New Differential Polarography with One Dropping Electrode. — The Use of Rotating Current Alternator

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In polarography, the derivative $\Delta i/\Delta E$ of the ordinary current-voltage curve is useful and important. For the purpose of obtaining it, a method of employing two mercury dropping electrodes has been proposed.[1] However, it is difficult to get a good result with the method, because of the difficulty of synchronizing the drop rates of both electrodes.

The authors made a new device of simple circuit system for obtaining the differential polarogram with one dropping electrode by the use of rotating switch, connected in series with the usual polarograph. Fig. 1 shows the scheme of the apparatus. In the figure, the voltage of $E+\Delta E$ is applied to the cell and the electrolytic current i flows through the galvanometer, and in the next instant when the alternating switch is half rotated, the voltage of E is applied to the cell, thereby the corresponding current i' flows reversely through the galvanometer. By rotating the switch with adequate speed (*ca.* 800 r. p. m.), the galvanometer is led to show the difference between both currents ($\Delta i=i-i'$) and so the polarograph shows the differential polarogram. Fig. 2 shows the differential polarogram compared with the ordinary one.

Some characteristics of this apparatus and the interesting results obtained will be submitted later.

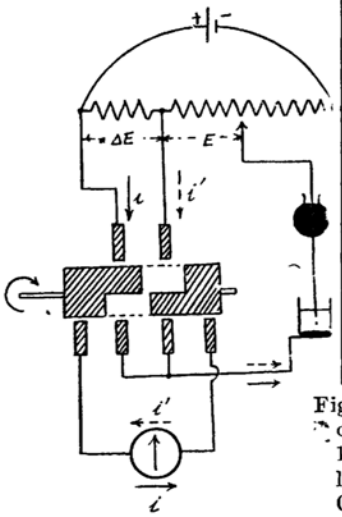

Fig. 1.

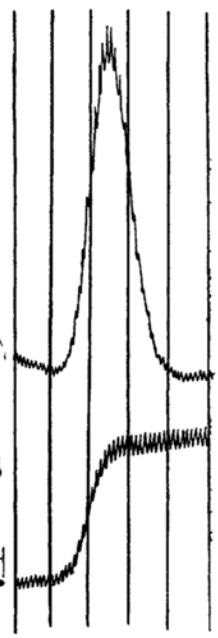

Fig. 2.—Polarograms of Cd^{++} ion: Curve 1, differential polarogram, 750r.p.m.; Curve 2, ordinary polarogram.

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(1) J. Heyrovsky, *Chem. Listy*, **40**, 222 (1946); etc.