

XXXIX.—THE MIGRATIONS OF EELS.*

By DR. OTTO HERMES.

The Swedish superintendent of fisheries, Dr. R. Lundberg, has published an interesting pamphlet on the eel-fisheries with so-called "hommor" on the Swedish coasts along the Baltic and the Sound, giving accurate observations on the migrations of eels on the coasts of Sweden, which, in the main points, strengthen the supposition that the mature eels seek the water of the Kattegat and the North Sea—which is saltier than the Baltic—for the purpose of spawning. These observations agree with those of Mr. Dallmer, which have been reported in these circulars (1880, p. 200; 1881, p. 18), and of which Dr. Lundberg does not seem to have had any knowledge. It is nevertheless a fact of considerable interest that Dr. Lundberg, without knowing anything of Mr. Dallmer's observations, was, by his practical experiences, led to employ the same method for his own observations. For, as Mr. Dallmer states in a letter to the committee of the German Fishery Association, the "hommor" used in Sweden for catching the migrating eel, are, though somewhat different in form, still in principle, in construction, and in the manner in which they are used, the same as our eel-baskets. With due regard to the habit of the eel, to migrate along the coast, the "hommor" fisheries are only carried on during the latter part of summer and autumn.

After Dr. Lundberg has given a sketch of the extent of the "hommor" fisheries he arrives at the conclusion that from these fisheries the route taken by the eels during their migrations along the coast can easily be recognized. It appears that the eels, after having avoided certain portions of the Swedish coast, such as the coast of Sodermanland, &c., cross from the Cape of Falsterbo towards the Danish coast, and do not again approach the Swedish coast till they have reached the narrowest part of the sound near Helsingborg. The reason why the eels in their migrations do not follow the Swedish coast altogether is sought by Dr. Lundberg in the varying depth of water along the coast, in the currents, and other circumstances which still need investigation. Pos-

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sibly the attempts to introduce the "hommor"-fisheries have not been made everywhere with the same degree of energy.

The migrations of the eels along the coast have not attracted the attention of naturalists as much as they deserve. It is true that men like Krøyer, Nilsson, and others have pointed out that this was a matter of great interest, but in works on the fauna it is mainly only the question as to the young fry of the eel ascending the rivers from the sea which is treated. That the fish migrate along the coast is proved by the position in which the fishing apparatus or the "hommor" has to be placed, if the fisheries are to be successful. On the east coast the "hommor" are placed in such a manner that the eels have to enter them from the north, while on the south coast the fish have to enter them from the east, and in the sound from the south. On the Danish coasts, in the Great and Little Belts, the eels coming from the east and south are likewise reported to wander in a northwestern direction towards the Kattegat. Everywhere the fishermen maintain that there is no use in placing the fishing apparatus in another position; they say that the eel approaches the land from deep waters, where it turns and is led into the "hommor" in the natural course of its migration. The idea suggested thereby, that the migration along the coast is nothing but describing a circle from the depths to the coast, and back, is thoroughly refuted by the method of placing the "hommor."

There is, therefore, no doubt that a migration of the eels takes place along the coasts of the Baltic towards the sound and the Kattegat, and there can be but little doubt as to the cause of it. It is most assuredly connected with the process of propagation. As the salmon ascends the rivers from the sea, and does not reach sexual maturity till that period, the eel, reversing this, seeks the salter water, which seems necessary for maturing its sexual organs. Where and at what time the eels spawn in the sea is still an open question, which can only be answered satisfactorily by continued observations and investigations.

The time when the eel-fisheries are carried on along the Swedish coast corroborates the supposition of the migration along the coast, referred to above. These fisheries commence at Grissleham and Landfort in July, in East Gothland and the Kalmar district towards the end of July and last till October, while in Schonen the fisheries commence in August, and do not yield many fish till September and October. In the sound the eel-fisheries do not commence before September. The first eels are here generally caught in October. At Humlebeck, on the Danish coast of the sound, about a mile from Elsinore, the eel-fisheries commence towards the end of October and do not come to a close till the 10th of November. This shows that the ideas relative to the migrations of the eel along the coast towards the Kattegat, expressed above, are very probably correct.

As in Komacchio, so also in Sweden, experience has taught that dark, stormy, and rainy nights are most favorable to the eel-fisheries. In

many places the fishermen will not set their fishing apparatus in moonlight nights. The eels seem principally to stir about during the night, for during the day they are but rarely caught. The moon and the currents also have considerable influence on the fisheries; but the imperfect data which we possess do not justify us in drawing any definite conclusions.

Although statistics on this subject were not collected till the year 1879, it appears from these incomplete data that the Swedish eel-fisheries are of great economical importance. In East Gothland there were in use in 1880, 312 "hommor," with which 24,097 kilograms (about 53,000 pounds) of eels were caught, representing a value of 17,010 crowns (\$4,558.68). In the Kalmar district the number of "hommor" was 1,144, yielding 40,000 kilograms (about 88,000 pounds) of eels, valued at 27,900 crowns (\$7,447.20).

In the district of Christianstadt the value of the eels caught in 1879 was 138,629 crowns (\$37,152.57), and in Schonen 151,239 crowns (\$40,532.05). Most of the eels caught in the northern districts of Sweden are sent to Stockholm and Norrköping, while those caught in the Blekinge and Ostschonen are bought by German dealers and are sent to Berlin via Stettin.

Mr. Dallmer, in his letter referred to above, calls attention to the fact that we lack data from the coasts of Mecklenburg and Pomerania, but that the observations made by Dr. Lundberg, Dr. Benecke, and by himself prove to a certainty that the Sound and the Belt—therefore saltier waters than the Baltic—are the points towards which the eels direct their autumnal migration from the Baltic. He does not doubt, either, that this migration is in some way connected with the process of propagation, and points to the fact that Dr. Benecke (in his work, "*Fische, Fischerei, und Fischzucht in Ost- und Westpreussen*," p. 181) has determined the development of the eggs by measurements taken during the months of September, October, and November.

Dallmer concludes his remarks by pointing out the practical importance of the observations as far as they go. "The observations on this subject which have been made so far are in my opinion not only of scientific interest, but are probably of considerable importance to the fishing-industries, for I have no doubt that there are many and extensive portions of our German coast on the Baltic along which eels migrate without its being generally known, or without fisheries employing eel-baskets. It was at my suggestion that the minister of the interior granted a sum of money for obtaining eel-baskets for the purpose of making experiments with the same. These experiments unfortunately commenced a little too late last autumn, but it is expected that during the present year they will fully corroborate the facts given above relative to the migrations of the eels. Although we are not able to chronicle during the present autumn (1883) very large numbers of eels

caught in these eel-baskets, this does not signify anything, as during this autumn the eel-fisheries were very poor all along the east coast of Schleswig-Holstein. It seems that the eels kept nearer to the Danish coast, which was probably caused by the wind and the currents. These changes caused thereby likewise open out a wide field for observations."

It is hoped that these few remarks may cause renewed observations and investigations relative to the mode of life and the birth and development of the eel.

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