AN IMPROVED TYPE OF MICROSCOPIC ELECTROCATAPHORESIS CELL.

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The cataphoresis cells previously described\textsuperscript{1,2} are troublesome to make and have the further disadvantage that they cannot be cleaned with cleaning solution. Dr. D. P. Morgan called the writers' attention to the fact that a flat glass capillary cell could be made by drawing out tubing sidewise as shown in Fig. 1. A 1.5 cm. test-tube is a convenient size to use. The capillary should be about 1.0 by 5 mm. inside dimensions and as uniformly rectangular in cross-section as possible. It is then sealed to short pieces of glass tubing as shown in Fig. 2, and the whole connected with the Zn-ZnSO\(_4\) electrodes as previously described.\textsuperscript{3} Slight curvature of the glass may be overcome by sealing cover-slips with Canada balsam to the top and bottom of the cell.

In using the cell the potential drop per cm. in the cell itself must be known. This may be calculated from the cell dimensions as previously described\textsuperscript{1} or measured directly. For direct measurement two small platinum electrodes are sealed into the cell about 2 cm. apart, and the potential drop per cm. which occurs in the cell itself is determined by measuring the potential between these electrodes with an electrometer.\textsuperscript{3} This measurement may also be made with a potentiometer provided the apparatus is filled with mercury. The cell is assembled and filled with dry mercury. A dry cell is connected in series with the two Zn electrodes and the potential between these electrodes determined with a potentiometer. The potential between the electrodes sealed into the cell is also determined. This gives the propor-

\textsuperscript{1} Northrop, J. H., \textit{J. Gen. Physiol.}, 1921–22, iv, 629.
\textsuperscript{2} Kunitz, M., \textit{J. Gen. Physiol.}, 1923–24, vi, 413.
\textsuperscript{3} A potentiometer cannot be used with an electrolyte solution in the cell, owing to polarization.
tion of the total potential drop which occurs in the cell, \( i.e. \) if \( V_T \) is the potential between the Zn electrodes, \( V_C \) the potential between the electrodes in the cell, then, since the electrodes are 2 cm. apart, the ratio of the potential drop per cm. in the cell to the total potential is

\[
\frac{V_C}{2V_T}.
\]

This factor is constant for any one cell and the drop per cm. at any time is therefore \( \frac{V_C}{2V_T} \cdot V \), where \( V \) is the total voltage applied to the Zn electrodes during the measurement. This potential between the two Zn-ZnSO\(_4\) electrodes at the ends of the apparatus may be determined with a voltmeter. The arrangements of the zinc electrodes and the other connections are the same as those already described, as is the method of correcting the motion of the particles for the motion of the water in the cell. For small particles an adjustable dark-field condensor may conveniently be used.

4 The entire apparatus may be obtained from Eimer and Amend, New York.