qualitative analysis of the water showed lime, magnesia, and sulphuric acid to be present.

Another piece of the ice was pounded and allowed to melt in a beaker. When about half was melted, the water was poured off and found to measure 95 c.c.; 75 c.c. were titrated with silver solution, and required 1·9 c.c. The remainder, when melted, measured 130 c.c., and required 0·9 c.c. silver solution. Hence the first portion of water (95 c.c.) contained 0·0085 gramme chlorine, and the second (130 c.c.) 0·0032 gramme chlorine. The whole quantity (225 c.c.) of ice therefore contained 0·0117 gramme chlorine, or, on an average, 0·0520 gramme per litre.

These determinations of the temperature of melting sea water ice show that the salt is not contained in it only in the form of mechanically enclosed brine, but exists in the solid form, either as a single crystalline substance or as a mixture of ice and salt crystals. Much additional light has recently been thrown upon this subject by the investigations of Dr. Pettersson, published in the Reports of the "Vega" Expedition under Nordenskiöld. Dr. Pettersson observed that sea water ice exhibited the extraordinary property of contracting with heat at temperatures a little below its melting point; he also noticed that the latent heat of sea water ice is much inferior to that of pure ice. In the course of his chemical investigations he also found that specimens of sea water ice vary greatly in their composition, and the result of his investigations may be summarised as follows:—

Ocean water is divided by freezing into two saliniferous parts, one liquid and one solid, which are of different chemical compositions. The most striking feature of the freezing process is that the ice is richer in sulphates and the brine in chlorides. The extraordinary variation both in saltness and in chemical composition of every individual specimen of sea-ice and sea-brine depends on a secondary process by which the ice seems to give up its chlorides more and more but to retain its sulphates. Hence the percentage of chlorine is no indication of the saltness of the ice, though it may to a certain extent be taken as an index of its age.

Professor Guthrie in his work on cryohydrates[1] gives the following Table:—

Cryohydrate of	Contains	Solidifies at
Chloride of Sodium, ...	76·39 per cent. water.	- 22° C.
Chloride of Potassium, ...	80·00 „ „	- 11°·4 C.
Chloride of Calcium, ...	72·00 „ „	- 37°·0 C.
Sulphate of Magnesia, ...	78·14 „ „	- 5°·0 C.
Sulphate of Soda, ...	95·45 „ „	- 0°·7 C.

Supposing that these cryohydrates are formed in the freezing of sea water, it is easy to see how as the temperature rises the chlorides melt out first and leave the ice richer and richer in sulphates.

[1] *Phil. Mag.*, ser. 4, vol. xlix. p. 1, 1875.