Journal of the Minnesota Academy of Science

Volume 23 | Number 1 Article 11

4-1955

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GEOLOGY AT THE SECONDARY SCHOOL LEVEL

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This year, at the University of Minnesota, North Central School of Agriculture, we have presented, on an experimental basis, a course in elementary geology. Since no study of this nature has previously been presented, we have proceeded on the assumption that this most basic earth science is not beyond the grasp of secondary school students and that, in addition, it would fill a gap in our school curriculum.

It was previously decided by our school authorities that an enrollment of twelve students out of the total of thirty-nine juniors and seniors combined would be considered the minimum number to make the project worthwhile. When nineteen indicated a definite desire to enroll, the course became a part of our winter quarter curriculum. Of these, nine were juniors and ten were seniors.

As the material which we have covered in one quarter is fundamentally college material, it was necessary to condense and abbreviate. A certain allowance was also made for the fact that high school juniors and seniors do not, as a rule, assimilate new material as rapidly as students of college age.

At this point let us state that our objective was and is to present geology, not so much to future professional geologists, but chiefly as a means of indoctrination, with the hope that our students will have, because of it, a wider scope of knowledge, a better understanding of the fascinating world in which we live. If, as a result, some of these student should become sufficiently intrigued to go on to further studies in geology, so much the better; but to us that is of secondary importance.

The various phases of geology which we covered were orogenic geology, stream and wind erosion, ground water, vulcanism, glaciation, wave action and sedimentation, and diastrophism, as well as a brief study of historical geology. In this last phase, we passed rather briefly over plant life and the invertebrates. Greater emphasis was placed on the cold-blooded vertebrates and the Pleistocene mammals, touching briefly on the evolution of man.

The reason for the latter emphasis is quite simply a matter of general interest. To the average student the amphibians, dinosaurs, and early mammals present a far more vivid picture than the invertebrates. Considerable care was taken, however, to point up biological similarities, wherever they exist, between invertebrates and other forms of life in order to demonstrate more clearly the evolutionary processes.

Inasmuch as the project was on an experimental basis, no funds were expended on textbooks. Daily reading assignments were made in the mimeographed material supplied by Prof. Stewart, but with that exception, this has been almost entirely a lecture course. The chief sources of material have been drawn from *Down to Earth* by Kroneis and Krumbein and from old college notes. Supplementary lecture material consisted of slides, photographs, maps, and fossil specimens.

The breakdown of the course is as follows: four lectures per week, with three reading assignments, one examination, and one period each week devoted to study of minerals and rocks.

SUMMARY

Our conclusions, based on this brief experiment, are: (1) that the sturdy of geology is definitely not too difficult for secondary school students; (2) that it fills a gap heretofore found in most, if not all, high school curricula; (3) that the tremendous enthusiasm shown by the students involved in this experiment indicates that it will become a permanent fixture in our own curriculum and, as such, we sincerely recommend its adoption, wherever possible, by other schools in the state.

TAMARACKS AND THEIR RELATION TO GLACIAL GEOLOGY — A STUDY OF THE ROCKVILLE-COLD SPRING AREA

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Introduction. Tamaracks are not haphazardly distributed in the Rockville-Cold Spring area; tamarack groves outline the banks of Lower Cold Spring Terrace, and seepage from the older and higher Upper Cold Spring Terrace creates hanging bogs. Terrace sediments favor retention of moisture in that they were originally derived from the shale, clay and limestone tills of the gray drift. The adjacent heights of the Saint Croix moraine provide protection from heat, dryness and high wind velocities. The granite outcrops of both Cold Spring and Rockville check the flow of the Sauk River and so tend to favor a swampy condition between these two localities. Eventually, however, the regional climate will prevail, the water supply will dwindle, the swamps will be filled or drained, and the local dominant deciduous forest replace the tamaracks—living relics of the geological recent retreat of the continental ice sheet.