

the oxygen returns, producing thus an annual change in the gaseous conditions of the deeper parts of the oyster-"polls." In autumn the state of things may become critical for the oysters, which are suspended in baskets at a depth of $1\frac{1}{2}$ –2 metres; it happens occasionally that the animals all die at this time by suffocation through want of oxygen or by sulphur poisoning.

The water may, on the other hand, become over-saturated with oxygen, as occurs sometimes in the Kattegat, or in spring in some parts of the oyster-"polls," where plant life is particularly luxuriant.

Carbonic acid.

Carbonic acid occurs combined as carbonates and bicarbonates, and only in very small quantities as a free gas. The quantity varies considerably, among other things because of the activity of plants and animals, as above mentioned. Usually there is about 50 c.c. of carbonic acid in 1 litre of sea-water, but of this only a few tenths of a cubic centimetre is free gas in solution.

Krogh's investigations.

Carbonic acid has probably been present from the formation of the primitive ocean, together with the salts of the sea, but the quantity varies from place to place and from time to time, depending on the number of plants and animals, on the composition of the bottom, and more especially on atmospheric conditions. At times considerable quantities of carbonic acid gain access to the water through submarine volcanic activity, but this has probably less influence on the variations than the atmospheric conditions. August Krogh has made some very valuable investigations on this point, and has arrived at the conclusion that the sea is a sort of regulator for the amount of carbonic acid in the atmosphere. When there is much carbonic acid in the air, much will be absorbed by the sea; this is the case near land, and especially where there is a dense population and extensive industrial activity, or near active volcanoes. The tension of carbonic acid is everywhere small, but it is on the average greater over the land than over the sea. Now, if the tension in the air over a certain portion of the sea is smaller than it is in the sea, the latter will give off carbonic acid to the air. The sea thus has a regulating influence on the variations in the carbonic acid of the atmosphere. Many important questions arise with regard to these relations, but we cannot enter into further detail here; investigations on the subject are few.

Nitrogen.

Nitrogen is so inert a gas that it is of little importance in oceanography. It is absorbed from the atmosphere in con-