

U. S. COMMISSION OF FISH AND FISHERIES,

JOHN J. BRICE, Commissioner.

NOTES

ON THE

FOOD OF FOUR SPECIES OF THE COD FAMILY.

BY

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Extracted from Report of Commissioner for 1896. Appendix 3, Pages 177 to 186.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1897.

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INTRODUCTION.

The relation of animals to their food supply offers a problem to the student of natural history the solution of which would contribute much to the knowledge of animal distribution. It is this relation that brings animals most intimately into touch with each other, and the influence of even one species is so far-reaching that an ever-widening field is opened to the view of the investigator.

The food supply is one of the most important factors affecting the abundance of fishes in any locality, whether they be the so-called migratory and anadromous fishes or the more or less permanent residents. The phenomena of the withdrawal of certain fishes from a region where they have been abundant, the presence of large numbers one year and their scarcity the next, their disappearance for long periods and their sudden reappearance, might be explained by a study of the food and feeding habits of the species.

In the investigations which the United States Fish Commission has been conducting for a number of years relative to the food and feeding habits of the mackerel, menhaden, and other marine fishes, considerable knowledge has been acquired; yet the conditions and influences are so manifold and complicated that much remains to be learned. To the writer, however, there seems no doubt that the effect upon the food of mackerel of prevailing winds, varying currents, and temperature determines to a great extent whether their movements be in or off shore, at the surface, or some distance beneath.

The occasional absence of menhaden for several years from a given section and their sudden return, though at present attended with some mystery and ascribed to various causes, is a problem which can best be solved by the study of their food and the conditions which influence it.

In short, it seems reasonable to believe that the food supply is a controlling power, modified more or less by other forces, affecting directly or indirectly the movements and abundance of all fishes.

This paper treats of the food of a few of the more important members of the cod family—commercially the most valuable group of fishes

found on the Atlantic coast of North America—and consists chiefly of a record of an examination of the stomach contents of numerous specimens taken on the shores of the New England States and the Canadian maritime provinces.

THE COD FAMILY.

The cod family or *Gadida* is principally represented on the Atlantic coast of the United States by the following species, which have the stated geographical range in the Western Hemisphere:

Cod. *Gadus callarias* Linnæus. Greenland to Virginia.

Tomcod; Frostfish. *Microgadus tomcod* (Walbaum). Labrador to Virginia.

Pollock. *Pollachius virens* (Linnæus). Atlantic coast, south to New Jersey.

Spotted Codling. *Phycis regius* (Walbaum). Atlantic coast, south to Cape Fear.

White Hake. *Phycis tenuis* (Mitchill). Atlantic coast, south to Virginia.

Squirrel Hake. *Phycis chuss* (Walbaum). Atlantic coast, chiefly northward.

Chester's Hake. *Phycis chesteri* Goode & Bean. Off the Massachusetts coast.

Earll's Hake. *Phycis earlli* Bean. Off coast of South Atlantic States.

Cusk. *Brosmus brosme* (Müller). Polar regions south to Cape Cod.

Haddock. *Melanogrammus aeglefinus* (Linnæus). North Atlantic coast, south to Middle States.

Four-bearded Rockling. *Rhinonemus cimbrius* (Linnæus). North Atlantic, south to New England coast.

A number of other species, mostly of small size and inhabiting the deep seas, occur in the western Atlantic and are sometimes taken on the United States coast, but they are of no commercial value.

The more important economic species are the cod, white hake, haddock, pollock, cusk, and tomcod.

The species of the cod family, though not usually classed with migratory fishes, have movements from one feeding-ground to another, and in some localities a winter bathic movement.

How far the cod may go in search of new feeding-grounds is not known. There are a few observations which show that occasionally, at least, they may travel long distances, but the reason therefor can not be positively stated. Thus in "The Fishery Industries of the United States"* reference is made to the occurrence of a large school of cod on the New England coast, especially at Cape Ann during the winter of 1877-78. In some of the fish caught were found hooks differing from any used by New England fishermen, but identical with those used by French trawl fishermen on the Grand Banks.

Mr. F. S. Conley, first mate of the United States Fish Commission schooner *Grampus*, states that during the winters of 1892-93 and 1893-94, while taking cod eggs at Kittery Point, Me., he saw the same kind of French trawl hooks taken from the stomachs of cod caught in Ipswich Bay, Massachusetts, and was told that this was not an uncommon occurrence. This would indicate that for some reason the fish had migrated from the Grand Banks to Cape Ann, a distance of about

* Section I, Natural History of Aquatic Animals.

800 miles. Since these hooks were galvanized, it would be impossible to form any estimate of how long they had been in the fish. It is hard to conceive of any reason for these migrations, other than the search for food.

It would be interesting to know to what extent the winter movement of cod into deeper water is due to the effect of a change of temperature directly upon the fish or to the change of food conditions.

The cod and haddock are more commonly found on the rocky and hard bottoms, the so-called banks and ledges. Hake are considered to prefer mud bottoms, and it is true that at certain seasons they resort to such, but do not confine themselves to the bottom, very frequently approaching the surface, which habit is common to nearly all bottom fishes. Surface-swimming animals are frequently found in their stomachs.

FOOD OF THE COD, HADDOCK, HAKE, AND POLLOCK.

During the summer and fall of 1893, while a party consisting of Mr. H. F. Moore, of the University of Pennsylvania, Mr. B. L. Hardin, of the United States Fish Commission, and the writer were stationed at Eastport, Me., the habits of the various fishes of this locality were studied. Through the kindness of Mr. Spear, a local fish-dealer, it was possible to examine many stomachs of cod, haddock, hake, and pollock, brought to the Eastport fish market, chiefly from Quoddy Bay, West Quoddy, between Campobello and Grand Manan, and Cochran Ledge in Eastport Harbor. Cod, haddock, and pollock were also caught at Eastport by members of the party and their stomachs examined. The greater number of stomachs of adult fishes were empty, but when food was present it did not differ materially in kind or quantity in the fishes from the several localities.

The diet of the cod and haddock was much alike, though frequently enough difference existed to distinguish the species of fish. Often both fishes had made a hearty meal upon pieces of herring, probably gleaned from the fishermen's hooks. The animals most frequently found in cods' stomachs were crabs, mollusks, and young fishes; in the haddocks' stomachs there usually was a preponderance of brittle stars, small sea-urchins, and mollusks, though both contained more or less of the same species. Particular attention was paid to the food of the young of any of the cod family that could be obtained. The food of young cod and hake 2 or 3 inches long consisted principally of small crustaceans, such as amphipods and copepods, while young pollock were found to subsist almost wholly upon shrimp-like crustaceans (*Thysanopoda*).

Of the species enumerated in the appended list only the larger crustaceans, mollusks, brittle stars, and small sea-urchins were found in any degree of abundance. The smaller forms consisted of only a few individuals which were probably ingested with the larger and more

noticeable objects. Cod and haddock, however, may browse upon algæ, hydroids, etc., for the sake of the small crustacea, mollusks, and worms attached to them.

Protective mimicry seems of little avail against these fishes, as the ophiurans, which so much resemble in color the rocks, sand, and algæ among which they live; the caprellas, almost indistinguishable from the hydroids and algæ; and fishes that simulate the color of the rocks and plants are frequently obtained from cod stomachs. Foreign objects, too, are occasionally found in the stomachs and are a source of wonder to the fisherman. Rocks, pieces of wood, etc., are not uncommon; a piece of rope was found in a cod stomach, and the entire globe of an incandescent electric light was removed from the stomach of a pollock.

The pollock examined had been feeding almost exclusively upon a shrimp-like animal (*Thysanopoda*) and prawns. The thysanopodas were very abundant at Eastport during the season mentioned and large schools of pollock of nearly all sizes were very numerous, feeding upon them. If at any time the crustacean disappeared from a place the large pollock disappeared also. The small fish remained in large numbers about the wharves.

The contents of the hake stomachs examined consisted almost uniformly of thysanopodas and prawns (*Pandalus*).

The amphipods were identified mainly by the aid of Stimpson's "Invertebrates of Grand Manan," the nomenclature in that paper being adopted, with the exception of a few species identified by the means of Verrill's "Invertebrates of Vineyard Sound." Doubtless some of these names have become synonyms, but it is thought that anyone desiring to know the recent names of the amphipods enumerated in the list will be able to find them.

Thanks are tendered Mr. James E. Benedict, assistant curator of marine invertebrates of the United States National Museum, for verifying the identifications of the crabs and for identifying the annelids; and to Mr. Charles T. Simpson, of the National Museum, for verifying the identifications of some and identifying others of the mollusks.

The following list of the animals found in the fish stomachs comprises the technical name of the species, the name of the fish in which it was found, the locality where the fish was caught, and the date when taken. Notes are also added upon the stomach contents of a few cod and haddock caught by the United States Fish Commission schooner *Grampus* in 1894 and 1895 on the New England and Nova Scotia coasts and in the Gulf of St. Lawrence.

List of animals found in fish stomachs, showing technical name of species, name of fish in which it was found, locality where fish was caught, and date when taken.

EASTPORT COLLECTION.

Hydroids.

- Sertularia*, sp.
 Sept. 12, haddock, market.
 Oct. 6, 11, haddock, Cochran Ledge.
Sertularia argentea.
 Sept. 23, cod, market.

Hydroids were frequently found in the stomachs, but in such condition that no attempt at identification was made.

Echinoderms (Starfishes, Sea-urchins, etc.).

- Pentacta frondosa*. Sea-cucumber; Pumpkin.
 Aug. 28, haddock, market.
 Oct. 18, cod, Quoddy Reef.
Strongylocentrotus dröbachiensis. Sea-urchin; Sea-egg.
 Aug. 3, haddock, between The Wolves and Grand Manan.
 Aug. 7, haddock, Head Harbor.
 24, haddock, Head Harbor.
 24, haddock, Eastport.
 28, haddock, market.
 Sept. 1, haddock, Cochran Ledge.
 Sept. 2, haddock, Eastport.
 4, haddock, West Quoddy.
 12, haddock, Eastport.
 12, cod, market.
 Oct. 6, haddock, Cochran Ledge.
 Oct. 11, haddock, Cochran Ledge.
 Oct. 17, haddock, Quoddy Bay.
 23, haddock, Keat Harbor.
 25, haddock, Storer Ledge, between Harbor De Lute and Cherry Island.
Asterias vulgaris. Starfish.
 Aug. 24, haddock, ———.
 Oct. 17, haddock, Head Harbor.
Cribrella sanguinolenta.
 Aug. 17, haddock, Eastport.
Solaster endeca.
 Sept. 2, haddock, Eastport.
Crossaster papposa.
 Oct. 24, haddock, Head Harbor.
Ophiopholis aculeata. Feather star; Brittle star; Serpent star.
 Aug. 24, haddock, Eastport.
 28, haddock, The Race, Eastport.
 Sept. 1, haddock, Cochran Ledge.
 2, haddock, Eastport.
 4, haddock, West Quoddy.
 ———, cod, Eastport.
 5, cod, Cochran Ledge.
 12, cod, market.
 12, haddock, Eastport.
 23, cod, market.
 Oct. 6, cod, Cochran Ledge.
 6, haddock, Cochran Ledge.
 6, haddock, The Race.

Echinoderms (Starfishes, Sea-urchins, etc.)—Continued.

- Ophiopholis aculeata*—Continued.
 Oct. 11, haddock, Cochran Ledge.
 11, haddock, The Race.
 17, haddock, Eastport.
 17, haddock, Quoddy Bay.
 20, cod, Head Harbor.
 21, cod, Yellow Rock.
 23, haddock, Head Harbor.
 24, haddock, Head Harbor.
 25, haddock, Storer Ledge, between Harbor De Lute and Cherry Island.
Ophiopholis elegans. Brittle star.
 Aug. 3, haddock, between the Wolves and Grand Manan.
 Aug. 17, haddock, Eastport.
 24, haddock, Eastport.
 28, haddock, market.
 Sept. 1, haddock, Cochran Ledge.
 2, haddock, Eastport.
 4, haddock, West Quoddy.
 Oct. 17, haddock, Quoddy Bay.
 23, haddock, Head Harbor.
 24, haddock, Head Harbor.
 25, haddock, Storer Ledge.
Ophioglypha sarsii. Serpent star.
 Aug. 3, haddock, between The Wolves and Grand Manan.

Of echinoderms, the most common forms found were, first, *O. aculeata*, and second, *S. dröbachiensis*. Holothurians were very scarce and other species of starfishes were uncommon.

Mollusks.

- Saxioara arctica*.
 Oct. 6, haddock, Cochran Ledge.
Cardium islandicum.
 Sept. 4, haddock, West Quoddy.
Cardium pinnulatum.
 Sept. 1, cod, Cochran Ledge.
 2, haddock, Eastport.
 4, haddock, West Quoddy.
 Aug. 3, haddock, between The Wolves and Grand Manan.
 Aug. 17, haddock, Eastport.
 24, haddock, between Campbell and Grand Manan.
 Aug. 28, cod, market.
Cardita borealis.
 Aug. 17, haddock, Eastport.
 Oct. 28, haddock, market.
Nucula tenuis.
 Aug. 3, haddock, between The Wolves and Grand Manan.
 Aug. 7, haddock, between Campbell and Grand Manan.
 Aug. 17, haddock, Eastport.
 28, haddock, market.
Toldia sapotilla.
 Oct. 24, haddock, Head Harbor.

List of animals found in fish stomachs, showing technical name of species, name of fish in which it was found, locality where fish was caught, and date when taken—Continued.

EASTPORT COLLECTION—Continued.

Mollusks—Continued.

- Modiola modiolus*. Mussel.
Oct. 2, cod, Yellow Rock.
- Modiolaria discors*. Mussel.
Oct. 17, haddock, Quoddy Bay.
- Modiolaria nexa*. Mussel.
Oct. 6, haddock, Cochran Ledge.
- Anomia aculeata*.
Sept. 4, haddock, West Quoddy.
12, haddock, Eastport.
- Aug. 3, haddock, ledge between The Wolves and Grand Manan.
- Aug. 17, cod, Eastport.
- Terebratulina*, sp. Lamphshell.
—, cod, market.
—, haddock, market.
- Chiton ruber*.
Sept. 2, haddock, Eastport.
Oct. 6, haddock, Cochran Ledge.
25, haddock, ledge between Harbor De Lute and Cherry Island.
- Chiton albus*.
Oct. 20, haddock, Storer Ledge.
20, haddock, Cherry Island.
- Puncturella noachina*.
Aug. 17, haddock, Eastport.
- Margarita cinerea*.
Sept. 1, cod, Cochran Ledge.
Oct. 28, haddock, market.
- Margarita undulata*.
Oct. 17, haddock, Quoddy Bay.
23, haddock, Head Harbor.
- Velutina haliotoidea*.
— cod, Market.
- Velutina zonata*.
Sept. 12, haddock, Eastport.
23, cod, market.
- Oct. 17, haddock, Quoddy Bay.
23, haddock, Head Harbor.
- Natica clausa*.
Aug. 3, haddock, between the Wolves and Grand Manan.
17, haddock, Eastport.
- Sept. 4, haddock, West Quoddy.
Oct. 17, haddock, Eastport.
- Lunatia islandica*.
Aug. 3, haddock, between the Wolves and Grand Manan.
- Buccinum undatum*. Whelk.
Sept. 2, haddock, market.
Oct. 21, cod, Yellow Rock.
- Cemoria noachina*.
Aug. 17, haddock, Eastport.
- Trochus occidentalis*.
Sept. 1, cod, Cochran Ledge.
Oct. 28, haddock, market.

Annelids.

- Lepidonotus squamatus*. Scaly worm.
Oct. 6 to 11, haddock, Cochran Ledge.
- Harmothoë imbricata*. Scaly worm.
Oct. 6 to 11, haddock, Cochran Ledge.

Annelids—Continued.

- Nephtys*, sp.
Oct. 24, haddock, Head Harbor.
- Nereis pelagica*.
Sept. 2, haddock, Eastport.
—, haddock, Storer Ledge.
Sept. 23, cod, market.
Oct. 23, haddock, Head Harbor.
- Nereis*, sp.
Oct. 6 to 11, haddock, Cochran Ledge.
Oct. 17, haddock, Quoddy Bay.
- Thelepus cincinnatus*.
Sept. 2, haddock, Eastport.
- Brada sublaevis*.
Sept. 4, haddock, West Quoddy.
- Brada granosa*.
Aug. 17, haddock, Eastport Harbor.

The annelids were very difficult to identify, owing to their natural softness, which rendered them easily broken and quickly destroyed by the juices of the fishes' stomachs.

Crustaceans.

- Caprella*, sp.
Found in both cod and haddock from various localities, often formed into small or medium-sized wads in the fishes' stomachs.
- Idotea phosphorea*. Isopod.
Oct. 6, haddock, Cochran Ledge.
18, cod, Quoddy Reef.
- Idotea robusta*. Isopod.
Aug. 17, haddock, Eastport.
- Leucothoë grandimanus*. Sea flea.
Oct. 23, haddock, Head Harbor.
- Unciola irrorata*. Sea flea.
Aug. 7, haddock, between Campbellello and Grand Manan.
Aug. 17, haddock, Eastport.
Sept. 12, haddock, Eastport.
Oct. 17, haddock, Quoddy Bay.
24, haddock, Head Harbor.
- Cerapus rubricornis*. Sea flea.
Oct. 6 to 11, haddock, Cochran Ledge.
- Iysianassa spinifera*. Sea flea.
Sept. 1, haddock, Cochran Ledge.
- Amphithonotus*. Sea flea.
Sept. 1, haddock, Cochran Ledge.
Oct. 17, haddock, Quoddy Bay.
- Pteilocheirus pinguis*. Sea flea.
Aug. 7, haddock, between Campbellello and Grand Manan.
Aug. 17, haddock, Eastport.
28, haddock, market.
- Sept. 1, haddock, Cochran Ledge.
12, haddock, Eastport.
12, cod, market.
- Oct. 24, haddock, Head Harbor.
- Nymphon grossipes*. Sea flea.
Aug. 24, haddock, Eastport.
Sept. 1, haddock, Cochran Ledge.

List of animals found in fish stomachs, showing technical name of species, name of fish in which it was found, locality where fish was caught, and date when taken—Continued.

EASTPORT COLLECTION—Continued.

Crustaceans—Continued.

Nymphon grossipes—Continued.

Oct. 6, haddock, Cochran Ledge.
6, haddock, the Race.

Thysanopoda inermis?

Aug. 2, hake, between Campobello and Grand Manan.

At all times found in pollock. Very abundant in this region during the season.

Eupagurus pubescens. Hermit crab.
Sept. 5, cod, Cochran Ledge.

Not many found in fish stomachs, but not an uncommon species in this region.

Eupagurus bernhardus. Hermit crab.
Sept. 1, cod, Cochran Ledge.
5, cod, Cochran Ledge.
Oct. 18, cod, Quoddy Reef.

This species is not rare in this region, but only a few were found in fish stomachs.

Eupagurus krøyeri. Hermit crab.
Aug. 3, haddock, between the Wolves and Grand Manan.
Aug. 17, haddock, Eastport.
Sept. 23, cod, market.

Not uncommon.

Hyas coarctatus. Spider crab.
Aug. 3, cod, between the Wolves and Grand Manan.

Aug. 17, cod, Eastport.
21, cod, Yellow Rock.
23, cod, West Quoddy.
28, haddock, market.

Sept. 5, cod, Cochran Ledge.
12, cod, market.

Oct. 6, cod, Cochran Ledge.
19, cod, Quoddy Bay.
20, cod, Head Harbor.

Many of the crabs had *Anomia aculeata* attached to them. This crab is the most frequent and abundant animal found in the cod's stomach.

Cancer irroratus. Rock crab.
Aug. 23, cod, West Quoddy.
Sept. 12, cod, Eastport.

This species common in this region, found in cod stomachs with *C. borealis*.

Cancer borealis. Jonah crab.
Aug. 23, cod, West Quoddy.

Crustaceans—Continued.

Cancer borealis—Continued.

Sept. 12, cod, Eastport.

Found only in cod stomachs; quite numerous in the above two instances.

Pandalus annulicornis. Prawn.

Aug. 2, hake, between Campobello and Grand Manan.

Aug. 3, cod, between the Wolves and Grand Manan.

Aug. 17, cod, Eastport.

Sept. 12, cod, market.

Oct. 20, cod, Head Harbor.

Oct. 21, cod, Yellow Rock.

Quite plentiful, especially in hake stomachs.

Another prawn, which could not be identified, was found in a cod stomach.

Pycnogonum littorale.

Aug. 17, haddock, Eastport.

Oct. 24, haddock, Head Harbor.

Oct. 25, haddock, Storer Ledge.

Very few specimens found.

Fishes.

Acanthocottus, sp. Sculpin.

Sept. 5, cod, Cochran Ledge.

Too much digested for identification.

Acanthocottus scorpius groenlandicus. Sculpin.

Oct. 18, cod, Quoddy Reef.

Acanthocottus or *Hemitripterus*. Sculpin or sea raven.

Oct. 6-11, cod (fragments), Cochran Ledge.

Liparis liparis. Sea slug.

Oct. 21, cod, Yellow Rock.

Muraonoides gunnellus. Rock-cod; butter-fish.

Sept. 5, cod, Cochran Ledge.

Oct. 20, cod, Cochran Ledge.

Oct. 21, cod, Yellow Rock.

Clupea harengus. Herring.

Oct. 18, cod, Quoddy Reef.

Oct. 18, cod, Quoddy Reef.

Oct. 21, cod, Yellow Rock.

These were fragments. Pieces of herring were frequently found in the stomachs of all fishes examined, but when they had unmistakably been used for bait and picked from the hook by the fish no account was taken of them.

List of animals found in fish stomachs, showing technical name of species, name of fish in which it was found, locality where fish was caught, and date when taken—Continued.

GRAMPUS COLLECTION.

- May 30, cod. Station 333, lat. 46° 19' 15" N., long. 59° 51' 45" W.
Hyas coarctatus, several.
- July 19, 1894, cod.
Hyas coarctatus, numerous.
Pandalus annulicornis. Prawn. One specimen.
Natica clausa, one specimen.
Aphrodita aculeata. Sea mouse. One specimen.
Trophonia, sp., one specimen.
 Young sculpin, one specimen, northern edge of Brown's Bank.
- July 25, 1894, cod. North side of Prince Edward Island, N. by E. 6 or 7 miles from East Point.
Cancer irroratus. Rock crab. Few young.
Homarus americanus. Lobster. One young, 4 inches long.
- July 26, 1894, 50 cod. Stations 588 and 589, Bradielle Bank, Gulf of St. Lawrence.
Hyas coarctatus. Spider crab. Numerous.
Chionacetes opilio. Spider crab. Numerous.
Pandalus annulicornis. Prawn. Common.
Glycimeris siliqua. Bank clam. Numerous.
Yoldia sapotilla. One specimen.
 Holothurian. One specimen.
Serpula tube. One specimen.
 Worms. Several.
- July 27, 1894, 60 cod. Stations 599, 600, and 601, Orphan Bank, Gulf of St. Lawrence.
Hyas coarctatus. Numerous.
Chionacetes opilio. Numerous.
Eupagurus krøyeri. Hermit crab. Two specimens.
Pandalus annulicornis. Few.
Glycimeris siliqua. Numerous.
 Holothurians. Numerous.
Priapulid candatus. Numerous.
Nereis, sp. Clam worm. One specimen.
 Small fishes. Two species, two specimens.
Clupea harengus. Herring. Several.
- August 8, 1894, 2 haddock. Station 699, latitude 47° 8' N., longitude 61° 53' 30" W.
- These two fish contained considerable algae, in which were many small white worms and several species of amphipods (the identification of which was not attempted), some fine sand, and the following species:
Hyas coarctatus. One specimen.
- August 8, 1894—Continued.
Echinarachnius parma. Sand dollar. Young, from the size of a pin head to three-fourths inch in diameter.
Liocyma fluctuosa. Thirty-eight specimens.
Yoldia sapotilla. Four specimens.
Aphrodite granlandica. Two specimens, young.
Spisula ovalis. Sea clam. Nine specimens, young.
Spisula solidissima ororalis. Six, very young.
Cylichna alba. One specimen.
Crenella pectinata. One specimen, young.
Polinices granlandica. Three specimens.
Margarita cinerea. One specimen, very young.
Cyprina islandica. One specimen, very young.
- May 16, 1895, cod. Georges Bank, Station 258, latitude 43° 50' 45" N., longitude 64° 39" W.
Eupagurus bernhardus. Hermit crab. Several.
Aphrodita aculeata. Sea mouse. One specimen.
- June 17, 1895. Tignish, Prince Edward Island.
 Several cod stomachs were examined at the fish-packing establishment of Mr. Myrick. One large cod contained 3 cunners (*Tautoglabrus adspersus*) from 6 to 10 inches long; others contained from 4 to 6 cunners each. One stomach contained nothing but a mass of lobster eggs (about 1 pint), others contained considerable purple membranaceous alga with a lot of some kind of spawn amongst it. Mr. Myrick once found in the stomach of a 71-pound cod 63 large herring, 3 good-sized flounders, and 1 lobster.
- July 12, 1895, cod. Station 574, latitude 40° 33' 45" N., longitude 69° 15' 30" W. "Pollack Rips."
Cancer borealis. Jonah crab. Many, small.
Cancer irroratus. Red crab; rock crab. Few.
Pentacta frondosa. Sea cucumber. Few.
Aphrodita aculeata. Sea mouse.
Tautoglabrus adspersus. Cunner.
 One cunner, about a foot long, was removed from a 14-pound cod. Some of the crabs had hydroids, bryozoa, and *Anomia glabra* attached to them.

Summary showing the animals found in the stomachs of each of the gadoid fishes named.

EASTPORT COLLECTION.

Species.	Cod.	Haddock.	Hake.	Pollock.
<i>Hydroids:</i>				
Sortularia, sp.		x		
Sortularia argentea	x			
<i>Echinoderms:</i>				
Pentacta frondosa	x	x		
Strongylocentrotus dröbachiensis	x	x		
Asterias vulgaris		x		
Cribrella sanguinolenta		x		
Solaster endeca		x		
Crossaster papposa		x		
Ophiopholis aculeata	x	x		
Ophiopholis olegans	x	x		
Ophioglypha sarsii		x		
<i>Mollusks:</i>				
Saxicava arctica		x		
Cardium islandicum		x		
Cardium pinnulatum	x			
Cardita borealis		x		
Nucula tenuis		x		
Yoldia sapotilla		x		
Modiola modiolus	x			
Modiolaria discors		x		
Modiolaria nexa		x		
Anomia aculeata	x	x		
Chiton ruber		x		
Chiton albus		x		
Puncturella nonchima		x		
Margarita chinora	x	x		
Margarita undulata	x	x		
Velutina ballotoidea		x		
Velutina zonata	x	x		
Natica clausa		x		
Lunatia islandica		x		
Buccinum undatum	x			
Comoria nonchima	x	x		
Trochus occidentalis		x		
<i>Annelids:</i>				
Lepidonotus squamatus		x		
Harmothoe imbricata		x		
Nephtys, sp.		x		
Nereis pelagica	x	x		
Nereis, sp.		x		
Thelepus cincinnatus		x		
Brada sublovis		x		
Brada granosa		x		
<i>Crustaceans:</i>				
Caprella, sp.	x	x		
Idotea phosphorea	x	x		
Idotea robusta		x		
Leucothoe grandimanus		x		
Unciola irrorata		x		
Corapus rubricornis		x		
Lysianassa spinifera		x		
Amphithonotus ?		x		
Pteleochirus pinguis	x			
Nymphon grossipes		x		
Thysanopoda, sp.	x		x	x
Eupagurus pubescens	x			
Eupagurus bernhardus	x			
Eupagurus krøyeri	x	x		
Hyas coarctatus	x	x		
Cancer irrorata	x			
Cancer borealis	x			
Pandalus annulicornis	x	x	x	x
Pycnogonum littorale		x		
<i>Brachiopods:</i>				
Torobratulina, sp.	x	x		
<i>Fishes:</i>				
Acanthocottus, sp.	x			
Acanthocottus scopius grænlandicus	x			
Murænoidea gunnelus	x			
Liparis liparis	x			

Summary showing animals found in stomachs of each of the gadoid fishes named—Cont'd.

GRAMPUS COLLECTION.

Species.	Cod.	Haddock.	Hako.	Pollock.
<i>Crustaceans:</i>				
Cancer borealis	x			
Cancer irroratus	x			
Hyas coarctatus	x	x		
Chionocetes opilio	x	x		
Pandalus annulicornis	x			
Homarus americanus	x			
Eupagurus krøyeri	x			
Eupagurus bernhardus	x			
<i>Mollusks:</i>				
Glycymeris siliqua	x			
Natica clausa	x	x		
Liocyma fluctuosa	x	x		
Yoldia sapotilla	x	x		
Aproditia grœnlandica	x	x		
Spisula solidissima or ovalis	x	x		
Spisula ovalis	x	x		
Cylichna alba	x	x		
Crenella pectinata	x	x		
Trochus grœnlandica	x	x		
Margarita cinerea	x	x		
Cyprina islandica	x	x		
Anomia glabra	x			
<i>Echinoderms:</i>				
Pentacta frondosa	x			
Echinarachnius parvus	x	x		
<i>Annelids:</i>				
Aproditia aculeata	x			
Trophonia, sp.	x			
Serpula, sp.	x			
Priapulid caudatus ?	x			
Nereis, sp.	x	x		
Other worms	x			
<i>Fishes:</i>				
Cunners and herring	x			