A CELL FOR MEASURING THE ELECTRICAL RESISTANCE OF LIQUIDS.

BY W. WALTER DINWIDDIE.

ALL instruments for a student laboratory should be so devised that the student can go to the bottom of what he is investigating without having to take anything on faith. In the usual forms of cells for measuring the resistance of liquids (Stewart and Gee, *Elementary Practical Physics*, Vol. 2, page 219), the student will either have to take the constant of the cell as given by the instrument maker, or use it first to measure the resistance of some liquid of which the resistance is assumed.

A very simple cell for determining the resistance of an electrolyte by Kohlrausch's method, which is free from this objection, may be constructed as follows :

Select a glass tube of uniform bore ; cut it off a little more than a meter in length, then grind the end off until it is exactly one meter. Short pieces of tube of a much greater diameter, with the ends sealed and a large hole blown out on the side, are fitted on the ends with corks. The corks should be coated on the inside with shellac, or some substance not acted on by the liquid used.

The electrodes are made of copper, with one side ground smooth and amalgamated.

The tube is weighed with two small discs of glass to cover the ends, it is then filled with water and again weighed. Mercury may be used in place of water with some advantage, as it may be poured out and weighed alone.

One of the cells which the writer has constructed was found to contain 49.83 grammes of water at 26° C., at which the density of water is .9969, which gives .49902 sq. cm. for the mean cross-section. If the cross-section varies considerably a correction may be applied (Kohlrausch Physical Measurements, page 304), but the ones I have used were very nearly uniform.

In using the instrument the electrodes are first placed together and the resistance measured, then they are placed at the ends of the tube and the resistance measured again. The difference is the resistance of the liquid in the tube.

WASHINGTON, D. C.,

June 14, 1902.