Current Developments in Education . . .

Science Education

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Science education in elementary and secondary schools was, until the last decade, largely ignored by the scientific community. It is highly significant that of the three NSSE yearbooks (1) devoted to science education, only the most recent recognizes the important role that the scientific community can play in science education.

A partial explanation is that in the first half of this century, there was little cooperation and interaction on the concerns of science education between scientists and teachers of science in elementary and high schools. Within the last decade this has changed.

Scientists have gradually become aware of science education first in the secondary school and more recently in the elementary school. This awareness and a concomitant growing concern about the quality of science education have led to the involvement of many scientists in matters of curriculum and teaching. As Bruner states, "Major efforts in curriculum design had been launched by leading physicists, mathematicians, biologists, and chemists, and similar projects were in prospect in other fields of scientific endeavor" (2).

Unfortunately, in many places, misunderstandings and ill will have characterized the relationships between scientists and educators. This can be largely avoided if scientists realize, as they have in Hawaii, that educators have a great deal to contribute to these efforts to improve the quality of science education.

Historically, in Hawaii, the relationships between science education and the scientific community are interesting. In 1926, the retiring president of the Hawaiian Academy of Science stated that the Academy had no interest in science teaching. He and most of the other scientists in Hawaii believed that teaching should be left to the teachers in the schools and that the Academy should serve only professional and amateur scientists. This belief persisted until recent years.

In 1953, as an affiliate of the American Association for the Advancement of Science, the Academy presented two honorary AAAS memberships to high school students. This act helped to make the scientific community aware of the lack of contact between scientists and those teaching science in elementary and secondary schools. From 1954 to 1956 a number of attempts were made to close this gap.

In 1958, the Hawaiian Academy of Science sponsored the first statewide science fair held in Hawaii and upon the recommendation of the fair committee established the Inter-Society Science Education Council. ISSEC "was instructed to organize the next science fair and to promote the extension and improvement of science education in other ways" (3). From the very beginning ISSEC was a cooperative endeavor involving not only scientists from a wide range of research areas, but also educators from the University of Hawaii, the public schools and the private schools. This wide and active representation on the part of all concerned with science education is undoubtedly the reason for the phenomenal growth and success of ISSEC's program.

During the past year the activities of the scientific community in Hawaii, under the direction of the Inter-Society Science Education Council of the Hawaiian Academy of Science and Associated Societies (4) included the following programs.

Science Fair. For the fourth consecutive year, ISSEC sponsored a state-wide science fair. The primary purpose of this fair is to inspire the young people of Hawaii to engage in some scientific research work. The fair seems to be achieving its purpose, because last year more than five thousand secondary school student projects were exhibited at local fairs throughout the islands. An estimated 25,000 people viewed the exhibited projects at local fairs and at the state fair. At the state fair two outstanding projects were selected from the 150 shown and the responsible students exhibited them at the National Science Fair-International in Kansas City, Missouri. The scientific community not only sponsored the fair but also through its organizations and members provided assistance for students work-

ing on projects and gave awards to outstanding students.

Science Clubs Service. The program of the Hawaiian Science Clubs Service was directed toward increasing interest in and promoting science clubs in secondary schools. In addition to this primary function, workshops were conducted for science teachers and a weekly television program, *Science in Hawaii,* was produced locally. Interest and activity in science clubs on all of the islands increased rapidly as a result of the services provided by this program: arranging field trips, providing guest speakers, making film loans, distributing scientific and technological literature, arranging weekend science camps and cruises, giving advice on science projects, and lending out surplus electronic equipment.

Student Science Seminar. The seminar program was initiated three years ago, because an evaluation of the local high school science curricula indicated that superior "science-prone" students were not being satisfactorily challenged. The seminar was designed to meet this need by providing a weekly series of evening meetings for these young people with outstanding local and visiting scientists. An indication of the seminar's success is that, even though the participating students receive no academic credit, their attendance at meetings has consistently averaged better than ninety per cent. Meetings in the past have been conducted by a wide range of individuals, including anthropologists, philosophers of science, mathematicians, marine biologists, geneticists, psychologists, volcanologists, chemists, physicists, oceanographers, biochemists and missile experts. From a single seminar group, this program has expanded until it now includes student science seminars on the four major Hawaiian islands: Oahu, Hawaii, Maui, and Kauai.

Teacher Science Seminar. In another phase of the scientific community's science education activities, teachers from elementary, intermediate, and secondary schools are invited to attend lectures and demonstrations designed to improve their science subject matter backgrounds and to help keep them informed about recent scientific advances. Teacher response to this program has been very favorable. Their attendance at meetings has been further encouraged by credit offered them by the State Department of Education.

Museums in Miniature. This project is carried on by ISSEC with Bishop Museum cooperation. Museums in miniature are portable exhibits which are loaned on request to schools in Hawaii. Included with each exhibit are suggestions for teaching which have proved to be helpful. About fifteen exhibits are available for distribution including ones on the coral reef, poisonous plants in Hawaii, geology of a volcanic island, and others on Hawaiian butterflies, crabs, fishes, and marine shells.

Elementary Science Texts. This is the only organized scientific community project geared primarily for the elementary grades. It began in 1955 under the auspices of the Roman Catholic Diocese of Honolulu. It was designed to provide a graded series of supplementary texts covering the scientific aspects of Hawaii. Most standard elementary science textbooks do not deal with such information, since they are geared primarily for children living in temperate areas. Such science topics as Hawaii's plants and animals, the unique water supply, volcanoes, coral reefs, and marine invertebrates are included. In 1959, ISSEC endorsed this project and since then members of the Hawaiian Academy of Science have been supplying aid for the texts in a variety of ways. Books I-VI have been published and are available for use in the schools, and books VII and VIII will be available this year.

Other ISSEC projects are the *Teachers Coordination and Science Talent Search,* which keeps teachers informed about ISSEC's activities and directs a science talent search for Westinghouse Science Awards; the *Counseling and Scholarships Program,* which helps teachers and students in regard to questions dealing with programs and scholarship opportunities at different colleges and universities; and the *Science Library Resources Program,* which is designed to aid local libraries by the distribution of science bibliographies and the circulation of three sets of the Travelling High School Science Library and two sets of the Travelling Elementary School Library to schools on all of the islands.

The last ISSEC project to be noted here is a committee on *Public Relations and Community Participation.* The committee serves a most important role in ISSEC's overall effort in regard to science education and its work is, in a sense, related to all the ISSEC activities described here. The committee is primarily responsible for press, radio, and television coverage of all of ISSEC's programs and for raising the necessary funds to pay for equipment, materials, books, films, and services not contributed.

Certainly the crucial factor in the rapid growth and success of the activities of ISSEC is the cooperative efforts of scientists from many disciplines and professional educators from the University of Hawaii, the public schools, and the private schools. In addition, there are other factors which have contributed to the success of the program. The financial support

Continued on page 21