evaporation in different latitudes, the amount of rainfall and snow, and the quantity of water brought down by the rivers. He observes the difference between the specific gravity of fresh-water and that of sea-water, and the difference in their freezing points. This latter difference, he says, is owing to the salt of sea-water, which contains a something (spiritus) opposed to congelation.

MARSILLI. Marsilli was also one of the first to study the saltness of the sea, and the bitter taste of its water.[1] He believes that both are due to the solvent effect of water on the substances forming the bed of the ocean. He made experiments with the hydrometer,[2] and found that the deepest waters were heavier than the surface water. He states that he drew the water from various depths, but does not describe in what manner. He avers that the salt in the surface water of the Mediterranean, at those points where rivers and torrents do not mix with it, and where coral is freely developed, is equal to $\frac{1}{32}$ of the weight, and $\frac{1}{29}$ of the volume, of the water. He attributes the bitter taste of the water to the presence of bitumen.[3]

BOYLE. In his paper: Of the Saltness of the Sea, Robert Boyle describes a great number of experiments. He personally made a series of observations on the water of the English Channel, collecting it from various depths, and observing its specific gravity. The samples from beneath the surface were probably procured by means of Hooke's water-bottle, an extremely ingenious valved box, which is fully described and figured in one of the early numbers of the *Philosophical Transactions*.[4] Boyle investigated the saltness of the water by a number of processes: he tried the estimation of total solids by direct evaporation and ignition, but not being satisfied with the result he ultimately took the density as an index of the saltness, and determined this either by means of a glass hydrometer, by weighing in a phial which was afterwards weighed when full of distilled water, or by weighing a piece of sulphur in distilled water and sea-water consecutively.

"As for the different degrees of the saltness of the sea," says Boyle, "I shall deliver what I have been informed of as briefly as I can. And first, it hath been observed, by one to whom I gave a glass conveniently shaped to try the specific gravity of the water, that it grew heavier and heavier as he came nearer the line, till within about 30° latitude;

[1] Marsilli, *op. cit.*, p. 21.

[2] Marsilli, *op. cit.*, p. 220. This important apparatus for ascertaining the specific gravity of sea-water was discovered about the fourth century of our era. It was made according to the principle of Archimedes. As mentioned by Günther (*op. cit.*, Bd. ii. p. 366), the invention of this apparatus was discussed by E. A. Gerland (Zur Geschichte der Erfindung des Aräometers, *Ann. d. Physik u. Chemie*, ser. 2, Bd. ii. pp. 150 *et seq.*) and M. Schmidt (Report in *Philol. Wochenschrift*, Jahrg. iii. p. 1224). The first clear description of this instrument is to be found in the fifteenth letter of Bishop Synesius to Hypatia; nothing in the letter, however, suggests that Synesius was the inventor of the apparatus. One Rhemnius, in a poem in hexameters, attributes the invention to Archimedes; others attribute it to Priscianus. It is quite possible that neither of them invented it, but the inventor, whose name is unknown, may have lived between 200 and 400 of our era.

[3] Marsilli, *op. cit.*, p. 13.

[4] *Phil. Trans.*, vol. ii. p. 439, 1667 (reproduced in the tail-piece to this Introduction).