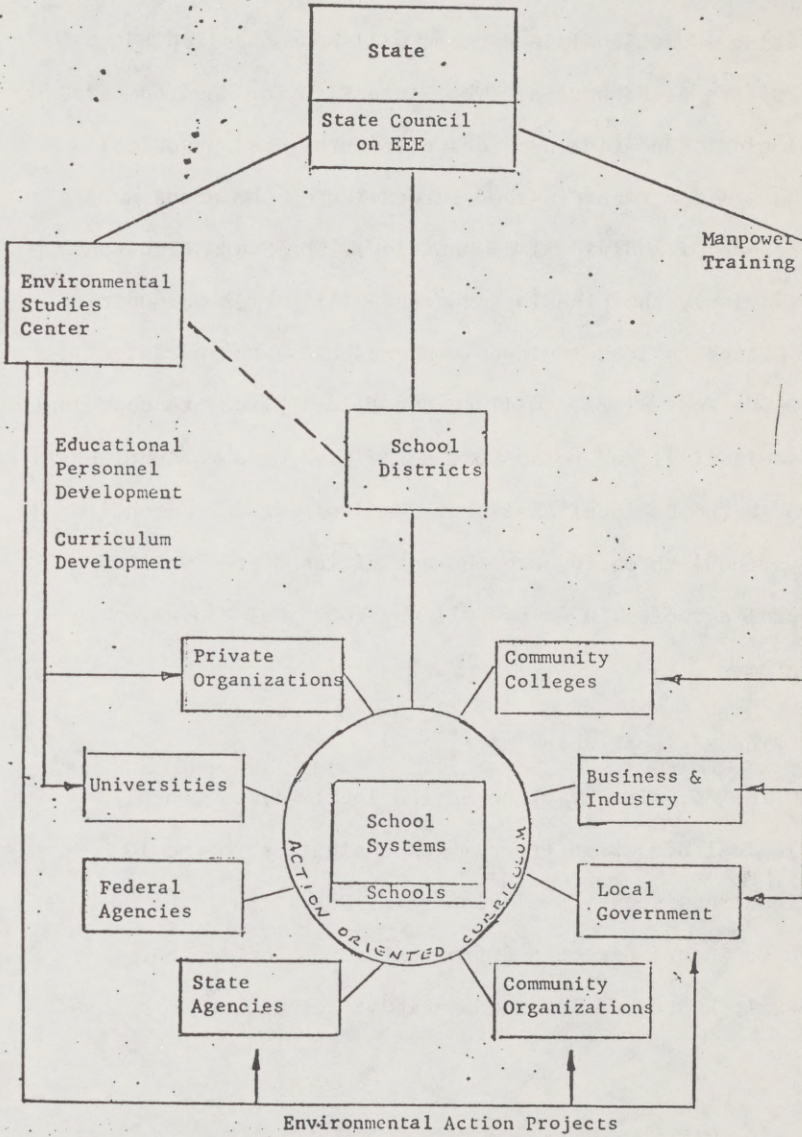
Programs of environmental action should be developed at the local level by community organizations, local governments and other appropriate organizations. Ideally, these activities will be coordinated with educational programs. For instance, an environmental action program to measure the pollution levels of a local river system could be coordinated by a State agency, with data collection by high school students as part of their curriculum and by volunteers from community organizations, and with data analysis by the students and faculty of a nearby community college as part of a manpower training program for environmental technicians.

D. State Councils of Environmental Education

A State plan would call for heads of the various State agencies to serve on a State council for environmental education, to coordinate planning and to assist local groups. Staff support should come from each of the agencies participating on the council. A principal recommendation is that an environmental study center be designated or developed in each State. The center would provide the primary staff support for the education section of the council and would also be the focal point for coordination, reference services, conferences, seminars, curriculum development, and other State-wide activities.

The State plan will consider, as a matter of course, the various other factors of Environmental/Ecological Education ranging from public awareness to manpower training. It is, therefore, a workable plan for the best use of local, county, State and Federal resources and funds.

One Alternative For Organization
For State Plans



V. FEDERAL SUPPORT FOR LOCAL INITIATIVE

Active community participation in planning and creating educational innovation will be emphasized by the Office of Education. The State Plan for Environmental/Ecological Education provides a voluntary and practical mechanism for recording and interrelating the needs and resources of individual communities. The State Plan--and particularly the planning process--will permit communities and States to identify problems, resources and needs.

The Federal role will be two-fold: First, to coordinate dissemination, and to support activities on a regional basis through the Regional Assistant Commissioner for Education; and second, to coordinate the activities of the various Federal agencies in an overall environmental education program.

A. The Regional Role

The decision by OE to assign local Environmental/Ecological Education Program responsibility to the 10 Regional Assistant Commissioners of Education is based on the need to insure direct and frequent communication between Federal, State and local educational agencies across the

Nation. The strategic location of the Commissioner's personal representatives in each of the 10 regions will permit local school leaders to seek and receive assistance for developing local and State programs in response to national goals. At the same time the Office of Education will be placed in a key position to identify, evaluate and select innovative and exciting activities developed at the local level and then call these worthy models to the attention of educators across the Nation. This direction, and some other coordinating aspects of EEE, will be the responsibility of the Washington office.

Each Regional Assistant Commissioner of Education will assist each State* in his specific geographical area to develop its own plan and will assist State educational agencies to:

- Evaluate environmental projects within the region.
- Assist with the dissemination of information within the region and between regions.

*Responsibility for working with the District of Columbia will be retained in Washington.

- o Determine priorities and specific projects within the regions for state and/or Federal funding.
- o Assist with the coordination of activities within ecological areas (watershed, etc.) that cross OE regional boundaries.
- o Develop, with EEE core staff in Washington, overall OE plans and support for environmental education.

B. National Coordination

It is necessary to create programs and working relationships between established government agencies for the purpose of more effectively utilizing existing skills and minimizing duplication of effort. Throughout the Federal government there is a vast wealth of well trained and experienced individuals with skills directly relevant to Environmental/Ecological Education.

The Office of Education's special effort in coordination will identify individuals and agencies with experience in planning. This cooperative effort will receive OE's support and is considered essential if the appropriate resources are

available to the Federal government to be effectively utilized by the Nation's schools in environmental education.

Many years ago, Switzerland recognized the need for creating or strengthening national unity and spirit in a population of diverse extraction (with language and customs derived from their respective French, German and Italian origins). Of course all these citizens of the mountain state had some cultural and historical background in common, but it was also seen that even small children noted and identified with one great heritage they all enjoyed...the natural beauty of the land itself. From a very early period, school children were consciously directed toward a love and understanding of their environment through specially designed educational nature walks and outings.

The value and considerable potential of this outdoor learning experience has been long recognized by OE, the National Park Service in its interpretive programs, and other agencies of the Federal government. In the decade of the Seventies it is anticipated that OE and Department of Interior personnel will assist local school systems in the Nation to identify and develop adequate space or

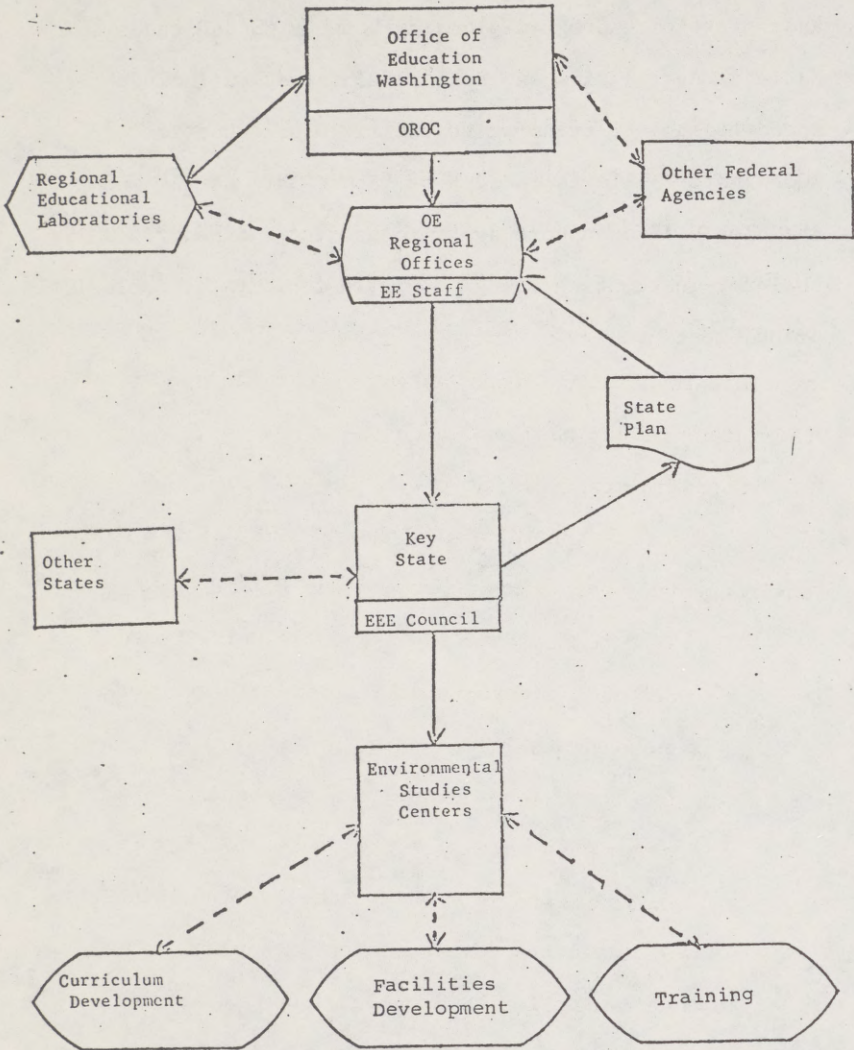
appropriate facilities for use as Environmental Study Areas.

Coordination of OE and environmental health planning carried out within the Department of Health, Education and Welfare, serves to illustrate a second example of human resource conservation. Joint planning, particularly in manpower development (such as training environmental health technicians) promises to minimize duplication of efforts, time and cost.

The planning, administration and evaluation of the Manpower Development and Training Act provides an additional example of joint cooperation between two Federal agencies in environment management. The training of individuals for employment in water pollution control represents a joint planning effort on the part of at least three Federal departments, (Labor, Interior, and HEW), several agencies and even local community water districts. Similar programs of close cooperation may be cited in areas that are the concern of the Departments of Commerce, Agriculture, Transportation, HUD, and many of the highly specialized agencies such as the National Science Foundation. Possible

areas for joint program planning between OE and the National Aeronautics and Space Administration include space technology transfer to the field of education. Buckminster Fuller's concept of "Space Ship Earth" and the closed life support system constitutes a powerful tool for instructing young people in fundamental ecological principles.

The Regional Role



VI. AN EARLY EMPHASIS ON EEE WITHIN THE OFFICE OF EDUCATION

As the Congress and the President establish the re-direction and re-emphasis of national policy toward a program of Environmental/Ecological Education, the Office of Education is creating preliminary operational procedures to support the EEE effort and is reprogramming some of its existing funds and activities in keeping with the intent of the national policy.

Specific staff activities of the Office of Education during 1970 that contribute to the initiation of a national environmental education effort are the following:

- o The Commissioner has asked all Chief State School Officers to develop State plans for environmental education.
- o One State (New Jersey) has been chosen to serve as a model project, and the Washington Office of OE is working closely with this State in the development of its plan.
- o OE's plan for environmental education will be discussed with the Chief State School

Officers.

- o OE's Regional Assistant Commissioners will be asked to work with the State in their regions during the summer on the development of their plans.
- o Each Regional Assistant Commissioner will be asked to identify one model State in his region. A significant amount of OE's effort during FY 1970 and FY 1971 will be directed toward these States so that they may provide assistance to the other States in the region.
- o OE will hold a National Conference in September, 1970 in Washington in order to provide assistance to the States in their initial efforts to develop State plans. Most of the conference will be devoted to workshops chaired by the Regional Assistant Commissioners. Consultants from the private sector, and personnel from other Federal agencies will be present.

In addition, two Office of Education program activities will provide direct support to the development of local planning efforts.

- Funds will be provided for up to 10 Regional teacher teach-ins, in the late summer of 1970. The primary purpose will be to provide teachers with additional resources for environmental education programs at the local level for the 1970-71 school year. The teach-ins will also serve to begin a dialogue between the local and the State level in the development of State plans.
- Teach-ins for administrators of manpower training programs will be conducted by the Regional Assistant Commissioners of Education. The teach-ins will be held during the fall semester of 1970 to assist administrators in planning for the development of innovative training programs in environmental management and in identifying sources of Federal State and local funding and technical

assistance. Personnel from the State departments of education in the region will be invited to participate in the programs to help insure intra-regional coordination and cooperation in carrying out a total environmental education program. Follow-up sessions to assess the progress made by the participants and to find solutions to the problems encountered will be conducted in late winter or early spring, 1971.

Other 1970 activities planned by the Office of Education are:

- o Support for the development of an educational television program on environmental education. The Office of Education has funded the initial phases of an education and dissemination program by the Corporation of Public Broadcasting. A center has been established to focus the resources of television and radio to educate the public concerning the need and

resources for improving the quality of the environment.

- o Support for the development of training programs in environmental management. The Office of Education has developed a major proposal for a comprehensive training and placement system in the emerging field of environmental management. The proposal, currently being considered by the Department of Labor for funding under the Manpower Development and Training Act, is designed to provide interchangeable technicians, trained to function in multiple occupational roles in a broad field of environmental management. The unique and inventive aspect of this project is that it provides access for the 16 year old and other young adults to post-secondary occupational education. This access is provided by the development of a new bridge over which a potential dropout

can pass directly into post-secondary education, through special programs of early admission into the local community college or similar post-secondary schools.

- o Research and development. An initial research and development effort will support pilot demonstration projects in environmental education and the development of supplementary teaching materials. Most of the projects will begin during the summer of 1970.

In addition, the Office of Education will use existing authority to provide direct program support for local efforts. The major resources include:

- o The Cooperative Research Act for the development, testing, and evaluation of curriculum and supplementary instructional materials and for the support of pilot or experimental programs and projects.
- o The Educational Personnel and Development Act for training of elementary, secondary, and post-secondary teachers.

- o The National Defense Education Act for training of prospective college and university teachers in environmental fields and for the purchase of equipment for environmental studies at all levels.
- o The Higher Education Act for assistance to developing institutions desiring to introduce programs in environmental studies and to local colleges and universities for community environmental improvement projects.
- o The Elementary and Secondary Education Act for assistance to States for the identification, development, and implementation of programs and projects at the elementary, secondary, and post-secondary levels, and under the new Title IV of that Act for technical assistance to schools and institutions planning and developing programs and for dissemination of information and materials on environmental education.

- o The Vocational Education Act (Innovative Vocational Education) for instructional program development, including research in vocational and technical education at the secondary and post-secondary levels and in teacher training in all branches of environmental management technology.

Passage and funding of the Nelson-Brademas bill for an Environmental Quality Education Act will allow greater flexibility in the area of Federal assistance for public education and community based projects; will permit in-service and preservice training for business, industry, and local government leaders; and may allow for preservice training of elementary and secondary school teachers (activities for which the Office of Education does not have specific authority). These additions to the legislative mandate of the Office are highly desirable in view of the goals, objectives and proposed strategy for environmental education. However, the absence of such authority will not prevent the Office from carrying out a meaningful program in environmental education.

It is generally agreed that the primary significance of this bill or of any education bill in this area is that of providing a recognized basis for a continuing and coordinated program effort.

Commissioner ALLEN. There are many other activities in the Office of Education and these are listed in the testimony. I will not take the time at this point to mention them all.

We have taken special pains to encourage the States and the localities, particularly the States, to begin to develop plans for environmental education and to prepare curriculum materials for the schools. Many of the States have done so.

Some have done an unusually good job and we have mentioned those in the testimony. We are going to encourage these States to become models of how States can take the lead in this important area. We are working closely with the National Park Service, with the Corps of Engineers, the Corporation for Public Broadcasting and other agencies in the Government who have a contribution to make in this field.

We are helping to fund television programs and working closely with the Park Service, which has really been a leader in thinking about this now for several years, particularly in the curriculum area and the use of the resources of the National Park Service for environmental education.

Elsewhere in HEW the Environmental Health Service which administers the various environmental control programs for the Government, is conducting educational programs for the public on ecological problems and Dr. Hanlon is here this morning and will be in a position to answer your questions about the program in his agency. The National Science Foundation is also helping in its support of research and education in the sciences and we are taking steps to encourage them to devote an increasingly larger portion of their money to this support of science in this area.

While we feel we have sufficient authority under the existing law to carry out most of the objectives of S. 3151, we welcome very strongly the bipartisan support which Congress has given the bill and we therefore support this legislation.

I believe that S. 3151 will give added strength and encouragement to our effort to improve the environmental education. I might say this position in supporting this bill is somewhat changed from the position we took in the House.

There we did not support the bill. We supported the purposes of the legislation and indicated that we felt we had the authority, but I have felt rather strongly that my office and the whole program in education in this country would be encouraged and supported greatly if we had this back of us. Even though we may not need for pure purposes of authority all of the authority granted in this bill, we feel that it is important to have it on the books.

We would like to propose, however, a few amendments, Mr. Chairman, and would like to send these up to you in a day or two. One of them I might mention is that the administration feels that the authority which is presently granted in the bill to the Commissioner with respect to preparation of materials and so on should be placed in the Office of the Secretary.

The reason for this is that it is more than just the Office of Education that is interested and concerned here and it might be well to have the authority placed in the Secretary so that it is clear this is an entire HEW obligation.

I also want to say that I support the amendments, or the proposals, expressed by Senator Nelson a few minutes ago with respect to authorizing us to provide stipends for teachers in the lower grades and I particularly like the suggestion that we might have authority to provide stipends for people outside of the field of education—to businessmen, industrial people, and others who can make a contribution here in the educational field.

While we probably have the authority at the present time to provide stipends for teachers, I do not believe we have it to provide this kind of financial assistance or stipends to people outside of the field of education and I think this would be a real addition and we would welcome some language there.

Senator NELSON. You would submit an amendment to the chairman?

Commissioner ALLEN. Yes; we will.

Of course we have a problem with limited funds and if we were down to the question of what the priority is with respect to these stipends we would feel they ought to go to the educational personnel first, but I certainly hope we may have enough money later on to do both things.

We hope S. 3151 is passed, Mr. Chairman, but if it is not we in OE are committed and look forward and believe we have sufficient authority to achieve most of the objectives outlined in the bill.

(The information subsequently supplied follows:)

SUGGESTED AMENDMENT TO S. 3151 REQUESTED BY SENATOR NELSON

On page 4, line 3 add the following: "State, Federal, and local levels. Insofar as funds are available, the Commissioner may support the attendance of elementary and secondary teachers at such training programs through grants, stipends, or payment of tuition."

Commissioner ALLEN. To indicate our commitment I intend to request in the fiscal year 1972 budget \$15 million to begin to implement the purposes of this legislation. The breakdown of that \$15 million is included in my testimony.

We shall continue to encourage and increase leadership.

Senator PELL. When you say you will request, does this mean that Bureau of the Budget will support that request?

Commissioner ALLEN. The Office of Education will request in the first instance, of course, the Secretary, and hopefully then the Bureau of the Budget to put into our 1972 budget a sum of \$15 million to be broken down for certain types of service for the programs.

Senator PELL. I don't mean to embarrass you in any way, but is there any indication from the Bureau of the Budget?

Commissioner ALLEN. I have not submitted this although the Bureau of the Budget knows of this statement in the testimony and it was not objected to, to the best of my knowledge.

Again I want to express my appreciation to the committee for this interest and concern in this area and to pledge you our support in the efforts you are making in the field of environmental education.

Mr. Chairman, we are prepared to answer your questions.

Senator PELL. Have you had a chance to look at the amendment I have suggested, which would centralize and establish the responsibility for programs under the bill a section in your Office, concerned with environmental education?

Commissioner ALLEN. Yes. As a matter of general principle, we have not supported that type of amendment, simply because it has been the feeling that the decision as to how we organize the Office for the programs of this kind should be left to the administration.

As a matter of fact we intend to involve the entire Office in this area, and the purpose of this task force we have, which is a continuing operation, is to make certain every agency in the Office has something to contribute here and that every unit of the bureau makes that contribution.

So I think we would question whether we really need a separate office set up and a separate director if we can operate within the present authority. We appreciate the special interest that you have taken in giving attention to that.

Senator PELL. Senator Nelson.

Senator NELSON. I had favored the amendment of Senator Pell in order to give the proposed special emphasis. I understand that traditional objection within agencies and departments of any administration of categorically designating particular positions.

Would it be your interest in any event to designate this the special responsibility of some individual?

Commissioner ALLEN. Let me say this. This has already been listed with the Secretary, that is, the subject of environmental education, as one of the few top priority matters in the Office of Education.

At the moment Mr. Sallada here is my special assistant in this area reporting directly to me and I have given him the authority to see that all units in the Office give priority to this area and to develop the program. So I feel, at least at the moment certainly, that we have the kind of organization that can focus special attention on this.

I don't think we could do very much more even if we were to set up a separate office. As a matter of fact, I don't think it would be as successful or effective as what we are doing now because Mr. Sallada is reporting directly to me. I am personally taking a deep interest in this. I think the environmental problem here offers an opportunity not merely to focus education on this area but to revise and revitalize the entire curriculum in our educational system, from the lower grades to the graduate schools. This seems to me to be a way in which the whole system can be improved.

Senator PELL. When you, Senator Nelson and I become oxidized pollutants we hope the program will still be going on. This would affix the responsibility for a longer period than might otherwise be the case.

Commissioner ALLEN. Let me send you a special comment on this to tell you a little bit more about what we are doing and what we have planned in connection with the organization in the Office.

(The information subsequently supplied follows:)

ENVIRONMENTAL EDUCATION WITHIN OFFICE OF EDUCATION

Present preliminary planning documents call for the environmental education effort to be placed within the immediate office of the Commissioner. The final documents have not yet been approved by the Commissioner of Education. We will be pleased to send a copy of the final document to the Subcommittee members and staff.

Commissioner ALLEN. Is there anything further?

Senator NELSON. Did that complete your testimony?

Commissioner ALLEN. It does, Mr. Nelson, unless you have questions.

Senator NELSON. In delineating the authority of the Secretary and the Commissioner in the bill, apart from that point I raised under subsection 3, page 3, for which I understand you will submit some language, does the bill specifically delineate the authority that you as Commissioner would want under this concept or do you have any other suggestions for modification or broadening?

Commissioner ALLEN. We think that it is broad enough, Senator Nelson. We have not discovered anything we feel we could not accomplish there under this or under existing authorities we have.

I believe this covers really the entire field very well.

Senator NELSON. Are you satisfied that it is flexible enough too so that it gives you the judgment factor of flexibility when necessary to implement the intent of the bill in the way you would see best?

Commissioner ALLEN. I think so, yes.

Senator NELSON. I assume it would be your intent in the implementation of the legislation to utilize the personnel and expertise that would be found in the Department of the Interior, for example, or in other departments?

Commissioner ALLEN. That is right and to some extent we are already doing that.

Senator NELSON. Are you satisfied with the structuring of the Advisory Committee as shown on page 6 of the bill?

Commissioner ALLEN. We have a few questions about that which I would like to submit some comments on. I will do that in a special letter, Senator, if I might.

(The information referred to follows:)

EXTENSION OF COMMISSIONER ALLEN'S COMMENTS CONCERNING THE ADVISORY COMMITTEE ESTABLISHED BY S. 3151

Generally, we prefer the language contained in section 807(c) of Senator Pell's amendment to S. 3151. We would suggest, however, that the Advisory Committee not be burdened with the requirement to review applications and make recommendations respecting their disposition, as required by (c) (2) (C) of that section.

Additionally, as I mentioned in my testimony on May 19, we would request that the word "Secretary" be substituted wherever the word "Commissioner" appears in the bill.

Senator PELL. Senator Randolph.

Senator RANDOLPH. Mr. Chairman, I am privileged to be joined here with you and Senator Nelson this morning. I have conflicting appointments, including the chairing of a subcommittee of the Public Works Committee. But I wish to be on the record on behalf of S. 3151 which has been offered by our colleague and others who have joined him in this purpose.

I would want to say for the record that I came partially to greet Jim Allen—Commissioner Allen—who was a student in a college where I taught. I had him in one of my classes. I wanted to say hello to my esteemed friend and to commend his performance as Commissioner of Education.

But I also came because of my interest in the subject matter and the purposes of the legislation on the agenda here today. I would want the opportunity, of course, to be definitive in my look at the legislation. And I will read the testimony presented by Commissioner Allen and those who join him at the witness table this morning.

If, Mr. Chairman, I may have the privilege later of presenting questions to one or more of the gentlemen who are present as witnesses, should I feel that testimony being presented might need amplification or clarification, I would ask permission to do so. Would that be agreeable?

Senator PELL. Absolutely and we appreciate very much your being with us.

Commissioner ALLEN. We will be glad to do so, Senator Randolph.

Senator RANDOLPH. Thank you, sir. I do not have any questions at this time.

Senator PELL. Thank you very much. Commissioner Allen.

Commissioner ALLEN. Senator Pell, may I ask if Dr. Hanlon might say a word or two?

Senator PELL. Certainly proceed as you wish.

Dr. HANLON. I would like to state that I consider it a privilege to appear here with Commissioner Allen on this very important and noteworthy cause, and especially before this committee which has so many members with unique interest in problems of the environment. I am well aware of the chairman's interest in marine health sciences, in Senator Goodell's concerns in air pollution, and the overall leadership that Senator Nelson has given in this fight to get the Nation really moving on this extremely critical problem.

Speaking for the Environmental Health Service of HEW I want to most enthusiastically endorse a bill which proposes, in effect, the possibility of the development of a partnership of very great potential value to the people of our Nation.

As I am sure the members of this committee have been and are aware, and as Commissioner Allen has indicated in his testimony which is submitted for the record, the Environmental Health Services has a long record, it and its predecessors, of activity in the field not only of research and programing but also of education.

There are a great many examples one might give of this. Some are in the testimony.

I would like to leave with the committee if I may, not for the record because they are long, but a few examples, one of which deals with our efforts to motivate the students of America. These are the minutes of the Conference for the Developing Professional.

I have a tickler here at the photograph of a distinguished member of this committee who gave one of the outstanding talks at that conference which we sponsored.

Also the committee may be aware of our interests in an earlier meeting which was held in 1968 by us to motivate the members of the academic and business and industry communities. These are proceedings of the Symposium on Human Ecology.

(The information referred to may be found in the files of the subcommittee.

Dr. HANLON. In a different vein is a very inexpensive document on the environmental problems which was distributed to the extent of well over 100,000 to students throughout the country in connection with Earth Day to give them the background data they would want and need.

(The information referred to may be found in the files of the subcommittee.

Dr. HANLON. Getting further down the line in age we have a type of document we have made up for the even younger part of the population.

(The information referred to may be found in the files of the subcommittee.

Dr. HANLON. Our staff, of course, devotes a great proportion of its time in meeting with all types of groups in all levels of educational institutions and the like. Only the other day I had the privilege of addressing the students at the University of Alaska, for example, and tomorrow I will be addressing, using myself as an example, the annual Congress of Collective Bargaining with representatives of industry and labor.

They fan out to the communities of the Nation. So that I think that with the expertise in educational methodology that obviously exists under the leadership of Commissioner Allen, and with our input in the Environmental Health Services on the technical and scientific aspects there is, indeed, a great potential here for a very effective partnership and I strongly endorse the proposal.

Senator PELL. I thank you. Along the line of what you have just been saying, I guess the greatest compliment is plagerization, I would like to see us move to not only have Earth Day every so often, but Ocean Day.

If you will forgive me for being very parochial, I would hope the work you are doing in your laboratory in Rhode Island would put more emphasis on the problems of pollution in the oceans and less on fresh water problems in view of the increasing problems and the site of the laboratory.

I believe a report is due from you on the followup and I would be grateful if you would put it in as soon as possible.

Dr. HANLON. I assure you our report will be shortly forthcoming.

Senator PELL. Our oyster beds in the bay are becoming increasingly polluted and I think you can play a real role in assisting us to clean them up.

Commissioner ALLEN. Someday perhaps we should have a sea-grant college in Rhode Island.

Senator PELL. I have thought of that.

Commissioner Allen, I am asking this next question on behalf of Senator Cranston: What is your Environmental Education Task Force presently doing under present statutory authority in educating people about the interrelationship between environmental and population growth and what material have you initiated with regard to population growth and the environment?

Commissioner ALLEN. I would support Senator Cranston's amendment to the bill to include the population problem as part of this. I would be glad to submit something further.

(The information subsequently supplied follows:)

RESPONSE TO SENATOR CRANSTON'S QUESTION CONCERNING POPULATION AS AN ENVIRONMENTAL PROBLEM

The study of the effects of population size and growth on the quality of the environment, both natural and manmade, is an essential part of environmental/ecological education. The Office of Education, therefore, expects that it will be included as a factor in most, if not all, programs and courses dealing with the problems of the environment.

Senator PELL. Thank you very much, gentlemen. Thank you.

The next witness will be Senator Goodell, if he would come forward, please.

STATEMENT OF HON. CHARLES E. GOODELL, A U.S. SENATOR FROM
THE STATE OF NEW YORK

Senator GOODELL. Mr. Chairman, despite all that has been written and said about the despoilation of our environment all too few citizens are concerned about this threat to our existence.

A poll conducted for the National Wildlife Federation in July 1969, for example, showed that 68 percent of those surveyed felt that air and water pollution had not affected them. Those astounding figures clearly demonstrate the need for a more effective program of environmental education.

At this point, environmental education in the school system, especially at the elementary and secondary level, is largely limited to education in agricultural conservation. It takes the form of occasional field trips, nature hikes for children from urban areas and tree planting ceremonies or bird watching clubs. Few textbooks or curriculums are available which present a systematic examination of ecological principles and of environmental management problems.

The August 1969 Report of the Citizens' Advisory Committee on Environmental Quality, headed by Laurence S. Rockefeller, sums up succinctly the current status of American environmental education:

If man is the only living thing which can consciously manipulate, control, destroy, or preserve his environment, then a knowledge of his actions and their environmental consequences should be an essential part and element of his education. It is not, and the reason it is not, is a failure in American education at all levels.

The Federal effort in this area has been startlingly deficient. For example, the Task Force on Environmental/Ecological Education in the Office of Education had a staff of only three, backed with no specific funding.

THE NELSON AND GOODELL BILLS

There are now two bills on environmental education before your subcommittee, Senator Nelson's bill, S. 3151, and my bill, S. 3237.

Because of its greater detail and scope, I submit that bill would have certain advantages over the Nelson bill, to which I would like to call the attention of the subcommittee, in order to at least suggest the possibility of amendment of the Nelson bill along these lines.

Senator PELL. Proceed.

Senator GOODELL. (1) In a time of crying need for multidisciplinary cooperation in reaching solutions for environmental problems, my bill emphasizes the use of funds for the organization within universities of integrated courses of study in environmental fields, curriculums which would be part of new ecological degree-granting programs. The Nelson bill has no such provision.

(2) My bill proposes use of funds for the establishment of a system of regional ecological environmental education centers, which would develop, collect, and disseminate information on environmental problems, their prevention and solutions, emission standards and enforcement processes, environmental monitoring and information gathering techniques and necessary ecological inputs into long-term urban and regional planning.

This proposed system of regional education centers is in keeping with the current structure of the Air Quality Act and the Water

Quality Act, both of which emphasize regional organization as a means of national environmental management. The Nelson bill has no provision for such educational centers.

(3) The Nelson bill requires that projects funded under it must also be funded independently, and that Federal funds are to be used to supplement or increase, but not to replace, that independent funding. My bill places no such constraints upon potential environmental educational centers which may not be able to get independent funding.

(4) The Nelson bill makes no mention of the crying need for innovative environmental curriculums for the training of teachers. My bill specifies the use of funds for the development of specialized teacher-training programs in the field of environmental education, and also specifies that those programs are to be used for training teachers for all educational levels.

(5) My bill specifies the development of curriculums in a variety of educational institutions, from primary school to graduate school levels, as well as in educational television. The Nelson bill omits these specifics.

(6) Under the Nelson bill, requirements for membership on the Advisory Council on Environmental Education to not include specific organizational affiliations, and familiarity with specified subject matter is required only in extremely broad terms. My bill specifies the requirement of participation by representatives of those Federal agencies, named individually, which are most likely to be involved in environmental education, in addition to representatives from the public and private sector who are deemed expert in the subject matter.

(7) My bill specifies an authorization of \$37 million over the next 3 fiscal year as a goal for funding levels. The Nelson bill provides an open ended authorization, thus providing no target amounts for congressional appropriations.

Furthermore, my bill contains a major component not found in the Nelson bill—the creation of a National Advisory Commission on Technology and the Environment. The task of this commission would be to investigate methods to identify deficiencies in existing processes of governmental decisionmaking on the evolution of technology and its adverse effect upon environmental quality.

I would urge the subcommittee to include in the legislation it reports these elements of my bill that are not found in the Nelson bill.

INTERDISCIPLINARY APPROACHES

The report of the National Academy of Sciences on "Waste Management and Control" emphasizes that truly interdisciplinary approaches are required for preparation of manpower which is to effectively manage the quality of our environment. The report of the Environmental Pollution Panel of the President's Science Advisory Committee, "Restoring the Quality of Our Environment," emphasizes the interdisciplinary orientation and the necessity for highly trained manpower to work in the environmental field, from research to enforcement.

My bill, S. 3237, specifically provides funding for such interdisciplinary approaches, as I have stated earlier in the testimony.

Senator Nelson has introduced a separate bill—S. 3809—to create environmental career fellowships, that also assist this interdisciplinary

effort. I am a cosponsor of this bill, but shall introduce an amendment to it that will perform two functions:

(1) It will, in lieu of the circumscribed set of academic disciplines which may be aided under the Nelson bill, substitute a complete listing of those disciplines identified as crucial to environmental education in a study made for the House Subcommittee on Science, Research, and Development.

(2) It will, moreover, make eligible for fellowships under the bill those undergraduates who seek a career of teaching on environment problems and preservation—since most teacher training is now done on the undergraduate level.

In the first chapter of Genesis man is instructed to populate the earth, to subdue it, and to gain dominion over it. That in large measure he has done.

In the second chapter of Genesis, however, he is instructed to nurture and preserve this earth. That injunction he has disregarded, and the need now is for him to recognize that he cannot perpetually continue freely to procreate and to pollute, that he must subdue and gain dominion over himself if he is to survive.

If he is to succeed in that effort, it is essential that an environmentally educated citizenry be created, and that a corps of environmental technicians and teachers be trained.

Thank you.

Senator PELL. I noted the list of disciplines you read which you would include for study. I wonder are you familiar with Constantinos Doxiadis, the Greek environmental science man, should his concept of ekistics be included as one of the disciplines?

Senator GOODELL. I believe it should and could; yes.

Senator PELL. I would hope it could be. I have long believed that we should accept this as being one of the sciences. That "ekistics" should become a term accepted and put into law. If some measure of this sort would include ekistics would that meet with your approval?

Senator GOODELL. Yes; it would.

The thrust of the amendment I offered was we should list some of the crucial areas that we feel are relevant and should be included here; and that certainly was not meant to be an all-inclusive list.

Senator PELL. I am sure Senator Nelson has some comments and questions.

Senator NELSON. I think it is my opinion that the authorization in the bill would cover several of those points that you made. One particularly important point that you commented on, was the question of the education of teachers and that provision is in subsection 3, page 3. You will note it includes courses of study, symposiums, workshops, for teachers, including preservice and inservice training programs on environmental quality and ecology.

The only think that isn't really clear in there is whether or not the Commissioner would specifically be authorized to pay a stipend to the grade school and the high school teacher who desired, for example, to take a 3 months' summer course. I discussed that before you came with Commissioner Allen.

He agrees and I think it is important that that aspect be spelled out to be sure that education for grade school and high school teachers is covered with the authorization of the Commissioner to pay a stipend.

I think a crucial part of the whole environmental education program has to be the education of the grade school and high school teachers.

I will take a look at those other suggestions you make. However, I think some of them are covered in the bill now in broad enough general authorization for the Secretary to proceed with the suggestions you made.

Senator GOODELL. I appreciate that. I agree with you that the subsection 3 you referred to could be interpreted to cover what I think it is critically important to be covered.

I hope it will be clarified in any event.

Senator NELSON. The Commissioner is going to submit an amendment to clarify his authority to pay that kind of a stipend.

Senator PELL. We have no more questions; thank you very much, Senator Goodell, for being here with us today.

The next witness is Dr. David Hawkins, professor of philosophy at the University of Colorado.

Senator PELL. Senator Dominick, who is a member of the subcommittee, I know would welcome you with very real real enthusiasm.

STATEMENT OF DR. DAVID HAWKINS, PROFESSOR OF PHILOSOPHY, THE UNIVERSITY OF COLORADO

Dr. HAWKINS. Thank you, Senator Pell.

I would like to say by way of explanation of the drift of my remarks this morning that in thinking of about how to respond to the invitation to testify, I decided I should try to spin perhaps a bit larger web than would be indicated by the specific intent of the legislation which has been proposed.

But I assure you I think it is relevant to all of our concerns about environmental education.

I might also add that my testimony probably reflects my immediate interests in starting, as we are at the University of Colorado, a center for environmental education which is mainly, at the present time at least, restricted to the range of elementary school education, so I am going to stick rather to that last—although I think the implications for higher education are fairly clear.

As a college teacher of philosophy and of science and mathematics I have long been acutely and sometimes frustratingly aware of the fact that education, like politics, is an art of the possible.

What this means to a teacher, is that the young human mind is not an open filing system in which we teachers can store the fruits of society's wisdom, but a highly reactive and selective affair which accepts, reorganizes, or rejects what we offer in accordance with its own inner program of readiness, need, and motivation.

If frustration is the inevitable consequence of thoughtful teaching, the other side is delight—delight with the inventiveness of the young mind, with new perspective and connections, and so with the opportunity to learn while teaching. Good teachers are those who learn to steer themselves by these responses and so maintain the freshness of subject matter and of their own minds.

I make these remarks when there is widespread and varied criticism of our educational system. The United States has been one of the great

traditional leaders in universal elementary and secondary education, and there is a deep puzzlement as to why a system, of which we have been justly proud in the past, should now receive such devastating criticism for its failures.

Somewhere between the changes of our unique North American social scene with its propitious racial mixture, the changes of the schools themselves, and the changes in our own perceptions a gap has appeared and widened rapidly between what is and what ought to be.

This need not be considered a negative state of awareness.

On the contrary, I think the evidence shows clearly that part of the change is a new recognition that we have indeed never done very well by a large fraction of children and youth. I refer to the Army induction tests and other large-scale studies restricted, as they mainly have been, to rudimentary literacy and other such narrow skills and understanding.

A second part of the change is that there has been increasing dislocation in the lives of many of our children—in suburbias and slums for example, which among other serious symptoms has led to a widespread alienation really from a traditional neighborhood school pattern and program.

Many children not only drop out—educationally speaking—but never drop in with their minds in the first place. Our real educational needs have increased and not just our subjective awareness of past failures.

The traditional offerings of school, including kindergarten, do not match the limitations or the strengths of many of these children whose families are new to the school educational scene, and there begins a long and dreary process of boredom and alienation which dooms them from the early days of what we then call their failure. Thus also there is a new challenge to be met.

Another aspect of the widening gap affects children even from well-educated families, as the lengthening years of childhood, adolescence, and young adulthood swell the numbers of human beings who are in but not of our working society.

These demand a new sort of development and relevance in their lives which they fail to find in school and have not found in the apprenticeship of work. From them also a need to learn, which was once more adequately met outside of school, brings a challenge to the educational system.

Let me add another to this catalog of woes and opportunities, necessarily a matter of personal interpretation. In spite of hard and devoted work by many of our nearly 2 million elementary and secondary teachers, there is a sense of frustration and demoralization widespread among them in the face of public indifference, neglect, or lack of imaginative awareness of the needs teachers have to grow and change with new developments in society. This demoralization has existed for a long time in urban systems, and the outcry of newly developing constituencies—of urban blacks and Indians and Latin Americans in particular—has made it more widely visible.

While bond issues fail economic needs increase in our urban school system and we are in mounting trouble.

The central aspect of education I single out in all of this is a need to carry forward the initial promise of American education, but with a new emphasis.

One of the signs of demoralization most conspicuous from the inside is an increasing acceptance of the belief that teachers are not really professional persons who are accorded the freedom and dignity of planning their own work with their children, of learning themselves.

Traditional canned learning aids, useful to teachers as adjuncts to their work, are developed more and more ambitiously not as adjuncts but as replacements of the teachers' work—"teacher-proof" materials. Teachers are very often hemmed in by inflexible timetables, by inflexible systemwide adoption of textbooks and guides which preprogram the daily work, sometimes literally even putting words in their mouths—and amazingly, their children's.

All of this work is of course much tried and tested but I have yet to see an evaluator's report which says, in effect "this program is no good."

Such beliefs and practices tend, of course, to be self-confirming. Teachers who are not treated as professionals often fail to grow professionally and often themselves drop out after a very few years. The rapid and extremely costly turnover of elementary school teachers is usually attributed to a stereotype of the young girl college graduate who only intends to teach for a short time until, allegedly, she finds the right man and settles down to being a happy homebody with no further professional life.

The truth is, I believe, that many of our potentially best drop out from discouragement and fatigue as a result of being treated like cogs or ciphers. And the result is that we keep for long terms only the very hardy best, or those insensitive enough to regard teaching as a routine job.

Thus it is that all three explanations of the newly visible gap are partially correct. First, our schools have never evolved to the place where they were adequate to the task of universal mass education, especially that of children from poor and poorly educated backgrounds. It is only some four generations, after all, since the time when schools were mainly for the literate and well-to-do and their progress in style and content has not yet adapted them to the century-old need and opportunity to expand into new areas.

Second, the problems of early education have intensified in several ways. Deprivation in the lives of children from new-old slums, new suburbia, old Indian reservations, all alike force us to reexamine the presuppositions underlying the curriculum—to ask anew then what various groups of 5- and 6-year-olds are really like, what their early learning and development really equips them for as a springboard and in what kind of schools they are ready to function well.

Third, there is a new demand, and a new promise, in childhood and adolescent education which makes us see more clearly than ever before the inadequacies of the old education and the reasons for its failure in the lives of so many of the children of today.

It is from the perspective of this third partial explanation that I wish to speak about the importance of a new turn in the evolution of schools and about what I would mean, in particular, by the phrase "environmental education."

I believe the funds which might be appropriated in support of environmental education will be looked at in two rather different ways. There will be a majority view, I fear, which will see the existing school system only as an available means for advancing the cause of

sensitizing—or rote teaching-learning—of new generations to a concern for the preservation of the environment.

Then there will be a minority view, with which I strongly identify myself, which sees the new concern about the welfare of our environment as a way of advancing the more general cause of education.

Froebel's perception of a school as a kindergarten—a child's garden, must be deepened and rescued from its 19th century parochial limitations. The planet is our ragged garden and children who grow to honor it must first live well within it—for us they are the central core of our environment.

This second view shares a deep skepticism that we will face and welcome the new problems of our relation to Mother Earth except through a reorientation of our whole culture and conception of what education is and ought to be.

The central point in this needed orientation, then, is a conception of education as environmental in style. The adequate development of the human mind and character depends on the learner's personal development and involvement in the world around him. In and through this involvement a child is able to assimilate knowledge and tradition as these match his own growing perceptions and needs.

From this point of view there is a basic inadequacy in the conception of school which fails to value, provide for, and in all ways encourage children's active involvement in understanding and exploring the world around them.

On the other hand it is a romantic fallacy to suppose that this sort of activity, for which children come well equipped at birth, can be sustained, enjoyed, deepened, and made lifelong merely by benign adult permissiveness and provisioning. This is a fallacy indulged in by some of today's radical critics of our schools as though all one had to do were to get out of children's hair.

Good teaching is a many sided professional activity which indeed often leaves children on their own resources—partly to discover what those resources are. On the other hand good teachers sometimes intervene actively to redirect the work and sometimes join in an investigation as partners in the enterprise. The overriding purpose is that children can grow in knowledge and organization, discipline, and independence of mind and character. There are occasions for coercion, but in good schools these are infrequently and decreasingly needed.

To be very concrete about the meeting of environmental education, imagine first an elementary school classroom which you visit on a Saturday morning. There are no teachers or children around and you are required to infer from your imagination and your inspection just what has been going on in the lives of those children in the previous days and weeks.

In classroom after classroom you will find a few wall charts, a few neat displays of all rather similar paintings, a few rows of workbooks and books, some pictures of astronauts and perhaps, for example, a chart declaring the dependence of all living things on sunlight—but few living things.

What you will scarcely find displayed are any samples of the immediate unique environment in any profusion, and evidence of individual investigations in progress, children's own graphs, maps, written summaries, shelves full of jars, wire, simple tools and apparatus, experi-

ments with seeds and plant cuttings, a microscope or two, animal cages, rocks from the local geology, or rubbings from the old gravestones in a nearby churchyard.

Nor will you find a sizable display of books other than a few textbooks. There exists an increasing array of small inexpensive monographs and story books which represent some of the best and most exciting of children's literature.

Some of these are in a school library if the school boasts one, but they are not often available for reading and study in the place where the action might be, the classroom.

One could add, to the list of missing items, a tape recorder and a film-loop projector with a file of loops in a corner carrel, a polaroid camera—perhaps Senator Goodell's slightly negative remark about bird watching, if it is put in this context, becomes a good deal more positive than—it might be what the camera is for.

But books above all can be the great storehouse, the stimulus to enter a world beyond the immediate, and except for a few primers and texts we exclude them from the rich imaginative uses which a classroom could provide.

Reading as practiced in most elementary schools is in essence a mechanical instruction in unmotivated decoding or translation, the aim and savor of which is lost on all but those happy few who learn elsewhere the real romance of all those little marks on paper.

Writing is similarly mechanical for the most part, in which spelling, sentences and paragraphs are valued, but not the intent of a child's potential for fresh and vivid communications about his own world. Our schools predominantly neglect the concrete stimuli to thoughtful and imaginative communication which could be the context for strongly motivated reading and writing. In pursuing a curriculum which minimizes children's direct investigative contact with the world around them, we make everything dependent on an abstract symbolic medium which in that very process is drained of vitality and meaning.

During the past 8 years I have spent all or part of my time working in and around our elementary schools and have been a visiting teacher here in Britain and in Africa. I have come to the conclusion that there is one really hopeful pathway of progress. Progress lies in the evolution of a style of school and classroom organization which engages children far more and far more actively than at present with the natural and human world around them, not just in the context of science or social studies, but also as fresh subject matter for artistic expression, reading, for mathematical analysis, for astronomy, history, for reading and writing.

Such a thoroughgoing shift in emphasis can be evolved through a many-sided effort by teachers, principals, coordinators, and with the understanding and support of local authorities and parents—again the art of the possible, but with essential steps already known and described and at least as feasible and challenging as the exploration of the moon.

One crucial step, partly charted, is that which helps teachers to rescue themselves for new levels of work and insight. In workshop situations many teachers become involved with environmental subject matter that is tangible and fresh, and discover in a very personal way what one teacher expressed in delight, "I have a mind!"

The occasion was one of capital scientific discovery—that a soap film spanning a twisted wire frame will contract to a shape with minimum area. She could have been told this in 30 seconds but it could not have brought insight or new mental power without her considerable work or play with the fascinating shapes and colors of the Plateau surfaces.

In her eyes moreover it gave new dignity and potential to children's endless fascination with an ancient toy: that after such pleasures the mind is in new state of readiness to organize and reason.

The three R's should be woven into every activity of a proper environmental education, not kept aside in separate periods—unless a time is ripe for separation. The curriculum should be a system including subject-matter objectives, as always, but it should be fulfilled in different ways for different children and groups. It should be planned and organized for diversity and for openness to specific topics and enterprises which a manifold environment and a teacher's guidance will bring forth.

If what teachers need is not canned progress, except sometimes as points of departure or anchors to the wind, what then? A rich array of supporting resources—concrete materials, tools and instruments, written guides which talk about ways of exploiting typical situations and materials, time, material provision to explore, for example, the school's own city block.

One time it might be grasses in the pavement ecology, fossils, in a limestone wall, the slow erosion of steps by human feet—for age-determination of a building or for estimates of each footstep's share and a story about Lucretius' estimate of the size of atoms from the toe of an old god word by the kisses of supplicants.

Another time it might be the architecture and age and previous use of old houses, once grand and now crowded with a slum's tenants—a small corner of history come alive.

Teachers need help also with the mechanics of a classroom erosion table or with the making and uses of maps. They need time—paid professional time at least in part—for the exchanges of experiences and ideas, for discussion of children's capacities and ways of fostering these.

Some of these can come with books and film, much must come through personal discussion with other teachers and with advisers.

We know of one large system and now one State legislature which provides a half day a week set aside for such programs, another which offers short-term fellowships for teachers bent on studying new educational research and new subject matter. Such practices are a minimal recognition of a professional status for teachers.

Senator NELSON. Where is that?

Dr. HAWKINS. Illinois just apparently passed a law, I don't know the details, giving financial support to teachers for a half-day off a week—Newton, Mass. has done it for some time. The school system which has the fellowship program is Lincoln, Mass.

Such manifold changes cannot in general come quickly but they can come at a rate which arouses new interest and new morale, sustained by early partial successes.

A reading corner with good and enticing books will not lower anyone's reading score on the formal tests and here and there will dra-

matically liberate a child who goes to it with fossils to identify and who stays, reads and then writes a "book" about where his fossils were formed. He stays because the corner is valued. He learns something about books that is not in books—that they are his home and not, as so often in the case, enemy territory.

The history of the last decade has brought new groups into the field of elementary and secondary education, and has established a pattern in which there have been many national projects working to revise and modernize curricula, and more recently to investigate technology. I refer to the curriculum groups supported by the National Science Foundation and by the Office of Education, to the Regional Laboratories and many other projects in and out of schools of education, federally supported or otherwise.

My own way into the field of elementary education was through the first named of these. As a generalization we of that period—in my case scientists and mathematicians—had our virtues and our vices—on the one hand a fresh view of subject matter and a willingness to try radical innovation and on the other, ignorance about children—thus about the art of the possible—and arrogance about teachers' difficulties and schools' failures.

From the combination we, many of us in fact, accepted very conventional ideas about the proper use of textbooks, timetables, and lesson plans. Some of us were saved, I think, because we had the wit or innocence to go and try to be teachers of the young. A few good teachers stood up to us when we went wrong, we were already called experts, and we had some successes, heady stuff.

So I value the period very much and think it has produced some good curricular ideas and materials. But it did not really come face to face with the deeper problems—and we must.

Along with or some time after us who were content-oriented, there has grown up another sort of expertism having to do not with subject matter primarily, but with programing, testing and evaluating of curricular materials, teaching strategies, and educational technology.

While professedly concerned only with the effectiveness of means, the *modus operandi* of such groups often reinforces the existing narrowness of aims as well. Valuable as much of this work may yet prove to be for special purposes, it has often had the effect I spoke of before, of rigidifying the behavior of teachers and children even further by a very detailed daily charting of their course and thus robbing them of the very initiative and planning which education ought constantly to induce.

Good teaching involves much planning but "lesson plans" evolve along the way. Since local opportunities will always loom large in the operation of environmental education, it will therefore vary radically from time to time and place to place though always within a curriculum of suitable scope, generality, and organization.

Ten-year-old children mapping a magic island found there a river which rises nowhere. I leave it to you to find out how this is possible; in the instance I mention the discovery was an open door to a wholly new exploration of the world of maps, a high level of curiosity and insight. Can you map the ocean? The magic world, the real world, and the world of maps came together for these children on that day as a source—as a new way into the world of rivers, lakes, and oceans.

Under such circumstances, proposals to give Federal support to environmental education and to define this support in terms of now-established patterns of curriculum development, testing, evaluation, and teacher training, seem to me in danger of overreliance on instruments inappropriate to the job.

This pattern may result in some valuable ideas and materials but it does not touch the vital nerve, for the basic innovation we need to support is that of exploring, with and through innovative teachers, all the means through which children can be brought into a different way of learning.

The very phrase "teacher training" implies a style of innovation in which teachers are being shown the way when in fact teachers must be part of every effort to find the way—with moral and material support, through teachers of teachers who value their minds and respect their innovative capacities who are prepared to receive as much as they give.

Nowhere is this more true than in our present-day inner-city environment, which environmental education will neglect at its peril. This world of children in the slums needs the profoundest exploration by skillful and perceptive teachers newly awakened to the need and potential for environmental learning, and with all the support we can give them.

Detached study by sociologists or psychologists will help, or linguists, of course, but can only lead to dubious panaceas and formulas if it is not measured against much creative detailed working experience to seek out the manifold resources for learning which can be found there by discerning eyes—butterflies and beetles are to be found there and not only the lamentable rat, and there are streetside rivers and lakes which rise somewhere when the rain comes.

It seems that we may pile up mountains of abstractions and try to pass them on while forgetting the primary motivating qualities of our learning—of perception, engagement, and enjoyment.

Many of our college students are trying, I think, to tell us this, though their own confusion sometimes makes it sound like and become a repudiation of learning itself—which as we ourselves have unwittingly taught them, is seen as dreary and irrelevant to life.

We have not invested, as we must, in helping our young become engaged to the world, rather than alienated in being marriage brokers toward lifelong union.

Without this, nature is left a prostitute. Unless education leads the young to love, honor, and cherish the planet from their own direct experience, and to value themselves as its custodians, it won't lead them beyond our own previous record of ignorance and indifference.

Senator NELSON. Do you have any specific proposals on any of the pending legislation before the committee in respect to developing an understanding and a better feeling about our environment?

Dr. HAWKINS. I have, I don't know how specific, but I have at least one general proposal. I don't know how this can be formulated, how it can be institutionalized.

It seems to me at this time after practically a decade of work in which the central emphasis was curriculum development, there ought to be a genuine shift in policy to finding all means to support the education of teachers in the field, that is to say systems by which there

are more numerous advisers, for example, in school systems—who know how to work with teachers because they have been teachers themselves, who can lead them to see the potentialities of a more environmental style of education.

This obviously in the main has to be the job of local and State school systems. The education of advisory persons who can work in this practical way in the school systems is however something that seems to me to need some kind of national support and not just be left to chance.

These will be environmentalists, people who know environment in the region and the locality but who also know children and teachers and can give teachers the kind of moral and material support the need to get them off the dead center where so many of them get caught.

I am thinking now mainly of elementary teachers. Summer courses in environmental studies are fine but the teacher goes back to a classroom in a school with already established patterns, with a schedule and timetable that does not allow any but the most perfunctory kind of field trips, for example, and the effort to change these patterns is not easy and many teachers despair of doing it and give up.

Their enthusiasm can be aroused transiently until they face the reality of the thing. It is a system locked into its own habits and we really need very intelligent perceptive people who go and work in a free floating advisory capacity in school systems to find the teachers who have the good ideas, to find the teachers that have the spark to set them going and thus create models for other teachers to see.

Short of stimulating the schools themselves in such ways I fear we are not going to get very far with programs which merely concentrate on curricular materials.

Senator NELSON. I, at least, don't interpret the bill I introduced to be limited to developing curriculum and materials to be used in the classroom.

I would anticipate that interdisciplinary environment departments and institutes that are being created within universities, mostly in the last 2 or 3 years, will develop an educational program to involve grade school and high school students to work with and relate to the environment in a real way outside of the classroom. I think this is necessary.

In fact, there were some 10,000 grade schools and high schools involved on Earth Day. In looking at the several thousands of letters that we received from grade school children there was a large number of remarkably creative teachers who were engaging these young people in projects outside the classroom directly related to the environment itself.

Dr. HAWKINS. I agree completely and I think this is why the appearance of the subject of environmental education on the program, so to say, is a very encouraging one. I think the use of the environment, the wider and deeper use of the environment in schools by teachers is going to almost commit us to a better kind of education.

I don't interpret negatively any of the provisions of the bill but I would like to see, for example, something to provide for the training of advisory persons who function in the school systems who go around and give teachers this kind of help.

They need help, they need materials in the classrooms. The classrooms are bare. You can't investigate materials you bring back from

a field trip, including junk from the junk pile you stumble across in an old field, not to mention the botany and the zoology, because you don't have the tools in the classroom.

We must try to raise the temperature so this kind of need in classrooms is seen as legitimate educational need and not just the textbooks and the curriculum guide.

Our classrooms are very bare of the supporting material for genuine environmental education. So it seems to me the people who will perform this catalyst role in helping teachers get started, and the materials of all kinds, including curriculum materials that they can bring with them to recommend and to explain to teachers and get them involved, all of this is, I think, a crucial component which curriculum development by itself does not bring about.

I think it can be agreed, in spite of the tremendous efforts of the last 10 years as to curriculum development in elecentary and secondary schools, there has been very little change in the schools.

This is why I want to push the environmental emphasis not only as a subject matter about which we teach. Mathematics, science, art, social studies—all of this is meaningful to young children as it is concretely embodied in the world around them; that is the thing that is missing in our educational system, and that is the thing that brings it close to pretty severe failure in many parts of our population—the lack of that kind of environmental emphasis.

Senator NELSON. There was an interesting project lasting for a week at San Jose State College in California in which every course from the classics to the sciences was taught in respect to that subject's relationship to the environment. This is directed to the point that I think you are making.

Dr. HAWKINS. We want to get into the world more often and more of the world into the schools. The barriers, symbolic and literal, which separate them are much too high.

I want environment not to become something that is thought of in terms of didactic instruction about the state of our problems, because most kids in most schools receiving that kind of instruction are not going to have their interests in the environment deepened or extended at all, they are going to regard it as one more part of the dreary thing from which they seek to escape.

Senator PELL. Thank you very much.

Our next witness is Dr. Reed Bryson, director of the Institute of Environmental Studies from the University of Wisconsin.

Senator NELSON. I am very pleased to welcome Dr. Bryson. He is a friend of mine who is the director of an institute, created just this year. Is that not correct, Dr. Bryson?

Dr. BRYSON. Yes.

Senator PELL. Your statement will be printed in full in the record. You can present it in any way you desire.

STATEMENT OF DR. REED BRYSON, DIRECTOR, INSTITUTE OF ENVIRONMENTAL STUDIES, THE UNIVERSITY OF WISCONSIN

Dr. BRYSON. Mr. Chairman, if it is appropriate, I will speak to and summarize the formal statement that I have prepared.

Senator NELSON. The chairman has to go to the Foreign Relations Committee at this time and has asked me to preside.

(Senator Nelson, presiding *pro tempore*.)

Dr. BRYSON. It is clear that degradation of the earth's physical and biological environments pose great threats to all living organisms and this degradation has certain social, cultural and economic and esthetic as well as biological consequences for mankind.

Indeed there is growing evidence that these threats could reach a catastrophic level.

Within recent decades man has rapidly proliferated in numbers, cleared forests and prairie for agriculture, stripped the wilderness of minerals and resources, and perhaps most disastrously of all has endlessly polluted the waters, the air, and the lands.

We can no longer afford the luxury of assuming that the future will take care of itself.

This means we must know where we want to go. This knowledge can be reached only through education, and I would submit that there are four basic kinds of education that are needed. One you have heard about today, the precollege education, for it is here that a commonly held set of information and values is acquired.

There is needed an undergraduate program designed for the production of educated, knowledgeable citizens who are broadly familiar with the environmental problem.

There is a third kind, a professional manager who is capable of managing parts of our environmental system, which we think of as the master's level—professional manager's level—and fourth, the interdisciplinary, advanced graduate research level, for we do not know all of the answers.

Because the problem is now, we must concentrate on retraining and adding to the training and expertise of scientists, teachers, and humanists, throughout our society.

The university has a major responsibility to mobilize its resources to aid in the solution of environmental problems. It has a clear responsibility for the survival and improvement of the life of the civilized man. In addition, our entire educational system has a responsibility to preserve and transmit not only the knowledge, wisdom, and values of the past; but discover and develop that which will insure the survival of the present and future generations with improvement in the quality of life.

The educational system must have a mandate to develop a commonly held body of knowledge about the whole man-environment system too, so that a national environmental ethic can emerge.

The University of Wisconsin has been engaged in the investigation of environmental questions for nearly a century. To illustrate what we feel needs to be done, I would like to tell you about what we at the University of Wisconsin have attempted to do, following the old dictum to "put your money where your mouth is."

We have tried to rearrange our program so that we can be more effective in the development of education on the entire man-environment system. For a century, almost, we have developed a strong set of pertinent disciplines. We have worked on the eutrophication of lakes for 50 or 60 years. We have worked on the impact of man on his climate for 2 decades, we have developed centers, and groups with expertise in all of the pertinent disciplines.

But this is not enough. We have the disciplinary strength. It is held in a number of great universities, but despite this impressive array

of scientific and technical competence we have felt that something significant was missing—a massive integrative effort to combine the bits and pieces of knowledge—biological, physical, social, and cultural—into an integrated interdisciplinary effort.

To this end we established this winter an Institute for Environmental Studies, parallel to the colleges, charged with developing undergraduate and graduate curricula and research in the environmental area, specifically to do the kinds of teaching that I have mentioned—broadly educated citizenry, environmental managers, and researchers competent to tackle the problems broader than those that lie within a single discipline.

I would like to summarize what some of our specific concerns are because they are different than the specific concerns that would be the guide for the development of a particular discipline.

We are concerned with the environment of man, not with just conservation, not with just the restoration of an illusive environmental quality which we cannot go back to, because now there is something new on the earth—saturation with man.

We cannot go back to the bronze age. We are concerned with the environment of man now and in the future to insure the survival of this and future generations. We are concerned with the total environment, not just the biological, not just the physical, but the social, esthetic, cultural as well, for they are interconnected.

Third, we are concerned with interdisciplinary studies. It is clear that the disciplines, useful and necessary as they are, have not provided the links between themselves and the integrative effort that is necessary to understand the total man-environment system.

Fourth, we are concerned with the development of open-ended solutions. It is not enough to come up with a solution. We must have solutions that allow for error.

Senator, as an ex-meteorologist for 20 or so years, involved in such things as forecasting the weather, I have learned that when you are trying to predict what will happen in a complex system you frequently make errors.

If this were not so, we would have much better weather forecasts. But the weather system is much simpler than the man-environment system. We mustn't allow in our planning and in our research for the possibility that we will make a very serious error.

Thus any solution that we propose must be an open-ended solution, one that gives us a chance to say, "whoops, we goofed," and go back to a new approach to it.

While we recognize the essential importance of strengthening the existing disciplines we look toward teaching, research, and extension configurations that will transcend the traditional lines of endeavor and be concerned with the wholeness of the relations between man and the total environment.

Lastly, we are concerned with quantitative answers. We have had, in the last couple of years, a great deal of rhetoric about the environment, but it is necessary for us to be quantitative, for we must know which actions have big consequences and which are less important.

Finally, environmental education that elucidates problems or makes people more aware of them will only increase frustrations unless it deals with means and methods of solution.

New curriculums, aimed at environmental understanding and ecological awareness thus cannot be composed of shopping lists of traditional courses and subjects. We cannot simply specify which disciplines will be taught, which are the important disciplines, for the lack of integration of discipline-oriented courses and research is probably the most important reason for the general lack of understanding of man as an integral element of a complex system.

In summary, sir, I would like to emphasize that the earth is finite, and it is near saturation. We want to see survival with improvement in the quality of life. The closer we get to total saturation, the fewer our options and alternatives will be, the less possibility we will have for open-ended solutions, and thus there will be a reduction in personal freedom.

We must, therefore, as we have tried at Wisconsin, try on a massive scale to develop broad, far-reaching educational programs, reaching down into the schools, and retraining, because we don't have a lot of time, to where we have developed an environmental ethic that shows respect for the delicate web of life of which man is an integral part.

Thank you for the opportunity to present these views.

Senator NESLON. If under the bill, for example, your institute was provided with funds to develop a curriculum in the field and to set up an educational training program for primary and secondary school teachers, would you agree with Professor Hawkins that just to create another series of classroom lectures, so to speak, would be counter-productive?

Dr. BRYSON. I don't know that this would be counterproductive. It probably would be insufficient. The broad problem is not generally understood.

There is a wide variation in the use of the word "ecology," for example. Some use it in the sense of the whole man-environment system, others talk about ecology as only biological in its scope.

Curriculums that are as narrow as biological ecology would probably simply perpetuate the fragmentation and the lack of integration. I don't think it would be counterproductive. It would probably be a good program, but the whole problem requires that the entire curriculum be integrated.

In this sense I agree with him that there has to be an environmental emphasis. After all, education is to say who you are and how you relate to the world around you.

Insofar as we have deviated from that and simply provided a series of subjects and courses, we have failed in our educational mission. I think however, that your suggestion of bringing teachers back to give them not just a course in ecology or just a course of meteorology, but to bring them back to help them gain what they did not get the first time around in college—how all of these things interrelate—I think most would be most productive, and as I read it this is within the scope of your bill.

Senator NELSON. Will that camp which is under the jurisdiction of the university be used by your institute?

Dr. BRYSON. We are planning that our curriculum at the undergraduate level, particularly, will involve work-study programs, will involve undergraduate seminars, and will involve field trips and field work.

When I say work-study I think in terms of "biological field camps," "urban field camps," the entire environmental world around us, connected directly and intimately with the learning process.

So yes, indeed, we plan to use field camps of various sorts.

Senator NELSON. If I understand the comment made by Professor Hawkins, he was suggesting someone who would be used within the school system to help develop programs relating to the environment. As he said that, it occurred to me that a State university might very well develop a creative group of this type to go from school to school around a State or region because all schools could not get nor would not have the necessary money.

Do you think there is any value to that idea?

Dr. BRYSON. I would hope that all teachers at all levels would be environmentalists but when it comes to an expert task force this is exactly what we have in mind in the development of a strong extension thrust to our program. Extension to me is more than simply providing a group that can answer questions that are imposed by citizens, industries, and the like throughout the State but also of extending what we are learning in the universities and what we know now in the various disciplines into the schools as well as to the populace at large.

This would be probably a very effective method of extension.

Senator NELSON. Thank you very much Dr. Bryson.

(The prepared statement of Dr. Bryson follows:)

Testimony of Reid A. Bryson
Director, Institute for Environmental Studies
University of Wisconsin-Madison
before the Subcommittee on Education
of
The United States Senate
May 19, 1970

Mister Chairman,

Throughout some three billion years of evolution, living things have adapted to the environment by an intricate network of interaction and reaction. The threads of this web are so closely interwoven and complex that discord in one section usually spreads like a wave into every corner of the pattern. When the environment is healthy, the community of organisms is most apt to flourish.

Today, however, degradation of the earth's physical and biological environment poses grave threats to all living organisms. This degradation has serious social, cultural, economic, and esthetic, as well as biological consequences for mankind. Indeed, there is growing evidence that these threats could reach catastrophic levels. Within recent decades, man has rapidly proliferated in numbers, cleared forest and prairie for agriculture, covered lands with highways and cities, stripped the wilderness of minerals and resources, and perhaps most disastrous of all has endlessly polluted the waters, air and lands.

It is apparent that man has begun to tear apart the fine fabric of the very resources upon which he is so totally dependent. Yet the environment is rapidly deteriorating at a time when ever increasing numbers of people depend upon it and are seeking greater uses of it.

We need a better understanding of the physical and biological effects of the natural and man-made environment upon man. We must gain a clearer understanding of the relationship of all living things to their physical and biological surroundings. We must learn how to keep the earth's environment in a condition capable of maintaining life throughout the decades and centuries of the future. We can no longer afford the luxury of assuming that the future will take care of itself.

The University has a major responsibility to mobilize its resources to aid in the solution of environmental problems. It has a clear responsibility for the survival and improvement of life for civilized man. In addition, our entire educational system has a responsibility to preserve and transmit not only the knowledge, wisdom and values of the past, but discover and develop that which will ensure the survival of the present and future generations with improvement in the quality of life. The educational system must have a mandate to develop a commonly held body of knowledge about the whole man-environment system so a national environmental ethic can emerge.

To deal effectively with the intricate interrelationships among features of the physical and biological environment and their social, economic, and political consequences requires a measure of integration of intellectual effort rarely achieved in the past. The knowledge and analytical tools of many disciplines must be utilized, but more critically, a true interdisciplinary effort is required to solve some of the more intractable problems and to design effective policies to deal

with them. The investment of effort must be multiplied through established disciplines and also must be expanded through the development of comprehensive interdisciplinary programs of education and research which integrate the various disciplines.

There has been serious discussion on organization for environmental studies among students and faculty at The University of Wisconsin-Madison through a series of committees, beginning as early as 1966. In that year the Madison Campus Special Committee on Environmental Studies reflected:

One of the significant national trends of our times is the flooding tide of expressed concern over the degradation of man's surroundings: his natural surroundings--water pollution, air pollution, soil erosion, marred landscapes, waning wildlife; and his man-made surroundings--metropolitan sprawl, preempted open spaces, inner core slums, congestion, smog, "slurbs," and so on--the "mis-development" of our resources.

The University of Wisconsin has a long-standing reputation as a leader in environmental studies, beginning in the early 1900's with the pioneering research of Birge and Juday on the limnological problems of Madison's lakes. Since those early investigations, Wisconsin has become a national "center of excellence" for research on eutrophication, the accelerated aging of natural waters due to man's activities, the contamination of natural waters and pollution abatement. The University is a leader in research on legal aspects of environmental quality, computer modeling of lakes and streams, and sewage treatment methods. Wisconsin experts have pioneered in rural land zoning and environmental diseases. The University is one of the leading centers for research on food poisoning and how

bacterial organisms affect food.

Our earth scientists continue their search for an adequate understanding of the basic geophysical and ecological principles which govern the relationship of life in its environment--particularly that of man to the earth. Wisconsin meteorologists are studying the physics of the atmosphere to better understand the mechanisms of energy distribution that power the weather and account for climatic change. Climatic change is of interest particularly for understanding world patterns of climate and the impact of climate on ecological systems. University climatologists are studying the possibility that atmospheric pollution from industry, large-scale man-made changes in vegetation over the earth, or the triggering of cloud formation by jet contrails may intervene in the delicate balance of atmospheric forces and result in climatic changes of great significance.

Widespread interest in the broad area of environmental studies at The University of Wisconsin in the past decades has generated dozens of centers and programs in the biological, physical and social sciences on the Madison Campus, and many faculty members have been engaged in teaching and research in environmental studies. A number of programs have developed cooperation and participation of faculty from several disciplines and will continue to do so. Yet despite this impressive array of scientific and technical competence, we have felt that something significant was missing - the massive integrative effort to combine the bits and pieces of research into a broad understanding of the total man-environment system, in all its

biological, physical, social, and cultural aspects. We also felt there was a need to develop several kinds of teaching programs:

1. Broad undergraduate programs concerned with the environment which would contribute to a knowledgeable and ecologically perceptive citizenry,
2. a more advanced masters level program for the training of environmental managers,
3. a doctoral research and education program directed particularly at those interdisciplinary environmental areas which have been largely neglected in discipline-oriented research, and
4. a strong adult education and extension program to carry the results of research to application on the many pressing environmental problems, and, to provide an interchange of ideas between the University and the citizens.

We also feel strongly that the need is now.

To these ends, The University of Wisconsin, this winter, reconstituted its Institute for Environmental Studies as a divisional unit responsible to the Chancellor of the Madison Campus. The Institute had been a research unit within the Graduate School. The Institute has been administratively restructured to provide improved leadership and impetus to the University's teaching and research efforts in the environmental studies area. Functions of the Institute are threefold:

1. Provide leadership in interdisciplinary environmental

research by initiating new and coordinating existing research programs.

2. Initiate and support cross-disciplinary undergraduate and graduate courses and degree programs.

3. Improve communication among groups and individual faculty members involved in environmental research, training, and extension programs, and with the public. The Institute will develop and foster programs of external communication to concerned publics through University Extension.

Many of these activities are already underway, and the Institute will assist in their further development toward closer cross-disciplinary ties and greater public awareness.

The integrating focus of the Institute for Environmental Studies is the man-environment system: the relationships between man, individually and collectively, and his natural and man-made environment. A definition of environmental studies must include the following factors:

1. We are concerned with the environment of man. Research findings have identified relationships between physical surroundings and human performance, have found that physiological health and psychological well-being are affected by environmental variables, and have determined that social behavior is influenced by elements of the environment. Man, in turn, exercises profound effects on his environment. The focus, additionally, must be upon the growing numbers of humans concentrating in increasing densities and bringing greater pressures to bear upon the natural and the constructed environment.

2. We are concerned with the total environment: its social, cultural, economic, and esthetic as well as physical and biological aspects. Within the University the cumulative effect of the efforts of the humanities, engineering, social sciences, biological sciences, physical sciences, medical sciences, and the attendant professions must be considered in looking at the total environment of man. To seek an optimum total environment requires both an understanding of human needs as well as the needs of healthy, living, natural and man-made environments, in which a certain amount of creative disorder is essential for natural evolution and human creativity to continue. Any discussion of the goals of individuals and of society must quickly draw upon a knowledge of the nature of the world in which man lives, just as any discussion of a balance of nature today must take into account the necessary impingements of man.

3. We are concerned with interdisciplinary studies. The development and management of an optimum total human environment requires an understanding of the contributions which can and must be made individually and collectively by all the arts, sciences, and professions.

4. We are concerned with integrated studies that have as their ultimate rationale the development of open-ended solutions for environmental problems, rather than short-term solutions that may degrade the environment or actually hasten man's extinction. We are concerned with the application and adjustment of designed time and space for optimum human

performance within the carrying capacities of the environment, and without the destruction of natural evolutionary reserves that are necessary for survival. The desired objective is to bring conflicting forces into functional relationships, so that human impact does not needlessly destroy earth quality, and that earth qualities contribute to more fruitful human life without destroying the heterogeneity of existing flora and fauna that are desirable for a viable evolutionary continuum or the heterogeneity required for the continued development of man.

5. While we recognize the essential importance of strengthening existing disciplines, we look toward teaching, research and extension configurations that will transcend traditional lines of endeavor and be concerned with wholeness of the relationship between man and the total environment. In a real sense, we seek to provide a university environment in which integrated environmental studies can be accomplished and in which the fruits of such research can be reflected in improved campus teaching and community service.

6. We are concerned, finally, with quantitative answers, for the problems are so complex that we must know which factors are more important and which actions may have consequences far larger than their apparent significance.

In terms of S.3151, The Environmental Quality Education Act, the above mentioned concerns and conclusions prompt the following observations:

1. There is a general lack of understanding of the nature of the man-environment system and the need for ecological balance by professional academicians and by the public. There

is widespread public concern over environmental quality today, which will continue and increase, but there is considerable dissonance because of the complexity of the problems and the lack of knowledge.

Much of the attention on environmental problems so far has resulted from a growing recognition that there are problems. This recognition ranges from awareness of things around us that are unhealthy or unpleasant to awareness of some global environmental problems. There has been less attention to rational solutions of individual, local, or non-local problems. This is a source of frustration. Individuals can gather up aluminum cans in a spring clean-up, or choose low-phosphate detergents, but they can't by themselves deal with the large sources of environmental perturbation or set up the social, economic, and legal institutions that will be able to do so. Many people are aware of their individual impotence. Environmental education that elucidates problems or makes people more aware of them will only increase this frustration unless it also deals with means and methods for solution.

2. Much of the material on environmental problems has been rhetorical. There is a need to quantify as many of the factors influencing the environment as possible and a need for the construction of models. The educational process must also deal with this need to quantify. People must understand interrelationships in eco-systems. Decision makers must understand the consequences of alternative decisions throughout the

system. It should be pointed out that modeling work on environmental systems is a young science in which students can be involved. This means that new curricula at all levels should aim at developing on the one hand an appreciation of the interrelation of all parts of the web of life, but on the other a feel for which interactions are most sensitive. The totality of nature is too much for the single human mind to comprehend, but the well-educated citizen must understand the essential framework and how much stress is tolerable.

3. The above two points also say that new curricula aimed at environmental understanding and ecological awareness should not be composed of "shopping lists" of traditional courses and subjects, for the lack of integration of discipline-oriented courses and research is probably the most important reason for the general lack of understanding of man as an integral element of a complex system. It is clear that a prime purpose of education is to help the citizen discover who he is and how he relates to the rest of the world. Integrative environmental curricula, properly designed, can do much to alleviate the general failure of traditional curricula to achieve this goal.

4. There is a general lack of understanding of what is meant by "ecology". It is a term used in both narrow and broad senses. There is also great variation in the use of the term "environmental quality". Both should mean more than conservation of wildlife and abatement of pollution. It is hoped that in the context of S.3151 the broadest possible interpretation is put on those two terms.

Many of our current environmental problems are a function of population growth and increasing per capita consumption of resources. That is to say that not all our problems are poor housekeeping problems. This means that the educational program needs to establish the relationships between population, pollution and ecology. Further, the public needs to be in a position where it can make intelligent value judgements about what kind of life it really wants; that it is no longer possible to "let technology take its course". Because if we do, nature will surely respond and take its course.

Thank you for the opportunity to present these views.

Senator NELSON. Our final witness is Mr. Frederick Mold, director of Fairbanks Museum of Natural Science, St. Johnsbury, Vt.

STATEMENT OF FREDERICK MOLD, DIRECTOR OF FAIRBANKS MUSEUM OF NATURAL SCIENCE, ST. JOHNSBURY, VT.

Mr. MOLD. I have a prepared statement, Mr. Chairman, but in the interest of time I would prefer to summarize it. I hope that will be acceptable.

Senator NELSON. Senator Prouty, who is a member of the committee, asks to extend his regrets to you that he could not be here. He is at another committee meeting.

Your statement will be printed in full in the record. You may present it however you desire.

Mr. MOLD. I am honored to be asked to testify this morning.

We at the Fairbanks Museum have been addressing the problem of environmental education since about 1890. Until 1948 we concentrated on the life sciences; since then we have added the physical sciences as well. We teach at a museum, a valuable community resource which all too often is not fully used.

St. Johnsbury as a community was put on the map by a rather despotic industrialist, and he decided to found the museum. He pretty much told the town that his museum would become the science center for the town, and it has been that way ever since.

We work with children from kindergarten through grade 12. We teach interdisciplinary sciences using all the gimmicks and motivational tricks which are known, plus some we invent on the spot.

I think that the bills before the committee, and I address myself chiefly to your S. 3151, are just what the doctor ordered. It is what we have been waiting for.

We have had a 3-year grant under title III. We have done all of this work, we have gotten our educational program to such a level that we are now handling 30,000 to 40,000 students a year, and title III is dead, it is gone, it is all finished.

Without some new source of assistance the environmental education we have been carrying on will have to be cut back to a program which handles perhaps 15,000 students. Our board, however, has determined that it will devote possibly as much as 10 percent of its endowed funds—sacrificing that money and that subsequent income—to continuing the program for another year, while we keep trying to find some way to shake the plum tree and find some more money.

I am sure that my institution is not the only one in this box at this moment. But now the Nation is crying for help and wondering what to do next. For years conservationists have been looked upon as old ladies in tennis shoes hunting for orchids. We have been the objects of amusement.

Now suddenly the environment has been discovered. Well, we know that environmental education can be done. We know it can be done in the ways you propose if the money is made available so we can start.

We have worked with some 700 schoolteachers in summer programs in the last 9 years. I am employed as well by Michigan State University in their outdoor education conservation programs in summers, and that program has reached the teachers. You can take a woman 53 years

old and stand her in a brook of 52° and enthuse and train her about invertebrate biology. You can teach her the meaning of this brook in terms of the life she finds at the moment, and what the fisherman might find in it because of what she finds underneath the rock she is turning over. You can teach her the relationship of the sun to the ecology. Then you can send her back to the classroom on fire, able to take her children out and inspire them with the same enthusiasm.

Yet I had this experience not very long ago in a town in northeastern Vermont: we got the work going, we got the teacher fired up, the superintendent got the outside area, 150 acres in which to work. Students went out, got into it, and the citizens said what are they doing outdoors? So you have a big selling job to do. I could sell it easier if the Congress of the United States and HEW and everybody else recommending this legislation was really building public support and acceptance for environmental education.

This bill would authorize assistance for the development of curricula, and that is fine. But I want to make it very clear that that is not the most important thing. A 5-foot high stack of new curricula is no good to anybody. What we really need are the trained people to teach environmental education. If we could multiply the number of trained teachers, we could do a terrific job using only the present curriculum materials. I don't want to seem opposed to developing new curriculum ideas, but I do want to emphasize very strongly that training teachers and getting them out teaching is the No. 1 priority, in my experience.

I think S. 3151 is a whale of a start if you can pass it. It does provide the money. We have the talents and the institutions. If the money is made available—and by that I mean readily available to institutions like museums as well as to school systems—we can really do the job.

Sciences are very important in this matter of ecology and conservation, but I ask you also to remember, and I think it has been hinted at here this morning, that man lives not be bread alone. Food for the soul is often not solid enough, but the preservation of beauty, the preservation of neighborhoods, the enabling of a child to interpret all the things he sees in all the various ways is very important, too. So I submit also that some attention perhaps be given to the arts and sciences and esthetics conservation.

I think that the programs that we have had are excellent. There are many like mine in this country that will be running out of funds shortly and this bill may come along just in time to save our necks.

The only way we can do it is by beginning right at the kindergarten level. If it is your own child you can start even before that. We are now taking prekindergarten at the museum. I know other museums are doing it and I know from the experience of my own children that you can commence this at age 2.

It can begin anywhere you have the time and talents to start. If we are going to begin with a great mass of the American public we have to start at the very earliest grades we can get to just as early as we can get there. Again I come back to the preparation of teachers. We are going to have to retread a lot of teachers to make these young children really understand the wonder and beauty of ecology. We know that good teachers can get this across, and we know that we can produce good teachers. What we need is the support for the training.

Senator NELSON. Do you have many primary and secondary students who take training courses in your museum?

Mr. MOLD. Children come to the museum about 15 times a year from 55 school districts in northeastern Vermont.

Senator NELSON. What funding were you talking about?

Mr. MOLD. We have had a grant as a supplementary educational center under title III of the Elementary and Secondary Education Act of 1965.

Senator NELSON. And that funding has expired?

Mr. MOLD. Yes, as of June 30 of this year. That is the way the title III program was intended to be. To keep the funds moving into new programs there is a 3-year funding limit for any one program or project. It is intended that at the end of 3 years successful program will be supported by local or State funds.

Our problem in northeast Vermont, a problem that I am sure is shared in many other parts of the country, is that our local school \$10,000 next year to the support of the program but that is less than 20 percent of the total cost. The costs average out to about \$0.25 per child per visit.

Senator NELSON. Is your museum getting title I funds?

Mr. MOLD. No, no museum can. Only State and local education agencies are eligible for title I funds. All of the Federal funds we have received have had to pass through the hands of the local school district. As you know middlemen cost money, they cost the Federal Government money and they have cost my program money. It is my hope that this new legislation will encourage direct funding to museums.

What could be more appropriate to a program for environmental education than eligibility criteria that encourage the support and development of all the educational resources in a community—not just its schools?

We know our program works. We are delighted that the committee is interested in our program and hopeful that there will be an environmental education act that will make it possible for our program to continue and expand.

Senator NELSON. Thank you very much for taking the time to come here today.

Mr. MOLD. Thank you, Senator Nelson.

(The prepared statement of Mr. Mold follows:)

The Fairbanks Museum
and Planetarium
St. Johnsbury, Vermont

Statement of

FREDERICK MOLD, DIRECTOR

Fairbanks Museum and Planetarium
St. Johnsbury, Vermont

on the proposed Environmental Quality Education Act (S 3151)

Before the Senate Subcommittee on Education
Washington, May 19, 1970

Mr. Chairman,

I am Frederick Mold, since 1948 the Director of the Fairbanks Museum and Planetarium of St. Johnsbury, Vermont. It is a great honor and privilege for me to have the opportunity to testify today on S 3151, the proposed Environmental Quality Education Act.

St. Johnsbury, with a population of about 9000, is the county seat of Caledonia County which, with its sister counties of Orleans and Essex, comprises Vermont's "Northeast Kingdom." That name was given our area by a former Governor of our state, now your distinguished colleague and the Dean of his party in this body, Senator George D. Aiken. One of the most illustrious products of the Northeast Kingdom is the distinguished ranking member of this Subcommittee, Senator Winston Prouty, of Newport in Orleans County. The three counties contain 1,991 square miles and a population of about 45,000.

The Fairbanks Museum bears the name of one of the most notable Vermont families. In St. Johnsbury, over a century ago, Erastus and Thaddeus Fairbanks perfected the platform scale, and the company they founded gained national fame as Fairbanks Morse & Company. The

Fairbanks plant brought economic vitality to Caledonia County. But beyond that, its founders and their descendants were men of great public spirit and philanthropy. The Fairbanks Museum is a direct result of the civic interests of Franklin Fairbanks.

As a youngster, Franklin Fairbanks developed a deep interest in natural science. His diaries of weather observations included arrival times of birds, appearance of snow, sleighing, frost and flowers. They date back to 1853. The early nucleus of his collection, a calcite crystal collected at the age of ten, remains at the museum.

As the family scale business grew and prospered, funds were available to permit the young man to consider travel and wider collecting. His "curiosities" by 1880 included minerals, bird skins (set up by a taxidermist in his employ), and a botanical garden complete with greenhouses to keep the tropical and sub-tropical exotics he had gathered. The entire third floor of his mansion was the "museum." On Sundays the citizens of the area were permitted to enter and inspect the gallery. It is not difficult to imagine the strain thus placed upon the 19th century household. Mrs. Fairbanks must, surely, have dreaded Sundays.

In response to this and public pressures, Franklin Fairbanks in 1890 built a red sandstone edifice in Romanesque style on Main Street in the unpaved, wood sidewalked village. In his dedication address to the assembled townspeople, he charged the museum with

the responsibility of "public instruction." This was not only a charge to the Museum, but also an exhortation to the town school system to take full advantage of the new institution as a science department.

Now the family began to plan new and more ambitious trips to Europe, the east, and Africa. Sons-in-law sent in items from everywhere; bird skins from Southeast Asia, reptiles from Africa, and minerals from all quarters. The procession of teamsters bearing new and mysterious crates lasted twenty-five years. One great event was the mandate acquired by another Vermonter, Admiral Dewey, over the Philippine Islands. Ethnological material began to pour in from that corner of the ocean as St. Johnsbury's own William Ide was appointed governor. Samoa, Ponapé, the Gilberts, and the Marianas all yielded their treasures to his gathering, and they began to fill even the ell added to the building in 1895.

Classes from the local schools were treated to open cases utilizing all these things as well as American Indians artifacts. All the while, however, local birds, animals and some physical science were subjects of study for area children. Franklin Fairbanks was the first director and did some teaching. Staff Assistants, however, did most of this work.

Classes visited the museum once a month at first, but by the 20s, this slim contact was made more frequent by the alternate device of sending a visiting instructor with museum material to schools.

The fortunes of the Fairbanks family dwindled somewhat as male heirs failed to appear, and the E.&T. Fairbanks Company was swallowed by its sales department, thus becoming Fairbanks, Morse & Company. The museum and its sister institutions (St. Johnsbury Athenaeum, St. Johnsbury Academy, and a Y.M.C.A.) found the going harder. The Y.M.C.A. failed to survive and turned its assets over to the library, or Athenaeum, as it is called. The Museum's golden years had, for the time, ended. Open hours and instruction were limited by financial considerations.

When I arrived as Director in 1948, I was given the multiple responsibilities of fund-raising, designing and planning, and received two-thirds of my salary as a teacher from the St. Johnsbury school board. Paint, lights, glass and children began to flow again as interested donors refreshed the ailing coffers. Now, interest on the part of the Board of Trustees cured some of the ills plaguing the investment portfolio, making rejuvenation possible.

Other school districts in the vicinity began to inquire about room for their pupils in this vital, broadly oriented science instruction. Based explicitly on the need for broadening the understanding of conservation and ecological principles, the Museum's program was innovative in its interdisciplinary approach to the elementary science field. In 1965, the new federal aid to education made genuine region-wide participation possible. The instruments, tools and increased staff made it possible to bring fifty-five school districts into the program, previously available only

to limited numbers of classes from a few nearby towns. Today, with the heightened national interest in preserving and protecting our environment, interest in and demands upon the Museum's personnel and resources are sharply rising. Yet, Mr. Chairman, we are desperately concerned about our financial ability to respond to those interests and demands.

We know we can afford to maintain a browsing museum, where people can come in from the street and inspect our exhibits. But this is not enough. We must continue to operate a living and teaching museum - not just an attic of stuffed animals, but a meaningful museum which offers a real living experience to young people. We must continue our field trips to the fascinating natural areas which abound in the Northeast Kingdom - to Victory Bog, to Lake Willoughby, to Burke Mountain. We must continue our classroom activities, which attract children from schools miles away. We must continue to reach out to our local schools, to add our resources to theirs as they seek to impart an understanding of the vital necessity of preserving the environment of this small and crowded planet.

Mr. Chairman, the Environmental Quality Education Act before your committee is a well founded response to the growing national need for improved and increased education in ecology and its component sciences. Its purpose is

"to encourage and support the development of new and improved curriculums to encourage understanding of policies, and support of activities designed to enhance environmental quality and maintain ecological balance; to demonstrate the use of such curriculums in model educational programs and to evaluate the effectiveness thereof; to disseminate curricular materials and information for use in educational programs throughout the Nation; to provide training programs for teachers, other educational personnel, public service personnel, and community and industrial business leaders and employees, and government employees at State, Federal, and local levels; to provide for community education programs on preserving and enhancing environmental quality and maintaining ecological balance."

To that end it would authorize the Commissioner of Education to make grants to or enter into contracts with institutions of higher education and other public or private agencies, institutions or organizations for curriculum development projects, demonstration projects to test the curriculums, and dissemination of relevant materials so developed. The act would also authorize grants, contracts or other arrangements for evaluation of new curriculums, training of educational personnel, community education, and the preparation of materials for use by the media. A community based museum is uniquely qualified to undertake each of these important tasks.

Community museums like the Fairbanks Museum have been called the "sleeping giants of education," and rightly so. Yet museums are not regarded as education institutions by the Federal Government. The museum cannot receive Federal aid on its own. It can be granted only through local educational agencies. As a result museum programs are twisted and bent by school administrators and auditors at all levels, whose well intended supervision and management are oriented to traditions of other times and different institutional needs.

There is unquestionably a need for a close working relationship between community museums and local educational agencies. But this relationship will probably bring about some adjustment problems. Both the schools and the museum need money to operate. When the funding is exclusively controlled through local school boards and superintendents, the museum necessarily becomes a step-child of the system. However well intentioned, school administrators and auditors cannot be expected to fully understand the operating methods and approaches of the museum, for they may differ considerably from those of the ordinary public school system. So long as these persons hold the power of the purse over the museum, the museum can only accept their dictates, or opt out of what should be a productive and valuable symbiosis.

What is needed, I feel, is some Congressional force and support behind the fullest use of museum resources to complement the local school systems in the field of environmental education. So

long as the museum must beg for funds from the schools, its opportunities for introducing innovative techniques and broader concepts into the school curriculum are severely circumscribed. There is little two way exchange of ideas. The museum must fit into the school's plans as determined by the school administrators, or else the museum and its physical and personnel resources will not be incorporated into the school's programs.

I am pleased to note that S 3151 permits the Commissioner of Education to make grants or enter into contracts with "institutions of higher education and other public or private agencies, institutions, or organizations" to carry out the purposes of the act. This could clearly permit the Commissioner to fund a museum such as our directly. While I would hardly favor the funding of a local museum program completely independent of the program or goals of the local educational agency, I believe wise administration of this direct authority by the Commissioner could bring about a far stronger cooperative effort between museums and local schools. It would thus be possible for the Commissioner, in formulating regulations under the act, to require cooperative arrangements between museum and school. This is not presently the practice when the Federal Government funds local school districts under the Elementary and Secondary Education act.

It will perhaps be argued that S 3151 establishes yet another categorical grant program for education, at a time when the present Administration's policy lies in the opposite direction. I think

this objection overlooks the fact that this environmental education bill is not aimed at the permanent support of local environmental education programs, which should be a function of local educational agencies. The program envisioned by S 3151 is really a program to sharply increase the resources and techniques available to a vital area of education which has been sadly ignored in past years. When effective curriculums are developed and evaluated, when the findings of demonstration programs are in, when teacher training techniques are perfected and a wide range of educational materials are available, then S 3151 will have served its purpose. It could then be allowed to expire, since by that time it would no longer be needed as badly as it is now.

Mr. Chairman, I support this bill and hope your Committee will report it favorably to the Senate. I am satisfied that the operative language of sec. 3 permits the Commissioner of Education to make grants directly to community museums engaged in developing new environmental education techniques. I would, however, make one specific request: that your report to the Senate explicitly make the point that community-based museums offer significant potential for achieving the objectives of the act, and that it is the Committee's intent that the Commissioner of Education should embark on an active program for using these museum resources effectively, and for using the authority conferred upon him by the act to strengthen cooperative relationships between museums and local educational agencies.

Mr. Chairman, I very much appreciate this opportunity to appear before your Subcommittee, and I will be happy to answer any questions the members of the Committee may have.

The Fairbanks Museum
and Planetarium
St. Johnsbury, Vermont

SUMMARY

of Testimony by Frederick Mold, Director of the Fairbanks Museum and Planetarium, St. Johnsbury, Vermont, on S 3151, the proposed Environmental Quality Education Act, before the U.S. Senate Subcommittee on Education, Washington, May 19, 1970.

1. The Fairbanks Museum, located in Northeastern Vermont, has since 1890 been engaged in environmental education programs for the young people and adults of three Vermont counties.
2. There is today a sharply increasing recognition of the long-ignored need for educating young and old in the importance of protecting and preserving our environment and ecology. S 3151 would help meet that need by supporting new curriculum development, evaluation techniques, demonstration projects, teacher training, community education, and dissemination of environmental education materials.
3. Community based natural* history museums offer very important, and presently underutilized, resources for achieving the objectives of S 3151. Congressional recognition of the importance of community museums, along with authorization of Federal assistance directly to museums, would do much to achieve greater results in this area.
4. Under S 3151, the Commissioner of Education would have authority to assist in the development of stronger cooperative relationships between local museums and school districts. Under present arrangements the museum, because it can be funded only through the school system, becomes a stepchild of the school, under the control of school administrators and auditors who do not fully comprehend the differing procedures and requirements of community museums.
5. Although the bill would create a new categorical aid program, it is a demonstration and stimulation program in nature, and desperately needed at this time. Later, when it has resulted in widespread incorporation of environmental education programs into regular school curriculums at all levels, the act could be allowed to expire.
6. While the present language of S 3151 clearly permits direct funding of museums, it would be helpful if the Committee report on the legislation would make explicit the potential contribution of community museums, and encourage the Commissioner in administering the act to give special attention to realizing that contribution.

Senator NELSON. The hearings will resume tomorrow on S. 3151 and the other measures before the subcommittee. They will be held in the committee room of the Joint Committee on Atomic Energy at 10 a.m.

(Whereupon, at 11:45 the subcommittee adjourned, to reconvene at 10 a.m., Wednesday, May 20, 1970.)

ENVIRONMENTAL QUALITY EDUCATION ACT

WEDNESDAY, MAY 20, 1970

U.S. SENATE,
SUBCOMMITTEE ON EDUCATION OF THE
COMMITTEE ON LABOR AND PUBLIC WELFARE,
Washington, D.C.

The subcommittee met at 10 a.m., pursuant to recess, in room H-403, the Capitol, Senator Gaylord Nelson presiding pro tempore.

Present: Senators Pell and Nelson.

Senator NELSON (presiding pro tempore). Our first witness this morning will be Mr. John Marshall Briley, senior vice president, the Owen-Corning Fiberglas Corp.

Mr. Briley, the committee is very pleased to have you here today and appreciates your taking time to testify.

Your statement will be printed in full in the record. You may proceed as you wish.

STATEMENT OF JOHN MARSHALL BRILEY, SENIOR VICE PRESIDENT, THE OWENS-CORNING FIBERGLAS CORP.

Mr. BRILEY. Thank you.

I do appreciate the opportunities to appear. I have prepared a statement for the record, but I would like to summarize the contents rather than read the statement and then respond to any questions you may have.

I am here with really two hats on. As senior vice president of Owens-Corning Fiberglas Corp. I represent industry. Our company has approximately \$500 million of sales of Fiberglas and Fiberglas products which are used in a great variety of insulations and fabrics and for reinforcement of gypsum and other materials and Fiberglas-reinforced plastics which are used in boats and automobiles and appliance components, pipes, tanks, construction materials and a myriad of things, even spaceships. So that is my industry hat.

Also I am chairman of the Ohio Board of Regents, which is the statutory body in Ohio which has been set up to advise the legislature and the Governor and to be the coordinating planning agency for all of the institutions of State-assisted higher education in the State. So that is my other hat.

I appear in support of your bill which is concerned, of course, with the educational aspects of the subject of ecology. I want to make a disclaimer right at the outset that I am by no means an expert in ecology.

Senator NELSON. I don't think there are any. It is too big a field.

Mr. BRILEY. It may be a bit presumptuous because, as you say, it is terribly complex and there is very little public information.

It seems to me that the subject of ecology is concerned with the interrelationships that exist between plant life and animal life, human life, and the environment that we all must share on this planet. Man has been the first and only animal in history who has been able to exercise positive control over his environment and because of his brain and the technology that he has developed over the recorded history of man, he has been able to adjust the environment to his own needs.

But in recent years ecology has suggested that all life and environment on this planet has to be in a sort of a balance and this balance can either sustain life or, if it is disturbed seriously, can destroy life.

The concern that is now expressed in the field of ecology seems to be that man's progress may be upsetting this kind of a balance and can threaten our population, our physical survival even and our prosperity.

Now over the course of time man has had many technological achievements and I have outlined some of the more important ones in my statement, but the two outstanding ones, I think, are his conquest of disease and the expansion and diversification of food supply.

But technological achievement, apparently, cannot be achieved without some impact on environment, sometimes adverse, very often adverse.

For example, the technological achievement I have just referred to in the medical science and food supply has enabled an astounding increase in the world's population, but this increase has been so great that some people are now questioning whether this population growth, if it continues, may not soon exceed our environmental capacity to sustain human life in some sort of relative decency and with an adequate food supply.

We are also learning that technology can often be developed at a price of environmental quality. The use of herbicides and pesticides to increase food supply has introduced dangerous chemicals into the land and the water and the air and that has upset the ecological balance in plantlife and animal life, wildlife.

The development of industrial powerplants and the internal combustion engine have introduced gasses into the atmosphere which affect sunlight and which affect the atmosphere itself.

Our water cycle is contaminated so much and in so many places by industrial and household and human waste and, without adequate treatment, is returned into the water that we drink.

We have been consuming raw materials at an ever-increasing rate to the point where many authorities feel that the time will come when it will be impossible to find adequate replacements for these materials.

All of these, I think, are ecology problems and they are compounded by the fact that man seems to have a disposition to huddle together into great urban complexes, which makes it even worse. So it seems to me that the problem of environmental quality is the challenge of whether or not man can continue with population expansion and affluence without destroying or seriously impairing the environmental resources which are essential to human life.

Now there are two extremes in this argument. One is that the economic and technological development of man, if it continues, will so pollute the world with the excrement of his technology and the

consequences of his neglect that the air will be unbreathable and the water will be undrinkable and therefore we ought to stop all of this stuff.

The other extreme is that the economic and technological advance of man is the most important thing, far more important than landscapes or clear skies.

Now I think that reasonably man could agree that somewhere between these two extremes; that is, between the extreme of the primeval forest or the dead world, someplace in between those two extremes we will have to find the answer to our ecological problems.

Now already in this field twin characteristics of the American people are beginning to appear. One is the characteristic of being impatient to solve any problem that confronts us and the other is the tendency to go into action without finding out what the facts are and what the actual dimensions of the problem might be.

Also there is a certain mysticism which seems to be beginning to emerge in ecological thinking, and that is the idea that nature's balance is so delicate that it can't be touched and that the values of economic growth are now outmoded because the technical advances of man are moving so fast that we are just hurtling down the road to our own destruction.

Now I think it is an error to take the position that mankind has only two alternatives, to stop economic growth or else go down the road to destruction, because it seems to me that such a belief, if it should become widely accepted, could paralyze the serious action which is needed now. This bill is one step that should be taken.

I, for one, don't concede that economic growth should be stopped or slowed. This country, I don't think, could stop it if it wanted to. We are going to need jobs and homes and transportation and education and recreation for a hundred million more people and technology is going to have to advance to meet these needs.

So the problem is how do we do it without ruining ourselves in the process? This is why I feel that we must equip ourselves to make a real assessment of technology. By that I mean to be able to find the relationship between the environmental consequences of a technological development.

Now one dramatic example of this is the need to assess this problem I referred to before and that is to take the belief that population growth has got to be stopped. This is a pretty widespread belief.

Now even more widely believed is that the use of herbicides and pesticides has to be slowed down. Now what is the relationship between these two? If we thereby lessen agricultural production by eliminating or slowing down the use of pesticides and herbicides, wouldn't this threaten our existing population with a lessened food supply?

So we are going to need some balance between the technology and the food production and the growing pressure of population, because science has removed it from the power of nature to control this balance through drought and pestilence and natural disasters. This is what I mean by assessment.

Now I would like to comment briefly on these two characteristics of the American people that I mentioned a little bit before, that is, the impatience for results and the desire to move ahead despite ignorance of the facts. It is almost a trite expression now that the Nation that

can spend billions to put a man on the moon ought to be able to solve its ecological problems.

But like most generalizations, I suppose including this one, it leads to a false conclusion and that is that it is only a matter of spending enough money.

Now this is not necessarily true and I would like to cite an example from my own company. We have always had problems of air and water pollution from our plants and nearly 10 years ago I personally set up a program to do something about it. We soon found out after we started on this program that there were no machines or equipment that we could buy that would do us any good in solving our problem.

We only found this out after about 2 or 3 years of work and spending \$5 million on one plant. So we then decided that we had to reorient our thinking and think in terms of something that would stop the pollution from developing in the first place rather than curing it after it developed.

This reorientation approach is very fundamental, because it meant that we had to go back and change the basic technology of our processes in making glass fibers. We charged the R. & D. people with the responsibility for developing these basic changes and coming up with a product which was of the right quality and at a price the customer could afford.

We have done this. It has taken a lot of time, it has taken a lot of dollars. Relatively, it has taken more time than it has dollars, but we finally have got to the point where we think that we now know how to control these things in our plants. The point is, and this is important, it isn't just dollars, it is time, in a great many of these instances, that is required.

So what I fear is that in the rush to end pollution and make the world safe for future generations, there is going to be a certain excitement engendered in the impatient pursuit of a worthy cause and this may obscure reasonable consideration of the ecological problems we face. This, I think, is one of the real major problems in solving the problems of ecology.

Now I am sure that technology will solve these problems, given enough time and enough money, but it seems to me the ultimate question will be is society going to be willing to pay the price in time and money? Whichever way the cost is going to have to be met, whether it is by increased taxes or higher prices or lower profits, it is going to be a big bite out of everybody's personal pocketbook and it means the manner in which the gross national product is spent in order to solve the ecology problem is going to be changed.

Now this is an enormous and complex problem and it has great economic and political consequences and that is why I feel that it is going to need a great deal of more knowledge and more delving into the facts, assessment of the technology and some hard thinking.

Now business has been one big part of the ecology problem, not the only one, but it has been a big part. Business should become an active part in the solution of the problem and this is one reason that I feel that business should support this bill, because it is, I think, a reasonable beginning for a rational assessment of the facts.

Now another reason business should support it is that there is an increasing need in industry for people who are trained in the field of

ecology. Now in the experience of my company as to the college graduates that we have taken on in the last few years, none of them have the necessary training in ecology and environmental control that is needed in industry.

You take a professor of science in chemistry. Now he has had a brief exposure to water pollution control. He has had none at all in industrial hygiene or in the phases of air pollution like sampling and administration, equipment, and that sort of thing.

Or, a bachelor of science in civil engineering has been trained in water pollution systems and he has some information on public health like mosquito control and landfill and garbage incineration and that sort of thing, but neither has he received any training at all in the fields of industrial hygiene or air pollution control.

The third discipline in a bachelor of science degree is mechanical engineering. He has had very little chemistry, very little water pollution work and none at all in air pollution control.

Now as far as I know, in any of the institutions I am familiar with, there are no baccalaureate courses available today which are at all adequate in the field of environmental control or ecology. So a student must either continue his education beyond his baccalaureate degree into the master's and doctorate field or else he has to acquire this experience by working with a public pollution control authority or even an industrial pollution control program.

Now when we get a graduate from college with a bachelor of science degree in any one of these three disciplines, he is not very valuable to us until after he has had 2 years of practical experience. Then we have to return him back to college or the university to get his master's or his Ph. D. in the field of sanitary or environmental or public health.

Now I feel that from the standpoint of industry, it would be highly desirable if undergraduate students could receive training in at least some areas of ecology and environmental control and, in my statement for the record, I have set forth a number of courses which I think would be good things to study.

Now I would like to comment from the standpoint of higher education. Here I have some difficulty, Senator, with some of the details of the bill, 3151. These doubts may or may not be valid, but they do raise to my mind, at least, some questions as to how education and ecology should be approached.

I understand there will be some amendments proposed to the bill to be considered by the Education Committee of the Senate, including those introduced by Senator Pell. But just to avoid any confusion, I will confine my remarks to your bill, because that is the one I have been asked to testify on.

My doubts stem from the fact that there is really no science of environmental, and from my observation of the emerging subject of ecology, it is an emerging discipline within the biological sciences whereas most of the technology that is involved and the knowledge that is involved is in the other academic disciplines, the other sciences.

Even political science is involved, because the problems of environmental quality are never going to be solved by scientists and engineers. Environmental quality, I think, concerns not only technology, but also economic development, financing, and institutional action at various levels of government and private industry.

So I think the subject of ecology must be considered in terms of biological, medical, economic, social, technological and, most important of all, its political aspects.

Now I have earlier urged patience in implementation of pollution controls, particularly in those where our knowledge is inadequate as to whether these controls are sound or not. But I urge all possible speed in the development of curriculums which will enable us to enhance our environmental quality. Here is where we must be most impatient to make progress.

I think you are to be commended, Senator, for seeing that this emerging science of ecology needs assistance and direction and in proposing this bill to accomplish it.

It would be very difficult for a reasonable man to disagree about the statements of findings and purposes which are contained in your bill. But there are certain questions that I would like to raise regarding the manner in which these purposes are to be achieved. I want to emphasize the reason I raise them is because I hope it will be of some help in making the bill stronger.

In the first place, it seems to me that the language is far too broad and gives an unlimited charter to the Commissioner of Education. I think that the maximum emphasis should be on the development, demonstration, and evaluation of curriculums rather than diluting this effort by the many other avenues that are open to the Commissioner, particularly in subsections (4) and (5) of section 3. Subsection (5) is the public relations section.

In my view the bill could also be greatly strengthened and a lot of time saved if the Commissioner of Education were directed to consult with other Government agencies and universities in his task of developing educational programs or curriculums.

Now there is a great deal of experience and data available, I am sure, in our universities and in the Department of Interior, Department of Transportation, Department of Health, Education, and Welfare. I think there should be a sense of urgency in this bill so that we would avoid spending a lot of time and money for one agency to relearn what others have already learned, so that from the very beginning of the administration of this bill, once it is passed, all that is known in this field of ecology and environmental control could be incorporated into this effort.

Now another thing, I think, is too broad is the definition of "grant eligibility." That is so broad that any outfit that springs up that shows some concern in ecology would be eligible. This gives me some concern.

I would hope that in the administration of this bill that we could borrow from the experience that at least in Ohio we have had under the Higher Education Act and tie eligibility to a State accrediting agency. That is just a suggestion.

Now another broad authorization is the definition of the "proposed advisory committee" and that just takes in anybody that the Commissioner of Education wants to put on it.

Also the bill authorizes the Commissioner of Education to promote understanding of policies in the field of environmental quality. What policies? I don't know of any policies in this field of ecology and environmental control that aren't the subject of considerable controversy.

Some people say we ought to reduce or limit our economic growth. Others say we ought to spend more money on sewage disposal and mass transportation and new sources of energy. Some argue that the Government should subsidize the whole cost, others say the Government should subsidize it through various tax devices and others say industry should pay the cost.

These are all policies, if you will, that are of great controversy.

Now ultimately these are going to have to be defined by Congress, not by some bureaucrat, because they are going to have enormous political and social and economic consequences. How can Congress define them at this point without much more knowledge of the facts and analysis of the problems and debate?

Here again I fear that the Commissioner, if he is charged by Congress with such a broad responsibility and authority to enunciate and develop and promote policies, that he is going to be unable to accomplish the basic educational purposes of the bill.

Now this is a minor thing, but I have been bit by it several times. The bill calls for grants to institutions of higher education for various curriculum projects. This is what I think I said about the Federal Government paying the entire cost of this.

There have been too many examples in the past where universities have undertaken some task for the Federal Government and then before it is finished, the thing is stopped or the scope is changed and the university ends up picking up a substantial part of the cost. That is a minor thing, but one I am interested in.

Now just recently we have seen the Federal approaches to this problem of ecology beginning to multiply. HEW recently announced projects under title I of the Higher Education Act which involved 78 colleges and universities in 36 States "to help citizens solve problems of air and water pollution."

The Department of Interior has just announced a pilot project, nationwide, junior and senior high school program "to examine community water pollution problems."

It seems that now is the timely opportunity, Senator, whereby this bill of yours could move toward a concentration of effort and responsibility and thus discourage at the outset a proliferation of these, bureaucratic approaches to a set of problems that are so vast that billions could be wasted.

Now it seems to me that most of these doubts of mine could be laid to rest by a little different approach. For example, why wouldn't it be a good idea in this ecological education bill to take the basic initial step of authorizing grants for the development of curricula just as now, but with more specific direction to the Commissioner and with a modest appropriation of a couple of million dollars for a year or two and at the end of that time require the Commissioner to report back to Congress on what has been accomplished and what his recommendations are for the future?

This would force the Commissioner to make a full and complete evaluation of the curriculums that have been developed under these grants.

Now there is no question but what it will be useful to undertake these experimental and development projects in devising instructional material and curriculum guides in this whole subject, just as this bill

envisions, but shouldn't this work be comparatively concentrated in order to get the maximum impact?

If funds are distributed among a large number of institutions and various agencies and a large number of different projects can much in the way of accomplishment be expected? In other words, I would hope that the Commissioner would develop the educational programs and curriculums from a narrower base, but in a far greater depth.

Finally, I would like to reemphasize that our knowledge as to how environmental quality can be improved is limited. The entire subject is vast and complex. There is yet little general agreement, let alone informed understanding, about public policies which can enhance our environmental quality without forcing surrender of many of the achievements of civilization.

The real challenge that we are facing today is how can man simultaneously advance his civilization and preserve the quality of his environment within the limitations of a healthful, prosperous balance between life and environment?

This being the challenge, I think that every possible and reasonable method to advance our understanding of this great issue has got to be pursued and this bill, in my opinion, both as a manufacturer and educator, is a long overdue step in that direction.

Thank you, sir.

Senator NELSON. I want to thank you for your very constructive and thoughtful suggestions.

In fact, one of the reasons S. 3151 was drafted with rather broad authorization was because we did not originally have enough knowledge to delineate in final detail all the things that ought to be done. The general idea was that the Commissioner of Education would call upon the resources of the Federal Government and the scientific, industrial, and academic communities to help develop programs.

This was presumed to be the only logical way to proceed. Your suggestion that perhaps there ought to be some specific directive to that effect is useful.

I think the idea that the Commissioner make fewer in-depth grants rather than a large number spread all over makes good sense. He ought also, as you suggest, report to Congress on some specific aspects of the proposals in the development of curriculums and so forth.

There is another missing aspect of this bill. I introduced separately a bill which should have been included in the first place as an amendment. It is in reference to your comment on the problem of hiring anybody who is a real environmentalist. You end up with a hydrologist or a chemist or a biologist or somebody who is well trained in one particular aspect of one particular discipline rather than being qualified in any general way as an ecologist or a broad-gage environmentalist.

A bill introduced early in the month provides for establishing what is called the Environmental Careers Fellowship Act. I would hope this subcommittee would incorporate it or the principle of it in the Environmental Quality Education Act.

The concept does aim at exactly the point you made about hiring somebody in your industrial plants with a bachelor's degree or another degree which is very narrow in the area it covers. This proposal

would provide for the establishment of fellowships aimed at having the student go into a department or institute within a university which is broad-gage with the objective being to make a broad-gaged environmentalist out of your hydrologist or chemist or biologist or what-have-you.

In other words, it is designed to broaden his approach to the whole subject. That is the only basis upon which this fellowship can be granted in that they are going into an institute that includes an interdisciplinary approach.

Now the interdisciplinary institutes of departments and universities are relatively new and relatively few. Many universities which have been interested in the environment have been trying to work out an interdisciplinary approach with each department still retaining its sole jurisdiction over everybody within those disciplines within their department.

There has been a move in another direction, as I am sure you are aware of. The one I am most familiar with is the institute created at the University of Wisconsin this year. It is an environmental institute with its own personnel and its own director, with all the disciplines you suggested, so far as I know, including the humanities, the social sciences and the various natural sciences and engineering. So they have their own cadre and are aiming at a program of broad environmental education.

Then other departments are called upon to furnish the necessary personnel for particular projects that they may be involved in. I think it is a fruitful approach, a necessary approach, and in that way we will be able to give the kinds of training you were making reference to.

The bill aims at giving some grants to universities to help set up that kind of an institute.

S. 3151 as you know from reading the bill, affords programs of education and institutes for people in industry, public service, and teachers in primary and secondary schools. I recognize that S. 3151, as initially introduced, is a first draft of a proposal and, of course, one of the important reasons of the hearings is to get a commentary on the proposal from a broad spectrum of people, so that in the markup session we will be able to incorporate into the bill the best of the ideas that have been presented at these hearings.

So the committee appreciates very much your taking the time to come here and give us your very thoughtful commentary. It is most valuable to the record. Thank you very much.

Mr. BRILEY. Thank you, Senator.

(The prepared statement of Mr. Briley follows:)

STATEMENT BY
JOHN MARSHALL BRILEY
BEFORE THE
SUBCOMMITTEE ON EDUCATION
OF THE
COMMITTEE ON LABOR AND PUBLIC WELFARE
UNITED STATES SENATE
WEDNESDAY, MAY 20, 1970

I appreciate the opportunity to appear before your committee to discuss Senate Bill 3151. First, I would like to identify myself, since I appear not only as a member of the industrial, but also the educational community.

As a manufacturer, I am the senior vice president of Owens-Corning Fiberglas Corporation. We have sales upwards of \$500 million annually, and are engaged primarily in the manufacture of glass fibers and glass fiber products which are used in all types of insulation, in fabrics, in filtration and in the reinforcement of paper, gypsum and a myriad of plastic products such as automotive and appliance parts, pipes and tanks, construction materials, boats and even space vehicles.

From the standpoint of education, I have been for over six years the chairman of the Ohio Board of Regents -- which is the co-ordinating and planning agency for the entire state-assisted system of higher education, and the advisory body to the executive and the legislature. My name is John Marshall Briley, and I reside on a farm at Perrysburg, Ohio, near the city of Toledo.

I appear in support of Senator Nelson's bill, which is principally concerned with the educational approach to the problems of ecology.

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I am decidedly not an expert in the field of ecology, and I feel at a disadvantage in presuming to comment on a subject so extremely complex, and on which there is so little public information. Accordingly, I hope it will not be taken amiss, nor considered presumptuous, if I review briefly what seems (at least to me) to be the overall problem of ecology.

Ecology is concerned with the inter-relationships between the lives of plants, animals, and man, and the environment they share. One of its major concepts is that, in the process of natural selection, all forms of life must adapt to the necessities of survival in an environment of land, water, air, and sunlight. In fact, the study of ecology has suggested for some time that there is a kind of balance which develops between all life and the environmental factors on this planet - a balance which can either sustain or destroy life.

Man himself is the first and only animal in history who has exercised a positive control over his environment. Through the power of his brain, and with the assistance of the technology he has continuously devised for performing his life's work, man alone has been able to adjust his environment to his own needs. In his drive for civilization and learning which has brought him from the cave and the wandering nomad to his present state of great numbers, remarkable health,

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and considerable influence, man has probably upset some ecological balance which could eventually threaten our population, our physical well-being and our prosperity.

Probably man's two outstanding achievements in relation to his environment have been his conquest of disease and his expansion and diversification of food production. Certainly both of these technological achievements have reached substantial levels of accomplishment.

Another great achievement of man's technology has been the growth in his material comforts: in his use of power to free himself from the slavery of manual labor; in his use of resources with which to develop shelters to withstand extremes of cold and heat; in his development of amazing means of transportation and communication; in his discovery of synthetic raw materials; and in his greatly expanded opportunities for education and recreation.

But technological achievements can also have an adverse impact upon man's environment. For example, technological achievements in both medical science and food supply, have caused an astounding increase in the world's population; so great, in fact, that some are now questioning whether the world population growth may not soon exceed our environmental capacity to sustain human life in a state of some decency and with an adequate food supply.

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We are also learning that technology is often developed at a price in environmental quality. The herbicides and pesticides, which have done so much (along with mechanical equipment) to expand agricultural production, may also introduce dangerous chemicals into our water and food supplies, as well as upset balances among species of wildlife. The industrial power plant and the internal combustion engine introduce gases into the atmosphere which may reduce sunlight as well as dangerously affect the atmosphere for plant, animal, and human life. The water cycle, contaminated in many cases by industrial, human, and household wastes, is returned poorly treated into our water supplies. Our advancing standard of living is consuming raw material resources at a rate which might well be beyond our capacity to find appropriate replacements. And environmental problems are compounded by man's increasing disposition to live in great urban complexes.

In this complex society of 1970 there is an instinctive yearning for the simpler and more wholesome environment of the poet's barefoot boy. But, as a practical matter, what we are concerned with today is the preservation of America's priceless heritage of clean air and clean water, of timber, land and wild-life -- or at least what is left of it.

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The concern for conservation is not new. In 1681, when William Penn was planning the city of Philadelphia, he said: "Let every house be placed if the person pleases, in ye middle of its platt as to the breadth way of it, that there may be ground on each side for gardens, or orchards or fields, so it may be a greene country towne which will never be burnt and will always be wholesome..." Memories of the Great Fire of London, and the dreadful plague, were still vivid at the time and, although Penn was planning a village in the middle of America's primeval forest, still he was aware of the need for trees and gardens in a city plan to prevent the spread of fires and to assure a healthy community.

But the remarkable development of our economy and society has taken us far beyond the planning of a Penn, and we will never return to the forest primeval. The problem of environmental quality is the challenge whether or not man can have population expansion and affluence without destroying or vitally impairing the environmental resources essential to human life. At one extreme is the argument that man's own physical survival will eventually so pollute this planet with the excrement of his own technology and the consequences of his neglect, that the water will be undrinkable and the air unbreathable. At the

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other extreme, it is said that man's economic advance is more important than landscapes or clear skies. Reasonable men will agree that, somewhere between these extremes (i.e. the forest primeval and a dead world) we will find the solution to the problem of preserving our environment.

Twin characteristics of the American people are now becoming involved -- characteristics which can be either virtues or vices. And by that I mean our well-known impatience to solve any problem that confronts us as a nation, and our tendency to go into action in ignorance of the facts or the nature or dimensions of that problem.

The recent Earth Day turnouts indicated that both impatience and ignorance are involved. They also evidenced that there is a certain mysticism beginning to develop in ecology thinking -- the idea that nature's balance is so delicate it can't be touched, that the values and virtues of economic growth are outmoded because our technological advances are moving mankind towards its own destruction. This may be true, or it may not be true. But I believe that it is error to state that mankind has only these two alternatives (i.e., to stop economic growth or hurtle down the road to doomsday), because such belief -- if accepted -- could paralyze serious action that is needed now. I submit

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that we should move as rapidly as we possibly can towards an accurate assessment of the facts, so that the ecology problem can be appraised and defined -- factually and unemotionally.

I do not concede that economic growth has to be stopped, or even slowed down. This country couldn't stop it if it tried. We must have jobs, homes, transportation, education and recreation for 100 million more people. And technology itself must grow, because it holds the possible remedies not only for saving the environment but for doing it rationally. Only by further advances in technology can some environmental problems be met, such as improvement in housing standards, improvement in transportation and improvement in living conditions generally. But it is now obvious that man in our present society must give greater attention than ever before to technological assessment; to an evaluation of the relationship of environmental consequences to technological development.

One dramatic example of the need for such assessment is the apparently growing belief that reduction in the rate of population growth is probably one necessary step at this time. Indeed this is official policy in many governments and societies today. But it is even more widely agreed that more careful use

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of pesticides and herbicides also may be essential; but if we thereby lessen agricultural production, will we not threaten even our existing population with inadequate food supplies? It would seem that we will probably need some balance between the technology and environment of food production and the pressure of growing populations, because science has made it difficult for nature to control this balance through drought and epidemic. This is what I mean by assessment.

I would like to comment, very briefly, concerning the two characteristics of the American people I have adverted to earlier -- acting through impatience for results and despite ignorance of the facts. For, in our concern for environmental quality there is a danger of action (or even worse, despair) because of our lack of knowledge of the facts about how to restore environmental balance in our lives.

It has become an almost trite expression that a nation that spends billions to put a man on the moon, should be able to solve its pollution problems. But like most generalizations it leads to a faulty conclusion, i.e., that it is only a matter of spending enough money. This is not necessarily true.

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In my own company, for example, we have long had problems of air and water pollution. Nearly ten years ago we began taking steps to solve the problems, and we soon discovered that there were no existing machines or equipment we could buy which were of much help. But we found this out only after spending upwards of \$5 million at one plant alone. We then recognized that our best approach was to eliminate the sources of pollution, and this reorientation of our approach proved to be of fundamental importance. It necessitated basic changes in the manufacture of glass fibers.

Our research and development people were charged with the responsibility to create and develop changes that would eliminate or control our plant effluent, and produce quality products at prices the market could afford. We think we have made significant progress. We expect to make more. This takes money, of course, but it also takes time -- and lots of it. And even then we have found that different plants (and even different manufacturing lines within the same plant) require different solutions.

But we are an impatient people. This very trait has accounted for our amazing progress and development over a span of 100 years wherein we have grown from a divided, war-shattered, and infant nation into a great world power.

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We have succeeded because we have demanded instant success, but psychology teaches that instant gratification can be a dangerous thing; dangerous, because it is not always possible. We have been so successful in doing so many things so well and so swiftly that we are not conditioned to the right kind of attitude for tasks which are going to prove difficult and relatively slow. In the sudden rush to end pollution and make the world safe for future generations, it is more than likely that the excitement engendered in the impatient pursuit of a worthy cause may obscure reasonable considerations of the ecological problems we face. And this, to my mind, is one of the major problems in solving the problems of ecology.

There is no question about technology coming up with remedies. They either exist now, or can be found with enough time and effort. The ultimate question will be: Is society willing to pay the price in both time and money? Whichever way the cost is met -- increased taxes, higher prices, lower profits -- it will take a big bite out of everybody's personal pocketbook. It means a switch in the way our Gross National Product is spent to meet ecological needs.

These are going to be enormously complicated economic and political issues. And that is why we need a great deal of analysis, fact finding, technological

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appraisal and hard thinking.

Business has been one big part of the ecological problem (although certainly not the only one) and business should become an active party to the solution. This is why I think business should support this bill. It is a reasonable beginning for a balanced assessment of the facts.

Another reason business should favor this bill is because of the increasing need for people trained in the field of ecology. It has been the experience of my company that college students do not receive the necessary training in ecology and environmental control that prepares them for industry.

A Bachelor of Science in Chemistry has only had a brief encounter with water pollution control, and none whatever in industrial hygiene nor phases of air pollution such as sampling, administration, equipment, etc.

A Bachelor of Science in Civil Engineering generally receives extensive training in water pollution control and potable water treatment as well as some information on public health such as mosquito control, land fill and incineration of garbage and rubbish and so on. But neither has he received any training in the fields of industrial hygiene or air pollution control.

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A Bachelor of Science in Mechanical Engineering has very little chemistry, very little water pollution work and no training in air pollution.

There are no baccalaureate degree courses available today, at any of the schools with which I am familiar, that educate students adequately in the field of environmental control. A student must either continue his education into the master and doctorate level, or acquire experience by working in a regulatory or industrial environmental control program. When we receive a graduate with a Bachelor of Science degree in one of the three disciplines, he is of little value to us until after two years of experience in the field. Even then, he is seldom capable of coping with a total problem (i.e., combined air, water and solid waste problem) without supervision and assistance on a continuous basis.

The best program we have been able to develop is to take a graduate with a Bachelor of Science degree in either mechanical or civil engineering, train him for two years and then return him to college for master's and doctorate work in the sanitary, environmental or the public health fields.

It would be highly desirable if students at the undergraduate level could receive training in at least some areas of ecology or environmental control.

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It would be rather fruitless, with the changing pattern across the country, to have courses on regulations; however, it would be appropriate to have general courses on administration of environmental control organizations and, in the technical field, instruction in such areas as sampling and analysis as it relates to industrial hygiene, air and water pollution. Other areas of training that should be made available are those dealing with characteristics of contaminants such as fluorides in water and in gases, suspended materials in water and in air, threshold limit values of various toxic materials, and the general handling of chemicals to prevent problems in industrial hygiene and pollution of air and water. Courses in organics and inorganics, as related to these various fields should also be available as credit courses.

I would now like to comment from the viewpoint of higher education, and here I have some difficulty with the details of Senate Bill 3151. These doubts may or may not be valid, but they do raise, to my mind at least, questions as to how education in ecology should be approached. I understand that there will be amendments to be considered by this committee, including those recently introduced by Senator Pell. But in order to avoid confusion, I will confine my remarks to Senator Nelson's bill, on which I have been permitted to testify.

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My doubts stem from the fact that there is really no science of environment and from my observation that, whereas the subject of ecology appears to be emerging as an academic discipline in the biological sciences, the great bulk of the technology involved lies principally in other sciences. Even political science is involved, because the problems of environmental quality will never be resolved by engineers and scientists alone. Environmental quality concerns not only technology but also economic development, financing, and institutional action. And preservation of our environment will demand efforts by business and industry, by governments at all levels, and by our educational system. It is a subject which will have to be considered in terms of its biological, medical, economic, social, technological, and, most of all, its political aspects.

I have just finished urging patience in the implementation of pollution control procedures in those instances where there is a serious lack of information to make them sound, but I urge all possible speed in designing and establishing curricula which will enable us to enhance our environmental quality. Here is where we must be most impatient to make progress.

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Senator Nelson is to be commended for seeing that this emerging science of ecology needs assistance and direction, and in proposing legislation to accomplish it.

It would be difficult for reasonable men to quarrel with the Statement of Findings and Purpose set forth in his bill. But there are certain questions I would like to raise regarding the manner in which purposes of the bill are sought to be achieved, and I raise them in the hope that it will be of help in making the bill stronger.

It seems to me that the language of this bill is far too broad and is virtually an unlimited charter to the Commissioner of Education.

I think the maximum emphasis should be put on the development, the demonstration and the evaluation of curricula, rather than diluting that effort by the many other avenues open to the Commissioner, particularly under subsection (4) and (5) of Section 3.

In my view the bill would be greatly strengthened, and a great deal of time saved, if the Commissioner were directed to consult with other agencies of the government, as well as universities, in the development of educational programs and curricula. There is a great deal of experience and data available,

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I am quite sure, in our universities and in the Department of Interior, the Department of Transportation and the Department of Health, Education and Welfare. There should be a sense of urgency about this bill, and let us avoid spending unnecessary time and money for one agency to relearn what others have already learned. From the very beginning of the functioning under the authority of this bill, all that is now known on the subject should be incorporated.

The definition of grant eligibility seems far too broad -- so broad, in fact, that every outfit which springs up and voices concern for the environment could qualify. This gives me some concern and I would hope that, in the administration of the bill, we could borrow from experience with the Higher Education Act, and tie eligibility to a state accrediting agency. Likewise, in subdivision (b) of Section 4, shouldn't the language be sharpened so that approval of the state agency would be required rather than the state having only the "opportunity to offer recommendations"?

Another very broad authorization is the definition of the composition of the proposed advisory committee, which takes in almost anybody.

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The bill authorizes the Commissioner to promote understanding of policies in the field of environmental quality. What policies? I don't know of any policies in this field which are not a matter of considerable controversy. Some people argue that we must reduce our population, cut down our consumption, and limit our economic growth. Others are urging that we improve our technology in order to reduce water, air, and land pollution; saying in effect that we must spend more money on sewage disposal, mass transportation, and new sources of energy. Some say the government should wholly subsidize the cost; others that it should partially do so through various tax devices; others that industry should bear the cost. These are all matters -- policies if you will -- of great controversy. I suppose they will ultimately have to be defined by the Congress. But how can it define them -- intelligently and fairly -- without much more analysis and fact finding and debate? For any of these policies, once adopted, will have enormous economic, social and political consequences. Here again, I fear that the Commissioner, if charged by Congress with such a broad responsibility and authority as to basic policies, will be unable to accomplish the basic educational purposes of the bill.

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Finally, although the bill calls for grants to institutions of higher education for various curricular projects, nothing is said about the federal government paying the full cost of such projects. This could well become another example (of which there have been far too many in the past) where our universities have undertaken some task for the federal government and then find the project stopped, or its scope altered, and the universities themselves end up paying a substantial amount of the cost.

Already federal approaches to the problem are beginning to multiply. The Department of Health, Education and Welfare has very recently authorized projects under Title I of the Higher Education Act, involving 78 colleges and universities in 36 states "to help citizens solve problems of air and water pollution." The Department of Interior has recently announced a pilot project aimed at developing a nationwide junior and senior high school program "to examine water pollution problems in their own communities." This is a timely opportunity whereby the bill you are considering can move towards a concentration of effort and responsibility and thus discourage, at the outset, a proliferation of bureaucratic approaches to a set of problems so vast that billions would be wasted.

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It seems to me that most of the doubts I have raised could be allayed by a little different approach in this legislation.

For example, why wouldn't it be a good idea for this "ecological education" bill before you to take the basic initial step of authorizing grants for the development of curricula (just as it now does, but more specifically directed), with a modest appropriation of one or two million dollars and for a specified experimental period of two or three years? At the end of that time the Commissioner of Education would have to report back to Congress specifically what had been accomplished, and with his recommendations for future programs. This would force the Commissioner to make full evaluation of the curricula developed under these grants.

It would undoubtedly be useful to undertake experimental and developmental projects in devising curricular guides and instructional materials about the whole subject. This developmental work should be comparatively concentrated in order to obtain maximum impact. If the funds and effort are distributed among a large number of universities and a large number of different projects, very little in the way of accomplishment can be expected. In other words, I would hope the Commissioner would develop the educational programs and curricula

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from a narrower base, but in far greater depth.

Finally, I would like to re-emphasize that our knowledge as to how environmental quality can be improved is limited; the entire subject is vast and complex; and there is yet little general agreement, let alone informed understanding, about public policies which can enhance environmental quality without condemning man to surrender many of the achievements of his civilization.

The real challenge for man today is the simultaneous advancement of his civilization and the quality of his environment within the limitations of a healthful and prosperous balance between life and environment. Every possible and reasonable method to advance man's understanding of this issue must be pursued today. And this bill before you, in my opinion both as a manufacturer and educator, is a long overdue step in that direction.

Senator NELSON. Our next witness is Mr. Edward Ames, Division of Resources and Environment of the Ford Foundation.

The committee appreciates your taking time to come here today and present your statement. It will be printed in full in the record and you can present it however you desire.

STATEMENT OF EDWARD A. AMES, PROGRAM OFFICER, THE FORD FOUNDATION

Mr. AMES. Thank you, Senator Nelson.

I am very pleased to be here in response to a letter of invitation from the chairman.

I would like to summarize my statement. The Ford Foundation has had a variety of programs in the environmental field and, more specifically in education, starting in June 1966 and going through the present.

Today I would like to talk about programs in elementary and secondary schools, and about how schools may affect behavior in relation to the environment. In doing so, I will give you some specific examples because, among other difficulties, the term environmental education suffers from a lack of definition.

Virtually all learning consists of coming to grips with one's environment in one way or another. The problem that has concerned us is that the schools present a very special environment which is different from that of the community and quite separate from the life which surrounds them. This separation is pervasive throughout the school experience, both in the elementary and in the secondary schools.

Children learn about the environment of their community from being in it, and from their direct experience in it. In schools, they learn about school environment and how to survive in that special setting.

This is a fundamental problem of education, and it is the level at which we have sought to develop programs at the Ford Foundation. As we have gone around to schools and have talked to people about programs in environmental education, we have been concerned by the separation between the school and the community.

This separation comes about because the teachers are not trained to take advantage of the resources in the immediate community. It also comes about because the textbooks treat the environment in a very generalized way, and because the administrative practices in many schools make it difficult for classes to go out into the community and have a free exchange of materials and experiences in the local surroundings.

This separation exists even because of the architecture of the schools. For instance, I.S. 201 in the city of New York is in a building without windows. It is also lifted up a floor above the street level. This was done with a constructive purpose in mind, but it does, we have to recognize, represent at least a symbolic separation between school and community. This symbolism is in all probability not lost upon the children who go to school there.

I think we can assume that this separation has a behavioral effect on children, although it may be hard to measure. Our concern has been to find ways of making the actual experiences of children in their

environment as important a part of the learning environment of schools as possible.

One way of doing this is exemplified by a program on water pollution at the Tilton School in Tilton, N.H. Forty or fifty teachers from both public and private schools have been trained to date in teams with children from those same schools.

The teachers and the children go out into the local communities and they make measurements, observations, assessments of the water quality in local streams. They learn the technology of making these measurements, and of using the appropriate instruments in addition to learning a good deal of basic science.

They then investigate water pollution control law, the economics of the enforcement of this law, the practical problems of standards and the enforcement of standards and what this means to the communities, including the question of financing secondary sewage plants, and the question of industry's attempts to comply with the laws.

The result is a very broad program organized around a specific topic, namely, water quality. Significantly it also involves some changes in what goes on in the school and these changes are quite important, I think.

First, the student is put in a central position to contribute to the design of his own academic program. At the Tilton School the training involves teams of teachers and students, who prepare research programs to be carried out in their own schools during the following school year.

Secondly, the work is organized around problem solving in the community around that school, so that each team serves as the nucleus of student groups doing extensive field work or local pollution problems.

Thirdly, the course work transcends the academic boundaries and is organized around the requirements for solving that problem. As a result it draws freely on courses in social studies, government math, sciences, and various other aspects of the academic curriculum of that school.

Finally, there has to be some arrangement made in the school scheduling to allow the students to get out and do the fieldwork and do work together on these problems. This means being able to use blocks of time so that students can accomplish some of these tasks which cannot be done in the normal 50-minute class period.

Another example at the secondary school level is a program in the marine sciences which has been developed at the John Dewey High School in New York City.

Incidentally, the school is built on a tidal estuary which has long served as an informal, illegal dumping ground. A fact again, I think, which was not without significance to the students who go to school there.

In any case, Dr. Joshua Segal, who is the principal of John Dewey High School, was determined to draw very deeply on the community resources for the academic program. Fortunately, the New York Aquarium is located in the school neighborhood. He was able to make arrangements with the Aquarium so his students could make full use of its facilities both informally and as part of their academic pro-

grams. This was coupled with fieldwork on the beaches of Coney Island, which is also in the immediate neighborhood.

The reason the school could work in this way was because they found administrative methods of injecting flexibility into the scheduling. The students were allowed to use blocks of time to go to the Aquarium, to do fieldwork on the beaches or to do laboratory work in the school and to make real headway on some of these problems.

The spirit in that school is quite extraordinary and what they are accomplishing shows great promise. This is a perfectly normal New York City high school in other regards.

This kind of environmental programming is best started in the elementary school but there it has a somewhat different form. Whereas in the secondary school you deal with topics such as water quality or the marine sciences, in the elementary schools, because of the nature of elementary education, the work is not organized around topics or academic disciplines.

I believe that you heard yesterday from Prof. David Hawkins of the University of Colorado, who has done some very interesting work in elementary schools in this country and more recently in Great Britain. I would like to mention the work that has been done in some of the British primary schools and its significance for what might be done here in this country and for what is indeed going on in some American schools now in an experimental way.

The British primary schools have developed a program called Integrated Day, which we think has considerable significance for environmental education. This significance lies from the fact that "Integrated Day" makes good use of physical materials which are collected from the neighborhood by children and by their teachers and brought into the classroom. It gets the children out into the community to pursue investigations using the school neighborhood for the learning experiences that are invariably to be found there. It allows children to to work together in teams on problems which interest them with the teacher working in a supporting role to guide them.

But what it really does, and I think this is really very important, it gives children the message that their perceptions of their environment, that their work in their surroundings means something and has relevance and importance. I think this is the challenge that we face in environmental education. We may introduce topics, academic disciplines, courses, textbooks, films about the environment, but unless we do something to give children the expectation that they as individuals count for something and can have some ability to change what goes on in their environment or to cope with it, these more specific topical treatments will be for naught.

The sense of isolation from the environment that exists in some classrooms is hard to exaggerate. I have gone into classrooms in New York and talked to the children and found that they have never seen a river although their community may be surrounded by rivers on three sides. These children, either alone or as a class have never gone the two or three blocks down to the Harlem River or the Hudson River or the East River. They have very little understanding of what tides are, of what a river is, of how it is used by man, of what its significance is.

We have gone into classrooms in the Bronx that are two or three blocks away from Van Cortlandt Park and discovered that the chil-

dren have never been in Van Cortlandt Park or have never been in the Bronx Zoo or have never been in the Bronx Botanical Garden, and this isolation, I think, is very serious in terms of our expectation that these children will be able to understand the concepts that we would like to introduce into the school about the environment.

I would suggest that if environmental education is to be pursued as a national policy and with Federal support, that we should, among other things, seriously consider these very fundamental aspects of the problem. I would not say this is the only things that should be done, but it is an aspect of it that has interested us. It is tempting, I think, to do a far easier job of just introducing materials into the curriculum, into the classroom, but while such programs would be easier to implement, at least initially, I just don't think they would stand the chance of achieving the results that we are looking for.

I also think that the greatest need at this point in environmental education is for programs which help teachers in a very direct way in the classroom.

This means that I would place a much higher priority on the kinds of fundamental educational change involving the schools, the classroom, and the relationship between the classroom and the surrounding neighborhood than I would on the more conventional work at nature centers and sanctuaries.

I would also place a higher priority on work in the schools than I would on school sites for outdoor education, for instance, because the problems we are dealing with have to do with man, his interactions, his economic activities. I think in studying those things the community and streets, transportation systems, its marketplaces, are a much more cogent subject to deal with than are open spaces and the natural environment.

In conclusion, I would say that the basic problem we face is that environmental education is an abstraction which is not very well understood. It covers a great variety of programs which while only to be expected make it difficult to define and evaluate and it certainly is going to make it difficult to support. At least we have found that to be true in our experience at the Foundation.

I think it is going to be hard to make environmental education a national priority unless we do clarify what it is and how it functions and how it relates to some of the other educational goals that this country has set for itself. Certainly curriculum reform has come before from social crises such as war, economic stagnation during the depression, immigration, or the launching of sputnik.

There are many examples we can look to in the past where broad social concerns have had their impact on education and resulted in reform in the schools and very fundamental changes in curriculum. We have had improvements, for instance, in vocational education and agricultural practices and in the teaching of science, math, foreign languages. But all of these involved a considerable mobilization of talent, of money, of effort, and it is not clear now that mobilization is taking place in the environmental field.

I hope that it will take place and I hope that these hearings are helpful to you in your work in the development of this bill through the legislative process. I am very pleased to have had this chance to be here.

Thank you.

Senator NELSON. How would you provide the teacher with the kinds of supportive services, assistance, and counseling that you think he needs?

Mr. AMES. To take the example of New York City, there are a number of institutions which are interested both in the subjects of environmental education and in doing something with teachers in the schools. These institutions in some cases are universities which have an interest in environmental programs, or institutions like the American Museum of Natural History, or the Wave Hill Center for Environmental Studies in the Bronx, which is working with school districts in the Bronx.

I think new ways have to be figured out to get people from those institutions to work more directly with teachers and to get them out into the schools. We have thought in the past of using our cultural institutions such as zoos, museums, botanical gardens, as sites for field trips, and that is fine and perhaps we should do more of it.

But I think also if these people have something to say that is important, we must get it more into the mainstream of education and make it more important in the curriculum. One thing that we might do is make it possible for these institutions to have workers, educators working with teachers who can go out into the schools using the institutions as a base of operations, but who do their work primarily in the classrooms with the teachers.

Also we do have a tradition in this country of having supplementary personnel in the schools working with teachers, but normally as supervisors. For instance, we have had in New York City a science coordinators program. We have not had enough of these people, but they have been teachers with special training in the sciences who help teachers as they develop their course outlines and as they develop their programs in the classroom.

I think the supervisory relationship perhaps is less good than the advisory relationship in this sense. I think it might be more useful to call on teachers who have worked in this field, who have received some special training in this field perhaps at a university and then support them without the responsibilities of teaching in a classroom, but support them so they can work with a number of teachers in a number of classrooms in some specific schools.

We may need some new institutions to support them. This might be done in some cases out of our colleges and universities. I think this is one way teachers' colleges and universities could become involved in this kind of educational programing.

I don't think it is useful for them just to offer courses in educational theory. I think it would be far better for them instead to figure out ways of getting out of the college, out of the universities and into the school, or into the classroom to work directly with the teachers.

Senator NELSON. The most pervasive experience we have had in that, I would assume, is the Agricultural Extension Service, isn't it?

Mr. AMES. That is very true and the extension service is a great success story. Perhaps there is some analog to that which could be developed in this field. I understand, incidentally, that in California the University of California is attempting to develop a program of this sort, an environmental extension service out of the University of

California at Davis. I do not know the details of that particular effort, but this may be happening in some places.

Senator NELSON. Dr. Hawkins commented on this concept yesterday. Assume that those who are working in the field of environmental education at some of our universities develop an innovative curriculum. Then, if so, some method or mechanism of bringing that approach to the primary and secondary school needs to be established. You might do it with an environmental extension service that in some way or another is similar to the Agricultural Extension Service.

Mr. AMES. I think that is right. I think the universities have a very great contribution to make here. I don't think it is enough any more just to bring the teacher in for a course in the university and then expect the teachers to go back to the classroom and do the job, because we are talking about some rather fundamental change here in the relationship between the school and the community.

I think we have to involve the community, the people in the community. We have to change practices in the schools so that the teacher and her class can get out into the neighborhood and take advantage of some of these resources, and I think the teacher is going to need help in that job.

I think this help can be centered in the school system, or can come from special personnel in the school system or perhaps from special personnel at the university who are assigned to this kind of job.

Senator NELSON. The process of educating the students in an actual environmental situation, using the word in its broadest sense, as you have suggested, is just about exactly what the agricultural agent and the home agent have done, isn't it?

Mr. AMES. As far as I understand that program, I think that is true, yes.

Senator NELSON. The classroom was the farmer's own farm and the teaching involved all the various methods of land use, contour cultivation and planting, and methods of breeding and developing stock and the production of milk. All of these were programs carried on in a practical way by a local county agent in each county directly with the farmers in their own agricultural farm settings.

Mr. AMES. That is certainly true. Of course what we are dealing with here is something a little bit different, because we are talking about the training of teachers and perhaps their natural setting, if you will, is the school. What we are really talking about is finding ways of reaching the teacher in that special environment that we call the school.

Also we are talking about how the teacher relates to the class and the children and how they all relate to the surrounding neighborhood. I think the extension idea is a very good one, but it is not exactly an analogous model certainly in terms of teacher training.

Senator NELSON. I would assume that first the teacher does have to have some qualifications of some kind in the field. If the teacher is a biologist or a botanist or a chemist or what-have-you, the teacher is going to have to get environmental education teacher training. The bill proposes that there be courses established in the universities and colleges where they may go and receive special training. In addition to developing an understanding of the concept in its broadest sense, they would also develop an understanding in the kind of tools and methods

that would be valuable in translating to the students or developing for the students a relevant program.

Once you had a teacher like this, your environmental extension expert would work with that teacher in the kind of setting we are talking about. It would not have to be on some farmer's farm, although some programs might be there. But it would be an extension expert who is available to consult and advise and work with teachers in the school system.

I would assume that given good people, they would continue to develop their own understanding and improvement on techniques and that they would keep up with what was going on elsewhere in the country, as they do in the Agricultural Extension Service, by bringing continuing creativity into the school system that the environmental extension expert was involved in.

Mr. AMES. This makes good sense. The British experience might be worth citing here, very briefly.

They have developed what they call "school advisory centers" and these centers are staffed by four, five, or six people with special training, who work in an advisory relationship with the teachers in that school district. The advisory center really exists for the teachers, for their convenience, for their support, so the teachers can come to the center, see various things demonstrated, or see various materials.

The small staff of the advisory center can go out into the schools and work with the teachers as they try to apply some of the things that they have learned at the center. The center really becomes a focal point for on-going training of the teachers. It is located right in the communities where the schools are, or usually located in a school, for that matter.

It functions in a very general way in support of the teacher. Where the teachers have seen or felt the need for this kind of help, the centers have worked very well and in some other circumstances they have not. We don't have anything quite like it in this country and I am not sure that it is entirely appropriate in its British form, but we are now experimenting with it in some places in this country.

Professor Hawkins is going to experiment with this idea in Colorado and there are some experiments of this sort going on in Philadelphia and New York.

Senator NELSON. With this center concept?

Mr. AMES. Yes.

Senator NELSON. Under whose direction and control are the centers in Great Britain?

Mr. AMES. The head of the local educational authority, which is analogous to our school district. This kind of change in education is, I think, best done from within the system itself. We are not talking about structuring something from outside the system to bring about change.

In England the experience has been that it is best done from within the system.

Senator NELSON. I don't know what the financing of their school system is. Is this financed by the Parliament or locally?

Mr. AMES. It is a shared financing arrangement, shared by local and the central government. But, of course, we have numerous precedents for providing aid to schools districts from the Government

through the Elementary and Secondary Education Act, for instance. I don't think the cost of this kind of center need be very high. Admittedly it would take the salary of three or four people who would otherwise be assigned to teaching in classrooms.

There is one caution I think I should mention here, and that is that if we get too grand in our plan and it becomes too cumbersome or too expensive, it is probably not going to be picked up by the locality, by the local school district in the final analysis.

Certainly the Ford Foundation cannot bear the cost even of these experimental programs for more than a relatively short term and I would think the same thing would be true in the case of the Federal Government in some of these programs.

We have to imagine ways of building these things into the structure of education in this country without imposing undue burdens on the system, which is just unrealistic in the long term.

Senator NELSON. Thank you very much. We appreciate your testimony.

(The prepared statement of Mr. Ames follows:)

Statement of Edward A. Ames
 Program Officer, The Ford Foundation
 on
 Education and the Environment
 Before the
 Senate Subcommittee on Education
 May 20, 1970

Mr. Chairman, members of the Committee, I appreciate this opportunity to appear before you in response to your letter of invitation to discuss education and the environment. The general question before us is how to use education to achieve a social purpose; namely, to change the behavior of our citizenry so that we may enhance rather than destroy the quality of our physical surroundings. Starting in June, 1966, the Ford Foundation has provided support for a variety of programs with this general goal. Today, however, I would like to talk about our more recent experience focussing specifically on primary and secondary schools and on teacher training. In doing so, I will draw some conclusions about how schools affect behavior and how this relates to the environment. I will also give you some specific examples of efforts now being mounted in a few schools and then suggest some actions that might be taken to support a far richer treatment of the environment in schools throughout the country.

To start with, virtually all learning consists of coming to grips with one's environment in one way or another. The problem is that the classroom and the school provide some very special environments which have become more and more divorced from "real life", that is from the specific social and physical surroundings in which we all live. This separation is pervasive throughout the school experience, and it has serious implications for both the learning process and the development of values and attitudes about the community and its physical environment.

Children learn about the environment from the environment. They learn in school how to survive in the school environment, but not how to be effective in the community outside the school. The learning environment of schools is shaped by a number of influences each of which tend to make the school a special place separated from the community in which it exists. Perhaps the dominant influence are the teachers who are seldom prepared by their training to draw upon the surrounding community for the learning experiences that invariably exist there. The teachers' own experiences may differ substantially from the concerns and perceptions that are the daily fare of their students; yet learning from children so that teachers may help them more effectively with their concerns is not a generally popular idea. It has also become evident that many of the environmental issues which now concern us are highly controversial. They involve fundamental social conflicts of a type which teachers are reluctant to deal with. Teachers soon learn that they can get along better if they do not delve too deeply into the conflicts which are hot in their community.

Textbooks and teaching materials also tend to be environmentally bland, dealing with a generalized, homogenized environment which bears little resemblance to that very specific world experienced by each child. It is a rare classroom that provides much physical evidence as to what kind of community and what environment surround that school. I could go on and demonstrate that administrative practice and even school architecture make it unlikely that that much learning will take place of the kind that is based on the students' perception of their own world. My basic assumption is that

the consequences of this separation can be measured in behavioral terms and that an educational system which exemplifies it is unlikely to produce either good students or good citizens.

If this assumption is correct, then the primary goal of environmental education should be to make the actual experiences and concerns of students as important a part of the school environment as is humanly possible. This means making some fundamental changes in our educational systems: in the training of teachers, the administration and design of schools and their programs, and in the nature of textbooks and teaching materials. Most importantly, these changes should be designed to close the gaps between school and community, and between teachers, students and their surroundings.

Certain elements of this change, of this process of linking schools and the environment, are already taking place or perhaps have always existed in a few schools across the country. For the sake of clarity, I will cite some of these activities as examples of what is now being done and as examples of what I think should be further encouraged by Federal support for environmental education. Incidentally, some of these projects have received support from the Ford Foundation, and some have not.

A variety of environmental programs have been developed in secondary schools, but the ones that I shall describe to you share a number of distinctive attributes. These have to do with the role of the student and of the teacher,

with the interdisciplinary nature of the curriculum, and with the interactions between school and community. For instance, in the water pollution research program at the Tilton School in New Hampshire, teachers and students are trained together in teams to do research on water quality in local streams and lakes. To date, over fifty public and private schools have participated in the program. Since participating in the training at Tilton School, many of the teacher-student teams have set up programs in their own schools. The result has been that the students learn a good deal of basic science by studying actual streams in various states of pollution. They also develop technological skills and produce data that are useful to the several governmental agencies charged with monitoring water quality. Quite beyond this scientific and technological base, the students and teachers investigate relevant legislation on water quality, and finally pursue the economic and political consequences of the enforcement of that legislation. The behavioral objectives of the Tilton work have to do with the ability of the students to design and carry out a successful research program, to produce acceptable data, and to analyze actual environmental problems. Presumably the program also achieves broader behavioral results through changing the students' perception of their role as individuals in society. Funding for the Tilton program, incidentally, came initially from the Ford Foundation, but now comes from the Federal Water Pollution Control Administration.

The point of the Tilton program is that although it is organized around a single environmental topic, water pollution, its subject is really much broader

than this; particularly since it uses the environment as a tool to achieve pedagogical and social results. In order to accomplish these, however, it must depart from a number of usual educational practices. For instance:

- 1) Students are given a role in the development of their academic program,
- 2) Work is done on an actual problem affecting the local community,
- 3) Course work transcends academic boundaries and is organized around problem solving requirements,
- 4) The school schedule is made flexible enough to permit extended periods of field work.

A second example that exemplifies some of these same changes is a program in the marine sciences being developed at the John Dewey High School in Brooklyn, New York. Incidentally, it is interesting to note that this brand new school was built on the edge of a polluted marshland which continues to serve as an unofficial dump, a fact which may hold some significance for the students who go to school there. The school principal, Dr. Joshua Segal, has seized the opportunity offered by the fact that the school was starting from scratch to institute a number of innovative programs that have to do with the organization of classes, scheduling, and the curriculum. Through these innovations advantage can be taken of the resources offered by the community which includes, among other things, Coney Island with its beaches and the nearby New York Aquarium. Cooperative arrangements have been made with the Aquarium and students now work and study there as part of their school program. Blocks of time have been set up in the schedule for field

work in the marine sciences and extensive sessions are held in the tidal marshes and estuaries around the school. While this program happens to focus on a natural resource, it does so in the context of man's environment and the problems of pollution. Further programs are being discussed which would study the community, its attitudes and values in relation to environmental concerns. While all of this is new and not fully developed, none of it would be possible without the organizational flexibility of the school and without their commitment to use the local environment and local institutions as a resource for learning.

Other examples can be cited which attempt to close the gaps between school and community, and between students and their environment in different ways: The Parkway School Project in Philadelphia, for instance, where the entire curriculum takes place in agencies of the municipal government, in businesses and in local cultural institutions; or the Dunbar High School in Baltimore where the new school is being planned jointly by the community, teachers, and others so that it will be both architecturally and programmatically integrated with the community and its environment.

All of these programs potentially broaden the scope of the educational experience and change the relationships between the individual student, his school, and his community. It is hard to believe that they do not also offer great promise for making the student more effective in coping with and controlling his own environment. This kind of environmental education is best started in

the elementary schools and there are a number of potentially important developments taking place there which I would also like to share with you.

While elementary school curriculum ostensibly deals with the neighborhood and the community, there exists here in fact the same separation between classroom and the surrounding environment that afflicts secondary schools. In spite of the rich tradition of environmental education exemplified by John Dewey and others, it is an unusual school that draws upon the surrounding community for anything approaching its full measure of learning experience.

Certainly the most promising development in closing this gap is the increasing interest being shown by a number of schools in this country in an approach to learning called "integrated day" or "open-structure". The approach described by these terms has been developed most fully in the British primary schools where it is now standard practice in a number of areas of that country. I understand that Professor David Hawkins of the University of Colorado has also addressed this committee. His work in England and now in this country is concerned with the British experience with integrated day and with its meaning for American schools and for environmental education.

Without suggesting for a moment that we transplant the British primary schools here--they also have their problems--I would like to point out the potential significance of integrated day for environmental education. This significance lies in the fact that it places an emphasis on the use of materials found in the local environment ranging from building rubble to living plants and animals.

Classrooms operating under this scheme are cluttered with objects not normally found in schools, objects brought in by the children as well as by the teacher. Typically a class might go out into the neighborhood to search the remains of a demolished building as though it were an archeological site. Through this experience the children might learn about exploratory techniques and problem solving as well as about the history, climate, demography of their community. In addition, the fact that the teaching deals with the immediate environment and involves children in an open-ended exploration of those surroundings carries an implication for the children that their own environment and their individual perceptions of it really count. This kind of individualized, child-centered learning which deals with the immediate physical surroundings certainly develops different and presumably more positive attitudes, values, and behavior toward the environment than the traditional, more structured approaches.

Perhaps of more fundamental educational significance is the fact that the practice of integrated day often means that classrooms are combined, breaking down the walls so that children can work together in teams on problems which interest them and which at the same time provide valuable learning experiences. It disregards the traditional subject area boundaries and follows a unified approach to learning which much more closely approximates the child's actual perception of his environment. It drops the rigid schedule enforced by periodic bells and allows the use of blocks of time to pursue problems which could not even be tackled in a

more traditional classroom. In fact, after seeing an integrated day in process, it is hard to imagine how effective environmental education could be pursued in the elementary school under any less open-structured conditions.

Experiments in these very fundamental aspects of environmental learning are taking place in a number of schools in Los Angeles; Montpelier, Vermont; New York City; Cambridge, Massachusetts; Boulder, Colorado, and elsewhere. Much of this work is not even called "environmental", and in spite of the interest being shown, it remains to be seen whether it will succeed as an educational movement in this country and whether its full significance for environmental learning will ever be developed.

Here I would like to cite work going on in New York City with particular emphasis on the educational support being provided for teachers as they develop their own ideas for using the environment that comprises their own particular classroom, school, and community. These efforts are being mounted from the City College of New York by Lillian Weber who is working with teachers in Harlem schools and by the staff of the Wave Hill Center for Environmental Studies working with teachers in elementary schools in District 10 in the Bronx. In both cases the program staff works with the teachers in the classrooms, in the corridors, and in the community surrounding the school as they try to evolve a more effective way of dealing with that very special environment of those particular children. The basic technique is an exploration of the materials, patterns, sounds, and feel of the physical surroundings. For instance, it is not uncommon to find children living

on the island of Manhattan who have never seen a river, although the nearest one is seldom more than a few blocks away. A class in the habit of using its surroundings can map the river, measure its rate of flow, observe, measure and begin to understand what tides are and how the river serves man. Through this exploration, the children develop academic skills ranging from simple counting and reading to very sophisticated skills of scientific experimentation. The approach seems to work, and the advisory role played by the program staffs is highly effective in supporting the teacher and in bringing about educational change.

I have dwelled on some fundamental and pedagogical aspects of environmental education because I believe that this is where we should direct our attention and provide support for change. If environmental education is to be pursued as a national policy, it must satisfy both educational and social requirements; that is, it must facilitate learning as well as change behavior toward the environment. It is tempting to do the far easier job of supporting the development of courses and textbooks which teach about the environment in an informational sense. But while such programs would be simpler to implement, they would in all probability amount to a superficial add-on to the curriculum, and as such, they would seem sure to fall far short of achieving the hoped for results.

The greatest need in environmental education is for programs which help teachers, particularly as they attempt to come to grips with the basic changes which make it possible to take advantage of the environment in their teaching. A most effective way of providing this help is through the provision of advisory personnel who work with teachers in classrooms. These advisors should not be

be useful. To bring about sustained change, the real help is needed right in the classroom. Various formulas for providing this help might be tried using whatever institutions, public or private, are available in the community to provide additional training and assistance.

A second need which might be served by Federal funding is the support of the relatively limited number of institutions and centers, both public and private, which are already involved in educational development work in this field. These centers may be located in universities, like David Hawkins' new center at the University of Colorado and Lillian Weber's effort at the City College of New York. Others may be independent centers like Wave Hill in New York or the Children's Museum in Boston, but whatever their status, they must be closely tied in with the educational systems which they serve, and concerned with fundamental aspects of learning in the classroom. I would place a much higher priority on support of such innovative centers than on funding, for instance, for the far more ubiquitous nature centers and sanctuaries which are usually more remote both geographically and educationally. I would also place a relatively low priority on school sites for outdoor education. Our really difficult environmental problems have their genesis right in our midst, and a city street or a polluted river girded by highways and railroads is a much more cogent site for environmental education than a nature sanctuary.

The basic problem is that environmental education is an abstraction which is little understood and only sporadically practiced. It's not now a national priority,

nor is it likely to become one unless it is clearly defined and shown to facilitate the achievement of current educational goals such as high achievement in reading and math. The relationship between environmental education and the realization of social objectives must also be clarified. Curriculum reform has been triggered in the past by such crises as war, economic stagnation, immigration, and the launching of Sputnik. The resulting improvements in vocational education, agricultural practices, and in the teaching of science, math, and foreign languages were the consequence of a considerable mobilization of talent, effort, and money. While both government and public are showing increasing concern over the state of our physical environment, our responses as a society in the educational field have been tentative and inadequate. We can only hope that these hearings represent the beginning of a redirection of our priorities and a commitment to the achievement of an education that truly prepares students to cope with the difficult problems that face us as a nation.

Senator NELSON. Our next witnesses will be Mr. James Pratt and Mr. Alan Levy of the American Institute of Architects.

We appreciate your taking the time to come here today. Your statement will be printed in full in the record and you may go ahead and present it however you desire. Identify yourself for the reporter so the record will be correct.

STATEMENT OF JAMES PRATT AND ALAN LEVY, AMERICAN INSTITUTE OF ARCHITECTS

Mr. PRATT. Thank you, Mr. Chairman. My name is James Pratt. I am a practicing architect in Dallas, Tex., and chairman of the Committee on Public Education of the American Institute of Architects. Accompanying me is Alan Levy, an architect from Philadelphia, Pa., and president of the Group for Environmental Education.

In testimony presented today, and in other testimony before the House committee, we constantly heard references to the scientific, the industrial and the academic communities in terms of findings solutions to the problems to which S. 3151 is addressed.

We would like to add the viewpoint of the design professions: The planners, the landscape architects, the urban designers, the engineers, and all the professions which are basically concerned with the actual fabrication of the physical containers in which we live.

We believe that this legislation is not only a remedial action program; it is also a very serious and long-range educational one. What we are striving for is to inculcate the will to achieve a better quality of life and to give the general public tools to judge not only the problems of nature with respect to man but also the problems of land use—for settlement purposes, for parks, for whatever qualities in the city will reinforce his way of life.

To do this, we believe a program must start with the familiar. The broad purpose of solving man's relation to conservation, ecology, nature, can best begin in our own backyard by learning what his relationships are to his local community.

For instance, in the context of planning and organizing cities today, we have just seen a major revolution in mobility within this country since World War II in the interregional highway system.

In general, this has been a single purpose activity, organized purely to move people at faster rates of speed and more efficiently. It has, in many, many places in this country, completely torn up the values, and the intimate relationships of the environment in "the neighborhood."

In Dallas, the schools no longer bear any rational relationship to the local living environment. Although they may be situated on the freeways or major thoroughfares, they are not organized so that foot traffic or bicycle traffic can get to them, or in a significantly sensitive relationship to the dwelling.

Drainage systems are being eradicated to use the land for other purposes. We do not anticipate maintaining these for many multi-purpose activities, we only consider how to move water faster to get it out of our way in the public environment. Whether or not we could use that land for linear movement systems, for recreational purposes, or for a connection to nature in the city also are matters which are little understood.

Another example is this room. Having learned to control temperature and atmosphere in the environment, we have a comfortable level of each and a personal communication with each other which is probably very efficient.

What about the psychological factors of this room as a place for the purposes for which we are here? What is the psychology of tedium and boredom by staying in this environment for an extended period of time? Do we have values to judge this? Yes. The choice of this room is much better than the one in the House Office Building where we appeared a month ago. In that room, it is difficult to communicate person to person. These factors are very little understood, however, and often overlooked in fabricating containers for human use.

In general, then, the processes of using the city, of using space, and of using the public domain are to often neglected in education. It is to that area of environmental concern that we shall address ourselves.

Specifically, we believe that this is not something separate from the concern for ecology and pollution, or for natural relationships of man, but an integral part of it. We urge that the word environment be defined in the legislation to include not only the natural, but also the built environment.

We believe that a successful education which all of us seek must be one that is an integral part of the curriculum and is not a new and separately added discipline to the traditional academic subjects. It is an attitude and it is information which perhaps belongs in various academic subjects.

For example, in a pilot program that we have in Dallas, our profession has hired a teacher to act with us as an intermediary with the 12-grade secondary and primary school. There, a pilot activity experimented in a variety of levels and with a variety of academic subjects.

We have developed a lesson plan with a 6th-grade geometry teacher in which he is attempting to demonstrate the relevancy of geometry to the real world. The students explore a building geometrically but, in addition, analyze attitudinally what parts of it feel good to them, and where they like to sit in it. They thereby are breaking down the barriers of traditional education and considering not only the math factors but certain social factors in it use: Certain factors of order or art in the way it is put together. Perhaps they are getting a much more significant and a more meaningful educational experience than in a traditional mode.

We have worked with social studies students in the 3d and 4th grades and we have taken them on tours to look at dying suburban towns that are being submerged in the growth of the metropolitan area. They see what relationships existed in the past between public facilities, talk to the old people in the dying towns, and compare the general store organization for services in a town of a hundred years ago, versus present separated and fractured service organizations for commercial needs.

We have looked at history. We have worked with a 9th-grade course to make certain areas of ancient history more relevant to today's terms. Specifically, they studied Egypt when, at the very beginning of recorded history, man learned how to use stone. They compared the learning of the use of stone with the learning of the use of steel and materials today.

We have tried to reinforce the hand-eye relationship through a more sensitive art program. It was not purely related to drawing and traditional modes of coloring and early school experience, but involved the children in three dimensional activities using clay and other media.

We have worked with science teachers who have taken children into nature on an esthetic basis as well as a scientific or more traditional mode of education. I believe, that, in general, in our own secondary-primary school experience we looked for ways in which we were encouraged to become professionals dealing with the problems of the environment. This, to me, is quite meaningful.

In my own experience, a woodshop course in the 8th grade was probably a very significant factor in making me very interested in becoming an architect. Pounding scenery or putting together flats for a theatrical production were significant in making me an architect. I may have been turned off by the mechanical drawing course, but I survived it.

These are considered the frills in education and, until we can reach a point where these attitudes change, we may not be even providing enough manpower within the professions to deal with this subject. Certainly I never would have dreamed of taking an art course in secondary school. It was not culturally acceptable. We all ran from it.

I would be a much better architect today, however, had I done so.

I would like to take a minute and look at what we believe the thrust of your legislation should be at the grassroots level. Our experience shows that education of this nature needs to be closely connected to local problems. The local teacher must be directly involved in curricula development in his school if he is going to be successful in this. It is the kind of subject in which the role of the expert is more catalytic than informational which perhaps is unlike the relationship of experts to other academic subjects.

There is a need to disseminate information about existing programs, other teachers' experiences, and source materials that are available. This is an important role which the Federal Government can take in the development of a program rather than working specifically toward an omnibus curriculum. We recently produced a survey of projects in environmental education, not in the natural and ecological area, but in the area of the built environment.

We identified approximately 18 to 20 instructional programs that are either just being produced or in the process of being produced in the whole country, and approximately 18 to 20 other programs being developed by professional societies and their local components.

This represents a very small beginning that could vastly be reinforced through the aid of the legislation before this committee. I would hope that you do not accept the recommendation that State accrediting agencies be asked to approve the kinds of programs that go on. It is our experience that many of these agencies are not in tune with current needs at the grassroots level. Many of the fresher and more creative approaches that don't follow traditional modes may be stifled in that kind of relationship.

In summary, we strongly support S. 3151. Thank you for asking us to come.

Now I would like to turn to Mr. Levy who also has a statement.

**STATEMENT OF ALAN LEVY, REPRESENTING GROUP FOR
ENVIRONMENTAL EDUCATION**

Mr. LEVY. Thank you Senator for this opportunity to express our intense belief in the aims represented by bill S. 3151 for environmental education and to present the results of some of our experiences which hopefully can add some ideas for the specific execution of the program.

My name is Alan Levy and I am part of a nonprofit group for environmental education. The group, originally formed 4½ years ago, has worked with some 25 schools in a dozen States in testing programs in the environment, the manmade environment most specifically.

Let me begin by stating that although I am an architect, we are concerned with the environment as a single unified concept, not fractionalized. We are concerned with man's interaction with his environment, all of his environment.

We have heard testimony previously given which we strongly concur in. Specifically the recommendations of Mr. Ames of the Ford Foundation. To reveal, more specifically, how our experiences support this emphasis on teacher training and teacher support and on relevant environmental programs, I would like to very briefly relate one experience we have had with seven school districts in New Jersey.

To begin with, our efforts have been coordinated and interwoven with the New Jersey State Council on environmental education, a vital and active conservation education unit of the State.

The fact that our emphasis is on the manmade environment has complemented rather than conflicted with their goals. Conservation education had run into some difficulties in the larger urban centers in the State.

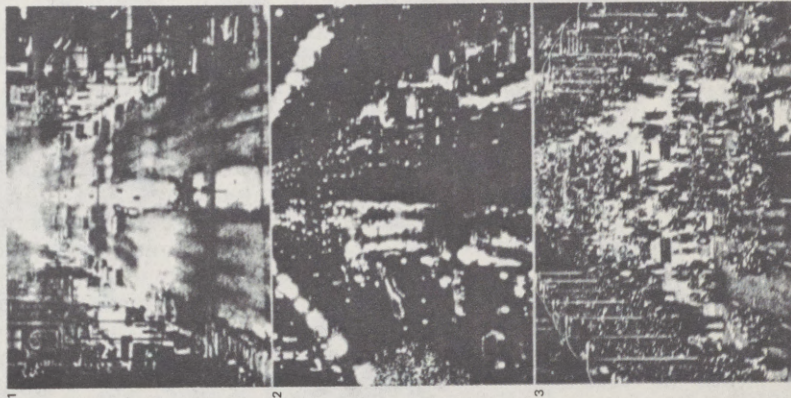
The districts we worked with were not all urban. They included smaller communities such as Salem and Bridgeton as well as Newark, Camden, Atlantic City, and Trenton.

As the Council and the group for environmental education both viewed the goal, it was to educate the children in their capability to effect change, exercise control over their environment, and seek ways on improving it. The process was the important thing, not the subject content. Thus working with the neighborhood or community was as valid as clean streams and air pollution. More valid if they offered urban children more relevant, more immediate ways to learn the lessons. A child, confident in his ability to make judgments, aware of the problems, able to see a role in effecting change, would not feel limited to any one aspect of his environment. He would be able to expand his role with ease. But a child who could not relate to the lesson, sense the immediacy of the problem, might never be able to accept his responsibility in our changing environment.

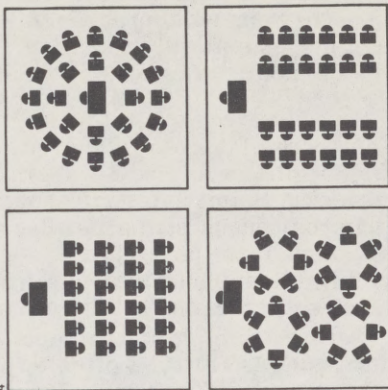
We supplied only one classroom resource, a workbook entitled "Our Man Made Environment" which we had developed. A copy of one of the problems out of that book is attached. The book was to be used as a resource and not as curriculum.

(A copy of the exhibit follows.)

Here is a street—empty, full of cars, full of people. The way outdoor spaces are used changes them as much as rooms.



Same classroom, same furniture, different activities.



If a single room is used in a variety of ways, each use can cause a change in the environment. In a classroom, for example, different activities may require an entirely different arrangement of chairs and desks. At times the teacher may instruct the class from her desk or blackboard... other times she may lead a debate between one half of the class and the other, or she may want to oversee a number of smaller group discussions.

You have breakfast with your family; you work in the classroom with your classmates on a project; you play ball after school in the playground; you go to the movies. As an individual you take part in many different group activities. Each of these activities demands a special environment. You wouldn't play ball with your friends in the kitchen or work on your classroom project on the ball field or have breakfast in the movie theater.

You have just done an exercise to show that even when rooms are the same size, the different activities taking place in them will make each room different.

Mr. LEVY. In brief, through teacher-training workshops and followup support, some 15 teachers were assisted in finding some 15 different ways to involve their children in environmental problem solving. The programs differed by classroom, by community, by district. The reports have been unanimous on one point, student and teacher enthusiasm.

WHAT DOES ALL THIS REVEAL?

To us, this pilot program has revealed a unity in environmental educational goals, whether related to natural or manmade phenomenon.

It has revealed the variety of directions possible when responsive to particular situations; possible and desirable.

It has shown the way adequate teacher training and support can reduce problems of defensiveness, fear, and insecurity so often responsible for negative attitudes to new programs.

It has shown the applicability of environmental studies to different age levels, different basic subjects—science, social studies, humanities, art—different backgrounds—white, black, Puerto Rican, ghetto, city, suburban, small town.

Conversely, it has revealed the unsuitability of a simple omnibus-type curriculum.

The results show the importance of attitude over content, interest over preconceptions, relevance over rigidity.

WHAT DOES ALL OF THIS HAVE TO DO WITH BILL S. 3151?

We are well aware of the multiple goals of the bill. The importance of developing specialists to find solutions, of training environmental professionals, cannot be ignored.

But it is to the other goal, a general education in the environment, that we wish to direct our recommendations.

We recommend:

That environmental education concern itself with the entire environment, natural and manmade, for educational and environmental reasons.

That environmental education aim at reaching all age levels, all disciplines, social studies, science, the humanities. It's potential as the great common denominator should be exploited.

That teacher training and teacher support through advisers or training institutes be emphasized far above curriculums development.

That attitude replace content as the educational priority.

That funding for classroom materials, textbooks, omnibus curriculums be put off in the beginning of the program to insure the best results for dollars spent and that in any event a vehicle such as regional institutes or advisory units, supporting teacher training programs, take funding precedence over the development of materials and omnibus curriculums.

In summation, we feel, along with a great many others who have actually had experience in the field, that environmental education does in fact hold the key to developing a citizenry interested and willing to support the great effort necessary to create a quality environment.

We are convinced that environmental education also holds the key to a dramatic and positive change in our educational system.

We ask that these potentialities be taken advantage of and that the bill reflect a breadth of interest rather than the narrowness of interpretation environmental education has too often been given.

Thank you for this opportunity. We stand ready to answer any further questions.

Senator NELSON. You suggested in your opening remarks broadening a specific aspect of the bill to include other disciplines. What part were you referring to in the bill?

Mr. PRATT. I would like to ask Mr. Levy to answer that question, if he will, because he is very familiar with the bill.

Mr. LEVY. Senator Nelson, the belief that we have is not so much one of a specific omission. It is one of precedent that too often the term "environmental education" has eliminated some of the kinds of ideas that the previous witness, Mr. Ames, touched upon, such as the experimental education in a city and an urban area.

As I say, this is not a specific defined omission in the bill. It is a fear of past definition which generally has tended to be exclusionary without purposely stating such.

Senator NELSON. Thank you very much for your very thoughtful presentation.

(The prepared statement of Mr. Pratt follows:)

• THE AMERICAN INSTITUTE OF ARCHITECTS

S T A T E M E N T

BY

THE AMERICAN INSTITUTE OF ARCHITECTS

ON

S. 3151, ENVIRONMENTAL QUALITY EDUCATION ACT

TO

SENATE COMMITTEE ON LABOR AND PUBLIC WELFARE
SUBCOMMITTEE ON EDUCATION

May 20, 1970

THE OCTAGON • 1735 NEW YORK AVENUE, N.W. • WASHINGTON, D. C. 20006 • (202) 393-7050

INTRODUCTION

Mr. Chairman, my name is James Pratt. I am a practicing architect from Dallas, Texas, and Chairman of the Committee on Public Education of the American Institute of Architects, a professional society representing over 24,000 architects. Accompanying me today is Alan Levy, an architect from Philadelphia, Pennsylvania and President of the Group for Environmental Education (GEE!). Attached to our statement is a recent TIME magazine article describing a GEE! project concerning our man-made environment.

The American Institute of Architects strongly supports S. 3151, a bill whose general purpose is to promote greater understanding of the environment by developing special educational assistance programs.

EDUCATING THE PUBLIC

The recent events of Earth Day and Earth Week brought to the surface a new national awareness of the nature of the environmental crisis. We share the urgency it pointed up. Awakening our society to environmental considerations, however, is only a short range goal.

To hold the line, or even reverse the direction of this crisis, there must be a long range, extensive education program directed to both

children and adults. With education as the tool, the public will be able to make the necessary judgments to achieve a quality of life which neither threatens our nation's survival, wastes its resources, nor dehumanizes its communities. The two efforts, timely pressure and public education, are intertwined and inseparable for a lasting solution to our environmental problems.

Environmental education is learning to make reasoned decisions based upon knowledge and awareness of the consequences of our actions. To learn and to understand these things, an education program must begin with what is familiar to the student. It is difficult to convince someone of his responsibilities and his ability to effect change, if the immediate world in which he lives is ignored. In the case of urban children, for instance, education must begin with the home, school and community to provide the basis for the broad understanding we are seeking. Environmental education must be concerned not only with ecology, but also with cities and neighborhoods, in order to reach urban and suburban children in the most direct way.

Too often environmental education is defined only in the context of resource conservation, natural ecology, and pollution. We feel that this definition is incomplete because it does not acknowledge the real

concern: man's interaction with his environment. Whether he uses the environment for outdoor recreation or to tap its resources, whether he builds a road, a factory or a park, man interacts with the environment. The man-made environment is not separate or additional. It is integral to the total environment in which we live. Accordingly, we suggest that either in the bill or Committee report the word "environment" be defined to include not only natural resources, but also the built environment.

PRESENT EFFORTS IN ENVIRONMENTAL EDUCATION

Our work causes us to become deeply involved with school systems across the country. Everywhere there is a keen interest in environmental education. Programs are underway in some schools, but to date there has been little financial support and less inter-communication. Our experiences underscore the fact that legislation such as S. 3151 is vitally needed to nourish the idea that environmental education should be an integral part of the school curriculum.

For years educators, seeking to motivate their students, have turned to the environment as one of the means to a more relevant education. Their goals are educational rather than environmental but their methods are similar to those of environmental education programs. Using the

environment as the catalyst, teachers have made their various disciplines even more relevant to their students. In addition, they have shown us that environmental education can and must be multi-disciplinary.

Many private organizations have undertaken a variety of programs to stimulate public concern. For instance, the AIA provided a grant to its Philadelphia Chapter to develop a program of environmental education at the junior high school level. We have provided the Subcommittee and staff with the results of this study: Our Man-Made Environment, Book Seven.

To take full advantage of professional capability and private initiative we suggest that:

- Sec. 3 (a) (3) defining those eligible for training for environmental controls, include professionals, especially those with the responsibility for the creation of physical products; and
- Sec. 3 (a) (5) be broadened to authorize the Commissioner to make grants to, or enter into contracts with, institutions of higher education and other public or private agencies, institutions, or organizations for the preparation and dis-

tribution of materials suitable for use by the mass media in dealing with the environment and ecology.

GRASSROOTS PARTICIPATION

We believe that the administration of such a program lies most heavily at the grassroots level -- in teacher training and classroom support. Work is underway to develop curricula, classroom materials and supporting resources. These projects are just the beginning, however. Now the real effort must be directed toward helping the teacher and administrator develop the confidence to tackle a program, to learn to use the environment as a laboratory, and to respond to their classes, their school and the special qualities of their community.

Environmental education requires by its very nature, a high degree of relevancy to the immediate environment. Local teachers must be directly involved in curriculum development in their own schools. In this type of program the role of the expert is more catalytic than is the case in other educational disciplines. The need to disseminate information about existing programs, other teachers' experience, and resource materials is a more important role for the Federal Government than the development of a new nationwide omnibus curriculum.

FUNDING

We suggest that the following funding program be authorized over a three year period:

Stage 1 - \$500,000 research and development	- FY 1971
\$8 million for 50 projects	
Stage 2 - \$4 million for 8 institutes	- FY 1972
\$8 million for projects	
Stage 3 - \$4 million for 8 institutes	- FY 1973
\$8 million for projects	
\$2 million supplemental salaries for teachers	
\$2 million material development	
Total - \$36.5 million	- 3 years

For the first stage, lasting twelve months, we recommend that \$500,000 be authorized to consolidate existing efforts and compile the results of ongoing environmental education experiments. Also, during the first year, we recommend that 50 environmental education projects be developed within an \$8 million budget.

The second stage involves the establishment of regional institutes or workshops to service the teachers and administrators in different regions across the country. The institutes would further teacher training,

information dissemination and research in environmental education.

The third stage of the plan includes a continuation and expansion of teacher institutes to include more teachers as well as modest supplements to teacher's salaries. Participating teachers would begin the environmental program in the schools, supported by the regional institute or workshop. Resources which were shown to be needed by experience would now be developed and tested.

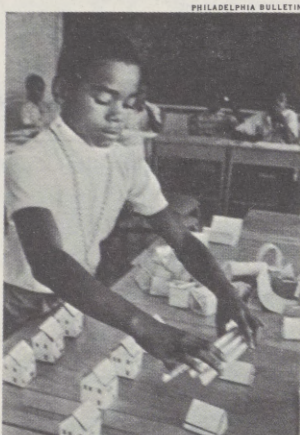
CONCLUSION

In summary, we believe the proposed Environmental Quality Education Act is worthy of your support. The rewards will benefit not only our environment but our educational systems as well.

We appreciate the opportunity to present our views. If there are any questions, we will do our best to answer them.

Attachment

[From Time Magazine, May 18, 1970]



PLAYING WITH PUNCH-OUTS

It has much to teach adults as well.

Opening Your Eyes

No one, to the day of my graduation, had ever taught me to look understandingly at a painting, or a tree, or the façade of a building.

—George F. Kennan, *Memoirs*

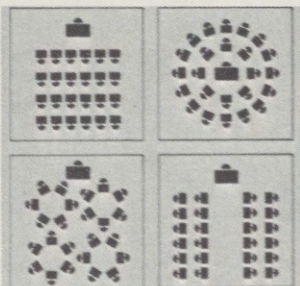
Kennan is far from alone. Because of widespread visual illiteracy, most of man-made America is ugly, messy and inchoate. But something may soon be done about the root problem. Next week Senator Claiborne Pell's Education Subcommittee will hold hearings on a bill that would provide \$10 million annually for environmental—including visual—education. During the hearings, the committee members (average age: 54) will be asked to pore over a book written expressly for 13-year-olds.

Our Man-Made Environment: Book Seven is, quite simply, the best primer on architecture and urban planning yet published in the U.S. Designed to open the eyes of seventh graders to the world being built around them, the book has much to teach adults as well.

Aspiration. It was conceived in 1966 after some educators in the Philadelphia school system asked the local chapter of the American Institute of Architects to help explain architecture to kids. But the collaborators set even higher goals. "We wanted to make students aware of their environment," says Architect Alan Levy.

"We wanted to give them confidence in their ability to make judgments about what they like and don't like. Finally, we hoped to give them a sense of aspiration beyond the limits of the environment they know."

The job took 3½ years and \$60,000 in foundation grants. Last summer the educators and architects formed GEE! (the Group for Environmental Education) to work out, says GEE! Vice President William Chapman, a complete teaching pro-



If a single room is used in a variety of ways, each use can cause a change in the environment. In a classroom, for example, different activities may require an entirely different arrangement of chairs and desks. At times the teacher may instruct the class from the desk or blackboard... other times she may lead a debate between one half of the class and the other, or she may want to oversee a number of smaller group discussions.

gram and to distribute the book. All 20,000 copies have since been sold (at cost) to schools in Philadelphia—plus Houston, San Mateo, Columbus, Ohio, and six cities in New Jersey. Despite its grade school language, the book is used by sophomores studying architecture at the University of North Dakota.

See and Do. *Our Man-Made Environment* bristles with challenge. Many of its pages are lightweight cardboard punch-outs, which can be folded to make beams, roofs, and whole buildings. One of the first lessons asks students to punch out six geometric shapes and arrange them in a pleasing design within a rectangular frame. When the students turn over the shapes, they find that the pieces represent armchairs, a table, a TV set. The next step is to rearrange the shapes within a room, which entails thinking about how people best communicate.

The lessons soon get more complex. Students learn about weather, topography and motion as determinants of design. They are required to see and draw the "rhythmic" elements of a streetscape, like doors and windows. As if that were not demanding enough, the kids must also arrange identical punch-out "buildings" so that one—then two—units stand out among the rest. This done, they may never look blindly at a street again.

GEE! already has a series of similar workbooks in progress. "What we are trying to do is develop a program that gets students to recognize that the man-made environment is more than just dirty air and water pollution," explains Architect Richard Wurman. "In effect, we see the program as an invitation to a marvelous, continuous visual party." If GEE! succeeds, the day may come when kids will know why man-made America is ugly. Better still, they may know how to clean up the visual mess.

Senator NELSON. Our final witness is Prof. William Q. Wick, head of the Oregon State University marine advisory program at the OSU Marine Science Center in Newport, Oreg.

I apologize for calling upon you last. The chairman is particularly interested in the marine and ocean sciences and since he was at another committee meeting, the chairman would have an opportunity to hear your testimony if you came in last.

I assume that is what you desired.

Senator PELL. Yes. Thank you very much.

STATEMENT OF WILLIAM Q. WICK, PROFESSOR AND HEAD, OREGON STATE MARINE ADVISORY PROGRAM, OSU MARINE SCIENCE CENTER, NEWPORT, OREG.

Mr. WICK. Thank you, Senator Nelson and Chairman Pell. I am very pleased to be here. I am head of the marine advisory program, which is a part of the cooperative extension service which you discussed with Mr. Ames just a few minutes ago. I am headquartered on the Pacific Ocean coast in Newport, Oreg.

Since all of us may have some biases, it might be of interest to detail my work experiences because they have included antelope trapping in Nevada and waterfowl management in Washington. Since 1960 I have been involved in environmental education programs on natural resources on the Oregon coast.

The marine advisory program receives primary funding from the National Sea Grant College and Program Act, with matching funds supplied by the State of Oregon, by all of our coastal counties and by a number of industries.

Extension education is a person-to-person type approach including use of workshops, mass media, and other techniques for educational programs among all citizens. This morning we have been discussing formal schools, school program, and educational curricula. We deal with schoolchildren, too, from kindergarten through high school into college and also many segments of the adult population.

We try to develop among our clientele an understanding of the ocean environment and to stimulate realistic development of ocean resources. I will give some specific examples later.

Extension education is often looked upon as a one-way street—extending information out toward people. We look upon it as a two-way street or a wheel, information goes out but also comes back from the field. This helps us define research goals and develop more useful programs.

I will comment on a number of points. I don't want to reiterate some of the items that others have already discussed, so I will go through rather briefly.

I am an advocate of the late Aldo Leopold and I think if all of our citizens would have a chance to sit down and really read "A Sand County Almanac," for instance, they would understand that man must live as a part of the environment and not attempt to be a master of it.

We seem to have mastered, in the United States, the philosophy of wasting resources. This must change. I don't mean to sound like a doomsday ecologist because I am not, but we have to get back to the realization of where we came from.

Marvin Durning, a Seattle attorney, received a national conservation award from the President a few years ago. He made one statement that stuck with me. He said, "We will be standing in garbage to our knees shooting rockets at the moon." Contemporary schools, at least in Oregon, are training the thought processes of children that—facts today may not be facts tomorrow. For instance, I grew up with the idea that fountain pens and airplanes were not here to stay. In Oregon our Governor likes to talk about a livable Oregon and a good environment. Recently an attitudinal survey was completed by one of the polling companies. From this came suggestions for laws, laws and more laws—laws against air pollution, water pollution, nonreturnable bottles and so forth. At one time I was in law enforcement and I realize that paying tuition to a judge is one form of education, but there must be a better way.

The interesting thing about this survey was that the people polled said they would be willing to pay for pollution control. Many would be willing to pay \$100 a year for getting rid of pollution problems, some would be willing to pay \$200, some even \$400.

"Earth Day," was an awakening experience for many of us from industry, Government, and education. I spent the day in a high school and believe me, those kids soon got down to the serious problems of the day.

Some of the questions they asked I could not answer. For example, "Can we continue to chase the gross national product and even seriously consider environmental quality?" "If human survival is at stake, can our democracy cope with this problem?" A majority of these students, by the way, indicated a firm belief in the zero-population-growth concept.

Environmental type education with our school children is not really new. It has taken many forms. These include Boy Scouts, Girl Scouts, Campfire Girls, and 4-H programs. We have had environmental education leaders in the country. I think the ones that have influenced me are people like Wilson Clark of Montana, Phillis Busch, Matthew Brennan, the Baileys of Tennessee, and others who have spent many years in developing approaches and model teaching programs.

In the Northwest we have had two kinds of programs. One could be called integration-trying to integrate environmental concepts into the existing curriculums. Another might be called the emersion type of experience where we have taken children into the out-of-doors, generally in the fourth through sixth grades, which I think is the best learning age for environmental concepts.

I am sure that you have had a chance to consider the outdoor-school type program. If you have questions about this later on, we can discuss it.

There are constraints that act against environmental learning, both in the schools and among adults. Some of these have been mentioned. For example, a bus is sometimes a serious constraint. A bus is needed to pickup the children to take them to school. Sometimes a bus is needed to go to the tide pools at 5 a.m. or to reach the strutting grounds of sage grouse. Because of the lack of an extra bus the environmental experience is ignored.

We have heard much during the testimony about training teachers. We work closely with teachers on marine science education. I will

give you some examples of that later. Probably the most important constraints we find in teachers is the lack of confidence to enter the out-of-doors, to study environmental problems, because most teachers feel that they must have a command of the subject matter.

We think this is not essential, in fact, the exploring techniques, which are especially useful in an environmental type of education, seem to work best when the student and teacher work together, learn together.

Senator PELL. Excuse me for interrupting here, but in connection with my general education work, I am a little struck at that thought. I think one of the weaknesses we have now is that we award teachers M.A.'s in teaching methods yet sometimes they don't have a command of the subject matter. Perhaps environmental education is a special thing, but there is too much emphasis on how to teach and I think sometimes too little on knowing the subject.

Mr. WICK. Senator Pell, I think that is a valid observation on your part. These are personal observations among the teachers that I have been involved with.

There are constraints even in adult environmental education. I will give you some examples of how we try to get around these later on. I would like to turn now to marine environmental education.

The people we work with are intrigued with the romance and mystery of the ocean and I guess this is normal. The oceans are a mysterious place, a beautiful place. Although the oceans are large, those of us who work with the seas realize that the resources in them are finite, the foods resources are exhaustible, most of the depths are unusable with present technology, and much of the ocean is a barren desert.

But serious environmental problems are developing in and around the shore, on estuaries, and the seacoast. With people come problems, I have heard estimates that soon there may be half of our people living in or adjacent to the ocean.

The oceans look like a convenient dumping ground because they are large and we tend to look upon them as a bathtub rather than an interconnected series of currents. They are an easy dumping ground. We can get away with dumping for awhile, but soon the symptoms of degradation begin to show shellfish concentrate radionuclides, crabs carry DDT, and other signals are readily visible.

In the 1970's I believe that marine environmental quality education is as important as environmental quality education on land. I think the Environmental Quality Education Act and supporting measures could be of great help as a companion to the National Sea Grants College and Program Act to put trained personnel to work developing public understanding of the ocean and its limitations.

I would like to give you some examples of some of the things we are doing. I think it is human nature that we often get about efforts toward environmental education after the problem becomes acute. About 10 years ago I became involved with a group of teachers who took school children to the seashore. To me the seashore, the environmental niche of the inter-tidal, which in Oregon is about 10 feet, is probably the best outdoor laboratory in the smallest space that one can find. A similar environmental experience inland would require trips

from sea level to the highest mountains. We can demonstrate ecological principles within the 10-foot inter-tidal zone.

School children came like lemmings in the spring at low tides. It was a nice way to get away from the classroom, and the teacher could assign the task of picking up one of everything. The result was decimated tide pools and beaches and wasted animals. Some of the teachers became concerned. I became involved with them in developing a program called "Seashore Eyes." It was called that because we wanted to open the eyes of people.

Few people who visit the out-of-doors really see anything. We are just not used to looking. Although the program included pre-trip and post-trip experiences in class, the essential part of the exercise was a field trip to the shore. The most important technique of the trip was "tipping the class over"—getting their heads down and their tails up. After a minute in this position even the most squeamish girls, that would not think about picking up a worm, became involved with the micro-world in front of them and nothing else really mattered. Once again, we were using exploring techniques where questions were answered by leading questions.

A surprise to me about this effort was that the children's parents soon became interested and we had to conduct the same trip with the parents because they too had never really learned to see the seashore.

This was an early stumbling beginning and since then we have included biological, physical, and other projects that can be learned on a seashore environment.

I realize that not all people in the world have the opportunity to go to the sea. Much of our present work with marine environmental quality education emanates from the OSU Marine Science Center. Mr. Ames mentioned a center and going out from it. This is what we try to do. We are involved in programs that are regional and even international in scope. We have a very modest marine aquarium containing about 11,000 gallons of water, a 180-seat auditorium, and some oceanographic displays. A small, but intensely used work area. I have had a chance to look at many of the museums and aquaria in the country and find that some of them are not being used with the educational intensity they are capable of.

Our small group entertained 213,000 visitors last year and we will have about 300,000 this year. Most of these take part in slide shows and talks and open houses. It rains sometimes in Oregon and one of our main efforts has been toward indoor field trips for schoolchildren.

These are graded, programed lessons in marine science. We are not trying to make marine scientists of these people but we want them to have an understanding of the ocean because as adults they will be called upon to make serious decisions affecting the marine environment. Students come from as far away as 700 miles.

We use educational and commercial television extensively developing programs on pollution of the estuaries, foreign fishing activities, and many other subjects, feature articles, and news releases are used regularly. I was interested in one of the other speakers discussions of pilot studies. We did one fourth-grade 12-week course curriculum experiment with a school class. We moved into the classroom, developed the fourth-grade lesson. This involved such ideas as what we called "mystery sticks." This is a very small technique but we used a string

and a stick and dipped it into the estuary and left it there and put it in several places, some of which were known to be polluted areas, some of which varied in salinity and so forth.

The children came back each week to see what had happened to the mystery stick and were able to find out in low salinity areas things change and in polluted areas where oxygen is low certain things happen. This is just one example.

A subject that we are very serious about is in public policy efforts with adults. For instance, in Oregon we have 40,000 acres of estuaries. It is a large State, maybe the 10th or 11th largest State and yet only three coastal States have fewer estuary acres than Oregon. These areas are being filled in rapidly and we are working closely with port commissions, county commissions, planning groups, and the general public in teaching them the values of estuaries. We emphasize that an integrated land and water use plan leading to zoning is essential.

We want not only to protect the natural resources but also provide for industrial development of estuaries. Residents of Oregon are probably not different from the residents of Wisconsin or any other place. The coastal people, provincially, want to believe that the ocean is theirs alone. We try to convince them that 200 million other Americans might want to be involved, too.

We have developed a statewide marine science education advisory council which involves not only the State department of education and the leading teachers, but also industry to steer and direct elementary and secondary science programs, including marine science in the State.

Sometimes we have to be a little clandestine. We developed a course called the Friendly Native Fishing Guide and presented this in a number of coastal communities. There is a waiting list longer than the original list we started with who want to take it, too. It serves a number of purposes. We have a hidden agenda, we want to teach these people about the environment. Many of the students have lived there for a long time and think they know everything about this area. Sometimes they help teach part of the course.

They realize many benefits from it. They become a better guide to tourists. They learn something about the area they didn't know and through environmental instruction within it we are able to teach them about environment.

There has not been too much said about teaching adults and this is one of the ways we try to act as the "county agents of the sea," if you will.

We work very closely with the commercial fishing community and have been pleasantly surprised with the amount of work that can be done with this group. I think we had several false impressions when we started to work with fishermen. One, that they were very independent. Secondly, we were not quite sure how intelligent they were, and so forth.

We have been very pleasantly surprised. They are extremely intelligent people, they are not as independent as we were led to believe, and they are very cooperative and interested in the environment. So we have involved them as scientific observers on projects such as environmental prediction for albacore tuna which is one of our major sea grants projects.

Another area that has not been mentioned and that I think is an excellent working ground, we provide information to church groups. Many of the churches have developed strong environmental statements recently and they need good information and like to use it.

Senator NELSON. I believe it was mentioned yesterday that in Genesis it is said that we need to become stewards of the environment and I think the churches can provide much help in this way.

Mr. WICK. I would like to suggest, Mr. Chairman, a few courses of action, especially as it relates to the marine field and in relation to S. 3151 and other associated measures. One, as you pointed out, Senator Nelson, the Cooperative Extension Service within the land-grant universities is successful in stimulating sound development of agriculture, forestry, community resource development and home economics with programs for adults and with youth through 4-H activities. Now some sea-grant institutions, such as Oregon State University, are using the same extension techniques in marine science and marine resource understanding and development.

I think that a modest program utilizing environmental quality extension specialists or agents, if you want to call them that, to work with schools and the public on environmental understanding, resources, public policy, and other pertinent subjects, would pay substantial dividends with very little cost.

The environmental quality specialists could take a leading role to stimulate environmental teaching in the classrooms and could be a part of the existing Cooperative Extension Service in the States and utilize the talents and the logistical support of the current staff.

I think these bills would have a tremendous impetus in helping to continue the work toward environmental concern generated by "Earth Day."

Many of our teachers, at least in Oregon, have taken courses in not strictly environmental problems, but outdoor-oriented programs. I think a need exists to develop courses for the uninterested teachers. There are some.

Environmental quality education programs should emphasize the contribution of expanding human population to environmental programs as suggested by Senator Cranston's amendment.

I believe that the sea affects everyone. We don't all live by the sea but it affects us in climate, food resources, pollution problems and just the plain beauty and wonder perhaps. I would like to see the Advisory Council on Environmental Quality Education which is suggested by the bill, include representatives from marine science and marine industry.

There are several other recommendations listed. I won't go into them right now. I would like to close by saying, Mr. Chairman, and Senator Nelson, that it is time to change our dominion over the land and sea to stewardship. The environmental education measures proposed and being studied by this committee, I think, are an excellent approach to this problem.

Senator NELSON. Do you have any views on the discussions that you heard from Professor Hawkins yesterday and today on how you bring this kind of education to the teacher and to the community? Is the idea of some kind of environmental education extension service practicable? You have had extension service experience in bringing the

student to become involved in the environment outside the classroom as well as within the classroom. How would you develop programs like that nationwide?

Mr. WICK. Well, first of all I firmly believe in the extension method of education, which is basically informal. This does not mean it is second rate. We go directly to the people first by request, but secondarily develop the program beyond that. We have had many requests for these kinds of educational help. I think from that single point, that an extension educational program in environmental quality could be very easily setup nationwide as a part of an existing program, such as the Cooperative Extension Service.

Senator NELSON. Assuming that it was tied in with our environmental departments in the university, would you use the extension service itself?

Mr. WICK. Yes; I would. Now, I am speaking of Oregon Extension Service and I realize that this differs somewhat from State to State. The one main advantage that I see, and there are several, is that the local county agent is an accepted part of the community, he is not someone coming in from the outside and as such has rapport with local citizens, but also has direct ties to the university and to the Federal Government.

Senator NELSON. Granted that any good county agent has been dealing with a significant part of the environment, though not all of it, could the county agent be used as a teacher in this field and would it be feasible to have a program in which the county agent took some courses to broaden his understanding and perspective and then work with other people from other disciplines within this field?

Mr. WICK. We are using them somewhat this way now in what we call in Oregon School Forestry tours. I don't think that the general county agent would serve the bill as far as direct teaching is concerned but I think that a small group of specialists could work with all the county agents in the various counties in the State and directly with the schools.

The county agent is certainly a specialist in one or several things and he is a darned good generalist in many things. He knows the political makeup of the county, where the structure is, and how to get things done. He is an excellent arranger. I think he would be valuable in this role rather than directly as a teacher.

We would have to have some specially trained environmentalists. I say this because I went into an area-type of extension position in 1960 working primarily on natural resources in environmental education, which because of its geographical position, turned out to be primarily marine-oriented.

Senator NELSON. I am just trying to figure out how you would use the existing structure in the best possible way. It is correct that the county agent, if he is any good, has great rapport with significant parts of the community, not only the farmers themselves, but the whole related farm industry, the businessmen, the feed business, the farm machinery business, the fertilizer business and so forth.

He has great acceptance, as you suggest, but he also is familiar, for example, with the personnel in the Soil Conservation Service. If you take his knowledge of the environment that he deals with, that is agricultural and the many related aspects of the use of the soil, tied in

with the Soil Conservation Service where you have experts in watershed management, for instance, somehow there ought to be a way to use the county agent model in a way related to an environmental education program.

Now, I don't know the exact mechanics but there is a great resource there. It is already in the field, accepted and understood. Now you need to tap their knowledge and expertise which is mostly out in the field.

We are dealing all the time with streambank stabilization and soil problems and watershed problems. There ought to be some creative way to use all of this knowledge, understanding, and political acceptance in an environmental education program.

Mr. WICK. I agree with you completely. The one place where this sometimes breaks down is that some agency people are not the best teachers.

Senator NELSON. Pardon?

Mr. WICK. Some agency people are not the best teachers, some are excellent teachers.

Senator NELSON. Well, a good many teachers aren't any good either. But the point is the knowledge is there and the teacher needs their knowledge and many county agents can teach. If they really know their subject, they can teach a lot. They are all Federal employees. There ought to be some way to tie this into an environmental education program without just ignoring it and starting out brand new.

Mr. WICK. Absolutely. I would like to suggest that Ernest McDonald, for instance, with the Forest Service in the Pacific Northwest, has developed tremendously successful scope and sequence charts for integration of education into a school system. He has done a beautiful job.

Senator NELSON. In those places where you have a national forest, and a number of States do, you add another dimension. The forestry people who are involved with tree management and multipurpose use of the forests together with a great deal of knowledge about insects and their relationship to the forests. There ought to be some creative way to use all of that knowledge.

Mr. WICK. I would like to suggest a simile, the way we have developed the National Sea Grant College and Program Act is that we have integrated the extension function into the Cooperative Extension Service for a number of reasons. Philosophically that is where it belongs, in my opinion.

Senator NELSON. I didn't follow that.

Mr. WICK. We have integrated the marine advisory program which is funded by the National Sea Grant College and Program Act. The sea-grant concept, of course, is very similar to the land-grant concept.

Senator NELSON. You have integrated that into the general extension service?

Mr. WICK. Right. We have another adult education program in Oregon called the Division of Continuing Education, but we have integrated the extension part of sea grant into the Cooperative Extension Service because we can use the logistical support of 36 county offices which are physically a part of the university. We don't expect the county agents to be marine specialists, but they can serve a tremendous role in aiding and abetting the program and as we move into the program they become used to what we can do to make their job more effective, too.

Senator PELL (presiding). I apologize for being late. I was working on the continental shelf problem in Senator Metcalf's Commerce Committee subcommittee. Indeed, your own Senator, Senator Hatfield, made a very significant contribution this morning.

We have at the University of Rhode Island a program similar to what you are doing. Every Saturday morning children from all parts of the State come to the lab for a tour. In this manner we try to get them interested in the ocean. I also congratulate you on your use of the county agents, which is exactly one of the ideas that we had here first while considering the Sea Grant College bill. As you may know, I was principal sponsor of the sea-grant college program; at that time we were trying to work out a parallel with the Land-Grant College Act. When I was in Japan a few weeks ago I noticed that they had actual county agents who lived in the community, had a high local acceptance and helped the fishermen not only on questions with regard to the movements of fish and other scientific problems, but also with such practical details as what oil to use in their fishing boats, how to repair their engines, and things of that sort. You are doing exactly what we had in mind to implement the act. I only wish that these two programs you are mounting, increasing the interests of the young and people as a whole, by bringing it to them and the development of county agents, were being done by all the colleges who are receiving funds under the Sea Grant Act.

Mr. WICK. Thank you, Senator Pell, we certainly appreciate your leadership in the act. I think it is going to pay real dividends. I just wish we had the size of extension service that the Japanese have, which numbers several hundred, as I understand it, in the nation of Japan.

Senator PELL. I have on other question. Do you have Government laboratories near you, near your college or university?

Mr. WICK. Not yet. We are hoping to have some someday. We do have State agencies and we have one of two marine meteorologists—I think the other is at Rhode Island, from ESSA at our center. We have a person or two from the Federal Water Quality Administration. We work very closely with the Bureau of Commercial Fisheries in many instances and the Sport Fisheries and Wildlife.

Senator PELL. I think one of your companions is in Japan. I know he took me around and showed me the Japanese fisheries. He really knew his stuff.

I thank you very much for being here. I apologize for keeping you waiting but being as interested in the sea-grant college act as I am, I particularly wanted to hear you.

(The prepared statement of Mr. Wick follows:)



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COOPERATIVE EXTENSION SERVICE

OREGON STATE UNIVERSITY
MARINE SCIENCE CENTER
Marine Science Drive
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Statement of William Q. Wick, Professor and Head, Oregon State University Marine Advisory Program, OSU Marine Science Center, Newport, Oregon

Comments on S. 3151, Environmental Quality Education Act, before Subcommittee on Education, United States Senate, May 20, 1970

Mr. Chairman, Members of the Subcommittee, I am pleased to be with you today to testify in favor of S. 3151, the Environmental Quality Education Act. My name is William Q. Wick. I am Head of the Marine Advisory Program, a part of the Cooperative Extension Service of Oregon State University, and am headquartered on the Pacific Ocean Coast in Newport, Oregon. By training I am a Fisheries and Wildlife Ecologist and have filled a variety of work niches ranging from antelope trapping in Nevada to waterfowl management in Washington, combined with game law enforcement at both the state and federal levels. Since 1960 I have conducted Extension educational programs on natural resources and the environment on the Oregon Coast.

In 1968 I became Head of the first, and currently the largest, marine extension education effort in the United States. The Marine Advisory Program receives primary funding from the National Sea Grant College and Program Act, with matching funds supplied by state, counties, and industries. Our Extension education program uses person-to-person contacts, workshops, and all forms of mass media to develop, among all citizens, an understanding of the ocean environment and to stimulate realistic development of the resources of the seas. Specific examples will be given later since most of our goals relate closely to the Environmental Quality Education Act.

Today I will make comments on the following points: the need for environmental quality education; examples of environmental quality educational programs, specifically in the Northwest; constraints on effective environmental education; the need for marine environmental quality education; examples of current marine environmental quality education programs in Oregon; and a suggested course of action relating primarily to the marine environment.

The Need for Environmental Quality Education

Environmental quality education is needed now more than at any other time in history. It is a simple matter of survival. Undoubtedly many of

of the best environmental minds in the country have discussed this need with you. Perhaps if all of our citizens would read Aldo Leopold's A Sand County Almanac they would understand that man must live as a part of the environment and not attempt to be the master of it. As a new nation, we adopted the Abrahamic concept of ownership and dominion of the land and resources. We have mastered this philosophy and use (waste) more resources per capita than any other country. As we industrialized we grew away from the land and the sea. Food and clothing come from stores, not the earth. Whether the temperature is hot or cold--a switch of the button can change all of that. If the air is dirty--filter it. Somehow we must get back to a realization of where we came from.

Fortunately our contemporary schools are training the thought processes of children--attempting to create an open mind to understand that facts today may not be facts tomorrow. There are still generations of us living, however, who are not used to this kind of thinking. The recent detergent dilemma is a case in point. Because we did not like sudsy drinking water we preached the need for bio-degradable detergents. Industry complied and now we find that a high phosphate problem is worse than the suds and that soap may be the best answer at that.

From a recent environmental attitudes survey in Oregon it was suggested that we need laws, laws, and more laws--laws against air pollution, laws against water pollution, laws against non-returnable bottles. With a resource law enforcement background, I realize that paying tuition to the judge is one form of education, but there must be a better way. We do not teach by breaking heads, or learn by nodding heads to platitudes. But I do agree with the citizens of Oregon that pollution is our most important problem.

Earth Day was an awakening experience for many of us from industry, government, and education. I spent the day in a high school and as the discussion heated up the questions approached the "nitty-gritty". For examples: Can we continue to chase the Gross National Product and even seriously consider environmental quality? If human survival is at stake, can our Democracy cope with the problem? The majority of these students indicated a firm belief in the zero population growth concept. A local pulp mill representative found that he could not get away with platitudes even with 14-year-olds.

Examples of Environmental Quality Educational Programs

The thrust toward enlightened environmental quality education is not entirely new. Some good work has been underway since the early part of the century. As a boy in Western Wisconsin, I was a faithful follower of "Deep River Jim and his Wilderness Trail Boys", slept out a hundred nights in the company of mosquitoes to earn a Boy Scout Camping merit badge, and learned that cooking eggs and bacon on a flat piece of limestone can be a

shattering experience. Millions of others have had like experiences in organizations such as Girl Scouts, Campfire Girls, and 4-H.

There are leaders today such as Wilson Clark, Phyllis Busch, Matthew Brennan, the Bailey's of Tennessee, and others who have spent years in developing and teaching model programs for a variety of environmental quality problems. A number of states have taken steps toward environmental education such as the Skylands Manor project in New Jersey and the Oregon 4-H Education Center.

In the Northwest we have had environmental education leadership from federal agencies such as the Forest Service, Soil Conservation Service, OSU's Federal Cooperative Extension Service and Department of Recreation, and state groups such as the Oregon Game Commission, plus leading teachers at all levels and some industrial groups. Ernest McDonald of the Forest Service, with the help of a strong committee, prepared "Conservation Scope and Sequence Charts" to integrate land resource studies into the present school curriculum. The Oregon Board of Education sponsors a blue-ribbon advisory committee on Conservation and Outdoor Education.

Agencies, universities, and industries have devoted many hours teaching in outdoor schools, school forestry tours, helped students replant the "Tillamook Burn", and worked on other worthwhile environmental education programs. All of these efforts have been roads paved with good intentions. Unfortunately, time spent does not guarantee subjects learned and technical knowledge alone does not make a teacher. It is time to train teachers specifically in environmental education for more efficient learning by the students.

The outdoor school concept deserves some comment since it is an immersion-type of learning experience and in my opinion is aimed at the best learning age, grades 4 through 6. In the outdoor school, children spend a week in the outdoors using their talents in mathematics, science, art, english, history, and other regular subjects in a coordinated attempt to understand the environment.

After some pilot experiences, the outdoor school programs seem to be picking up tempo. The first few were hard to sell. Even now only a fraction of our children have this opportunity. I have scars to help me remember the accusations that outdoor schools were vacations, playthings, a waste of tax money, etc. But the schools are proving themselves. Money is still a limiting factor as are suitable camp areas for conducting the schools. An important secondary value is the training in environmental teaching received by college students who serve as counselors and teachers.

Constraints on Effective Environmental Education

There are constraints that affect attitudes and activities toward a

viable environmental quality education program. Sometimes these are small items, such as buses. Nature does not always correspond to school schedules. When the environmental objective is to visit a tidepool or observe the pre-nuptial strutting of sage grouse at 5:00 AM and the bus is needed to pick up children for the regular school day at 7:00 AM, the children are picked up and the environmental experience is ignored.

An important constraint is a lack of confidence on the part of teachers to enter the out-of-doors. Most teachers feel that they must have command of the subject matter and feel discouraged in environmental situations by not having a ready handle for every living thing. This subject matter confidence is not essential. In fact, "exploring" techniques, which are especially useful in environmental education, seem to work best when teacher and student learn together. Some teachers are petrified at the thought of a confrontation with the living universe. Perhaps special courses on environmental quality for teachers who hate science are in order. Many teachers with scientific leanings have already taken environmental courses.

At the adult level, constraints are even more evident. Adults must want to become involved because of special interest, fun potentials, or an aid to the pocketbook. Conservation organizations that emphasize ground-root environmental issues are often by-passed for the more glamorous rod-and-gun club with a "varmint" control and "fish planting" campaign.

The Need for Marine Environmental Quality Education

Mere adjectives are not adequate to describe man's feelings about the ocean. But the feelings are mainly concerned with the romance and mystery of the water column which covers more than 70 percent of the globe. Although the oceans are large, those of us who study the seas know them to be finite. The food resources are exhaustible. Most of the depths are unusable with our present technology. Much of the ocean is a barren desert. Serious environmental problems are developing in and adjacent to the sea. Increasing numbers of our citizens live along the seashores--on bays and estuaries and the coast. With people come problems. We quickly mire down in waste--and search for a convenient dumping ground. What better than the ocean? Out of sight and out of mind! The oceans can gobble wastes for a time, but soon the symptoms of degradation begin to show. Shellfish concentrate radionuclides. Crabs carry DDT. Key-type housing developments destroy habitat for larval fishes, shrimp, and waterfowl. Estuaries are filled an acre at a time--soon to serve only as an alimentary canal of poisons leading to the mother sea.

Marine environmental quality education, in my opinion, is as important in the 70's as the need for environmental education on land. Substantial investments of public funds in ocean exploration and study during the past decade have helped to turn our National goals back to the sea. It

was almost too late. We had ignored the ocean, save for defense, for too long. We probably know as much about the oceans of the world as any nation, and yet our use of the living ocean resources, for example, has been non-competitive at best. The Environmental Quality Education Act could be of great help as a companion to the National Sea Grant College and Program Act to put trained educational personnel to work developing public understanding of the ocean and its limitations.

Examples of Current Marine Environmental Quality Education Programs in Oregon

It's human nature, perhaps, but many of our efforts at education come about through defense of the environment after the problems become acute. School children, guided by teachers who were well-meaning but untrained in the sensitive values and balance of the sea, came to the shore like lemmings with the low tides of spring. The purpose: To study the tide pools. Commendable. The method: Collect everything one can find. Destructive. The result: Decimated tide pools and beaches and wasted animals.

Attempting to rectify this situation, I met with a small group of teachers and developed a program called "Seashore Eyes". Few people who visit the beach really see anything. They are not accustomed to looking. Briefly, the program included a pre-trip session in the classroom to discuss animal relationships and emphasize that the students would observe tidal animals noting their place in the tidal range, their relationship to other animals and plants, wave exposure, sunlight, etc. The field trip consumed two hours at the beach--an hour before and an hour after low tide. Children were paired, lookouts posted for sneaker waves, and a few representative animals were brought back to the classroom for aquarium study. An essential procedure on the field trip site was to "tip the class over". This means "head down and tail up". After a minute in this position even the most squeamish little girls became so involved in the micro-world that nothing else mattered. Using the "exploring" technique, questions from the students were answered by leading questions from the teachers. A post-visit classroom exercise emphasized relationships of animals to their environment. To my surprise, parents soon became interested and I carried on the same program with adults who had never really learned to see the seashore.

Since those early stumbling beginnings we have expanded methods and scope to include the obvious biological interest plus physical problems dealing with temperature, the effect of wave action on beaches, and a variety of other simple exercises.

The tidal range, from low to high, on any coast is probably the finest outdoor laboratory for the study of ecological principles. Similar adventures inland would require trips from sea level to the highest mountains. The tidal zone is a balanced community, home to a wide variety of life, with each species of plant and animal habituated to a niche and to the ever-changing

conditions of water, wind, temperature, exposure, etc.

Much of our present work with marine environmental quality education emanates from the University's Marine Science Center on Yaquina Bay at Newport, Oregon. Funding under the Sea Grant College and Program Act has permitted us to enlarge the Extension Marine Advisory Program to a systems-approach team involving nine professional educators trained in physical oceanography, engineering, fisheries, economics, seafood technology, information, and marine science education. The marine science education specialist has the major role in environmental quality education, but all staff members participate.

The Center's public wing contains a 180 seat auditorium, an 11,000 gallon marine aquarium, and displays of ocean features, systems, and history. These facilities are modest in size, but are used with intensity.

Programs for all ages are under way. The list which follows will indicate variety:

1. 213,000 public visitors used the Center in 1969. Many of these took part in slide talks, films, workshops, open houses, and other meetings.
2. 12,500 school children participated in graded, programmed lessons in marine science during 1969. (Copies of the guide-sheets are included with this report.) The emphasis here, once again, is on "exploring" techniques. We are not trying to make marine scientists out of these children. We recognize, however, that as adults they will be called upon to make serious decisions regarding the marine environment. A typical visit by a school class involves pre-visit work in the classroom, approximately two hours of work at the Center, and a post-visit activity back to the school room. Students come from as far away as 700 miles to participate.
3. Scheduled lecture series have been held during the summer and winter for the past four years. These feature experts on marine subjects varying from poetry of the sea to pollution.
4. We aggressively present illustrated programs on the marine environment throughout the state, speaking to thousands of people each year.
5. Educational and commercial television is used extensively to create awareness of marine resources and marine environmental problems. These programs range from oyster culture to the effect of foreign fishing activities and the crisis in estuaries. Some of the programs have been used nationally on NET.

6. Feature and news articles pinpoint specific programs and problems in the marine environment. Some news releases are used nationally and features appear in national magazines.
7. As a pilot study, a fourth grade, 12 week course curriculum was developed and used successfully in a Newport, Oregon school.
8. We teach teachers to use the marine environment through workshops with the National Association of Biology Teachers and other groups.
9. A major public policy effort is designed to stimulate development of integrated land and water use plans for estuarine and coastal areas. Among the coastal states, few have less acres of estuary land than Oregon. Development, largely unplanned, is accelerating. Coastal residents want to believe that the bays and coastline are theirs alone. Sometimes our contacts become hot and heavy, but progress is being made and I anticipate that all of our coastline and estuaries will be zoned within a few years.
10. A statewide Marine Science Education Advisory Council was organized to steer marine education in the elementary and secondary schools. Members include the State Department of Education, premium quality teachers, and industry.
11. Friendly Native Fishing Guide courses have been presented successfully in several communities. We have long waiting lists of applicants anxious for the next session. These serve a number of purposes. The course makes the friendly native a better guide to tourists. The friendly native learns some things about his area that he didn't realize before. Most important to us, however, is the heavy emphasis on environmental quality and the need for conservative use of natural resources.
12. In our work with the commercial fishing community, we have found that most fishermen are observant and highly concerned with the ocean environment. We are using fishermen as scientific observers on projects such as environmental prediction for albacore tuna. The fisherman resource adds much to our scientific information base and in return he is rewarded by genuine environmental involvement.

A Suggested Course of Action Toward Environmental Quality Education

Mr. Chairman, the need for strengthening environmental quality educational programs is vital to our national interests and to human survival.

The list which follows contains suggestions for action under S. 3151 and related measures.

1. The outdoor school concept, described in this report, can be activated in many sections of our Nation. Technical aid plus pilot or matching fund programs could stimulate increased development.
2. Environmental quality education curricula in most universities are offered primarily as service courses. Selected universities should be encouraged to emphasize environmental quality through development of strong curricula.
3. The Cooperative Extension Service, within the Land-Grant universities, is successful in stimulating sound development of agriculture, forestry, community resource development, and home economics with programs for adults and with youth through 4-H activities. Now, some Sea-Grant institutions, such as Oregon State University, are using the same extension techniques in marine resource understanding and development. A modest program utilizing environmental quality extension specialists to work with the public on environmental understanding, resources, public policy, and other pertinent subjects would pay substantial dividends. The environmental quality extension specialists could take a leading role to stimulate environmental education programs for the classroom. In fact, the environmental specialists could be a part of the existing Cooperative Extension Service in the states and utilize the talents and logistical support of the current staff.
4. S. 3151, in my opinion, would help to continue the impetus for environmental concern generated by Earth Day.
5. Teachers, interested in environmental problems, have already involved themselves in a variety of outdoor-oriented courses. A need exists, however, to develop courses specifically for those teachers who are uninterested or untrained in environmental problems.
6. Although a multitude of audio-visual materials exist on natural resource subjects, not enough of these materials are aimed specifically at environmental quality problems in the wide variety of problem environments. For example, we currently are finishing a proposal for a series of five 28 minute films on understanding the ocean and oceanic environmental problems.
7. Environmental quality educational programs should emphasize the contribution of expanding human population to environmental problems.

8. The sea affects everyone through its effect on climate, food resources, pollution problems, and other factors. The Advisory Council on Environmental Quality Education should include representatives from marine science and industry.

9. Although the Act will be administered by the Office of Education, it appears essential to insure that environmental scientists are involved on policy decisions in implementing the Act.

10. Several recommendations relating primarily to techniques may be of interest:

a. The development of field trip clearing houses is desirable to assure the best possible teaching utilization of environments without the destruction accompanying overuse.

b. Mobile laboratories can be prepared to bring marine habitats inland or desert habitat displays to the coast.

c. Wet laboratories, for either marine or fresh water study, add substantially to the classroom experience. Few schools have these facilities.

BIOGRAPHICAL SKETCH

NAME: William Q. Wick

BIRTHDATE: October 24, 1927, Eau Claire, Wisconsin

CURRENT TITLE & RANK: Head, Marine Advisory Program; Professor,
OSU Cooperative Extension Service

DEGREES: BS & MS from Oregon State University

MARRIED: Wife Marie, daughters Rosemary (12), Susan (11)

MILITARY SERVICE: U. S. Army of Occupation--Japan, 1945-1947

PUBLICATIONS: Approximately 20 technical papers and notes plus several
hundred feature articles, columns, and television programs

MEMBERSHIPS: The Wildlife Society, The American Fisheries Society, The
National Shellfisheries Association, The Pacific Northwest
Bird and Mammal Society, The Western Society of Naturalists,
The Conservation Education Association, The Izaak Walton League
of America, The National Association of County Agricultural
Agents, Oregon Marine Biological Society, Pacific Fishery
Biologists

HONORARIES: Sigma XI Phi Sigma, Phi Kappa Phi, Alpha Phi Omega

RECOGNITIONS AND AWARDS: Eagle Scout; Golden Heart Award; the Neil Award
for Kindness; numerous society offices; Atonement Lutheran
Church, Newport, President 1968-69; Chairman, National ad hoc
Committee on Marine Extension Education; Chairman, Pacific
Sea Grant Advisory Program

POSITIONS: 1952-53 Wildlife Biologist, Nevada Fish and Game Commission;
1953-60 Waterfowl Biologist, Washington Department of Game;
1960-64 County Extension Agent, Tillamook
1964-67 Area Extension Agent in the Natural Resources,
Tillamook and Clatsop counties
1967-68 Coordinator of Extension Programs, OSU Marine
Science Center;
1968--- Head, Marine Advisory Program.

INDOOR FIELD TRIPS AT THE OSU MARINE SCIENCE CENTER

Oregon State University's Marine Science Center in Newport is at present composed of four units. These are Ship Support Systems, Pacific Fisheries Laboratory, Yaquina Marine Biology Laboratory and Public Wing. While each unit has its own defined mission, the Center operates as a cooperative and coordinated whole. Public education is an important function of the Center with the philosophy that people who are supporting research in ocean oriented studies should have the opportunity to become more knowledgeable in that area which will have increasing influence on their lives.

Responsibility for public education programs is vested in the Public Wing and is a part of the Marine Advisory Programs associated with Sea Grant University function. Operational and administrative funds come through the Department of Oceanography and Cooperative Extension Service and in certain programs the Division of Continuing Education has been a participant.

A major portion of the educational effort is devoted to working with school groups from kindergarten through college. In 1968, 10,500 students representing 200 schools visited the Center and took part in its programs. To assist effective use of the Museum-Aquarium a four level guidesheet series has been developed. Guidesheets help the student focus his attention on Museum-Aquarium subjects and stimulate a response. The levels defined are 1-primary (pink), 2-intermediate (blue), 3-junior high (goldenrod), and 4-senior high (green). Examples of these guidesheets are attached.

Museum panels or displays offer opportunities to learn about a wide variety of topics. For example, the following are shown:

1. Historic oceanographic cruises traced on a large chart with major oceanographic institutions identified.
2. Models of the layers of the earth and a detail of Oregon's continental shelf.
3. Dynamics of coastal geology shown through views of various changing beach formations.
4. Tides and tidal forces demonstrated with models and recording tidal gauge.
5. General ocean circulation and Oregon upwelling and coastal fog.
6. Cycling of energy through the marine environment.
7. Characteristics and significance of an estuary using Yaquina Bay as a model.
8. Commercially important marine creatures in Oregon.
9. Shore birds of the Oregon scene.

The 11,000 gallon aquarium consists of 17 tanks ranging in volume from 2,500 to 5 gallons. About 110 species are generally displayed. A few more are on display during summer months than during winter. It is exclusively a salt water exhibit with creatures from our shores, bays and shelf. Although we now lack facilities for marine mammals most other groups of sea creatures are represented. The invertebrate collection may be the largest of its kind in the western hemisphere. A feature that is well received is a handling pool where students can feel animals like seastars, sea anemones, sea urchins, crabs, snails, chitons, etc. Even an octopus is available for petting.

Page 2

When groups come on a scheduled visit, they are met in the auditorium by a member of the staff who presents a short history of the Center and the work currently being done. He then explains the guidesheet exercise and has the class go into the Museum-Aquarium section. After the group has toured and responded to questions put forward on the guidesheet, and handled the animals in the open pool, the staff member again joins the class for a question and answer period in the auditorium. The length of time spent at the Center may vary from one and one half hours to two hours.

Scheduling group visits is on a first-call-first-serve basis. The auditorium can seat 180 people although with school groups we prefer much smaller groups. During heavy visit times in Spring several schools may be simultaneously using the Center. The staff has noted that when groups have had some pre-visit introduction to marine science and when they are organized into subgroups of six to eight, the visit is more likely to be educationally profitable. If the visit is in conjunction with a trip to the rocks or mud-flats, students should clean their footgear before entering the building. Groups bringing sack lunches must plan to eat on their buses or in one of the nearby parks or waysides because the Center has no lunchroom facilities.

A separate "Career Opportunities" program is being developed to function with existing programs in school systems. Job opportunities and related information are discussed by cooperating Center staff and members of the community. Students may meet an aquatic biologist, laboratory technician, ship personnel specialist, marine fisheries extension agent and even a local restaurateur who talks about food services in a tourist area. Each describes how to get into his field, what schooling, training or apprenticeship programs exist, and outlook for the future. School guidance personnel who are interested are invited to write for further information.

Those wishing to visit the Center and use the programs are asked to write Donald E. Giles, Marine Extension Agent, (Marine Science Specialist), Marine Science Center, Newport, Oregon 97365, giving 1) name of school, 2) grade level, 3) preferred dates, 4) arrival time, and 5) number of students. The Center will respond confirming a date. Every attempt is made to accommodate all those who wish to schedule, however, it sometimes happens that rearrangements must be made.

MARINE ADVISORY PROGRAM
 Marine Science Education
 Cooperative Extension Service
 Division of Continuing Education

OREGON STATE UNIVERSITY MARINE SCIENCE CENTER

MUSEUM EXHIBITS

Locate the following panels and answer the questions.

1. Marine Exploration

How many windows in the divers helmet? _____

2. The Earth's Crust

How many layers does this earth have? _____

3. Coastal Geology

Do you think Jump-Off-Joe is bigger or smaller today than it was last year? _____

AQUARIUM

1. Look at the many animals in the tanks and pools and tell us the ones you have eaten.

Oysters? _____ Octopus? _____ Snails? _____

Clams? _____ Crabs? _____ Scallops? _____

Fish? _____ Shrimp? _____ Mussels? _____

2. Have you ever caught a fish? _____ If so, what kind? _____

How long? _____

3. Count the legs of a crab. How many? _____

4. Count the arms on the octopus. Write the correct number _____

5. Look at the seastars (starfish). How many different kinds do you think there are in the aquarium.

6. What animal do you like most? _____

Why? _____

TAKE ME HOME TO YOUR FOLKS

AQUARIUM

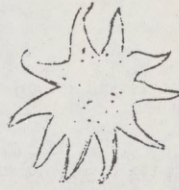
Circle the animals you can find.



ANEMONE



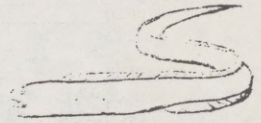
OYSTER

MANY-RAYED
SEA STAR

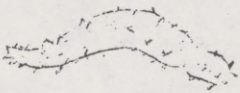
CRAB

FIVE RAYED
SEA STAR

OCTOPUS



WOLF EEL



SEA CUCUMBER



SEAPERCH



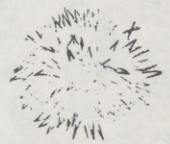
ROCK FISH



PIPEFISH



LING COD



SPINY URCHIN

MARINE ADVISORY PROGRAMS

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AQUARIUM

Find the following in the aquaria and answer the questions:

1. Seaperch. Can you find more than one kind (species)? If so, name them:

Have you ever caught one? _____ Have you eaten one? _____

2. Crabs. How many kinds of crabs can you discover? _____

How many walking legs does a crab have? _____

Have you eaten a crab? _____

3. Sea Anemones. Do you think these are plants or animals? _____

Why? _____

4. Seastars (starfish). How many species can you discover in the aquarium? _____

Do all seastars have 5 arms? _____

How do seastars move? _____ Take a good look at their feet.

5. Match the scientific name to the common name:

- | | |
|---------------------------|---|
| 1. Dungeness Crab _____ | a. <u>Sebastes ruberrimus</u> |
| 2. Ling Cod _____ | b. <u>Cancer magister</u> |
| 3. Red Snapper _____ | c. <u>Strongylocentrotus franciscanus</u> |
| 4. Common Seastar _____ | d. <u>Pisaster ochraceus</u> |
| 5. Giant Red Urchin _____ | e. <u>Ophiodon elongatus</u> |

6. Watch a ling cod. Behind his eyes are his gill covers. Everytime he pumps water over his gills to breathe the gill covers flap.

How many times a minute is he pumping water? _____

How many times does he pump every hour? _____

Does the small shiner perch pump slower, faster or at the same rate as the ling cod? _____

7. Oysters. How many shells does an oyster have? _____

Oysters are closely related to: a. barnacles; b. clams; c. crabs

Have you eaten an oyster? _____

8. Octopus. The octopus is related to clams and snails. Watch the octopus and describe how it breathes: _____

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OREGON STATE UNIVERSITY MARINE SCIENCE CENTER

MUSEUM EXHIBITS

Locate the following panels and answer the questions:

1. Marine Exploration

Find the OSU Marine Science Center on the world map, by number _____

Where is the research vessel YAQUINA today? _____

2. The Earth's Crust

The ocean's greatest depth is _____ miles.

The ocean's average depth is _____ miles.

3. Coastal Geology

Draw a picture of Jump-Off-Joe as seen in 1880 and as seen more recently.

4. Tides. Read the tide gauge. What is the tidal height? _____

The tide is: 1. going out ____ 2. coming in ____ 3. high ____ 4. low ____

The average tidal range is _____ feet at Newport

Are tidal ranges the same throughout the world? ____ Yes ____ No

5. Yaquina Bay

What is an estuary _____

Which of the following animals would you expect to find there?

a. Razor Clam _____

d. Albacore Tuna _____

b. Soft-Shell Clam _____

e. Red Abalone _____

c. Snake Prickleback _____

f. Graper or Horseneck Clam _____

6. Energy and Life in the Sea

What kinds of plankton are there? _____

Does anything eat plankton? _____

Does plant plankton eat anything? _____

7. Oregon's Marine Resources

Name three marine fish or shellfish which are important to Oregon's economy. 1. _____

2. _____

3. _____

Which have you had for dinner? _____

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OREGON STATE UNIVERSITY MARINE SCIENCE CENTER

MUSEUM EXHIBITS

Locate the following panels and answer the questions.

1. Marine Exploration

Name 3 historic oceanographic research vessels and the century each cruised.

(1) _____ (2) _____ (3) _____

2. Earth's Crust, A fathom is equal to _____ feet

The average depth of the ocean is _____ miles. Oregon's continental shelf is widest off Astoria, Tillamook, Newport, Florence, Coos Bay. Circle one

3. Coastal Geology

If you lived along the Pacific Ocean, would it be wiser to build your house on volcanic rock or sedimentary rock? Why? _____

4. Tides

What causes tidal range to differ from one area to another? Honolulu and Newport for example. _____

Read the tide gauge. The tide is 1. going out _____ 2. high _____
 2. coming in _____ 3. low _____

5. Circulation of the Oceans

T F Salt water floats on fresh water.

T F Warm water is heavier than cold water.

T F Cold, salty currents are generally found on the surface of the ocean.

6. Yaquina Bay

Estuaries are coastal bays where the fresh water of the land meet the salt water of the sea. Estuarine mud flats (shallows exposed at low tide) are important to man because _____

7. Energy and Life in the Sea

The most abundant plants in the sea are called _____

Plants and animals that die in the sea, and are not directly eaten, are not wasted in the system. Explain this statement _____

8. Oregon's Marine Resources

If Oregon has 2 million people, how many pounds of fish per person were landed by commercial fishermen in 1967? _____

What fish made up the largest percentage of the year's catch? _____

AQUARIUM:

Find the following in the aquarium and answer the questions:

1. Seaperch. Find at least three species. Name them.

2. Crabs. Crabs are classified as decapod crustaceans. How many walking legs do they have? _____ How many species of crabs can you discover in the aquarium? _____

3. Match the scientific name to the common name.

- | | |
|------------------------------|--------------------------------------|
| A. Green Anemone _____ | a. <u>Sebastes melanops</u> |
| B. Dungeness Crab _____ | b. <u>Platichthys stellatus</u> |
| C. Black Rockfish _____ | c. <u>Anthopleura xanthogrammica</u> |
| D. Bluestripe Seaperch _____ | d. <u>Cancer magister</u> |
| E. Starry Flounder _____ | e. <u>Embiotoca lateralis</u> |

4. Why are these scientific names important? _____

Mark True or False. Rewrite any false statement to read true.

5. T F All starfish have five rays (arms). _____
6. T F A sea anemone is a plant. _____
7. T F Seaperch bear living young. _____

Multiple Choice:

8. Sea Cucumbers are Echinoderms; so are starfish. What characteristics can you see that they have in common? _____

9. The octopus is biologically most closely related to:

a. Seastars b. Clams c. Anemones

10. Watch Ophiodon elongatus carefully. Behind his head are gill covers which flap each time he pumps water over his breathing structures, the gills. If each pump provides about 1 pint of water, how many pints of water does he pass over his gills every hour? _____

How many gallons a day? _____

11. Animals and Habitat. Which habitat area do we usually associate with each of the listed animals?

- | | |
|------------------------|-------------------------------|
| A. Green Anemone _____ | E. Giant Sea Cucumber _____ |
| B. Rockfish _____ | F. Dungeness Crab _____ |
| C. Sand Dollar _____ | G. Bluestriped Seaperch _____ |
| D. Abalone _____ | H. Purple Urchin _____ |

1. Surf-swept rocky coast 2. Muddy bottom 3. Rocky bottom
4. Around wharf pilings 5. Sandy bottom

MUSEUM EXHIBITS

Locate the following panels and answer the questions.

1. Marine Exploration:

List two reasons why research ships such as the R/V YAQUINA are necessary for oceanographic research. (1) _____

(2) _____

2. The Earth's Crust:

How many feet constitute a fathom? _____ How many meters? _____

To what approximate depth does the continental shelf extend? _____

The continental slope? _____; the abyssal plain? _____

What causes the underwater canyon off the Columbia? _____

3. Coastal Geology:

Name two forces which cause changes (erosion or accretion) in coastlines.

(1) _____ (2) _____

4. Tides:

Read the tide gauge. The tide is - 1. going out _____ 3. high _____
2. coming in _____ 4. low _____

Is the average tidal range at Honolulu the same as that at Newport? _____

If not, why? _____

5. Yaquina Bay:

What is an estuary? _____

Is Yaquina Bay a partly-mixed or a well-mixed estuary this month? _____

6. Energy and Life in the Sea:

Why are most fish caught within a few hundred feet (in depth) of the surface of the ocean? _____

How does the food cycle in the sea demonstrate conservation of energy? _____

7. Circulation of the Ocean:

Name two forces which produce currents in the ocean (1) _____

(2) _____

How might oceanic currents be traced? _____

8. Name two values of the marine fisheries resources to the people in Oregon.

(1) _____ (2) _____

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AQUARIUM

Find the following in the aquarium and answer the questions.

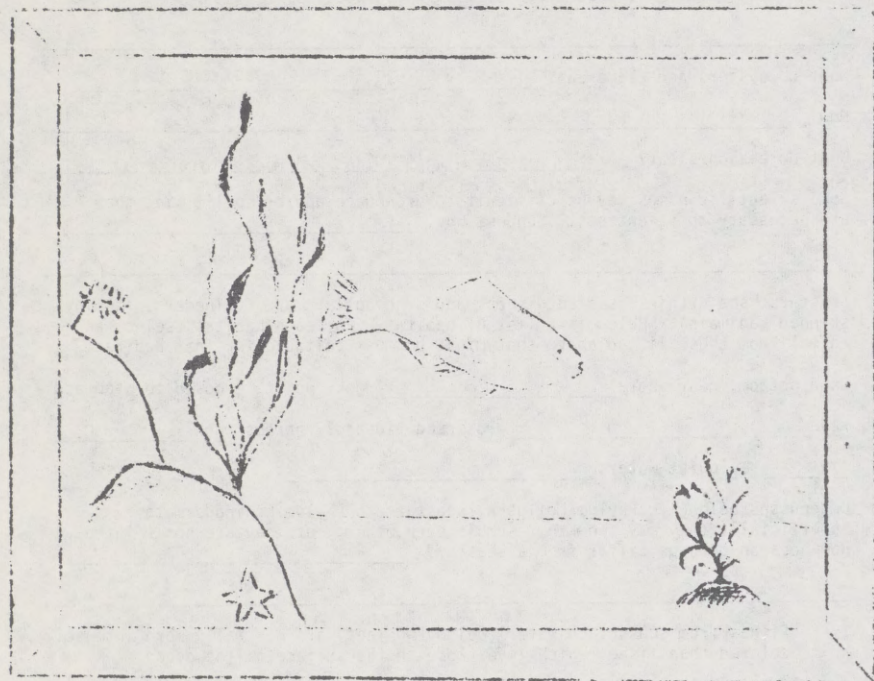
1. Name two groups of fishes which bear living young. 1) _____ 2) _____
 How might this help to insure survival of these species? _____

2. What do oysters and clams eat? _____
 How? _____
 What do abalones eat? _____
3. Some scientific names may be difficult to pronounce and/or spell. Yet they are necessary to scientists. Suggest Why. _____

4. Seastars, sea urchins, sea cucumbers, and sand dollars are Echinoderms ("spiny-skinned" animals). Below is a list of habitat. For each habitat, select an animal from those listed above that might be most suitable for that habitat.
 Sand bottom, near shore _____ rocky point, exposed to wind and
 wave _____ protected tidepool, porous rock _____
 quiet waters _____
5. Octopusses belong to Phylum Mollusca, seastars to Phylum Echinodermata. Superficially they may seem to resemble each other, but they are not related. How does an octopus differ from a seastar? _____

6. T F Fishes from subsurface water (below 200 feet) are generally more intensely colored than fishes which live close to the surface of the ocean.
7. Salmon and tuna are pelagic fishes. This means that they swim free from the bottom. Circle the items which best describe how salmon and tuna are adapted for this kind of life.
 a) Streamlined shape b) Schooling behavior c) large spines on the fins
 d) dark colored ventral (belly) side e) good to eat

INDOOR FIELD TRIPS AT THE
OREGON STATE UNIVERSITY
MARINE SCIENCE CENTER



Donald E. Giles
Marine Science Specialist

GUIDELINES FOR ROCKY INTERTIDAL FIELD TRIPS

Upswing of interest in Oceanography has lured increasing numbers of people to the edge of the sea. The value from their experiences goes beyond traditional scientific goals. Awareness of this unique environment offers our society additional esthetic enjoyment. However, the Marine environment is not inexhaustable which means its preservation is the responsibility of each group.

The Marine Science Education Advisory Council offers the following questions for any groups planning an organized trip to the tidepools.

The Council requests students and leaders to contribute to the growth and development of these guidelines by sending their suggestions to Mr. Don Giles, M.S.E.A.C. Secretary. Marine Science Center, Marine Science Drive, Newport, Oregon 97365.

Additional copies of this material and a list of rocky intertidal beach sites are available from the same source.

PLOTING THE COURSE

- A. What are your objectives besides getting out?
- B. Have you sent for the site list? Has the leader personally visited the site? Does your choice minimize the inherent hazards? By the way, have you checked the tide table for a +1' tide or lower? Have you established transportation and published itinerary? Are you familiar with Oregon's intertidal rules and regulations?
- C. Have you considered teaching aids? Slides? Films? Transparencies? resource people? books? bulletin boards? Have you established work crews (i.e. 5-8 with a designated captain for each)? Does each crew understand its mission? Where are you going to get your adult help? Parents? Busdriver? College students? Has acceptable behavior been agreed upon? Where is your food cache? Would emergency telephone arrangement be useful?
- D. Do you have money? Do you know what salt water does to leather shoes? Do you know what cold conditions do to ones enthusiasm and attention span?
- E. Why must you return rocks to their original position? Do you know that "trodding on" a sea urchin may destroy ten years of its growth? Have you considered that when you remove a six inch square segment of mussel bed you can destroy 6000 living creatures? Does everyone understand that if you leave the organisms on the beach the next group will be able to see them?
- F. Do you have a first aid kit? Will you have emergency transportation with you? Do you know what barnacles do to naked ankles and sea urchins do to exposed toes? Does each crew have a wave watcher and a tide watcher? Smooth soles lead to departed souls. WATCH YOUR STEP.

ALL HANDS TOPSIDE

Are all present or accounted for?

Have you defined the physical boundaries for exploration?

What is the direction and pattern of the waves?

Are crews assembled with their equipment? Does each crew member understand his duties?

What are you going to do?

a. Have you scheduled a familiarization time for when you first hit the beach?

b. Will each crew be carrying out a specific program?--

Observe:--Bands of organisms? tidepool communities?
rock formations? animals under rocks? north-
south propulation differences on a given rock?
feeding of a sea anemone? feeding of a crab?

Classify:--Different kinds of algae? different snail shell
structures? different ways that plants hold onto
rocks? different kinds of crabs? kinds of creatures
in a tidepool?

Measure:--Temperature? Size? Time? for sea anemone to close?
population density? Vertical height of zones?
Limpet shell height?

SWABBING THE DECK

Will there be oral presentations analyzing what each crew did?

Will there be formal evaluation?

Will you integrate the field experience with other experiences?

Publicity?--Parent night? Newspaper? Radio-T.V.?

Have you written thank you letters to those who helped you?

Have you written to the appropriate people if there was necessary first aid given?

Do you have a file on what you will do the same or change the next time you go to the intertidal?

SOME HELPFUL REFERENCES

BETWEEN PACIFIC TIDES...Ricketts & Calvin
Standard work on the subject.

SEASHORE LIFE ON OUR PACIFIC COAST...Vessel & Wong
Exciting book for pre-teens.

TIDE POOLS AND BEACHES...Clemons
Particularly good for elementary years.

INTRODUCTION TO SEASHORE LIFE OF SAN FRANCISCO BAY REGION AND THE
COAST OF NORTHERN CALIFORNIA...Hedgpeth
Applicable to Oregon. Jr. Sr. High.

GEOLOGY OF OREGON...Baldwin
Basic work on the subject.

GUIDE TO COMMON SEAWEEDES OF BRITISH COLUMBIA...Scagel
Works for our species. Good drawing for "Picture Keying."

WATCH THE TIDES...Greenwood
Successful primary level attempt to explain tides.

A FIELD GUIDE TO SEASHORE LIFE ON ROCKY BEACHES OF THE CENTRAL
OREGON COAST...Whitney and Whitney
While the title is almost longer than this little paperback,
it is a useful introductory treatment for those with no
experience with our intertidal beasts.

MARINE SCIENCE EDUCATION ADVISORY COUNCIL
GOALS, OBJECTIVES AND ACTIVITIES

I. GOALS:

1. Promote awareness and appreciation of the marine environment.
2. Foster the intelligent use of marine resources.

II. OBJECTIVES:

1. Develop a clearing house for the coordination of field trips to the intertidal coastal areas.
2. Coordinate, at all levels, the pertinent media available and to develop other media resources where needed.
3. Work toward the development of vocational fisheries experiences (fishing, aquiculture, and processing).
4. Involve State and Federal agencies as well as local interested groups in a total program to help maintain the best possible marine and estuarine environmental conditions.

III. ACTIVITIES:

1. Prepare and distribute an outline for teachers to guide the proper preparation for, and the conduction of, field trips to the intertidal environment.
2. Provide instruction on the handling of material.
3. Distribute the laws regarding the harvesting of nonfood intertidal organisms.
4. Promote inservice and orientation programs for teachers who wish to use the marine resource as part of their instructional program.
5. Develop various slide series to depict selected interaction among floral and faunal species, as well as show physical and social characteristics of the marine inhabitants.
6. Make available a series of laboratory experiences which will aid students in a better understanding of marine sciences.
7. Encourage the use of sea and estuary as areas to illustrate biological, physical, and chemical concepts.
8. Provide references which are of value to all levels in the study of marine sciences.
9. Promote for K through 12 student use establishment of
 - a) a wet laboratory facility at the OSU Marine Science Center
 - and b) a mobile marine laboratory for accompanying groups in the field.
10. Work with outdoor educators toward development of marine experiences for inclusion in their existing and developing programs.

7 July 1969

Marine Science Education Advisory Council
Marine Advisory Programs, Cooperative Extension Service

Guide

OSU Sea Grant
Marine Advisory Program

OREGON'S ROCKY INTERTIDAL FIELD TRIP SITES

1st Printing
Fall 1969

By Laimons Osis, Oregon Fish Commission, OSU Marine Science Center
Bob Bayly, Powell Laboratories, Gladstone, Oregon
Donald E. Giles, Marine Science Specialist, OSU Marine Science Center

Oregon's remarkable coastal shore provides sites for field trips by increasing numbers of students. Although there are many areas available for both educational and aesthetic objectives, class trips seem to concentrate on a few beaches. As a result, the physical and biological environment is often severely damaged. Even if no specimens are collected, the impression left on a beach by 500 pairs of shoes is indelible.

To help field trip leaders learn more about the Oregon coast and to suggest alternate sites for outdoor educational experiences, the state's Marine Science Education Advisory Council has prepared this summary of major locations. Data presented here have been abstracted from a preliminary draft prepared by the Oregon Fish Commission. For more detail about any of these sites, contact the Oregon State University Marine Science Center, Marine Science Drive, Newport, Oregon 97365.

Where permits are required for collecting, they may be requested from the Oregon Fish Commission, OSU Marine Science Center.

Future editions of this guide will be prepared in more detail. One object of this first printing is to solicit suggestions from those who use the guide. If you have a suggestion, please write to the Marine Science Education Advisory Council, OSU Marine Science Center, Newport. Additional copies are available from the same source.

SITES FROM NORTH TO SOUTH

ECOLA POINT Located two miles north of Cannon Beach, within Ecola State Park. The park has a large parking lot, rest rooms, and excellent trails to the beach. The road is too crooked for some large buses. The sandy beach is interrupted by a rocky headland with scattered boulders at its base and some bedrock. There are few tide pools.

HAYSTACK ROCK In Cannon Beach city limits. It is easily accessible and popular. One may drive on the beach or park a block away. This "sea stack" is a large rock isolated on a sandy beach. Although the variety of species found here is limited, it is ample for younger students.

ARCH CAPE Located just south of the town of Arch Cape, a few miles south of Cannon Beach. The same comments apply as for Haystack Rock.

BARVIEW This rocky area close to the mouth of Tillamook Bay is near the town of Barview between Rockaway and Garibaldi. Parking is limited. Barview is best used by smaller groups. The rocky intertidal area is limited but it represents an interesting habitat, just inside the mouth of a bay.

CAPE MEARES (South Side) Located about ten miles west of Tillamook. The cape itself is largely inaccessible but a rocky intertidal area is located on its south side. Access is at Short Beach, a mile north of Oceanside. Parking is very limited and the trail is poor. The area is not suitable for large groups in buses. The intertidal zone is a sandy beach with a large number of boulders scattered about. Closer to Cape Meares are a few larger out-croppings and coves.

OCEANSIDE Maxwell Point nine miles west of Tillamook. Ample parking for buses, easy access to sandy beach with sea stacks. This is a fine place for beginning and intermediate groups and can be used much more than it is.

CAPE LOOKOUT Eighteen miles south of Tillamook, on the south side of Cape Lookout. Access is through the Boy Scout camps, Merriweather and Clark, and prior permission to trespass must be obtained from the Camping Dept., Columbia Pacific Council, Scout Service Center, 2145 SW Front St., Portland, Oregon 97201, telephone 226-3423. The intertidal zone is found off Camp Clark and consists of numerous boulders scattered in the sand. This is a good location for smaller groups, advanced or beginners.

PACIFIC CITY (Cape Kiwanda) Located on loop highway off Highway 101. This offers a nice rocky out-cropping in a region of typical coastal sand dunes. There is good parking and easy access to an exposed area of tidal shelves and good tide pools. This location is best for smaller groups.

ROADS END Take last left from Highway 101 at shopping center at North end of Lincoln City. Parking is limited. Rocks at the north end of the beach have a dense biotic population. There are shelves, channels and table-top habitats. The effect of sand movement may be clearly seen and both sedimentary and igneous substrates are evident. Any class will find this a good site.

BOILER BAY Located one mile north of Depoe Bay. Ample bus parking is available at Boiler Bay State Park and there is a smaller gravel parking lot east of the state park. The trail down to the intertidal area is steep. North of the trail, the steep headland has been broken down to varying degrees, leaving rocky ridges and isolated cliffs with flat bedrock shelves and boulder fields. West of the trail, the shelf area is reduced and interrupted by several tide channels. This is a good area for any students. This popular site is in danger of being overused. (Collecting by PERMIT ONLY.)

DEPOE BAY North of the harbor entrance in Depoe Bay. Parking is ample and access quite easy. This limited intertidal zone consists of a narrow rocky shelf paralleling the highway. Some tide pools pocket the shelf. Although access is easy, this location is recommended only for smaller groups as it is very exposed and could be dangerous if the surf is heavy.

SHELL COVE South of Depoe Bay, reached by turning off Highway 101 onto Shell Cove Road. Although at present parking is ample, access and parking both could be limited if the land is developed. The intertidal area consists of a narrow shelf with a channel dividing it in the middle. It offers a good example of an exposed outer coast, but because of this the surf must be calm before it is safe here. It is not recommended for large groups. (Collecting by PERMIT ONLY.)

MARINE GARDENS at OTTER ROCK Nine miles north of Newport. Bus parking is available at Devil's Punch Bowl State Park and a limited number of cars may park along the dead-end road east of the park. A good trail leads to the intertidal area. Channels, paralleling the shoreline, break up the shelves. Numerous tide pools further pocket the rocks. To the north, the site changes character to higher cliffs with adjoining shoulders separated by some shelves. This is excellent for fieldtrips but NO COLLECTING OF intertidal, nonfood invertebrates is permitted.

YAQUINA HEAD (South Side) Located four miles north of Newport, near the Yaquina Head lighthouse. Parking space is adequate but the trail to the beach is quite primitive. This is one of the most heavily used intertidal regions in Oregon. Long fingers of basaltic headland jut out into the sea to the north and south. Several rocky out-croppings are present, ranging from boulders to isolated islands. Shelves are widespread and cut up by tide channels and tide pools. Yaquina Head has been a popular study area for all levels of students. Overuse is a serious problem. (Collecting by PERMIT ONLY.)

SEAL ROCK Located 12 miles south of Newport just off Highway 101. Access is from a state park on the north or from two turn-off points just south of the main park. Buses are more easily parked at the turn-offs. The trails range from good in the park to poor at the turnoffs. From the state park, a massive headland juts southwesterly. To the south, a combination of cliffs, bedrock and some boulder areas are found intertidally. A sandy beach is south of the headland. This is a good place for school groups and should be used more extensively.

YACHATS STATE PARK North of the mouth of the Yachats River. From Highway 101, turn west on 2nd Street in Yachats. From the large parking lot in the park, several trails lead to the beach and to some rocky intertidal areas. A rocky area extends for about half a mile from the Yachats River. A basalt shelf stretches down into the intertidals. Only on very low tides is some of the sandy beach westward of the rocky shelf exposed. Channels, small caves and tide pools are numerous. Surf can be a problem and must be watched. This is a good area for school groups but close supervision is necessary because it is exposed.

CAPE PERPETUA Three miles south of Yachats. Along the base of this massive mountain runs a shelf of varying width. Although most of the shelf drops abruptly into the sea, some intertidal shelf areas are found with tide pools, caves and channels. The U.S. Forest Service Cape Perpetua Visitor Center offers educational exhibits and films. The Forest Service maintains a network of trails that lead to the intertidal zone. Forest Service naturalists are available to conduct hikes to the tide pools and forest for ecological study. Advance arrangements should be made. (NO COLLECTING is permitted.)

NEPTUNE STATE PARK Located 13 miles south of Waldport on Highway 101. It forms the southern part of Cape Perpetua and has varied intertidal areas. The park is divided into three major parts: the north end, the main picnic grounds and Strawberry Hill. Except for the picnic grounds, parking is restricted to a few buses. Adequate automobile parking is available. The north end and the picnic grounds have limited intertidal areas because the rocks are too steep. Strawberry Hill has an excellent and extensive intertidal zone. Basically bedrock with some sandy beaches intermixed, this location also has numerous tide pools, channels and crevices. Neptune State Park is under-utilized by schools. (Collecting by PERMIT ONLY.)

BOB CREEK to BAY POINT Located south of Neptune State Park. This continuation of the Cape Perpetua basal shelf reaches out into the sand. The basal shelf is exposed to varying degrees in the sand and is broken up by tide channels and some pools. Access and parking is limited unless arrangements are made with a motel. Small groups will find this a rewarding study site.

FOSSIL POINT Located between Empire and Charleston. This unique region one-half mile inside the mouth of Coos Bay exhibits open coastal flora and fauna because it is in direct line with the mouth of the bay. Very restricted parking but rewarding as an unusual habitat situation. Best for smaller groups.

SUNSET BAY STATE PARK About nine miles south of Coos Bay. This state park has picnic and camping facilities adjoining the bay. There is a large parking lot and access is easy, although the south side of the bay has a narrow trail. The tide must be watched carefully. They bay is bordered by a sandy beach on the east with vertical cliffs and flat shelf on the south and north. The shelves are cut up by numerous tide channels. Sunset Bay is popular for field trips and is overused. (Collecting by PERMIT ONLY.)

CAPE ARAGO (North Cove) Eleven miles south of Coos Bay. The north cove is the largest of the three coves in the state park. It is easily accessible from an ample parking lot. The intertidal area is immense, extending to Shell island and parts of Stimpson Reef on the lowest tides. The cove has a sandy beach with a number of boulders. Bedrock shelves and higher cliffs rise from the sand. There are numerous tide pools and channels among the boulders and bedrock. (Collecting by PERMIT ONLY.)

CAPE ARAGO (Middle Cove) Smallest of the three Cape Arago coves. A steep but well-constructed trail leads down to the shore. A steep headland extending southwesterly is broken up by deep tide channels and is reduced to a series of cliffs and reefs. Landward from these cliffs are extensive boulders with some bedrock shelves and pools. (Collecting by PERMIT ONLY.)

CAPE ARAGO (South Cove) A steep but adequate trail leads to the south cove. Vertical cliffs on the north side of the cove break down to flat bedrock shelves and boulders of varying sizes in the intertidal zone. Although all three coves of Cape Arago are used extensively by school groups, the south cove probably is most heavily used. (Collecting by PERMIT ONLY.)

FIVE-MILE POINT (Whiskey Run Creek) Halfway between Bandon and Coos Bay, reached by turning off Highway 101 onto the Seven Devils' Road, 13 miles south of Coos Bay. Parking is limited (no buses). Best suited for smaller groups in cars, the point consists of two distinct areas. The main area is best studied at minus tides. It consists of numerous cliffs pushing out of the sand with some bedrock and boulders strewn about the cliff. Directly shoreward is a stretch of sandy beach and beyond this, large boulders and sandy tide pools.

COQUILLE POINT (Bandon) South of the Coquille River and west of Bandon. A series of rocky outcroppings adjoin boulders of various sizes scattered on the sandy beach, but there are only a few tide pools. Best access to the main intertidal zone is from the south bank of the Coquille River or from a bluff west of town. Parking is available and this area would be of interest to any size group.

CAPE BLANCO Approximately 10 miles northwest of Port Orford. This, the Western-most point in Oregon, has a large intertidal area that is relatively undisturbed. Intertidal zone is best reached on the north side of the cape, before entering the Coast Guard Station. Parking is limited and buses must park and turn around at the station. The intertidal area is a combination of steep headland reaching out into the sea and expanses covered with boulders and bedrock. Tide channels and pools are common. Cape Blanco is an excellent study site and may be used by many more school groups.

NORTH of HUMBUG MOUNTAIN STATE PARK (Rocky Point) About three miles south of Port Orford, just inside Humbug State Park. Access is from a dirt side road and parking is limited. No bus parking. This excellent intertidal zone consists of boulders scattered about on a gently sloping beach.

HUMBUG MOUNTAIN STATE PARK Four miles south of Port Orford. Along the north base of the mountain there is a small intertidal region that is easily accessible from the Humbug Mountain State Park camp grounds. The rocky area consists of several cliffs projecting seaward with smaller boulders scattered at the base. Although the intertidal zone is not very diverse, a beginning group will find much of interest.

NORTH of SAMUEL BOARDMAN WAYSIDE At and just beyond the northern boundary of Boardman Wayside 14 miles north of Brookings. From a gravel turn-off at the state park sign, a trail leads to the shore. The intertidal zone forms a half-moon and consists of an accumulation of boulders of varying sizes on a sandy beach. This is another good intertidal site that is not used by many school groups.

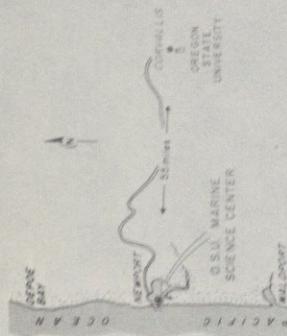
LONE RANCH STATE PARK Five miles north of Brookings. There is ample parking and easy access to the beach. The sandy beach has a large number of rocks, varying from a diameter of less than a foot to small cliffs. Tide pools in the extensive intertidal zone are few but open spaces among the rocks provide several quiet locations.

NORTH of HARRIS BEACH Less than five miles north of Brookings. From the large parking lot at the main picnic grounds it is but a few yards to the beach. The sandy beach is divided by a rocky point that has been broken down to varying levels. Isolated sea stacks and boulder fields are scattered. (Collecting by PERMIT ONLY.)

HARRIS BEACH Harris Beach intertidal zone is found directly west from the camp grounds. Rocky areas are accessible from the picnic grounds parking lot by walking south along the beach or from a trail that leads to the beach from the main park road. On the north, a massive rock reaches southward into the sea. A small tunnel has been carved in the rock and waves surge through onto the boulder fields that lie landward. To the south, the boulder field is again replaced by a smaller cliff with another scattering of boulders at its base, interrupted by small stretches of sandy beach. The beach continues south with a series of steep cliffs or out-croppings with boulder areas adjoining the larger cliffs and separated by sandy coves. (Collecting by PERMIT ONLY.)

MILL BEACH The southern-most part of the Harris Beach permit area. Turn towards the ocean at Center Street in Brookings. Turn right again at the plywood mill and park next to a small ball park. Characteristics similar to Harris Beach.

The Site



THE MARINE Science Center is located on Yaquina Bay at Newport—only 55 miles west of the Oregon State University campus at Corvallis. OSU President James Jensen has said the Center not only extends the campus west to the Oregon coast, but “actually hundreds of miles westward into the Pacific Ocean in an era when national and world-wide attention is focused on the oceans and marine sciences as never before in history.”

The site is a 49-acre peninsula at the southern terminal of the ferry which once crossed Yaquina Bay to Newport. When the bay was dredged to make a deep water channel from the bottom of the steep water channel to the peninsula, the dredging was done on the peninsula, making it wider as well as higher. The Marine Science Center is 17 feet above sea level. The land on the dredge fill is white with controlled shell.

Adjacent, to the east, is a 252-acre marine research reserve given to Oregon State University by the Georgia-Pacific Corporation. This controlled area of natural tidelands is essential for field studies of organisms and beach processes.

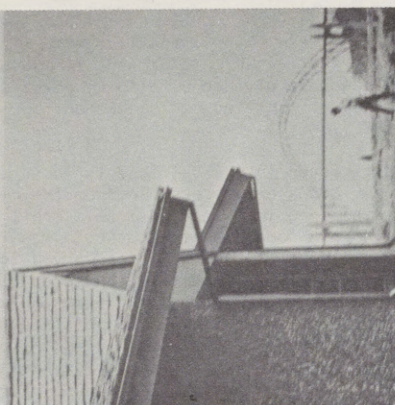
Access roads and large lights make the Center easy to find from the southern end of the Yaquina Bay bridge, whose opening in 1936 made the ferry obsolete. The mouth of Yaquina Bay and beyond that the Pacific Ocean is a mile by water from the center.

Published by the Oregon State System of Higher Education

OREGON
STATE
UNIVERSITY'S

MARINE SCIENCE CENTER

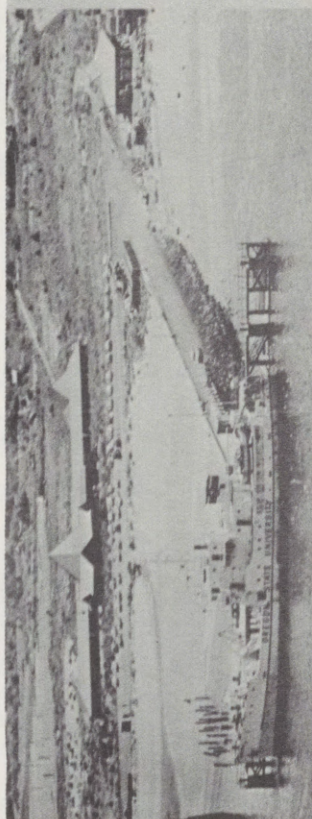
WELCOMES YOU



Yaquina Bay
Newport, Oregon



OSU Marine Science Center
Marine Science Drive
Newport, Oregon 97365
Telephone: 503-867-3011



OSU Marine Science Center

OREGON STATE UNIVERSITY's Marine Science Center at Newport is part of the university campus—the result of the University's expansion of marine research activities over the last decade.

OSU has performed extensive research on water quality, fisheries, and marine zoology since 1939. Oceanography was added in the late 50's, intensifying work in biology, chemistry, physics, geology, and geophysics. Marine research has also been strengthened with expanded programs in resource economics, hydrodynamics, watershed management, and several programs in the basic biological sciences. Research is conducted on a cooperative basis between departments and disciplines.

Major sections of the new Sea Grant program in training, research, and advisory services are headquartered at the Marine Science Center.

The first major building was completed in 1965. The Marine Science Center provides facilities for research and training in oceanography, fisheries, water quality, and marine biology. The public wing contains an aquarium-museum and an auditorium. A second building, for service and ship support functions, and a dock for oceanographic research vessels were also finished in 1965.

The Marine Science Center became a reality through the cooperation of the Port of Newport, which furnished the property, the Federal Economic Development Administration, which granted nearly a million dollars for construction, and OSU, which staffs the Center.

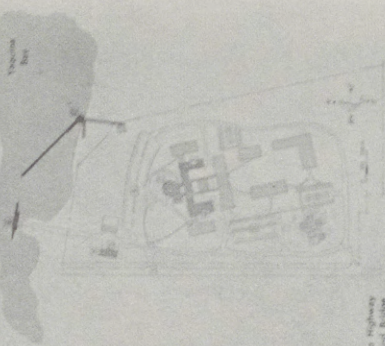
THE CENTRAL WING of the Marine Science Center is open to visitors daily from 10 a.m. to 4 p.m., contains an aquarium-museum, a 180-seat auditorium, conference rooms, and other public educational facilities. More than 200,000 persons annually use these public marine science educational opportunities. About 10,000 school children participate in organized guideshed programs and illustrated talks on marine science. On Saturday nights, in summer and winter, lectures on marine art and science are presented.

Marine fishes and invertebrates, native to the shores and coastal waters of Oregon, are displayed in the 10,000-gallon aquarium. Crabs, wolf eels, seasters, octopuses, and other native marine forms are placed in tanks arranged to show the animals' natural habitat. Seawater is supplied to the aquarium tanks through a filter system designed to maintain maximum clarity.

The museum area consists of panels displaying the history of oceanography, a map of the Earth's crust, coastal geology, and marine biology. Oregon's marine resources are highlighted in a series of displays, including mounted specimens of Oregon shore and marine birds.

A sales counter offers books and postcards on marine science and natural history. The Cooperative Extension Service of Oregon State University and the Division of Continuing Education of the Oregon State System of Higher Education conduct the publishing program with technical assistance from the OSU departments of Oceanography and Fisheries and Wildlife.

The Center Today... Mapping Plans for the Future



Existing buildings

Proposed additions

Future buildings

1. Main entrance
2. Public wing with aquarium-museum and auditorium
3. Yaquina Marine Biology Laboratory
4. Pacific Fisheries Laboratory
5. Service and ship support building
6. Dock for oceanographic research ships
7. Stockade
8. Parking for staff and employees
9. Visitors parking
10. Dock for small research boats

46-880 356

OSU Marine Science Center – Research and Teaching

Pacific Fisheries Laboratory (West Wing)

THE FIRST MARINE biological laboratory in Yaquina Bay was established by Oregon State University in 1928 in a small frame building three miles east of Newport. Research programs there emphasized the culture of oysters and clams and evaluation of the effects of pulp-mill wastes on marine animals.

These programs were moved to the west wing of the Marine Science Center when it opened in June 1965. That wing houses the Pacific Fisheries Laboratory. Research programs include studies of fish parasites, ecology of estuaries, genetics, population ecology of marine fishes and shellfishes, treatment of pulp-mill wastes, phenanthropics of plant life, and marine agriculture.

Facilities of the Pacific Fisheries Laboratory include chemistry laboratories, large apparatus rooms, constant temperature rooms, an aquarium, an algal laboratory, a bacteriology laboratory, a parasitology laboratory, a pathology laboratory, a library, a photo studio, dark-rooms, and offices.

Field facilities on the north (Naviers Reef) and the south Oregon coast (Port Orford) are used for research and training in marine fisheries and aquaculture.

Personnel from the Fish Commission of Oregon, the Oregon State Game Commission, the U. S. Bureau of Sport Fisheries and Wildlife, and the Federal Water Pollution Control Administration share space in the Pacific Fisheries Laboratory.



Research Afloat

THREE MAJOR research vessels comprise the Oregon State University marine science fleet. They are the *Yaquina*, *Cayuse*, and *Palute*.

Yaquina was built in New Orleans in 1944 as an overhaul and maintenance vessel for the U. S. Army Air Corps. She was assigned to OSU by the federal government and was commissioned in September 1964 after conversion into a modern oceanographic research vessel at a cost of \$770,000. Money for the conversion came from federal grants, as do major operational funds.

Yaquina is 180 feet long and displaces 900 tons. Speed is 11 knots, with a range of 6,500 miles by 21 days duration. Other statistics are crew, 18; quarters and life-saving gear for 36 scientists and crew. Equipment includes hydrographic winch, trawl winch, deep sea coring and dredge winch, 200 ft. d. beam trawler, hydraulic A-frame and Nipkow boom, articulated crane, radio, fathometer, radar and electronic navigation system, workboat, and seven scientific laboratories.

Cayuse is 80 feet long with a hull form and arrangements similar to northwest fishing and crab boats. She was commissioned in the spring of 1965. She has a speed of 10 knots with a cruising range of 5,000 miles and up to 20 days at sea. A crew of seven plus seven scientists make up the ship's complement. Equipment aboard includes hydrographic and trawling winches, beam trawler, and other modern electronic and mechanical gear. *Cayuse* was built in Portland.

Palute is of sport-fishing design, but was built and equipped for non-recreational scientific expeditions of up to 30 miles. Built at LeComme, Washington, for OSU in early 1966, she is 32 feet long and equipped with radar, radio, motor, and boom and winch for light near-shore trawls.

Yaquina, *Cayuse*, and *Palute* are berthed at the Marine Science Center's dock facilities.



Yaquina Marine Biology Laboratory (East Wing)

THE YAQINA Marine Biology Laboratory occupies the east wing. There are several seawater laboratories, specialized laboratories for chemistry, microbiology and radiochemistry, and common-use instrument rooms. There are also a darkroom, two cold rooms, a seminar room, and offices for resident staff. Laboratories are arranged on a continuous plan so work with plants and animals may be conducted in the four seawater laboratories, and work with sensitive instruments in general purpose laboratories. Organisms for research are kept in a tank room.

Research in the east wing is carried on by the departments of Oceanography and Zoology, by visiting investigators from other institutions as well as by resident scientists of the laboratory and the main OSU campus. Research projects include studies of the process of cell division in marine organisms, the ability of estuarine organisms to withstand changes in the salt and oxygen content of their aquatic environment, feeding of marine invertebrates—especially mollusks, marine parasitology and symbiosis, and studies of terrestrial animals on the atoll.

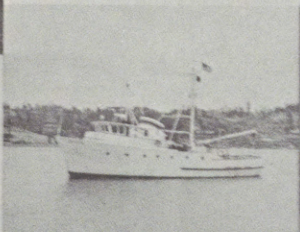
The Environmental Science Services Administration (Weather Bureau) in cooperation with the Department of Oceanography, operates a weather station devoted primarily to forecasting marine weather, including wind waves, storm tides, and changes in ocean currents and temperature.

In summer, advanced courses in biology and other phases of marine biology are offered. These courses attract the needs of students in the Oregon State System of Higher Education as well as students from inland institutions who must meet the requirements of residence at a marine station as part of their advanced degree programs.

Research Cooperation

RESearch PROGRAMS at the Center are cooperative in nature. Departments from Oregon State University which participate in research at the Center include Botany, Civil Engineering, Fisheries and Wildlife, Microbiology, Oceanography, and Zoology. State and federal agencies are also active participants in cooperative research at the Center. These agencies are Fish Commission of Oregon, Oregon State Game Commission, U. S. Bureau of Sport Fisheries and Wildlife, Federal Water Pollution Control Administration, and Environmental Science Services Administration (Weather Bureau). As the Center expands on its 49-acre site, several of these agencies plan to construct laboratory buildings of their own.

Under a program financed by the National Science Foundation, eminently qualified high school teachers are cooperating in research projects and will gain research experience by serving as assistants.



CAYUSE



YAQUINA

Dock Facilities

VESSELS are docked adjacent to the Center in Yaquina Bay. The dock, connecting causeways, and roads have been built to withstand use by truck and heavy machinery traffic for servicing moored ships. The main dock is next to the ship channel and can take vessels up to 15 feet in draft and 250 feet long.

- A building near the dock provides ship support, services, and storage units, including:
 - Office space for ship logistics.
 - A ship's repair shop.
 - Combined ship and storage area for research materials.
 - Electrical distribution center and maintenance center for building and grounds.

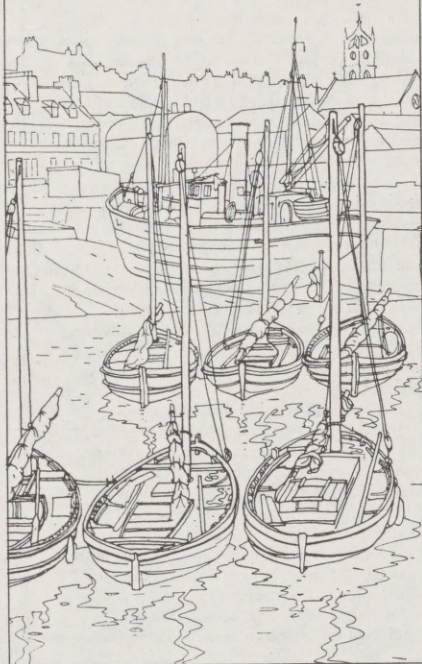
Construction of additional dock facilities, spurned from the existing dock, was started in 1967. A boat ramp, causeway, and portions of a dock were completed. When finished, the 400-foot structure will handle research boats up to 80 feet in length.



PALUTE

PUTTING OREGON'S OCEAN TO WORK

OSU MARINE ADVISORY PROGRAM



DEVELOPING THE SEA'S POTENTIALS

In Oregon, as elsewhere, more people are looking toward the sea and expecting more from it. Oregon State University, as one of the nation's first Sea Grant centers, is helping develop the economic, scientific, recreational, and aesthetic potentials of the sea. With federal Sea Grant support and appropriations from the Oregon legislature, OSU is embarked on a program of unusual significance to train students in applied ocean disciplines, to conduct applied research on marine resources problems, and to put this information to work through its Marine Advisory Program.

At Oregon State, the Marine Advisory Program is what Athelstan Spilhaus, originator of the Sea Grant College concept, envisioned when he called for "developing county agents in hip boots to take the findings of the marine scientists to...accomplish the true use of the sea for and by people."

EARLY EFFORTS PROVIDE FOUNDATION

Oregon State's earliest extension efforts in the marine field were in the 1940s. Programs in food technology were conducted to encourage the use of fish in the home. In the early 1960s county agents were indeed donning hip boots as they sought to help save the state's oyster beds from burrowing shrimp. In the last 10 years, marine extension work has expanded with emphasis on shellfisheries, estuaries, and land development on Oregon's north coast. The first full-time fisheries extension agent went to work in 1967 in Newport. When the university was named a Sea Grant center in 1968, the Marine Advisory Program became one of three major subdivisions of the Sea Grant program. The Marine Advisory Program is supported through the OSU Cooperative Extension Service by federal Sea Grant funds, by state matching money, and by coastal county governments.

STAFF SPECIALTIES RANGE WIDELY

Today, OSU's Marine Advisory Program staff is made up of nine marine extension agents and specialists. The agents, stationed in Astoria,

Newport, and Coquille, have responsibilities in large areas that include major fishing and shipping ports. In addition, the agents are subject matter specialists in such fields as seafood technology, engineering, shellfisheries, finfisheries, business, marine science education, coastal land development, and others.

Marine extension specialists, operating from the Corvallis campus, are professionals in marine economics, oceanography, industrial engineering, and information.



IDENTIFY AND SOLVE PROBLEMS

Operating as members of a closely coordinated team, OSU Marine Advisory Program staff members work individually and collectively with the commercial fishing industry, recreationists, local governmental units, mining interests, marine transportation, port commissions and other people who would like help identifying and solving problems related to the ocean resources.

OSU marine advisors provide liaison between the university and people who use or seek to use marine resources. Whether assistance is needed in assessing the resource, extracting it, processing or marketing it, the Marine Advisory Program staff brings to bear the university's knowledge and expertise.

Whether by applying results of research already completed or by encouraging university faculty members to begin research on altogether new problems, the marine extension staff members respond quickly to needs of their "clients." In fact, the program is so oriented to being responsive to the needs of marine resource users that agents and specialists spend a good deal of time determining areas in which assistance should be provided. Each Marine Advisory Program staff member actively encourages people to come to him with requests for help.

WHAT DOES IT DO?

Now, does it work? A few examples demonstrate the breadth of the Marine Advisory Program and show the kind of services it provides.

Workshops, seminars, town hall meetings.

When the fishing industry needs information, Sea Grant Marine Advisory Program helps provide it. Information sessions have included gear workshops on construction and design; sanitation workshops for seafood processors and their employees, seminars for fishermen on loan programs and vessel insurance; and "Town Hall" meetings for fishermen which report research, development, regulatory policies and other current matters.

Experimental oyster seed hatchery. Marine extension helped identify the need for a reliable, domestic source of oyster seed to supply Oregon oyster growers. In cooperation with researchers, other governmental agencies, investors, and oystermen, the marine extension staff encouraged formation of an oyster cooperative.

Albacore Central. Cooperating with fishermen, researchers, government agencies, and industry, the OSU Marine Advisory Program sponsored Albacore Central, a service to the albacore tuna fishery. Prime product was a daily radio message on fishing and weather conditions, transmitted to the fleet through the Astoria Marine Operator. Supporting the daily radio messages were weekly bulletins and temperature charts.

Publications. Marine advisory publications are intended for ocean resource users. Some are issued on a recurring basis, such as the *Commercial Fisheries Newsletter*. Others are printed one time to meet specific needs. These range from publications for use in the marine science education program, to fact sheets on seafood, to materials for conferences. The Marine Advisory Program views publications as one of its tools and is always happy to receive suggestions for publications.

Public programs in the marine sciences.

To meet a growing public interest in marine science, the marine science education specialist conducts organized school visits to the OSU Marine Science Center in Newport, sponsors films, lectures, seminars and meetings at the center that are open to the public, and is host to visitors to the museum-aquarium. More than 625,000 persons have toured the public wing since the center opened in 1965.

Promoting the use of seafood. Workshops conducted for extension home economists and for

Oregon homemakers encourage use of Oregon seafoods by showing them how to select and prepare the ocean delicacies.

Marine economics. Informal sessions with leading fishermen in each port furnish vital information from which the marine economist prepares Marine Economics Data Sheets. The sheets are valuable tools in helping any fisherman make sound management decisions.

Regional programs. To make best use of marine advisory talent in the Pacific states, OSU's staff is helping develop regional programs. The first of these programs was a traveling seminar on sanitation that began in Alaska, then continued in Washington, Oregon, and California. Experts from each of the states participated.

MARINE ADVISORY PROGRAM STAFF

On the coast

William Q. Wick, head of the Marine Advisory Program and specialist in shellfisheries
OSU Marine Science Center, Newport, 97365.
Telephone 503-867-3011

As program leader, Wick supervises the activities of the Marine Advisory Program staff. In addition, he continues his long-time work in shellfisheries, particularly with oysters and clams. He is active in planning development of Oregon's estuaries.

Donald E. Giles, marine science education specialist. OSU Marine Science Center, Newport, 97365. Telephone 503-867-3011

Giles conducts marine science education programs for the public at the OSU Marine Science Center. In addition, he is working with science teachers throughout the state to develop and conduct planned, integrated programs in marine science for students in all grades.

Paul A. Heikkila, marine extension agent
Coos County Extension Office, Courthouse, Coquille, 97423. Telephone 503-396-3121

Heikkila has broad experience in Pacific coast fishing. He is particularly interested in helping fishermen acquire proper storage and repair areas, and in serving as an information source on commercial fishing developments and techniques. In addition, Heikkila provides information to southern Oregon coastal communities about problems, needs, and successes of the fishing industry.

Kenneth S. Hilderbrand, seafood technologist
OSU Seafoods Laboratory, 250 36th St., Astoria, 97103. Telephone 503-325-6138

Drawing on his previous experience in industry, Hilderbrand encourages communication among members of the seafood industry, government agencies, and the university. His projects emphasize plant and boat sanitation, boat refrigeration, production quality, packaging, marketing, new products, and waste utilization to help the seafood industry keep pace with other segments of the food processing field.

Robert W. Jacobson, marine extension agent. Lincoln County Extension Office, 225 W. Olive St., Newport, 97365. Telephone 503-265-5376

With background and experience in business and commercial fisheries, Jacobson serves as an important source for members of the fishing industry throughout the state. He emphasizes gear and equipment, methods and techniques of operation, and federal and state fisheries legislation. In addition, he edits the Oregon Commercial Fisheries Newsletter and conducts workshops and short courses.

On the campus

Gwil Evans, marine science information representative. Waldo Hall 238, Corvallis, 97331. Telephone 503-754-3092

Drawing on education and experience in science and journalism, Evans conducts public information programs, internal information programs, and supervises production of publications for the Sea Grant program. His work is carried

on in conjunction with the Department of Information and Extension Information.

Don Langmo, industrial engineer. Department of Agricultural Economics, Extension Hall, Corvallis, 97331. Telephone 503-754-2942

Recognized as an authority in the fields of agricultural economics and industrial engineering, Langmo has long worked with food processors in the state of Oregon. Langmo applies proven industrial engineering techniques to seafood processing and is making results of his work available to processors. In addition, public interest in seafood has been further stimulated as a result of Langmo's work.

Daniel A. Panshin, oceanographer. Department of Oceanography, Corvallis, 97331 Telephone 503-754-3354

Bringing extensive experience in management, research, and naval matters to the staff, Panshin provides oceanographic support to those who are trying to make their livelihood from the ocean—especially to commercial fishermen. He helps put interested oceanographic researchers in touch with people in the field, helps field people to phrase their questions and then brings these questions back to campus. In addition, he works with manufacturing and consulting companies seeking to become involved in oceanography and marine sciences.

Frederick J. Smith, marine economist
Department of Agricultural Economics,
Extension Hall, Corvallis, 97331
Telephone 503-754-1821

Smith has extensive background and experience in agricultural economics, marketing, and marine economics. He is principally concerned with providing information to marine industries on their economic position and problems, assisting in solving individual management problems such as finance, insurance, and taxes, increasing impact of seafood marketing and merchandising, and providing guidance in marine economics research programs.

**Men helping men
put the ocean
to work**

OSU

Marine Advisory Program

Cooperative Extension work in agriculture and home economics, Gene M. Lear, director, Oregon State University and the U. S. Department of Agriculture, cooperating. Printed and distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914. 4M -- 3-70

Sea Grant 1

Senator PELL. Senator Nelson requested that responses to a questionnaire submitted by him be included in the record.

(Responses to the questionnaire submitted by Senator Nelson appear as an appendix on p. 387.)

Senator PELL. At this point I order printed all statements of those who could not attend and all other pertinent material submitted for the record.

(The material referred to follows:)

Statement of
John M. Lumley,
Assistant Executive Secretary
for Legislation and Federal Relations
of the
National Education Association
before the
Subcommittee on Education
of the
Committee on Labor and Public Welfare
on the
Environmental Quality Education Act S3151
May 20, 1970

My name is John Lumley. I am Assistant Executive Secretary for Legislation and Federal Relations of the National Education Association, a voluntary professional association chartered by Congress more than a hundred years ago. At present, we list more than a million members, most of whom are teachers.

It is with a good deal of pleasure and enthusiasm that I applaud the leadership and initiative of the sponsors of the proposed Environmental Quality Education Act (S3151). I also want to thank them and the members of this committee for the opportunity to present our views on this important topic.

For the record it seems appropriate to cite the resolution on environmental education passed by the NEA last summer (Resolution C-11):

"The National Education Association believes that each school system, in shared responsibility with classroom teachers, must continuously evaluate its curriculum, keeping it ever sensitive to the current and future needs of students.

"The Association recommends that each school curriculum reflect concern for such critical issues in our present society as--

- a. environmental education,
- b. American heritage,
- c. traditional American values,
- d. mental hygiene,
- e. safety education,

- f. conversion to the metric system,
- g. contributions of minority groups,
- h. cultural diversity,
- i. democratic processes, and
- j. human ecology."

This resolution is not mere rhetoric. Not only has there been much planning and discussion of the need for a better and broader understanding of the qualities which make for a better life and for the preservation of our human natural resources, but we also have established, as of last August, Project Man's Environment (ME), operated by our national affiliate the American Association for Health, Physical Education and Recreation here in Washington at the NEA Center.

Obviously we welcome federal funds and support in moving toward curriculum improvement. We see no evidence of federal control in the present legislation although we would welcome an explicit prohibition to this effect, if only to assert once again that traditional state and local control shall prevail.

I would like to suggest that you give the pending legislation a new thrust and a different organizational pattern. In short, we would like to see the preparation of educational and information materials dealing with environmental education placed under the auspices of an autonomous, nonprofit public institute or corporation, more or less along the lines of the Urban Institute, or the Corporation for Public Broadcasting--a body with its own trustees, staff, funds, and a specific mandate. This new institute will be in a position to seek out suitable talents on a short-range basis as well as for long-term commitments, and it could do so without the potential hazards of a federal operation. The composition of the board of trustees should

guarantee representation to all segments of the education community at the grass roots level providing adequate voice for classroom teachers and other educators.

This National Center for Environmental Education should be broadly based and broadly supported, drawing from private as well as federal funds. Our environment now suffers from a fragmented approach which we are now seeking to overcome through new organizational devices like the three-man Environmental Quality Council and pending proposals for a Joint House-Senate Committee on the Environment. The proposed Center could be a means of coordinating our environmental education efforts, a rallying point for the various federal agencies now seeking to improve environmental understanding and awareness. Instead of relying exclusively on new funds, we are eager to provide a place where other federal activities can be brought together for better coordination into a synergistic effort (which is not the same as a monopolistic effort). At present, there are environmental education activities (including adult education and community awareness) funded and sponsored by the National Science Foundation, the Federal Water Pollution Control Administration, the National Air Pollution Control Administration, the National Park Service, the Bureau of Outdoor Recreation, and others. These separate projects reflect the administrative divisions and the mission-oriented tasks of the funding agencies. Until such time as these agencies can be better coordinated, it makes sense to recommend the proposed nonprofit, publicly-controlled Center as a focal point.

The bill now before us does not contain a specific authorization figure. We visualize about \$12 million per year as adequate for support of the Center, including the sums to be disbursed through grants and contracts for the development and evaluation of curriculum materials and other informational and educational devices as described in S 3151. For the first year, we

recommend even less than that--something like \$2.5 million to get things off to a good start with the bulk of the money to be devoted to planning, program development, selection of qualified staff and consultants, and other organizational and start-up expenditures, probably including manpower development with specific provision for paraprofessionals.

Having cited this relatively modest amount, however, I want to make quite clear that we are looking for the pay-off to come after the first year, extending over a five-year period or so. In other words, we would like to see you authorize a Center for about five years, consisting of a year of planning with modest financial support, then four years of active operation, concluding with a modest phasing-out budget to permit evaluations and research to reflect back on the work of the previous four or five years. For the record, we do not preclude the possible renewal of the lifespan of the Center; its work may well be needed for decades ahead, especially in the context of technological change and the obsolescence of much of our knowledge. What is clear is that a Center like this, if it is to attract first-rate staff, should not be subjected to the annual struggle over authorizations and appropriations which is unproductive and interferes with the continuity of its work. There is precedent for a five-year authorization; there is even precedent for long-term appropriations (as demonstrated by the original Smith-Hughes vocational education act).

The present proposed bill puts strong emphasis on the development of curricula and demonstration projects in the schools. This is definitely needed and we also see the need for a planned impact on our adult citizens.

President Nixon, in his statement of May 29, 1969 put it this way:

"Together we have damaged the environment and together we can improve it."

Surely this damage was not deliberate. It reflects a lack of knowledge and understanding, especially understanding that our technological advances have brought with them certain unintended consequences which call for new ways of dealing with our surroundings. I see the pending legislation as a major vehicle for achieving this kind of new understanding.

It has become almost trite to say that we live in an age of change. What has not yet become trite is the impact of some of these changes. To quote the President again: (State of the Union, January 22, 1970.)

"We still think of air as free. But clean air is not free, and neither is clean water."

More or less the same thing can be said about most of the inroads being made into our environment--

- * Noise pollution is the byproduct of the machines and engines which have become our servants, which are our means of transportation, which wash our dishes and cool the air. They can be made more quiet but this will increase their cost of production and operation in most cases.
- * Highways are the base of our mobility but they also have sliced through neighborhoods and disrupted them, have gobbled up park-land, and have displaced thousands of our fellow citizens who often did not want to be uprooted.
- * Automobiles have given us undreamed-of mobility but they have also become the chief source of air pollution, an unintended by-product and one that can be reduced rather sharply if we are willing to pay

the additional costs of better fuels and engines designed for lower harmful emissions.

* Certain persistent pesticides have contributed to our abundant food supply and unintentionally have become a threat to our health. To cut down on these agricultural tools does not mean starvation but it probably means that we must pay for a better balance between supply and the hidden costs of our abundance.

In giving these illustrations I do not mean to pose as an expert chemist or engineer. I do mean to suggest that there is a need for a massive educational effort designed to reach all of us--adults and children--so that we can make more intelligent choices in our daily decisions as we use the abundant devices modern technology has put at our disposal.

Speaking for an organization of more than a million teachers, I am keenly aware of the responsibility we bear in reinforcing the values of our society. This means that environmental education must come to grips with the prevailing values of our society, that its impact must be broad and penetrating lest it wind up as a perfunctory addition to the curriculum when the teacher once a month passes out a leaflet or shows a motion picture because "today is the day when we have environmental education."

We live in a society which measures success by the size of the car and the power of its engine, but has overlooked the damage of its exhaust.

We live in a society in which the media praise the simplicity and convenience of the throw-away bottle without citing the hidden costs of the return trip or the degradation of the countryside with its litter of abandoned cans.

We live surrounded by commercials which praise speed and the glory of the jet airplane, but try to hide its noise by talking about Whisperjets

which howl just as loudly as the others.

We live in an age which is just beginning to take a look at the idea of environmental quality in terms other than quantity.

We are just beginning to question whether "more" and "bigger" and "faster" are really the same as "better".

And we are just beginning to realize that our problem is not so much the danger of running out of natural resources as running out of places to put our garbage.

And very slowly we are learning the technical terms for this garbage which can be broken down into solid wastes and liquid wastes, into residuals and particulates.

Not only is it desirable for all of us to understand the concept of externalities; it is, indeed, crucial that we understand that man is inescapably a part of his environment and that he is dependent upon it for his very survival. Science classes must learn about harmful emissions, about coliform counts, about the difficulties inherent in producing an efficient steam-propelled automobile, but more important it is critical that these same classes be equipped with the values, knowledge, and skills needed to solve the grave problems which they produce.

The essence of environmental education is the change in attitudes and values, the new stance we must take toward nature so that we treat neither the biosphere nor our rivers and oceans as if they were bottomless sinks in which we can dump with impunity the wastes of our affluent and effluent society.

It is in this sense that I urge you to review the pending legislation so that it will have a much broader thrust and impact. It can and should include pilot studies and demonstration projects, curriculum innovations and teaching techniques. It should also afford an entering wedge for other educational reforms, such as providing for the acquisition and development of environmental study areas by school systems.

Today's hearings deal with environmental education and I share with the members of the committee the hope that they and we will be successful. I ask that environmental education be structured to enrich existing curricula and provide intensive learning experience in this arena of man's future.

I welcome the idea of using environmental quality as the rallying cry which brings together a wide variety of interests.

This widespread interest reflects the fact that our lives are at stake. If the alarmists are right, then our survival, our immediate survival is now being threatened. If the alarmists have overstated the case, there remains the fact that we cannot go on as we have been going, that the survival of future generations is threatened.

What seems inescapable is that we must do something now to assure our survival and to stop the degradation of our environment. This is a matter for education which I would like to see defined as education for all Americans and which I would like to see administered through a nonprofit corporation rather than through a federal agency as being more in keeping with the American tradition of avoiding federal control and avoiding even the

illusion of federal control over education and other means of influencing public opinion.

If environmental education is to be effective, we really must seek to influence public opinion--we must seek to use a variety of media to enlighten the American public about the turning point we have reached in our use of nature, natural resources, and technology, and we must make the schools a part of this shift in attitudes. Your bill is an important means toward these ends and I hope that it will open the way for federal funds, without even a suspicion of federal control, to become available soon. We look to you for continued leadership and encouragement and support.

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Statement by
 ELLA F. FILIPPONE
 25 Holmesbrook Road
 Basking Ridge, New Jersey 07920
Profession: Economist

Environmental Quality Education Act of 1970

The quality of life is dependent, I believe, on the quality of the environment and the quality of education equally interrelated. Environmental education in all areas of the school system from K through college is imperative if Man is to survive. We cannot continue to pollute our air, water, and land. We must find a solution to many of these problems. It would seem that since Man has through his experiments and productiveness been able to build and destroy, he should also be able to take those wastes which he manufactures and find ways and means in which to break them down to complete the cycle, so that he can use them in a productive process again. This cannot be quickly accomplished, however, unless more people begin to form a new attitude toward themselves and their environment and then begin to ask for these changes from industry and government.

I am sure that you have received a great deal of testimony on the need for environmental education for our young people and especially those children in the cities and our ghetto areas. I am not going to dwell on this need, although it is extremely important. I would like to go on record, however, that this should be one of the primary considerations of the Environmental Quality Education Act.

As an economist, I often find that individuals view their environment as the out-of-doors - nature. This is not totally so. The homes in which we live, the place of work - factory, office, school, farm, transportation --- all are an important part of our environment. This new concept of environmental education must do more than give people a renewed appreciation for their natural environment. It must make them more aware of what really constitutes a better life --- it must change their values. People, for example, must begin to understand the need for open spaces and the importance of a swamp's ability to retain water for their own water supply. They must begin to understand that it is far more expensive to buy a cheap house in a flood plain than it is to buy a more expensive house on dry land.

It is extremely important that those theories and attitudes relevant to improving our environmental problems begin to be established during this generation. I was astonished at the lack of understanding among members of the academic community during various Earth Day seminars I attended as to the effect pollution has on the overall growth structure of our economy. We must take some of these people out of this sterile-theoretical atmosphere and place them in the real problematical world in which many of the theories with all their conflicting variables do not work. The cost factor of air pollution alone can hardly be estimated; it changes everyday, since we find it damages another part of our economy daily. If we could isolate one element and place a cost factor on it, we would come up with an astronomical figure in dollar and cents. We do not know how air pollutants actually effect the health of our Nation; we do not know how it effects the growth of our crops; we can only speculate.

When one questions the expert engineers and technicians, one finds that answers might be found in the future. We must begin to find solutions. This can only be done through research, and we must encourage students to go into these fields. We must give every incentive to those interested in finding solutions to this multifaceted crisis.

In our concern with the problem of controlling environmental pollution, we will engender problems of economic stabilization. It is possible that these stabilization problems will arise because at the present time we have not established appropriate measurement concepts and thereby resultant statistics.

For example, as industry begins to spend more for pollution controls, their outlays will naturally be absorbed in the rising costs of their products or services. Therefore, price statistics will show an upward trend. Another alternative would be if government assumed some of the costs via the route of tax credits or other incentive measures. Then the curve would not be as high in the private sector. In any case, to conclude that we will have an economic stabilization problem because prices are rising is somewhat incorrect. New benefits will have been created, some of which in the long run will increase the total productivity in the economy. One must begin to include the social benefit derived from the inclusion of pollution abatement processes towards our environment. The costs and prices of the initial outlay will, of course, be high; however, the ultimate result in stopping the deteriorating environment and reversing the trend will pay after a period of time has elapsed. This example is but one theory which must be reworked in order to put our economic house in order. We must develop a new subject which I call "environmental economics," which in brief is the study of the marketplace with all of its interrelated ecological problems included. The businessman should also be one of the participants of the environmental education program, as I believe our economy is just beginning to see some of the financial problems it will experience if we do not change our approach.

New Jersey, as my home state, has always held a special interest for me. It is the most densely populated state in the Union; heavily urbanized, and one of the most industrialized states in the country. We have all the problems of pollution in emergency categories. The projections are not very encouraging unless we begin to rectify them now. Our State government has reorganized the structure of our state departments with the establishment of the Department of Environmental Protection.

Through the farsightedness of Assemblywoman Josephine Margetts, a bill was introduced and ultimately passed, providing for the establishment of Conservation Commissions in municipalities desiring to do so. To date, 70 have been established throughout New Jersey.

Rutgers University, with the assistance of a grant from the Ford Foundation, presented a Course for Conservation Commissioners. It was held in three areas of the State, i.e., Lincroft, N.J., New Brunswick, N.J., and Morristown, N.J. The course was oversubscribed to, and as a participant of the Course, this was an excellent intro-

duction for approximately 100 adults in the State to start to see the gravity of the problems facing them. Many fortunately were in decision-making positions in communities so that once they returned home, they could continue their studies of problems of particular concern to them and apply them in the proper direction.

In Bernards Township, we not only have established a Conservation Commission (four of the six commissioners took the Rutgers Course), but we also have an organized group of Citizens for Conservation - Bernards Township, of which I am a director and publicity chairman. We have a membership of over 100 families within the Township and have participated in numerous educational programs not only in our own Township but in neighboring communities as well. We have been instrumental in starting other Citizen's groups as well as the formation of new Conservation Commissions in other communities. It is one of the only service organizations which works around-the-clock with volunteers from all walks of life with all kinds of talents from young and old.

The Somerset County Park Commission is in the process of building an Environmental Education Center in Lord Sterling Park, Bernards Township. Once this is established it will assist in the formulation of curriculum and the training of thousands of people in environmental education. This Center will not just be a nature center, but will show how Man is dependent on all of his surroundings and how he must take care of these surroundings so that he will be able to continue to survive.

A bill has just been introduced in the New Jersey Assembly, Bill No. 1092 by Assemblywoman Margetts, Assemblymen Ewing, Kean, Pfaltz, McDonough, Kiehn, Fay and Florio, "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 private school students and teachers, for the establishment and operation of a network of Environmental Education Curriculum Research and Development Centers, and making an appropriation."

With participation on a local level as well as state and federal, it might be possible to turn the tide. Education has proved itself many times over. It was through increased knowledge that Man has developed from the cave to the abundance of life we enjoy today. We have proved many times over that the more education an individual has the better place he can make for himself in society. It would seem to me that environmental education interwoven with all other subjects would reap limitless rewards. It would bring a better understanding of not only Man's relationship with the natural environment but with his brother Man on which he is also dependent. He will begin to comprehend better that ghetto's bring decay which ultimately spread; that what is needed is an understanding of the delicacy of balance in nature, such as our relationship with the micro-organisms

in the soil and how pesticides are destroying our chances of any relationship at all.

The "luxury of polluting" must be eliminated from our society. Archeologists have shown that the demise of many great cities was caused by water pollution or the loss of water supply altogether. Scientists of today are constantly warning of the possible problems which might arise from "bad" water. Education of our masses is the only solution. We must begin NOW!

I strongly endorse the passage of the Environmental Quality Education Act of 1970.

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GENERAL ASSEMBLY
OF NEW JERSEY
TRENTON

JOSEPHINE S. MARGETTS
ASSEMBLYWOMAN, DISTRICT 10A (MORRIS)
BLUE MILL ROAD
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Statement by Josephine S. Margetts
on

Environmental Quality Education Act of 1970

We Americans during the past few generations have changed our mode of living from rural to urban to city. Our standard of living is the highest in the world, and thereby we produce the most pollution in the world. We have ruined millions of acres of land a year through erosion and poor land development; polluted every major river and stream; caused many problems with wildlife, insecticides and herbicides; mined fossil fuels and minerals to an exhausting degree; polluted the air to dangerous proportions; and are continuing to overpopulate so that we will continue to overconsume.

Most people today do not realize that the human relationship to the environment presents one of this century's greatest changes and one of education's most serious challenges. We need to educate an entire new generation of citizens, planners, developers, engineers, economists, and scientists to understand that people are a part of the environment and what effects the environment ultimately will affect MAN.

It is probably true that many children today are not aware of the environment for the most part because they go from the classroom to the television set and see very little of the community. We have recently seen many studies which show that the quality of children's programs is not the high standard it should be.



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Environmental Quality Education Act of 1970

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Environmental education is a relationship which must be taught to all children including those in the cities.

Basically, I feel, environmental education must be taught at all levels of education. It must be interwoven in all courses taught in grade K through 12 as well as during ensuing college years. Special courses should be developed for adult schools as well. As a matter of fact, the philosophy and techniques of introducing environmental education should be carefully developed so that teachers can utilize every opportunity to include environmental education into their instructions.

One of the problems with previous environmental education programs, as I understand it, is the fact that since they were separate from the regular curriculum program, once federal funds were no longer available, many of the schools dropped the program from their schedules. Therefore, in addition to developing a procedure which would fit into the overall curriculum, I urge careful consideration be given to the development and establishment of environmental education centers, which will specialize in the interrelationship of man to his environment. These centers when properly located can easily work their programs into the schools without drastic curriculum changes, and also hold seminars and classes for adults, the handicapped and pre-schoolers.



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Four such centers were established in New Jersey under Title III of the Elementary-Secondary Education Act of 1965 using both Federal and State Funds. They are:

1. The Conservation and Environmental Science Center at Brown's Mills, which operates several college-sponsored teacher training courses which prepare teachers through the use of guidelines and original material prepared for environmental education in urban, suburban, rural and marine environments. The Center also maintains one day field trips in all seasons and a restricted resident program each week of the school year.

2. The Union County consortium of school districts has developed a day-use program at the "Deserted Village" site in Union County.

3. The Stepping Stone Environmental Education Center in Branchville has developed resident facilities, resident programs and a day-use and school-sire visitation program.

4. The Middletown Township Board of Education, Sandy Hook, New Jersey, operates a shore and marine center for the school system and for Brookdale College.

County parks and museums, such as those in Monmouth, Bergen, Somerset and Morris Counties have also developed day programs in conservation and natural history studies.

Our State of New Jersey is growing at a tremendous rate.



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We have the largest population density per square mile in the Nation.. 909 people per square mile. We have all of the problems which go with overcrowding; yet we do uniquely still have some open spaces which can also lend themselves well to teaching about outdoors. The Great Swamp and similar areas throughout New Jersey are marvelous natural areas within easy access to residents in Morris, Somerset, and Essex Counties.

We must use the community around us as a source of learning.

On May 14, 1970, I introduced bill A1092, entitled the "Environmental Quality Education Act of New Jersey" which states: "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 educational programs for public and private school students and teachers, for the establishment and operation of a network of Environmental Educational Curriculum Research and Development Centers, and making appropriation."

We have a great job ahead of us to correct the abuses we have placed upon nature. Even our economic structure does not participate in good conservation practices. We must change these attitudes.



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I would like to bring to the attention of the Congress the following quotation, which is all too relevant today to underscore the need for environmental education:

"The conservation of our natural resources and their proper use constitute the fundamental problem which underlies almost every other problem of our national life...For the last few years, through several agencies, the government has been endeavoring to get our people to look ahead and to substitute a planned and orderly development of our resources in place of haphazard striving for immediate profit. Our great river systems should be developed as national water highways..."

This statement was part of President Theodore Roosevelt's 7th Annual Message to Congress on December 3, 1907. It could very well apply today.

It has been proven again and again that the value of an education can lift an individual one level of society to several if not many degrees higher; it can produce a higher rate of income. By interweaving environmental education with everyday learning, I believe we can achieve a true quality of life or as Albert Schweitzer called it "a reverence for life", which will set man back into the environment where he belongs and not place him above and beyond that on which he is so thoroughly dependent.

As Chairman of the New Jersey Assembly Agriculture, Conservation and Natural Resources Committee, I am most concerned that the Environmental Quality Education Act of 1970 be enacted into law.

ASSEMBLY, No. 1092

STATE OF NEW JERSEY

INTRODUCED MAY 14, 1970

By Assemblywoman MARGETTS, Assemblymen EWING, KEAN,
PFALTZ, McDONOUGH, KIEHN, FAY and FLORIO

Referred to Committee on Education

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 private school students and teachers, for the establishment and operation of a network of Environmental Education Curriculum Research and Development Centers, and making an appropriation.

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

1 1. This act shall be known as the "Environmental Quality Edu-
2 cation Act."

1 2. The Legislature finds and declares:

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

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

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

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

13 e. The public and Legislature have expressed their concern by
14 the passage of the Green Acres Bond Act of 1961, the Water Bond
15 Act of 1969 and the establishment of a Department of Environ-
16 mental Protection; and

17 f. It is a prime objective to create an environmentally literate
18 citizenry who understand their interdependence with and responsi-

19 bility for the total environment, and who possess the knowledge
20 and concern to solve existing problems and to prevent future ones.

1 3. The Commissioner of Education is hereby authorized and
2 directed to promote the establishment and operation of local public
3 and private elementary and secondary school environmental educa-
4 tion programs, and to assist in the development of such programs.

1 4. The Commissioner of Education in consultation with the
2 Commissioner of Environmental Protection is hereby authorized
3 to designate and operate and develop Regional Environmental Edu-
4 cation Centers and facilities for the purposes of assisting in the
5 development of environmental education programs in each school
6 district and providing environmental education instruction to public
7 and private elementary and secondary students and teachers.

1 5. Any public or private agency may apply to the Commissioner
2 of Education for designation as a Regional Environmental Educa-
3 tion Center.

1 6. The Commissioner of Education with the approval of the
2 State Board of Education shall by rules and regulations prescribe
3 the courses of study, schedule of fees, and use of Regional Environ-
4 mental Education Centers for public and private schools.

1 7. Instruction at Regional Environmental Education Centers
2 shall include, but not be limited to the study of man and his environ-
3 ments, and problems of environmental pollution, erosion and sur-
4 vival as they relate to the fields of ecology and other sciences, social
5 sciences, language arts, mathematics, the arts and humanities.

1 8. Any public or private school in the State may arrange its
2 schedule in accordance with rules of the Commissioner of Education
3 so that its elementary and secondary school pupils may utilize the
4 services and facilities of an environmental education center; and
5 any school, except such school as is operated for profit in whole or
6 in part, may, upon application made to the commissioner at the
7 time and in the manner specified in the rules and regulations made
8 by him, cause its pupils to utilize the services and facilities of a
9 Regional Environmental Education Center.

1 9. Upon proper application submitted to the Commissioner of
2 Education by the local school district, the commissioner is autho-
3 rized, subject to available appropriations, to enter into agreements
4 with, and to make cost sharing grants of money to local school dis-
5 tricts or Regional Environmental Education Centers for the pur-
6 poses of assisting in the costs of services for local student partici-
7 pation and other education services provided by the Regional
8 Environmental Education Centers.

1 10. Upon proper application submitted to the Commissioner of
2 Education by a local school district, the commissioner is authorized,

3 subject to available appropriations to enter into agreements with,
4 and to make grants of money to such local school district for the
5 purpose of paying half of the cost of constructing and equipping
6 local environmental education facilities.

1 11. The New Jersey State School of Conservation and the Step-
2 ping Stone Environmental Education Center at Branchville, the
3 Conservation and Environmental Science Center at Browns Mills,
4 and the Sandy Hook Environmental Education Center, by virtue of
5 their long standing and demonstrated capability aided by nearly
6 \$2,000,000.00 in Federal grants, are hereby designated as Environ-
7 mental Education Curriculum Research and Development Centers
8 for the purpose of providing to local, public and private school dis-
9 tricts services such as, but not limited to, development and dissemi-
10 nation of curriculum materials, teacher training, demonstration
11 pilot programs, guidance in facility development and use, and con-
12 sultative services to municipal conservation commissions and other
13 environmental interest groups. The Environmental Education
14 Curriculum Research and Development Centers shall concentrate
15 their research and curriculum development efforts on problems
16 related to pollution, erosion, land use, ecology, survival and related
17 natural, physical and social sciences.

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

3 a. Make rules and regulations for the establishment and operation
4 of the Environmental Education Curriculum Research and Develop-
5 ment Centers;

6 b. Designate additional Environmental Education Curriculum
7 Research and Development Centers as the need arises; and

8 c. Employ such personnel as may be necessary to carry out the
9 purposes of the act.

1 13. There is hereby appropriated to the Department of Educa-
2 tion the sum of \$500,000.00 for the purpose of carrying out the pur-
3 poses of this act.

1 14. This act shall take effect immediately.

Testimony in support of Environmental Quality Education Act of 1970 submitted May 27, 1970 to the House of Representatives and the Senate by Mrs. Betty Little, 11 Berta Place, Basking Ridge, N.J.

I am a conservationist and an economist and I am making this statement in support of the Environmental Quality Education Act because my experience leads me to believe that this is the quickest and most important way in which to meet the environmental crisis.

I have twenty years experience in the field of finance and economists, have spent the last seven years teaching finance at Fairleigh Dickinson University, Madison, N.J. and am currently Co-ordinator for Citizens for Conservation-Bernards Township.

The environmental crisis is most acute in New Jersey. We are already the most densely populated state in the nation and 12,000 persons a year are being added to our population. We are highly industrialized and lying between two large metropolitan areas, we can only expect that our problems will become more complex. Some of our communities are already closed for lack of adequate sewerage, power failure and dim-outs are frequent, air pollution alarms soon will be common place and large stretches of our rivers are open sewers. Our roads are jammed with car, our railroads in decay, our governments-state and local bankrupt. There are riots in our cities and drugs in our suburbs, we are indeed a state in environmental crisis.

There is a need here, as in the nation, for a vast reordering of human concepts and resetting of human priorities in terms of ecology and environment. In a determination to do what we could under the circumstances and with whatever talent we could find, Citizens for Conservation-Bernards Township established in March a speakers bureau (see Exhibit #1 program sheet) We feel strongly that in a democracy the necessary changes will take place only when the people are educated to make responsible choices.

I have come here to report to you about our activities, about conclusions which we have reached from our experience, and about our investigation of possible locations for programs such as ours.

First, Our speakers bureau which originally numbered six was expanded to fourteen to meet the demands of the community. In three months of operation we have participated in programs ~~da~~ given in four counties, covering six school systems and many private organization. We have reached over 3,000 persons ranging from three to eighty plus in age. The programs were primarily presented to small groups on a personal basis. We have also under taken two ~~gxamp~~ pilot programs one for a fourth grade and another currently underway for a fifth grade which include a series of class sessions, a project and a field trip to the management area of the Great Swamp. The fourth grade group studied the need for taking an inventory of our environment and of using our resources wisely, the fifth grade is experimenting with soil problems.

Second, from our experience we have drawn a number of conclusions which will be of interest to you in considering this bill.

a) We have gained a great deal of experience in how to teach various groups and age levels, how to involve class teachers, how to use one class to teach another, how to develop classroom materials and where to look for materials and assistance.

b) In doing these programs we have learned more about our environment and have found ways to solve some local problems. The material is dynamic and the longer we have studied it, the more possible it seems to solve the problems.

c) We have recognized a need for environmental centers outside existing school systems. Such centers could provide education for people regardless of education and background. Programs could be flexible and creative and there could be in such centers an opportunity for all segments of the population to make contributions towards the development and running of the center. The success of such a program will depend on the ability of the Center to reach all segments of the population in a meaningful way. It must be a personal education for individual commitment.

d) We feel there is a need for leadership on a national level to channel experience and material and to provide funds for the building of environmental centers or for the restoration or revitalizing of existing centers which could provide environmental education.

There are three centers in Northern New Jersey, for example, which with the proper guidance and teaching materials could act as centers and put in motion program far more extensive and advanced than ours. We have visited with our children, Morristown Museum, Trailside Museum in Summit and the State Museum in Trenton. Very little in the way of environmental education appears available and yet the basic materials are there. There must be hundreds of such potential centers throughout the United States.

I urge you to pass the Environmental Quality Education Act of 1970 as swiftly as possible so that next year we can begin the long but critical job of re-education for survival on a national basis.

EXHIBIT 1—PROGRAMS SPONSORED BY CITIZENS FOR CONSERVATION—BERNARDS TOWNSHIP

"Environmental Brainstorming," all ages, 30-60 minutes, audience participation.

"Native Animals and Flowers," slide presentation, all ages, 15-45 minutes depending on age level.

"The Meaning of the Food Chain," discussion with visual aids, 15-30 minutes, all ages.

"What is Conservation?" experiments and games, 15 minutes, kindergarten to 5th grade.

"Restoring your Environment," 30 min., adult.

"Chalk Talk on Conservation," 45 minutes, all levels. (P)

"Life Cycle of the Gypsy Moth," 30-45 minutes, visual display including specimens; all ages.

"Environmental Education," 45 minutes. (P)

"County Parks are for People," How parks can play a role to preserve the quality of our environment. 45 minutes. (P)

"Random Reflections—Philosophy and Spirit of the Outdoors," 20 minutes, 6th grade and up. (P)

"Our National EQ" (environmental quality), 30 minutes, adult.

"The Passaic River and Its Problems," 30 minutes, adult.

"Population Problems," Alice Day, Smith College, 1 hour edited tape and discussions, adult and high school level.

"Environmental Crisis," Barry Commoner, 1 hour tape and discussion sessions, adult and high school level.

Speakers Bureau include: Mrs. Elfreda Finch, Mrs. Florence Cox, Mrs. Betty Little, Mrs. Ella Filippone, Mrs. K. Von der Heiden, and Mr. Walter Jones, Somerset County Naturalist.

Material for these programs was prepared with the assistance of Rutgers University College of Agriculture and Environmental Sciences, Somerset County Park Commission, N.J. Department of Agriculture, Somerset County Extension Service, North Jersey Conservation Foundation, and the National Wildlife Federation.

These programs are sponsored by Citizens for Conservation—Bernards Township. Arrangements for them may be made by writing to Box 232, Bawking Ridge, New Jersey 07920 or by telephoning 766-5516.

(P) These programs may be arranged by calling Mr. Walter Jones directly at 766-2489.

Statement by
MILLICENT FENWICK
State of New Jersey
Assemblyman, District 8 (Somerset)

MAY 29 1970

on
Environmental Quality Education Act of 1970

Several months ago a group of concerned citizens in my district conducted a survey as to "What is Conservation?" My answer to them was: Conservation and ecology - The whole relation of man to his environment are the most vital issues before us now. When all the others have been resolved or forgotten, these will be with us, our children, and our children's children.

The growing concern of man for his environment can be seen in every newspaper and magazine one reads these days. On March 7th, the Saturday Review instituted a new monthly section entitled "Environment and the Quality of Life." In their introduction, they said:

"Philosophy precedes ecology. What is most needed today are new realizations about man's place in the universe, a new sense of life, a new pride in the importance of being human, a new anticipation of the enlarged potentialities of mind, a new joyousness in the possibilities for essential human unity, and a new determination to keep this planet from becoming uninhabitable."

It would seem that in order to develop the proper philosophy on a broad scale, one must start at the very beginning, and that is to begin in the school systems where the children are given the basic materials on which to build a future. Environmental education must be brought into the schools, homes, factories, colleges, and any other place where there are Americans.

The concepts of ecology are primary to the structure of environmental education. Complexity of interactions, the delicacy of balance, the importance of variety, these are all concepts which must concern all students and be related to each student's immediate surroundings and all aspects of his life. It is essential that for this program to be effective that all educators become enthusiastic and committed to the cause. Every teacher can influence attitudes toward environmental

quality and thus influence the quality of future life.

My state of New Jersey is one of the fastest growing in the Nation primarily because of its geographical location. We in Somerset County are the next frontier for expansion. The populace of the cities and suburbs are looking toward us for what is considered "the peace and quiet of the country."

We have, therefore, undertaken to build an Environmental Education Center in Lord Sterling Park, Bernards Township, New Jersey, like no other park or educational center in the United States. Hopefully, ground will be broken in the spring of 1971; however, land acquisition was completed on April 3, 1970. We define environmental education as "that education which deals comprehensively with both human resources and conditions, and natural resources and conditions. It is aimed at producing a citizenry which is knowledgeable concerning problems that affect our total environment, understand how to be effective in helping to solve these problems, and is motivated to work toward their solution." The ultimate goal of our Center will be "the stimulation of awareness and understanding of our total environment, natural and altered, among people of all ages by providing learning experiences that cannot be duplicated in any other type of facility, and to develop a sense of responsibility for the care and wise use of our natural resources."

This Center is physically located in the Somerset County section of the Great Swamp. It is about 400 acres of undeveloped land, much of it being marsh and swamp. The land, buildings, trails, equipment --- all will serve as educational tools to be used to fulfill the Center's guiding purpose and educational objectives.

We have employed a professional naturalist, Mr. Walter Jones, who has already been setting up programs and bringing them into the various school systems of the County under the auspices of the

Somerset County Park Commission, ~~of~~^{to} which the Center is an important new addition. Parks already in existence are and will be an important part of the overall program.

Many of the Earth Day activities were conducted by children and adults who had participated in previous programs which are being introduced via the other parks in our system. We believe that our Center should accomplish what few other "nature centers" are doing, and that is open the eyes and minds of people to the total environment around them so that they might appreciate and understand what they see, and value their environment in proper perspective, then stimulate them to become actively involved in correcting the abuses to the environment, and in planning for its future wise use.

We plan to bring environmental education to every part of the County. An abbreviated list of our program possibilities is as follows:

A. Program objectives

1. To give school classes (and other visiting groups) an enjoyable learning experience that is unique and beyond anything that can be achieved in a classroom, or at any other kind of facility.
2. To demonstrate to teachers the values of, and techniques for, environmental education and to carry out an active program of teacher education.
3. To instill in youth and adults an awareness of and appreciation for their environment, and to show individuals and groups how they can actively, effectively, and creatively involve themselves in correcting the abuses of natural resources.
4. To assume a role of leadership in bringing to light, objectively, environmental problems in our area and in providing sufficient information so that an informed and concerned public will strive to solve these problems.
5. To provide foundation experiences for youth which lead to positive attitudes including a reverence for life (of all forms), an "environmental ethic", a desire to contribute to rather than detract from their surroundings.

6. To demonstrate to all visitors the interrelatedness between all living and non-living natural resources and to demonstrate that there are many possible uses of natural resources including some very valuable ones such as esthetic appreciation, which require little or no alteration of natural orders.
7. To give guidance to schools in the county in developing better environmental education programs, and to give guidance when requested to other governmental agencies or bodies in the county with regard to the best application of known ecological principles to land-use planning, park development, and natural areas use.
8. To carry on an active program of adult education, civic leadership and youth advisor training, and to provide facilities and encouragement for seminars, workshops, university short courses, and group meetings concerned with the total environment.
9. To bring rural, suburban, and urban people closer together in understanding problems related to their shared use of natural resources, and to bridge the "understanding gap" that often exists between these people.
10. To encourage, co-sponsor with other educational institutions or to conduct active research in all phases of the environment, environmental education, and human behavior as related to the environment.
11. To assist in and encourage vocational training in the environmental sciences.
12. To provide a quality recreational facility for the people of Somerset County to allow them to relax and withdraw temporarily from the pressures of everyday life.

B. List of Feasible Programs

1. Guided Group visits (1 1/2 hours to all day)
 - a. Schools (nursery through college)
 - b. Youth Groups (of all kinds)
 - c. Adult Groups (of all kinds)
2. Natural History Field Schools
 - a. Week-long (9:30-3:30 daily) sessions for youth in summer.
3. Naturalist aide program
 - a. For high school youth to acquaint them with the natural world and vocations in environmental sciences. (Conducted Saturdays and after school).

4. Vocational Education (applied environmental sciences)
 - a. Horticulture
 - b. Limnologist technician
 - c. Forestry technician
 - d. Soils technician
 - e. Wildlife Management technicians
 - f. Natural Resource Law Enforcement
5. Adult Education (credit, non-credit, formal, informal)
 - a. Botanical sciences (variety)
 - b. Zoological sciences (variety)
 - c. Ornithology
 - d. Home Landscaping & gardening
 - e. Environmental concerns
6. Civic Leadership Training
 - a. Conservation Commission Forums, workshops
 - b. Land-use planning forums, seminars
 - c. Political aspects of conservation
 - d. "Community Action for Conservation"
 - e. Environmental concerns courses
 - f. "Man and the Urban Crisis" courses, seminars
7. Teacher Training (credit, inservice, non-credit)
 - a. College extension courses
 - b. Environmental interpretation and education in the classroom and outdoors
 - c. Taxonomy - recognition, identification of plants and animals.
 - d. General ecology
 - e. Audio-visual aids for environmental education
 - f. Methods of collecting and using specimens
 - g. Field trip planning and execution
 - h. How to effectively use park and school grounds
 - i. The psychology of environmental education
 - j. Educational resources available (personnel & publications)
8. Youth Group Leadership Training (for adults)
 - a. Environmental interpretation techniques
 - b. Conservation project guidance techniques for youth groups
 - c. Youth "community action" programs
9. Naturalist Apprentice Program
 An on-the-job training experience designed to familiarize college students and graduates, and other qualified adults, with all facets of nature education center work. Can be conducted during the school year and summer, and can give us needed help during peak periods at minimal expense.
10. Nature and the Arts (instruction for older youth and adults)
 - a. Photography
 - b. Crafts
 - c. Painting
 - d. Sculpture
 - e. Literature - prose and poetry
 - f. Music

11. Natural History Art Festivals
To compliment No. 10.
- 12 Consultation Services (to schools, government units)
 - a. Environmental education
 - b. Conservation practices
 - c. Ecological planning of land use and development
13. Research
 - a. Animal population dynamics
 - b. Animal social behavior
 - c. Taxonomy
 - d. Animal and plant adaptation
 - e. Aquatics, limnology, hydrology
 - f. Wildlife Management techniques
 - g. Bird banding, animal tagging and marking
 - h. Life history studies
 - i. Geology, soils studies
 - j. Paleobotany, Paleontology, Archeology
 - k. Human Behavior
 - l. Vandalism control
 - m. Education - methods and psychology
 - n. Historical studies
 - o. Pesticides
14. Dissemination of information
 - a. Publication of natural history information (booklets, pamphlets, manuals, etc.)
 - b. Publication of environmental education material
 - c. Reference library
 - d. Development of audio-visual aids (for circulation in the schools and for use in the center)
 - e. Natural history journalism
 - f. Radio-TV appearances, assistance in productions
 - g. Displays at Fairs, shows, public gatherings, lobbies of public buildings
 - h. Encourage industries to develop and temporarily place in our building displays as to how they are coping with environmental problems.
 - i. Film-Lecture Series and engagements - programs presented at center by visiting lectures, and programs presented by our staff away from center.

As you can see, we have been making extensive plans for our Environmental Education Center. People are beginning to see that with increasing urbanization the pursuant problems of environmental pollution, destruction of natural beauty, and loss of open land will only be intensified. Thousands of young people are growing up in our County without any real concrete contact with an unaltered environment that is a part of our heritage and a basis for our existence. Instead these youth learn about the natural world only within the artificial,

formal, and often sterile climate of a classroom, or from a television set. Even school grounds are often devoid of any semblance of nature with their stoned or paved playgrounds and parking lot. These youths will all too soon be faced with the environmental crisis that we and our forefathers have created. These youths must solve the environmental problems for time is running out. Future generations may not have the opportunity.

Without an understanding of the natural world of which he is a part, Man not only will fail to achieve his potential, but will reach the brink of extinction. Man is an endangered species. Man alone can change this. Environmental education is the first step towards an overall solution.

As a Member of the New Jersey Assembly, I heartily endorse the passage of the Environmental Quality Education Act of 1970.

AMERICAN ASSOCIATION OF MUSEUMS

2233 Wisconsin Avenue, N.W.

Washington, D. C. 20007

(202) 338-5300

STATEMENT OF KYRAN M. McGRATH, DIRECTOR
 AMERICAN ASSOCIATION OF MUSEUMS, ON S. 3151,
 THE ENVIRONMENTAL EDUCATION ACT, BEFORE THE
 U.S. SENATE COMMITTEE ON LABOR AND PUBLIC WELFARE
 WEDNESDAY, May 20, 1970

Mr. Chairman, museums offer unique opportunities for the education of the public in matters of environmental health. It is my privilege to inform your Committee that museums as source institutions bring to the American public information essential for the understanding and appreciation of threats to human ecology from pollution. Close to 7,000 museums in the United States represent practically every aspect of man and his environment. Museums are equipped physically and philosophically for the monumental task of education that confronts this country on this vital subject.

A practical example of the type of exhibition that museums can develop for the purpose of this educational effort was "Can Man Survive," a self-contained exhibition created for the centennial celebration of the American Museum of Natural History, New York City, 1969. The exhibition uses the techniques of multi-media devices and architectural design to produce a message of shock and physical discomfort producing a result that impresses the viewer with an education of environmental pollution and is reinforced by psychological reaction and physical sensations. Since early 1969, more than 300 people per hour have experienced this particular exhibition. It cost \$650,000 to construct, and the admission charge of \$1 per adult and 50¢ per child and 35¢ per each member of school groups will not recover the cost of construction and maintenance, but it helps recover part of the museum's expense in producing this message.

"Can Man Survive" relies on visual and sound sensations for its message, and therefore, its educational value is fully available to people of all ages and educational levels. There are no labels in descriptive or quantitative terms. The museum community feels that this is very important in providing an educational service which does not require the viewer to be enrolled in any particular program of formal education nor does it presume that the viewer has achieved a fixed level of academic achievement.

The Oregon Museum of Science and Industry has prepared a relatively inexpensive exhibit on urban sprawl called "A Disposable World," which utilizes multi-media techniques of presentation and concludes with a number of choices that each visitor might select to solve the problems depicted.

The Natural Science Museum in Cleveland has presented programs on population, endangered species, urban sprawl and habitat preservation, and on the legal aspects of conservation. The Akron

Art Institute in Akron has presented exhibitions on the ghettos and traveling exhibitions on environmental problems. The Anacostia Neighborhood Museum in Washington, D. C., as well as MUSE, the neighborhood museum in Brooklyn, has presented many exhibitions on environmental topics including the famous programs on rats which have drawn thousands upon thousands of viewers, old and young. The Corcoran Art Gallery in Washington, D. C., presented a dramatic exhibition on the work of an architect, Paoli Soleri, who combined architecture and ecology in the hope "that man will learn to build a harmonious environment rather than disrupting the balance of life." The Carnegie Museum (Natural History) in Pittsburgh, has presented a number of shows on the subject of strip mining, water pollution, population, litter, and soil erosion. The Northern Indiana Historical Society, South Bend, Indiana, presented an exhibition with headings such as "Beautiful Lake Michigan Makes Us Sick." These are types of exhibitions and programs which evidence what some museums have done in the recent past and which many hundreds of museums can do in the future.

In the winter and late 1969, the American Association of Museums inquired of their 1060 member institutions at that time as to past and present programs in the field of ecology and their interest in conducting such programs in the future. With approximately 54 percent of these museums responding, 73 percent of those which did respond expressed interest in initiating or expanding efforts for environmental displays or exhibitions. Forty percent of those responding had no present programs and wanted to initiate them, but did not have the resources, neither financial nor material, to carry out their programs. Very interesting in this response was the number of museums in each of the three major categories, art, history and science, which are presently or intend in the future, to be actively involved in programs on human ecology. The biggest single factor cited as holding back educational programs on environment and ecology in general was the lack of financial ability to construct the exhibitions and provide the floor space necessary to house both the exhibition and the crowds viewing them.

I would like to insert at this point two tables on the responses of this analysis. This survey, from late 1969, is the most recent of its kind presently available, and it provides a strong indication of the willingness on the part of museums to assist in the national effort to educate the public on the value of our environment and the dangers of its indiscriminate destruction. This survey was conducted under the chairmanship of Dr. James A. Oliver, Chairman of the AAM ad hoc committee on human ecology. Dr. Oliver was Director of the American Museum of Natural History at the time "Can Man Survive" was developed and opened. The analysis of his committee was made possible through support from the U. S. Public Health Service Consumer Protection and Environmental Health Service, HEW.

TABLE I
Institutions Requiring Assistance for Environmental Programs

Type of Institution	Responding	Financial	Technical	Exhibit Space	Material
Art ¹	76	74%	34%	13%	57%
History ¹	89	79	39	33	44
Science ¹	68	58	27	35	39
General ²	102	78	33	45	42
Children's	19	74	21	32	32
Univ. & Coll.	56	69	16	29	33
Other ³	11	50	30	20	30
Planetarium	1	—	—	—	—
Zoos	2	—	X	—	X
Botanical Garden	1	X	X	—	X

TABLE II
Institutions Carrying Out Environmental Programs
Breakdown of Specific Programs

Type of Institution	Responding	Any Type of Program*	Pollution	Population	Endangered Species	Urban Sprawl
Art ¹	76	37%	7%	7%	3%	17%
History ¹	89	34	15	0	10	6
Science ¹	68	79	35	44	44	13
General ²	102	84	33	16	38	10
Children's	19	63	10	21	53	21
Univ. & Coll.	56	59	29	12	18	18
Other ³	11	70	60	20	30	30
Planetarium	1	X	X	—	X	—
Zoos	2	X	X	—	X	—
Botanical Garden	1	X	—	—	—	—

* Includes exhibits or programs on pollution, population, endangered species, urban sprawl and any other environmental problems.

Footnotes

1. See the Museum Directory for a breakdown of each category.

2. General—any museum that emphasizes at least two of the Art, History and Science categories.

3. Other includes any institution not covered by the above categories, for example, specialized museums.

(From Pg. 30, MUSEUM NEWS, May, 1970)

Almost every conceivable technique of education is employed in museum programs: displays, exhibitions, film series, lectures, workshops, field trips, and art shows. Topics covered in existing programs of museums include urban design, mass transit, garbage disposal, water pollution, rodent control, nutrition, exercise, environmental health, wet-land conservation, natural resources, wilderness and wildlife preservation, endangered species, habitat destruction, agricultural chemicals, forest fires, littering, cultural trends, population control and the many other aspects of human ecology.

Mr. Chairman, I am grateful for this opportunity to inform your Committee of the resources available within museums as well as the willingness shown by their professional staffs to utilize their resources for the purpose of educating the public on the physical and psychological facets of environment. Approximately 50 percent of museums in the United States are supported solely through private funds. Of the remaining museums, most receive support from local governments. They are unable to expand their educational programs in areas such as environment as long as their financial support is limited to the local tax base. Many millions of visitors from outside the local tax base pour into these museums annually, and do not contribute an amount equal to their per visitor cost of operating the museum and providing the educational programs available. If

museums were to begin charging the true per-visitor costs, ranging from \$1-\$8 per person, many millions of Americans would be unable to afford admission and hence be excluded from the very education so desperately needed by all residents in America.

If there is anything that museums or the American Association of Museums would be able to provide for you or your Committee in regard to your consideration of S. 1351, the Environmental Education Act, please know that we stand ready to respond to the best of our abilities.

STATEMENT OF DR. CASEY E. WESTELL, JR.
 GENERAL WOODLANDS MANAGER
 PACKAGING CORPORATION OF AMERICA
 FILER CITY, MICHIGAN

SPEAKING FOR THE FOREST INDUSTRIES COUNCIL
 ON S. 3151, ENVIRONMENTAL QUALITY EDUCATION ACT
 BEFORE SUBCOMMITTEE ON EDUCATION
 COMMITTEE ON LABOR & PUBLIC WELFARE
 UNITED STATES SENATE
 MAY 20, 1970

Mr. Chairman, Members of the Subcommittee, it is a distinct pleasure to be with you today to testify on S. 3151, the Environmental Quality Education Act.

My name is Casey E. Westell, Jr. I am General Woodlands Manager for Packaging Corporation of America, and my headquarters is in Filer City, Michigan. I am appearing on behalf of the Forest Industries Council which is a policy coordinating organization on resource matters for the American Forest Institute, the American Paper Institute, the American Plywood Association, the American Pulpwood Association, and the National Forest Products Association. Together these organizations represent the various facets of industrial forest management and forest products manufacture in this country. As an element of their resource responsibilities, they are directly concerned with the environmental aspects of timber growing, cultivation, harvesting and conversion into more than five thousand useful products.

My qualifications as spokesman for these groups rest upon my longtime participation in the activities of the American Pulpwood Association and the American Forest Institute, my professional activities, and my educational training.

Since leaving the military service at the end of World War II, I have been directly concerned with matters of forest ecology and environment. I hold the degrees of Bachelor of Science in Forestry, Master of Wildlife Management, and Doctor of Philosophy in Forest and Wildlife Ecology, all from the University of Michigan.

Currently, I am a member of Governor Milliken's cabinet-level Council on Environmental Quality of the State of Michigan, a third-term member of the McIntire-Stennis Cooperative Forestry Research Advisory Committee, and a member of the Michigan Natural Resources Council. I am a director of the Michigan Association of Conservation Ecologists and of Trout, Unlimited, which I served as its first president for four years. I am also a member of

the Society of American Foresters and the Wildlife Society. In 1963, I was appointed by Governor Romney as a member of the Conservation Study Committee which resulted in the reorganization of the Michigan Department of Natural Resources. I have written and lectured extensively in my fields of interest.

From 1951 to 1954, I held research and teaching posts in forest and wildlife ecology at the University of Michigan. The following year I conducted research in forest ecology for the U. S. Forest Service and then joined Packaging Corporation of America in 1955 as a research forester. In 1956, I began five years as the corporation's forest and wildlife ecologist, then served as chief forest ecologist until 1965 when I became general woodlands manager, the post I now hold.

In detailing my background, it has not been my intention to parade personal accomplishments. Rather, I had hoped to establish for this committee that industrial personnel, by reason of training, responsibilities and citizen participation, devote themselves to the public interest on a broad base as well as to the immediate benefits of their employers.

The forest products industries, more than most, are dedicated in principle as well as for sound woodland management reasons, to quote the language of the bill, "to enhancement of environmental quality and ecological balance."

It is our earnest hope that the fundamentally sound purposes of S. 3151 will convey these facts to all the people through effective educational programs and prompt citizen support of modern forest management activities on all commercial timber lands, both public and private.

S. 3151 can be an effective means of advancing public understanding of environmental problems, and what can be done about them. Federal support for development of curricula and course materials is a different approach than Congress has commonly taken in the past, when it has enacted programs designed to strengthen instruction in given subjects through grants to state education agencies. Nonetheless, the approach is not unknown.

The McIntire-Stennis Act (P.L. 87-788, 87th Congress, October 10, 1962) is a classic example of effective coordination of federal educational objectives, funding, and advisory management. I shall speak to its application to S. 3151 at a later point. This precedent establishes the important fact that the parties who hold the key to environmental quality should be part and parcel of the development of such curricula. Otherwise, we will wind up teaching theories in the classroom that bear little relationship to what is happening, and to what is possible.

Representatives of industry, trade associations, municipal water and waste disposal agencies, regulatory bodies, and the Public Health Service should be among those who take part in any realistic appraisal of environment, and its enhancement. Moreover, they are the source of enormous knowledge of what the problems are, technically and economically.

There is scarcely a manufacturing industry, or extractive industry, that is not affected by the national concern for resources and environmental quality. Some in industry are far more concerned than the public is about diminishing resources, their conservation, and their replenishment. Industry bears a major responsibility for the quality of environment. It would seem logical, therefore, that industry be a participant not only in finding the means of controlling pollution and ecological imbalance, but in educating the public to the issues.

Essentially, my testimony embraces four major points:

First, a challenge -- or admonition, if you will -- to set and maintain from the outset only the highest and best of professional standards for teaching and disseminating information about environmental quality and ecology.

Second, a brief presentation of some of our industry's experiences and efforts in environmental education over the years.

Third, some recommendations with respect to the legislation itself.

Fourth, some specific offers and suggestions as to how the American forest products industries can be helpful in assisting and advancing the worthwhile aims of this legislation.

Gentlemen, logging is one of the oldest industries in North America. It is believed that Indians logged the Southwest 4,000 years ago and that Norsemen cut timber in the Northeast several hundred years before Columbus arrived here.

Forests are basic to our environment, and, happily, they are a renewable natural resource. They are at once the home of wildlife and water-sheds, living factories consuming carbon dioxide and producing oxygen, scenes of beauty and sites for recreation, as well as the source of timber for building and renewing man's own habitats -- his homes and his cities -- and for supplying him with thousands of wood products.

The art of silviculture (producing and caring for a forest) today has infinitely more basis in scientific method and technology -- and its

practitioners more professionalism -- than ever before. Where once Indians set fire to dense, old growth forests to aid their regeneration and provide browse for animals, we prune, thin, harvest and employ other proven timber improvement practices. Where once the early settlers and our forefathers depleted forests in the East and Midwest as they moved westward settling the country, we are reforesting our private industrial timber lands at a higher rate than we are harvesting.

In the South, the same pattern has occurred. Intensive timber management has enabled the South to regrow timber at a rate which permits harvesting of its second forest now and, at the same time, provides for planting the third forest.

Today, thousands of industry foresters plant, thin, fertilize, harvest and regenerate their tree crops for the present and future use and enjoyment of man in accord with conservation values and other multiple factors of the environment. Foresters have to be professionally trained experts in ecology and are among the most sensitive to changes in environment. We foresters, directly and indirectly, are the ones closest to and most careful about the proper management of our timber lands. For we are the stewards of most of the government and industrial forest lands in this country.

The "Paul Bunyan Syndrome" of irresponsible loggers and raped forests is a part of history, repugnant to our ideals and contradictory to our contemporary practices. In fact, a primary reason for our industry support of the principles of this Act is an overriding desire to dispel with facts and truth the confused tangle of myth, ignorance and misunderstanding about forest resources which dominates the attitudes of millions of Americans.

Potential progress in forestry, particularly in our publicly owned timber lands and in the application of new scientific methods of forest management in this country, we believe, has been handicapped because of lack of understanding and knowledge on the part of many of our citizens. Not a few of those opposed to more progressive forest management are Members of Congress and, therefore, obliged to make decisions on laws affecting our forest resources.

Allow me to illustrate how the task of our industry functioning in a setting of environmental illiteracy can be extremely difficult, and on occasion, impossible.

Perhaps, nowhere has public misunderstanding been greater than in connection with the redwood trees. Many believe they grow only in Northern California, but they actually thrive on five continents. Many believe redwoods are in danger of disappearing, but foresters calculate there may be more redwoods now than when man began to utilize them. Many believe they are the

oldest living thing on earth, but they are the fourth oldest known species of tree in California. Many believe that redwoods living today were here "when Christ walked the earth," but the greatest age so far determined by an actual count of the growth rings is just over 2,200, the conclusion of a half century of sampling and studies shows less than three percent of the old growth trees are over one thousand years old, and the lifespan maximum is normally from five hundred to eight hundred years. Many believe the forest products industry cares only about cutting down trees, but many of the majestic groves of superlative redwoods in 29 State parks and the new Redwood National Park in California were either donated by private redwood companies or were set aside from cutting in cooperation with the Save-the-Redwoods League and the State of California while the companies continued to pay the taxes on the land for decades. Many believe that natural growth trees are somehow special, but under the scientific management practices of privately owned producing forests, new young-growth redwoods may equal the height of the mature giants in less than a man's lifetime.

I would submit, gentlemen, that if the foregoing opinions were put in the form of a quiz, hardly one person in one hundred could come up with the right answers. Yes, our industry welcomes and unhesitatingly supports environmental education programs that will provide our citizens with the environmental facts of life. Some of us believe that in our present society and educational system our youth know all about sex before they get to the birds and bees and too many never do get to the flowers and trees.

Exceptionally few graduates of our public, and private schools today have even a minimum appreciation or understanding of the basic facts of the ecological web of life and man's place in it. So long as man does not possess these facts, he will continue to defy and to destroy nature. He will not even have sufficient knowledge to enact appropriate laws to protect himself from himself.

Equally disturbing is that many of these environmentally illiterate people, while honestly concerned about pollution and other environmental problems, will strike out at superficial symptoms while ignoring the disease itself. In the long-term, our environmental problems can only be solved by those with competence and training in environmental studies.

The challenge our industry makes to you who are writing the legislative history of this bill and to those who will administer it is to maintain the integrity of ecological science so it will be well prepared to serve and guide our actions in this area. Emotional responses to real problems can be wholly destructive.

In a prophetic introduction to a book entitled "Ecology" by Peter Farb and the editors of LIFE Magazine published in 1963, Prince Bernhard of The Netherlands, then president of the World Wildlife Fund, said, "Ecology, in the next 10 or 20 years, may well become the most popular of sciences -- a household word to those masses who today are ignorant of both the word and its meaning." Significantly, we think, he added, "It is much to be hoped, however, that such an aroused interest will not affect pure ecology as a science by diluting it to an amateurish half-science that appeals to the masses."

In a recent lecture at the Smithsonian Institution, Dr. Rene Jules DuBos, a microbiologist, experimental pathologist and Pulitzer Prize-winning author, contrasted differing attitudes toward nature in these words: "On the one hand, passive worship; on the other, creative intervention."

Obviously, an eroded farm or hillside could not be an object of passive worship to anyone. But, a forest not only could be, but is, an object of passive worship to a number of rational Americans.

Naturally, we have very definite ideas as to which of these conflicting philosophies -- passive worship or creative intervention -- can result in greater benefit to a greater number of people as well as being an environmentally sound concept. We are willing to take our chances in an ideological arena open to inquiry and unrestricted to new ideas and information in the truest sense of academic freedom.

In other words, we are convinced that, in the long-term, environmental education will mean a triumph for rational discourse and treatment of our national problems of pollution and protection of our natural resources.

Forests, we believe, occupy a particular environmental niche because they are a renewable resource. Wise use of forests, not preservation, means that man is able to consume timber for the benefits it provides even as he increases the total supply of that natural resource.

We cannot help but believe that the environmental literacy of our citizenry is the key to the successful solution of the problems largely created by man, not always because he did not care, but because he did not anticipate the full consequences of his honestly motivated actions. While we do not look upon education as a magical cure for all of our ills environmental or ecological, without it, we believe, we cannot hope to succeed in this national obligation.

Our own industry's efforts over the years in a wide variety of environmental education programs is proof of our confidence that the best interests

of our country and our industry are best served by an informed public. A better understanding of the fantastic possibilities and opportunities in modern, scientific management of our forest resources will benefit all of us. It is this premise which underlies the educational and informational programs currently being undertaken by our industry.

Hundreds of forest products companies and associations are engaged in a wide range of projects and activities initiated and administered by themselves or in conjunction with local schools, school districts, state education systems, colleges, universities, local units of government, conservation groups and women's organizations.

In the Northwest, for example, each year about 40,000 Oregon and Washington sixth-graders are taken into the forests for full-day conservation field trips. Manpower for the program is largely provided by the forest industry in cooperation with several governmental agencies.

In Oregon, a current survey reveals a wide range of activities benefitting both students and teachers. Several companies have agreements with local schools and school districts for field study trips to private industrial forests. One company is developing a teacher training center in conservation education on an island in the Puget Sound area; another hosts an annual teachers workshop at its experimental seed orchard. A number of companies sponsor tree planting days for school children, one of these programs dating back to 1945. Many companies provide conservation education packets for teachers and students, answer student information requests, and make available films and speakers upon request. One company provides teaching aids for school use in connection with woods-and-plants tours at all its operating branches. Several companies and associations provide resource specialists who teach in as many as ten conservation education workshops in the Northwest.

In California, 60 underprivileged high school children participate in a 10-week environmental study course held during the mornings at various conservation clubs and in the afternoons at a forest products corporation's logging camp. A paper company recently completed a 12-day environmental seminar for children of its employees, including a tour of its mill and water pollution control facilities. A three-day annual redwood region Junior Logging Congress involves 100 high school forestry students. Also in redwood country are six redwood demonstration forests, sponsored by various companies, which are visited by some 100,000 persons each year. Just next week, another demonstration forest on a portion of a privately-owned tree farm will be dedicated with the planting of seedlings and it will eventually become public.

In Illinois, a tree farm well-known to Illinois youngsters and adults is operated under multiple use management and features a demonstration forest,

identification of trees, a saw mill and other learning experiences which can be seen in person or read about in an explanatory booklet.

In Wisconsin, a paper firm cooperates with a state university in sponsoring a twice-a-year conservation program and field trip for prospective biology teachers and a seminar for faculty members. Another paper company has developed two do-it-yourself tours -- one by auto, the other walking-- used by thousands of students and teachers as well as Boy Scouts, Girl Scouts and conservation groups. A colored slide presentation, based on the tours, is available to schools. Several companies produce educational materials for various grade levels.

Many similar programs are conducted in other states in the West, Midwest and South. For obvious reasons, the preponderance of the individual company sponsored educational activities has thus far occurred in forest areas. We have other programs for introducing these activities to urban areas. Most are sponsored by the major forest industry associations which generally have at least one executive skilled in working with the schools. The American Forest Institute sponsors the TREE FARM Program, KEEP GREEN Program and promotes forestry in every state through schools, Boy Scouts, 4-H Clubs, Future Farmers of America and through garden and women's clubs. This organization is 25 years old and has spent many millions of dollars in educational work.

The so-called demonstration forest idea is a project which can be transplanted anywhere in the country where there are existing tree farms, a few acres of timberland or even a large available field where a producing forest could be developed, provided suitable sponsors and technological assistance were secured.

Another demonstration forest on a tree farm in the West defines the scope of education possibilities in such a project. There, thousands of teacher-escorted school children have followed well-marked trails to areas which identify different species of trees, show how thinning improves a timber stand, and instruct about wildlife prevalent in the area with actual stuffed animals and birds. The visitors can see a weather station where they learn aspects of meteorology and an artificial lake stocked with fish. They can observe small trees growing in a nursery, and they learn about diseases that affect trees in a special "hospital".

Such living education experiences need only be adapted to available land in or near urban and metropolitan centers. Recently, Los Angeles primary graders planted 100 pine seedlings on a steep slope bordering the Hollywood Freeway to launch the second session of a unique urban demonstration forest project jointly sponsored by Universal Studios, the forest products industry,

Los Angeles City and County schools and the Los Angeles County Forestry Department. During the 1968-69 school year, about 1,000 seedlings were planted in four studio lot areas, with an excellent survival rate reported. The school children are enjoying an outdoor educational environmental experience of growing their own forest and learning the multiple use benefits of wood production, watershed protection and wildlife improvement. Long-range plans call for development of nature trails and more sophisticated ecological and environmental study experiences.

The Southern Forest Institute helps sponsor forestry summer camps for high school students on demonstration forests in most states from Texas to Virginia. Trees for Tomorrow, Inc., sponsored by pulp and paper companies in Wisconsin and neighboring states sponsors summer training for high school teachers in forestry, game management and conservation.

Right here in the District of Columbia's Rock Creek Park is a federally-sponsored nature study center and marked nature trail which might easily be upgraded and expanded.

In brief, our forest products industries have pioneered in environmental and ecological education and will surely cooperate in programs to extend the scope of public understanding of the relationship between vigorous forests and dependent man.

We believe that industry could better lend its resources to helping carry out the purposes of the bill if section 2 was amended by the inclusion of a subsection (C) which would clearly define the meanings of the terms "environmental quality" and "ecological balance" so that activities provided for in the legislation could be directed towards positive goals.

The popular understanding of what these terms embrace has, as I have pointed out, caused confusion.

Further in the statement of findings and purposes, adequate reference should be made to the economic aspects of environment and ecology as a safeguard against misconceptions which might tend to deny the Nation the financial incentives and means to accomplish the worthy environmental and ecological purposes envisioned by the legislation.

With respect to forest management, for instance, it is wholly feasible to apply sound practices which will enhance, maintain and restore environmental quality and ecological balance. This can be done, however, only if management of timber resources allows fulfillment of the Nation's material requirements. The dollars generated by modern forest management, in the final analysis, are the principal source of funding for those activities which represent the other benefits of the forest: fish and game management, watershed

management, recreation, and forage. Each of these other desirable uses is derived directly from timber production; without timber management they are neither likely to be accomplished because of lack of funding nor are they attainable in areas barred from timber production.

The McIntire-Stennis Act of 1962 offers a good example of how this bill might be amended to better accomplish the objectives. Public Law 87-788 authorizes the Secretary of Agriculture to encourage and assist the land grant colleges and other publicly supported colleges in carrying on a program of forestry research. It was conceived of as a means to accomplish within that relatively limited sphere what S. 3151 is designed to do within the broad terminology of "environmental quality" and "ecological balance" in terms of education.

Perhaps the most significant aspect of the McIntire-Stennis Act, and I commend it to this subcommittee's attention, is the composition and authority of the advisory committee.

Whereas, S. 3151 in Section 5 provides for establishment of an advisory committee which can advise, recommend, review, and evaluate, various aspects of the programs involved, it grants no specific authority. Neither does it establish meaningful criteria for composition of the advisory committee with this language:

"Persons familiar with education, information media, and the relationship of man as producer, consumer, and citizen to his environment and the Nation's ecology."

The McIntire-Stennis Act provides in Section 5:

"Apportionments among participating states and administrative expenses in connection with the program shall be determined by the Secretary after consultation with a National Advisory Board of not less than seven officials of the forestry schools of the state-certified eligible colleges and universities chosen by a majority of such schools..."

At Section 6 it states:

"The Secretary is further authorized and directed to appoint an advisory committee which shall be constituted to give equal representation to federal-state agencies concerned with developing and utilizing the Nation's forest resources and to the forest industries. The Secretary and the National Advisory Board shall seek at least once each year the counsel and advice of the Advisory Committee to accomplish effectively the purposes of this Act."

The significance of the McIntire-Stennis advisory system cannot be over-emphasized. For the first time the federal government was directed by law to appoint an advisory committee including one-half representatives of the industry and to seek their counsel and advice. Previously industry advisory groups were established, altered, abolished and considered at the whim of the administrative agencies. They were so handled that they constituted a "rubber stamp" for agency plans.

Experience under this system, and I am a member of the McIntire-Stennis Advisory Committee, has resulted in full and constructive participation by the interested industry, by the educational institutions, and by the federal agency involved to the benefit of the overall program.

A number of statutes affecting both education and public health apply the same yardstick to advisory committee members in the interest of positive program accomplishment.

A single example in the area of health will demonstrate the trend towards expertise among citizens designated to advise federal officials and monitor federal programs. National advisory councils are dealt with in the Public Health Service Act, at Section 217 (a) of 42 U.S.C. 218 as follows:

"The National Advisory Health Council, the National Advisory Cancer Council, the National Advisory Mental Health Council, the National Advisory Heart Council, and the National Advisory Dental Research Council shall each consist of the Surgeon General, who shall be chairman, the chief medical officer of the Veterans' Administration, or his representative and a medical officer designated by the Secretary of Defense, who shall be ex officio members; and twelve members appointed without regard to the civil service laws by the Surgeon General with the approval of the Secretary of Health, Education, and Welfare. The twelve appointed members of each such council shall be leaders in the fields of fundamental sciences, medical sciences, or public affairs, and six of such twelve shall be selected from among the leading medical or scientific authorities who, in the case of the National Advisory Health Council, are skilled in the sciences related to health, and in the case of the National Advisory Cancer Council, the National Advisory Mental Health Council, the National Advisory Heart Council, and the National Advisory Dental Research Council, are outstanding in the study, diagnosis, or treatment of cancer, psychiatric disorders, heart diseases, and dental diseases and conditions, respectively. In the case of the National Advisory Dental Research Council, four of such six shall be dentists."

Federal dependency upon these experts is such that the Community Mental Health Centers Act has recently been amended to include a section 266 regarding approval of grants by the National Advisory Mental Health Council. It reads:

"Grants made under this title for the cost of construction and for the cost of compensation of professional and technical personnel may be made only upon recommendation of the National Advisory Mental Health Council established by section 217 (a) of the Public Health Service Act."

The forest products industries believe that the breadth of the impact of the programs envisioned under the environmental quality education act requires equally careful development of advisory committee membership and individual qualification to assure that all appropriate disciplines are represented. Industry, particularly primary industries, such as those directly concerned with land use involving raw material supplies should be individually represented. Among these would be: agriculture, forestry, mining, petroleum, grazing. Other manufacturing industries involving environmental considerations and striving to overcome deficiencies should be active members: automotive, chemicals, paper, food processors, and metallurgy. States, counties, and municipalities deserve participation through their anti-pollution agencies. The Public Health Service should be represented. Educational institutions, the media, and general citizens should comprise a fourth category with the chairman being selected from among the latter group. The distribution of influence among these several categories would assure that programs would be focused upon common objectives without regard to special interests nor removal from the realities of technology and economics. Recommendations as to qualified personnel to be appointed to the advisory committee should be solicited from among the groups cited.

Environmental considerations, like public health, concern all citizens and are of such consequence that they must be dealt with by those highly qualified to make informed judgements.

Mr. Chairman, because we are convinced of the need to improve the level of environmental literacy and respect which is the purpose of this legislation, I wish to suggest several ways in which the forest products industry can render assistance and support.

First, we will consider the addition of educational representatives to a proposed nationwide network of local and regional environmental improvement committees currently being formed within our industry. These committees would be uniquely qualified to render professional assistance to elementary and secondary schools, colleges and universities, and sponsors of community conferences on the environment participating in programs under this Act. We will further consider the establishment of a National Environmental Education and Improvement Board within the forest industries which will coordinate the activities of the local committees while serving as a resource center. The information and assistance of this National Board would be made available to Federal, State and local governments, school districts, universities, non-profit organizations, the media and other groups involved in environmental education programs

under the provisions of this Act or otherwise.

Second, we will solicit the industry to inventory ways we are presently involved and how we can participate in environmental education programs. We need to know the extent to which there are present or future commitments of forest acreage, facilities, funds and/or personnel. I have already cited a number of specific examples of educational experiences in which the industry is engaged. These could be expanded, modified or increased, and new projects added. For instance, a study-work-recreational program for students, drop-outs or the unemployed is now under industry consideration and pilot projects are about two years old. Our findings could be used by those administering this Act to help determine where and to what extent their educational programs could avail themselves of private industrial forests, forest facilities and appropriate industry personnel.

Third, upon enactment of this legislation, we will offer to the Secretary of Health, Education and Welfare a list of names of individuals both from within our industry and outside who would be eminently qualified to serve as respected and responsible members of the advisory committee on environmental quality education.

We sincerely hope that in these several ways we can help contribute to the success of the objectives of this legislation.

I appreciate the opportunity to share our ideas and comments with you today.



Dr. Samuel I. Porrat
Chairman
Edwin J. Kirschner
Director

TRANSPORTATION, TRAVEL AND TOURISM
RESEARCH AND CONSULTING GROUP

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May 15, 1970

Chairman
Committee on Labor
and Public Welfare
U.S. Senate
Washington, D.C. 20510

Dear Mr. Chairman:

TRANSPORTATION, TRAVEL AND TOURISM Research and Consulting Group wishes to submit the following written comment on S.5151, S.5257, S.3809 and S.3151 Amendments relative to authorizing the Commissioner of Education to establish an ecological-environmental, community educational programs.

Collaterally, the Congress, the public and the Executive Branch have all urged a series of actions be accomplished to reduce the adverse impacts of transportation on the environment.

The U.S. Department of Transportation (DOT) has moved toward assuring the minimum possible impairment of the environment through its Office of Environmental Impact. DOT's guidelines have been to provide our country transportation services without destroying its natural and cultural or social institutions in the process.

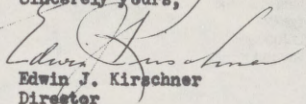
In today's complex transportation environment, we continue to use outdated tools to likewise attack the transportation-related multifarious ecological-environmental problems confronting our society.

Ecological-environmental education, like in transportation, has been parochially approached through individual disciplines which are no longer adequate in themselves to cope with today's complex problems. Through the systems development and implementation of ecological-environmental programs of education...which should include transportation systems...the innovational task of approaching an effective underpinning will have been demonstrated for the urban, state and national framework; all toward the goal of preserving and enhancing the environmental quality and maintaining ecological balance.

In this connection, I wish to point out for the Committee's consideration the importance of transportation systems education as an integral part of the proposed Environmental Education Act, and

have submitted, as an enclosure, suggested additional language to the aforementioned Bills.

Sincerely yours,



Edwin J. Kirschner
Director

Enclosure. 1/

EJK/em

1/ The article entitled "Transport Technology: The Decade Ahead", parts 1 and 2, may be found in the files of the sub-committee.



Dr. Samuel I. Porroth
Chairman
Edwin J. Kirschner
Director

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ENCLOSURE TO LETTER TO THE CHAIRMAN, COMMITTEE ON
PUBLIC WELFARE AND LABOR, DATED May 15, 1970.

Changes are suggested in the following Bills:

S. 3151, p.2, 1.4: ...quality, ecological balance and transportation systems relationships.

p.2, 1.8: ...activities, as transportation systems.

p. 2, 1.23 and 24:..quality, ecological balance and their relationship to the systems of transportation.

S. 3809, .p.1, 1.10:biology, transportation systems, and...

S. 3237, p.2, 1.12: ...industry and transportation has...

p.3, 1.5; p.4, lines 7,15, 20 and 23; p.5, lines 1 and 21; and p.6,1.1:ecological-environmental-transportation education...

S. 3151, Amendment #615; p.2, lines 18,19,23 and 24; p.3,1.4: . include the phrase....and transportation systems.

S. 3151, Amendment #614: p.1,1.6: population and transportation to environmental...

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DANIEL M. KELLEY - PUBLISHER
 MODERN HOSPITAL
 NATION'S SCHOOLS
 MODERN NURSING HOME
 COLLEGE & UNIVERSITY BUSINESS
 HIGHER EDUCATION EXECUTIVE ASSOCIATES, INC.

May 8, 1970

STATEMENT ON S. 3151Environmental Quality Education Act

I am in full agreement with the Environmental Quality Education Act.

It's quite true, as stated in SEC. 2. (a) of the bill, that presently there are not adequate resources for educating citizens about their environment and about the need for a concerted effort to do something about environmental quality.

COLLEGE & UNIVERSITY BUSINESS and NATION'S SCHOOLS, McGraw-Hill's two monthly publications serving the field of education, endorse constructive efforts to increase the awareness in citizens of the need for a consciousness about environmental control, and we understand the important role that education must play in this.

We have gone on record in favor of furthering education on this subject in the April issues of our publications with a special 16-page report entitled "Environmental Degradation and Education." In that report we call on our readers to "support suitable Federal legislation to stimulate environmental education." We will continue to call for that support. I would like to submit this 16-page report - and particularly its sections on "What Can Education Do About Environment?" and "Environmental Education Is All Things" - to be included in the hearing on this Act.

Respectfully submitted,

Daniel M. Kelley, Publisher
 COLLEGE & UNIVERSITY BUSINESS
 NATION'S SCHOOLS

Environmental Degradation and Education

The push against pollution is on and will draw education into its politics and programs

Principal authors of this report are William L. Steif and George N. Arnstein.

Mr. Steif is education writer, the Scripps-Howard Newspaper Alliance, Washington, D.C.

Dr. Arnstein, former executive secretary of the Study Conference on Environmental Research at the National Academy of Sciences, is a consultant in environmental education, Washington, D.C.

This special report was produced under the direction of the editors of *Children & University Business and Nation's Schools*.

Suddenly ecology has become a great national consensus, and saving the earth has become a national mission.

In San Francisco, for example, where beatniks and flower children used to flourish, youth groups have been organized with such unlikely names as Ecology Action to Build the Earth, Zero Population Growth, and Citizens League Against Sonic Boom. David Brower, for 16 years the Sierra Club's executive secretary, has founded Friends of the Earth, whose principal benefactor turns out to be the board chairman of the Atlantic-Richfield Oil Co., Robert O. Anderson.

Resources for the Future, a Washington-based think tank, reports that "rising public, professional and governmental concern with environmental problems was evident in 1963."

Education Commissioner James E. Allen Jr. goes out of his way to endorse environmental education, and the Democratic Policy Council lists it as a national goal. Senator

Edmund Muskie suggests changing the objective of land-grant universities' agriculture schools so that they become "schools of human environmental studies."

Dozens of colleges, universities and high schools swiftly cranked up ecology courses and even ecology majors.

Industry sees a good thing and moves in on it.

Westinghouse Electric, for instance, forms an antipollution training school to teach electric utilities' personnel "legal and technological aspects of environmental management" in a four-week course.

Bethlehem Steel boasts that

TV, magazines, newspapers and radio go wild with the subject.

A scientist, quoted in *Fortune*, describes the phenomenon:

"First, islands of anxiety about specific environmental ills — like the redwoods, the rivers, or the slums — rose from a sea of apathy; when they rose further, land appeared between them; we became aware that all these separate environmental issues were connected, all part of a single challenge to our civilization."

The President, in his 37 point program for rescuing the

Some critics felt the Nixon program was a "cop-out" on the nation's racial and central-city problems, and it may be, for it is certainly easier to cope with the physical needs of cleansing the Potomac River than it is to cope, for example, with the physical, mental and spiritual needs of the two-thirds of Washington's population who are black.

The Nixon program, at any rate, is the kind of thing that can capture wide popular support. It is calculated to engage the interests and sympathies of young and old, and especially younger, white, middle-class suburbanites who want to be "with it" and who incidentally comprise a kind of balance of power around the nation.

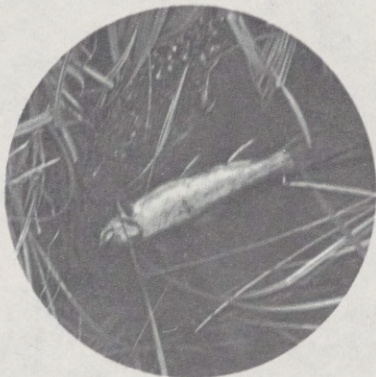
In short, the President's ecological approach to the polluted American environment has a lot of political sex appeal.

No doubt, many western stockmen applauded Nixon's message. But they also had their eyes on something more fundamental — to them.

Within days of the Nixon environmental message, Interior Secretary Walter J. Hickel and Agriculture Secretary Clifford Hardin ruled that a scheduled increase in grazing fees on 180 million acres of western public lands would not take place. This obscure ruling, on an obscure issue, in the obscure bureaucracies of the Bureau of Land Management (Interior) and the Forest Service (Agriculture), may have more effect on the American environment than all the pious phrases in the President's heavily publicized message.

After more than a decade of argument and study, the outgoing Democratic Interior and Agriculture Secretaries, after the 1968 Presidential election, ordered a 10 year, phased increase of the outrageously low grazing fees western stockmen pay to the federal government for the use of public land. The present fees average 44 cents a month for a cow and a calf; private owners of range charge up to seven times as much.

The increase would have raised about \$15 million a year, which could have been



An ecosystem drop-out.

in the next five years 11 per cent of its capital expenditures will go to pollution control, and some companies talk of spending as much as 30 per cent of their capital investment on antipollution projects.

General Motors and Ford ride with the tide by endorsing the battle for clean air and promising to come up with auto engines that use lead-free gasoline.

Republic Steel hires a Director of Environmental Planning fresh from NASA, and hundreds of firms, big and little, jump into the environment business, manufacturing everything from smoke scrubbers to flocculating chemicals.

nation's environment, called for more money and tougher laws to improve "the quality of American life" by "total mobilization" against pollution.

Nixon laid down 23 major legislative proposals and 14 executive orders running the gamut of air and water pollution, waste control, park acquisition, and even population planning. His program was the product of ecological thinking, broad-based and done primarily by a half-dozen young men led by Chris DeMuth, a 23 year old Harvard graduate who had served as secretary of the liberal Ripon Society at college.



Despoliation is evidenced by riverside wounds in Chicago and smog-shrouded Skeggs Point near San Francisco.



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used to rehabilitate the public range. This land is being wrecked by erosion, and overgrazing is the cause; the reason for overgrazing is that western stockmen find it cheaper to graze their animals on low-cost public lands than on private range.

Raising the grazing fee would have had the twin effects of increasing the funds available for improving the range and excluding marginal cattle and sheep operations, thus relieving pressure on the lands.

But all that went by the boards at about the same time the President was telling Congress that "we in this country have too casually and too long abused our natural environment . . . The time has come when we can wait no longer to repair the damage already done and to establish new criteria to guide us in the future."

This is not to doubt, for a moment, the sincerity of President Nixon, his proposals, or many of his Administration's advisers. What happened in the case of the stockmen under the Nixon Administration is no different from what happened in the case of the oilmen under the Johnson Administration, the coal men under the Eisenhower Administration, and back, back in time.

The system simply works this way, and there seems to be none better.

Indeed, there are signs of the increasing effectiveness of an aroused public opinion, fanned by media which find it economically useful to deal in terms of daily crises. Random samples come to mind:

—Timber companies might be "harvesting" (sweet euphemism) the last of California's redwoods by now if it weren't for public pressure.

—Coal companies might not be restoring some badly scarred strip-mine areas if it weren't for that kind of pressure.

—The nation might be building a handy-dandy ecological disaster, in the form of two dams at either end of the Grand Canyon, if public voices had not prevailed.

—Decimation of Florida's Everglades, through construction of an international jetport, might be proceeding apace, and the whooping crane might be a dusty museum memory like the passenger pigeon.

—Los Angeles County might be enclosed in a permanent smog, Lake Erie might be well on its way to becoming a swamp, and the Missouri might run red chronically from the wastes of the packing houses at Omaha, Kansas City, and St. Joe.

There is, in short, improvement, even without the rhetoric of Presidential messages and the lip-service of ambitious politicians. The messages and lip-service help, but actions are more important.

With so many people paying tribute to "ecology" and the "environmental revolution" these days, it probably is old-



fashioned to point out that Gifford Pinchot and President Theodore Roosevelt really originated the earth-saving business in this country. Essentially, they were romantics, but from that kind of romanticism grew the conservation movement, which was one of the vital forerunners of the present ecological approach.

The other front of present-day ecology is academic, represented chiefly by the biological sciences and expressed emphatically through men like Barry Commoner of Washington University, St. Louis, and Stanford's Paul Ehrlich. The academics tend to view the environment with such alarm that they scare the pants off most politicians — and politicians without trousers generally don't run very far.

In fact, the extremist is the bane of the politician, whose essential job is to synthesize;

yet it is also true that without the sharp jab of informed opinion, the politician may not move at all.

Within the last two decades, these two streams — the conservationists' romantic view and the biologists' alarmist view on our environment — have merged and brought considerable pressure to bear on succeeding administrations and on the Congress.

From the House and Senate Public Works Committees came a rising tide of legislation designed to cope with air and water pollution, even as the same committees authorized immense expenditures for projects which created more air and water pollution; from the House and Senate Interior Committees came measures to preserve our lands, waters and animal populations, even as the same committees bent to special-interest lobbyists and opened public lands to exploitation; other committees tossed in legislation to stimulate planning and provide for city open spaces, even as they were assuring the destruction of the downtowns and the sprawl of the suburbs. We are so rich and productive and, at the same time, so wasteful and voraciously consuming, that we compartmentalize our thinking from our actions.

One current, solid estimate is that, excluding such operations as construction and earth moving, the American economy uses 2.5 billion tons of material a year — nearly 13 tons a person.

Yet it is unthinkable that Americans would retreat from their advanced technology to the low technology of Thoreau's Walden Pond or modern Nepal, where man and nature are in consonance.

What the rise in ecological thinking indicates is a surfacing of awareness that some kinds of self-sacrifice are necessary to reach the goal of a quality life for all, without destroying our earth.

The basic question is whether Americans are willing and self-disciplined enough to forgo some traditional freedoms in order not to ruin their environment.

STATEMENT ON ENVIRONMENTAL EDUCATION

by James E. Allen Jr.
U.S. Commissioner of Education

The issues of the "quality of life" and our threatened environment have become a very important topic in recent months. The American public has been aroused by the degradation of our air, water and land resources. This concern has engendered citizen participation by students, teachers, businessmen and housewives, all trying to impart a new consciousness of environmental problems and their solutions. Within this framework, the educational component has often been neglected.

The Office of Education, however, is committed to the belief, shared by many in the education community and the private sector, that the key to survival is education. It is through the process of education that we will acquire the knowledge and understanding needed to make the right choices and to take the actions necessary to solve our society's pressing environmental problems.

In response to this need, the U.S. Office of Education has established as one of its major goals for the 1970s that of assisting the introduction of Environmental/Ecological Education throughout the educational continuum, from preschool through continuing and adult education. The objectives of Environmental/Ecological Education are to develop a citizenry that is--

AWARE of how man affects and is affected by his environment;

CONCERNED about man's unique responsibility to re-establish balanced relationships among all forms of life within the closed earth system;

MOTIVATED AND TRAINED to work toward solving interrelated environmental problems.

Such an educational program would attempt to convey (1) a clear understanding that man is an inseparable part of a system composed of men, culture and the natural environment, and that man's technology alters the interrelationships of this system; (2) an appreciation of the environment, both natural and manmade; (3) a fundamental knowledge of the problems confronting man, ways to solve these problems, and the need for citizen and governmental partnership in working out solutions, and (4) attitudes, ethical standards, and behavioral patterns which will foster citizen commitment and action to overcome the environmental crisis and to improve the quality of life in the 70s and 80s.

Based on the holistic concepts inherent in its component parts--environment, ecology and education--Environmental Education will require the synthesis of the natural sciences, the social sciences, the arts and humanities. It is teacher and pupil centered education and its major resources are outside the classroom. We must begin immediately the task of designing and providing this interdisciplinary education for not one but two generations--the adults and the students. The commitment and dedication of the education community can do much to ensure that man restores the environmental balance and maintains in fact the fragile relationships that sustain and replenish life, and that he not lose sight of the elemental fact that the most fundamental needs of mankind--water, air, light, land and companionship--are derived from his environment, not his technology.

The Office of Education, in cooperation and partnership with the American educational system and the private sector, intends to do its part in insuring that Environmental/Ecological Education is introduced into every level of the educational experience of all our citizens in the years ahead.

Undertaking this vast new educational enterprise will have far reaching and highly beneficial implications for American education. It will be a catalyst whose impact will register in every classroom and in every home, office, and plant in America.

The active involvement of an educational system in problems that pervade the lives of all will help to make the educational process more relevant and responsive.



What can education do about environment?

The subject calls for new rules which the faculty may find harder to learn than the students

Education should be concerned with the environment, if only because of immediate self-interest: survival; but what, specifically can the education community do about environmental improvement?

Much has already been done, as evidenced by a sampling of reports and recommendations on the environment and related problems. The contributions of researchers and teachers are clearly meaningful and visible.

However, neither the academic community nor society has done enough — not enough thinking, planning, and, above all, not enough following through toward more effective action programs. Let's take a look at what we know and what we are being urged to do by some of the best minds within and without the academic community.

Technology Assessment. Concurrent with the rise in awareness of environmental problems there has grown an awareness of the double-edged nature of technology. We enjoy the products of technology but not the noise, litter, pollution and congestion that are its side effects and consequences.

Reports on technology assessment by the National Academy of Sciences and the National Academy of Engineering are confident that these assessments are possible, that present procedures can be improved, and that there is a need for new institutions. Clearly, the brainpower will have to come from the academic community.

Political Lag. There is an increasing realization that our

institutions and organizations are not responsive to present problems. Philip M. Hauser, professor of sociology at the University of Chicago, enumerated some of the shortcomings:

"We are trying to deal with 20th Century problems with 18th Century ideologies, institutions and values. . . . As recently as 1960 there were 39 states with urban popular majorities but not a single state in which this urban majority controlled the state legislature. We are hampered by the dead hand of the past if we still believe that government is best which governs least. Do we really mean that we don't want or need Social Security, pure food and drug protection, or a Federal Communications Commission?"

What does this have to do with schools and colleges and their responsibilities? The environment and its problems is a relevant subject, central to the lives of students and citizens, and it calls for new rules, which the faculty may find harder to learn than the students.

Roger Revelle calls for such changes in a forthcoming book, "America's Changing Environment," in which he cites three roles for education: manpower development, creation of heightened sensitivity among young people, and the "formulation and inculcation of the moral and intellectual values on which environmental improvement must rest." While this kind of teaching will ask teachers to undergo a massive rethinking, he thinks the teaching of values is necessary.

Organizational Lag. Most of our institutions are lagging, but there is also hope and forward motion. Henry L. Diamond, counsel for the Citizens' Advisory

Committee on Environmental Quality, reported to the National Commission for UNESCO:

► Government at all levels . . . has been literally unable to pull itself together to face the rising environmental aspiration of the American people.

► The courts seem increasingly responsive but there has been very little litigation about the environment. "We may be seeing a whole new body of law in the making."

► Education — "a huge mass of thousands of self-governing entities. . . ." Some school systems have begun to teach environmental awareness and new college courses, departments and programs "seem to be proliferating."

► Foundations are showing increased interest but there is a lack of over-all voluntary environmental organization.

The same can be said for the academic community.

The Citizens Advisory Committee on Environmental Quality's "Report to the President" was quite critical on the subject of environmental education:

"... our formal education system has done little to produce an informed citizenry, sensitive to environmental problems, and prepared and motivated to work toward their solution. . . ."

"Some federal programs have elements of environmental education in them, but . . . these programs can be made more responsive to a growing public need.

"In partial response to a recommendation of the (predecessor) committee, the position of Coordinator of Environmental Education was established in the U.S. Office of Education; however, one person has been able to accomplish little, and it appears that

Detergents won public favor — but evidence accumulated that they present ecologic problems.



Environmental thinking is compartmentalized: Youth may be embracing the movement but the litter at the 1969 Woodstock music festival would never show it.

a fully staffed service unit is required. . . .

"Extension service programs are generally out of touch with environmental problems."

Although directed primarily to elementary and secondary education, the committee describes how Title I of the Higher Education Act of 1965 could be used better.

At USOE there is the promise of increased interest and activity. James E. Allen Jr., commissioner of education, said USOE will:

► Support the environmental teach-in activities scheduled for April 22, including suggested follow-up activities for teachers during the summer.

► Call for a major conference in June on environmental/ecological education.

► Support suitable federal legislation to stimulate environmental education.

► Set up a staff to redirect existing resources and plan new programs.

F. Kenneth Hare, professor of geography at the University of Toronto, recently called for a new kind of discipline that is "basically synthesizing in method," noting that "a really positive and successful program of environmental studies ought to involve a large part of the university, and it ought to spread downward until it contributes heavily to the undergraduate curriculum and influences what is done in the schools."

Whether the schools can do as much as is expected of them is most uncertain. NEA's Project Man's Environment is considering testimony on environmental education, warning that "education cannot overcome prevailing and existing values in our society. If adults pollute and destroy (and if

advertising and public opinion favor smoking, big cars, and throwaway bottles), then it is not realistic to ask teachers and the schools to cancel out adult values and attitudes. . . .

"(We need) effective legislation dealing with environmental degradation so that the American consumer becomes aware of the money cost of degradation, of the social costs, of the direct and indirect damage. . . . This calls for effluent charges, disincentives, taxes on pollution, services charges, not so much to generate revenue as to effect changes in behavior, to bring about awareness."

It is only after creating such awareness that we can ask educational programs to reinforce this thrust.

Preparation of the article "What Can Education Do About Environment?" was funded by ERIC Clearinghouse on Higher Education, One Dupont Circle, Washington, D.C.

'Earth Day' is only the beginning: Student action will go on

For Denis Hayes, the April 22 "Earth Day" is just a starting point.

Hayes, 25, is national coordinator of Environmental Teach-In, Inc., a non-profit, tax-exempt educational foundation which is acting as a kind of big daddy to thousands of local groups, including at least 700 in colleges and 1,400 in high schools, working to reverse the growing pollution of the American environment.

Hayes' headquarters is the second floor of an aging office building just off Washington's hippie heaven, DuPont Circle. Stuffed into the 10 rooms are about 100 volunteers (not all present at the same time) and 16 paid assistants ("on subsistence salaries," Hayes says). The people are busy phoning, compiling lists, selling buttons and posters, writing and packing pamphlets, and preparing and mimeographing sheets with names like "Eco Facts."

As many as 300 letters daily come to the headquarters. Four regional coordinators handle the four quadrants of the nation, and a fifth handles high schools. The purpose is simply informational — and to build what Hayes and his colleagues call a "national constituency for the environment," which can exert pressure on local, state and national government.

Co-chairmen of Earth Day are Sen. Gaylord Nelson (D-Wis.) and Rep. Paul N. McClosky (R-Calif.) who was active in the movement to "save" San Francisco Bay before he beat Shirley Temple Black in a special election in the fall of 1967.

Nelson originally tossed out the proposal for "national environmental teach-ins next spring" in a speech last Sept. 20, in Seattle. He repeated the idea several times and it took hold; soon his office was getting letters asking how to or-

ganize the teach-ins. So he, McClosky and President Sydney Howe of the Conservation Foundation organized the new group and, just before Thanksgiving, the Internal Revenue Service gave it its tax-exempt status.

A leader was needed. "Nelson heard about me," Hayes recalls. "I talked with him and out of that came an offer."

Since then, Hayes has been on his own. "I haven't seen Nelson," he says.

But he knows what he's doing. He puts it this way:

"Our underlying philosophy is the clear assumption that some fundamental mistakes have been made in this country. These are not aberrations but the natural end-result of what has been called progress."

As an example of a mistake, he cites the internal combustion engine and notes that "emphysema has been increasing 12 per cent a year for the last decade in California . . . an auto driven a block consumes as much oxygen as 100 people use in a month."

"But to eliminate the internal combustion engine you have to take on the auto and oil industries. For that matter, nearly every family has a vested interest, with \$2,000 or so invested in a car. What do you do?"

"Well, you start with small steps. First comes the warning label on the car, like the one on cigarette packages. Later, perhaps, you limit auto purchases to one per family, or one per lifetime. People will accept the inconvenience and move to mass transit. They will start realizing the problem is not the auto but how to perpetuate life on this planet."

"We look for responsiveness, we try to touch people, to change life styles. There are going to have to be significant pressures for sacrifices."

In addition to schools involved, a lot of unions, garden clubs, volunteer firemen, and other community groups have taken up the cause. Hayes says campus groups often don't have the expertise needed to stage community actions. He is keen on bringing non-academic types into the movement.

The predictably activist college and university student bodies have cranked up elaborate Earth Day events. But quieter, smaller schools at all levels also have seized on the idea. For instance:

— Students at Emory & Henry College, in southwest Virginia, are staging an "environmental art contest."

— Students at Cubberley High School, Palo Alto, Calif., are working on environmental proposals to be sent to government officials.

— Students in four colleges around Charleston, W. Va., are petitioning the President for stronger air pollution controls against the state's biggest single industrial enterprise.

— Several Chicago area high schools have organized projects to identify main industrial polluters and instigate picketing and petition activities.

— A group of students from Pittsburgh area high schools are tutoring elementary school youngsters about environmental projects, utilizing materials from current magazines.

— Students at Mississippi State University, in Starkville, are putting on weekly, quarter-hour radio shows explaining how agricultural and household products contribute to pollution.

— Students at St. Louis University and Washington University are planning an Eco-Fair at which they will sell pure Ozark water.

— Philadelphia high school and elementary school students are working with re-

cently prepared study guides in experimental ecology courses, which include instruction in special air monitoring centers set up for students to measure pollution.

— University of Alabama students at Tuscaloosa want the Warrior River, fouled by paper mills, closed to human use by April 22, and if it isn't, they'll post their own signs.

— Students at Coe and Cornell Colleges, at Mt. Vernon, Iowa, plan a "Breathe-In."

— High school students from several Midwestern states have formed a regional student council on pollution which planned an early teach-out last month.

Long before the April 22 date, the campaign began showing results in such varied actions as the creation of the nation's first regional clean-air consortium (Duke, North Carolina State, and the University of North Carolina), endorsements by federal officials like Education Commissioner James E. Allen Jr., and Environmental Council Chairman Russell Train, and — most of all — by a flood of proposed legislation and actions at all governmental levels.

And Hayes calmly went about his business, selling his message and raising money.

He doesn't know what the effort will cost over-all — it started with a \$1,000 Conservation Foundation donation and could run as much as \$100,000 or as little as \$25,000.

After April 22?

Hayes, a tall, blond, strong-faced chap who wears desert boots and buckskin jackets, isn't sure, but he knows "a lot of local groups are acquiring an interest in change. I don't know if this is a national vehicle, but we could develop coordinating functions around a fight on the SST or the Alaskan Pipeline or a new canal across the Central American Isthmus.

"I don't feel terribly messianic, but I know that if we don't change pretty fast we're going to have one vast wilderness. . . . And if my staff ever loses its drive, I'm going to fly the whole group to Los Angeles. That'll shake 'em up."

Bearded and beardless join battle on pollution

For diverse elements of society, the environmental movement could be either a link or a wedge, or both

A year ago, whenever a member of the under-30 generation referred to "the movement," you could be sure he meant the antiwar, antiracist, anti-establishment movement, whose devotees could invariably be identified by dress, hairstyle and vocabulary. Today the definition has to be enlarged to include antipollution votaries, who are not so readily distinguishable from the rest of the population. In fact, some of them wear vests and talk in sentences, and some of them have hair that is not only short but gray. It has even been suggested by a few optimistic observers that the antipollution crusade could become the means of linking "the movement" with the rest of the society.

Whether this is a real possi-

bility or a vain hope may be made clear in classrooms and corridors and on campuses around the country on April 22, when the bearded and the beardless will join forces for the National Teach-In on the Crisis of the Environment, an exercise aimed at bringing elementary, high school and college students, teachers, scientists, community and industry leaders and environmental specialists together to examine threats to the environment.

Depending on the position of the viewer, this occasion may be seen as either an ecological apocalypse or an invitation to disaster. "It is hoped that the teach-in will deeply involve communities, environmentally concerned organizations and high school and grade school as well as college students," said national co-chairmen Sen. Gaylord Nelson, (D-Wis.) and Rep. Paul McCloskey, (R-Calif.). "We anticipate that a successful teach-in will in-



U.S. industry belches 172,000,000 tons of smoke and fumes annually.



Chemical wastes choke streams, like this one near Moshannon, Pa.

volve more diverse elements of our society working toward a common goal than this country has ever seen before."

Taking a gloomier view, a public relations adviser for the oil industry suggested that the teach-ins were an invitation for "down-with-everything types to harangue industry, government and the establishment. Campus activists are looking for environmental issues to become their *cause celebre* to replace Vietnam," he added, obviously wishing the activists would go back to the war.

Actually, both sides may be right. Getting a jump on Earth Day, some schools have already initiated action programs that are getting results, as at the University of Washington in Seattle, for example, where a "plant-in" on a former garbage dump owned by the university resulted in a commitment to build a permanent park. In New York City, students are calling the offenders whenever they see smokestacks emitting black smoke. Their slogan: "It will cost you a dime, but it may save your life."

Elsewhere in New York, another student leader had a different goal: "The civil rights movement and antiwar protests showed young people that they could organize and could have political action."

he said. "The public is badly mistaken if they think the environmental question is taking the place of antiwar or civil rights. It's all in the same bag. Our primary concern is to mobilize people, to get them out on the street."

At Northwestern University in Evanston, Ill., Earth Day was anticipated in late January when 10,000 students, faculty members, scientists, environmental specialists and miscellaneous visitors thronged to the campus for an all-day, all-night teach-in that may be a foretaste of what will happen all over on April 22. At Northwestern, Earth Day, or Earth Night, was a gallimaufry of information, enlightenment, discussion, harangue and protest. "If Lady Bird Johnson, President Nixon, Spiro Agnew, Shell Oil, and Senators from Mississippi are all for ecology, what's wrong?" said one bewildered speaker.

Contemplating the coming nationwide teach-in, a professor of English at the University of Oklahoma took the long view: "I think it unlikely that there will be demonstrations," he said. "The reason is that there's such a widespread belief now that this problem has got to be solved. The function of a protest is to draw attention to a problem. There is plenty of public attention; what is needed now is specific identification of problems, and practical suggestions."

While it is likely that hun-

dreds or perhaps thousands of suggestions may emerge from Earth Day, they may not all be practical, for one thing, and, for another, the solutions aren't going to be all that easy.

In a recent test examination of just one environmental problem, the proposed construction of a jetport north of the Everglades in Florida, the National Academy of Sciences-National Research Council found that, among other things, any solution would require consideration of population growth and location, protection of water supplies, proper allocation of resources for agriculture, sound development of public transportation, insurance of adequate living conditions, and protection of unique national resources.

"The large number of interested segments of the society, the number of involved governmental agencies, the scope of the technological, sociological, political and economic aspects of environmental problems, all point to the need for a variety of responsive institutional innovations. No single one can do the job," said the N.A.S.-N.R.C.

It wasn't exactly what the N.A.S.-N.R.C. had in mind, but Earth Day should at least produce a variety of responsive institutional innovations.



Overflow crowds at Northwestern's teachout watch proceedings on TV.



The number two target after autos: effluents of our production lines.



Environmental movements are creating a new and broader activism.

Environmental education is all things

It teaches some science
conservation, nature, history,
geography and biology

One reason why the present surge for a better environment is so widespread is that each supporter sees his own segment and thinks that everybody shares his special vision of the good life.

On closer examination, however, this apparent consensus is somewhat illusory.

Those who want better health may want to ban persistent pesticides like DDT, on the grounds that they eventually end up in the human body. But farmers have found that they can greatly increase food production through preventive spraying with DDT to kill crop-destroying insects.

Those who fear malaria will favor the draining of swamps, but duck hunters like marshes because they are home to the ducks.

Members of traditional conservation societies want to maintain and expand wilderness areas, bird refuges, and save the California condor. Some persons, while not opposed, believe that there are more urgent priorities than putting large chunks of public funds into new parks or efforts to save a vulture.

Both sides are advocating a better environment.

There is a great range of concepts presently subsumed under the heading of environmental quality.

The same situation exists under environmental education (EE).

An auto driven a block consumes as much oxygen as 100 people use in a month — Denis Hayes.



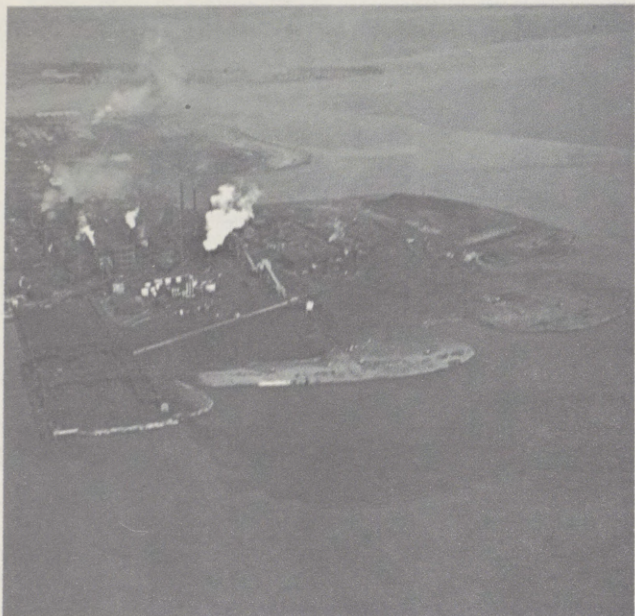
► There are those who think it is an expanded version of conservation education.

They are right. Environmental education certainly includes the concepts of traditional conservation, sometimes referred to as classical conservation: preservation of our natural resources, use of techniques of soil conservation, contour plowing, windbreaks, afforestation, expansion and preservation of wilderness areas.

Schools have been doing a pretty fair job of teaching these concepts and values for half a century, although the increasing shift to our cities has brought with it some lags. Conservation education tends to be too rural. It needs updating, but its basic concepts and ideas are sound. There are some new textbooks and some new ideas emerging. They are part of an honorable and sound tradition which should be encouraged to meet the needs of our increasing urban and suburban population.

► There are those who think EE is a new version of science education.

They are right. Environmental education surely must have scientific content and new curriculums are being developed. A report to the Environmental Studies Board of the National Academy of Sciences singles out the Science Curriculum Improvement Study developed for Grades K-6 at the University of California at Berkeley (*Institutions for Effective Management of the Environment*, Part I, January 1970 p. 30). At the same time it notes



The question: Are Americans willing and self-disciplined enough to forgo some freedoms in order to save their environment?

the need for a high priority Junior Environmental Education Program (Grades 7-9).

The programs have a strong bent toward science, especially the attempt to build the programs around things which can be handled or touched. It is a deliberate attempt to get away from abstract learning and to emphasize tactile, visual, manipulable learning — which leads to abstractions.

► There are those who think environmental education is an expanded version of outdoor education.

They are right. Man and his relationship to nature is an important part of environmental education, and we ought to welcome almost any educational experience which will take the students outside the four walls, the box-like environment in which they spend half of their waking hours.

► There are those who think that environmental education is an enlargement of biology into ecology, a modification of geography into something broader and deeper, an addition to English courses so they will include a composition on how we cleaned up our picnic area.

They are right, and they should be encouraged in broadening and modifying existing educational programs.

► There are those who think that environmental education is the constructive use of field



Lake Erie pollutants in 1968 were so heavy that one tributary caught fire and burned for days.

Legislative proposals seek aid for environmental teaching programs

Several bills have been proposed in Congress to nourish environmental education, and while hearings on the bills are only beginning, most observers feel it is only a matter of time before new federal money starts to flow into schools and universities for programs of this kind.

In the Senate, the Environmental Reclamation Act of 1969, introduced on December 11, by Senator Charles Goodell (R-N.Y.) would pump \$37 million over three years into developing environmental programs at all education levels.

In introducing the bill, Senator Goodell said:

"Title I of the bill authorizes the Secretary of Health, Education and Welfare to develop a truly national environmental-ecological education program ranging from the preschool to the graduate school level. . .

"It contemplates the utilization of such programs — which will include curriculum development and teacher training — in state and local school systems, institutions of higher education, adult education courses, community action programs, and in educational television.

"It also authorizes the establishment, throughout the nation, of a system of regional ecological-environmental education centers, which would develop, collect and disseminate to the general public information, materials, data and statistics concerning:

— "the nature, sources, causes, extent, prevention, control and abatement of air and water pollution, and activities affecting undesirable environmental and ecological change. . . .

— "the present and prospective impact of technology upon the environment and ecological cycle. . . .

"It is hoped," Goodell concluded, "that the federal government can point the way — for state and local governments and the private sector — to more responsible management of technological change consistent with our national environmental goals."

In the House of Representatives, Bill HR 14753,* introduced on November 12 by John Brademas (D-Ind.), James Scheuer (D-N.Y.), Ogden Reid (R-N.Y.), and Orval Hansen (R-Idaho) — and HR 15288, an identical measure reintroduced to allow more co-sponsors — would provide federal grants to universities and other organizations to develop teaching materials in environmental studies and to train teachers. Called the Environmental Quality Education Act, it would also provide aid to elementary schools for courses on ecology, pollution control, and natural resources and would set aside additional funds for adult education, through city or state agencies.

No appropriation amount is specified in the bill, whose programs would be administered by the U.S. Commissioner of Education with approval of state education agencies.

An advisory committee to be appointed by the Secretary of the Department of Health, Education and Welfare would oversee the program and make recommendations about allocation of funds. The committee would have 21 members from outside government.

trips to national landmarks, to the environmental study areas being set up by the National Park Service, to the use of the American countryside (and urban settings) to tie together nature, history and an appreciation of our heritage.

They are right.

► There are those who think that environmental education is something to be added to the curriculum, a special unit on the environment the way certain states have legislated units on the evils of alcohol, tobacco or drugs.

They are wrong — because this approach is perfunctory, and it doesn't work. It fails to get to the heart of the matter, which is what environmental education really means or should mean:

The pervasive and conscious examination and understanding of man's relationship to nature, influenced by our growing population which produces congestion, and which, in turn, calls for a change in values and attitudes.

How, for example, can environmental education hope to be successful as long as it is part of a society which still worships the Holy Grail of a rising Gross National Product (to borrow a phrase from former Secretary Udall).

If adults pollute and destroy, is it realistic to ask teachers to expose the evils of pollution and despoliation? As long as advertising favors smoking, big cars with high-compression engines and leaded gasoline, can we expect the schools to overcome the deliberate and expensive assault staged by our sophisticated media? As long as we favor throw-away bottles, can we hope to persuade children that litter and waste are extravagant, expensive and ugly?

One of the hazards of the environmental bills now being considered by the Congress (at left) is that they may raise false hopes. If they merely lead to add-on teaching units with the up-to-date label of environmental and ecological education, they may merely widen the credibility gap and increase youthful cynicism about adult hypocrisy.

*Senator Gaylord Nelson (D-Wis.) introduced an identical bill in the Senate on November 19, 1969.

University program stresses man's natural, social and scientific environment

Few places seem so favored by nature as Green Bay, Wis., nestled against the shore of a long inlet of Lake Michigan, the Fox River winding through its wooded hills. But the polluted bay is closed to swimmers, the river is virtually an open sewer, the woods provide raw materials for the paper companies whose smokestacks dominate the skyline.

In the midst of unsolved problems of physical and social environment, the University of Wisconsin at Green Bay (UWGB) has created an academic plan focused on ecology — the study of man in relation to his surroundings — that is producing a new academic environment by involving the student with his university, with his community and region, and reaching out into the wider world.

The environmental emphasis is an outgrowth of the mission stipulated by the Wisconsin legislature in creating the university in 1965: to respond to the needs and potential of the Northeastern Wisconsin community and the Northern Great Lakes region. Integrated with the main campus are three two-year campuses, at Manitowish, Marinette and Menasha.

The UWGB college structure is based on environmental themes, rather than disciplines: the College of Environmental Sciences emphasizes the problems of the natural environment; the College of Community Sciences focuses on the process by which man relates to his social (man-made) environment; the College of Human Biology emphasizes human adaptability to the social and physical environment, and the College of Creative Communication is centered on human identity — man's impact on his social

environment. A School of Professional Studies complements the theme colleges.

The theme colleges are more than tricky names for the traditional divisions; they emphasize the university's whole approach of involving the student in the interrelationships not only between the disciplines, but between knowledge and application, between the university and the community, and between the community and the world.

"Teaching melds imperceptibly with research, and teaching and research with community outreach until you can't tell where one leaves off and another begins," says UWGB Chancellor Edward W. Weidner.

A project completed last month illustrates the approach. Two freshmen, two sophomores, and a junior worked with a local clinic and physician on the relation between contraceptive pills and an apparent vitamin B6 deficiency. Students prepared the patient questionnaires; the doctor administered them; the clinic took the blood samples, but students did the analysis and reported the results.

"This is the sort of project that at the usual university only graduate or honors students would get involved with," says John Beaton, dean of Human Biology.

Community involvement is especially meaningful at UWGB because some 85 per cent of the students live within 80 miles of the campus. They study water pollution where they used to swim; they study a packaging plant as a contributor to pollution with an awareness of its economic contribution because their parents or brothers or possibly they themselves are employed

there (80 per cent of the students work at least part time).

The result is what Chancellor Weidner calls "communiversity" — community input into the campus and student outreach into the community.

All sophomores undertake an off-campus project that relates their academic interest to the problems of the area. In their junior year they study this same problem as a comparative cultural experience, for example studying a branch of a local plant in rural Arkansas or in Brussels. Students who went to London for the January special projects "term" looked at the problems of industrialization.

This field orientation, Mr. Weidner says, makes "students and teachers fellow explorers of knowledge, mutual seekers of solutions."

This involvement carries beyond the classroom; because students and faculty are working together on projects that are meaningful to both, they meet informally in snack bars, the student club (there is, deliberately, no faculty club), and in the "people pockets" built into the buildings.

Students are represented on nearly all faculty and university committees, there are student advisory committees to each of the five colleges, they are active on community committees, and a student advisory group meets every two weeks with Chancellor Weidner in a free-wheeling session at his home.

"This involvement of students in university governance is basic to our environmental approach," Mr. Weidner says. "You can't expect students to get involved in changing their community or world environment if they can't exert meaningful change on their own university."

The success of this approach is summed up in that much over-used and under-utilized term — relevance. As a transfer student from the Madison campus expressed it, "You just don't think in terms of tossing a brick through a window when you love the school and you love what it's doing."

Curriculum guide for air pollution unit

The following curriculum guide for a unit on air pollution, which features student involvement in activities that take place in the school, home and community, is excerpted from materials offered as a resource for teachers of seventh grade science classes in the Philadelphia public school system. The material was prepared by William Whiteley, a teacher at Penn Treaty Junior High School, under the direction of the district's Science Office, which has suggested that four topics be emphasized in this and in an additional guide for senior high students: air pollution, water conservation, pest control, and waste disposal. While the material is tentative and unedited and is for experimental and evaluative use only, it represents a significant attempt by a school system to meet the urgent demand for prompt and concerted action in the field of environmental education.

ACTIVITIES

—Have students review the composition of the atmosphere and make a chart for showing this.

—Have students explain how to demonstrate the gases present in the atmosphere.

a. Carbon Dioxide—by blowing breath into a container of limewater.
b. Oxygen—by burning a candle in a beaker with water about one quarter of the way up the candle, then inverting a large cylinder over the burning candle.

c. Water vapor in the air—soak strips of paper in solution of cobalt chloride. The dried strips of paper will turn color as the moisture in the air changes.

—Burn pieces of soft and hard coal. Observe the difference in amount of smoke and ash. Tell

class that soft coal is cheaper and relate this to industrial pollution.

—Have the children observe the number of different ways pollutants are being put into the air at home and on the way to school. Have them list the sources.

—Field trip to area air monitoring station, where youngsters can observe equipment for measuring pollution levels.

—Discuss with students how they add to air pollution.

—On map have children locate industries in their own neighborhoods. What do they produce or manufacture? Have children volunteer information where father works and what his company manufactures.

—Discuss with class why the amount of air pollution increases with industry and increasing population.

—Ask children to project what will happen in the future.

—Have a child trace the development of the word "smog" and report on Dr. Des Voeux who coined the word.

—Have children create their own smog. Beat board erasers for dust, burn sulfur, etc.

—To demonstrate the dilution of pollution by air movement, burn a small amount of red phosphorus in a room with little or no air movement. Have the children observe.

—From the children's observations discuss the presence or absence of smog in Philadelphia.

—Have the children collect materials from newspapers, magazines, etc., and report to class.

—Make a diagram of the atmosphere under normal conditions and during a temperature inversion.

—Reports on several of the serious smog incidents: Los Angeles; London, 1952; Donora, Pa., 1948.

—Reports on the respiratory conditions associated with smog: emphysema, miners' asthma, etc.

—On a walking tour of the area near school, have children attempt to point out evidence of damage by air pollution.

—Ask children why cleaning has to be repeated so often.

—Place piece of polished aluminum copper and silver coins in an exposed area for some time. At the same time, place polished controls away from the air.

—In demonstrating sources of man-made pollution (auto engines, burning fuels and waste products), show effects of incomplete combustion of fuels. Demon-

strate with a Bunsen burner the amount of carbon produced with various amounts of air. Hold a pyrex tube over the burner flame with the air opening set at different levels. (Make sure time remains constant.)

—To show that the major source of urban air pollution is the automobile, have children stand at a corner near their home for five minutes and count the numbers of cars and trucks that pass by. Have them also keep a count of the number that are emitting blue or black smoke.

—Discuss other ways automobiles pollute the air, besides fumes from the engine.

—Ask children what would happen if they sat inside a closed garage with the car motor running.

—Produce a small amount of H₂S by reacting dilute HCL with ferrous sulfide. Explain some of the sources of this type of air pollution. CAUTION: H₂S is toxic.

—Use analogy of preventive medicine and disease (e.g. vaccination, injections, etc.) in having children understand significance of preventive measures.

—Have children obtain information on latest pollution control laws.

—Report on auto smog equipment.

—Report on new means of generating power.

—Report on new types of auto power. Relate current interest in electric and steam powered automobiles to this problem.

—Discuss ways of removing the waste gases from the industrial process.

—At this time, review the material covered by the children.

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STATEMENT OF GARRETT DE BELL
Washington Representative,
Zero Population Growth

Submitted to Senate Committee on Labor and Public Welfare
May 12, 1970

I am Garrett de Bell, the Washington Representative of Zero Population Growth, Inc. ZPG established its National headquarters in California in September of 1969 and has now grown to over 10,000 members in 116 chapters across the nation. ZPG is actively working for stabilization of the population of the United States and is seeking positive solutions to the environmental problems that result in part from excessive population size. Since ZPG is not tax-exempt, we are free to lobby for legislation that makes ecological sense, to support public officials whose policies make ecological sense and to work for the defeat of those who do not.

I am sure that there is general agreement that education and public awareness of ecology is critical to the resolution of the ecological problems that threaten the quality of life and even the future existence of the human species. The hearing is evidence of this committee's commitment to do something in this area. ZPG applauds the purposes and intent of Senate Bill 3151. We will, however, make the bulk of our testimony in the area of changes that we feel will increase the effectiveness of the bill.

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Zero Population Growth is concerned with the environmental problems that are a direct and unavoidable consequence of a population that already exceeds a reasonable size and continues to grow at an explosive rate. If the U.S. population is not stabilized, we will have to contend with a population of over 300,000,000 by the end of the century. There is very little chance of solving any of our social and environmental problems if this growth continues. The relationship of population growth to environmental problems is not stressed in Senate Bill 3501 as introduced. Zero Population Growth would therefore endorse the amendment suggested by Senator Cranston and numbered Amendment #614. This amendment would make clear the intent of Congress that "full consideration is (to be) afforded to the relationship of population to environmental balance."

There is one other aspect of this bill which concerns us. Section 4, Approval of Applications, sets forth requirements for book-keeping, auditing, and reporting which applicants for assistance under this act must fulfill. It is an old story with federal programs of this sort that when federal assistance finally becomes available for a problem like this it is so wrapped up in red tape that those very groups which created public awareness cannot qualify for grants or aid. The purpose of such supervision and

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monitoring are valid, but the result of the procedures actually adopted often eliminates many of the organizations which could best use the funds: small, volunteer groups of local citizens which are already devoting their own time and resources to solve the problem but which may be badly prepared to negotiate ^{with} the federal bureaucracy.

The Congress has a choice. It can write into this bill the routine language, can require the usual paper work. It will end up providing grants to exactly those large, established institutions which have displayed total indifference in their educational efforts to environmental considerations. Or Congress can modify the usual procedures and minimize the administrative burden on applicants for aid. This will help the small, unestablished group, the group which has no auditor because it has no regular sources of funds, the group that has no fixed overhead charges because its members absorb the overhead, the group, in fact, which laid the groundwork of public concern for this hearing. Zero Population Growth fails to see the connection between intimate knowledge of the corridors and layers of the federal bureaucracy and concern and dedication to the preservation of our world. In fact, if anything there is a connection between this type of established, bureaucratic outlook and the very educational practices and attitude which have led us to despoil the environment.

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A specific example: Section 3(a)(4) provides for grants "to local educational, municipal, and State agencies and other public and private nonprofit organizations for community education on environmental ecology, especially for adults." The current contribution of school systems and other government agencies to this awareness is virtually nil. The purpose of this bill, of course, is to provide those agencies with funds to do their part of the job. But in many cases it is not funds that are lacking, but will and interest. Even as these agencies develop that will, much will remain to be done by the citizens group. In virtually every community in the nation such groups have begun the fight to save the environment and educate their fellow citizens. Congress ought not to deny them an important role in developing programs of environmental education.

Furthermore these groups, by the very voluntary nature which makes it harder for them to qualify for grants under conventional procedures, can make better use of limited funds than well established organizations. A dollar of federal money matched with the energy and interest of the members of such groups will go a lot farther than a dollar of federal money which has to be spent hiring that energy and interest.

Therefore Zero Population Growth would like to suggest to this committee that it be a clear part of the legis-

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lative history of this bill that the Congress does not wish to exclude any otherwise qualified organization from receiving assistance simply because of that organizations inexperience with federal grant and aid procedures, its lack of regular auditing staff, or its informal administrative structure. We would like to suggest that technical assistance should be made available by the commissioner to such groups to enable them to provide the Federal Government with necessary monitoring data on the expenditure of public funds, but that such requirements should be kept to a minimum. We would like to suggest that one of the criteria to be considered by the Commissioner in providing assistance should be the past record of the organization in the problems of environmental education and public awareness, its past efforts to solve these problems, and its history of independent and voluntary efforts to advance that goal with its own resources.

I think it is very important that this committee consider the overall role of the Universities in the environmental crisis. The problem has not been simply lack of effort in one phase or another of environmental problems. Rather the basic purpose of the universities in teaching and research has been to encourage ever-increasing specialization and "professionalism" at the expense of

the broad education necessary to a democracy that depends on an enlightened electorate. A large majority of the faculty of our large universities are dedicated by training and habit to the over-specialized type of study that has been a major contributing cause of our present state of ecological crisis. They are fond of blaming all problems on "the administration", or a conservative board of trustees, or lack of funds, but the problem has been the reluctance of the faculty to continue their own education and growth as times changed and their failure to develop, and even to allow others to develop, truly interdisciplinary teaching and research. The situation here should be very familiar to you gentlemen as a very similar one prevails in the United States Congress. The committee and seniority systems which reward longevity and specialization ^{not} stability and dedication to human purposes. The seniority system prevails in both the Congress and the Universities. In both it has prevented those institutions from effectively dealing with the problems of our times. You are familiar with the situation in Congress. I will touch on the problems the seniority system causes on the University campus. The older faculty control the committees that control course content, faculty hiring, fellowship support allocation, and degree requirements. They decide on faculty advancement primarily on the basis of professional standing as determined by output of publication of suitable specialized papers. Creative teaching, interdisciplinary research or teaching, or working with citizen groups to attempt to develop action programs based on sound knowledge of all implications are not

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regarded as valuable ways for faculty time to be spent. The rewards for both faculty and students go to those who will become highly expert in some narrow area of specialization. Some of this specialized research is socially valuable and some of it is of great academic interest. But in a world that is rapidly approaching disaster we must question our priorities. After seeing how well the faculty at our universities have enforced specialization at the cost of breadth and have resisted interdisciplinary teaching and research, I would not like to see legislation which lets the fox guard the chicken coop. We should use the environmental issue to force the reform of the universities that is necessary in other areas as well as in the area of the environmental crisis. This bill should include specific provisions implementing the proposals in the publication The Universities and Environmental Quality; Commitment to Problem Focused Education (a report to the President's Environmental Quality Council) prepared by John Steinhart and Stacie Cherniack. This report stresses that effective multi-disciplinary problem focused programs were only successful when the faculty in the program had complete control of the faculty reward structure, course content, and requirements for degrees. This is necessary to prevent the majority of specialists from undermining the creative few who are moving into the vacuum and working between disciplines. The implementation would be as revolutionary as genuine congressional reform. Funding under this act should be restricted to groups which have the degree of independence suggested in the above report.

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I would like to enter into the record of these hearings two further items. One is an article, "Education and Ecology" which I wrote for The Environmental Handbook, edited by myself and published by Ballantine/Friends of the Earth. The^{other} is a bibliography on education from the same Handbook. I feel the reading of a few of the books on this list might help to give congressmen and their staff some better feeling for the reasons why so many students regard the education system in this country as contrary, to basic human purposes.

Thank you for the opportunity to testify.

EDUCATION

- Hesse, H., *Beneath the Wheel*. New York: Farrar, Straus and Giroux, 1969. \$1.95.
- Steinhart, J. and Cherniack, S., *The Universities and Environmental Quality—Commitment to Problem Focused Education*. U.S. Government Printing Office, 70¢.
- Hutchins, R., *University of Utopia*. University of Chicago Press, 1953. \$1.50.
- Goodman, P., *Compulsory Mis-Education: Community of Scholars*. New York: Vintage. \$1.95.
- Goodman, P., *Growing Up Absurd*. New York: Vintage, \$1.45.
- Jencks, C. and Riesman, D., "Where Graduate Schools Fail" *The Atlantic Monthly*, 1969.
- Hapgood, D., "Degrees: The Case for Abolition" *The Washington Monthly*, August 1969.
- Lichtman, R., "The Ideological Function of the University" *International Socialist Journal*, December 24, 1967.

Education and Ecology

Garrett De Bell

Education, particularly higher education, is critically important to solving our ecological crisis. At present, universities do much of the specialized research which develops the technology that is raping the earth and threatening our survival. They do this job devastatingly well. Yet the knowledge and wisdom to apply technology wisely is neglected. The whole direction and purpose and thrust of our culture is toward greater production, greater exploitation. In many, if not in most of our universities, there is little criticism of the basic assumptions and value judgments that underline our current priorities. The university is quite capable of developing an automated machine to harvest almost any crop, but it is unable to evaluate the long-term social costs of such a development. Do farm workers want to be forced out of work and into the cities? Is it desirable to replace people with machines whenever it is feasible? Does this use of machines increase the crop, or just the profit? Some of these machines use gamma radiation to determine if the crop is ripe. Is this a safe and desirable practice? Special strains of crops are developed by plant-breeding programs to meet the needs of the machine system—strains with synchronous ripening, uniform size, tough skins, and long storage life. Does this selection have a detrimental effect on food value? Use of machines makes us more dependent on high technology and the energy needed to make and run the machines. Should we continue to replace labor by energy-using machines when

petroleum reserves are sufficient for only a few more generations and energy use pollutes the environment? These are the kinds of questions that go unasked.

The universities are characterized by increasingly narrow specialization in all fields. For instance, ecology as a field emphasizing interrelationships—the study of the total impact of man and other animals on the balance of nature. Yet only a few professional ecologists are willing to brave the disapproval of their narrowly professional colleagues by pursuing the broad spectrum that ecology implies. Some of their names are household words—the late Rachael Carson, Paul Ehrlich, Kenneth Watt, Barry Commoner, Lamont Cole, and Garrett Hardin. The rest do very specialized studies that appear in journals such as *Ecology*, *Ecological Monographs*, and the *Journal of Animal Ecology*.

The biological and social sciences are trying to emulate the elegant work of a few nuclear physicists and molecular biologists and are learning more and more about increasingly trivial subjects.

Very little research is aimed at developing alternatives to our present disastrous pattern of existence with excessive production—waste; conspicuous consumption; manipulative advertising; growth for its own sake; poverty in the midst of plenty; and destruction of the air, water, soil, and organisms that are the basis of the life-support system. One reason that we don't get the right answers is that we aren't asking the right questions.

Probably most important is that we are not providing the kind of education that will allow the electorate to evaluate the choices that are, or will be, available to them.

Our system is, in a word, geared to diplomas, not education. What is to be done? A statement of Paul Goodman's is appropriate:

Today, because of the proved incompetence of our adult institutions and the hypocrisy of most professionals, university students have a right to a large say in what goes on. . . . Professors will, of course, teach what they please. My advice to students is that given by Prince

Kropotkin, in "A Letter to the Young": "Ask what kind of world do you want to live in? What are you good at and want to work at to build that world? What do you need to know? Demand that your teachers teach you that." Serious teachers would be delighted by this approach.

A recent report to the President's Environmental Quality Council (OST 1969)¹ recognized many of the barriers to effective multidisciplinary education on the campus and makes specific suggestions for reform. It recognizes both the need for people trained much more broadly than the present overspecialized Ph.D. and the resistance within the faculty to truly interdisciplinary work. It found that only separate institutes that had control of the faculty-reward structure (raises, tenure, hiring, and firing) and that had complete "freedom to be innovative in introducing course material, educational programs, work study programs, and curriculum requirements for degrees were successfully achieving meaningful multidisciplinary teaching and research." They found many students coming to these programs after lapses of many years in their schooling, because they felt their earlier education was inadequate for interdisciplinary work. They also found students eager to work in programs aimed at finding workable solutions to our environmental problems.

At least, good ideas on education have been presented to the federal government. Since these ideas will require real changes by the people who control the universities, the trustees, the department heads and deans, there will be vigorous opposition to implementing the proposals. If you are interested in education reform, get hold of the report and press for change on your campus.

It will be a challenging task to make our education system both uplifting and truly relevant to our environment. There is a chance to revitalize the system around the central theme of survival and ecology as suggested in John Fischer's article on page 134. In their calls for a relevant education, students have shown tremendous enthusiasm for study that relates to solving the social and

ecological problems that are threatening our existence. They would respond very favorably to efforts by faculty and administration to devote more of the universities' teaching and research to important environmental problems on all levels, especially where they could get directly involved, as through work-study programs. Real inquiry may rescue the university from the sterile degree-and-diploma game it has become.

SUGGESTIONS FOR ACTION

Examine the course content, curriculum, and research of your university or college to see if there is a reasonable balance between pure and applied research; between teaching and research that perpetuates present trends and that which questions trends and suggests alternatives.

How can you make your field relevant to serving our environment? Take surveys of graduate students to see how many are pursuing relevant theses and how many would like to. If the numbers differ significantly, ask questions about the reasons they have not chosen relevant topics.

Check into faculty salaries, fellowships, and grants in different fields and subfields to see where the main priorities are in federal and campus programs. Are these priorities good? See how your local representatives at state and federal levels feel about these priorities and then volunteer to campaign for them or for their opponents depending on their answers. Check the voting record against their answers to be sure.

Set up an experimental college with faculty controlled by students to get some open discussion and fresh ideas. Hire graduate students, uncredentialed people with experience in the real world, politicians, or anyone else you feel could get out of the overspecialized, study-problems-to-death academic syndrome. One dollar per student per quarter at U.C.-Berkeley could provide \$108,000 for this purpose. This could provide ten full-time faculty appointments. You might choose to bring in people for a quarter or shorter periods to get more variety. Appointments could be made by the student senate,

if it is representative of the general student body on your campus. Provision might be made to ensure that small interest groups were able to have an influence. The purpose of the experimental college would be to counter the university's resistance to change. There are a great number of vested interests in the faculty and administration that resist any change that might alter their power. Students don't have the same vested interests and are more willing to experiment.

NOTES

1. OST 1969: Office of Science and Technology, Executive Office of the President, *The Universities and Environmental Quality—Commitment to Problem Focused Education*, a report to the President's Environmental Quality Council by John S. Steinhart and Stacie Cherniack, September 1969. For sale by the Supt. of Documents, U.S. Government Printing Office, Washington, D.C. 20402, price 70 cents.

Remarks Submitted by Raymond D. Vlasin ^{1/}
to Senator Claiborne Pell
on S. 3151, The Environmental Quality Education Act

U. S. Senate
May 19-20, 1970

Of the many important problems of environmental quality, one that needs immediate and major attention is the monumental gap in environmental education. There is truly a gap between the scientists' knowledge and the citizens' understanding of environmental problems. There is likewise a gap between the scientists' knowledge of required remedial measures and the citizens' understanding of those needed measures.

It is for these reasons that I am extremely pleased you are considering S. 3151, "The Environmental Quality Education Act". If it is passed and adequately funded, it could make a major attack on the environmental education gap.

The comments and suggestions I give support S. 3151. They are intended to add strength to it.

Our environmental crises are not brought on primarily by lack of scientific and technological knowledge. The crises are rooted instead in the attitudes and values of all of us. In work at The University of Wisconsin-Green Bay and in University Extension, the extension arm of The University of Wisconsin, we have found that the combined adverse actions of individuals, families, businesses,

^{1/} Assistant Chancellor for Community Outreach and Research, The University of Wisconsin-Green Bay; and Assistant Chancellor for Extension, University Extension, The University of Wisconsin.

industry, governmental units and communities throughout the nation have caused major environmental problems. The problems occur in both our natural resource environment and our man-made environment.

In the natural resource environment we see fouled streams and rivers, deteriorating lakes, polluted air, defaced landscapes. We also see cut up and squandered open spaces, cluttered and defaced parks and wilderness areas, destroyed scenic vistas and other natural resource abuses.

In the man-made environment we see crowded, noisy and deteriorating urban places as well as unhealthy dust, air pollutants, and smog. We also see ugliness of poles, lines and wires crisscrossing the sky, and garish or inappropriately placed structures, billboards and facilities. One can include also examples of dreary internal surroundings such as may be present where people work, where youth and adult learn and are cared for, and where the elderly live out their existence.

In UWGB, and in University Extension, we are convinced that we and others must look at the broad array of environmental problems and work vigorously for their solution. In UWGB, under the leadership of Chancellor Edward W. Weidner, we have organized our educational efforts around environmental problem areas. In addition, we have integrated instruction, research and community outreach efforts behind these problem areas. Such integrated efforts are designed to involve UWGB faculty and students with community leaders in educational thrusts on-campus and off-campus on environmental problems and their possible solution. This action is in cooperation with University Extension which has increased its emphasis in this problem area. As we proceed, some environmental education needs are becoming clearer to us.

First, it is a fact that individuals, families, businesses, industries, governmental units and communities have not fully recognized the environmental consequences of their acts. In particular, these units have generally ignored the social costs or hardships imposed on others by either their productive or consumptive acts or both. Examples of this problem are very numerous.

One key example of social costs imposed on others is the increased cost or decreased usefulness of water to a downstream user because of actions by an upstream user. Another is the higher cost of home maintenance, diminished home enjoyment, and increased health problems by downwind recipients of airborne pollutants. Still other examples are the limitations imposed on all by one or a few that deface landscapes, cut up and squander open spaces, destroy forested and green areas, adversely alter parks and wilderness areas, destroy scenic vistas, and make other assaults on our natural resource and our man-made environments. Helping adults and youth in all walks of life understanding the consequences of their individual acts on others is one of our greatest environmental education needs and challenges.

Second, environmental problems seldom occur in isolation. They frequently involve a range of other activities of man including interrelations with other parts of his environment. These conditions alone would make the problems difficult to understand and remedy. In addition, a particular environmental problem might involve investments of capital, some group's economic well-being, job opportunities,

and taxes. The problem also might involve laws, customs and habits that permit and in some instances even encourage, the problem. Further, those who receive the benefits from existing arrangements may not be the same persons who bear the social costs. Thus, there is little wonder that both confusion and frustration occur as people recommend simple solutions to complex problems that cannot be solved in that manner. Helping people understand the relatedness of environmental problems is another urgent educational need.

Third, most of the crushing environmental problems involve sizable groups of persons. The remedial actions for such problems in turn usually require group or public action. The group action may be in evaluating and planning for the environmental improvement, in promoting the improvement, and in financing the improvement. Group effort may be involved in coordinating community and governmental action, in improving the laws or other institutional arrangements, and in maintaining, supporting and servicing the environmental improvement once it has been achieved. Educating adults and youth about group problems and about individual and group responsibilities is still another badly needed part of environmental education.

Fourth, the remedial actions on environmental problems must be broadly feasible. For example, to succeed the remedy for a natural resource environmental problem may need to be physically (including chemically and biologically) and engineeringly possible. But to succeed it also may need to be feasible or optimal in an economic sense, acceptable politically and legally, and possibly administratively. Consequently, both interdisciplinary analyses and interdisciplinary educational efforts with the public are prerequisites of major environmental improvements.

Fifth, there is much confusion over environmental quality levels. We must determine those quality levels of environment we need in order to survive and launch an educational effort about them. Presumably those survival levels must be met at all costs. Beyond the minimum quality levels for survival, we must determine what additional quality levels we hope to achieve and maintain. These decisions concerning environmental quality must be translated into quality levels for air, water, land and other features of our natural-resource environment and for our man-made environment. The educational requirement here is both large and urgent.

Sixth, it is clear that the market forces in our private enterprise economy can be made to cope with more of the societal costs of pollutant creating activities. One need only reflect upon the array of solid wastes that clutter our landscape to become acutely aware of the need for greater responsiveness to social costs by the market mechanisms. The possible supplements to the private market forces include (1) appeals to civic responsibility; (2) regulatory and enforcement actions by public agencies; (3) adversary proceedings in courts by damaged parties or by concerned citizen groups; (4) financial inducements; and (5) financial charges for pollutants discharged. These and other possible supplements for improving the market mechanism are poorly understood and decision makers could benefit greatly from an increased understanding of them. Again, education is required.

Seventh, it is clear that we have been less than successful in integrating decisions about "economic development" and decisions about "environmental quality improvement." Historically, we have treated these groups of decisions separately. At the local community levels we observed separate pathways by conservation and service groups concerned with the environmental quality and by community, business, and industrial groups concerned with economic development. We see also a separation at state levels between groups handling business and industrial development, and groups concerned with environmental quality improvement. These separations appear at the national level as well. Even though we are making some progress at all levels we seem to be just beginning. I personally have seen many environmental abuses that have occurred in the process of community development, residential development, business development, recreational development, and industrial development. The irony is that some of these adverse impacts could have been largely or entirely eliminated by a more careful integration of environmental concerns and developmental concerns. Again, education of decision makers and the public is a key.

Eighth, environmental problems do not respect community and political boundaries. Therefore, to handle the problems those affected may need to create new management systems and organizational and governmental arrangements or to improve the existing ones. The alternative choices include various public, various private and various public-private management systems and organizational arrangements. They might cover a multi-community, multi-county or multi-state area. Clearly, there is need for education about such systems and arrangements. Likewise, we must educate the public about environmental problems such as pollution of our international water and impart knowledge about it. And, of

course, the assault of our exploding population on the natural resource environment and the man-made environment constitutes one of the most pressing national and international problems for education and remedial action.

Ninth, there is need also for educational efforts directly upon some of our social values and preferences. There is a deep attachment by many people to more production and more consumption as if they were an "absolute good." One need only reflect upon the way we have given growth of GNP such prominence, the way we treat increased volumes of products produced and sold as an "unquestioned good", and the way we look at increased electrical power and other utility use as a "mark of progress." At the family and consumer level there is a deep attachment to more garbage disposals, more electrical appliances, more cars, more travel, and more of other conveniences, all of which give us increased resource demands. I observe that youth, individual adults, and families normally do not see much connection between their preference for more of these things and an impact upon the environment.

There are other values that also need to be highlighted. We seem to have arrived at a point in time when it is antisocial for large businesses, industries and utilities to pollute our natural environment, particularly air and water. However, we seem to view our local municipalities as being less antisocial if they pollute the air or water. By further contrast, we seem to attach little or no antisocial label to individuals or families who by their actions pollute the environment. Without a feeling of social stigma, individuals and members of families drive to and from work each day alone, discard litter with ease, show little concern about side effects of their consumption and recreation habits, and take other actions that make increased demands on goods and services with associated social costs.

We must launch a major hard hitting environmental education program nationally with all adults, as well as with the teachers and youth in our elementary and secondary schools. For example, we must help those in business, industry, commerce, and labor see the environmental consequences of their production, processing, manufacturing, transportation and disposition. We must help local, regional and state governmental officials and employees, as well as community leaders and community and regional development personnel identify opportunities for economic progress with environmental quality preservation. We must help stockholders and other income recipients see the importance of environmental quality restoration and preservation as well as financial gain. We must help those who direct, build and maintain our utilities and the public that uses them, safeguard our natural resource and our man-made environment. We must help those who help pass and enforce our ordinances and laws have a clearer grasp of our environment and the preservation of an ecological balance. We must help them develop and integrate urban environmental preservation policies with land settlement policies, with urban and rural development, with policies for industrial location, and with tax preference policies.

I stress the adults of today because they are the ones who are responsible for the major productive and consumptive decisions today. They are adding to our population. They are the ones who have the responsibility for establishing and maintaining family attitudes consistent with environmental preservation and ecological balance.

The purposes of S. 3151 are both necessary and functional. I say that because they parallel in a remarkable way the educational thrust of The University of Wisconsin-Green Bay which is itself relevant and functional.

Institutions of higher education can play a major role in helping to implement S. 3151. For example, among the activities at UWGB we have proposed and are proceeding with: (1) A national symposium on environmental education designed to focus on the educational aspects and curriculum, as well as staff needs; (2) Summer workshops in environmental science education designed to train teachers to become environmental change agents within school districts; (3) A program of liaison and staff development in the local school districts, utilizing individuals trained during the summer workshops; (4) Assessment and evaluation of each phase, with feedback being used to plan and develop the next step in establishing environmental literacy.

To further strengthen the S. 3151, I would stress strong programs and funding for educational efforts with adults. In my judgment, our greatest inadequacy in education today is in adult education, and the need for environmental education with adults ranks at the top among adult and societal needs.

Also, there is need for capital funds, whether in this Act or others, for the development of certain demonstration and education facilities at ecologically-oriented institutions. For example, at the University of Wisconsin-Green Bay, we are beginning to think in terms of a combined conference-demonstration center to support a continuing program of workshops, symposia, exhibits, pilot projects and even dramatic presentations that will all be related directly to the

development of ecological awareness and the solution of specific environmental problems. We see such an environmental improvement center as being essential to the full accomplishment of our mission. Since it cannot be justified primarily, however, as a facility for the education of our undergraduate students - although they ~~would~~ certainly become involved in its activities - we are not likely to succeed in having it included in our state-financed construction program. This means that we must turn to business and industry, private donors and the federal government. Although we have not yet had time to prepare detailed plans for this facility, I feel confident that ample justification for a federal contribution can be developed.

The bill as drafted does not appear to contemplate capital grants. You may wish to give consideration to specific authority for such grants to the extent that they are directly related to the educational and demonstration objectives of the bill.

I applaud the attention given by S. 3151 to technical assistance. I would urge that technical assistance under the Act should be viewed as a continuing commitment. It takes time to develop an effective and smoothly functioning, technical assistance effort. Further, I urge that the technical assistance by the Secretary and Cabinet officers not be conducted separately from the centrally related issues and programs concerning rural development, urban settlement, rural-urban balance, economic development and industrial dispersion, and the investment and tax policies facilitating these.

I thank you for the opportunity to share my observations with you and I will be pleased to assist you and your Committee in any way I can.

S.3151--"Environmental Quality Education Act"

STATEMENT OF LOUIS S. CLAPPER ON BEHALF OF THE NATIONAL WILDLIFE FEDERATION BEFORE THE
SUBCOMMITTEE ON EDUCATION, SENATE COMMITTEE ON LABOR AND PUBLIC WELFARE

May 20, 1970

Mr. Chairman, I am Louis S. Clapper, Director of Conservation for the National Wildlife Federation, which has its national headquarters at 1412 Sixteenth Street, N.W., here in Washington, D.C.

Ours is a non-profit, non-governmental organization which has independent affiliates in all 50 states and the Virgin Islands. These affiliates, in turn, are made up of local groups and individuals which, when combined with associate members and other supporters of the National Wildlife Federation, number an estimated 2½ million persons.

The Federation seeks to attain conservation goals through educational means. Consequently, we welcome the invitation to appear here today to comment upon S.3151 to authorize the "Environmental Quality Education Act."

We congratulate the authors and sponsors of this bill, in both the House and the Senate. We hope it will be passed in time to be a major accomplishment of this 91st Congress.

Mr. Chairman, we are exceedingly pleased at the new awakening of interest in the environment, as evidenced by the President's recent message and by the introduction in the Congress of numerous bills on various environmental problems. I might say that our Federation and

many other non-governmental conservation organizations, as well as governmental agencies, long have endeavored to arouse an awareness on the part of the public to the need for preserving and enhancing the quality of the environment. However, we have been terming this practice as "conservation," or wise use of natural resources.

Many of us have been concerned about use of the term, "conservation," believing it has not always been truly descriptive of the movement. Some people equate "conservation" with preservation rather than wise use. On the other hand, the term "environment" may not be truly descriptive either. In the most basic sense, a person's environment can be his home or office or club. However, with respect to both conservation and environment we are talking about natural resources such as air and water, and fields and forests, and wildlife and the problems of pollution control, solid waste disposal, use of potent pesticide poisons, preservation of natural beauty, and wise management of these assets. We are talking about ecology, or the study of the interrelationships of living things, and their environments.

The National Wildlife Federation long has been cognizant of the interrelationships of these natural resources, including wildlife. The fourth resolution adopted at our first annual convention 34 years ago called for water pollution control. In fact, water pollution probably has had more attention from our organization than any other. It is the only theme ever to be repeated in our annual observance of National Wildlife Week. In years after 1936, the National Wildlife Federation became seriously concerned with air pollution control, reclamation of strip-mined areas, noise pollution, the indiscriminate distribution of pesticide poisons, and all other aspects of environmental

contamination. And, last month, our organization went on record as favoring stabilization of the Nation's human population (copy attached).

I might digress here, Mr. Chairman, to point out that most major national conservation organizations have similar objectives. In fact, most are members of a coordinating group known as the Natural Resources Council of America and it is my pleasure to serve as a member of the Executive Committee of this organization. The NRC has an active committee on conservation education and we have been urging that the Office of Education give greater emphasis to this phase of work. Consequently, we are quite pleased at the thrust which S.3151 will give to environmental education. We also are pleased that the Office of Education has established a new Environmental Education Study Staff which is making real progress in stimulating concern for the environment throughout the entire Department of Health, Education, and Welfare.

Before commenting about specific provisions in the bill under consideration, I would like to make a few general observations.

First, we believe that a fundamental change must be developed in the attitude of the public toward the environment. Much of education deals with how, why, and what but not enough on "so-what." Call this a conservation ethic, or moral attitude, or whatever, it must be a desire on the part of the people to not only prevent forest fires and avoid being a litterbug, but to demand that industries clean up their pollution, to insist that bureaucratic Federal, State, and local agencies give proper consideration to all environmental effects in their programs, and to offer solid financial support to projects which will result in a quality type of environment. We are confident that the American public is willing to pay more for environmental protection

and enhancement. Last year, the National Wildlife Federation commissioned the Gallup Organization, Inc., to conduct a survey on public attitudes toward the environment. Almost three of every four persons interviewed said they were willing to pay something extra to improve their natural surroundings. We followed this survey up with another by a widely-known and recognized sampling organization. In this case, 52% of those interviewed thought that protection of the environment is receiving too little financial support in comparison to other public programs. Also significant is the fact that the younger age groups of people are the most willing to pay.

Second, we hope that the Congress soon will rearrange this Nation's priorities to give greater emphasis to protection of the environment. The budget proposed for fiscal 1971 is divided into 13 functional categories. Last on the list is natural resources with an allocation of about 1.2 percent of the total budget outlay. The 1970 budget contained about \$2.5 billion for natural resource programs, or equivalent to about one-sixth of the interest we pay on our national debt.

Third, this new awareness to environmental hazards must be considered more than a "fad" which can pass away in a year or so. Every possible encouragement must be given to a continuing program, perhaps through incentives for industries and public resource-management and production agencies to recycle and reclaim their by-products so that "wastes" are held to a minimum. There is no doubt that the life style and attitude of every American must be vastly different in the future. This calls for a drastic change in the educational system as an initial step.

Fourth, consideration should be given to making it mandatory that teachers demonstrate a proficiency in environmental education as a qualification for certification in schools receiving Federal financial assistance. We are well aware that such a suggestion is fraught with dangers of running afoul of educators who carefully guard their prerogatives, and that it may be unwise to attempt to legislate curricula. We also know that most States either have laws or regulations which require teachers to be qualified to teach conservation. However, all too many educators approach this entirely from an academic point of view and miss the practical applications which are so important. We would hope that the Commissioner of Education can use S.3151 to improve this situation, beginning with teacher training institutions, with any program permeating the whole educational system.

In a basic sense, environmental education involves helping students learn to make sound judgments, ones in which the general welfare must be dominant, and in which they will do the right thing regardless of stress and strain. Like other educational objectives, these develop man-to-man relationships, and man-to-resources relationships, which include matter and energy. Some people believe a man-to-idea relationship also is essential if people are to work in harmony. We must be governed by moral or ethical and scientific considerations in the use, management, and manipulation of materials and forces of nature. These require an understanding of natural laws and processes and an appreciation of these things. Studies and research then must lead to the development of solid information, this to knowledge, and this to understanding and appreciation and finally to wisdom--or wise use

of natural resources. A friend of mine, James L. Bailey, Director of Conservation Education for the Tennessee Department of Conservation, puts it this way: he doubts that anyone should have the ability or authority to make rain unless they also have the ability and authority to stop it.

And now I should like to comment specifically about a few provisions in S.3151 - under consideration here today.

We are in agreement with the Statement of Findings and Purpose, as outlined in Section 2, and which relate to the deterioration of the quality of the natural environment. If anything, this statement is not sufficiently strong. We believe the situation has become so critical that the national security and man's very survival may be at stake. And, most certainly, we are in agreement with the broad purposes outlined in subsection 2(b). We feel that it is absolutely essential that educational efforts be accelerated and expanded in order to obtain the citizen support which is necessary for implementation of proper resource management programs.

We believe that Section 3 gives the Commissioner of Education sufficient latitude to make grants or enter into contracts for projects or programs which will stimulate education of the public on problems of environmental quality and ecological balance. This section appears to cover virtually all types of educational and/or informational programs and we are particularly pleased to note that provision is made for utilization of the mass media. The National Wildlife Federation has had success in disseminating information through its own publications and via press and radio-TV media and most certainly believes there is a place for such projects in any overall program such as that

envisioned by S.3151.

I would also suggest that provision be made in Section 3, or elsewhere, for an Assistant Commissioner to administer this particular program. Its importance merits the close attention of a top-flight administrator.

We would suggest that Section 5, providing for an Advisory Committee on Environmental Quality Education, be strengthened. First, we suggest the name should be changed to imply a decision-making role rather than one of an advisory nature. I say this because of the background of presently serving as a member of the Federal Water Pollution Control Advisory Board set up by statute as an advisory group to the Secretary of the Interior. Responsibilities of the group should be spelled out as being of a decision-making type unless vetoed by the Secretary. Second, composition of the Committee should be spelled out in such a manner as to require enough ecology and education-oriented members to preclude the possibility that vested economic interests would ever get control of the Committee's decisions.

To conclude, Mr. Chairman, the National Wildlife Federation again thanks the Subcommittee for the opportunity of making these remarks. We stand ready to help in any possible way.

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OPTIMUM POPULATION LEVELS

WHEREAS, the human population is making ever-increasing demands upon natural resources for food, fibre, space and other basic needs, including outdoor recreation; and

WHEREAS, these demands are resulting in an overall degradation of the natural environment through water pollution, air pollution, unwise uses of chemical poisons, losses of natural areas, surface mining, and noise; and

WHEREAS, many fear that overcrowding is leading to irrational and destructive behavior among humans, behavior similar to that which prevails among lower forms of life when they are overcrowded; and

WHEREAS, man's very survival may be threatened if the ecosystem no longer can cleanse itself because of environmental contamination;

NOW, THEREFORE, BE IT RESOLVED, that the National Wildlife Federation, in annual convention assembled March 20-22, 1970, in Chicago, Illinois, hereby asserts its conviction that the human population in the United States, as well as throughout the world, has reached the point where it should be stabilized at the current level; and

BE IT FURTHER RESOLVED that this organization encourages the President of the United States to initiate action, both in this country and abroad, which will result in the development of plans and/or programs to curtail the present expansion of human populations.

21 Arizona Circle
Madison, Wisconsin 53704
May 25, 1970

Dear Senator:

Wisconsin Senator Gaylord Nelson, with whom the idea for an environmental teach-in on 22 April originated (the Centennial celebration of Lenin's birthday) is proposing legislation which would authorize federal funding of teacher-training and education programs on environmental problems. These programs would be in elementary and secondary schools, colleges and universities, and adult education classes.

As a Wisconsin voter I urge you to vote against such legislation. Here in Wisconsin we find that far too many of our students cannot read, lack an even elementary history education, and have never been taught the "check-and-balance" principle written into our Constitution.

Please, Senator, do not dilute our educational system with any more federally financed frills. Vote against Sen. Nelson's Environmental Quality Education Act.

Respectfully yours,

William J. Parker
William J. Parker



TOWNSHIP OF BERNARDS

ADMINISTRATIVE AND EXECUTIVE OFFICES
15 WEST OAK STREET
BASKING RIDGE, NEW JERSEY 07920
201-766-2510

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JAMES T. HART
DPT. TWP. CLERK
JOHN MCARTHUR

May 28, 1970

The Honorable Claiborne Pell
Senate Office Building
Washington, D. C.
Dear Sir:

The Bernards Township Conservation Committee is very much in favor of the Environmental Quality Education Act of 1970. As a newly formed Conservation Commission we are extremely concerned about the environmental crisis and feel that education is a positive step toward improving our environment.

We hope that our name will be submitted in favor of this legislation.

Very truly yours,

Joanne L. Howell
Mrs. Joanne L. Howell
Secretary

June 2, 1976

The Honorable Charles Pell
Senate Office Building
Washington, D. C.

Dear Senator Pell:

It is with a great sense of urgency that I record our support of the Comprehensive Quality Education Act of 1976. Only by the intense and effective educational process will it be possible to preserve much that is good in our American way of life.

Sincerely yours

Ernest E. Hare, Ph.D.
President, Metropolitan
Action

Executive Committee, C.I.E.

A.S. #1/Box 53

Amherst, N.Y. 01003

RUTGERS • THE STATE UNIVERSITY

NEWARK, NEW JERSEY 07102

June 5, 1970

Senator Claiborne Pell
Chairman, Education Subcommittee
United States Congress
Washington, D. C.

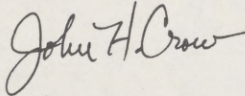
Dear Senator Pell:

You deserve great credit for trying to promote environmental education. There is no doubt at all in my mind that our nation's youngsters - as well as the oldsters - need to learn of the diversity and nature of their surroundings. This requires a thoughtful program to enlighten our people regarding their apartments, homes, schools, businesses, recreation areas, farm areas, natural areas, etc. It seems that we must teach our people just how their well being is related to all the above.

It is my hope that your committee will succeed with this important education - speaking as an ecologist, I hope your committee will remember the value of getting our youngsters into natural areas and aprks with a qualified naturalist, as books and simulation cannot be effective enough. The young must have real experiences in their environmental education, not just vicarious ones!

I should very much like to be kept informed as to your committee's progress. If I can be of any service please let me know.

Yours truly,



John H. Crow
Assistant Professor of Botany

JHC:kc

Rutgers University, Department of Botany,
New Brunswick, New Jersey,
June 1, 1970.

Senator Harrison Williams
U. S. Senate
Washington, D. C. 20510

Dear Senator Williams:

This is in reference to "Environmental Quality Education Act of 1970".

For some time we have had support from N.S.F. for environmental studies. This has been through training grants which has made it possible to carry on an effective program of educating students in environmental biology. It is highly important to produce as many persons as possible at this level because of the great demands for educational programs that are developing--in part, those that will arise because of the probable (hopeful) implementation of this "Act". I have letters from 23 colleges and universities wanting trained ecologists. I am sure that only a fraction of those needing such persons have written to me. It is absolutely certain that most of these positions will not be filled. You can almost count on your fingers the universities that are turning out ecologists with Ph.D. degrees. There just are not enough being produced, and these are the people that are going to be needed to train the teachers for "environmental quality education".

N.S.F. has had to retrench and since training grants seemed to be peripheral to their main emphasis, these programs have disappeared.

I feel that this or a similar program needs to be established but with increased emphasis on the establishment of Ecology Training Grants to support programs of graduate study. We need this so we can continue to produce the urgently needed highly trained ecologists. We need it to back up the rest of the program suggested in the "Environmental Quality Education Act".

Senator Harrison Williams
June 1, 1970
Page 2

Such a program has a second significant contribution and that is an increment to our understanding of environmental effects and ways to approach their alleviation. Each graduate student contributes his bit to our knowledge through research required in partial fulfillment of his degree requirements.

Sincerely yours,

Murray F. Buell, Director
Ecology Program

MFB:js

cc: ✓ Claiborne Pell
Mrs. Ella Filippone



National Audubon Society

NATIONAL CAPITAL OFFICE
1827 JEFFERSON PLACE, N.W. • WASHINGTON, D. C. 20036

202-659-8898

December 12, 1969

mail

Gentlemen:

Would you please notify me when hearings are scheduled on S. 3151, the "Environmental Quality Education Act," as our organization is very interested in this proposal.

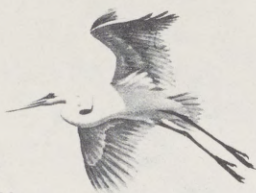
Thank you for your assistance.

Sincerely,

Cynthia E. Wilson

Cynthia E. Wilson
Washington Representative

Senate Committee on Labor and
Public Welfare
Senate Office Building
Washington, D.C.



NATIONAL AUDUBON SOCIETY

1130 FIFTH AVENUE, NEW YORK, N.Y. 10028 (212) 369-2100 Cable: NATAUDUBON

June 8, 1970

Senator Claiborne Pell, Chairman
Senate Subcommittee on Education
Senate Office Building
Washington, D.C. 20510

Dear Senator Pell:

Thank you for your letter of May 28 concerning hearings on S.3151, the Environmental Education Bill. I understand that the hearing record is now being prepared for printing and that it will include letters and statements that were not personally presented.

This is all right with us. We have no desire to push for further hearings, but we do urge respectfully that the Subcommittee act favorably upon this important legislation at the earliest possible time. We do not wish to see the 91st Congress pass into history without this bill being laid on the President's desk.

Sincerely,

A handwritten signature in dark ink, appearing to read "Charles H. Callison". The signature is fluid and cursive, with a large initial "C".

Charles H. Callison
Executive Vice President

CHC:es



NATIONAL AUDUBON SOCIETY

1130 FIFTH AVENUE, NEW YORK, N.Y. 10028 (212) 369-2100 Cable: NATAUDUBON

February 12, 1970

Sen. Claiborne Pell, Chairman
Education Subcommittee
Senate Committee on Labor & Public Welfare
Senate Office Building
Washington, D.C.

Dear Senator Pell:

I write to express the enthusiasm of the National Audubon Society for the Environmental Education bills that are pending before your Subcommittee -- S.3151 by Sen. Nelson and the similar S.3237 by Sen. Goodell and co-sponsors.

We formally request an opportunity, when hearings are scheduled on this legislation, to make a major presentation in support of the objectives. Our Society is particularly well qualified, through experience, to speak not only about the purposes of the bill, but also about some of its specific provisions.

Education of children and adults, to sensitize them to qualities of the environment and to promote an understanding of the principles of ecology, is the major purpose of the National Audubon Society. The Society pioneered in the development of summer ecology workshops for teachers, youth leaders and other adults, and also in outdoor educational centers for children.

Since 1910 we have had the Audubon Junior (Educational) program through which millions of children have had their first introduction to natural sciences and conservation. In recent years the program emphasis has been in ecology, as we dared to introduce the word and the concept to young children eight years ago.

We have a Division that specializes in the planning and design of Nature Centers sponsored by local governmental or private agencies.

In all of these programs we have the cooperation and support of our 163 local Audubon Chapters, all of whom we are informing about S.3151.

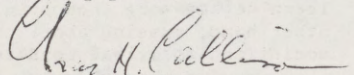
Briefly, we believe environmental, or ecological education is essential to the ultimate solution of America's growing problems that stem from the population explosion, poorly planned urban and industrial development, outmoded transportation policies, unwise chemical assaults upon our lands and waters, and pollution from a multitude of sources. This is particularly true in urban areas. We are now working with New York City school authorities in developing materials for urban ecology education.

Prior to the hearings, if possible, we would like to discuss with you and the sponsors, and also with Mr. Wexler, some amendments we propose to recommend. With specific reference to S.3151, we believe the language should be revised or added to in one or two places to authorize assistance for the planning and establishment of nature centers for community education in natural ecology and environmental science.

At this time we have two other comments. It would be impractical, I believe, to give the proposed Advisory Committee such a clearly administrative function as reviewing applications and making recommendations thereon as provided in section 5 (a) (3). This, I am afraid, would prove cumbersome and inefficient.

We further strongly recommend that section 9 of S.3151 be revised to authorize appropriations for a longer period than one year. Make it five years at least.

Sincerely yours,



Charles H. Callison
Executive Vice President

CHC:es

CC: Mr. Stephen J. Wexler, Subcommittee Counsel

Sen. Gaylord Nelson

Sen. Charles Goodell

Dr. Elvis J. Stahr

Audubon Regional Representatives

Miss Cynthia Wilson,

Washington Representative

Dr. Carl W. Buchheister

306 Upper Gulph Road
Radnor, Pennsylvania
June 19, 1970

The Honorable Claiborne Pell
Room 325, Old Senate Office Bldg.
Washington, D. C. 20510

Dear Senator Pell:

Thank you very much for your letter of May 22 regarding environmental education. I have studied bills S.3151, S.3809, and S.3237 and I would like to offer my opinions and suggestions. I am a senior at Brown University pursuing an independent concentration in Environmental Design Studies, analyzing and constructing theories in architecture and planning (which, incidentally, should be included in the list of environmental careers in S.3809). I worked on a slide presentation about ecology which has been shown in many Rhode Island schools and colleges, and I have worked for Ecology Action for Rhode Island. I recently appeared on a Channel 36 television show on the environment sponsored by the A.I.A. in Providence. I would be glad to take part in any conferences and councils in which I could voice my opinions on environmental education.

I believe that what must be made clear in legislation is that environmental education is primarily an attempt to change people's attitudes and goals, not their knowledge of facts. This point is implied by Sec. 104(a)(5) of S.3237, but references to "poor understanding" (S.3151, p. 1, line 8) and a need for "materials, data, and statistics" (S.3237, p. 4, line 24) are downright misleading. Decisions involving "the broadest possible public participation" (S.3237, p. 10 line 7) must be ethical not technical. This fact suggests both hopes and dangers. On one side, Americans could find in ecology some new goals to work for. We could find better things to do than simply getting rich quick and fighting Communism. For a new national commitment, the United States could try to build a healthy and stable environment. Hopefully, if people learned to cooperate with nature they might learn to act more thoughtfully toward each other. On the other hand, fussing about pollution could lead us to ignore social and political conflicts.

However, our environmental goals are not clear. It is not enough to clean up the world; we must plan a future and decide how we want to live. Conflicting viewpoints will arise. Thus environmental education must not consist in simply handing out information; it must stimulate discussion. Otherwise, "education" for particular goals could become a form

of political campaigning. Does "public support" (S.3237, p. 2, line 22) mean votes? And whose value system will be imposed by a review of government agencies (S.3237, p. 12, line 12)?

Below are some of the basic questions which must be debated. Each one is vitally related to environmental problems. One must ask:

1. Should we build new towns or expand old ones?
2. Should we take advantage of short-term benefits at the risk of long-term costs, or vice-versa?
3. Should our ideals be basically capitalistic or socialistic?
4. Should communities be locally self-sufficient, sacrificing wealth, or tied to the national economy, sacrificing freedom?
5. Should the U. S. economy depend on foreign resources, which depend on political situations, or not?

I think the country has chosen the wrong answers so far. It would be a pity if the alternatives were never even considered.

The points I have raised here could be discussed at great length. Please tell me if I could help you in any way to further environmental education. I appreciate your efforts and thank you for keeping me informed.

Sincerely,

Charles F. Zimmermann
Charles F. Zimmermann

CFZ/mlk

255 BEACH DRIVE NORTH □ *MUSEUM of FINE ARTS* □ ST PETERSBURG, FLORIDA

LEE MALONE, DIRECTOR

June 19, 1970

The Honorable Claiborne Pell
Sub-Committee on Education
Room 4270
Senate Office Building
Washington, D.C.

Re: Environmental Education Act-
S.3151

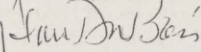
Dear Senator Pell:

We are interested in the Environmental Education Act, S.3151. We are keenly interested in the statement issued by the American Association of Museums concerning the use of museum facilities to help educate the public on environmental dangers. This seems to us to be a very logical growth of the museums' interests concerning community and environmental problems.

I would respectfully request that the act be given sufficient latitude to allow art museums to approach the problem of communication on environmental problems in a creative manner. For instance, we have been seriously considering an exhibition here in St. Petersburg that would deal with three of our crucial problems: 1, having to do with the elderly; 2, in terms of race relationships; and 3, in terms of our environment. Basically on the latter, the ways and means by which we can preserve the beauty of our surroundings without further encroachment of urbanized life.

St. Petersburg is an ideal test place; and for this reason we would welcome federal support in putting forth an exhibition of this type, which would not only include photographic documentation of the city, but might also include a catalog with specific writings dealing with the total problem of the community. Should the Environmental Education Act be passed, we would like to stand in line with our application for our project. Congratulations on your fine work, and looking forward to hearing more about the act S.3151,

Sincerely,



Alan Du Bois
Assistant Director

ADB:al

AUDUBON SOCIETY OF RHODE ISLAND,
Providence, R.I., June 24, 1970.

Hon. CLAIBORNE PELL,
325 Old Senate Office Building,
Washington, D.C.

DEAR SENATOR PELL: It is our understanding that the Environmental Quality Education Bill—S. 3151—is currently before your Senate Sub-committee on Education. We are informed that hearings have been completed and the bill is now ready for action by the committee.

As the oldest and largest environmental education organization in Rhode Island, we would like you to know that we believe the provisions of S. 3151 for making environmental education available to students throughout the country may be one of the most important pieces of legislation considered by Congress for some time. We can speak from long experience in evaluating the job public school systems have done in this state and other New England states relative to environmental education over the past 25 years or more. To say that it has been inadequate would be a gross understatement. In most instances, it has been non-existent for at least 50 years. It is quite likely that many of our environmental problems today are due at least in part to this blank in our educational process.

Audubon Societies and other conservation organizations have for years attempted to fill the gap left in public education with various kinds of programs in public schools, outdoor educational activities at wildlife refuges, trailside museums, outdoor recreational centers, nature centers and other similar activities. Obviously, we have not been equal to the job but in performing it, we have gained considerable experience and knowledge. Assuming that S. 3151 will receive favorable consideration by the Congress, we hope to be able to make much of this experience and knowledge available to the public and private school systems and other educational institutions. From personal knowledge, I can attest that many other Audubon and similar environmental education organizations stand ready to offer the same services and facilities.

The principal obstacle for us in handling large numbers of youngsters and teacher trainees effectively in our own programs has been inability to obtain sufficient private financial support to hire staff equal to the volume of demand. It has been nearly as difficult to finance the construction of educational centers with completely private solicitation. While this organization and the Massachusetts Audubon Society have for years carried out a more or less financially self-sustaining educational program in the school systems of Massachusetts and Rhode Island, increasingly tight public school budgets are making this less and less an effective approach. The quality of the work has never been questioned by any educator or educational institution. However, the anomaly of a public school system hiring an outside agency to do a job which it obviously should be doing itself makes it difficult to sell this kind of program to local school committees and finance committees. When budget cuts are inevitable, we, as outsiders in the system, are always the first to go. In order that you may have some idea of the type of program to which I refer, I enclose a brochure on the program we have been providing to the public school system in this state.

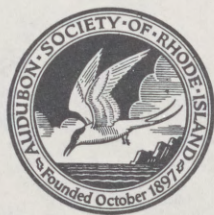
Your personal sponsorship of much of the recent progress and interest in marine research and development is ample evidence of your recognition of the value of basic environmental education for all people. I urge you to use all the considerable persuasive powers at your command to obtain favorable consideration of this most important legislation by the Congress.

Thank you for your time and attention.

Sincerely yours,

ALFRED L. HAWKES, *Executive Director.*

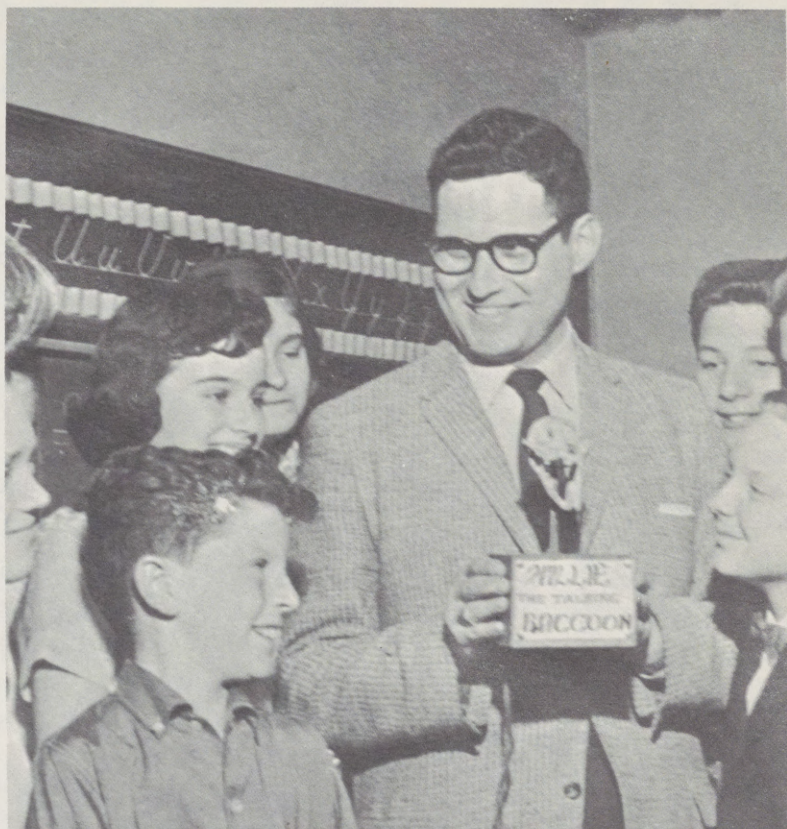
Enclosure.



SCHOOL PROGRAM

*Basic Natural Sciences
and Conservation
for the
Elementary School Classroom*

**This is the age
of great enthusiasm
for trying things out,
sharing discoveries,
and for asking how
and why things happen.**



IN 1955 the Audubon Society of Rhode Island, in response to public demand, initiated its School Program in Natural Sciences and Conservation. This program involves making a teacher-specialist trained in science and conservation available to schools on a contract basis for bi-weekly classes throughout the school year.

These classes serve two important functions. First, they introduce the students to science through the study of the things about which they are already curious. The course answers many of the questions the youngsters have about the animals, plants, and minerals they find in their own wanderings and reading and at the same time stimulates new questions about these fields of knowledge. Information is presented in such a way that it leads the child toward the fuller understanding of the basic biological and physical principles which govern existence on Earth. In this way it is nearly ideal preparation for science courses which will be taken later in school, especially since a wide variety of natural sciences come under discussion.

The second function of this course is to demonstrate to parents, teachers, and school administrators that this is a significant and vital phase of education often omitted from the curriculum for lack of trained teachers to do the work. The response in the classroom and the enthusiastic approval received from parents and professional educators alike indicate that the aims of this course are being accomplished with outstanding success.

While the basic objective of the course is to provide some understanding of the interrelationships among plants and animals and their environment, another very definite result of these lessons is the development of an awareness of what these natural objects are, how they may be found, and why they are important in the life of the individual, the community, State and Nation.





THE objectives of this course are accomplished by using a variety of teaching techniques. Live animals are brought into the classroom whenever it is appropriate to the discussion and safe to do so. Films and colored slides are used to illustrate or demonstrate things too large, too distant, or too extreme in some other form to bring directly to the children. Field trips are taken by most classes in the late spring and form one of the most important and valuable experiences of the course. Worksheets containing appropriate forms for recording information and suggestions for further activities are provided with each lesson. Natural objects which youngsters wonder about are used to illustrate the lessons: rocks, bones, shells, galls, and many others are brought in by the Audubon teacher and often by the youngsters themselves as they are encouraged to ask questions of their own.

The main part of each lesson is presented in the form of a guided discussion in which the Audubon teacher asks leading questions, draws a response from the youngsters, and then expands the topic or fills in the gaps in their knowledge. Every child is encouraged to participate in these discussions.



OBJECTIVES

Concerning the Child:

1. To arouse in the child an interest which will encourage further inquiry in the field of natural science and develop worthwhile and lasting hobbies.
2. To provide the beginnings of a background of basic natural history information necessary to understand conservation ideas and practices, biology and related sciences.
3. To develop an appreciation of the importance man's relationship to his natural environment and his responsibility to use it wisely.
4. To help correct the great store of popular misinformation about outdoor things, and destroy the concept of inexhaustibility of natural resources.
5. To stimulate the child to endeavors in creative activity through a primary interest in natural resources.
6. To begin the study of science with those things most familiar to the child, and to encourage the use of scientific methods.



Concerning the School System:

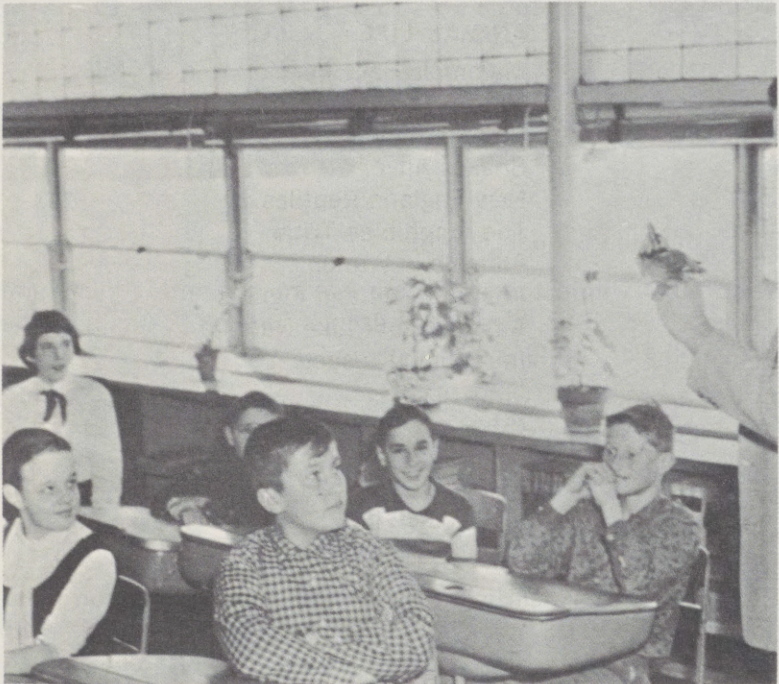
1. To build within the classroom a core of interest in natural history which the classroom teacher may use to facilitate the teaching of regular courses of study.
2. To demonstrate to the classroom teacher, school administrators and parents the need and value of this type of program.
3. To help supply the current need for training in this area of knowledge among teachers until school systems can train and/or employ personnel of their own to do the work.

It is worth emphasizing that this is not an extra-curricular activity or frill, but, rather, where the classroom teacher is alert to the opportunities, it provides a new focal point around which to organize many other class topics; it can thus help spark up the classroom's entire program.

THE Audubon School Program is given at the fifth and sixth grade levels for very specific reasons. Dr. Glenn O. Blough, national authority on science education, helps explain why in an article in the publication THE EDUCATIONAL TREND:

"Pupils in the middle grades are able and willing to stay with an interesting idea longer and, consequently, to go greater lengths to learn about such science topics. They can work independently on experiments that will explain, explore outside the classroom to find evidence that will illustrate, and read widely to discover information which they then organize to solve problems."

"These pupils are able to assume greater responsibility in care of equipment, in formulating and executing plans, in evaluating results. At this level, too, there is a great need for success, that sense of accomplishment, among pupils who may not yet have found themselves in a reading program, or in some of the areas demanding word skills, but who are at home with atoms, space travel, or the outdoors. There is great enthusiasm for trying things out, sharing discoveries, and for asking how and why things happen. If not properly cultivated, these precious characteristics unfortunately too often seem to evaporate after the ages 9 to 12."



TOPICS

Classroom presentations are drawn from the following list of topics. Others will be prepared to satisfy local needs.

THE EARTH

- The Three Kingdoms
- The Sun's Family
- Weather
- Our Changing Landscape
- Rocks, Minerals and Fossils
- Soils are Alive
- Water, Life Blood of the Earth

PLANT LIFE

- Tree Farming
- Our Evergreen Trees
- The Factory in a Leaf
- The Travels of Seeds
- Non-Flowering Plants
- Christmas Greens

ANIMAL LIFE

- Mammals Have Fur
- How to Know the Birds
- Birds in Winter
- Snakes Alive!
- New England Reptiles
- The Amphibian Tribe
- Animals in Winter
- Animal Facts and Figures
- Animals Built Like Nuts
- Introducing Insects
- Spiders
- Predators
- Food Chains

COMMUNITIES

- Narragansett Bay
- Ponds and Streams
- Sea Shore Life

AS a non-profit educational organization the Audubon Society of Rhode Island undertakes to provide this school program at less than cost-absorbing the deficit from funds supplied for this purpose by grants, contributions, and membership fees. The cost of the course to the school system is \$300 per classroom for a maximum of 18 hours of instruction. This time is usually divided so that the Audubon teacher visits the class about once every two weeks during the school year.

The lessons given are selected on the basis of interest to the student, the contribution they make to the pupil's general background in science, and their utilitarian value to the classroom teacher. The last two hours are combined into an optional field trip to a nearby wildlife sanctuary.

The immediate purposes of the visit to the classroom by the Audubon Society's teacher are to stimulate interest in the subject discussed, to introduce the subject in a clear and scientific light, and to leave with the class a nucleus of fundamental information which the teacher may use as a basis for further activity in this and other subjects.

In communities where the school budget cannot meet the extra financial investment, some of the cost have been temporarily borne by groups such as Garden Clubs, Granges, Kiwanis and Lions Clubs, Parent-Teacher groups, and others.

This program has been enthusiastically received in many Rhode Island communities and is making significant contributions to the curriculum in those schools which have enjoyed its advantages. Student interest in science is increased and classroom teachers are finding it of high value in their regular work.

Where a regular science curriculum has been adopted by the school system, the Audubon Course will provide that discussion of local natural resources so necessary to a full understanding of textbook materials. And no approach to science is more effective than that which includes contact with the living things and the processes active in our own familiar environment.

Consult us NOW to provide your community with the services of the Audubon School Course in Natural Science and Conservation for the coming school year.



AUDUBON SOCIETY OF RHODE ISLAND

40 BOWEN STREET
PROVIDENCE 3, R. I.

A BRIEF INFORMATION SKETCH ABOUT THE PROPOSED ENVIRONMENTAL EDUCATION CENTER OF THE SOMERSET COUNTY PARK COMMISSION, NEW JERSEY

Following is a very brief description of the proposed Environmental Education Center to be developed at Lord Stirling Park in Bernards Township, Somerset County. *The complete Philosophy and Plan are contained in two reports, totaling 80 pages, which have been submitted to the Park Commission and Board of Chosen Freeholders as guide lines for development.*

WHAT IS THE "ENVIRONMENT"?

Environment in reference to humans may be defined as not only our natural surroundings, but also our man-altered surroundings, including social conditions with their importance as factors in the physical, mental, and moral development of the human species or the individual. Perhaps the best definition is one given by a fifth grade boy who said, "Environment is what I eat, what I wear, what I breathe, where I sleep, what I do and if I don't, I won't." Environment is *everything* around us at any given time.

WHAT IS ENVIRONMENTAL EDUCATION?

Environmental Education is defined as that education which deals comprehensively with both human resources and conditions and natural resources and conditions. It is aimed at producing a citizenry which is knowledgeable concerning problems that affect our total environment, understands how to be effective in helping to solve these problems, and is motivated to work toward their solution.

WHAT IS AN ENVIRONMENTAL EDUCATION CENTER?

An Environmental Education Center is a new concept of using land, physical facilities such as buildings and trails, educational equipment, and educators who are also well-trained naturalists, ecologists, and conservationists, to teach people about themselves and their interrelationship with their surroundings. *The essential features are the land, the specially trained staff, and the effort to teach about the total environment of people, and not just about natural resources, or bird study, or conservation. The programs of such a Center are human oriented so that individuals who could care less about identifying birds or flowers will come to realize that they are a part of a complex, interwoven world in which their very existence has either a positive or a negative effect upon everything around them, including such things as water quality, air quality, and the quality of life for other humans.*

WHAT IS THE GUIDING PURPOSE OF THE ENVIRONMENTAL EDUCATION CENTER?

The Center has as its guiding purpose the stimulation of awareness and understanding of our total environment, natural and altered, among people of all ages by providing learning experiences that cannot be duplicated in any other type of facility, and to develop a sense of responsibility for the care and wise use of our natural resources.

PROGRAMS?

Programs will be conducted for all ages, from pre-schoolers to senior citizens, and for all interests. Many programs will be co-sponsored or co-operated by community organizations who may wish to work with the Park Commission or utilize the facilities of the Center. The Center will be responsive to the interests and the needs of the county. Program areas now contemplated include: 1) Teacher Education 2) Adult Education 3) Guided Group Visits 4) Natural History Field Schools 5) Naturalist aide Program 6) Vocational Education in Environmental Sciences 7) Civic Leadership Training 8) Youth Advisor Training 9) Naturalist Apprentice 10) Research 11) Consultation Services 12) Nature & The Arts 13) Dissemination of Information 14) Natural History Art Festivals.

STAFF?

The ultimate staff will include the Chief Naturalist, three interpretive naturalists, one "extension" naturalist who will be available for programs in areas other than the Center itself, such as other parks, and schools. Additional

staff will include part-time paid instructors, volunteers, and supportive staff as necessary to ensure programs of the highest quality. *With the full staff, it will be possible to directly teach between 25,000 to 30,000 people per year. Many others will utilize the Center without the personal guidance of a staff person by using self-guiding facilities, or just visiting to walk the trails or view the exhibits.*

FACILITIES

Approximately 400 acres of the 750 acre Lord Stirling Park will be used for the Environmental Education Center. The land includes marshes, swamp (part of the great swamp basin), ponds, bogs, open fields, woods, the Passaic River, and numerous streams. *On the land it will be necessary to construct an Interpretive and Education Building, with classrooms, auditorium, offices, exhibit areas, laboratory, library, Natural History Shop, and other facilities; trails, including boardwalks, landuse demonstration areas; conservation practices demonstration areas; facilities for the handicapped. Also proposed are a Planetarium and a combination Museum-Conference Center for interpretation of the history of the area, and to accommodate large conservation and environmental conferences. All of the Park Commissions park, present and future, will be utilized in the programs as well.*

DEVELOPMENT PLAN?

It is proposed that development be carried out in 8 phases over a ten-year period ending about 1979-80. The major portion of development, including the Interpretive & Education Building will be done in the first 4 phases over four to five years to 1973-74. The Planetarium and the Museum Conference Center are deferred to the later 4 phases.

FINANCING?

The Somerset County Park Commission will seek County, Federal and State assistance for development. Such assistance has already been used in acquiring the land for the Center. Also, the Park Commission will seek assistance from Foundations. The North Jersey Conservation Foundation has given assistance already, and other Foundations will be approached. In addition to these sources of funds for development the Park Commission is hopeful that many individuals, organizations, businesses and industries in the region will support the development. Such assistance will be vital if the Center is to be developed fully to meet the needs of the County. Contributions large and small, will be sought. For operations, once established, the Center will rely basically upon the tax support funds given to the Park Commission annually for operations by the Board of Chosen Freeholders. Some operational assistance will come from the sale of merchandise in the Natural History Shop, and for minimal fees charged for some programs.

COMMUNITY SUPPORT

Somerset County needs an Environmental Education Center, as do most areas of the United States. Considerable community enthusiasm and support has been expressed already, but much more will be needed to make the Center a reality. Our Center will become an integral part of the county community, and can be a dynamic influence in the efforts to give present and future generations of county citizens a better environment and higher quality of life than we now enjoy.

"For further information, please fill out the attached form. If a group of which you are a member is interested in learning more about the Center, please indicate this interest. If your group, or you as an individual, are interested in supporting the development of the Center, please indicate this also.

Please detach and return to: Walter A. Jones, Chief Naturalist Somerset County Park Commission Environmental Education Center Project P. O. Box 837, Somerville, N.J. 08876.

I am concerned about my environment, particularly in Somerset County, and I am interested in the Park Commission's Environmental Education Center.

I would like further information as to how I might become more actively involved in supporting the development of the Environmental Education Center, either financially or through voluntary service.

My organization may like to have a program about the Environmental Education Center, and I will contact you later for more specific arrangements.

I would like to be included on the Park Commission Mailing List to receive further information about the progress being made in the development of the Environmental Education Center, and the efforts of the Somerset County Park Commission to help achieve a high quality of life for all of the people of Somerset County.

----- Signed -----

Name -----
 Address ----- Zip Code -----
 Organization Name -----
 Address ----- Zip Code -----

This is Our County—Our Environment—Our Concern

SOMERSET COUNTY PARK COMMISSION,
 Somerville, N.J., June 17, 1970.

ED CHANEY,
 Editor, *Conservation News*,
 NATIONAL WILDLIFE FEDERATION,
 Washington, D.C.

DEAR MR. CHANEY: The report by Martha Wright in the June 1, 1970, issue of *Conservation News* was most interesting, and well done. However, it should be noted that the U.S. Office of Education is not the only tardy education establishment. Many state departments of education are just as slow to promote environmental education, and most, though not all, local school boards move even more slowly.

Part of the problem arises because very few educators who are in the critical decision making positions know what "environmental education" is.

There is a distinct and vital difference between environmental education and either conservation education or outdoor education. All three are separate in their objectives and methods even though all three, along with "nature education", have the same basic genesis, or rather all are along the same evolutionary line. Conservation education is that education which teaches the care and wise use of natural resources. As such, it is basically a subject, or a course content. Outdoor education is the use of the outdoors to enhance a school's existing curricula, whether mathematics, science, social studies, or whatever. Outdoor education is a method, or a body of methods and techniques. Important to understand here is that outdoor education conforms to the school's basic *existing* curricula, and changes the approach to teaching within that curricula. Therefore, it does not necessitate a change in content, or texts, or teachers, or administrative approaches.

Environmental education is about 5-6 years old—still embryonic. Since most educators in administrative roles can not adequately define and do not fully understand either conservation education or outdoor education which are considerably older, it is small wonder that they are slow to grasp environmental education which, given the opportunity, will be revolutionary. If education is to change the attitudes which underlie most of our environmental problems, and bring forth the needed changes in application of technology, a "revolution" is essential.

Environmental education is that education which deals comprehensively with both human resources and conditions and natural resources and conditions, integrating existing bodies of knowledge and extending research so that individuals more fully understand the complex bio-physical interrelationships of which they are a part, so as to achieve a citizenry that is knowledgeable concerning problems that affect our total environment, understand how to be effective in helping to solve these problems, and is motivated to work toward their solution.

To initiate environmental education within a school system texts may need to be changed, or written, teaching methods will need to be reviewed and probably changed rather drastically, administrative systems may need considerable alteration. Outdoor education can be "applied" by one teacher with one class, but environmental education requires that the total school system be involved in the application of its concepts. Further, teachers have to extend their thinking and teaching beyond the confines of their particular specialties. Thus for example, a mathematics teacher must know enough biology to be able to teach

geometric progression in terms of population dynamics, and a biology teacher must know enough sociology to be able to recognize differences and similarities between human societies and social behavior and other species' societies and social behavior.

It distresses me that many programs in schools, and elsewhere, are being conducted, and often funded, under the heading "environmental education" when in fact they are outdoor or conservation education. Too often educators and program developers looking for funds have latched on to the term "environmental education" because it sounds current, innovative, and worthy of money. In Ohio, Michigan, and New Jersey, I have seen a number of "environmental education" projects funded under Title III of ESEA which are inappropriately labeled, although some have been good outdoor or conservation education projects. We have in New Jersey a "State Council for Environmental Education" established in 1967 and funded through ESEA. They have done considerable work, yet they are promoting more outdoor education than environmental education. This is fine, and definitely useful, yet their title is misleading. (Also, they are not really a "State" council but are administered through the Newark Board of Education.) Actually, the North Jersey Conservation Foundation has done more, perhaps in promoting environmental education by assisting Madison Schools in developing and publishing a completely new curriculum.

In reality, there is very little environmental education in existence, and much that is, is being promoted from outside the school system and department of education structures. Public non-school agencies, such as ours, and private agencies can often be more innovative, flexible, effective and serve a broader public than most schools which tend to be hampered by "traditional" education, budgets, administrative structures, bureaucracies, teacher organizations, 5-day school weeks, 180-day school years, limited land, and a number of other disadvantages. Furthermore, we have a staff which many of whom are not only capable teachers but who are also "on the front lines" so to speak in trying to solve numerous environmental problems. Our chief problem is that during the school day youth will have to be bused to our facilities for instruction, or we will have to send out limited staff to the schools. Both require school administration cooperation, and in the case of busing, funds. For adult programs, and for youth after school on weekends, and during school vacations our problems are minimal. We can do a tremendous job of extending education beyond the classroom and leading educational changes in our area. I know that it is true of many other non-school agencies across the country. However, we are limited too by lack of sufficient funds.

It would be a serious mistake if the Brademas-Nelson Environmental Quality Education Act is not well funded. And, if funded it would be a serious mistake if the funds are not channeled to establishment and development of true environmental education projects. Conservation and outdoor education have been of value and still deserve encouragement, but it is evident, especially after Title III, that more of the same is not enough. The projects which receive priority under EQEA should be those which, within school systems or without, will bring the needed long term solutions to environmental problems in their communities. To give such priority would be in keeping with both the title of the bill and the statement made by Senator Nelson as he presented the bill before the Senate on November 19, 1969.

Enclosed you will find a brief description of our plans for an Environmental Education Center to serve our county and surrounding area. The Center's development is progressing steadily, and we will be in limited operation this fall. Feel free to use this material or pass it along to others who may be interested.

Keep up the good work of the Conservation News.

Sincerely yours,

WALTER A. JONES, *Chief Naturalist,
Director of Environmental Education.*

Senator PELL. This will wind up our hearings. I want to thank all of the witnesses who appeared to testify and also all other interested persons who submitted statements and other material for the record.

(Whereupon, at 12:20 p.m. the hearing was closed.)

APPENDIX

RALPH YARBOROUGH, TEX., CHAIRMAN

JENNINGS RANDOLPH, W. VA.
HARRISON A. WILLIAMS, JR., N.J.
CLAIBORNE PELL, R.I.
EDWARD M. KENNEDY, MASS.
GAYLORD NELSON, WIS.
WALTER F. MONDALE, MINN.
THOMAS F. EAGLETON, MO.
ALAN GRANSTON, CALIF.
HAROLD E. HUGHES, IOWA

JACOB K. JAVITS, N.Y.
WINSTON L. PROUTY, VT.
PETER H. DOMINICK, COLO.
GEORGE MURPHY, CALIF.
RICHARD S. SCHWEIKER, PA.
WILLIAM B. SAXBE, OHIO
RALPH T. SMITH, ILL.

ROBERT O. HARRIS, STAFF DIRECTOR
JOHN S. FORSYTHE, GENERAL COUNSEL

United States Senate

COMMITTEE ON
LABOR AND PUBLIC WELFARE
WASHINGTON, D.C. 20510

February 13, 1970

XXXX

XXXX

XXXX

Dear xxxx:

Last November I introduced in the Senate the Environmental Quality Education Act, a bill to encourage and support the development and dissemination of new and improved programs in environmental and ecological education from pre-school through the adult level. Many noted authorities have agreed that this country needs a broad program of education to provide our citizens with an awareness of and concern for the environmental crisis if we are to confront the problem in a positive and constructive way.

Hearings on the proposed Act are tentatively scheduled for late March or early April before the Senate Subcommittee on Education. The House will also hold hearings on an identical bill. In order to make the hearings as meaningful as possible, I would like very much to have your comments and suggestions regarding this legislation.

Specifically, I would appreciate your response to the attached questionnaire, with illustrative examples of programs, underscoring their objectives and methods. Any further comments you would care to add would be very useful. A copy of my bill and introductory remarks are enclosed. Your assistance and cooperation is greatly appreciated.

Sincerely yours,

GAYLORD NELSON
U.S. Senator

GN:ch
Enclosures

Office of Senator Gaylord Nelson
404 Old Senate Office Building
Washington, D.C. 20510

February 13, 1970

QUESTIONNAIRE RE ENVIRONMENTAL EDUCATION LEGISLATION

1. What do you believe is the most concise definition of environmental education?
2. What knowledge, attitudes and skills do students and adults need to learn about the environment?
3. What items are of highest priority within the field of environmental education?
4. What educational vehicles and models would be the most beneficial to achieve the best possible learning experience about the environment?
5. What are some fruitful ways to increase the use of the environment as a teaching resource?
6. What role can the Federal Government play in helping to develop programs in environmental education?
7. How should the requisite teachers' training programs be conducted?
8. What are your specific reactions to S. 3151?



THE UNIVERSITY OF WISCONSIN

24 March 1970

MARINE STUDIES CENTER

*Meteorology and Space Sciences Building
1225 West Dayton Street
Madison, Wisconsin 53706
Telephone (608) 262-1585*

Office of Senator Gaylord Nelson
404 Old Senate Office Building
Washington, D.C. 20510

Dear Senator Nelson:

Thank you for your letter of February 13th. I am sorry to be so long in replying, but as you may know, I have recently moved to the University of Wisconsin and the complications of a new job are very time-consuming. I am keenly interested in your Environmental Quality Education Act and will try to respond to your questionnaire dated February 13, 1970.

1. I would define environmental education as the search for a satisfactory steady state relation between man and his environment such that each man may find in his life some dignity, meaning and satisfaction. It might be described without mentioning environment at all as the steady preservation and improvement of the quality of life.

2. The knowledge, skills, and attitude needed to learn about the environment constitute a very large body of information. First, for attitudes, we need to change our basic attitude toward the environment. For the past three hundred years or so, encouraged by predominant theological attitudes, man has placed himself at the controls, superior to the environment, and he must again learn to live in it. We must, all of us, look again to our status as animals and inquire in which areas we have gone too far; we have left too far behind those methods of living which have a history many times longer than that of any civilization and which cannot be changed except by the slow and tedious evolutionary process encompassing many thousands of years. We need most of all to sensitise people to the need for deep warm human relationships, for without these it seems hopeless to expect understanding of the rest of the biological world and the place of beauty in our lives. We shall ~~also~~ need those who have this broad understanding and attitude who also understand the technical questions, some of considerable complexity of cutting across old established disciplinary lines so that we may understand and anticipate deleterious things which we propose to do. Finally, we need

the knowledge of the past, but we need to acquire it with an eye toward what we anticipate our future problems and opportunities to be. It is easy to tell when someone is getting old. When a man talks more about how far we have come and less about what our present problems are, he is probably old.

3. The items of highest priority in the field of environmental education are to escape the focus on expertise and provide opportunities and rewards for students and teachers who are willing to lay their own incompetence on the line and search for answers together. Somehow we must challenge the idea that professionals are narrow technical experts and anyone with general knowledge across a wide variety of fields is automatically an amateur. This means, to me, experimental efforts synthesizing many disciplines, many areas of knowledge, admitting that both professors and students must learn at the same time. We do not have a well developed theory for education of this sort, but mere pursuit of what has been done before will not yield much. All too often the reaction when a variety of knowledge is needed, is to add together a number of technical experts on the assumption that somehow general synthesized knowledge will be forthcoming. My experience is that this does not happen and that the effort of syntheses are perhaps the most difficult and must be made by the faculty itself. The highest priorities then are support for programs attempting to cross disciplinary lines and change pedagogical approaches used for the past thirty or forty years. Within universities as they presently stand, such efforts are not only unpopular and difficult to institute, but there is simply no money available to finance salaries, materials or the planning and preparation necessary for this difficult task.

4. The educational vehicles and models are in desperately short supply. Experimentation is needed. There is considerable evidence of willingness among young faculty members (and some not so young) to try new ideas, new methods and new syntheses of previous educational programs. There is also a considerable body of traditional faculty members who are not only unwilling to experiment but opposed to the very idea. In many universities they have successfully blocked any attempts at real meaningful educational change. I do not propret to have the answer to what educational model will work best, either, however I have expressed my views in the report to the president's Environmental Quality Council entitled "The Universities and Environmental Quality--Commitment to Problem Focused Education".

5. The most fruitful ways to use the environment as a teaching resource, in my view, are to be found in adaptations of the work-study program long practiced and made famous by Antioch college in such a way that students as a part of their educational progress accompanied by their faculty members are able to engage in real, live projects in the community and in the government and elsewhere. The balance between the hard, practical, slow, tedious business of changing existing patterns provides a nice contrast to the philosophical strivings for meaning and understanding in a growing, complex technical world. The very act of students and teachers leaving the walls of the university and entering the community cannot help but remind one of our environmental problems. The late Jack Kerouac wrote very well what the environment looks like to those with their eyes open when he wrote ". . . the pathos . . . of modern America . . . 'What am I doing in all this junk?'"

6. The key role the federal government can play in helping develop programs for environmental education is the provision of money for those experimental and innovative programs which are being proposed widely in colleges and universities throughout the country. Money is desperately needed for teachers' salaries and materials so that the time may be spent preparing these new and complicated programs and so that faculty assistance can be provided during the first few years of organization of such programs. In most universities, once the students are actively engaged in such programs, the normal sources of support will be diverted to supporting these programs. Federal government might very well consider the establishment of a new federal university originally proposed by George Washington in which environmental education and study of the quality of life might be a key focus. The University of Wisconsin at Green Bay has made an initial attempt in this direction, but they are poorly funded and do not have at their disposal the finest faculty from end-to-end that are required for such new innovative ventures.

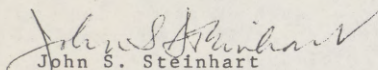
7. I do not feel competent to comment in detail on teacher training programs. I am convinced, however, that the schools of education are at least as incompetent as I am to change their archaic and outmoded educational ideas in any useful direction without a very serious and stringent requirement placed on them to consider educational change.

8. S 3151 as written contains most of the right comments about environmental education. The most serious shortcoming I see is that it plays directly into the hands of those departments and faculty members who, in the face of federal funding strictures, will seek to subvert these funds to do what they have been doing all along. At the University of Wisconsin the E-Day (April 22) programs have tended to be laid out by departments who discover at this late date that this is what they have been doing all along and really no-

thing is needed that they are not already doing. I submit that the observational evidence is that they not only have not been doing what is required, but are doing a disservice in pretending that their efforts encompass the environmental needs. I would, therefore, suggest that if modifications are made to the bill they be made in such a way that institutions, particularly colleges and universities, are encouraged to set up new programs with independent faculty not focused on disciplinary lines but ranging across all of the knowledge and skills encompassed at universities and directed toward understanding the environment and the quality of life as you have spoken so eloquently about it. Unfortunately the hard facts of bureaucratic pushing and shoving in universities (which have many similarities to the federal government) mean that in the absence of such urgings, funds are likely to be absorbed by existing departments and expended in narrow disciplinary efforts which, however much they are needed, do not supply the answers your bill seeks.

Thank you for an opportunity to comment on your Bill and your questionnaire. I would be delighted to testify or supply any other information which might be useful to you.

Very truly yours,



John S. Steinhart
Professor

JSS/hq



The Extension Service - University of Vermont

BURLINGTON 05401

April 24, 1970

RECEIVED
APR 28 1970
OFFICE OF
SENATOR GAYLORD NELSON

Honorable Gaylord Nelson
Senate Office Building
Washington, D.C. 20510

Dear Senator Nelson:

Enclosed are answers to your questionnaire which Chairman Arthur Gibb asked me to send to you. If you need more detail information, I would be glad to furnish it.

Sincerely,

R. P. Davison
Associate Dean and Director

RPD:kb

Enc.

cc: Representative Gibb
Senator Aiken
Senator Prouty

QUESTIONNAIRE RE ENVIRONMENTAL EDUCATION LEGISLATION

1. What do you believe is the most concise definition of environmental education?

Helping people of all ages understand the interrelationship of factors in the world around them and how every change affects their future individually and collectively.

2. What knowledge, attitudes and skills do students and adults need to learn about the environment?

- a. What the environment is.
- b. How it can be spoiled or polluted.
- c. How it is being spoiled or polluted.
- d. What they can do about it first as individuals and then as groups working toward a common end.
- e. Basic information relative to the major pollutants of our environment.

3. What items are of highest priority within the field of environmental education?

Developing within the individual the understanding of the need for balance in our environment between industry, agriculture, recreation and people working toward the common end of improving and preserving this land of ours.

4. What educational vehicles and models would be the most beneficial to achieve the best possible learning experience about the environment?

Personal involvement by "people polluters" is the best educational vehicle. Green Up Day in Vermont showed many thousands of Vermonters, young and old alike, what results from unwise disposal of solid wastes along our roadside. Thus field trips, discussions with industrialists, discussions with agriculturists, etc. all would rank high as educational vehicles.

5. What are some fruitful ways to increase the use of the environment as a teaching resource?

This relates to (4) above. Nothing beats on-the-ground work as far as the environment is concerned. In addition good movies, slide presentations, educational television, etc. all have a vital place.

6. What role can the Federal Government play in helping to develop programs in environmental education?
 - a. Take the lead in having all of its various agencies, departments, etc. highlight environmental concerns with their programs now and in the future.
 - b. Continue to develop through the U.S. Office of Education support to the states, both monetarily and program wise, environmental educational information and guidance.
 - c. Cooperate with the states in creative localism as it relates to environmental controls, education, and information.
7. How should the requisite teachers' training programs be conducted?

On the ground teacher training is highly desirable. Specially conducted classes, tours such as have been held in Vermont under the auspices of the Forests and Parks Department for several years and now will continue through the Institute for Environmental Studies at Ripton.

Older students should be involved to a certain degree to give more meaning to the overall environmental control educational program.

8. What are your specific reactions to S. 3151?

This legislation should provide the way for much needed improvements in our educational endeavors and systems as far as a quality environment is concerned. Certainly there is need for well developed curricula, teaching methods, and innovative procedures affecting all, from preschool to the various steps of education ending with continuing adult education programs. This proposal is a good one.

UNION INTERNATIONALE
POUR LA CONSERVATION DE LA NATURE
ET DE SES RESSOURCES

1110 MORGES - SUISSE



1948

☎ (021) 71 44 01

Télégr. Unicorn Morges

INTERNATIONAL UNION
FOR CONSERVATION OF NATURE
AND NATURAL RESOURCES

1110 MORGES - SWITZERLAND

In your reply, please refer to:
En répondant, veuillez rappeler:

Return Address:

c/o Education Development Center
55 Chapel Street
Newton, Massachusetts 02160

The Hon. Gaylord Nelson
United States Senate
Committee on Labor and Public Welfare
Washington D.C. 20510

Dear Senator Nelson:

Thank you for your letter of February 13th and the opportunity to comment on the Environmental Quality Education Act. It is indeed encouraging to see that attention is being given to the need for education programs in this area. Certainly it is my wish to provide whatever support I can for the development of bold new educational programs in response to the environmental crises. However, I am choosing to respond only partially to your specific request for comments on the questionnaire which you have enclosed. The reason for this limited response on my part is that I feel the legislation which you have introduced deals with a narrower definition of the environment than I feel is essential.

Environmental education could easily become a label of convenience, a fad or a cause without sufficient content. It might very well be seen too narrowly as information which the public at large does not have and all that is needed, therefore, is to prepare this material for the different levels of the population and then disseminate it. It is easy to decide that since the problem has to do with unwise use of our natural resources and physical environment we should press forward with the new enlightened conservation for the masses. The danger lies in that this is just true enough to be deceiving. Conservation and the rational use of our natural resources are vitally important issues. The ecological distortions which confront us must be corrected if the quality of our existence is to improve rather than continue to disintegrate. The creation of a citizenry that is knowledgeable concerning the biophysical environment, its existing problems, and aware of how to help solve these problems, and motivated to work toward their solution, is a commendable and indeed important objective. That objective is a slightly paraphrased version of a definition of environmental education developed by a diligent, concerned group of professionals. I support their aims and efforts, but it isn't enough.

Man doesn't just live in a bio-physical environment. He exists in real, though less quantifiable, environments on the social, psychological and esthetic levels as well. Environmental education must embrace these spheres too.

We are in need of a new ethic with which to guide our lives. There are large questions to be answered that must ultimately be reduced to individual choices and sacrifices. The understanding of how we are motivated to make these choices must be explored as vigorously as the technological solutions to pollution. These insights must be reflected in educational programs for all levels of the population.

There has never before been so much public attention paid to and resultant awareness of our environmental crises. The mass media and increasingly formal educational materials are presenting the 'facts' to all of us. But in the face of the mounting concern for air pollution, how many of us have switched to public transport, formed a car pool, or sold our second cars? Are some of the major oil companies in dire financial straits because so many people are switching to the only available lead free gasoline? Faced with the waste pouring into the local water system, how many communities have advised a 'major' industry to 'clean up or clear out'? Has there been a consumer boycott of the products and services of major polluters of the biosphere? If we believe half - just half - of what we read and hear lately, aren't these the sort of 'pocketbook' and comfort decisions that we should be making? If this is a real crises of survival then when and how do we face the danger?

Let me move to a close by offering a working definition of environmental education. It is that education which provides the individual with the materials and opportunities to appreciate his relationship to his total environment or world. In this sense it can be considered as a collection of interrelated experiences which allow the individual to explore the social, physical, esthetic and psychological world that he inherits. Through these experiences there should be the opportunity to strengthen or develop the 'student's' confidence that his environment can be changed and most importantly that he can effect change.

Perhaps this appears to reduce environmental education simply to 'good' education. But it can be, should be and must be more than that. There is an intellectual approach to ecology which is vital to adequate educational programs. It is related to the macro-sociology which Daniel Bell writes of, the planning which Jay Forrester suggests for complex social systems, the view of environmental science which Everett Hafner has advocated and the point of view brought out in the OST report The Universities and Environmental Quality. This approach is, to some extent, found in the interdisciplinary, problem focused educational efforts characteristic of some programs from pre-school to college. Legislation which imaginatively supports the collaboration of efforts to meet these crises is urgently needed.

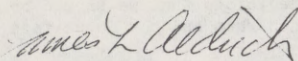
We may well be at the crossroads with one path leading to increased environmental distortions and the other to an exciting intellectual revolution. Perhaps it is not in the nature of legislation to lead the way but maybe it can provide the opportunities and support the activities of those that might. It is a big task, but can we afford to do less than begin?

It will take the combined inputs from many intellectual disciplines to approach some answers to these questions. Educators must be closely involved and seeking to interpret this input for use in our schools from the primary to the college level.

I am enclosing a memorandum of comments on S. 3151 which reflect the concerns that I have tried to address in this letter. It is essential that legislation of this sort be enacted. The problems in both education and environment are of a critical nature. In both systems we are perilously close to disastrous breakdowns. Our environment is despoiled to a large extent because our culture and the education which reflects it has failed to provide the necessary understanding of important relationships of man in the biosphere. Man is part of nature and man in conflict with nature is man in conflict with himself.

Thank you once again for the opportunity to present my views. I hope that they will be of value to you.

Sincerely,



James L. Aldrich
Chairman, North American Committee
on Education, IUCN

Enc. 1/

1/ The enclosure referred to may be found in the files of the subcommittee.



the university of wisconsin-green bay

2309 BAY SETTLEMENT ROAD • GREEN BAY, WISCONSIN 54301

- *Office of the Chancellor*

11 March 1970

A handwritten signature in cursive script, likely of Edward W. Weidner, the Chancellor.

The Honorable Gaylord Nelson
The United States Senate
Washington, D.C. 20510

Dear Senator Nelson:

In response to your recent letter, we are returning to you some concise replies to your questions. You will realize that a great deal more might be said concerning these important points. However, we have made them as short as is consistent with clarity.

If further explanation is required, we shall be happy to furnish your office with additional information. We are particularly interested in Senate Bill 3151, and are prepared to assist you at the hearings, if you should so desire.

Sincerely,

A handwritten signature in cursive script, likely of Edward W. Weidner, the Chancellor.

Edward W. Weidner
Chancellor

EWV:mc
Attach.

1. What do you believe is the most concise definition of environmental education?

"A program of education stressing the relationship of man and his surroundings, giving students of all ages an awareness of the totality of physical, biological, social, political and humanistic dimensions of the environment."

2. What knowledge, attitudes and skills do students and adults need to learn about the environment?

The knowledge and skills required by students and adults include those presently learned in a variety of disciplines, plus others that increase understanding about man's interaction with his environment. One of the additional requirements is an attitude and an outlook that will integrate current and emerging knowledge across ~~conventional~~ lines to focus on specific environmental problems. Solution to environmental problems demands, not only an interdisciplinary approach, but also new attitudes towards the purposes of man on this planet.

These new attitudes are centered in a predisposition to action about the solution of environmental problems.

3. What items are of highest priority within the field of environmental education?

- a. Support of interdisciplinary institutions of higher education to produce a new kind of student whose training has been developed in broad areas of problem concentration, rather than narrowly conceived according to subdivided disciplines.
- b. School teacher-training programs to carry environmental attitudes into the elementary and secondary schools, and into a life style that stresses continual learning and continual action to preserve and enhance one's environment.
- c. In view of the long-term nature of the above requirement, it is important that resource people are made immediately available in the various districts and regions of the country, in order to advise and counsel school personnel in environmental questions of importance to their country and to their locality.

4. What educational vehicles and models would be the most beneficial to achieve the best possible learning experience about the environment?

The enhancement of the best possible environmental learning experience is facilitated by the idea of the "communiiversity", which stresses relevance and commitment to environmental problems, and a mission to help resolve those problems through mutual educational action.

The regional university provides a concentration of resources directly applicable to environmental education. To facilitate the utilization of university resources, we propose (1) a national symposium on environmental education designed to focus attention on the educational aspects and curriculum, as well as staff needs;

(2) an extensive summer training program in environmental science education designed to train change agents within the majority of school districts throughout the region; (3) a continuous program of liaison and staff development in the local school districts, utilizing the individuals trained during the course of the summer and made possible by telecommunications links with area schools; (4) continuous assessment and evaluation of each phase, with feedback being used to plan and develop the next step in establishing environmental literacy.

5. What are some fruitful ways to increase the use of the environment as a teaching resource?

A series of environmental education centers can be developed throughout the region served by the university. Each of these centers would represent a different focus on man's natural or man-made environment. Together, these foci would represent the essential elements of environmental literacy and would make available resources for education at the various school levels and for adults, as required in the region. The centers would be a public resource but would be most appropriately managed by the university for the benefit of the regional community and the needs of higher education, as well.

6. What role can the Federal Government play in helping to develop programs in environmental education?

The Federal Government can facilitate the rapid development of the environmental programs outlined above and can provide the exceptional personnel and training needs necessary to overcome the crisis. Involvement of the Federal Government in questions of national survival seems essential, since the cost of producing such rapid and dramatic changes in education cannot be borne by the local school system nor by the universities.

7. How should the requisite teachers' training programs be conducted?

Teacher training programs must involve a very strong component of feedback which links the school system to the university for the mutual interaction of these resources. This calls for a carefully structured model designed to bring the available resources to bear on the problem. Teacher training must include a revision of the pre-service training of the teachers of science and social studies and humanities, to involve environmental literacy. Similarly, retraining programs require systematic training and placement of "change agents" in environmental literacy in each and every school district. These steps provide the basis for continued, on-going staff development.

8. What are your specific reactions to S 3151?

The Environmental Quality Education Act, as set forth in bills presented both to the Senate and the House of Representatives, has elicited much interest at the University of Wisconsin-Green Bay.

The purposes of the Act, as stated in Section 2(b), are essentially parallel to the philosophy and objectives of UWGB. We are in the midst of a pilot project in curriculum development, whereby the whole university serves as the "model". This is consistent with Section 3, 1(a). One of our immediate objectives is to obtain support funds in order to demonstrate and test the effectiveness of our various curricula, which is listed as 3, 1(b).



RECEIVED

MAR 12 1970

THOMAS J. D'ALESSANDRO, III
MAYOR

OFFICE OF
SENATOR GAYLORD NELSON

MODEL CITIES AGENCY
ROOM 419 CITY HALL
BALTIMORE, MARYLAND

March 10, 1970

RECEIVED

MAR 12 1970

OFFICE OF
SENATOR GAYLORD NELSON

Office of Senator Gaylord Nelson
404 Old Senate Office Building
Washington, D. C. 20510

Dear Senator Nelson:

Thank you for asking me to respond to your very provocative question. I will make no pretense to be thorough or definitive on any of them; I will merely do my best to convey to you through my replies what I take to be the general direction we must take on these matters.

1. Environmental Education is the entire education process organized to produce those specifiable skills, understanding, appreciation, awareness, and methodologies required for sane and efficient use, development, management, and conservation of the near earth and inhabitants.
2. More than any specific bits of knowledge, what is most urgently needed is a deepened sense of the essential connexity of things and events of the near earth.
3. The items which I give the highest priorities are 1) Urban Environment (cities) and Macro-Systems (Atmosphere and Aquasphere).
4. On the one hand, the near-earth is a rich openended laboratory as it stands; on the other, in its present condition, it possesses some impressive "break-down" features. So it can easily be regarded as a great discovery center and curriculum, and approaches evolved around the so-called discovery approach to learning would be appropriate. If the entry point is to be a break-down, eg. air pollution, noise pollution, then problem solving models and approaches are clearly more desirable.

5. See number 4 (four) above.
6. In addition to those activities that would be covered under provisions of the bill as it is now written, I think it is most important to create means of providing incentives directly to leaders at all levels who have shown some initiative in the direction of environmentally oriented education.
7. I am convinced that training for teachers who are already in service must be adjunctive to whatever incentive programs can be created with Federal assistance. As for pre-service training, my feeling is that institution of higher education must be encouraged to develop entire teacher training programs around environmental education and the students who elect such courses of study should be provided full financial support together with some assurance of placement is a school system which will be receptive to the approaches the student so trained will bring into the classroom.

I hope that the foregoing observations and comments are helpful.

Sincerely,

Fred J. Clifton /HBT

FRED J. CLIFTON
Education Coordinator

FJClifton:hbt

Vermont Environmental Center, Inc. Ripton, Vermont 05766

May 15, 1970

STATEMENT IN SUPPORT OF SENATE BILL 3151, THE "ENVIRONMENTAL QUALITY EDUCATION ACT".

Submitted by:

Andrew P. Nelson, Director
Vermont Environmental Center, Inc.

On behalf of myself and the Center.

Having studied the text of the "Environmental Quality Education Act" introduced into the first session of the 91st Congress as Senate bill 3151 and House bill 14753, I find that this bill provides for federal recognition and support of programs such as those being developed by the Vermont Environmental Center. It therefore seems appropriate that the Vermont Environmental Center express support for the "Environmental Quality Education Act" and that this expression of support take the form of a statement detailing the rational underlying establishment of the Vermont Environmental Center, the current status and planned programs of the Vermont Environmental Center, and the existing guidelines for future development of the Vermont Environmental Center.

The rational underlying establishment of the Vermont Environmental Center was detailed in June of 1969 in the pamphlet "Ripton - Another Vermont First?" prepared by Richard M. Brett and James E. Wilkinson, Jr. This pamphlet is attached and needs no elaboration here.

At this writing, the Vermont Environmental Center has been incorporated as a private, non-profit organization, trustees have been appointed, funds for the first year of operation have been obtained in the form of a grant from the New England Regional Commission, the Ripton Job Corps Camp has been made available, through a special use permit, by the U. S. Forest Service, and an executive director and staff have been employed to begin work in June, 1970.

The staff will immediately initiate two educational ventures, an internship program for college students and a series of

summer workshops for primary and secondary school teachers.

An announcement of the student internship program is attached. This announcement has been distributed through students and faculty of regional colleges and universities. The basic purpose of this program is to provide concerned college students with a medium for action, an opportunity for insight into the organization of a facility for environmental education, and an opportunity for interaction with people in primary and secondary education. For this initial summer period, up to eight students will be supported on Center funds.

The summer workshop program is in two parts. First, Center staff will join this year's sessions of the Vermont Department of Forest and Parks' Teacher Outdoor Conservation Laboratory, a program which has been in existence for approximately ten years. Tentative schedules for this year's sessions are attached. The Center will consider hosting this program in future years.

Secondly, the Center will run two of its own workshops, as described in the attached leaflets. The first of these two will involve exploration of the overall question of environmental education. The second will be a project oriented session on water pollution. Experience with three different workshop programs, then, will give the Center staff a broad basis for planning future efforts with primary and secondary teachers.

Tangible possibilities for the remainder of the Center's first year include hosting and participating in training programs of the Vermont Department of Fish and Game and the Vermont Department of Forests and Parks. Other possibilities will be pursued during the next few months as the Center gets under way.

The avowed purpose of the Vermont Environmental Center is to develop a comprehensive program of environmental education. Activity to this end is just now being initiated, and guidelines for future development are still quite general and strongly indicative of the personalities enunciating them. I conclude this testimony, then, with a statement of philosophy which is as much personal as corporate.

The challenge is clear. We must, as individuals, as communities, as nations, and as a species reconcile our values and behavior with the ecological realities of existence in a closed system. This challenge embraces all disciplines and professions, and evokes a truly human ecology.

The first, and most widely accepted priority is awareness. Nearly every program of environmental education I have seen

emphasizes awareness. But awareness alone falls tragically, indeed dangerously short of meeting the challenge. Awareness in the absence of opportunity for satisfying, effective action is analogous to stimulus without the opportunity for response. It leads to frustration, depression, and the possibility of violent reaction or pathological withdrawal. Environmental education must be directed toward awareness and beyond, to the need for participation in effective action. Agencies of environmental education must direct their attention to removal or circumvention of obstacles to participatory action on the part of environmentally aware teachers and students. Inflexible schedules which inhibit field trips are as much a part of our concern as the content of those field trips. Project oriented workshops are irrelevant if school policies prevent the participation of students in extramural projects. To be sure, environmental education must be concerned with curriculum, but its concern must also encompass the entire educational context. Only in this way can we meet the challenge of survival, and without question I support the allocation of this nation's resources to the meeting of that challenge.

Andrew P. Helser

*American Association
for the Advancement of Science*

1515 MASSACHUSETTS AVENUE, NW, WASHINGTON, D. C., 20005

Phone: 387-7171 (Area Code 202)

Cable Address: Advancesci, Washington, D. C.

March 27, 1970

The Honorable Gaylord Nelson
United States Senate
Washington, D.C. 20510

My Dear Senator Nelson:

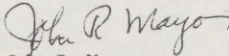
As Director of the Commission on Science Education of the American Association for the Advancement of Science, I am pleased to comment on the questions enclosed with your letter of February 19, 1970, addressed to Dr. Athelston Spilhaus, with regard to the Environmental Quality Education Act. The interest of the AAAS in the science-related problems of Mankind is reflected in the work of three Committees which have been appointed by the Board of Directors: the Committee on Environmental Alteration, the Committee on Science in the Promotion of Human Welfare, and the Commission on Science Education.

The interest of the AAAS in the specific problems related to environmental education which are involved in the Environmental Quality Education Act are most explicitly reflected in the work of the AAAS Commission on Science Education, supported primarily by the National Science Foundation. The Commission on Science Education has appointed a Committee on Science and Society which, with the assistance of a small staff, is engaged in the planning and development of appropriate programs and projects which fall directly within many of the concerns of the Act.

The Commission staff, therefore, has been requested to prepare responses to items in the questionnaire. These responses are contained in the attached document entitled, "Comments from the AAAS Commission on Science Education on the Environmental Quality Education Act."

I would like to express deep appreciation to you, Senator Nelson, and your colleagues in the Congress for foresight, skill, and leadership in fashioning what may well be one of the most significant attacks upon the problems of American education that has been made in our time. As a former resident of Wisconsin and faculty member of the University of Wisconsin, I take great pride in your leadership and accomplishments.

Sincerely yours,



John R. Mayor
Director of Education

Comments from the AAAS Commission on Science Education
on the Environmental Quality Education Act

Following are comments in response to the questionnaire which accompanied the letter dated February 19, 1970, from Senator Gaylord Nelson to Dr. Athelstan Spilhaus, President, American Association for the Advancement of Science with reference to the Environmental Quality Education Act.

The following remarks have been prepared by the staff of the AAAS Commission on Science Education, since there has not been time to canvass the individual members of the Commission.

The numbering of the responses corresponds to the numbering of the items in the questionnaire.

1. While the Commission has not formally adopted a definition of environmental education, the activities of the Committee on Science and Society are centered around the following concept:

The thrust of the educational process is being re-oriented from an academic concern with the past to a dynamic concern for the future. The focus of education is increasingly upon the development of the individual learner as a functioning member of society. This calls for basic changes in the educational program with emphasis on providing means to assist students at all levels to identify constructively with all aspects of the environment, within which he must live. To the limit of his talents, he must be able to synthesize knowledge and understanding of such diverse but interrelated facets of the environment as the physical, social, cultural, economic, and aesthetic in such a way that he can make wise judgments with respect to the conduct of his own life and to his conduct as it affects the lives of others--including future generations. Environmental education, then, must include all influences, within and outside of

the formal educational structure, that help the individual, at whatever age, to synthesize his own understanding of the world and to make wise judgments as a member of a complex society.

2. The vast range of knowledge, attitudes and skills that students and adults need to learn about the environment depends, first of all, upon the capacities and talents of individuals. To a greater or less degree, however, each individual should have:

a. Knowledge -

- (1) The methodology of scientific inquiry
- (2) The relationships between scientific knowledge and its applications, especially as it relates to environmental problems and situations
- (3) The mechanisms (including criteria) by which decisions are made which involve the applications of science to the benefit (and the detriment) of society, at the local, state, national, and world levels
- (4) The processes of ecological change - factors that affect ecological balance - the consequences of ecological imbalance - ways in which ecological balance is affected by Man (including the well-being of human society, itself).
- (5) A comprehension of at least the elements of societal evolution and development, including the effects of emerging science and technology on the advancement of human society and the improvement of the "quality of life"
- (6) Enough basic science (biology, chemistry, mathematics, physics, earth science, and social science) to make possible the acquisition of knowledge listed in items (1) through (5).

b. Attitudes

- (1) Self respect as a contributing member of society
- (2) Responsibility for actions that might affect others
- (3) Curiosity about the nature of and interrelationships among environmental factors.

c. Skills

- (1) Ability to observe, compare, measure, analyze, evaluate, and form conclusions and judgments (this includes laboratory, library, and field experiences) about factors affecting the environment.

3. The highest priority in environmental education probably lies in the need for a new approach to science education. Students have demonstrated that they will respond to the study of environmental problems when they see that they are related to their own lives. The concept that the young are not really living--yet--and that there is a point of metamorphosis when they are released from the custody and protection of "education" will no longer serve our needs--nor theirs. In this sense, education is equated with participation. The laboratory becomes the community; the teacher becomes the leader and partner in investigation; and, as experience broadens the scope of understanding, the community becomes the world.

The study of environmental problems (using the term in its broadest sense) requires a multidisciplinary approach, because each problem has aspects which involve the sciences, the social sciences, and the humanities. For this reason, high priority should be given to the development of new educational techniques centered on a multidisciplinary approach. The eventual outcome might be the restructuring of the organization of the school and of the curriculum.

Basic to the success of these new approaches is the need to broaden the concept of environmental education far beyond its generally accepted definition. The classification of societal problems in Science for Society: A Bibliography, to be published soon by the AAAS Commission on Science Education, and intended primarily for the use of teachers and librarians, is as follows:

1. Population problems
2. Agriculture, food, nutrition
3. Pollution of air, water, food; pesticides
4. Medicine, health, drugs
5. Natural resources, conservation
6. Race
7. Biological engineering, eugenics
8. The nature of science and scientists
9. Science, technology, and society
10. War and Peace

All of these topics are of immediate concern to students, and all of them involve, in the long run, important aspects of the "environment."

4 - 5. The Committee on Science and Society of the AAAS Commission on Science Education has concentrated its attention largely on needs at the secondary school level. The following comments on educational vehicles and models and fruitful ways to use the environment as a teaching resource are suggested from that point of view.

- a. There is a need for new instructional materials for use by both teachers and students which deal with specific environmental problems as a unity (dealing with its scientific, social, and aesthetic aspects) and oriented toward the study of local manifestations of the problems. For example, the Commission is experimenting with the development of a series of "Study Guides" for use primarily in inservice teacher education. It is expected that the experimental edition of the first one, on Atmospheric Pollution, will be pre-

pared at the State University of New York at Albany during the summer of 1970. It will include instructions for cooperative student-teacher-community projects for the measurement and analysis of various types of air pollution within the community.

- b. There is the need for mechanisms to make the resources of the community that are related to environmental problems more readily available to students and teachers. For example, the Commission is exploring the need for and functions of proposed community Environmental Councils which would serve essentially as two-way corridors between the schools and the resources of the community. Discussions are under way with science and social science officials of the Chicago Public Schools and the Director and staff of the Field Museum of Natural History to determine the potential usefulness and structure of such a council for the Chicago Metropolitan Area.

6. The long-range control of environmental problems must have its base in the educational system. Fundamental changes in the educational process must be devised and implemented. This will require a large-scale planning effort, an intensified program of research and experimentation including the preparation of new teaching materials of many kinds, and a massive program of preservice and inservice teacher education. These things can be achieved only through leadership and financial support from the Federal Government.

The Legislative Branch must continue to provide basic leadership through examination and analysis of the problems (in cooperation with the Executive Branch) as the basis for the legislation that will be required. This cannot be accomplished through a "one-shot" approach, but the appropriate committees must be

sensitive to changes and be ready to amend the legislation in keeping with new requirements. Legislation "on the books" will be of very little value unless it is followed up by the appropriation of adequate funds.

The Executive Branch must develop a coordinated approach to the needs for action programs, with each mission-oriented Department or Agency contributing its share in the over-all planning, in the request for funds, and in the administration of action programs.

7. The usual apparatus for conducting teacher education programs — colleges and universities, state departments of education, summer institutions⁴⁴, inservice programs in the schools — must be utilized, and new mechanisms developed. One new mechanism might be community environmental education councils to which reference is made in answer to question 5 above. Whatever the sponsoring agency, the teacher education programs will have to be multidisciplinary, necessitating cooperation among disciplines and areas of interest, too seldom characteristic of teacher education. Development of this kind of cooperation could become an exceedingly important by-product of new emphases on environmental education.

Environmental teacher education programs must involve active participation in the community and in the study of nature. It cannot be achieved by classroom lectures. Again, this will require modification for the good of most current teacher education programs.

Another consideration given to environmental education in any teacher preparation program must center on the development of an awareness of the broad aspects of science. In a literate, technologically oriented society it is of paramount importance that educators at all levels understand the role and influence of science in directing the evolution of culture. In addition, an understanding of the nature of science as a means of seeking reality through a screen of ob-

jectivity should be considered as a requisite of any "educated" individual of the twentieth century.

It should be pointed out that any awareness of the environment should not be limited to scrutinizing reality via objectivity. An appreciation for the surroundings, used in the broadest sense, would also include a consideration of the artist's conception. It is not only necessary for the future teacher to develop a competency in the use of objectivity but for a full and complete view of reality the teacher must also foster the ability to see his surroundings through the eyes of the artist.

The environmental education for future teachers is not unique to that group of people. Perhaps it is true that the neophyte educator needs to develop understanding somewhat beyond that of the lay person, but the basic education is the same.

8. The staff of the AAAS Commission on Science Education views the Environmental Quality Education Act as landmark legislation which has the potentiality for providing the stimulus and funds for the accomplishment of a major break-through in the effort to make education relevant to the needs and interests of those who are seeking education.

~~I see~~ ^{are some} no serious flaws in the bill in its present form, ~~but there are~~ some minor reservations:

- a. There should be a broad interpretation of the term "environmental quality and ecological balance," to include most of the environmental factors listed in Item 3 above. The fundamental educational changes that must be created in order to carry out the spirit of the Act cannot be accomplished by simply patching up the existing structure. Support for change must be broad enough to make the total program effective.

- b. It is hoped that the provisions for the Advisory Committee on Environmental Quality Education are broad enough to permit the use of judgment and discretion in the granting or contracting of funds so that the quality of proposals and the qualifications of those who will undertake the work, will have top priority, while at the same time giving reasonable attention to geographic distribution.
- c. The entirely commendable, and probably necessary, provision that the Commissioner shall approve applications for support "only if the State educational agency has been notified of the application and been given the opportunity to offer recommendations," (Sec. 4, (5), b) may lead to long delays and frustration unless administrative procedures are carefully worked out.
- d. While it is entirely appropriate that the Act should be administered by the U.S. Commissioner of Education, it is hoped that specific provision can be made for participation in the overall program by other agencies of the Federal Government, especially by the National Science Foundation. A large part of the work to be done lies in the general area of science education. The National Science Foundation has a long and successful history of experience both in the development of course-content materials for the teaching of science and social science and in the continuing education of science teachers at all levels. On the basis of information at hand on the activities of the National Science Foundation with respect to a wide range of interests related to the environmental sciences, from basic research to educational programs in the schools, it is our opinion that the important contributions that the National Science Foundation is

making, under its present authority, to the general objectives of the Act should be taken into consideration by the Committee in evaluating the overall impact on environmental education by agencies of the Executive Department.

AAAS
2/27/70



NATIONAL AUDUBON SOCIETY

1130 FIFTH AVENUE, NEW YORK, N.Y. 10028 (212) 369-2100 Cable: NATAUDUBON

March 6, 1970

Senator Gaylord Nelson
Senate Office Building
Washington, D.C. 20510

Dear Senator Nelson:

Thank you for your letter of February 13 inviting our comments and answers to specific questions related to the purposes of S.3151, the proposed Environmental Quality Education Act.

I had previously addressed a letter to Senator Pell, Chairman of the Education Subcommittee, about this important legislation. A copy of my letter, which was dated February 12, undoubtedly is in your files by this time.

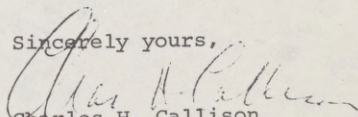
Upon receipt of your questionnaire, I asked the Director of our Department of Educational Services, Mr. Duryea Morton, to draft our response to your questions. Mr. Morton's thoughtful answers, built upon the long experience of the National Audubon Society in ecological studies and conservation education, are enclosed.

We are looking forward to an opportunity to make a major presentation in support of S.3151 when hearings are held.

May I call your attention again to the amendments which we propose to present. These are outlined both in my earlier letter to Senator Pell and in Mr. Morton's reply to your question #8.

With continued respect and admiration for your leadership we are,

Sincerely yours,


Charles H. Callison
Executive Vice President

CHC:es
encl.

CC: Messrs. Stahr, Morton, Buchheister, Brigham, Franson
AMERICANS COMMITTED TO CONSERVATION
Wisconsin Audubon Societies



National Audubon Society

EDUCATIONAL SERVICES DEPARTMENT

1180 FIFTH AVENUE • NEW YORK, N. Y. 10028 • ENright 9-2100

February 27, 1970

TO: Charles H. Callison
 FROM: Duryea Morton
 SUBJECT: Questionnaire re Environmental Education Legislation sent by
 Senator Gaylord Nelson.

1. What do you believe is the most concise definition of environmental education?

To create in the whole population a sympathetic understanding of man as an integral part of the natural system, and that he too must live by its laws.

An awareness of and becoming familiar with the life systems and the ways in which man influences the natural world positively and negatively.

2. What knowledge, attitudes and skills do students and adults need to learn about the environment?

Knowledge

Potential population growth
 Potential population pollution
 Potential technological pollution
 The specific effects of man on specific areas
 (individual locales or habitats)
 Plant/animal populations
 Soil and water
 Ecological:
 the way it works
 environment
 food webs
 food chains
 habitats
 succession

Attitudes

Controlling population growth
 Curbing pollution and depletion
 It is not too late to develop attitudes.

Attitudes, continued

There are problems right now which must be solved.
 Conservation anti-pollution may slow national "growth".
 Progress is not defined as massive unstructured growth.
 Man must accept the responsibility of our technology.
 Quality of life and environment is more important than quantity.
 Finance and dollars growth should not be our true goals.
 Aesthetic enjoyment and respect for all of life.

Skills:

Anti-littering
 Writing officials expressing concern and point of view
 Environmental problems
 General learning:

Background reading
 Use of field guides to increase knowledge, habitat surveys, etc.

3. What items are of highest priority within the field of environmental education?

Mass public education on the problems of pollution, population.
 This to include an awareness and understanding of the results of these two subjects.

What the individual can do. (be a member of a task force, pressure group, etc.)

4. What educational vehicles and models would be the most beneficial to achieve the best possible learning experience about the environment?

Natural areas around each school, or owned by each school district, for use by students in all subject areas of the curriculum - personnel to interpret in these areas.

School camping.

Outdoor education programs for all ages.

Neighborhood field trips for adults.

Visits to nature centers and participation in their programs which will increase knowledge.

Participation in ecological workshops

Increase work with scouts and similar groups to aid them in the development of more ecologically oriented programs.

5. What are some fruitful ways to increase the use of the environment as a teaching resource?

As stated in #3, a massive teaching training program for present and future teachers. This should be field trip oriented as much as possible and these courses should have access to natural areas in which to train.

The biggest problem in environmental education is that the teachers do not feel confident teaching outdoors. Programs must be instituted to give them experience and thus boost their confidence.

Environmental subjects should be inserted in all curricula at all grade levels.

6. What role can the Federal Government play in helping to develop programs in environmental education?

Grants for new programs in environmental subjects instituted at teachers' colleges.

Students at teachers' colleges required to take environmental course throughout 4 years' work.

Teacher training aimed at the ecology of the city as well as natural areas elsewhere.

Help acquire land near population centers for use by schools.

Provide properly trained interpretive people for these areas.

Help acquire passive recreation areas near population centers for use by people other than students.

Provide financial help for existing conservation organizations who are professionals in this field so they may do a better job.

7. How should the requisite teachers' training programs be conducted?

Research needs to be done in this area.

Continue the Natural Science Foundation Grants - encourage ecologically oriented programs - open up the requirements regarding experience for those who apply

Teacher training during summer in ecological understanding and environmental awareness of 2, 4, or 6 weeks' duration.

Sponsor weekend workshops. This teacher training should deal primarily with field work to give the trainees the broadest possible experience to build their confidence.

8. What are your specific reactions to S. 3151?

We are enthusiastic about Senate Bill S. 3151. We do propose the following amendments:

Specifically, we believe the language should be revised or added to in one or two places to authorize assistance for the planning and establishment of nature centers for community education/in natural ecology and environmental science.

We also feel it would be impractical to give the proposed Advisory Committee such a clearly administrative function as reviewing applications and making recommendations thereon as provided in Section 5 (a) (3).

We also strongly recommend that Section 9 of S. 3151 be revised to authorize appropriations for a longer period than one year. We feel five years would be more appropriate.

WILLIAMS COLLEGE WILLIAMSTOWN, MASSACHUSETTS 01267

CENTER FOR ENVIRONMENTAL STUDIES

March 24, 1970

The Honorable
Gaylord Nelson
United States Senate
404 Old Senate Office Building
Washington, D. C. 20510

Dear Senator Nelson:

Thank you for your letter of February 13, requesting my views on the Environmental Quality Education Act. As one involved in conservation and environmental education for nearly 20 years, it is indeed gratifying to witness the surge of public awareness that is occurring today. However, much of this response, despite its sincerity, reflects a concern with the results of environmental contamination and pollution, rather than real understanding of its causes and the nature of the long-term solutions that must somehow be found. The Environmental Quality Education Act has the potential capacity to overcome this basic deficiency.

In response to the specific questions contained in your letter, I offer the following comments.

1. Environmental Education must be defined in ecological, economic, philosophical and political terms. Environmental education must be concerned with synthesis, illustrating ways in which different disciplines and modes of thinking can and must contribute to understanding of resource problems and their solutions. This can begin at the most elementary levels, and must continue into the most sophisticated levels of scientific and social analysis.

2. Students of environment should acquire a working understanding of the basic principles of ecology, together with an appreciation of the ways in which man relates to his physical environment through varying kinds of institutional arrangements. But perhaps more important than technological understanding and social insight are the attitudes towards environment that must ultimately be developed. This applies to individuals, communities, corporate firms and political leaders. Distinctions must be made between levels of living - measurable in quantitative terms - and standards of living - reflecting the goals, values, and aspirations of individuals and societies. Policies of restraint in the face of uncertainty must replace those of growth at any cost, and attitudes of accommodation and respect for life must replace those of domination based upon faith in the "technological fix."

3. Highest priority should be assigned to the task of developing a keener sense of individual responsibility towards environment, a personal responsibility that must somehow be exercised within the framework of an increasingly corporate society. I can visualize no way of achieving this goal other than through a long-term process of formal and informal education. Such educational activities must be based upon rigorous scientific understanding, utilizing all of the factual information and physical evidence that is available. But it must be concerned essentially with the question of establishing meaningful and viable images of the future, upon which planning goals might be established and policy objectives formulated. As stated above, this process has to be generated at all levels, from elementary to adult education, and must involve public as well as private institutions.

4. The most direct route to meaningful environmental education can probably be found by working directly with the environments at hand. This means moving from the classroom into the field, whether an outdoor laboratory, a wildlife sanctuary, a local river, industry, planning commission or resource-based enterprise. After certain theories and concepts have been developed in the classroom it is necessary to move directly into real situations, encouraging students to study and relate to different environmental situations, to test their perceptions, and to trace the relationships inevitability involved in their solution. I believe that this educational model could be adopted to elementary, high school, college and adult educational programs.

5. The following examples are based upon my own experience within an undergraduate, liberal arts institution.

a. Developing a course on the environment within which the institution is located, offered in the freshman year, and taught by a group of faculty concerned with different disciplinary approaches. The course should be designed to teach students to see the environment around them, and to understand interrelationships in terms of history, ecology, politics and economics. High priority should be given to extended field trips and personal encounters - interviews, surveys, monitoring projects.

b. Extended use of internship programs, ranging from a month of independent study to an entire academic year's association with a particular agency, citizen organization, or private industry.

c. Upper level courses in environmental planning and policy based upon case studies of actual and current environmental situations. Accumulated bodies of factual information could gradually be established through this process, incorporating field studies conducted by students themselves, faculty research, reports and surveys carried out in conjunction with public agencies. This could provide a service to local and regional planning and resource agencies, while at the same time heightening the sense of participation on the part of students themselves.

d. Developing cooperative relationships with neighboring academic institutions, whereby students from college A might spend one or two semesters or years at college B in order to experience different environmental situations and to benefit from the strengths and resources of different institutions. It is easier to move students than to transfer faculty, and this concept of inter-college and university exchange on a rotating basis merits fuller experimentation.

6. The federal government could further certain of these objectives through specialized funding programs, such as the Title I program of the Higher Education Act of 1965, while at the same time encouraging agencies to make fuller use of academic resources. Limited internship programs are now available, but this pattern could be vastly expanded and modified, making it possible for short-term associations and for more direct participation in fact gathering, field surveys, public hearings, etc.

7. I do not feel qualified to comment on this question.

8. The Environmental Quality Education Act has my wholehearted enthusiasm and support. If enacted and sufficient funds provided, it could stimulate program innovations that are urgently needed, particularly in the area of adult and community education.

My one reservation concerns the possible fragmentation that might result if the program is channeled primarily through schools of education, at the expense of professional schools of resource management, environmental sciences and planning. This would apply particularly to pilot programs of adult or community education, which I believe should be firmly rooted to professional research and graduate teaching.

This leads to a final comment, namely the potential impact of the proposed program upon the ways in which colleges and university become organized to deal with environmental education and research. At the present time most institutions are splintered, uncoordinated and organized along departmental lines in their approaches to environment. Research efforts are not geared to graduate training needs, or to the needs and problems of surrounding communities and regions, and the response to the demand for adult education is frequently ad hoc and after-the-fact.

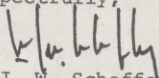
The proposed legislation could help to overcome these deficiencies by linking its educational focus to defined research needs of federal departments and agencies operating in the environmental field. Ultimately, Federal funding for environmental research and education should be made on an inter-agency basis - block grants to individual

universities or groups of academic institutions designed to stimulate comprehensive and sustained attacks on defined sets of environmental problems within selected jurisdiction or regions. Programs funded under S 3151 could be designed to initiate and encourage a long term research and educational strategy of this nature.

I am enclosing with this letter a background statement describing activities of the Center for Environmental Studies at Williams College, where we are attempting to implement such a coordinated approach to undergraduate teaching, research and off-campus involvement in environmental education.

I hope that these comments are helpful to your deliberations. Please do not hesitate to call upon me if I can be of further service.

Respectfully,



A. J. W. Scheffey
Director

AJWS:ct
Enc.

THE USC STUDENT INSTITUTE ON HUMAN POPULATION AND ENVIRONMENT

*Department of Biological Sciences
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ENVIRONMENTAL EDUCATION LEGISLATION QUESTIONNAIRE RESPONSE

Submitted by Tee L. Guidotti,
Chairman, USC Student Inst. on Human Pop. & Envir.,
Member, Board of Directors, Student Environmental
Confederation of California

1. Concise definition of environmental education.

Environmental education can be viewed as the development in the pupil of an appreciation for the consequences of his own acts.

Such a student must learn that he is part of a vast, interlocking web of influences and forces, and that he bears the responsibility for the repercussions of his actions, although they may manifest themselves in unexpected ways and in distant places.

2. Concepts for inclusion in environmental curricula.

Clearly a student who is oriented toward a career in science or the social sciences must have an in-depth background in ecological principles. There are, however, certain areas which should be covered in the education of every pupil who will take his place as a responsible citizen within the society:

Basic ecological principles, food chains, the "web of life" concept, theoretical aspects of pollution-generation, effects of overconsumption, population dynamics.

Personal impact on the ecosystem, the specific effects of the pupil's consumption, pollution output, and disturbances during his life as a citizen, employed producer, and consumer.

Appreciation of the values of life, a concept of the quality of life, the rights of other humans to a clean, healthy environment, the right of species to survive on their own evolutionary merits, the ethics of land use and the need for careful conservation of valuable resources, the esthetics of wilderness, the responsibility to prevent cruelty and unnecessary pain to individuals and species, and the realization that the ecosystem is indivisible, and that therefore so is life.

3. Items of highest priority in field.

Instilling respect for life. If the pupil can be impressed with the need to treat fairly his pets, his immediate environment, and his fellow humans, this attitude will guide him when he lacks the factual knowledge.

Realizing that consequences exist for every act. The pupil must be made aware that in a complex, interdependent world, disturbances in one part are transmitted throughout the web of interrelationships, frequently with unpredictable and undesirable effects.

4. Educational vehicles and models.

Vehicles:

- a.) The local neighborhood. If the student can be made aware of the tremendous complexity and diversity within an area he has always taken for granted, and particularly if he can appreciate how his neighborhood has changed historically, for the better or worse, then the lesson will be carried over whether he remains in that area or moves on.
- b.) Integration with other subjects. Environmental education should not be separate from other aspects of the curriculum. It must be intimately linked with the student's learning of science, economics, social studies, and the arts. However, ecological concepts should be clearly identified when they occur, to give continuity to the presentations. The subject to tie these various aspects together in a coherent total is science, biology in particular, where the pupil can learn the physical and biological basis for this all-encompassing concern.
- c.) Topical approach. In order to underscore the immediacy of the problems being faced on a community, state, or national level, and in order to maximize the student's interest in something "relevant", environmental education should deal heavily in the basis and background for contemporary environmental issues.
- d.) Field work. By far the best way to instill an appreciation for the environment is to take the pupil beyond the very limited classroom environment and to expose him to a variety of examples, natural wilderness, accessible parkland, urban, etc. Of particular value are those examples illustrating a current problem, an adequate solution, and a visible transition (either changing with time or at an interface). Thus environmental education will by its very nature place heavy emphasis on field work and personal discovery.

Models:

- a.) Biology 100 at USC; a 4-unit course in biology for non-majors only emphasizing the application of biological principles and the understanding of contemporary problems in biology. Heavily environmentally oriented, and of interest to all majors.
- b.) The Urban Semester at USC; a 16-unit, semester-long interdisciplinary in-depth study of the city, emphasizing the structure and function of the institutions of the city, using Los Angeles as a vast laboratory. The urban ecology is, of course, that most familiar to most of our citizens.
- c.) The Biology Semester at USC; to begin Fall 1970, a 16-unit, semester long in-depth study of current problems in biology for non-majors, emphasizing the importance and application of biological principles in the participant's own field of interest. To be heavily environmentally oriented.
- d.) The Los Angeles County Museum Natural Science Workshop; a series of lecture-sessions, small classes, outings, and programs for advanced students grades 9-12. The program has been extremely successful in motivating students in the county toward further study in natural science, and in encouraging independent work and thought. The Workshop has been in operation for a number of years, under the guidance of Miss Gretchen Sibley.
- e.) The Committee for Advance Science Training; a program through which exceptional high school students can receive grants (running a couple of hundred dollars) to do original research work under the supervision of trained workers at a local institution, such as a university or hospital. This program has been extremely successful; it is very competitive, and could well be expanded into environmental disciplines. Los Angeles-based.
- f.) Junior Engineers and Scientists Summer Institute; JESSI sessions are held on campuses throughout the nation during the summer months. Two weeks long, they include a series of short classes in a wide variety scientific and engineering areas, with numerous special lecturers, special programs, many field trips and tours, and even a limited opportunity for the student to seek out original interests and explore them using campus facilities. The program is not extremely competitive, tuition is not particularly high, and the results appear quite effective in giving students an appreciation of the many technical fields, and better preparing them to decide on career choices. Similar programs could use this same pattern to emphasize interdisciplinary relationships between subjects, and could well inform the student of the continuity of environmental concern and principles between them all. Based in Portland, Oregon.

5. Utilizing the environment as a teaching resource.

Intense field work can be conducted in all subjects. Philosophy was taught

in the streets by Socrates. Precisely the sort of awareness that is the primary goal of environmental education can be achieved through the introduction of ecological concepts in many subjects through field work. Besides the standard patterns of biology field trips, art sketching expeditions, and history field classes, the technique can be expanded to subjects such as business education, civics, economics, and even history, by conducting class on location in, for example, a plant whose product is needed by society but whose operation is a major pollutant source (a lesson in setting values and appraising real costs), sitting in on planning commission meetings or city council meetings discussing an environmental issue (a lesson in the legal institutions of the community as they relate to environment), studying on site the operation of an extractive industry or of a land-development company (a lesson in the economic factors influencing an environmental alteration which will in turn affect the community and alter the economic profile of the area), and, finally, studying on site the historical change in the local environment as man has developed the land for his own use visiting relatively undisturbed areas and tracing the correlation between ecological disturbance and the socioeconomic development of the area. (a lesson in applied history).

Besides emphasizing the relationships between each subject and ecology, such use of the environment as a teaching tool may have great effects in making such course material more interesting and relevant to the student.

6. The role of the federal government in environmental education.

The federal government can support environmental education in a number of ways beyond financially supporting programs in instruction, teacher training, materials development, community education, and the training of government employees. Since a great deal of the most significant applied and research work is now being conducted within the government structure itself, the government as such is a prime source of data and educational facilities.

In order to achieve maximum utilization of the government's own resources, to avoid duplication, encourage efficiency, and give practical experience, the laboratories, testing centers, research stations, and offices of execution and policy of all

civilian government agencies concerned with the environment might be opened to traineeship and assistantship programs, allowing students to study and work for academic credit as assistants and trainees. Such a program, which would not involve the student doing entirely routine or paper work, would have the student learning the techniques of resource assessment and conservation, pollution control technology, wilderness and parkland management, the legal and governmental framework of environmental management, programs and projects in operation, and how change is effected within the structure of government, depending on the student's primary interest and career goal. Such a program could result in increasing substantially the body of trained technicians, policy-makers, and management personnel in environmental quality control. This proposal has been presented in greater detail as part of the recommendations submitted by the USC Student Institute on Human Population and Environment to the Student Conference (Hearing) on Environment sponsored by the Federal Water Pollution Control Administration in Oakland, California, on 30 December 1969. (Copies should be available through the office of Paul DeFalco, Director of FWPCA's Western Region.) A program along somewhat similar lines as those described above is now being conducted by the National Air Pollution Control Administration.

Additionally, government facilities could well be used for on-site class instruction, allowing access to equipment for demonstration and projects (which also might be very useful to the agency involved) and to personnel and expertise for discussion and lecturing.

Federal grants for environmental projects to be conducted by trainees in residence or at nearby institutions could aid the agencies as well as provide the trainee with an opportunity to do useful original study. It would free the agency personnel to conduct their functions while the trainee, who would as a prerequisite to the program have acquired a certain degree of expertise in the area, executed the studies and surveys. A program of a similar nature is now prepared by the National Science Foundation, entitled "Student Originated Studies", and could serve as a prototype for an expanded program.

7. Teacher training in environmental education.

Conscientious standards must be set to evaluate the strength of preparation a teacher must have to instruct on environmental disciplines. Such teachers must of course have sufficient background in science to understand the fundamentals of ecology, and must have a thorough appreciation for the ramifications of ecological concepts in social studies. Beyond that, standards will vary with the class level taught. A broad, interdisciplinary background is to be encouraged, but not at the expense of a thoroughgoing knowledge of basic ecology.

Environmental education will demand certain skills of instructors, such as the ability to convey the sense of relationships and complex interdependencies that may not be as vital in other disciplines. Adequate preparation must be made to make maximum use of the environment in the local community; this requires training in the best use of field work.

8. Specific reactions to S. 3151.

I feel strongly that S. 3151 is a major breakthrough in environmental education. It has the added feature of being self-refining by providing support for innovative pilot programs and materials. While recognizing that the key to sustaining any improvement in environmental management is educating the next generation to continue it conscientiously, it provides for the immediate attack on environmental problems by supporting the education of public officials and key private citizens. If properly funded and competently executed, S. 3151 will be a major factor in instigating action, and directing that action, in meeting the problems of our environment and solving them.

Los Angeles, California
4 May 1970

Tee L. Guidotti
Tee L. Guidotti
Chairman,

USC Student Inst. on
Human Pop. & Environ.
Member of the Board of Directors
Student Environmental
Confederation of Calif.

HAMPSHIRE COLLEGE

AMHERST, MASSACHUSETTS 01002

March 3, 1970

The Honorable Gaylord Nelson
 United States Senate
 Washington, D. C. 20510

Dear Senator Nelson:

I am glad to have your letter of February 13, and to hear of your introduction of an Environmental Quality Education Act in the Senate. My colleagues and I at Hampshire College are keenly aware of the need for legislation of this kind, and we would support your position in the hearings in every possible tangible way. Having organized a AAAS symposium on precisely this subject last December, we now have not only a strong sense of the current movement toward environmental education, but we also have a large library of correspondence and reports which give significance and meaning to the movement. This material is open for the use of any member of your staff who wishes to communicate with us. As an indication of the extent of our active correspondence, I enclose a copy of our mailing list on this subject as it stood a month or two ago.

Now I turn to the questions you have raised in connection with environmental education legislation. In answering them, I express a personal view which I believe to be very widely shared and supported by academic people across the nation.

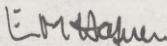
1. Environmental Education as it relates to this legislation is the study of that body of knowledge, both in the natural and social sciences, dealing with man as a principal agent controlling the destiny of his planet. In the natural sciences, it ranks with and to some extent incorporates the disciplines of geology, meteorology, biology, chemistry, physics, and astronomy; in the social sciences it ranks with geography, sociology, anthropology, psychology, economics, and politics.
2. Students need to learn that there is a body of knowledge constituting an environmental study and combining the fields listed above. This is generally thought to mean a requirement for interdisciplinary studies. However, my view is that we must recognize the emergence of a new discipline, which I call Ecography, devoted exclusively to the problems of environmental control, and with its theoretical basis derived from a manageable body of ideas drawn from other existing disciplines. Adults need to learn, if it is not already too late for them, that the management of their every day lives, including especially their attitudes toward the education of their children, bear very heavily on the future of their planet and their species.

3. We should give highest priority to the task of reorganizing existing institutions, and organizing new institutions, so as to combine the study of the natural sciences and the social sciences into new and more relevant patterns. At the level of the secondary schools, this means an enormous revision in the teaching syllabus of almost every area of study. At the university level, it means a reconstruction of academic divisions and departments along completely new lines. Of equal importance, and therefore also of highest priority, is the need to identify and to put to work the teachers and professors whose qualifications and incentives for environmental education are appropriate to the needs of our educational institutions. These people must be given every possible incentive: prestige, academic status, and the promise of those privileges and freedoms generally associated with the work of teaching. And as a fair task of extremely high priority, there is ~~an~~ urgent need to develop academic leadership for the purpose of channeling the immense current of student concern into fruitful courses of study. Naturally, all of these matters are related to each other, and should be considered together in any comprehensive educational program.
4. There are new patterns of American education now emerging and gathering strength, many of which provide us with excellent opportunities for the study of environmental science. Independent study, project orientation in laboratory work, community involvement, and participation in the political process are devices of increasing importance to the development of education. All of them deserve encouragement and support in the development of environmental programs.
5. A school and its neighborhood are immediate and natural laboratories for the study of typical environmental problems. The typical college campus, for example, is a rapidly and chaotically expanding community of tax-exempt construction. It tends to grow without serious concern for the conservation of wildlife, for the increasing burden on local community services, or for comfort and beauty in the design of living and working spaces. Students can learn to recognize these aspects of their environment, to assist in more intelligent planning of new facilities and to criticize and correct existing deficiencies. A school which manages to return pure water and pure air to its community instead of raw sewage and smoke, and salvageable material instead of trash, will become an obvious environmental workshop for its students and a model for other institutions to emulate. While many universities are excellent repositories of scholarship in the arts and the sciences, they fail to lead their communities in environmental awareness, and they become in that sense just another source of community problems. Such institutions should take it upon themselves to clean up and in so doing to teach their students the costs and benefits of environmental control.

6. In addition to its natural role of stimulating and supporting environmental education as provided in the Bill that you are introducing, the Federal Government can devote its agencies and resources to environmental education on an unprecedented scale. To cite only one example of highest importance, the National Science Foundation should take on an environmental mandate comparable in scope and in spirit to the commitment of the space agency to the lunar landing. Taking the explicit goal "A Clean World in the Seventies," the Foundation should *lead* ~~lead~~ the nation in devising and carrying out an environmental program worthy of the cause. Most of its activities would be based in education and research, but they would be designed and intended to spill over into action within industry and government. The Foundation is well staffed for such a project, and it enjoys the respect of scientists throughout America and abroad. What it needs to begin on the task is an explicit mandate and a realistic budget.
7. The training of teachers for these special tasks falls naturally within the competence and interest of the National Science Foundation, and therefore would form an integral part of the national environmental program proposed in Paragraph 6. Summer institutes and in-service training sessions are programs already extensively and competently administered by the Foundation, and the program need only be extended by a significant degree in order to achieve the necessary aims.
8. Your proposed Bill is constructed wisely and solidly for the implementation of a program desperately needed for the proper education of young people. What might be added is a section on adult education. I call your attention, for example, to the Scientists Institute for Public Information (SIPI) which for many years has been sponsoring and supporting local information groups across the country in which scientists and laymen combine forces for the education of communities, largely on environmental matters. SIPI and its affiliates constitute a model which should be very widely copied, and which might be explicitly recognized and supported by the Federal Government on a very broad scale through the mechanisms laid out by you in S. 3151.

I hope these comments are useful to you and that you will call upon me for further assistance on any matter related to this important problem. If our resources would be of any help to you, you are most welcome to call upon us. Meanwhile, let me express my admiration and that of my colleagues for the excellent work you are doing in bringing this critical problem to the attention of the Congress, students, and the community at large.

Yours sincerely,



Everett M. Hafner
Dean
School of Natural Science
and Mathematics

EMH:cb

cc: Bernard Berger, Ray Coppinger, John Foster, Franklin Patterson, Ken Rosenthal

Enclosure

THE UNIVERSITY OF WISCONSIN—MADISON
Center for Environmental Communications and Education Studies

602 State Street
Madison, Wisconsin 53706

March 2, 1970

M E M O

FROM: Clay Schoenfeld

TO: Office of Senator Gaylord Nelson

QUESTIONNAIRE RE ENVIRONMENTAL EDUCATION LEGISLATION

1. What do you believe is the most concise definition of environmental education?

Environmental education may be said to encompass a recognition by man of his interdependence with his environment and all of life, and his responsibility for developing a culture which maintains that relationship through policies and practices necessary to secure the future of an environment fit for life and fit for living.

2. What knowledge, attitudes and skills do students and adults need to learn about the environment?

Development of an awareness of the natural physical environment, a recognition of the interdependence among natural resources and of man's complete dependence upon them, an understanding of intelligent resource conservation and improvement of the physical environment. In essence, environmental education views resources as a community of which man is a part, not as a commodity which man is to exploit. It seeks to lay a basis for action in the public interest, to elucidate the choices in land and water use and relate them to general values and social objectives, to provide integrated approaches to environmental management consistent with ecological principles, economic facts, esthetic insights, and ethical dimensions.

3. What items are of highest priority within the field of environmental education?

Strategically, we must put our trust in a system which protects diversity--diverse species, diverse attitudes, diverse adaptations, diverse experiments, diverse thrusts.

4. What educational vehicles and models would be the most beneficial to achieve the best possible learning experience about the environment?

Establish on appropriate university campuses Environmental Education Centers that will focus on the problem of translating resource management policies and plans into action on the landscape through (a) the collation of information about, and the preparation of practical materials on, restoring the quality of the environment, (b) informal instruction and technical assistance carried out directly to local governments, regional instrumentalities, and citizen groups, (c) the refresher education of key practitioners brought back to the campus for work in natural resource policy implementation, and (d) research in adult education theory and practice. Growing national programs of environmental management depend increasingly on state and local initiative and responsibility. "The problem of the states" as Life Magazine said in its editorial of Nov. 4, 1966, "is not lack of power or opportunity or even solely of money; it is a shortage of competent public servants." The proposed Environmental Education Centers would tackle the problem directly by up-grading such key community leaders as planners, lawyers, resource specialists, adult educators, communicators, teachers, and public administrators, and by reinforcing them with improved educational materials and professional consultation. The Centers would also be concerned with adult education and communications research.

5. What are some fruitful ways to increase the use of the environment as a teaching resource?

Those contending for environmental quality need data to show that economically we can afford such surroundings and that biologically we cannot afford anything less. That information needs to be made applicable and available in localities where the problems exist and where the issues are fought. We have need of not just more research but of bringing existing techniques and existing skills to the service of communities on the front lines. Local leadership needs a point of focus for coordinated action. Local leadership needs a fund of counsel and special talents on which to draw, including the effective stimulus that would come from knowing the experience of other leaders in other communities who have met and overcome some of the common problems. Local leadership needs an infusion of new talent.

6. What role can the Federal Government play in helping to develop programs in environmental education?

A national Environmental Quality Education Act which will make organizational and fiscal provisions for the following main thrusts:

1. At the Presidential level, a National Commission on Environmental Education, charged principally with developing integrated concepts, methodologies, and materials.
2. At the Cabinet level, an integrated National Environmental Education Center, lodged in the U.S. Office of Education but drawing support from all appropriate agencies.
3. At the Regional level, integrated Environmental Education Centers charged with instruction, research, and technical services.

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4. At the State level, Environmental Education Coordinators in each Chief State School Officer headquarters.
5. At the Local level, coordinators, curricula, committees, and sites to translate the national effort into action in the school and on the landscape.
7. How should the requisite teachers' training programs be conducted?

Experimentation in new teaching techniques and materials, in new ways to utilize school sites and other lands for environmental education, in new and improved media for dissemination of information, and in model programs of in-service training of teachers.

Demonstration of media and techniques proven to be effective.

Communication -- of the best thinking on the subject of environmental education.

Cross-fertilization -- of the ideas of creative leaders in environmental education throughout the Nation and the world.

8. What are your specific reactions to S. 3151?

The rationale for an Environmental Quality Education Act is simple: it is unthinking people who pollute the environment, and it is thinking people who can bring about environmental quality conservation, redevelopment, and maintenance. The spirit of the decade is a spirited search for environmental quality. To support and sustain this third American revolution will require an educational program as massive as the problem of human survival.

CAS/rmk

UNIVERSITY OF RHODE ISLAND • KINGSTON, RHODE ISLAND 02881

Office of the Provost for Marine Affairs

401-792-6222

April 14, 1970

The Honorable Gaylord Nelson
United States Senate
Senate Office Building
Washington, D. C. 20510

Dear Senator Nelson:

Upon receiving your letter asking for comments related to the Environmental Quality Education Act tentatively scheduled before the Senate Subcommittee on Education in May, I discussed the matter with several of my colleagues. One of them suggested that this might be an opportunity to allow some of our more concerned students to express themselves on this matter. The enclosed letter is from Mr. Jack A. Donnan a graduate student and a member of Humans to End Environmental Deterioration (HEED). Although I do not concur with Mr. Donnan that there is no need for further "studies and research" I do agree with him that it is very important to broaden our educational base in order to make more people more deeply aware of environmental problems.

Sincerely yours,


John A. Knauss
Provost for Marine Affairs

JAK:abb
Enclosure
cc: J. Donnan

HUMANS TO END ENVIRONMENTAL DETERIORATION

ECOLOGY ACTION FOR SOUTHERN RHODE ISLAND

P. O. Box 9
Kingston, Rhode Island
02881

April 9, 1970

The Honorable Gaylord Nelson
Senate Office Building
Washington, D. C.

Dear Senator Nelson:

Your letter to Professor John Knauss was shown to our organization for comment and suggestions. This is the direction which we as interested students feel should be taken as regards environmental education.

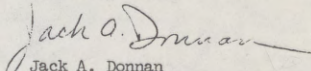
1. The legislation should involve no new studies or research. There are already numerous agencies and organizations through which research funds can be channelled. No need to set up new bodies for this. Further, we feel that enough "Studies and Research" have been, or are, taking place. Programs should be undertaken with the aim of creating an awareness of the environment and its needs to the urban and suburban population.
2. The practical result of this awareness would be a willingness to pay the increasing costs of environmental sanitation and quality. Americans in cities and suburbs pay most of the local and Federal taxes so much of the decision making lies with them. These people are, for the most part, (particularly in the suburbs) protected from seeing or being affected by environmental abuse. It is this 70-80% of the population that we must reach.
3. We propose that environmental education programs be focused on motivating these people in the following manner:
 - a. Environmental studies should be included in all high school curricula.
 - b. High school teachers should be given re-training in environmental subjects.

- c. Environmental programs should be tied to welfare make-work programs. For example, much needed sewer construction in cities could provide much needed employment to thousands of unskilled inner-city dwellers.
 - d. Efforts must be made to carry the message to suburbia where money and votes decide the fate of many environmental investments (sewage plants, parks, etc.).
4. People are not involved in most environmental problems today. With air conditioning, the automobile, and swimming pools, middle class America is as yet insulated from water pollution and solid wastes, or they take such nuisances as smog and congestion as facts of life. It goes without saying that the poor in urban ghettos are insulated in a different, less agreeable manner, but insulated just the same. Environmental education must reach both groups, rich and poor, suburb and ghetto, if it is going to have any effect.
5. We feel that more environmental programs should be introduced into the University level in this manner:
- a. The science course requirements for liberal arts students should be an intensive examination of man and his use of resources. This would be much more valuable to non-science students than any number of biology, chemistry, or geology courses and would better prepare him for an appreciation of what he is paying for in the way of an environment.
 - b. Environmental courses should be required of all engineering students.
 - c. Interdisciplinary environmental departments and curricula should be strengthened or established in areas where they presently do not exist.
 - d. These curriculum changes could be effected by providing money for teacher salaries, equipment, and student aid tied specifically to environmental studies.
6. In summary, we feel that legislation, money, and efforts should be directed at action programs and not siphoned off into "further research" or into the "R&D-university complex". We would, of course, caution against establishing new bureaucracy but would hope that present enthusiasm and good intentions are not attenuated by the old bureaucracy.

We hope that these comments have some bearing on your inquiries, and we remain at your service if you require any further assistance.

Best of luck in your endeavors.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "Jack A. Donnan", with a long horizontal flourish extending to the right.

Jack A. Donnan
for Humans to End Environmental
Deterioration

JAD/seg



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