rearrangement, since all the other first-order gas reactions are decompositions.

CONTRIBUTION NO. 256 FROM THE
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A Capillary Gas Valve.—Having had occasion to withdraw many small samples of extremely pure chlorine from a large storage bulb without contaminating the main supply, the scheme in Fig. 1 was adopted. The outer tube D is of thin-walled 12-mm. tubing, 30-cm. long; the capillary E is less than 1-mm. bore, with thin walls. When a sample is to be collected in the reaction vessel which, together with tube D, has been evacuated, liquid air is applied at G. From this point on, H serves as a chlorine block, cotton wrapping around H being continually soaked with liquid air throughout all subsequent operations. The Dewar flask is then removed, and the chlorine in capillary G begins to melt. Current sent through an electromagnet held at point A, Fig. 1, causes the iron-cored glass capsule C to jump up and break the capillary at point A, and chlorine in G begins to distil over into the reaction vessel. C is then pulled out of the way, as in Fig. 2. When sufficient chlorine has been collected, F is shut, and a small flame applied momentarily at B. Since the pressure in D is less than one atmosphere, the thin tube immediately collapses as represented by the dotted curve in Fig. 2. The flame is now directed at A, and the capillary quickly sealed off as shown in Fig. 3. The blob of glass may be pulled off subsequently to give the appearance of Fig. 1 again. The capillary always breaks at point A-B where the strain of being sealed to D lies. Any gases given off from the momentary heating at B can be pumped out of D before opening F to the reaction vessel again; and none of these gases can pass into the storage bulb against the stream of chlorine which continually evaporates from G and flows into D through

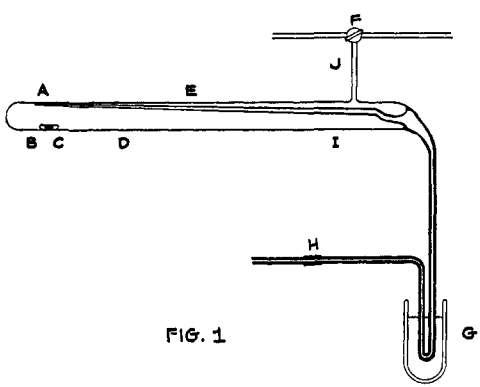

FIG. 1

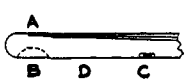

FIG. 2

FIG. 3

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capillary E. The latter is sufficiently long to permit the withdrawal of about thirty samples, after which a new tube can be sealed on at I, and thirty more samples withdrawn. Stopcock F, treated with a special chlorine-resisting lubricant,[1] can be dispensed with, if necessary, by a slight modification of the scheme in Fig. 1, such as by sealing off the reaction vessel each time at a constriction at J.

This scheme is, of course, applicable to gases other than chlorine to replace other more complicated and less satisfactory devices. It has the advantage of repeated use without replacement. In other cases the liquid air trap may or may not have application, according to circumstances, and may be omitted at will.

CONTRIBUTION FROM THE
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A New Line in the Absorption Spectrum of Samarium.—During the course of work on the concentration of illinium it was noticed that an extremely faint line appeared at 5960 Å. in the absorption spectrum of supposedly pure samarium. No line at 5960 Å. has been reported for this element. As the material had been prepared by fractional crystallization of the double magnesium nitrates, the line could be attributed only to neodymium, europium, illinium or to samarium itself.

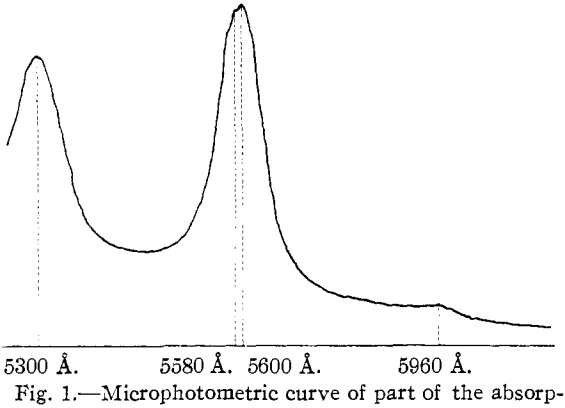

Fig. 1.—Microphotometric curve of part of the absorption spectrum of samarium nitrate, showing a new line at 5960 Å.

About two kilograms of rare earth oxide showing the line was, therefore, fractionally crystallized five hundred times as the double magnesium nitrate, and then one hundred times as the simple nitrate. During all this

[1] H. N. Stephens, THIS JOURNAL, **52**, 635 (1930).

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