CCCLXXIV.—*The Solubility of Potassium Selenate in Water between* 0° *and* 100°.

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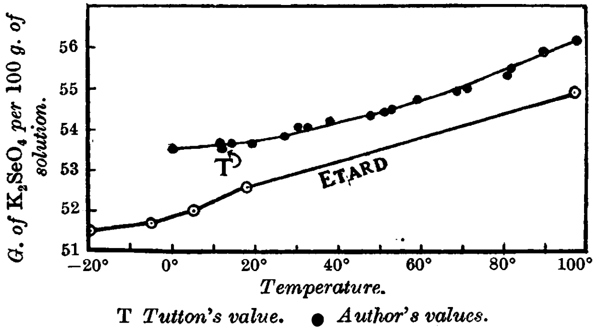
In 1894 Etard (*Ann. Chim. Phys.*, **2**, 503) gave the results of the determination of the solubilities in water of a considerable number of salts. More recent work has shown, however, that in many cases his results are low, presumably because his solutions were not thoroughly saturated, although in some cases, *e.g.*, lithium sulphate (Friend, this vol., p. 2331), his methods of analysis are now known to yield untrustworthy results. His data for potassium selenate are shown in Fig. 1. A break appears to occur in the curve at or above 18°. The only other available solubility datum is that of Tutton at 12° (J., 1897, **71**, 846), marked T in Fig. 1. This point lies appreciably above Etard's curve and, if correct, indicates that in this case also the whole of Etard's data are low. The present research was undertaken in order to determine with greater accuracy the solubility of the salt, and to ascertain whether or not a break in the solubility curve exists.

Pure potassium selenate, free from bromate, was purchased (Found: Se, 35·65; K, 35·37, 35·10. Calc.: Se, 35·77; K, 35·32%). Spectroscopic analysis showed that any impurities could only be present in negligible amounts.

The saturated solution, prepared in the manner already described for lithium sulphate (Friend, *loc. cit.*), was evaporated almost to dryness in a platinum dish on the water-bath, and finally heated, for several hours, up to 170° in an electric oven. The weight of anhydrous potassium selenate was thus obtained directly.

FIG. 1.



The solubilities shown in Fig. 1 are given in the table as g. of anhydrous salt per 100 g. of solution, S_S. The curve, which is almost horizontal between 0° and 20°, appears to be continuous. Tutton's result at 12° shows very close agreement. At and below the ordinary temperature, prolonged stirring with excess of crystals is essential to ensure complete saturation of the solution. Probably the low results obtained by Etard were due to insufficient stirring. The total increase in solubility at 100° is only 5% of the solubility at 0°

Temp.	S_S.	Temp.	S_S.	Temp.	S_S.	Temp.	S_S.
0·0°	53·57	26·8°	53·81	51·2°	54·39	80·6°	55·31
11·6	53·59	30·4	54·04	52·4	54·48	81·2	55·50
12·0*	53·52*	32·6	54·08	59·0	54·69	89·6	55·85
14·0	53·63	38·0	54·17	68·5	54·97	97·6	56·16
19·4	53·66	47·4	54·33	71·0	54·96		

* Tutton, *loc. cit.*

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