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Student Participation in Field Classes

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STUDENT PARTICIPATION IN FIELD CLASSES

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Field work consisting of trips and excursions out from the class room plays a prominent part in instruction in many of the science courses throughout our educational system. Almost all courses in general or natural science in the secondary schools have it as an attachment of greater or less rating. So also do the technical or applied science courses in colleges. The materials and features with which the various branches of science deal are widely scattered over the earth's surface. They cannot all be brought into the laboratory and dealt with indoors, nor adequately represented by illustrative materials of one sort or another. Photographs, lantern slides, models and the illustrations of textbooks serve some considerable purpose in this regard, but they fail to give an adequate conception of size, of texture and of space relationships. Thus from the very nature of the materials pertaining to a particular science it is only natural that field class work should have some part in the teaching of that science.

But if this is so just what part should the field class play and what should it accomplish? Much time and effort are often employed in field work. Is it always worth while to the student? Does he get value received? Has the instructor deliberately considered why field classes have a part in the course he is scheduled to teach? Does he have quite clearly in mind what worth while accomplishments are possible through field work? Does he plan and carry out the field class in accordance with these possibilities? And finally, at the end of the term, does he have the satisfied feeling that his time and that spent by his students in the field have been most wisely employed? These are a few of the questions that come to mind when one begins to evaluate the educational possibilities of field classes.

The methods employed in teaching in the field undoubtedly differ greatly. They are affected by the particular course of which the field work is a part. They may also be affected by the ideas of the instructors in charge, since each instructor may have a different idea as to the best way in which the field work of a course should be handled. The degree of satisfaction with the results achieved may also differ, and widely, with the instructor. On the one hand

there are those who are quite satified with some routine or time-honored method and the results thereof. At the other extreme there are those who are dissatisfied with both methods and results. It is for those instructors who are endeavoring to make the field class most productive that this article is particularly intended. It has been in an attempt to make his own field classes most productive that the writer during a period of several years has made a study of field class procedure. Certain conclusions have been reached as a result of this experience. These are here presented for the suggestions they may offer to other teachers.

OBJECTIVES

Since much depends upon what the instructor is endeavoring to accomplish through field classes, a clear statement of possible objectives or aims is desirable. In fact, before initiating any sort of a work project it would seem wise and reasonable that objectives be set up as a goal toward which to work. They should be stated as clearly as possible and be capable of attainment. The methods employed in the class room, the laboratory, and in field work should all contribute to the attainment of these objectives. The objectives and methods may vary somewhat with the background and experience of the students, the environment of the institution at which the course is offered and the amount of time given to the course.

Aside from the general objectives of all education to which the teaching of a natural or applied science should contribute, there are certain desirable aims for such science courses in the attainment of which field work may play a prominent part. These objectives may well be chosen with the thought in mind that the attempt is being made to produce desirable changes in the students. Thus they are not the more formal objectives that are concerned with the amount of knowledge to be covered in the course, nor with the manner of its arrangement.

The first objective may well be that of arousing *a genuine interest* on the part of the student in the particular branch of science under consideration. This means that a field class should not only in itself prove an entertaining and stimulating period of time for the student but that it should also be of such a nature that it will contribute to the development of a lasting interest in the subject. For example, the student who may have only one or two courses in geology should have his interest aroused so that ever thereafter the character of the face of the earth and the story

of earth materials will have meaning for him. All the rest of his life can be enriched by an awakened and permanent interest in his environment. In a like manner the students of botany, of soils, or of entomology may have their interest so aroused in that particular science that ever thereafter the contributions of that science are more meaningful to them. Field work from its actual contact with the materials of each science is a natural avenue for the development of lasting interests.

A second desirable objective is the attainment of *some ability to interpret correctly* certain observed phenomena, processes, or materials. Field work with such an aim in mind will give the student an opportunity to participate in an interpretation of his surroundings from the very beginning of his work. It is through such experiences that he will best be able to continue his interpretations for the rest of his life, using his knowledge of the science in whatever environment he may find himself. The student will no doubt make mistakes but in the process his powers of observation and judgment will be developed. The extent to which the ability to interpret observed phenomena can be developed through a limited amount of field work depends upon many factors. These factors are closely connected with the matter of suitable methods for field classes which will be considered later.

Another worth-while objective is the development of *some appreciation of the natural environment of mankind.* The student who develops such an appreciation will not henceforth casually accept his environment. For example although the student of geology will not everywhere be able to interpret geological phenomena he will nevertheless have the realization that the earth is dynamic, that it has experienced many changes, that it is still undergoing them, and that its surface characteristics are everywhere the result of the interaction of many processes. He will look upon the physical features of the earth as reflections of the events which have affected the various parts of the earth through the long ages. He will realize that there is a fascinating story back of the commonplace earth features as well as of the spectacular and the scenic ones. He may not be able to interpret the phenomena completely, but he will realize the possibility of completing or securing an interpretation through the research studies and other literature of the science. He will become aware of the close relations between the evolution of life upon the earth and the geological forces which have acted upon it. He will see in the present civilizations and cultures reflections of these geological events which

have provided the setting for them. An individual in whom this appreciation of the geological environment of mankind has thus been developed will have his own life enriched.

Another *appreciation* to be gained from properly conducted field work is *that of the contribution of earth materials and the substances derived therefrom to man's progress, his pleasure, and his comfort.* The individual in whom this appreciation is developed will see in countless phases of his daily living the increasing usefulness of earth materials. The structural and decorative materials of buildings, the various types of machinery, the automobile and its fuel, the paved or surfaced highway, even the pencil with which he writes have been produced from earth materials. His food and clothing are products of the soil, which is itself a result of the action of natural forces. Field work properly conducted has much to contribute to an appreciation of the nature and distribution of soil and of the mineral deposits and other earth materials whose products are so necessary to the progress of civilization.

Additional objectives may be selected for field work in any science, but it is believed that those described above are significant.

Method

Assuming that the foregoing are reasonable general objectives for field classes, attention may now be turned to desirable methods to be used in the attainment of such objectives. How shall field classes be so conducted as to bring about the greatest possible realization of the objectives?

Some field classes are little more than conducted tours with the instructor acting as guide and the student directed to "see" some of the phenomena or materials of a particular location, or to observe, so far as the location may permit, the phenomena and materials about which he is becoming acquainted through his reading or in the class room. Some time will no doubt be allowed for questions, and for many of the trips, a written report of some kind will be required of each student. Other field classes are so conducted as to encourage each student to make thoughtful observations for himself, and to use his best judgment in arriving at conclusions based upon such observations and upon his ability to apply his knowledge gained from class discussions, his reading, and his previous field experience.

Let us ask ourselves frankly by which method the students will have the greater degree of interest in the natural phenomena ob-

served, and by which method they will have the greater opportunity for individual observation and comparison, and for realizing that the field trip is an educational experience as well as a pleasant change from the class room walls. By which method will the educational experiences of the group be greater in return for the time spent and for the physical effort or financial expense involved? Finally by which method will the objectives previously set up be more completely realized?

The field class that is to contribute the most to the attainment of the foregoing objectives and which is arranged with them in mind will be such as will require a maximum of participation, interest, and industry on the part of each student. According to the writer's experience active student participation may be secured most naturally through the use of a carefully planned activity program and selected problems. Such a method has resulted in field work which is not only interesting and even entertaining, but also challenging and highly instructive to the students. On field trips of this type the students' attention is directed to selected phenomena or materials pertaining to the science course in which the students are enrolled. The students are asked to observe independently the assigned locality for typical characteristics, noting similarities and differences, and to be ready to explain or account for what they have seen. After a suitable time the class is called together and the students are asked for the results of their observations. Some will be found good and others poor, some correct and others incorrect. The natural ability of the students to observe critically shows a wide range, but they learn through such practice in field classes and as they have opportunity to train their powers of observation. The students are next required to justify their observations. The different possibilities are weighed by inspection of the observed evidence at hand and by the use of the knowledge the students already have. Such procedure precipitates a discussion in which the students are the active participants with the instructor "keeping the ball rolling" until conclusions are reached. Only as a last resource does the instructor settle a matter, though he may open up possibilities other than those previously suggested and sum up the evidence after the conclusions have been given. If the instructor believes that the previous experience plus the evidence at hand should enable the student to come to sound conclusions the problem may be followed through to a complete solution.

The complete solution of some problems will lie beyond the present state of the students' learning. After all of the available

evidence has been considered, such problems may well be left open for the time being, to be taken up later, in the class room or in the field, when the course work has progressed to the proper point.

One incompletely solved problem may lead to other related problems. A second locality may be inspected. Wherein are its characteristics similar to or different from those of the first? Of what significance are the likenesses and differences? Again the student goes to work, independently, to inspect, compare, propose solutions, and finally come to conclusions, which, though they may not be adequate are still his own. The teacher's part in all this as previously stated is chiefly to direct the student's attention to the problem for study, to stimulate more accurate observation, and to lead the discussion to sound conclusions.

Such a procedure for field work encourages all of the students to participate in the examination of the materials and in the discussion and to contribute to the solution of the problems. The process of solving a problem becomes a coöperative venture wherein the observations of all are pooled and evaluated. In thus doing, the thinking of the students is sharpened, and their faculties of critical observation and judgment are developed. The class period becomes one of discovery for the group as a whole, and of development for the individual. Marked advance in the attainment of the desired objectives is apparent.

The effectiveness of any method of field instruction is evidenced by the student's attitude in subsequent field classes, by his initiative in his attempt to solve field problems, by his increased tendency to justify conclusions on the basis of observed evidence rather than opinion, and by the results of carefully planned tests.

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