SCIENCE EDUCATION

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ABSTRACTS

Wabash Summer Aquatic Biology Program—The First Year. AUSTIN E. BROOKS and WILLIAM N. DOEMEL, Department of Biology, Wabash College, Crawfordsville, Indiana 47933.——The Wabash Summer Aquatic Biology Program provides undergraduates a unique opportunity to learn about aquatic microbial ecology and camping—wilderness techniques. For each of four summers, students will visit a different aquatic ecosystem. This past summer the focus was the extreme environments of Yellowstone National Park. In subsequent summers visits will be made to the Wisconsin lakes and the Boundary Waters (Mn), the Northeast seacoast, and the Southeast seacoast. A 34 foot avion trailer serves as a laboratory. Equipped with an epifluorescense and 8 phase microscopes, a liquid scintillation counter, spectrophotometers, pH meters and other limnological supplies, this laboratory enables students to study microorganisms in their natural habitats and to isolate them in pure culture. The course consists of a number of orientation laboratories in which students learn microbial techniques. The primary emphasis, however, is placed on the development of projects by each pair of students. The students sleep in tents and are responsible for preparing all of their meals. Although consuming a considerable amount of time each day, through these activities the students learn much about themselves and about cooperation with others. Also many informal discussions highlight the significant scientific experiences of the day. We believe that the concept of a well-equipped mobile laboratory and tents—a traveling field course—offers an exciting alternative to the traditional field station.

Botanical and Zoological Prints in the Collections of the Hugh Thomas Miller Rare Book Room, Irwin Library, Butler University. RICHARD A. DAVIS, University Librarian, Butler University, Indianapolis, Indiana 46208.——A short history of the development of biological illustration which begins with the "Hortus Sanitatus" of 1491, and includes examples from such monuments of natural history as Fuchs "Historia Stirpium" (1542), Gesner's "Historia Animalium" (1551-), William Curtis' "Flora Londinensis" (1777-), and the frontispiece "Portrait of Linnaeus in Lapland Dress" from Thornton's "Temple of Flora" (1799-), as exemplified by the collection of original botantical and zoological prints housed in the Hugh Thomas Miller Rare Book Room of the Irwin Library.

This collection of some 80 original graphic works is in two parts: The Jeanette Siron Pelton collection of Botanical prints; and a parallel collection of zoological prints.

The collections were formed during the years 1970-73 with the encouragement of Dr. John F. Pelton, Chairman of the Department of Botany at Butler, and a grant for library enrichment from the Sears-Roebuck Foundation.

A Simple Quantitative Method for Teaching Phylogenetic Relationships Among

Animal Phyla to College Freshman. JAMES D. HADDOCK, Department of Biological Sciences, IU-PU at Fort Wayne, Fort Wayne, Indiana 46805.——A technique is described to enable students in introductory zoology to become better acquainted with major phyla of animals and their relationships to one another. In the laboratory, students first are asked to determine to what phylum an organism belongs by using a traditional taxonomic key. After having correctly identified the organism, students then are asked to assign a point value to each phylum based on an accompanying chart listing a variety of characteristics. Each attribute, such as body symmetry, for example, will have a number of alternatives—each having a point value. Each phylum thus receives a total score based on the sums of the aggregate characteristics. By looking at point values and totals, students can easily spot evolutionary trends and identify "simple" and "complex" phyla. Also by observing clusters of numbers, even non-science majors can easily achieve a quick, overall understanding of phylogenetic relationships among major groups.

STEP: The First Year: JOHN A. RICKETTS, Department of Chemistry, and PAUL B. KISSINGER, Department of Physics, DePauw University, Greencastle, Indiana 46135.——STEP, an acronym for Science Training Enrichment Program, is an attempt to strengthen science and mathematics education in the secondary school. The premise of STEP, which is supported by a three-year grant from the International Business Machines Corporation, is to create a viable, academic, high school-college interface across which science education can be promoted. It is anticipated that STEP might serve as a successful model to strengthen the education in the high school for any academic discipline.

The major components of STEP during the first year were:

(1) *The Planning Session*: All aspects of STEP were formulated in cooperation with science teachers from the participating high schools and DePauw science faculty during a two-day summer workshop.

(2) *Saturday Science Seminars*: One hundred thirty-five high school students (and 18 teachers) received 16 hours of instruction in one of the basic areas, *Computers and Mathematics*, *Physical Sciences*, or *Biological Sciences* on four Saturdays, two each semester.

(3) *"Frontiers of Science" Lecture Series*: Four eminent scientist/educators visited the campus and presented their views. The series was open to the campus and the community and also was advertised to the high schools within commuting distance of DePauw University.

(4) *Computer Science Module for High School Teachers*: Seventeen teachers received 16 hours (four successive Saturdays) instruction in programming skills and the use of the computer.

(5) *Consultants Service Program*: This component provides for visiting lecturers to the high school and also offers the opportunity to the high school to use the science facilities at DePauw University.

(6) *Summer Practicum in Science*: A two-week total immersion in one of the following areas, *Physics, Chemistry and Computers, Topics in Mathematics, or Introduction to the Biological and Health Sciences*, attracted 48 students from six states.

Formal assessment of the impact of the program will be made at the end of the second year. A random sampling of student participants from the two years and their science teachers will be invited to campus in order to evaluate the real strengths and weaknesses of the program.

Summary Report of Science Educators' Survey of Science Methods Curriculum. STANLEY S. SHIMER, Science Teaching Center, Indiana State University, Terre Haute, Indiana. 47809.——The purposes for this study were: 1) to identify the science educators' consensus regarding the content for the selected topics within the elementary school teacher preparation curriculum and 2) to examine the science educators' opinions concerning the content that should be included in an elementary school teacher education program. The science educators who were surveyed in this study (N = 44) were selected from recognized leaders in the field throughout the nation.

The instrument used in this study was the Science Educators Opinion Survey (Appendix A) which consisted of two parts. The questionnaire was sent to seventy-two (72) science educators located in forty-five (45) states. The mailing consisted of a cover letter, the *Science Educators Information* questionnaire, the *Science Education Opinion Survey*, and a self-addressed, stamped envelope. Three weeks after the original mailing a follow-up reminder postcard was sent to all non-respondents.

A panel of forty-four (44) science educators was asked to indicate the best context in which each of the forty-six (46) curricular topics should be presented. The context options provided were: (A) Science Methods; (B) Foundations of Education; (C) Introduction of Education; (D) Educational Psychology; (E) Others and (F) Uncertainty. As a first step in analysis, the responses were grouped. The designation "A" was used for the responses which indicated the context of science methods only. The group "B" denoted the responses in which science methods plus one or more of the other option areas was the recommended context. If the science educators' responses recommended that the topic should not be taught in science methods, the response was put into group "C".

The Crosstabulation Procedures and the chi-square test were used to determine whether there was agreement regarding the placement of the forty-six (46) topics in the curriculum of the pre-service elementary school teacher.

In conclusion, the science educators did come to an agreement of what should be taught in science elementary methods class. The author has made some specific recommendations for future science methods teachers. If done again, it also should try to identify the trends in science methods preparation for elementary majors.

The Necessity and Methods of Teaching Communication Skills for Science Fair Participants. PATRICIA ARNETT ZECK, Northwestern High School, 3917 North Northwestern Road, Kokomo, Indiana 46901.——Written and oral self-evaluation and discussion by advanced biology students indicate a direct correlation between communication skills and success in science fair competition. An increasing number of judges is reading the research paper in its entirety. Oral questioning may last as long as twenty minutes per judge with a minimum of 3 judges per student. To help the student prepare for a successful experience it is necessary for the science teacher to guide more than scientific research of each student. He must also aid in the library research of each student. He must review reference citation form, mathematical analysis and computation, and graphing. He must stress organization and presentation of data. He must mark the written paper for grammar and spelling. He should demonstrate the rudiments of effective speaking through personal appearance, poise, gestures, voice control, and elimination of distracting mannerisms. He should help the student arrange a color coordinated display board with topics according to the scientific method in order to facilitate an organized analysis and presentation. Following these guidelines will help the exhibitor to have greater confidence and success in his discussion of his science project.