

zeigen nämlich hohes V und niedriges D_2 , und eine solche Kombination spricht gegen die Annahme, dass die Riesendorsche der Ostsee nicht dort einheimisch sein sollten.

Die Ergebnisse deuten übrigens darauf hin, dass ein Zusammenhang besteht zwischen den isländischen und westgrönländischen Beständen, was auch durch Wiederfänge von markierten Grönlandsdorschen bei Island bestätigt worden ist.

Eine solche Untersuchung, die wegen der zeitraubenden Zählungen und des voluminösen Materials besonders kostspielig und anspruchsvoll ist, könnte schwerlich von einem staatlichen Fischereilaboratorium durchgeführt werden. Die Fischereiforschung ist daher dem Carlsberg Laboratorium wegen dieser grossen Leistung zu besonderem Dank verpflichtet.
O. S.

A. S. Jensen og P. M. Hansen. *Undersøgelser over den grønlandske torsk (Gadus callarias L.).* Universitetsbogtrykkeriet, København, 1930. 55 pp.

This is a short paper containing a wealth of material and information on the cod in West Greenland waters, the more interesting in view of the great cod fishery recently developed by several nationalities on the West Greenland banks.

The paper opens with an historical review of the fishery during the last century showing the extraordinarily variable character of the fishery, and this applies not only to the banks (where the fishery has not perhaps been tried regularly enough to warrant very decisive conclusions) but especially to the fjords where it must be supposed that the inhabitants will have become aware of any shoals of cod. In the XIXth century cod were plentiful in the 'twenties and again in the late 'forties, the remaining period being more or less barren. Only about ten years ago a new cod period set in.

The investigations which the paper summarizes are the following: the cruise of the "Tjalfe" in 1908 and 1909, directed by AD. S. JENSEN; Å. VEDEL TÅNING'S investigations in 1924; work during the "Dana's" cruise in 1925 by AD. S. JENSEN; and PAUL M. HANSEN'S work in 1926—1929.

The spawning of the cod in Greenland waters has been ascertained by the presence of spawny fish in early May in 1925—28 in some of the fjords up to a latitude of 67° N. which is considered the northern limit. The spawning seems to begin in April and to last into June. The bottom temperatures are very low in the spawning time, between 1.73° and -0.27° , with 2.53° to 5.60° at the surface. The greatest quantities of eggs taken during $\frac{1}{2}$ hour with a 2 metre net were 2200 and 1140 (which are indeed very small numbers compared to those habitually found at Iceland or Lofoten).

The fry were seen associated with jellyfish as in European waters. some young fish of the 0-group were obtained with a shore-seine in September and had a length of 5.29 cm. It is thus demonstrated that there is a certain amount of spawning and also rearing of fry on the Greenland coast.

The age and growth were examined by means of otoliths on not very extensive material from a number of localities. The growth was found to be about the same as in the Iceland cod and considerably better than in the Norwegian cod stock. (The Norwegian material used for comparison is, however, incomplete in so far as it only includes fish from the mixed feeding shoals at Finnmarken. If spawning cod had been considered, there would still have been a difference but only about 10 cm. for the higher age-groups (not about 20 as shown in the graph p. 27).

It is shown that the main bulk of the catch in the years investigated consisted of only certain year-classes, namely 1912, 1917, 1922 and 1924, — 1922 being the best.

The food of the cod in Greenland waters is treated at length. The most important food is found to be caplin; next come sand-eels. Otherwise the Greenland waters seem to offer a variety of different food, benthic as well as planktonic.

In the years 1924 to 1929 in all 1976 fish were marked and the recaptures from the first four of these experiments are discussed. It is shown that the migrations are not very extensive. Of the 1367 fish liberated 55 were recaptured but only four had gone any distance, which is the more remarkable as the majority of the recaptures were made 1 to 4 years after liberation.

The time of appearance on the banks seems to be connected with the temperature and varies accordingly between different dates in the month of June.

The authors point out the changes in the marine fauna which have accompanied the recent immigrations of cod to Greenland waters, i. e. the appearance of saithe in considerable numbers. It seems even to have spawned there. Even a full grown haddock was taken in 1929, while such northern animals as the white whale, the caplin and the black halibut have greatly restricted their wonted southward migrations in the latter years.

O. S.

H. C. Regnart. The lower limits of perception of electrical currents by fish. Journ. Marine Biol. Assoc. N. S., vol. XVII, no. 2. Plymouth, 1931.

The aim of Mr. REGNART'S investigation was to determine the lower threshold of the sensitivity of fishes to electrical currents. His animals (goldfish as a type of fresh-water fish, codlings (*Gadus callarias*) as a type of sea-water fish) were kept in tanks into which two steel plates were fitted as electrodes. The goldfishes reacted to the completing and (in weaker form) to the breaking of the circuit in different ways, according to their position in the tank. The lower threshold was found at about 5 microampères per sq. cm. direct current. With the codlings the threshold was at about 15 microampères per sq. cm. direct current, and about 2 microampères per sq. cm. alternating current. With both animals the reactions became weaker when the stimuli were repeated, until finally no more effect was obtained.

The author then tried to find out what organs are to be regarded as