

Throughout the period now under consideration, many accurate observations were made in all latitudes on the temperature of the surface waters of the ocean, and about the middle of the eighteenth century the subject of deep-sea temperature first began to attract attention.¹ Count Marsilli was one of the first to test the temperature of the sea at various depths. He made his experiments between Cassis and Riou in the Mediterranean. The table giving all his experiments shows that they were made in depths ranging from 10 to 20 fathoms.² His experiments extended only from January to June; he was unable to continue them during the other months. He concludes that, were the experiments continued and found to concur with his own, they would prove the temperature of the sea to be the same in all seasons. Marsilli's observations were made with the assistance of a common thermometer. The only merit of his observations is to show that scientific men were actively engaged investigating this question in the eighteenth century. According to Thoulet,³ Aristotle affirmed that the surface waters were warmer than the deeper ones, an opinion supported by Buffon in 1750, from the fact that a lead drawn up rapidly from deep water communicated a marked sensation of cold to the hand.

OBSERVATIONS ON
DEEP-SEA
TEMPERATURES.

In 1749 Captain Ellis, during a voyage to the north-west coast of Africa, made two experiments at depths of 3900 and 5346 feet (650 and 891 fathoms), in latitude 25° 13' N.,⁴ with an instrument devised by Dr Hales, and described by him in a paper read before the Royal Society.⁵ It consisted of a bucket about the size of a household pail, with valves at top and bottom, which remained open as the apparatus descended, and closed when drawn up. He obtained in both cases, with the thermometer enclosed in this vessel, readings of 53°, and rightly attributed this uniformity to the greater depth of water through which the instrument had to be hauled causing a rise in the temperature. Similar devices to ascertain the temperature of deep water were made use of by Foster, Cook, and Lord Mulgrave.⁶

Varenus, in his *Universal Geography*, examines the origin of the salt taste of the ocean waters, which he attributes to the presence of the particles of salt it contains; he then inquires into the origin of that salt. Rejecting the opinions current in his time, he offers two hypotheses: first, the saline particles being co-eternal with the ocean, that question cannot be treated without reference to the origin of the ocean itself, and second, the fact that water carries along with it in solution the saline matters contained in the earth. He admits that the waters grow saltier on approaching the equator, and less so on nearing the poles. Among the various theories which he brings forward to explain these phenomena are the following:—The difference of

OPINIONS AS TO
WHY THE SEA IS
SALT.
VARENIUS.

¹ See Prestwich: *On Submarine Temperatures*, *Phil. Trans.*, vol. clxv. p. 590, 1875.

² Marsilli, *op. cit.*, pl. vi. p. 16.

³ Thoulet, *Océanographie* (Statique), Paris, 1890, p. 281.

⁴ *Phil. Trans.*, vol. xlvii. p. 214, 1752.

⁵ *Ibid.*, p. 213.

⁶ In the "Race-horse," 1773, between Norway and Spitzbergen.

(SUMMARY OF RESULTS CHALL. EXP.—1894.)