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A NEW FORM OF DISCHARGER FOR SPARK SPECTRA OF SOLUTIONS.

BY L. M. DENNIS.

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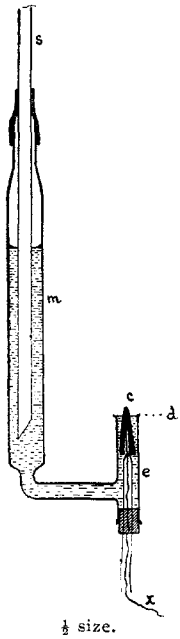
MANY forms of dischargers for examining the spark spectra of solutions have been described, but all of those with which the writer is acquainted possess disadvantages that seriously impair their value.

To prevent the spattering of the liquid upon the slit of the spectroscope the terminals are, in some cases, surrounded by a glass tube. If a spark of even moderate intensity be used, the liquid which is thrown against the walls of the tube soon cuts off most of the light and obscures the spectrum. It is then necessary to disconnect the discharger and to thoroughly clean the walls of the tube, an operation wasteful both of time and material. Others recommend that the glass tube be abandoned and that free terminals be employed. In this case it becomes necessary to place the spectroscope at some distance from the discharger to avoid the spattering of the liquid against the slit. Again, if the observations are at all prolonged, the liquid in the discharger is soon used up to such an extent that the lower terminal becomes too dry to give a brilliant spectrum. The discharger must then be refilled.

These difficulties are obviated by the following device which we have been using for the past year. No striking originality

is claimed for it, and the chief excuse for here describing it is furnished by its usefulness.

The lower terminal consists of a platinum wire *x* and the graphite cone *c*. The cone is bored as shown to permit of its being slipped over the end of the platinum wire, and the upper end of the cone is allowed to project slightly above the end *d* of the glass tube *e*. The platinum wire passes through a small glass tube, the upper end of which is fused together about the wire. This tube is held in place by a small cork. The remainder of the apparatus is made of glass tubing of the form as shown. The upper end of *m* is drawn out so that there may be slipped over it a piece of rubber tubing small enough to hold the tube *s*. To fill the apparatus, the tube *s* is removed, the discharger is inclined to the left, and the liquid is run in at the upper end of *m*. *s* is then inserted and pushed down nearly to the bottom of *m*. Upon now bringing the apparatus into the upright position, the liquid in the side arm *e* will rise until on a level with the lower end of *s*. *s* is then carefully drawn up until the liquid in *e* has risen to the point *d*. As the liquid is evaporated by the spark at the terminal *c*, it will be maintained at the level *d* by the entrance of air through the lower end of *s*, and this will continue until the liquid in *m* has fallen until about on a level with *d*.



½ size.

The employment of terminals made from Ceylon graphite was first suggested by Hartley,[1] who used pieces shaped like a wedge and made contact between the platinum wire and the carbon cone by wrapping the wire around the cone. The form here suggested permits of an easy removal of the terminal and its replacement by an electrode of other material. If a platinum terminal is desired, the carbon cone is removed and the glass tube carrying the platinum wire is pushed up until in the proper position.

[1] Trans. Royal Society, 175, 52.

The form of discharger above described leaves the terminals free and exposes the slit to spattering. This difficulty is removed by simply covering the slit with a glass microscope slip of suitable size. We use a slip three inches long by two wide and about one-sixteenth of an inch in thickness, and hold it in place by two rubber bands. If the glass becomes spattered, it can easily be wiped clean or replaced by a clean slip.

The upper terminal, which is not shown in the figure, consists of an insulated platinum wire or a graphite cone, around which the wire is wrapped.

CORNELL UNIVERSITY,
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[CONTRIBUTION FROM THE CHEMICAL LABORATORY OF CASE SCHOOL OF APPLIED SCIENCE. NO. 30.]

VINEGAR ANALYSIS AND SOME CHARACTERISTICS OF PURE CIDER VINEGAR.

BY ALBERT W. SMITH.

Received November 17, 1897.

THE laws of Ohio, copying the food laws of several older states, require, among other things, that apple or cider vinegar to be sold in the state shall contain at least two per cent. of cider vinegar solids. As to the chemical composition of what constitute the solids of pure cider vinegar, very little has been published. The *Analyst* for May, 1891, contains some analyses of pure malt vinegar and the prosecution, in 1893, of several cases in the courts of England, by the food inspectors against dealers in distilled and wood-acid vinegar, attracted considerable attention in that country to the subject of the chemical composition of vinegar and methods of distinguishing from each other the several kinds of vinegar upon the English market. Some valuable data were published by Allen and Moore,[1] especially concerning the character of vinegar made from grain. From the discussion of the question by the Society of Public Analysts[2] it appears that the English vinegar market is largely supplied by products made from distilled alcohol and from malted or unmalted grain. In this country the principal sources of vinegar are from apple cider and from distilled alcohol, the

[1] *Analyst*, 18, 240; and 19, 214.
[2] *Analyst*, 18, 180 and 240; 19, 8 and 33.