In my observations of icebergs I was greatly struck with the large amount of air dissolved in the ice. The white color of the 'berg is due to innumerable air bubbles in the ice, and not to snow on the surface. An iceberg is very deceptive in this way. While it looks quite soft, the ice is so hard as to make it difficult to chop it with an axe. Ice water which I prepared for drinking on board ship with iceberg ice appeared to effervesce like soda water, merely due to the liberation of the air from the melting ice. It is possible that the sudden disappearance of 'bergs with a loud report is due to their explosion from accumulated air in the interior. I passed close to one berg which was casting off small pieces, apparently by the pressure of the pent-up air.

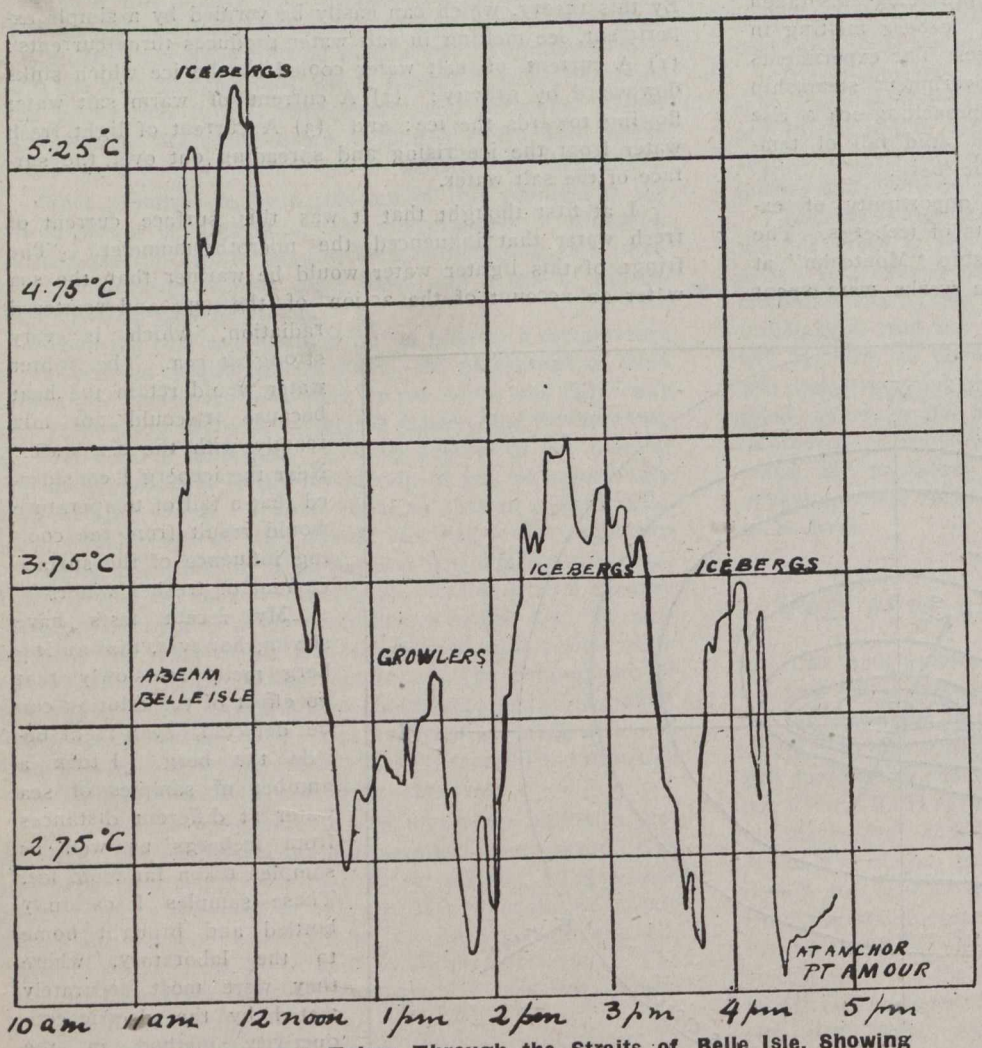

Fig. 2.—Microthermogram Taken Through the Straits of Belle Isle, Showing Effect of Iceberg Meeting.

While icebergs send the temperature of the sea up, land and coast line send it down. This was observed all along the coast in the Straits of Belle Isle. This effect is due to the action of land in turning up the colder under-water by the action of tides and currents. A great deal of work remains to be done in studying the effect of land and shoals on the temperature of the sea, but observations show the effect not only here, but on the Irish and English coasts.

From the point of view of the safety of our St. Lawrence route, the effect of land is most important. The iceberg causes us little worry because we have only a very short ice track, but to find means whereby the proximity of land can be determined is of the greatest importance.

WATER RATES.

The question of water rates comes under two heads, the engineering and the financial. The latter has probably been as productive of discussion as any single feature of waterworks operation. A few of the broader aspects of this subject particularly in the case of communities of 30,000 population or less were dealt with by Mr. Philip Burgess, consulting engineer of Columbus, Ohio, in a paper presented before the recent annual meeting of the Central States Waterworks Association. A summary of his remarks is given below.

In making an adjustment of the proper rates to be charged for water it is necessary to consider the three branches of service rendered, namely, domestic consumption, fire protection. and industrial use. The total annual revenue received must always at least equal the sum of (1) interest on investment, (2) operating and maintenance costs, and (3) annual fund required for replacement, commonly called depreciation. In considering these three factors every engineer knows how difficult it is to obtain from officials even a reasonable approximation of the cost of the first and third items. The books do not show a statement of the capital invested in the works nor is any attempt generally made to make the necessary corrections of the capital invested as may be required by replacements or even of extensions. Consequently, in making an adjustment of rates, the first step necessary for the expert is to determine the value of the works, generally assumed on the basis of the cost required to replace the works as they exist with other proper allowances.

In regard to the operating and maintenance costs, the former are comparatively easy to determine with accuracy. Maintenance, however, frequently is neglected or is charged to depreciation or replacement.

Waterworks and municipal officials may do a great deal of good towards the securing of equitable rates by seeing that the books are properly kept. The financial condition of the works may well be made public so that the consumers may know whether or not the water rates are reasonable and fair.

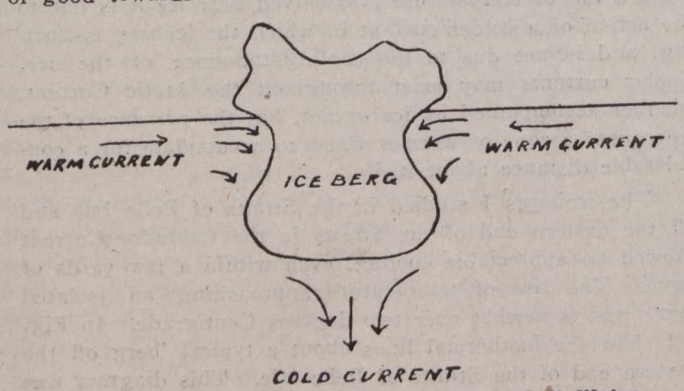

Fig. 3.—Currents due to Melting Ice in Salt Water.