observed important physiographic features of the Susquehanna Valley region with particular reference to peneplanation.

On Sunday, May 28, the whole conference united for a sixty-five mile tour of the Susquehanna and Juniata valleys. Dr. Willard was in charge of this excursion. The entire Paleozoic column from the Middle Ordovician through complete Silurian and Devonian exposures up to and including the Upper Mississippian was seen, Appalachian structures were observed, stratigraphic problems discussed and fossiliferous localities visited. Dr. Ashley drew the attention of the party to points of physiographic interest and to the river terraces and gravels of Pleistocene or Recent ages. This trip covered in a more extended form the Middle and Upper Paleozoic section to be visited by the International Geological Congress next July on Trip 1–B.

A choice of two trips was offered on Monday, May 29. Mr. Stone and Dr. Hickok led a party through portions of Cumberland and Adams counties where the chief interests were in economic geology including tile and ornamental stone works. Much also was seen of the Precambrian complex of South Mountain, and visits were made to certain ancient iron mines long since in disuse. Simultaneously with the foregoing, Dr. Willard conducted a second trip on Monday. Observations on this tour dealt entirely with stratigraphic problems. Those selecting this excursion visited several Silurian sections in Perry County, paying particular attention to the Ordovician-Silurian relations observable at points along Blue Mountain. The presence of Dr. Frank M. Swartz, of Pennsylvania State College, added greatly to the interest of the trip because of his thorough knowledge of the problems of the Silurian and the Helderberg, which he discussed at a number of localities.

The annual dinner was held at the Hotel Harrisburger on Saturday evening. After the meal, followed a discussion of the local geology by members of the Survey staff. On Sunday evening informal gatherings took place at the residences of Dr. Ashley and Mr. Stone. During a brief business session after the dinner an invitation was extended to the conference from its members residing in or near Pittsburgh to visit that area a year hence. The invitation was accepted by unanimous vote. The date for this meeting is tentatively set for the last week-end in May, 1934.

BRADFORD WILLARD
Secretary-Treasurer

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A SIMPLE STRING ELECTROSCOPE

THE instrument described below was developed while the authors were making a study of certain transient electrical phenomena. While there are instruments in use that are similar in general to this one, its simplicity and ease of manipulation, together with its general adaptability, seem to make a short account of it worth while.

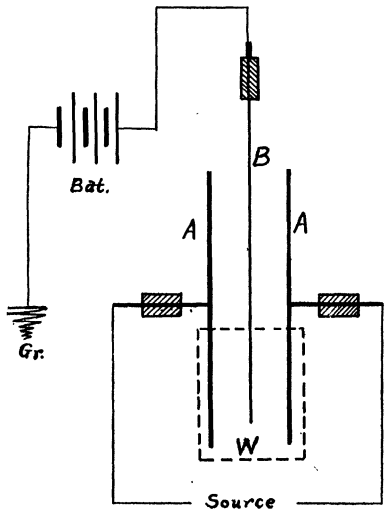

FIG. 1

A A in Fig. 1 are parallel brass plates about 8 cm long and 4 cm wide. They are mounted in the case of the instrument by the projecting rods as shown, so that the distance between them may be adjusted. These rods are supported by insulators of cast sulfur,[1] so that each plate is insulated from the case.

B is a silvered glass fiber[2] approximately 12 cm long hung midway between the plates from another sulfur insulator. It will be noted that the bottom end of the fiber is free.

W is a window in the case of the instrument through which the fiber may be viewed or its image projected.

In visual work the fiber may be observed through a low-powered microscope with a scale in the eyepiece. If the window is illuminated by a small arc, a sharp shadow of the fiber on a bright field may be projected

[1] Cast sulfur has proven to be excellent for this work. It is inexpensive and easily shaped and its insulating value is high. It deteriorates with age, and insulators made from it should be recast at intervals of 6 months or a year.

[2] The use of glass fibers has been surprisingly satisfactory. They are easily and quickly made and they last in service indefinitely.

by means of a cylindrical lens, on a slit in front of a drum carrying a sensitized film. As the drum rotates the film behind the slit is blackened, except where it is protected by the shadow of the fiber. Thus a record of the motion of the fiber may be made in the usual way.

This instrument may be used as a voltmeter and as an oscillograph.

(1) When used as a voltmeter for constant differences of potential the fiber may be connected to a dry cell battery of perhaps 200 volts, and the plates to the source to be measured.

When so connected (Fig. 1) the sensitivity may be varied by changing the distance between the plates and by changing the potential on the fiber. Fig. 2

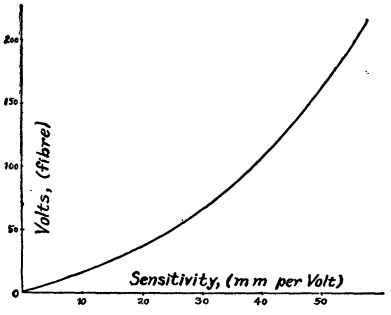

FIG. 2

is a typical curve showing the relation between sensitivity in mm of deflection per volt and fiber potential in volts. The sensitivity through a wide range is very evenly proportional to the potential gradient of the field between the plates. With properly chosen fibers the sensitivity may range from 200 or more mm per volt on the plates to 10 volts per mm, and it may be accurately controlled.

If, instead of connecting the fiber to a battery of dry cells, the fiber is connected through a resistance to one of the plates, the instrument will give steady deflections for alternating differences of potential. When used on differences of potential of this sort, it is very sensitive and readings may be repeated with accuracy.

The fiber should be drawn from ordinary sodium glass tubing and silvered. Its diameter should be something like .2 mm and for voltmeter work should be uniform throughout the whole length. The fact that it is a hollow cylinder insures high elasticity and small inertia, and these properties give high damping in ordinary air and a short period to the moving member. Fibers of this sort usually come to rest at the position of maximum steady deflection in less than .1 second.

(2) When used as an oscillograph a differently shaped fiber is required.

If the instrument as described above is used on alternating differences of potential with the uniform fiber charged from the battery as in Fig. 1, it is easily possible to set up nodes and loops like those in a vibrating rod in the fiber. While not useful in this condition for the study of wave forms, it is very good for the study of vibrations of rods and the like. It lends itself nicely to projection before a class, and when used with a stroboscope it shows the vibrations of the fiber clearly and distinctly in detail.

If the fiber is drawn so as to taper from a reasonable thickness (perhaps .5 mm) at the upper end to hair-like thinness at the free lower end, the stiffer upper part will not vibrate, but the lower fourth or thereabouts will, because of its extreme lightness, follow the variations of the field with no period of its own.

In this condition the fiber will follow audio frequency waves with fidelity when the plates are connected across a source. In connection with a microphone and a one-stage amplifier, voice currents, etc., may be recorded with great nicety. Records have been made of complex waves from various sources, such as organ pipes, orchestral music through the radio, the human voice, etc.

Since the moving part of this instrument is very small and light its motion in the field between the parallel plates disturbs the uniformity of the field very little. Therefore the source of the potential under measurement has to supply a very small charging current to the plates, and consequently very little energy. The exceedingly small amount of energy required to operate the instrument makes it useful in work where the source under investigation is very weak.

Because of the fact that its current requirement is so small, the authors have spoken of the instrument somewhat loosely as an "electrostatic oscillograph."

BENJAMIN ALLEN WOOTEN
WILBUR T. HARRIS
UNIVERSITY OF ALABAMA

SPECIAL ARTICLES

EFFECT OF INHIBITING FACTOR FROM NORMAL TISSUES ON SPONTANEOUS TUMORS OF MICE

IN a previous communication evidence was presented which indicated that a factor or substance could be extracted from mouse placenta and embryo skin which had a definite inhibiting action on the growth of transplanted mouse carcinoma. It has also been shown that an inhibiting factor isolated from a fowl sarcoma which was capable of neutralizing the causa-