The Feasibility of Conducting Successful Biological Field Studies

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The author is Professor of Science, and in this article tells about a unique summer program for high school students in field biology. There are clear admonitions and cautions and wise advice to those who comtemplate this type of program.

Within the past few decades the field study approach to the teaching of different aspects of the biological sciences has grown increasingly popular at all levels of instruction. The natural laboratory of the outdoor world has, in most cases, provided an opulence of specimens for students of all ages. The specious merits of field studies are deceptively alluring, and many instructors have been ensnared into the camouflaged pitfalls which inevitably accompany variation from standard instructional procedures. Field studies in the biological sciences can be found in the catalogs of most large colleges and universities. These programs, when conducted under the guidance of competent biologists and illustrious professors, have proved to be efficacious courses. Successful field courses are by no means restricted to the college level. Numerous secondary school instructors have offered excellent field instruction; unfortunately most of this commendatory effort has been expended during the post-curricular hours, and little if any recognition has been given. It is valid to assume that the vast majority of biology teachers have never attempted a field study, but many instructors are presently contemplating this type of endeavor for the first time. It is to this group that the following description of a field study program and suggestions are directed.

By means of a generous grant from the National Science Foundation, the program "Ecological Field Studies in Conservation" for academically superior secondary school students was conducted by State University College of Education at Geneseo, New York, from July 5 through August 12, 1961. It was conceived and developed as a cooperative effort by Roy I. Satre, who served as professor in charge of instruction and this writer, who served as director. The advantageous location of the campus in the verdant hills of the rural Genesee Valley favored a field study course which incorporated advanced aspects of ecology and conservation. The college was, therefore, a locus from which the staff and participants could ideally sweep out a 360° circle to a practical radius of approximately fifty miles in their studies of life in its natural environment.

Applications were solicited from only academically competent and physically fit students who lived within one hundred miles of the campus. Each applicant was rated by his principal and biology teacher on such factors as seriousness of purpose, initiative, influence, sense of responsibility, emotional stability, health, intellectual capacity, and academic achievement. Interviews were held with those applicants who resided within seventy-five miles of the campus. More than thirty applicants, all of whom were in the upper five per cent of their respective classes, received the best possible recommendations. Unfortunately, the program was limited to twenty students; the final selection of participants was based solely on qualifications regardless of sex or geographic location. The staff of this program was not convinced that an all-resident program in which students are chosen by geographic quotas is either more efficient or desirable than a mixed commuter-resident arrangement.

Thirteen of the participants found it necessary or convenient to live in the college dormitories; those who were housed on campus paid for their food and lodging. Spe-

cial wings in two dormitories were reserved for these secondary school students, and resident halls were supervised by special college-student counselors. All participants contracted with the food services of the college for box lunches on those days when field work was in progress.

As an added incentive to induce maximum personal and academic performance, students were allowed to enroll for three semester hours of academic credit. Participants who matriculate at this institution might be given advanced credit for their achievement in this program.

The instructional program consisted of daily preparatory lectures given by the professors in charge, lectures by outstanding scientists and outdoor biologists, laboratory procedures and observations, research studies, and field work. Most of the program hours were spent in observation and collection of selected specimen in field locations. A rented school bus was designed to serve the needs of transportation, carry necessary field equipment, and serve as a travelling laboratory. Field trips were carefully planned to assure maximum utilization of guest lecturers and the subject matter under discussion. In many cases the participants were transported to the lecturers, particularly to forest rangers, field ecologists and conservationists, and county agents. Regional field study sites included endemic aquatic plant and wildlife areas, watersheds, fish hatcheries and stocked streams, and game bird wildlife refuges. Binoculars and other equipment were issued to participants for field observations.

Laboratory instruction and exercises were administered weekly, and interested participants were assigned research projects of a limited scope. Increment bores, pH meters, microprojectors, microtomes, photomicrographic microscopes, and compound and dissecting microscopes were at the disposal of the students after they received appropriate instruction.

The compendium of general topics studied during the six-week program included ecological methods and their significance; natural factors involved in ecology, such as climate, soils, competition symbiosis, speciation and survival; ecological relationships of animal phenomena; ecological techniques applied to conservation in the areas of bird survival, fisheries, fur farming, and agriculture; and a study of the various techniques of ecologists. Participants were required to take two examinations on all aspects of the program.

There are many variations on the program described in the previous paragraphs; most variations represent "right" ways, but each has its distinct problems. However, there are many generalities of "do's" and "don'ts" which can be enumerated and are equally applicable to any field program.

Excellent field locations and a means of transportation are essential for field studies but are no guarantee of a successful course. The three most important factors in this type of endeavor are the program, the students, and the staff. All field programs can utilize the available local resources which are free or cost very little. Superintendents of fish hatcheries, forest rangers, county agents, and the professorial staff are oftentimes willing to address your students, and their lectures and demonstrations can complement or supplement a specific study. In some cases it is more advantageous to take the class to the speaker, particularly when the lecturer provides a tour after his talk. However, the presence of collegiate authorities on campus or in a school to deliver lectures and advise on projects enhances the prestige of a program. In order to attract outstanding lecturers to a small campus, it is necessary to pay these men an honorarium commensurate with their reputation.

Most institutions have access to numerous indigenous areas where field studies can be conducted. Nearby woods, forests, parks, marshes, bogs, and watersheds can usually be utilized. Students prefer a general approach to the study of a region followed by group collection of specimen, individual studies, and research projects. If participants possess a profound interest, exhaustive studies in ornithology, ichthyology, botany, taxonomy, and entomology can be conducted.

In those programs where the instructor is also the chauffeur, it would be wise to limit the radius of travel to a distance of approximately twenty-five miles. For the few trips which would possibly exceed this distance, a special driver should be provided; a college senior or graduate assistant could fulfill this function.

An important factor in any program is

organization, and any failure in this aspect of the program will be immediately observed by the students. Where there is a diversity of activities undertaken simultaneously, it is imperative that the director and staff maintain a constant vigilance on the progress of the program and on each participant in his research and studies. Students should be required to maintain a daily log of their activities, and these books should be periodically reviewed and evaluated by the staff. Each possible formidable problem must be anticipated; constant guidance and encouragement should mollify youthful frustrations when they arise. Some students can readily identify their own research projects. However, the instructional staff must expect to guide most participants in the selection and procedures of specific studies. A list of research projects, which are usually limited in scope, should be available at the start of the program. A planned list of manipulatory and routine laboratory procedures should be effected as a preface to research.

Field equipment should ideally include a source of water, waste disposal, heat, and microscopes. If a school bus is used for transportation, these helpful conveniences can be located in a wood cabinet which replaces a few rear seats. A special counter and sink can be designed to fit on top and in between permanent seats, if seat removal is undesirable. A small automobile trailer would ideally serve as a travelling laboratory.

Participants in a field study program must have access to suitable field and laboratory equipment. However, the instructional staff should guard against the continuation of a single manipulatory procedure such as the preparation of slides. Students should plan to use as much of the available equipment in their studies as is possible. A most important facility in any program is an extensive collection of pertinent books and other literature which are accessible to the participants.

The best planned program can fail if the intellectual competence, interests, and maturity of the students are not of the highest caliber. Regardless of familiarity with a particular group of secondary school or college students, it is imperative that the staff carefully scrutinize the personal as well as the academic qualifications of prospective participants. In the case of an unfamiliar applicant, the personal interview has been found valuable in the elimination of "emotional misfits" from further consideration. Once a participant has been selected for a field program, he should be assigned to an advisor who is a member of the instructional staff. In programs for secondary school students, college science majors and particularly graduate students have effectively served in this capacity.

Regardless of the apparent maturity of a secondary school group, it must be remembered that this personal quality has been newly acquired and, like the first coat of paint on wood, can be easily removed. After-program activities are essential if students reside on campus or in a camp situation. It is preferable to have one staff member responsible for this phase of the total program, although at least limited participation by the entire staff is desirable. Informal activities such as games, swimming, cookouts, and other events offer an excellent opportunity for the staff and participants to develop rapport and become acquainted in an informal atmosphere. The liabilities of a poorly organized social program can nullify the salutary effect of the instructional activities.

If secondary school students are brought to a college campus, they should be given the status of a college student and be allowed to use all the facilities of the campus. The rules maintained by resident halls for secondary school participants should be moderately strict, but flexible. Most youngsters appreciate the need for closer supervision and should not object to earlier curfew hours if they are consulted before any mandate is effected. Pre-college students appreciate an identification card, particularly if the name of the collegiate institution appears on it. The award of a certificate of achievement from a college is highly esteemed by secondary school participants.

A common mistake which can be made by complaisant directors and staff is a reluctance to dismiss a student who persists in undesirable behavioral patterns either within the formal program or after hours. Many staff members feel that they must live with their mistakes, and in their tolerance observe the gradual deterioration of the program by the epidemicity of disinterest. Another possible mistake that can be made is the preparation of a program which demands too much or

too little of the students; the latter is by far the more common complaint made by the participants.

No program can be better than the quality of instruction and the academic competence of its staff. It is not enough to know *about* biology; an instructor must be thoroughly familiar with all facets of the program entrusted to him. He is the teacher, not the student; if he lacks competence in his area of teaching, the prestige of the program will be disparaged. But knowledge alone is not enough. An instructor must be personable; he must develop rapport with each student and be profoundly interested in the progress of the individual.

If an institution can coalesce a director and staff who are competent in their academic fields and in teaching, a program which incorporates depth studies of local field sites, reputable guest lecturers, organized activities and supervision of youngsters after program hours, group and individual research studies, foresight to avert discontinuity of program, and a mature group of academically competent students, it could be predicted without reservation that the product will be a profitable program in all respects. However, the Utopia which has been outlined here has most likely never existed, nor ever will exist if the cost of the program is kept within a reasonable financial amount. Thus, it is recommended that the evaluation of any such program in terms of its objectives consider the per student per week cost as one criterion. If the judgment of participants is valid, the relative merits of field studies far outweigh the liabilities; field studies can be both enjoyable and edifying.

Finally, field studies must be given a distinct status above that of the traditional classroom course. This will be effected when the host institution gives official recognition and financial support to these programs, and students consider it an honor to be admitted to field courses.

AAUW Locator Service

A unique locator service which will assist colleges and universities to find trained, able, professional personnel will be developed by the AAUW Educational Foundation, according to an announcement by Dr. Anna L. Rose Hawkes, President.

A $20,000 grant from the Fund for the Advancement of Education is making possible a two-year expansion and development program for the Association's Roster of Women Holding Earned Doctorates.

Updated roster files will contain more detailed information. In addition, institutions will be able to ask that files be checked for each opening. Copies of the records of women whose training and experience seem to qualify them for the position available will be sent to the inquiring institution. Since the roster is not a placement service, no references will be kept nor recommendations made. The expanded roster will help to meet the critical faculty shortage in higher education and will help women advance with the educational profession.

Detailed information about the roster service may be had by writing to Mrs. Lorraine B. Torres, Roster of Women Holding Earned Doctorates, AAUW Educational Foundation, 2401 Virginia Avenue, N.W., Washington 7, D. C.

AAUW Graduate Program

A program of graduate study through which mature college women may qualify themselves for teaching, research, or administration in higher education was announced by the American Association of University Women Educational Foundation. Financed by a $225,000 grant from the Rockefeller Brothers Fund, this nationally significant program will be initiated over a three-year period in eleven southern states—Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas, and Virginia.

Approximately fifty candidates, thirty-five years of age or older, who hold the bachelor's or master's degree, will be selected each year for further education in one of the cooperating graduate schools.

The first group under the program will enroll in September 1962. Applications should be made not later than April 15, 1962. Inquiries should be addressed to Dr. Eleanor F. Dolan, AAUW Educational Foundation, 2401 Virginia Avenue, N. W., Washington 7, D. C.