

## CONSERVATION EDUCATION: CRUCIBLE FOR ATTITUDE DEVELOPMENT

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The most casual inquiry into the field of conservation reveals the complexity of the problems involved and the diversity of opinions that are held. In fact, since its inception, the conservation movement has fairly bristled with "issues." Even those who might be termed "conservationists" have found controversies arising within their own ranks. Hammar suggests that "Much obvious confusion in the field of conservation is apparent because the conservationists have been unable to state clearly when a restrictive and when an expansionist or developmental policy should be followed."<sup>1</sup> Hammar is probably justified in his appraisal. But it should be pointed out that the confusion to which he refers stems largely from the social implications of some of the major issues of conservation. Perhaps part of the difficulty lies in the fact that in the past conservationists have not outlined objectives specific enough in nature to permit attainment. Neither have they agreed upon criteria or definitions of conservation in terms of specific resources. Ostrolenk says ". . . this is a difficult subject because there is no clear concept of what is meant by 'conservation' and by 'natural resources'."<sup>2</sup> Bunce conveys the same idea when he states that, "It appears impossible to define conservation in such a manner that it will apply with equal validity to all resources, unless it is done in such broad terms as to become practically meaningless. For this reason the use of specific definitions related to clearly defined cases seems desirable."<sup>3</sup> Zimmermann further substantiates the contention in the statement that, "Even if conservation is applied solely to natural resources such as water, soil, minerals, etc., it does not call for a single set of rules but for several, carefully adapted to the peculiar nature and requirements of the different types of resources."<sup>4</sup>

In light of the foregoing the schools may well ask, "What are we to teach about conservation?" or "If the conservationists themselves are not clear on some of these issues how can they expect us to be?"

Certainly a subject should not be excluded from the curriculum simply because of its controversial nature, although the distinguished Judd implied this in many of his writings. He ventured the opinion

<sup>1</sup> C. H. Hammar, "Society and Conservation," *Journal of Farm Economics*, XXIV (Feb., 1942), p. 109.

<sup>2</sup> Bernhard Ostrolenk, *Economic Geography*, Chicago: Richard D. Irwin, Inc., 1941, p. 763.

<sup>3</sup> Arthur C. Bunce, *Economics of Soil Conservation*, Ames, Iowa: Iowa Collegiate Press, Inc., 1945, p. 4.

<sup>4</sup> Erich W. Zimmermann, *World Resources and Industries*, New York: Harper and Brothers, 1933, p. 796.

that it was less harmful to exclude the discussion of public utilities than to suffer the pro-trust propaganda in the schools!<sup>5</sup> As for the question of what to teach in conservation Burnett puts it this way: "The question is not to teach 'fundamentals,' but rather what information, attitudes, and skills *are* fundamental for optimum living in America today."<sup>6</sup>

Too often teachers assume that if students acquire certain factual information they will behave in certain desirable ways. Mere knowledge of a particular referent,<sup>\*</sup> however, does not preclude favorable behavior in respect to it. Witness the incident related by Palmer about the biology teacher who ". . . taught a lesson on fish by using undersized trout that he captured in a net out of season, in a posted area, and that he held captive without a licence to do so."<sup>7</sup> This example, together with many others that might be cited, serves to emphasize the fact that behavior is contingent upon other factors besides knowledge. There is considerable evidence to indicate that one of the most potent of these factors is attitude. Young puts it rather succinctly by stating that, "All we can say is that when the time comes to act the attitude will enter in as an essential factor."<sup>8</sup>

If attitudes are the determinants of behavior, as Hoover<sup>9</sup> has pointed out, what are the implications for teachers of science, especially when they are dealing with a course or a unit as personally and socially significant as is conservation? What attitudes are the desirable ones? What source materials should be employed? Should the teacher make known his own opinions, and if so, at what point during the instruction? These and many other questions will legitimately intrude upon the minds of thoughtful teachers. There will be some who will even doubt that attitudes are teachable. Not too long ago a scientist, distinguished in his own field of electro-chemistry, stubbornly maintained that attitudes can *not* be taught! To such people one can only cite the evidence of experimental research and hope for the best. Thorndike has summed up the results of the research in these words:

We now know that the fundamental forces which can change desires and emotions, directing them into desirable channels, are the same as change ideas and

<sup>5</sup> Charles H. Judd, "Scientific Techniques of Curriculum Making," *School and Society*, XV (Jan. 7, 1922), pp. 1-11; "Curriculum: A Paramount Issue," N.E.A., *Proceedings*, 1925, pp. 805-811; "Method of Securing National Educational Standards," *Educational Record*, IX (April, 1928), pp. 81-95; "Place of Research in a Program of Curriculum Development," *Journal of Educational Research*, XVII (May, 1928), pp. 313-323.

<sup>6</sup> R. Will Burnett, "Conservation: Focus or Incident in Science Education," *Science Education*, XXVIII (March, 1944), p. 84.

<sup>\*</sup> A referent is here defined as anything—a person, a group of persons, an institution, an object, or an idea.

<sup>7</sup> E. Lawrence Palmer, "Conservation Education in the Schools; Report of School Activities and Suggestions as to Programs," *Nature Magazine*, XXXII (Nov., 1939), p. 512.

<sup>8</sup> Kimball Young and Others, *Social Attitudes*, New York: Henry Holt and Co., 1931, pp. 8-9.

<sup>9</sup> Floyd W. Hoover, "Attitudes, Those Elusive-Behavior Determinants," *Educational Administration and Supervision*, XXXI (April, 1945), pp. 215-222.

actions. A human being learns to react to the situations of life by such and such wants, interests, and attitudes, as he learns to react to them by such and such percepts, ideas, and movements. In both cases, the task of education is to cause the desired connection to occur and to attach the confirming reaction to it.<sup>10</sup>

That attitudes can be taught is implicit in the objectives set forth by some of the official committees on science teaching.<sup>11</sup> If they can not be taught the listing of them as important objectives would appear to be a rather dubious procedure.

With respect to the changing of attitudes teachers of conservation are referred to the study by Williamson and Remmers.<sup>12</sup> They set out to:

- (1) measure persistence of group attitudes changed by defined social stimulus material,
- (2) measure the respective variabilities of the groups to discover whether they become more or less homogeneous after the presentation of such material,
- (3) compare rural with urban group-attitudes produced by defined social stimulus material and to compare their relative homogeneity after the presentation of such material.

The five attitude objects were:

- (1) allowing the government to tell the farmer how to farm,
- (2) allowing each farmer to farm as he pleases,
- (3) clean farming,
- (4) taxing all the people to plant new forests, and
- (5) draining swamps.<sup>13</sup>

In their results the investigators have this to say: "... with exposure to information about an issue, stereotyped attitudes appear to break down and become individualized."<sup>14</sup> The conclusions reached are deemed to be of sufficient interest to justify their whole inclusion:

- (1) the attitudes of high school pupils toward certain conservation issues can be significantly changed in a desired direction.
- (2) the attitudes of high school pupils toward certain conservation issues, having been changed by defined stimulus material, tend to persist as changed after a lapse of as much as eight months.
- (3) the attitudes of the group were generally less homogeneous after presentation of the stimulus material than before.
- (4) the rural group tends to be less affected on the average by the stimulus material than the urban group.<sup>15</sup>

A close examination of the techniques employed in the experiment just cited raises the question of what is meant by "defined social

<sup>10</sup> Edward L. Thorndike, *The Psychology of Wants, Interests, and Attitudes*, New York: D. Appleton-Century Co., Inc., 1935, p. 217.

<sup>11</sup> Annual Report of the Conservation Committee of the Central Association of Science and Mathematics Teachers, *SCHOOL SCIENCE AND MATHEMATICS*, XL (Jan., 1940), p. 74; *Science Education in American Schools*. Forty-sixth Yearbook of the National Society for the Study of Education, Part I, Chap. III, Chicago: Distributed by the University of Chicago Press, 1947.

<sup>12</sup> A. E. Williamson and H. H. Remmers, "Persistence of Attitudes Concerning Conservation Issues," *Journal of Experimental Education*, VIII (March, 1940), pp. 354-361.

<sup>13</sup> *Ibid.*, p. 354.

<sup>14</sup> *Ibid.*

<sup>15</sup> *Ibid.*, p. 361.

stimulus material." It might be argued that any attitude whatsoever can be induced by the presentation of suitably "defined social stimulus material." Another question that arises, and one closely related to the first, is what was the nature of the teaching procedures employed. The answers to these two questions may lend a clue to the questions formerly raised in regard to what attitudes are desirable and whether or not the teacher should make known his own opinions. As for the latter, an appropriate reply is suggested in the following paragraph:

Respect for pupil personality requires that a teacher will refrain from presenting a single solution to a pupil as a sort of fixed pattern that a pupil must accept. The democratic and American way of solving a social problem demands that the greatest number possible of our future citizens shall be taught to consider fairly the arguments for each of a number of alternative solutions. Hence there can be no question as to the teacher's right to deal with controversial issues, if the continued improvement of our fundamental institutions is to be assured. But to be able to "get away with this" the teacher must have a very broad scholarship, the ability to deal with delicate matters in an impersonal, objective, and fairminded way; the disposition to keep an argument free from emotion; and the habit of keeping his own views out of the picture until some pupil says, "Where do you stand?" then taking a definite position, but admitting that we all have our biases and prejudices and that at best his own opinion is merely one of alternative solutions.<sup>16</sup>

Any attempt to answer the first question must be predicated upon the method employed to achieve the desired attitudes. Two such methods are possible in the establishment of new values:

1. *propaganda* in which we (the powers that be) decide what values should be set up, and which resorts to any technique to accomplish its ends,
2. *education* which permits the learner to decide what values are the most efficacious, and which implies much greater respect for the individual.

If it is agreed among teachers that education shall be the way, the answer as to what attitudes are desirable is *scientific attitudes*.

It may be well to remind those who worship pure science to the extent of slavish adherence that ". . . all ideas, being social in origin, have, in a certain sense, social implications; and sometimes the social implications of what appear to be purely individual or abstract ideas are even more important than specific attitudes toward social relationships and problems."<sup>17</sup> "Science is not a technique or a body of knowledge, though it uses both. It is rather an attitude of inquiry, of observation and reasoning with respect to the world. It can be developed, not by memorizing facts or juggling formulas to get an answer, but only by actual practice of scientific observation and reasoning."<sup>18</sup>

<sup>16</sup> Raleigh Schorling and Howard Y. McClusky, *Education and Social Trends*, New York: World Book Company, 1936, p. 140.

<sup>17</sup> Merle Curti, *The Social Ideas of American Educators*, New York: Scribner's Sons, 1935, p. xiv.

<sup>18</sup> Karl T. Compton, "Science in Education," *Science Education*, XX (April, 1936), pp. 53-56.

The broad field of conservation, which demands a thorough understanding of the complex interrelationships of the social and economic forces with the physical, provides excellent opportunities for teachers to stage learning experiences, from which scientific attitudes may be derived. It is, indeed, a crucible for attitude development.

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#### THE MASTER'S DEGREE IN PHYSICS AT MICHIGAN STATE

Michigan State College will take the lead this year in offering a new program for obtaining the master's degree in physics—entirely through summer session work.

Students or teachers with bachelor's degrees in physics, or equivalent training, may complete requirements for the M.S. degree by attending four successive nine-week summer sessions, according to Dr. Thomas H. Osgood, Dean of the School of Graduate Studies.

The new program, which is in addition to graduate physics work available during the regular academic year, will offer graduate and advanced undergraduate courses. Most of these may be taken for graduate credit.

Beginning June 22 this year, advanced undergraduate courses will be offered in mechanics, electronics, modern physics, and radioactivity. These and advanced undergraduate courses in electricity and magnetism and in physical optics will be offered at least once during four successive summers.

Graduate courses, Dean Osgood said, will include introductory theoretical physics (mechanics), nuclear physics, electromagnetic theory, thermodynamics-statistical mechanics, atomic and molecular spectra. Each of these will be offered every other summer, with the exception of thermodynamics. It will be offered at least once every four years.

The four-year program is expected to be especially helpful to teachers, because of the "summer-only" work. Also interested are students, and workers in research laboratories, engineering firms and industrial organizations.

The 1954 summer session catalog may be obtained from the Director of the Summer School, Michigan State College, East Lansing, Mich. The Graduate School catalog and information about admission to the School of Graduate Studies may be obtained from the Dean of the School of Graduate Studies.

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#### NAUTILUS POWERED BY FIRST ATOMIC ENGINE EVER TO PROPEL A SHIP

The U.S.S. *Nautilus*, will be powered by the first atomic engine ever to propel a ship.

Built by Westinghouse Electric Corporation, under contract with the Atomic Energy Commission, the *Nautilus'* atomic power plant actually ranks as the second full-size power-producing atomic engine in the nation's history—the first (Mark I) being a land-based prototype.

But the *Nautilus* engine (Mark II) will be the first ever to provide the motive power for any vehicle or vessel by controlled nuclear fission. With most components of the engine now installed inside the *Nautilus* hull, Mark II is the most powerful submarine engine ever built. Fleet type submarines in World War II had engines of about 6,000 horsepower.

Capable of speeds above 20 knots while submerged, this atomic engine brings to reality the dream of useful power extracted from the same material—uranium 235—that was the heart of the first atomic bomb.

Because a nuclear reactor of this type does not require oxygen for its operation—as does a combustion engine—the *Nautilus* will be able to operate at top efficiency for long periods of time while submerged. It thus will be the first true submarine.