In Table I are represented at random a few of the substances of different homologous series for which the constant S was calculated. It may be noticed in Table I that the variation of constant S is very small, and falls probably in many cases within the experimental error of the determination of the three properties involved in the calculation. About the same variation was found in the case of thirty or more other substances for which the constant S was calculated. In taking the values of S for aliphatic esters from methyl formate to methyl isobutyrate it was found that the constant S is approaching a constant value characteristic of that series. The same is indicated for the saturated hydrocarbons. If the value of S, for instance, obtained for ethyl acetate is used for any higher ester in calculating the density, vapor pressure, or the viscosity, the error in most of the cases proved to be very small. These same effects have been noticed for other series which thus far have been calculated only approximately due to the lack of experimental data.

TABLE I

VALUES OF CONSTANT S AT DIFFERENT PRESSURES

V. p., mm.	$CHCl_3$	$(C_2H_5)_2O$	n-C_5H_{12}	n-C_7H_{16}	$(CH_3)_2CO$	$CH_3COOC_3H_7$	$C_3H_7COOCH_3$
100	0.0244	0.0934	0.00868	0.00855	0.0108	0.0124	0.0124
200	.0244	.0936	.00870	.00857	.0108	.0124	.0124
400	.0244	.0938	.00871	.00859	.0109	.0124	.0123
600	.0243	.0939	.00870	.00859	.0110	.0123	.0123

An attempt is being made to evaluate the constant S independently.

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A Quantitative Study of the Lanthanum–Neodymium Separation

BY P. W. SELWOOD

The writer had occasion for another investigation to prepare a considerable quantity of a lanthanum–neodymium mixture and, during recovery of this material, opportunity has been taken to make quantitative measurements on eight separation procedures including all standard methods available for the cerium group. The fractions were analyzed by means of their magnetic susceptibilities. The original mixture contained 29.6% Nd. Six-gram samples of the mixed oxides were taken in each case.

While the above results have not necessarily been obtained through the optimum conditions for all or any one of the separations, yet Prandtl's basic ammonia separation is shown to be definitely the most efficient of the methods as described in the literature. In actual practice it is frequently found that a reversal of the solubility order facilitates rapid purification. The oxalate method, which is the most efficient of the solubility

TABLE I

SUMMARY ON LANTHANUM–NEODYMIUM SEPARATIONS

Method	Ppt. (g. oxide)	% Nd in ppt.	% Nd in in filtrate	More soluble element
Sulfate[1]	2.9	24	35	Nd
Oxalate[1]	3.1	43	16	La
Alkali carbonate[1]	5.3	25	62	Nd
NH_4 double nitrate[1]	3.5	20	44	Nd
Basic magnesia[1]	1.2	61	22	La
Basic ammonia[2]	2.3	59	11	La
Basic urea[3]	1.9	43	23	La
Basic electrolytic[4]	1.0	60	24	La

procedures, has unfortunately the same serial solubility order as the basic precipitations. The ammonium double nitrate seems to be the next best choice.

(1) Procedure as in Little, "Textbook of Inorganic Chemistry" (Friend), Griffin, London, 1917.

(2) This is Prandtl's modification, using $Cd(NO_3)_2 + NH_4NO_3$, of the straight ammonium hydroxide basic separation [Prandtl and Hüttner, *Z. anorg. allgem. Chem.*, **136**, 289 (1924)].

(3) Six grams of mixed oxides was converted to nitrates, almost neutralized with ammonium hydroxide and diluted to 1 liter. Ten grams of urea was added and the mixture was kept at the boiling point for four hours. The precipitate formed was quite granular. The writer is indebted to Professor H. H. Willard of the University of Michigan for suggesting this method. He understands that Professor Willard has made an exhaustive study of the use of urea as an analytical reagent for group three elements.

(4) Dennis and co-workers, THIS JOURNAL, **37**, 131, 1963 (1915); **40**, 174 (1918). Neckers and Kremers, *ibid.*, **50**, 950 (1928).

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A Mercury Seal for Stirrers

BY D. T. ROGERS

In the past mercury seals for stirrers used in this Laboratory were made from Pyrex glass. They frequently broke because of improper annealing and careless handling.

To overcome these difficulties seals have been made from steel which have proved very satisfactory. The seals made from Allegheny metal No. 22 have remained unattacked after six months of service. Those made from soft steel and covered with a coat of paint have also proved quite satisfactory. The seals weigh about 200 g. and can be used at speeds up to 1000 r. p. m. The upper part of the seal is not shown in the diagram. It consists of either a thin-walled glass or steel cylinder which is fitted to the stirrer shaft with any ordinary rubber stopper. Dimensions are such that stoppers can be changed without dismantling the seals.

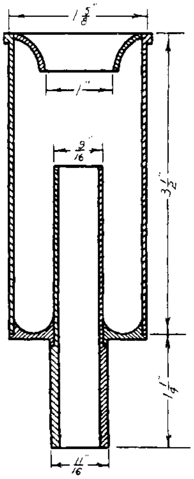

Fig. 1.