

'Navarino' sailed for about 150 miles through waters dotted as far as the eye could reach with dying fishes. Computations made by Captain J. W. Collins seem to indicate that an area of from 5000 to 7500 square statute miles was so thickly covered with dead or dying fish that their numbers must have exceeded the enormous number of one billion. Since there were no signs of any disease, and no parasites found on the fish brought in for examination, their death could not have been brought about by either of these causes; and many conjectures were made as to the reason of this wholesale destruction of deep-water fishes, such as would ordinarily be unaffected by conditions prevailing at the surface, submarine volcanoes, heat, cold, and poisonous gases being variously brought forward to account for the loss of life. Professor Verrill has noted the occurrence of a strip of water having a temperature of 48° to 50° Fahr., lying on the border of the Gulf Stream slope, sandwiched between the Arctic current on the one hand and the cold depths of the sea on the other. During 1880 and 1881 Professor Verrill dredged along the Gulf Stream slope, obtaining in this warm belt, as he terms it, many species of invertebrates characteristic of more southern localities. In 1882 the same species were scarce or totally absent from places where they had previously been abundant; and this, taken in connection with the occurrence of heavy northerly gales and the presence of much inshore ice at the north, leaves little doubt that some unusual lowering of temperature in the warm belt brought immediate death to many of its inhabitants. This is the more probable, as it is a well-known fact that sudden increase of cold will bring many fish to the surface in a benumbed or dying condition."¹

Destructive
effect of large
range of
temperature.

From the Barents Sea we know many instances of a similar destruction of animals on a large scale. The case of the boreo-arctic fish, the capelan (*Mallotus villosus*), is specially striking, millions of this fish having occasionally been found drifting dead at the surface. In the Barents Sea very sudden changes of temperature occur, and it is natural to conclude that the death of the fish is caused thereby. The greatest destruction of this kind probably occurs among the young stages, eggs and larvæ of fishes. As we shall see later, these young stages may be removed by currents very far from the places where they are capable of developing, and in all probability they are also liable to

¹ Sir John Murray, "On the Annual Range of Temperature in the Surface Waters of the Ocean," *Geogr. Journ.* vol. xii. pp. 128-130; 1898.