

The figures in the tables clearly indicate that, though the rate of increase is highest in August, the number of cells of *Ceratium* in the fjord makes no great advance before October. Throughout the whole summer the number continues at about the same level, in spite of a comparatively rapid production. This affords a further indication that in the Christiania fjord variations in the current and other factors of loss exert a greater influence than the variations in the conditions of existence which affect rate of increase.

The fact that we find in the Christiania fjord, and assuredly also in many other places along the coasts of North Europe, that the plankton is less abundant in the summer months than in spring, does not necessarily imply any unfavourable change in the conditions of existence due to summer. It may be caused by the melting of the snow in spring, and by the river water all through the summer driving the surface-water and its plant-life away from the coast, so that the production near land barely replaces the loss. In the autumn it would seem as if the prevalent sea-winds heap the surface-layers together along the coast, and thereby accumulate large quantities of plankton.

What effect these movements of the surface-water have upon the occurrence of the plankton we are as yet unable to say definitely, but they must be taken into consideration. We were obliged, therefore, to abandon our original intention, which was to ascertain the importance of such conditions of existence as dissolved nutritive substances, and particularly nitrogenous compounds.

Cultivation
experiments.

I made a series of cultivation experiments, however, under conditions of existence resembling the natural conditions as nearly as possible. Stopped glass bottles holding two and a half litres were kept just floating at the surface, by being filled with about two litres of sea-water; the amount of plankton present was carefully checked in advance, and then one bottle was left in its original state, while in the other two small quantities of chloride of ammonium or calcium nitrate were placed. After an interval of 3 or 4 days the plankton in all the bottles was once more examined, and it was generally found that most of the species had augmented best when nitrogenous nutriment had been added. The addition had naturally to be made with the utmost care, since anything over 0.5 mg. per litre generally had a poisonous effect. The following table shows the result of one of these experiments :—