sea to the river they had left during a previous season, induced by the stimulus of a definite temperature, which of course would be successively attained at later and later dates as the distance northward increased."[1.]

The effect of temperature on the local movements of the Mackerel may be recognized in the process employed by fishermen to "raise" Mackerel by toll-bait, and luring them seawards. The Mackerel follow the bait for some distance from shore, where suddenly they cease to bite and disappear. They probably find long exposure to the warm temperature of the surface waters unsuited to their habits, and sink to a cooler zone.

Hence the reason why a "Mackerel breeze," mixing the heated surface water with the cooler understratum, is favorable to prolonged mackerel fishing with bait. The mixing produced by agitation cools the surface and permits the fish to feed for a lengthened period.

Temperature in the case of the mackerel as with the shad, alewife, salmon, caplin, and launce, in fact both with anadromous as well as deep sea fishes, appears to be the sole guide in determining their movements in the spring and on the approach of winter.

In 1872, Mr. Whitcher prepared a full resumé of the views of different European Naturalists "On the supposed Migration of the Mackerel," which is published at the close of the Report of the Minister of Marine and Fisheries for that year.

In these recorded views the supposed migrations are entirely set on one side.

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1. Page xxx., Report of the U. S. Commissioner of Fish and Fisheries, 1871-72.