

VIII.—ON TEMPERATE STRATA, AND THEIR INFLUENCE ON THE HABITS OF FISH.

The cause of the existence of cold strata lying between warmer strata in the Gulf of St. Lawrence, noticed at length in pages 97-99, Part I., is to be traced to the remarkable properties of salt-water ice formed during our winters within the limits of the Arctic or Labrador current.

The relation which these bear to fish movements in their search for food is very intimate, but scarcely so curious and instructive as the establishment, after ages of trial, of favorable areas for the development of floating spawn and the growth of large local schools of fish. There must be a reason why the cod come year after year and century after century during the winter season to the vicinity of the once dreaded Maelstrom, among the numerous Lofoten Islands, which form one boundary of the Great West Fiord of Norway. Similarly, there must be a reason why the same species of fish come around Belle Isle in such vast numbers every year; also why the Mackerel congregate to spawn on Bradelle and Orphan Banks, in many other parts of the Gulf, and especially on Georges shoals and about Block Island, in the open Atlantic. These are all exceptionally cold sea areas, where an Arctic current exists in full force or where cold strata of sea water are brought to the surface by shoals obstructing the current.

The sea has been so generally regarded as possessing such an equable climate and uniform character, that until recently, the dependence of fish life and fish movements upon external influences, operating beyond the limits, or at the surface of the waters in which the creatures live, has been treated as of secondary importance.

This has arisen in great part from the temperate character of those European seas, where investigations have been chiefly carried on, (1) But in North American marine climates, where extreme temperatures occur under peculiar circumstances, the study of the physics of the sea becomes of the first importance. It leads to unlooked for results in relation to fish life, and may influence largely and favorably the industry of the fishermen.

No one investigating the habits of fishes in the waters off the British Isles, could form any conception of the effect of vast fields of salt-water ice upon their movements, because salt-water ice never prevails there to any noteworthy extent.

"Dutch Scientists were the first to devote more attention to temperature, by making a series of observations, with the view of ascertaining during what degrees of temperature the herring fishery is most prosperous. They found that more fish were caught at a temperature of from 53.6 to 57.2 Fah (12° to 14° Celsius) than at any other time. The Dutch herring boats are therefore always supplied with a thermometer, which enables them to place *the net at a proper depth*. Professor Munter discovered also that the higher the temperature of the water the deeper the Herring keep during the spawning time, for which reason nets on the coast of Pomerania are set deeper in summer than in spring." (1.)

(1) According to Mr. Buchan, the sea around Scotland constitutes a part of the Gulf Stream. "On the Temperature of the Sea on the coast of Scotland." By Alexander Buchan, Secretary Scottish Meteorological Society, 1865.

1. "The Norwegian Herring Fisheries." By A. I. Boeck and A. Fædderson. Translated from the Danish by O. Jacobsen.