A PLATINUM FILTERING BULB FOR DR. CARMICHAEL'S SYSTEM OF FILTRATION.

By P. Casamajor.

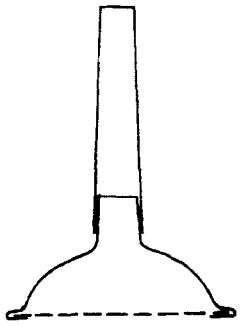
Dr. Carmichael's system of filtration, first published, I believe, in 1870, is well known to all chemists. In this system, filtration takes place on a small paper disc, held by the suction of a filter pump against the flat perforated surface of a small vessel called a filtering bulb. A description of this system of filtration is given in Crooke's *Select Methods of Chemical Analysis*, (London, 1886 p. 665.) Chemists who have seen Dr. Carmichael perforate the flat surface of his filtering bulb by means of a hot wire, say that the operation seems an easy one, but I have learned that very expert glass blowers in New York have failed to make these perforations, so that many chemists, who would have liked to try these filtering bulbs, were not able to obtain them. Several years ago I tried Dr. Carmichael's plan very successfully by making the filtering bulbs in two pieces, one of glass, having the shape of a Plattner's blowpipe mouthpiece, the other being a perforated platinum plate over which was placed a paper disc of slightly larger diameter. The paper disc and perforated plate were held against the glass portion by the suction of a filter-pump. This apparatus was described in 1875 (*Chemical News*, **32**, 46), (*American Chemist*, **5**, 440).

In 1881 I published a description of another apparatus for Dr. Carmichael's system of filtration. (*Jour. Am. Chem. Soc.*, **3**, 125.)

Prof. J. P. Cooke, of Harvard, has made Dr. Carmichael's filtering bulb entirely of platinum. (*Proceedings of the American Academy of Science and Art*, **4**, n. s., 125.) This seems the most practical and convenient way of making a filtering bulb; the shape is copied exactly from that of Dr. Carmichael's glass bulb. Only by such skill as a regular manufacturer of platinum ware possesses, can Prof. Cooke's platinum bulb be made. Those he uses were made by Messrs. Johnson & Mathey, of London.

Some time ago I decided to try a Carmichael filtering bulb, made entirely of platinum, and I succeeded in making it in such a way that any moderately skillful metal spinner could construct one.

The figure represents, in section, this filtering bulb which has given entire satisfaction. It is formed in three portions, the upper one being a straight tube which is placed in communication with a filter pump or its equivalent. This tube may be made entirely of platinum, or of platinum foil turned to form a tube, the edges of the foil being soldered with gold.



The portion immediately below this tube has the shape shown in section. No metal spinner of ordinary skill could have any difficulty in turning it on a lathe. The platinum plate should have a thickness of not less than half a millimeter or $\frac{1}{50}$ of an inch. A flat shoulder is turned on the lower part of the bulb. Against this is placed the third portion, a perforated plate, and then the outer rim is turned over the plate so as to leave a circular margin of about 2 or 3 millimeters wide. The platinum bulb has a short tube, spun on the lathe, which is made conical so as to fit tightly into the tube which connects it with the aspirator. The bulb and tube may be soldered together with gold, if it is thought preferable, instead of being connected by the conical tube of the bulb fitting tightly into the longer tube.

The platinum filtering bulb, which I am now using, was made by Messrs. Eimer & Amend, Third avenue and 18th street, New York.

ABSTRACTS.

GENERAL AND INORGANIC CHEMISTRY.

Fixations of Free Atmospheric Nitrogen by Argillaceous Soils. BERTHELOT.

The author discusses the questions of nitrification by atmospheric nitrogen, and the formation of nitric acid and of ammonium nitrate by the electric spark. He believes, with Boussingault, that plants cannot assimilate atmospheric nitrogen directly. Ten years ago the author established the theory of a new cause of fixa-