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to permit the withdrawal of about thirty samples, after which a new tube can be sealed on at I, and thirty more samples withdrawn.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.

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HUBERT N. ALYEA[2]

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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.

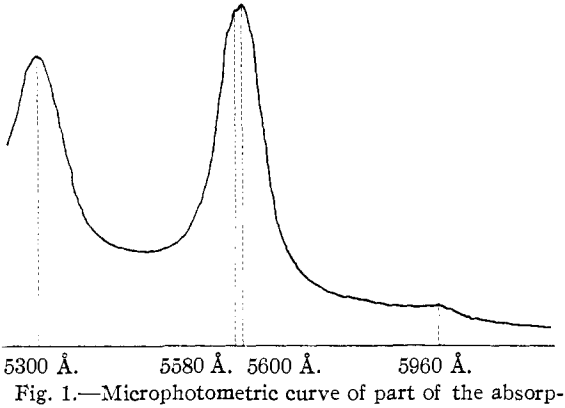

Fig. 1.—Microphotometric curve of part of the absorption spectrum of samarium nitrate, showing a new line at 5960 Å.

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).

[2] National Research Fellow.

time the line at 5960 Å. remained at the same relative intensity to the other lines of samarium throughout the series. The only impurity eliminated was a faint trace of neodymium, the absorption bands of which appeared quite distinct from the line in question. It was, therefore, concluded that the line at 5960 Å. belonged to samarium and had escaped observation before owing to its extreme faintness.

The figure shows a microphotometric curve taken from part of the absorption spectrum of samarium nitrate photographed on a Hilger E1 quartz spectrograph as described elsewhere.[1] The solution, which was 6.0 N in samarium nitrate, was in a 15-cm. absorption cell. The temperature was 80°, as the line is more intense when the solution is hot. Some idea of the relative intensities of the new line and the one at 5600 Å. may be gained from the figure.

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The Standardization of Weights.—The accuracy of the Richards method[1] for the standardization of weights by substitution can be doubled by using the method of weighing by transposition. This latter method makes the use of a set of tare weights unnecessary, and involves no more time or difficulty than the Richards method. In fact, this is one operation to which the little-used transposition weighing seems peculiarly suited.

If the weights W_1 and W_2 are to be compared, W_1 is placed on the left pan and W_2 on the right and the zero point noted. The weights are then reversed and the difference, d, necessary to bring the pointer to the same zero point is noted. It can be shown readily that $W_2 - W_1 = d(l_2) \div (l_1 + l_2)$ where l_1 and l_2 are, respectively, the lengths of the beam to the left and to the right of the central knife edge. Since d is very small, any error introduced by assuming that $l_1 = l_2$ is entirely negligible, so $W_2 - W_1 = d/2$, where d may, of course, be either a positive or negative quantity. The method of calculating the corrections remains the same.

Variations in the relative lengths of the balance arms are not likely to occur during any one comparison, and variations between comparisons could not affect the value of $W_2 - W_1$ appreciably.

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[1] Quill and Selwood with Hopkins, THIS JOURNAL, **50**, 2929 (1928).

[1] T. W. Richards, *ibid.*, **22**, 144 (1900).