ART. LI.—*On the Shadows obtained during the Glow Discharge*; by H. B. FINE and W. F. MAGIE.

It is well known that a body interposed between the poles of a Holtz machine causes a so-called *electrical shadow* to appear upon the positive glow. We believe, however, that the fact that a similar shadow can be obtained upon the negative glow has not yet been published. These appearances seemed of some importance as offering a further proof of the essential similarity of the positive and negative discharges. The following points with reference to them may be of some interest.

The glow was best obtained on either electrode when the other terminated in a point, the positive glow showing to better advantage on the smaller, and the negative glow on the larger of the two balls usually employed as terminals. Whenever either the positive or negative glow was established, a well defined shadow was cast upon it by any body, preferably a non-conductor, interposed between the electrodes. By careful manipulation, the smaller ball being used as positive, the larger as negative terminal, both glows were obtained at the same time, and shadows could be made to appear upon them simultaneously. The observations of Professor Wright* on the positive shadow were verified and found to hold for the negative also; and, in fact, all the phenomena obtainable with the one were likewise characteristic of the other.

These shadows, in general, whether positive or negative, represent closely the outline of the interposed object. If, however, the lines of electrical action be deflected by the presence of a conductor, the form of the shadow is altered. We could not effect any such alteration by merely blowing across the field.

The size of the shadow varies with the tension on the electrode, becoming smaller as this is heightened. This fact is

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easily illustrated by touching the electrode upon which the glow appears, and then removing the hand. The shadow, which at first covers almost the whole surface of the ball, rapidly diminishes as the tension rises. The size of the shadow further depends on the distance of the interposed object from the glowing electrode, though the relations of size and distance could not be very definitely determined. When the point and ball were used as terminals, the shadow appeared greatest when the interposed object was near either electrode and least when it was half way between them. When the two balls were used and both glows established at once, and generally when the discharge opposite the glow came from several points, the shadow decreased regularly as the interposed object was further removed.

It would not be proper for us to omit mention of the fact that Professor C. A. Young has since informed us that he noticed the existence of the negative shadow several years ago.

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