

## STUDENT PROJECTS AND THEIR PLACE IN GEOLOGIC EDUCATION

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The suggestion has been offered that it would be appropriate at this meeting to make some remarks concerning the work in geology at Augustana College. Back of this suggestion was the thought that most geologists present are university men, who may not have much familiarity with what goes on in the little world which is the one-man or two-man geology department of a liberal arts college. Also, a glimpse into the activities of one such department might be of some interest to the geology teachers from sister colleges.

I must forego any historical introduction, other than to note that at this college geology has been taught for almost three-quarters of a century. The pioneer teachers, Josua J. H. Lindahl and his student and successor, Johan A. Udden, were exceptional men who placed scientific instruction on a basis that was both sound and broad—broad enough to include geology almost from the beginning.

Twenty years ago a full major in geology was introduced in the curriculum, so that this science was placed on the same basis as the related disciplines of chemistry, physics, biology, and mathematics. Augustana was the first Lutheran college in the country to take this step—several have since followed its example—and it did so because the men who were then the academic leaders of the institution believed

that the cultural value of geology justified such increased emphasis.

Full departmental status involved new, advanced courses, which in turn necessitated additional equipment and supplies. A modest initial budget sufficed for purchase of study collections, maps, and a few essential instruments, but much else seemed necessary for a well-equipped department. With reference to such needs, the Physics Department seemed to have a good working solution: what one can't buy, *build*. There remained the problem, to be sure, of how an instructor was to do this with a schedule which regularly included four or five different courses.

In the new department, a solution early presented itself with the assignment of an undergraduate student assistant to the department. This assistant, R. W. Edmund, had the traditional farmer boy's resourcefulness and capacity for work, and given free reign to go ahead on his own had presently equipped the department with useful wall charts, structural models, relief maps, models illustrating construction of topographic maps, and other teaching materials which are still giving good service—not to forget his *opus magnus*, a working geyser model which could be operated before the class, and which no student could ever forget because it erupted with such startling abruptness, the first

spurt of water always hitting the ceiling.

When Edmund graduated—happily to return fifteen years later—the principle of student collaboration in our work had become pretty firmly established. I say “our” because I am speaking also for the several geology teachers who at various times have been on the staff: Leland Horberg, Chester Johnson, Troy Péwé, Barbara Hender Morris, and Rudolph Edmund. However, this principle—if it may be dignified with so formal a term—was long in operation before it was recognized and its possibilities consciously developed. For only gradually was it realized that in almost every geology class there are students who become so interested in the problems of their course that they will welcome an opportunity to do volunteer outside work in it. By encouraging such spontaneous interest wherever it appeared, and by directing it into specific, constructive channels, eventually a situation developed in which much of the work in the department was in the hands of the students, and this has continued to be the case.

How this has worked out may be made clear by some illustrations. Eugene Wittlake, intrigued by the dramatic sweep of Cenozoic mammalian development, undertook preparation of a display depicting the evolution of the horse. This display proved so useful that Lorenz Peterson undertook a parallel project for a representative invertebrate group: the evolution of the Cephalopods. Keith Hussey, becoming involved in the *Daemonelex* problem, drove out to western Nebraska, studied these curious fossils in the field, and collected a good specimen which he hauled back to the college, there preparing the museum mount which

still stands as a record of his undergraduate enthusiasm. Vernon Swanson constructed a geological column showing the formations penetrated by a deep well two blocks west of the campus; this column, mounted just inside the door of the museum, has been useful in many ways. Barbara Hender Morris classified the Mazon Creek collection built up during many years of annual field trips to that locality. Students with a flare for writing, like Jean Soady, have issued Departmental News Letters. Others, especially interested in museum work, like Donna Bulte, have aided with making labels, numbering and cataloging, and arranging displays. Still others have assumed responsibility for programs of geological films, presented to the general student body. Wendell Swanson has just constructed some display cases which we badly needed but could not purchase. This year Richard Edmund, Donald Danz, and John Rakus have been engaged in constructing a stream table, now well on the way to completion. Dick Fetzner and Kenneth Larson have been busy with a geyser model to replace the now legendary one built by Edmund years ago. Recent purchase of a rock saw and polishing equipment have opened up a variety of new possibilities.

Not all these projects can be displayed, but we hope that some of our visitors, despite their crowded schedule, may find it possible to visit the Geology Museum in Wallberg Hall, which houses many exhibits, most of them relating to vertebrate paleontology. There you will see two large ichthyosaurs, salvaged as fragments from an eastern warehouse which burned to the ground, which were reassembled by Charles G. Johnson till almost as good as

new. Joseph Hoare found preparing fossils even more absorbing than varsity sports or the college choir, and his brother Richard now continues his long-range project of mounting dinosaur bones. Ansel Gooding, an amateur archeologist, turned his hand to repairing fossils instead of pottery, and completed a number of jobs of high professional quality, including the fine *Pteranodon* skeleton on the north wall of the museum. Three years of tedious but intriguing work by five different students were required to complete the mounting of the mosasaur skeleton which Mr. C. B. Campbell made available to the Museum.

Projects like these have been undertaken in various ways: some purely as an expression of interest, and for the satisfaction of doing them; several as official, recurrent projects of the Geology Club; others, which involved actual research or much delving in the technical literature, as seminars, for which students have received one or two senior college credits; and still others as projects undertaken by student assistants, who receive nominal recompense for at least part of their time.

It seems to us that student participation in extracurricular activities such as these has been all for the good. The impulse, whatever its nature, which launches a student on a project almost always develops into deep interest, and I suspect that long after he has forgotten many a classroom discussion he retains a vivid recollection of what he learned through his individual work. Some students have discovered or developed special skills which later have proved useful in graduate school, or in their own professional work. And quite understandably, students de-

rive lasting satisfaction from having made a significant, worthwhile contribution of some kind to the work of the department.

It is to be expected that through deepened interest, developed in this way, some students might be led to choose geology as a major or even as a career. To some extent this has probably been true, but in encouraging student projects our purpose has always been to help the student grow into a fuller appreciation of the subject matter of geology. We have had, if anything, a special interest in the student who, while preparing himself for music, economics, or some other non-scientific field, has become sufficiently interested in geology to undertake volunteer work in it. The biology major who prepared our fossil horse material undoubtedly became a better biologist for his venture into paleontology; and the pre-seminary student who, through several years, made a hobby of working up vertebrate fossils, is probably a better clergyman for this enlightening, if somewhat unorthodox, experience.

To the institution, the advantages of student projects are quite self-evident. A brief tour of the department will suggest how it has been enriched by illustrative material most of which could not otherwise have been provided, even if funds had been available.

Also, through student assistance the instructors have been relieved of many time-consuming duties, and so freed to devote their best energies to actual instruction. Thus it has become possible for them to teach almost all laboratory sections themselves, rather than to delegate them to assistants.

Most important, perhaps, has been development of, or at least approach

to, a situation in which teachers and class members become closely associated as fellow students, engaged in a common pursuit. This relationship is as desirable in the undergraduate work which is the province of the liberal arts college as it is in the higher levels of the graduate school. And among intangible values such as these one would certainly include the vital personal interest and loyalty which students develop when they are allowed to become collaborators in the work of the department—attitudes which are not likely to end with graduation.

It is worth remarking that the Geology Museum, which thus has been developed mainly by the students, has extended its influence beyond the campus. Not only are there daily individual visitors, here from off-campus, but the Museum is now in regular use by the science classes and clubs of the public schools of Rock Island and nearby cities, and also by many other organizations such as boy scout and girl scout troops, Y. M. C. A. classes, amateur science clubs, and church organizations. So far as possible, instructors or advanced students meet these groups, speak to them, and answer questions; and in many cases when groups in the community request talks on geology they are invited to come to the Museum, where they can be shown the actual documents which the geologic story interprets.

The many small boys who come to the Museum with their puzzling conceptions, alleged meteorites, and precious agates, or to solicit information on dinosaurs and saber-toothed tigers, are also very welcome, even though they leave grimy finger marks and nose prints all over the cabinets.

The appreciation of these public

school children and their harassed teachers, who often must teach geology units in general science courses when they have no background whatever in the subject, is so real as often to be touching. I confess that we also find it rather sobering, for we have the growing conviction that helping these groups—the forgotten people, so far as geologic science is concerned—is one of the really important things that we can do. One would like to believe that, some day, geologists will see to it that every community is provided with a geology museum, however small, stocked, perhaps, from the superabundance of the great museums in our large cities. Geology will not be the loser for such generosity to the children of today, who will become the taxpayers of tomorrow. In saying this I am not unmindful of the splendid work which the Illinois Geological Survey is doing along these very lines; rather, I would here acknowledge it.

And so, at this college, while the main obligation continues to be the teaching of general geology to increasingly large numbers of general college students, we find ourselves reaching constantly toward two other somewhat diverging objectives: the preparation of a relatively small group of students for graduate study, on the one hand; and cooperation with the community, especially the public schools, on the other.

I realize that these remarks may not be wholly appropriate to this group, for admittedly they relate to the methods and purposes of geologic instruction rather than to the subject matter of our science. Also, they really present nothing new, for our experiences at Augustana have undoubtedly had their counterpart at many other like colleges. I sup-

pose that most other geology teachers have discovered, as we did, that they have been able to achieve their purposes only by taking their students into partnership with them, and that in trying to remedy the shortcomings of their small departments they have unwittingly transmuted weaknesses into elements of strength.

It is axiomatic to say that students will become interested in a field to the extent that they give

themselves to it, and that instruction succeeds in the measure that it becomes a cooperative venture. Yet these principles, old as education itself and applicable to all ages and levels of instruction, are so important that it may not be too much out of order to re-emphasize them through one more repetition. And as geologists, we should realize that few subjects lend themselves to application of this basic philosophy of education as well as ours does.