

## LANTERN SLIDE EXAMINATIONS IN GEOLOGY

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In teaching geology to students who live in a region where the surrounding country lacks features of geological interest, lantern slides are especially helpful to an instructor. If one of the main purposes of an elementary course in geology is to teach the students to appreciate the geological significance of scenic features, then an examination should be constructed in such a way as to test the ability of the class to interpret such features. Ordinary examination questions do not test this observational knowledge, but rather test the memory of the student for definitions. To know a definition unfortunately does not always include knowing how to apply it. By using a carefully selected series of lantern slides, the actual ability of the class to appreciate geology as shown in the field can be tested readily. A series of examinations of this sort have been given by the writer and two other members of the department at the University of Illinois during the last two years. The results have proved increasingly satisfactory with each examination.

It must be borne in mind that the average student has little idea of dimensions in pictures and needs practice in learning to discriminate various objects on the screen. Lantern slide examinations are probably only advisable if the students have been instructed by the use of lantern slides on frequent occasions during the course. At the University of Illinois, a daylight lantern is used which can be operated by the instructor from the front of the room. The lantern reflects on a mirror set back in the wall and out to a ground glass screen set in the blackboard just above the lantern (Fig. 1). Slides are available in a case next to the lantern and can be used at any time the instructor wishes without loss of time. This system saves the instructor much time and energy which would be lost by drawing on the board. Also the pictures are in most cases more effective than a sketch as illustrations.

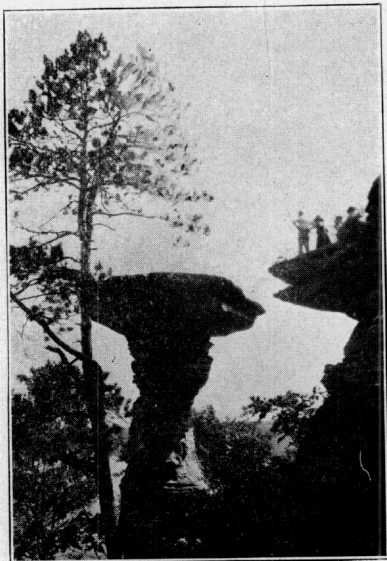


Fig. 2. Give a complete sequence of events which could lead to the development of this rock column.

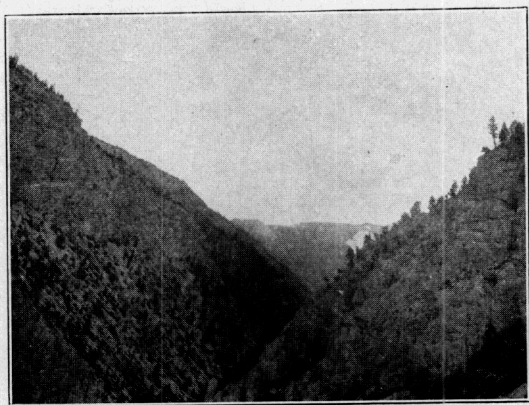


Fig. 3. Has this valley been glaciated?

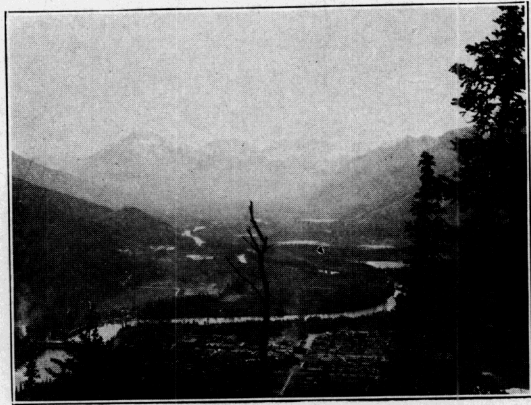


Fig. 4. What is the age of valley development illustrated in this photograph?

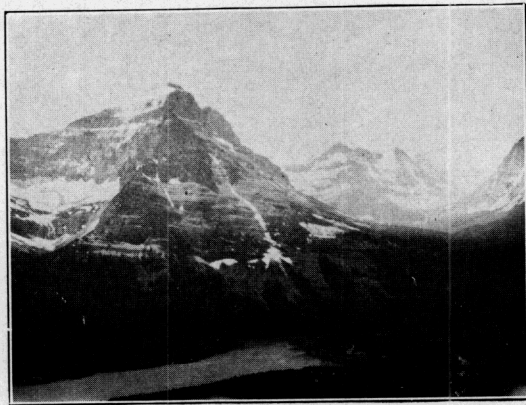


Fig. 5 . What evidences, if any, suggest a former greater extent of the glaciers in this region?

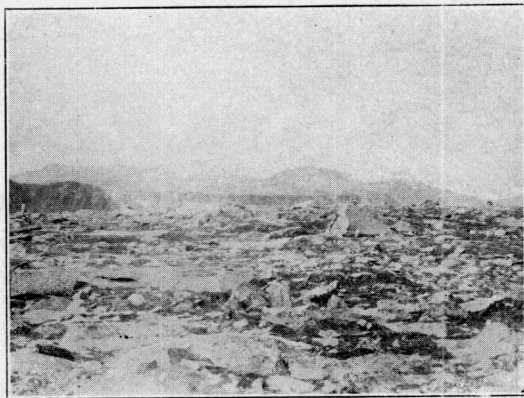


Fig. 6. This comparatively flat surface is at an elevation of 12,000 feet. The rock is crystalline. What is the geological significance of such a surface?



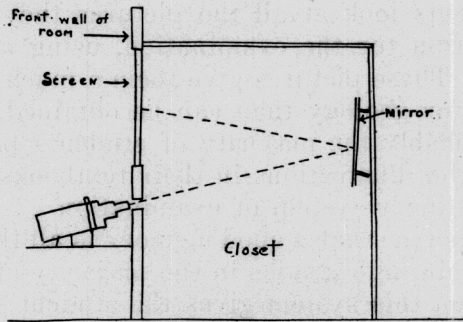


Fig. 1. Arrangement of daylight lantern devised by T. T. Quirke.

The type of question to use and the type of picture depend on two things; first, the amount of practice the students have had in class work with lantern slides, and second, the amount of field work that has been given in the course. If the field work is limited because of uninteresting areas, but lantern slides have been shown frequently, the photographs reproduced here are examples of the types used with questions which may prove satisfactory. The question with Figure 2 gives the student a chance for considerable application of knowledge because stratification suggests deposition, probably in the ocean; the present relief suggests uplift; the protruding layer shows difference of resistance in the weathering; and the shape of the column suggests that wind erosion helped to produce this feature. Figures 3 and 4 are simple tests of memory and application. Figure 5 requires more accurate observation in order to see all of the points such as the cirque, the U-shaped valley, the hanging valleys, and the lake. The uplifted peneplain in Figure 6 would probably mean nothing to the student who relied merely on text book definitions. The purpose of such a picture as Figure 7 is to give the keener type of student a chance to show his ability. Students, who have no trouble in determining that the boulders are from a landslide, in most cases attribute the killing of the trees to the landslide. Figure 8 is perhaps less certain as to interpretation than the others, but is a feature which many students will see and should learn to understand.

Some of the advantages obtained by the picture examination are as follows:

1. Examinations become more interesting and less tedious to the student.

2. Students look at all the pictures they can secure in preparation for the examination, using a variety of textbooks. These pictures give them a much greater appreciation for geology than can be obtained by reading alone. Probably the majority of students pay little attention to the illustrations in their textbooks if they expect the ordinary system of examination.

3. If it is true that a good memory is all that is necessary to obtain high grades in the majority of university courses, then this system gives the student with originality a chance to compete with one who has a better memory. This has been seen to work in many cases. "A" students have received as low as "C" on these examinations. Those students who show ability at clear thinking in class recitations invariably do well on the examination.

4. If an instructor wishes to avoid long rambling answers to examination questions, this method should recommend itself since many of the questions need but a few words to be answered. The examination tests geological knowledge and not rhetoric.

The reaction of the students to these examinations was tested by asking them to write criticisms of the system giving them to understand that these would not be read till their grades were recorded. What appear to be genuine opinions were obtained in this way. About 65% approved of the picture exams, 14% liked some features and disliked others, and the remaining 21% disapproved. As might be expected, those who disapproved were in most cases those who did badly in the examinations, but there were a few exceptions.

Some of the comments are perhaps worth noting. Among those who did not approve, one considered that it was too hard for elementary students to learn to apply their knowledge, since it took enough of their time to learn the theories. Another thought that the general low grades of "A" students in the mid-semester examinations proved that it was not a fair test. A few thought that the picture tests should not be graded early in the semester, but were perfectly fair for a final examination. Of those who approved, reasons ranged everywhere from

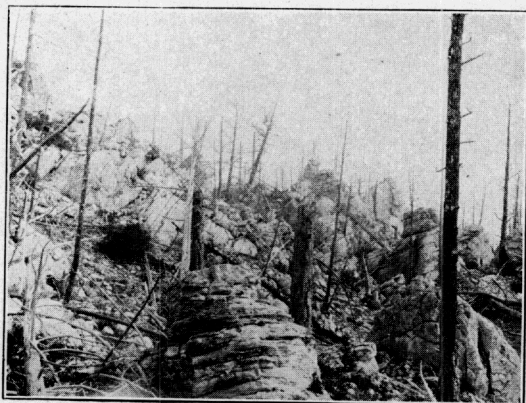


Fig. 7. There is a steep slope to the left of the view shown here. Tell what has happened including the history of the trees in your account.

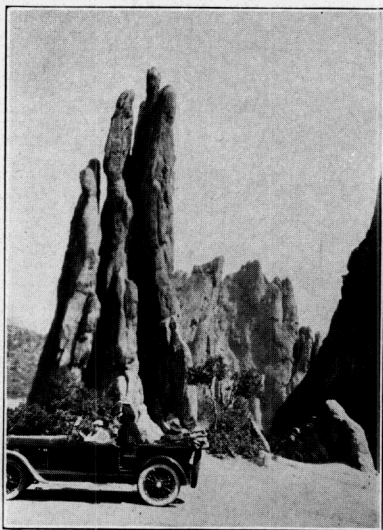


Fig. 8. This rock is sandstone. Account for its wall like appearance.



considering the examinations were easier and more interesting to the thought that it was a real test of knowledge. One man gave the following opinion: "I like this type of examination because I believe that it shows a practical application of the course and gives a chance for real thought and ingenuity."