this source. At present opinion is divided as to whether the diamond should be considered a constituent of the rock itself as is the mica, garnet, ilmenite, etc., or whether it has crystallized at great depths and merely been brought upward by the peridotite.

The discovery of diamonds at one of the American peridotite localities is causing some speculation as to whether the other two localities where this rock is known to occur and to contain the accessory minerals which so frequently accompany that gem, may not also contain the diamond. The remarkable similarity of the rocks at all three of the American localities with those of South Africa, not only in appearance as indicated in the collection mentioned, but also in eruptive character, in inclusions, in structure and in chemical composition, as has been frequently noted, makes such a supposition not improbable.

A catalogue describing the rocks of this collection in detail, together with a bulletin outlining the important facts concerning the Arkansas diamond field has been issued by Commissioner Guy B. Tucker, of the Bureau of Mines, Manufactures and Agriculture. Either of these may be obtained by applying to the Commissioner of Mines, Little Rock, Arkansas.

PHILIP F. SCHNEIDER

LITTLE ROCK, ARK.

SPECIAL ARTICLES

THE EFFECT OF AN ANGLE IN A CONDUCTOR ON SPARK DISCHARGE

AT a recent meeting of the American Philosophical Society held in Philadelphia the writer gave the preliminary results of his experimental work to determine the direction of flow of the electrical current in a wire. A large, eight-plate "static" machine, enclosed in a glass case containing also the Leyden jars, was used as a source of electricity.

The positive and negative discharges are led to two large metal cylinders hung in the air on insulators, and armed with a multitude of pin-points. In this way the positive and negative discharges are not superposed in the same conductor. The discharge was led around a sharply made right angle in the wire. This was done by means of a small splinter of bamboo, forming a sharp edge. A photographic plate in a holder of hard rubber was placed under the angle so that the discharge could be sent downward to the angle and then led horizontally away over the plate holder.

By reversing distant connections made by two small wires, the discharge could also be sent around the angle in the opposite direction.

The plate holder rests on a large sheet of plate glass forming a table top. Below this sheet of glass is a plate of metal connected to the water pipe. Its distance from the photographic plate may be varied. In all of the work done on the negative discharge this plate was not needed. Its use does not change the nature of the result.

It is found that when the negative discharge plunges down to the angle the electrical particles pass on into the air and through the rubber cover, whose thickness is three sixteenths of an inch, to the photographic film. This is shown by the character of the image formed on developing the plate. If the action is too strong, the electrical stresses produce branching images due to incipient breaking down of the film. By diminishing the spark length or by removing the angle further from the film, the image becomes a round spot just under the wire carrying the downward discharge. This image is apparently of the same character as is produced by X-rays or radio-action.

When the discharge is reversed, so that the negative particles pass across the plate to the angle and then upwards, the spot is much feebler, or does not form at all. The result depends somewhat on the extent to which the discharge is an oscillatory one. Oscillations are to be prevented.

When the positive discharge is sent around the angle, no such effect is produced. This is the case even when the grounded plate is brought as near as is possible without inducing spark discharges over the plate-holder. In such cases, however, the plate may be fogged by negative action from below, and

proceeding from the plate grounded on the water pipe.

By the use of this grounded plate and by replacing the thick hard-rubber cover of the plate holder by a thin sheet of black paper, in two cases distinct images have been produced by the positive discharge. In this case only a few millimeters of air separated the discharge wire from the film. It is then, however, very difficult to prevent the electric stresses from forming the branching images. When this begins the results are quite uncertain. When a negative discharge of the same spark length is used under the conditions which gave the faint positive image, the image produced covers a couple of square inches of plate. Five spark discharges of the negative produce a much greater effect than was produced by a hundred of the positive, in the two cases when the latter discharge produced any effect. The behavior of the positive line is somewhat perplexing. An X-ray tube will operate in this line, the cathode being connected on the cylinder hung in air. But these cathode particles do not appear to be active at the angle.

It may be possible to devise some method of electrometer examination which will not result in the destruction of the instrument. The continuous current has not yet been examined. This, however, involves different conditions from those existing in the circuits here examined. There are many precautions necessary in this work which can not be here discussed, but which will be presented as soon as final results can be given. It has required the use of sixty dozen photographic plates in order to reach the results already attained.

It is evident that the effects here described point to the action of the β and α "rays," in radio-active phenomena.

Francis E. Nipher

DINICHTHYS INTERMEDIUS NEWBERRY FROM THE HURON SHALE

In the spring of 1907 Dr. Lynds Jones found part of a dinichthyid mandible in the Huron shale near Huron, Ohio, and the writer collected it for the Geological Museum of Oberlin College. The specimen includes all of the cutting blade of the mandible excepting about one centimeter of the posterior end. The length of the cutting blade is sixteen centimeters. This indicates that the entire length of the mandible was about thirty-five centimeters. The width is eleven centimeters. In size it agrees with mandibles of *Dinichthys intermedius* Newb. and in form it agrees closely with the same species, differing in the greater and more regular concavity of the top between the second cusp and the posterior end of the cutting edge, and in the prominence of the cusp-like projection between the anterior tooth and the main cusp. As pointed out by Hussakof,[1] the prominence of this projection is probably an individual variation and is not of specific value. In the writer's opinion the first difference mentioned is not of specific value. The denticles on the posterior part of the cutting edge are smaller than in most specimens of *Dinichthys intermedius*. Teeth are absent from that part of the jaw where they are prominent in *Dinichthys hertzeri*. The differences between this mandible and those of *Dinichthys intermedius* are so slight that the writer has no hesitation in referring it to that species. The specimen is important in demonstrating the presence of a second species of *Dinichthys* in the Huron shale and in showing that the type of mandible of *Dinichthys intermedius* and *Dinichthys terrelli* did not develop from the *Dinichthys hertzeri* type.

A figure of this specimen will be published later with figures of other specimens recently collected from the Huron shale.

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SOCIETIES AND ACADEMIES

SOCIETY FOR EXPERIMENTAL BIOLOGY AND MEDICINE

The twenty-eighth meeting of the society was held in the physiological laboratory of the New York University and Bellevue Hospital Medical College, April 15, 1908. President Lee in the chair.

Members elected.—Otto C. Glaser, Alfred G. Mayer, John B. Murphy, Isaac Ott.

[1] *Bull. Am. Mus. Nat. Hist.*, Vol. XXI., p. 411.