ELECTROSTENOLYSIS AND FARADAY'S LAW.

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IT will be remembered that electrostenolysis is the name usually applied to the deposition of certain metals in capillary tubes during the passage of a current. This singular phenomenon was first noted by Braun, and subsequently an explanation was offered by Coehn.[1]

The deposition occurs as a rule only under circumstances capable of producing considerable endosmose—namely, when the fall of the potential in the capillary is great. After the capillary has been lined or plugged with deposited metal, its ends act as minute secondary electrodes within the liquid, giving rise to secondary cathodic and anodic reactions. The phenomenon is most easily demonstrated by using as capillaries the fine cracks, caused by the plunging of a hot glass tube into water. Such a cracked tube is inserted, as a porous cup would be, between the regular anode and cathode. If the cracks are not too widely opened or too plentiful, it is easily possible to deposit as much as a third of the silver corresponding to the current upon the glass tube.

Although the phenomenon seemed almost certainly to concern the neighborhood of the capillary alone, and to be without probable influence on the mechanism of the normal deionization of the metal, it was nevertheless deemed advisable to prove that it could not affect the weight of the normal cathode deposit. This proof is all the more important because the interposition of a porous cup (or system of capillaries) has been recently suggested as an essential part of any accurate electrolytic apparatus for measuring electrical quantity.[2]

It is true that in no case has an actual electrostenolytic deposition been noticed in a porous cup thus used, and also true that the same quantitative result is attained when no porous cup is interposed and diffusion is prevented by gravity alone, but in so important a matter no stone should be left unturned.

A glass tube, with one end sealed and partially cracked, was bent into the shape of the letter N, and filled with dilute silver

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[1] *Ztschr. Elektrochem.*, **4**, 501 (1898); *Ztschr. phys. Chem.*, **25**, 651 (1898).

[2] Richards, Collins and Heimrod: *Proc. Am. Acad.*, **35**, 123 (1899); **37**, 415 (1902).

nitrate. The cracked end was immersed in a platinum crucible containing the same solution, the acid liquid forming around the cracked end being kept away from the crucible by means of a porous cup. A silver anode was placed in the open end of the bent tube, and a current was sent in series through this cell and through a standard porous cup voltameter. The fall in potential in the total circuit was 14 volts, the resistance being over a thousand ohms, chiefly in the capillary cracks. The electrostenolytic silver formed usually weighed about 5 centigrams and the silver peroxide weighed 5 milligrams. Three trials were made, with ordinary analytical precautions, but no extraordinary care. The weights of cathode silver found in the cell complicated by electrostenolysis were respectively 0.2213, 0.2532, 0.1432, while the standard coulometer yielded 0.2213, 0.2527, 0.1432. Thus the results were identical within the limit of error of the work. This outcome is consistent with Coehn's hypothesis.

Therefore, it was proved that the complication of electrostenolytic deposition does not affect the weight of the true cathode deposit, or the exact application of Faraday's law.

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ON THE COMPLEXITY OF BERYLLIUM; A DISCUSSION.

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KRÜSS AND MORAHT[1] noting the presence of a foreign substance in their ammonium carbonate solution of beryllium hydroxide, which yielded a black precipitate on treatment with ammonium sulphide, implied that a possible new element was under consideration. This claim was not directly made by them, but the fact that they stated it yielded a black sulphide, but a white hydroxide, left no other apparent conclusion. The writer during an extened investigation on beryllium collected a notable quantity of this substance under conditions similar to those which obtained in Krüss and Moraht's work, and showed that it consisted almost if not entirely of a mixture of zinc and iron sulphides, but mainly of zinc[2]. No evidence of the presence of any other substance was obtained. Pollok[3] also showed that this precipitate consisted

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[1] *Ann. Chem.* (Liebig), **262**, 47.

[2] *Ztschr. anorg. Chem.*, **40**, 407; This Journal, **26**, 727.

[3] *J. Chem. Soc.* (London), 1904, p. 604.