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apparatus was therefore modified considerably, with the result that estimations of silver were done in half an hour with an average error of less than a-tenth of one per cent.

The principal differences from the former apparatus were the use of fine sand to retain the silver chloride precipitate, the replacement of the funnel by a short piece of thin-walled glass tubing, which enables the slightest opalescence to be easily observed, and the permanent attachment to an exhaust for washing the precipitate and solution down the tube.

A rubber cork, pierced with two holes, is inserted in a flask, A, of about 600 c.c. capacity. Through it passes a tube, C, of about 60 mm. diameter, fitted with a stopcock, D, and to its upper end is sealed about 4 cm. of a thin test-tube, E, of 1—1.5 cm. diameter. About 8 cm. from the lower end of the tube C, a plug of glass-wool is inserted and the remainder filled with sand, previously washed free



from impurities. The sand is held in its place by a second plug of glass-wool, and the curved piece of tubing, B, filled with glass-wool and attached to C by a small piece of rubber tubing. The curved portion may, of course, be sealed on, but in these circumstances is not so readily filled. This prevents the back suction from displacing the sand. Through the second hole in the cork a small piece of tubing passes, connected by a length of rubber tubing, F.M, to a three-way tap, H. J is a small hand aspirator to force a portion of the contents of A up the tube C for titration in E, whilst K leads to the exhaust pump. It is advisable to have a space between the tap H and the water pump, as this ensures there always being a ready vacuum available the moment the connexion is made through H to the flask.

The first set of experiments was made with quantities of a solution of silver nitrate of known strength, using N/10 sodium chloride in excess as precipitant, and titrating back with N/10 silver nitrate. A portion of the silver solution, equivalent to 0.5 gram of silver, is

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