

**Article XIX.—SOME MARINE FISHES FROM NORTHWEST GREENLAND<sup>1</sup>**

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The Crocker Land Expedition of 1913–1917, sent out under the joint auspices of The American Museum of Natural History, the American Geographical Society, and the University of Illinois, brought back several species of marine teleost fishes from the northwest coast of Greenland. Most of the specimens were collected by Dr. M. C. Tanquary, Zoologist of the expedition.

**COTTIDAE**

***Icelus bicornis* (Reinhardt)**

There are six small specimens of this sculpin, all from Etah. Two, 25 and 30 mm. in total length to tip of caudal fin, were taken in July or early August, 1914. Four others, 28, 29, 36, and 40 mm. respectively, were

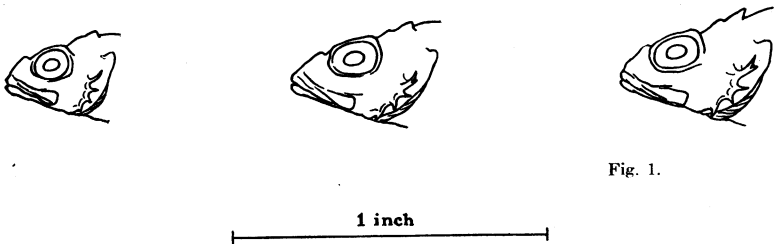


Fig. 1.

Fig. 1. *Icelus bicornis*, to show development of preopercular spine.

taken on Sept. 7 of the same year. The development of the upper preopercular spine with age is interesting. In the four of from 29 to 30 mm., it is simple and curved upward. In the one of 40 mm., it is two-pronged, as is characteristic of the adult, the prongs being of almost equal length. The 36 mm. fish shows an intermediate condition with a distinct lower prong, which is shorter than the original upper one. The three stages are shown in the figure.

<sup>1</sup> Scientific Results of the Crocker Land Expedition.

**Myoxocephalus scorpioides** (Fabricius)

There is a single specimen, 170 mm. in total length to tip of caudal, which differs from the numerous *groenlandicus* in stouter body, skin without asperities, more numerous small pimples on the top of the head, fewer anal rays, smaller mouth, narrower fold of the gill membranes, and weaker spines.

As it is rare to find adequate series of Greenland fishes in collections, a detailed description of this specimen may be of use to some future student.

Head in length to base of caudal, 3.0; depth, 2.5. Eye, in head, 5.0; interorbital, 5.5; snout, 3.5; maxillary, 2.5; pectoral, 1.0; ventral, 1.7; caudal, 1.8; longest dorsal spine, 2.5; longest dorsal ray, 2.2; longest anal ray, 2.5.

Spines of the head small, those on top of the head very low, the pair above and behind the eye and at the nape each with a small tentacle. Gill membranes narrowly joined to the center of the isthmus, forming a very narrow fold at this point. No slit behind the last gill. Skin smooth, except for the concealed membranous plates (common to the genus) along the lateral line and numerous small pimples which cover the top of the head. Dorsal IX-I, 15. Anal, 11.

Color, in alcohol, above and on the dorsal fins, dull grayish, obscurely mottled with darker. Pectoral and caudal more or less marked with dark and whitish; ventrals whitish, with a few faint gray markings. Anal whitish, marked with dark gray. Chin dusky, underparts otherwise whitish.

**Myoxocephalus groenlandicus** (Cuvier and Valenciennes)

This seems to be the commonest shore sculpin in the region. There are thirteen adult specimens, which are referable to it, from 200 to 340 mm. in total length to tip of caudal fin. Of these, four have 13 anal rays and nine have 14. The interorbital width varies as follows, quite independently of the size of the fish. Two have it contained in the head 6 times; three, 5.7 times; four, 5.5 times; one, 5.2 times; and three, 5.0 times.

Two of the four with 13 rays in the anal are from Umanak. Another specimen, a male, without definite data, is aberrant, in that it has the warty nodules larger and more regularly placed, interorbital more concave (6.0), dorsal more solidly black, than is usual.

Aside from this one individual, there seems to be comparatively little variation in them except that which is sexual: males have much larger dorsal fins and are brighter, more contrasted, more black and white in color. I have examined the stomach contents of a male and a female of approxi-

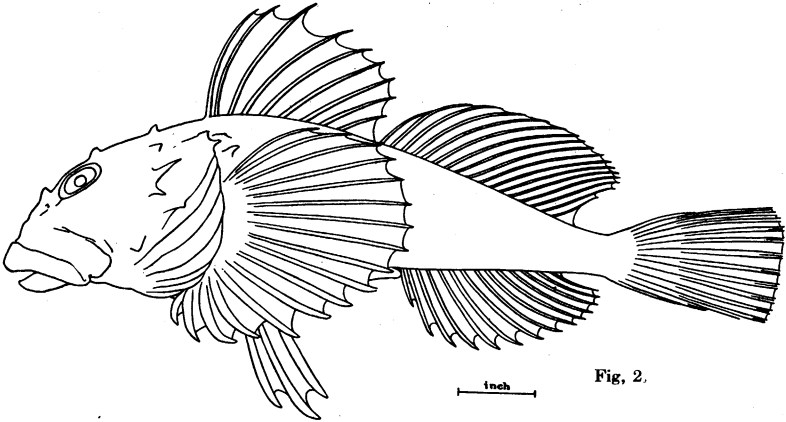


Fig. 2.

Fig. 2. *Myzocephalus groenlandicus*, male.

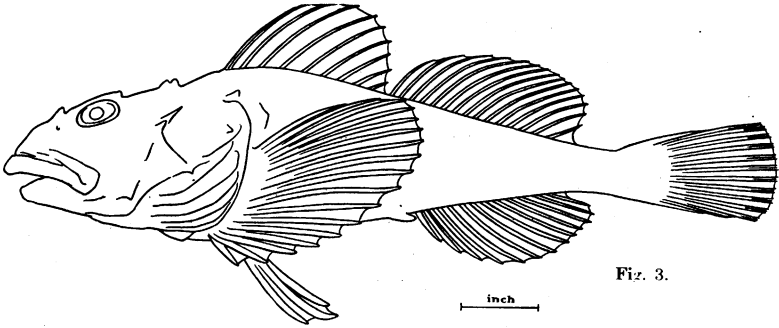


Fig. 3.

Fig. 3. *Myzocephalus groenlandicus*, female.

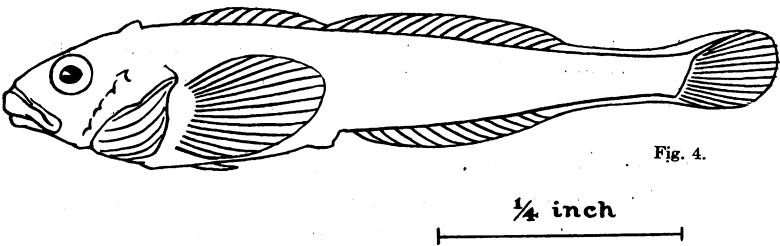


Fig. 4.

Fig. 4. *Myzocephalus groenlandicus*, larval.

mately the same size. Both contained Crustacea, the male almost entirely small amphipods, the female more of a variety. The illustrations of these two specimens show their sexual differences.

Besides the above, there are a number of larvæ, about 19 mm. in total length, from the beach at low tide, Etah, Aug. 19, 1914, collected by Dr. Tanquary. These are in the stage figured by Johansen, (1912, Medd. om Gronl. XLV, p. 12, Pl. XLVI, figs. 11 to 13) for *Oncocottus quadricornis* and resemble these figures very closely. They have 12 clearly discernible rays in the anal fin; about X, 17 in the dorsal; no slit behind the last gill; the only evident spines at the nape, except for 4 rather well-marked ones on the preopercle (see Fig. 4). I place them provisionally with this, the most abundant adult form, although their fin rays agree most closely with *scorpioides*. It is within the realms of possibility that they are the larvæ of *Icelus bicornis*.

Fish larvæ are often specialized forms with little philogenic significance. It seems probable, however, that such free-swimming cottoid larvæ approach the ancestry of the cottoid group. It is remarkable that, though repeatedly described from the Arctic, they are unfamiliar in these latitudes (New York). Perhaps different habits here make them less accessible.

#### CYCLOPTERIDÆ

##### *Eumicrotremus spinosus* (Müller)

Two small specimens, between 15 and 20 mm. long to tip of caudal, from Etah, Sept. 7, 1914, taken in water between two and 10 fathoms deep.

#### LIPARIDÆ

##### *Liparis tunicatus* Reinhardt

There is one specimen, 45 mm. long to tip of caudal, from the beach at Etah at low tide, Aug. 19, 1914, and twenty-three of 35 to 80 mm. from *Laminaria* at Umanak in July of the same year.

The two largest of these, 75 and 80 mm., are in excellent condition for study and, on account of the scarcity of good Greenland material in collections and the several species described from this region, a description of them is here given.

Head in length to base of caudal, 3.7-3.5; depth, 4.2; eye, in head, 5.2-5.0; snout, 2.5; interorbital, 3.0; width of mouth (inside), 2.0; length sucking disk, 2.2; pectoral from center of its base, 1.4; longest dorsal ray, 2.3; longest anal ray, 2.0-2.4; caudal, 2.0; longest ray in lower pectoral lobe, 1.7-1.6.

Margin of dorsal fin even, unbroken, joining the base of the caudal at a wide angle, anal joined to caudal somewhat farther back, so that about three-fourths of the caudal above and three-fifths below is free. Pectoral not reaching anal origin. Lower pectoral lobe extending back of the disk a distance equalling the eye. Dorsal, about 41; anal, about 35.

Color in alcohol (the larger specimen) pale, becoming purplish gray on the sides anteriorly, top of the head, and chin, gray cloudings barely indicated on the posterior vertical fins and caudal. The other specimen is dark purplish gray on the back, sides and vertical fins, the latter with a little obscure pale marbling; the belly, pale.

#### ZOARCIDÆ

##### *Lycodalepis mucosus* (Richardson)

A single, poorly preserved specimen of this species, previously known from Northumberland Sound and Cumerland Gulf, was collected by Mr. H. J. Hunt in shallow water along-shore beyond Provision Point, Etah, July 1915. It is 310 mm. long.

##### *Gymnelis viridis* (Fabricius)

A single specimen 180 mm. in length, Umanak, July 30, 1914, from *Laminaria*. Head in length, 7. Depth in head, 1.6; eye, 5; snout and interorbital, the same; maxillary, 2.5. Anal, about 74.

#### GADIDÆ

##### *Boreogadus saida* (Lepechin)

There are six specimens, 120 to 220 mm. to tip of caudal, from Umanak. The larger ones are dusky in color, including fins, and slightly paler below. The smaller are brownish, obscurely mottled with paler; dorsals, caudal, and pectorals, dusky. Ventrals dusky, with a white tip; anals white, with a rather broad black margin.

Another lot of five, also from Umanak, taken in June 1914, measure 70 to 190 mm. In July 1915, the species was found to be numerous, and six (of 90 to 130 mm.), caught by Eskimos in a crack in the ice, were preserved.

**Gadus ogac** (Richardson)

There is one small specimen, 245 mm. to tip of caudal.

This small collection from the Arctic contains three of the four dominant types of marine acanthopterygean fishes of cold northern seas. They are the free-swimming gadoids, the more or less bottom-haunting cottoids, and the eel-like species which squirm in and out of the marine vegetation or mud, here represented by zoarcids. The fourth type, not represented, is the flatfish, specialized for lying on the bottom.

It is interesting to contrast the marine ichthyfaunæ of varying latitudes (excluding deep sea fishes). The small Arctic area has plenty of fishes, by individuals, but a great paucity of species. The broad belt of cold water extending southward on our coast to Massachusetts is notable for the few dominant types: cottoids, zoarcids, etc., gadoids, and flatfish come to mind. At about the latitude of Cape Cod the ichthyfauna changes abruptly with the rise in water temperature to about 60 degrees Fahrenheit. More southern fish-types put in an appearance here than at any other point as we approach the equator. The northern factor in the ichthyfauna dwindles rapidly from here southward, and there is a steady increase in the number of species, which is much greater in the tropics than elsewhere. The following generalization is probably safe without compiling statistics. The number of types is very small in the Arctic and increases very slowly southward until the southern ichthyfauna is met with, where there is an abrupt rise, followed by gradual increase to the tropics. The number of species is also very small in the Arctic, increases in the subarctic, then more slowly until meeting the southern fauna, and then with accelerated velocity to the tropics. The number of individuals is considerable in the arctic, perhaps reaches a maximum in the northern seas, and varies locally with an indefinite tendency to decrease southward.

Whereas it is not possible to explain these faunal conditions satisfactorily, certain factors bearing on them are plain. The abundance of macroscopic plankton due to the absence of de-nitrifying bacteria in cold northern waters<sup>1</sup> furnishes a superabundant food supply for the large number of individual fishes. In the tropics the conditions are very permanent, unaffected by seasonal or climatic changes, and there has been a multiplication of species to take advantage of every environmental niche. Thirdly, the indirect effect of northern ice has been a very important factor in limiting, northward, environmental variety and multiplication of forms for marine

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<sup>1</sup> Osborn, H. F., 1917. *The Origin and Evolution of Life*, p. 91.

fishes. In the Arctic the shallows, which in the south support rich ecological associations, are scoured bare by it. Glaciation has left the New England coast uniformly stripped to the bare rock, and the change in coastal character at the southern limit of glaciation has perhaps as much to do with the abrupt change from northern to southern faunæ as the corresponding increase of water temperature. The organic waste from the land brought down by rivers doubtless is an important factor in giving variety to the environment for marine ichthyfaunæ. It increases from practically nil in Arctic glaciers to a rich contribution by tropical rivers.

Northern fishes in an environment of plenty, of monotony, but of instability, have made a few broad adjustments. Tropical fishes in an environment of competition, of variety, and of stability have made an infinite number of adjustments and, while perhaps less numerous in individuals, are vastly more numerous in species.

