



Photo by: Charles E. Mohr

A typical salamander (*Eurycea longicauda lucifuga*) found in caves from Virginia to Oklahoma. Length 6 inches.

nessee caverns. This paper was later printed in Bulletin 11 of the National Speleological Society—this group being the official organization in this country devoted to the study of caves. Some colleges have organized groups of stu-

dents into “Grottoes” and have explored the caves of their region. Since the science of Speleology is rapidly becoming better known, teachers should have even more reasons for including a section on cave biology in their course.

## Using the Community as a Laboratory

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Nearly all communities offer opportunities for observing practical uses for biological principles. The impressions that students get from seeing first hand such activities are far more lasting than those read from any textbook page.

There are pupils in most high schools that some day hope to become doctors, nurses, health workers, laboratory technicians, science teachers, and the like. Why not expose these students, not only to the high school laboratory, but to as many applications of biological work outside the school as can be found?

To do this a careful survey of the community's resources should be made and a series of field trips planned to include as many as possible. Already, I hear the cries go up, “Field trips! How

can you plan field trips without getting into the rest of the faculty's hair? How can you arrange transportation without school buses? How can you plan a good field trip for one class period? How do you know whether or not students get anything out of a field trip but a good time?”

It looks as if I let myself in for something. But let me try to answer the questions first so that you will try out something for yourself. To keep the faculty happy, I send out a notice ten days in advance with names of all the pupils going on the field trip, the date, time and the class periods that may be missed. I have it approved by the Principal first.

We do not have school buses, but I

find little trouble in getting pupils to drive cars when necessary. In a pinch, parents have always helped us. Oh! Oh! Do I hear someone saying something about responsibility? To my way of thinking, that is a lame excuse for not taking field trips. If the trip is to be a long one, and over a considerable distance from the school, written permission is secured from the parents. The pupil is expected to obey orders. If he does not, he is left behind the next time.

How do I plan a field trip for one class period? Every school will have its own problems to work out in scheduling field trips. The answer is careful advance planning and cooperation. I feel that few Principals or Superintendents will refuse to try to work out a satisfactory solution with you. There are several ways of handling the time factor. One way is to schedule study periods so that pupils have one following or preceding the biology period. When this is not practical, trips which consume only the biology class period may have to be used, and the school campus or nearby neighborhood will have to serve as the field trip area. There will be times, however, when it will be necessary to take additional time from the next class period. There should be no objections if pupils, faculty, and administrators have had the necessary advance notice.

Where no other possibility presents itself, and there is sufficient interest, special after-school or Saturday field trips are in order. You will not regret the extra time and effort on your part. It is an excellent opportunity to get really close to your students. I find that two or three such field trips each semester can be fun! Everyone packs a lunch and off we go. I do not get too alarmed if Joe seems more interested in Mary than in the scientific name of some flower. Mary is probably the reason Joe came along. Remember that biology

includes human relationships, and where is there a better time to stress co-operation, companionship, and courtesy than on a field trip?

The answer to the question, "Do students get anything out of a field trip?" depends almost entirely on the teacher. Students usually get something out of a well-planned field trip. If the students help with the planning, they get even more out of it. I find that a field trip usually covers four days: one day to plan the trip with the class and to get ready; the field trip day; one day for discussion and review; and one day to sample the results. Some will say that is too much time to allow for a field trip but, if it is made a part of a unit or problem, it becomes but an integral part of the whole.

Here is how it can work. I will use our advanced biology class for an example because one of the boys took his camera along and secured some good pictures. The class was studying elementary bacteriology. They were learning some of the techniques for using the various types of equipment. Around



FIG. 1. City pupils, especially, enjoy experiences with farm animals during trips to dairies. Here one boy scratches the nose of a calf, while other pupils look on interestedly.

this study, five field trips using community resources were planned. The first was a dairy farm, where a local farmer demonstrated how clean milk was taken from the cows and prepared for hauling to a city dairy. Students were shown how the animals were cared for and how every effort was made to produce sanitary milk. They inspected the milk house, scratched the noses of the calves (Fig. 1), and petted the cats. When they left, they had a better idea of the problems of the dairy farmer.

The second field trip was to a local city dairy. Here the processing of milk was followed from the time it came off the hauling trucks until it was bottled and placed in the cooler. Questions were asked and answered concerning the pasteurizing process, the sanitary measures taken in handling milk, and the various tests made in the laboratory. Perhaps the chief value from such a field trip is the opportunity for the class members to appreciate the cooperative measures that are carried out between the city dairy and the farmer to produce and deliver sanitary and wholesome milk to their doorsteps.

The third and fourth field trips were to the local water treatment plant and to the sewage treatment plant. Here the students were shown the way water samples were checked and tested (Fig. 2) and the procedures necessary to produce safe drinking water. At the sewage plant, they learned how the action of bacteria changes the wastes to harmless substances.

The final field trip in the series was to the biochemical laboratory of a local chemical company, our largest industry. Here, through the cooperation of the laboratory personnel in the divisions of bacteriology and toxicology, the students were shown the practical application of the fundamentals they were learning. It was interesting to note their surprise at



FIG. 2. Pupils are shown how water samples are checked and tested for purity.

the problems presented by bacteria, yeasts, and molds, and the methods used to solve these problems. They also gained a better understanding of the part research plays in industry and the extent to which an industry goes to eliminate health hazards from the materials it produces. They were quite impressed with the microtome (Fig. 3) and the part it played in making it possible to keep permanent records of the toxic effects of various chemicals on varieties of tissues.

Last, but not least, the pupils are given a test after each field trip. You will note in the pictures that each student carries a note pad. I feel that note-taking is important, so each student is required to take notes. To make this part easier, and to make certain that the important information is taken down, we discuss the field trip before we go. We list the information that we want to get. In this way, if certain points are not covered by the person doing the explaining, one of the students asks to have them explained. During the first class period following the field trip, we get out our notes and discuss them. By pooling all of our information, we discover errors in note-taking. The next day the test is given.



FIG. 3. Note-taking is required on field trips. Here pupils are quite impressed with use of the microtome.

Using your community as a laboratory is excellent public relations for your school. You are acquainting the community with what is going on within your department. You will be surprised at the cooperation you will receive from your fellow citizens. The pupils receive a broader view and a better understanding of their local environment. Why not plan now to make the best use of what your community has to offer?

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