lime passes into solution in the water, and their bodies use up the oxygen of the water to form carbonic acid.

One of the most important discoveries made during the voyage was that the occurrence of carbonate of lime on the bottom depends mainly on the depth of the sea above it. "Pteropod ooze" is not found in depths greater than 1500 fathoms, or Globigerina ooze, as a rule, in greater depths than 2500 fathoms. The animals, the shells of which, when dead, form these deposits, live almost exclusively at or near the surface; when they die they sink to the bottom, and it appears that the time which a Pteropod takes to sink through 1500 fathoms of average sea water is such that the water is able to dissolve it completely; the larger and thicker shelled pelagic Foraminifera are able to last till they reach 2500 fathoms. If, as appears to be generally the case, all the carbonic acid is already united to base either as neutral carbonate or bicarbonate, it is evident that it can have no part in assisting the solution of more carbonate of lime. It has been found, however, that sea water even without excess of carbonic acid has the power of dissolving carbonate of lime, though the presence of free carbonic acid renders it a much more energetic solvent. Professor Dittmar thinks the cause of the disappearance of the surface shells from the deeper deposits is not that deep water contains any abnormal proportion of loose or free carbonic acid, but the fact that even alkaline sea water, if given sufficient time, will take up carbonate of lime in addition to what it already contains.[1] It is probable, however, that carbonic acid does play an important part in the solution of the shells of animals sinking through the water. The organic matter of the animal on being oxidised produces carbonic acid, which being itself a liquid at all depths over 200 fathoms, will form a locally concentrated acid solution inside the shell, which it will attack with vigour.

The presence of carbonic acid in sea water was shown in a remarkable way by its presence in the drinking water. Except during prolonged stay in harbour the fresh water used on board the ship was supplied entirely by distillation from sea water. The steam was taken from the ship's boilers and entered at the bottom of the condenser, forcing by its pressure the condensed water up into the so-called aerating tank from which it went to the store tanks in the hold. There was thus no escape for the carbonic acid except through the distilled water. Freshly distilled water was frequently taken hot from the condenser and tested immediately. The amounts of carbonic acid per litre are given in the following table. They were determined by adding excess of baryta water and titrating with acid.

[1] Phys. Chem. Chall. Exp., part i. p. 222, 1884.