

It will be seen from the table that generally when the Herring were early the Mackerel were also early, and when the Herring appeared late, the Mackerel also were late.

In 1872 the Herring came in on the 3rd of May, but owing to the prevalence of ice, the Mackerel were three weeks later than usual inshore. With this exception the greatest difference between the recorded times of the appearance of these fish inshore was thirty-one days or about one month.

In all instances the large Mackerel are generally full of spawn when they are first seen in the Spring, and the young fry are observed a few weeks later in many parts of the Gulf.

It will be observed that in the year 1871 the Mackerel were first taken at the Magdalen Islands on the 31st of May, and in 1872 they were three weeks behind their usual time. A similar difference in point of time in the first appearance of this fish on the coast of Massachusetts occurred during those years. On that coast the following differences are recorded:

WAQUOIT, MASSACHUSETTS.<sup>(1)</sup>

1871.....April 25th.

1872.....May 10th.

Difference in time—15 days.

MAGDALEN ISLANDS.

1871.....May 31st.

1872.....June 20th.

Difference in time—21 days.

At the Waquoit Weir the earliest Mackerel would probably be taken in 1871. At Amherst Harbor the Mackerel vessels were actually engaged in fishing, (See L. H. LaChance—Report of the Marine Police Schooner "Stella Maria," 1871.), so that the fish must have been present in small numbers perhaps some days before the fishing began, and we may conclude that the difference in time between the arrival of the schools at the two places in 1871 and 1872 was very nearly the same, and due solely to local variation in marine climate.

Referring now to the consideration of the difference in the temperature of the waters through which the Mackerel would have to pass if they made the remarkable migrations from New Jersey or Massachusetts waters to the Magdalens in the month of May<sup>(2)</sup> it must be borne in mind that these supposed migrations involve a journey from warm coastal waters to cold seas, and as the mackerel are known to spawn not only in Massachu-

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places ('yatoves') in which the bed of the river abounds, and hide there as soon as the bed of the river is frozen. In their state of torpor these fish secrete a viscous matter, which forms a thin layer over their whole body. The fishermen call this the 'cloak' of the fish. This torpor or sleep of the fish is caused by severe cold and want of air under the water, and is therefore a consequence of the excessive weakening of the respiration.

"The fish eat nothing during this state, for nothing is found in their stomachs but viscous matter, spoken of above. The great Sturgeon alone (*Acipenser huso*) seems to take food during his winter sleep, for some have been caught having scaly fish in their stomach.

"The deep places or 'yatoves' of the Ural are from 7 to 8 saques (49 to 50 feet) deep, and the fish there pile themselves upon each other in thick layers.

"According to the accounts of experienced fishermen, Sturgeon there associate only with Sturgeon, and scaly fish with their own kind—never intermingling. The Sinitse (*Abramis Bullerius*) is the only scaly fish which has been found among the Sturgeon.

"Watchmen posted near the 'yatoves,' every one of which has its own name, notice exactly in what quantities the fish seek refuge there, and of which kind the fishing will be most productive. These watchmen develop a most astonishing sagacity in this respect."

(1) Report of U. S. Commissioner of Fish and Fisheries, 1871-72.

(2) While the mean recorded date of the appearance of the Mackerel at the Magdalen Islands is the 3rd of June, according to the preceding table, they were taken there on the 30th May in 1865, on the 29th May in 1866, and on the 31st May in 1871.