NOTES

A Cell for the Observation of Colloidal Solutions for Use with Substage Ultra-condensers.—In laboratories where an ultramicroscope of the Siedentopf and Zsigmondy type is not available, one of the various types of substage dark field condensers, such as the paraboloid or cardioid, is usually employed for the examination of colloids.

It has been stated that such a means of ultramicroscopic observation is useless for direct quantitative work.[1]

Burton[2] has, however, shown how a hemacytometer slide may be used for the estimation of the number of particles in a colloidal solution.

The method has the inconvenience that it is necessary to remove the slide and to readjust the optical arrangement in order to examine a fresh sample of solution. Extended counts become, therefore, somewhat tedious.

An apparatus has been constructed by means of which a series of solutions or of samples of the same solution may be passed through the cell without disturbing the adjustment.

The apparatus which is shown in plan and section in the figure consists principally of a brass block A which is bored at points diametrically opposite to receive two copper tubes of about 2 mm. internal diameter. The tubes fit closely into the holes and are further held by externally soldering. To the bottom of the brass block, which is ground perfectly flat, is cemented a carefully selected cover glass B. The writer used Canada balsam, though this is not an ideal cement to unite metal to glass. Whatever cement is used, the glass must approach closely and uniformly to the brass to ensure that the lower surface of the glass is perfectly flat.

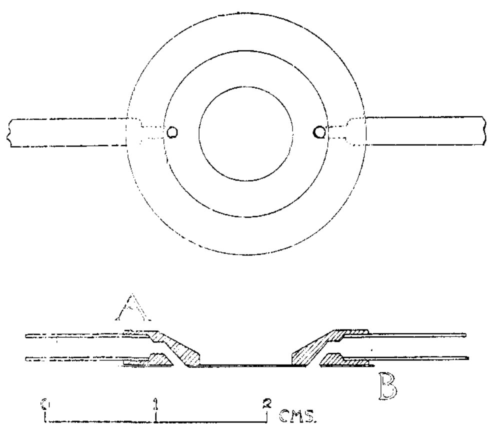

Fig. 1.

When the cover glass is cemented in position, two holes are bored through it to meet the holes in the brass block. This is a very easy operation if a piece of wood through which are bored two holes of the desired diameter and position is temporarily cemented to the glass with some water-soluble cement such as ordinary glue. The holes are bored by means of a copper tube charged at the end with carborundum and glycerine, the tube ro-

[1] King, "Third Rep. Brit. Assoc. Colloid Chemistry," p. 36.

[2] Burton, "Physical Properties of Colloidal Solutions," **1921,** p. 124.

tating in the wooden block which can afterwards be removed by soaking in water.

It will thus be seen that the arrangement has the advantage of a reinforced cover glass and as both surfaces of cover glass and slide are flat it will be found unnecessary to cement the two together. The apparatus is held in position on the slide, while being fixed in the microscope by two lumps of plasticine, one on each copper tube, and is further held in position by the spring clips of the microscope stage which press on the tubes.

To the copper tubes are affixed a delivery funnel with a clip and an exit tube.

By opening the clip it will be found that the colloid solution passes through the cell. Since the hemacytometer slides contain a channel round the central portion, it was at first feared that the solution might go round this channel instead of over the graduated portion. By observing the motion through the microscope, it can be seen that this is not the case.

Moreover, it can be very easily seen when the liquid is running through the cell whether any particles are stuck to the bottom of the cell or on the cover glass. This is an important advantage, as such particles, which may be of foreign matter, may constitute a serious source of error in counting the number of particles in a solution.

It would be an additional advantage to gold-plate the whole of the metal portion.

Finally it may be stated that it is easy to obtain such hemacytometer slides of any specified thickness to suit the particular ultra-condenser, and of any desired depth of cell. The writer has used slides of thickness 1.1 to 1.2 mm. to suit a Zeiss Paraboloid, and of depth 0.1 mm. and 0.02 mm. made by Messrs. Hawksley of London.

Fred Fairbrother

Contribution from the Chemical Department,
Victoria University,
Manchester, England
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Instability of Phthalate Potentials.—The note by Oakes and Salisbury on the instability of phthalate potentials, an instability which seems to have been observed by Merrill, is completely at variance with the author's experience. In the course of several years' work with the hydrogen electrode, 0.05 M potassium hydrogen phthalate solutions have been used as a "working standard" and have given no evidence of instability which could be considered convincing. It goes without saying that among hundreds of measurements there have occurred occasional potentials which could justly be called abnormal. Once on leaving an electrode, having an exceptionally light coating of iridium, in contact with a phthalate so-