SCIENCE EDUCATION

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ABSTRACTS

The Purdue Atmospheric Science Education Project Summer Program. Michelle E. Akridge, Gerald H. Krockover, David R. Smith and John T. Snow, Department of Earth and Atmospheric Sciences, Purdue University, West Lafayette, Indiana 47907.——In July 1987, 26 Indiana middle school/junior high school teachers participated in a four week atmospheric science program. The program was supported by a grant from the National Science Foundation. It was designed to improve the atmospheric science backgrounds of the participants and to assist them in applying the acquired knowledge into their classrooms. The program staff consisted of a combination of atmospheric scientists and science educators in order to provide a good mix of science and methods. The program format was a daily schedule of atmospheric science lecture and three hands-on laboratories: a field lab, an analysis lab, and a physical lab. Educational applications seminars were also conducted to provide the teachers with an opportunity to develop implementation plans for atmospheric science materials and equipment.

Some of the program laboratory exercises as well as some of the plans for classroom implementation will be presented.

1800's American Observatory and Laboratory Equipment. Vincent A. DiNoto, Jr., Department of Physics, Jefferson Community College Southwest, Louisville, Kentucky 40272.——The physical science equipment of the early United States college laboratories and observatories will be discussed. The equipment of most of the early American laboratories was manufactured in Europe through the early 1800s. By the middle of the 1800s skilled craftsment began to construct much of the equipment for the college laboratories, while some of the major institutions of higher learning still purchased European equipment. In this paper the equipment manufactured by American craftsmen will be discussed with particular interest given to the Clarke and the Pope Companies.

The use of this historical equipment in the teaching of the physical sciences will also be explored.

Environmental Archaeology and Ethnobiology. Gary E. Dolph, Indiana University at Kokomo, Komomo, Indiana 46902.——Almost unnoticed, two new topics have been slowly emerging in advanced placement and college level introductory botany and biology textbooks—the origin of agriculture and the form and function of domesticated plants and animals. To obtain background information on these topics, a wide variety of fine reference books are available. In contrast, practical field experience is more difficult to obtain. Therefore, I would like to discuss a very pleasant and cost-effective method of obtaining this experience. I would recommend studying Southwestern Indian (Anasazi) efforts at demostication and agriculture by attending the Crow Canyon Archaeological Center near Cortez, Colorado. Two sites, the Duckfoot Site (860 A.D. to 880 A.D.) and the Sand Canyon Pueblo (1232 A.D.

to 1274 A.D.), are being excavated by the Crow Canyon staff. I recommend working at the Duckfoot or similar Pueblo I Site, because at this time, the Anasazi were actively attempting to expand their agricultural resource base in the face of climatic deterioration and increasing population size.

Pick a Pocket. MARY L. FRENCH, Linton-Stockton Elementary School, Linton, Indiana 47441 and STANLEY S. SHIMER, Science Teaching Center, Indiana State University, Terre Haute, Indiana 47809.——This will show an activity that will help emphasize science and also control students. The procedure works as a behavior modification for students. We will give you the rules and a diagram of how it works and how it benefits students and teachers.

Physics Curriculum Modification to Include Holography in High School Optics Programs. UWE J. HANSEN, Department of Physics, Indiana State University, Terre Haute, Indiana 47809.——During the past two years the Indiana Commission for Higher Education has supported the Indiana State University physics department with Title II funds to conduct a series of workshops designed to prepare teachers to include holography in the high school physics curriculum. Minimal equipment was provided to participating schools for program implementation. Successes and difficulties in curriculum design will be discussed along with basic holography principles and their implications in course modification.

Holography in the High School Classroom. PAUL MASON, South Vigo High School, Terre Haute, Indiana 47802 and UWE J. HANSEN, Department of Physics, Indiana State University, Terre Haute, Indiana 47809.——Enrollments in high school science classes have shown some alarming trends during the last few years. One approach to remedy the situation is to include topics in the curriculum which convey to the students some of the excitement of contemporary science. This is difficult since much of the frontier of contemporary physics involves sophisticated equipment inaccessible at the high school level. Holography is an exception to this dilemma. With relatively modest means acceptable holograms can be produced by students in a high school laboratory. Minimal equipment will be discussed and examples of production of single and multiple beam reflection and transmission holograms will be given.

Laboratory in Engineering Physics: Elastic Behaviour of Beams. JOHN OSTENDORF Department of Physics and Engineering, Vincennes University, Vincennes, Indiana 47591 and UWE J. HANSEN, Department of Physics, Indiana State University, Terre Haute, Indiana 47809.——Laboratory modules to explore principles of applied statics were developed and tested in a classroom setting. The modules comprise the following topics: (1) Determination of the modulus of elasticity of bending structural members. (2) The mathematics of bending Beams. (3) The Cantilever Beam with Concentrated Load. (4) The Cantilever Beam with Distributed Load. These laboratory modules were developed for a second year engineering physics curriculum, however preliminary classroom tests and evaluations indicate possible adaptability to a general advanced applied physics laboratory in a regular physics curriculum.

Defining the Limitations of Computers in Science Education. JOHN RICHARD SCHROCK, Division of Biological Sciences, Emporia State University, Emporia, Kansas 66801.—— When routine word-processing, record-keeping and data management are separated from bona fide educational tasks, the predicted advantages of computers in education have failed to materialize. Developments in semantics and cognition science and the failure of computers to accomplish simple tasks in "commonsense" and recognition indicate innate limitations to computer use in science education. While this boundary of limitations cannot be finely defined, the following functions appear to be well beyond the abilities of computers: provision of word "meaning", reward of insightful non-standard answers, provision of non-audio-visual stimuli, provision of test-truthfulness, provision of real consequences, prediction in open systems, prediction in chaotic systems, rare and deviant cases for expert systems. However, most of these functions are easily provided by standard laboratory and field techniques. No justification is found for replacing any safe and practical laboratory exercise or field trip. The dangers of abandoning reality for simulations is illustrated by a newly marketed computer simulation that is elegant but erroneous.

How to Utilize Rose Colored Glasses. Stanley S. Shimer, Science Teaching Center, Indiana State University, Terre Haute, Indiana 47809.——This presentation will show how to make Rose Colored Glasses. I will describe how this will be implemented into an elementary classroom to teach science. It will involve the student with first-hand experiences, collecting data and raising questions. This will allow the students to explore the effects of various colors on observation.

Pan Am Animal Sciences Exchange: Internationalizing Animal Sciences Education. Michael H. Stitsworth, Department of 4-H Youth, Purdue University, West Lafayette, Indiana 47907.——A $18,200 grant awarded to the Department of 4-H Youth at Purdue University by The National Association of the Partners of the Americas is providing an exchange of Indiana 4-H club members and 4-S club youths in Rio Grande do Sul, Brazil. The Pan Am Animal Sciences Exchange permitted sending ten 4-H members enrolled in animal sciences 4-H project areas to Rio Grande do Sul for 6 week homestays during the summer of 1987. Purdue University faculty assisted the hosting Brazilian 4-S organization in structuring appropriate thematic experiences. The 4-H members lived on typical Brazilian animal production farms and toured agricultural training facilities, processing operations, and exporting facilities. In the summer of 1988, eight Brazilian 4-S club members will live on Indiana farms for six weeks to learn about animal science practices, research, and technology in Indiana.

Four-H, a program of the Purdue University Cooperative Extension Service, is Indiana's largest non-formal educational program with a membership of 160,000 youth distributed among Indiana's 92 counties.