

Pollock

Pollachius virens (Linnaeus) 1758

[Jordan and Evermann, 1896-1900, p. 2534.]

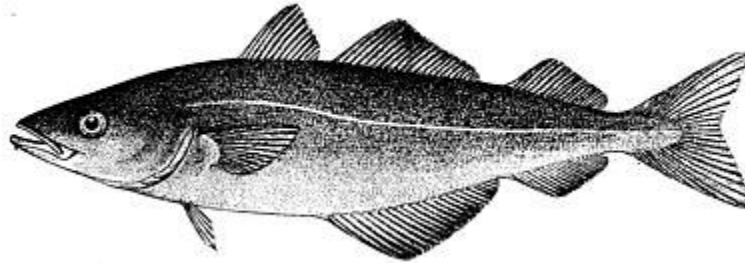


Figure 98 - American pollock (*Pollachius virens*), Eastport, Maine.
From Goode. Drawing by H. L. Todd.

Description

The American Pollock [99] has a deep, plump body (about four and one-fourth times as long as it is deep) tapering to a pointed nose and to a slender caudal peduncle. Its mouth is of moderate size. Its projecting lower jaw (giving it an undershot facial aspect); its forked, sharp-cornered tail, small ventral fins, small chin barbel (as a rule the latter is lacking altogether in large fish), and its beautiful olive green color, are ready field marks when it is caught with cod and haddock.

Its first dorsal fin (13 or 14 rays), originating slightly behind the pectoral, is triangular, and is a little the highest of the three dorsals. The second dorsal, also triangular, is the longest of the three (21 or 22 rays) and is separated by a considerable space from the third dorsal fin (19 or 20 rays) which is more rhomboid in outline. The second anal fin (20 or 21 rays) corresponds in shape and size to the third dorsal, under which it stands, but the first anal (24 to 28 rays) is considerably longer than the second dorsal though similar to the latter in shape. The ventral fins are a little in front of the pectorals, and are only about half as long as the latter. The pectorals are set high on the sides, and are longer than the first dorsal, but shorter than the second dorsal; they have rounded lower corners and bluntly pointed tips. The caudal fin is noticeably forked, with angular corners, unless it is spread to its widest when its margin becomes nearly straight.

Color

Pollock are always of a greenish hue, usually deep rich olive green or brownish green above, paling to yellowish or to smoky gray on the sides below the lateral line, and to silvery gray on the belly. The lateral line is white or very pale gray, contrasting strongly with the dark sides. The dorsal, caudal, pectoral, and anal fins are olive, the latter pale at the base. The ventral fins are white with a reddish tinge. Young fish are darker than large ones, and many of them are more tinged with yellow on their sides.

Size

Pollock reach a maximum length of about 3½ feet and a weight of about 35 pounds. But fish of this size are exceptional, few growing larger than 40 inches or 30 pounds, with about 2 to 3 feet and 4 to 15 pounds as the average for adults. The proportion of length to weight was as follows among fat fish measured by Welsh off Boon Island on April 22 to 25, 1913:

Length, in inches	Weight, in pounds	Length, in inches	Weight, in pounds
24½	4 - 5½	30	8½ - 9½
26	4	31	10
27	7½	31½	10
27½	8½	32	10 - 12
28½	8	33	12
29	8 - 9	35	14
29½	8½ - 9		

Large pollock, however, of a given length vary widely in weight; for example, we have found 40-inch fish to weigh from 25 to 35 pounds; 35-inch fish, from 14 pounds to 21 pounds.

Habits

The pollock is an active fish, living at any level between bottom and surface according to the food supply and on the season, often schooling, and sometimes gathering in bodies so large that it is on record that a purse seiner once took 60,000 fish from one school at a single set. In our Gulf their depth range is from the surface down to 100 fathoms at least,[1] while they may descend somewhat deeper in the deepest troughs. And it is the local presence or absence of prey that governs the movements of the larger pollock.

Pollock feed chiefly on small fish, and on pelagic crustaceans; among the latter most often on the large pelagic shrimp-like euphausiids. It is commonplace that pollock destroy great quantities of small herring, launce, young cod, young haddock, young hake, silver hake, and other small fish in the Gulf of Maine just as they do on the other side of the Atlantic. Pollock chasing schools of herring are a familiar sight;[2] pollock of 1 to 1½ pounds commonly run up estuaries in pursuit of smelt in autumn; and newly hatched haddock or other larvae that are liberated in harbors from the hatcheries are always in danger of being snapped up by the young pollock that are plentiful in such situations. When a pollock only 9 inches long is capable of eating 77 herring up to 2½ inches long at one meal,[3] "ravenous" is only mildly descriptive. However, pollock so seldom strand in pursuit of prey that we have never seen one on the beach though schools often come close in and are caught in the traps.

In the Gulf of Maine, pollock depend perhaps as much on pelagic shrimps as on fish. At Eastport, for example, where these shrimps (genera *Meganyctiphanes* and *Thysanoessa*) are very abundant all summer, Kendall[4] reports pollock of all sizes not only fattening on them but so evidently preferring them to young herring that he did not find a single "sardine" in a pollock stomach, though these were plentiful enough at the time. He adds that "if at any time the crustaceans disappeared from a place the large pollock disappeared also." And pollock, breaking the surface in pursuit of shrimp are familiar sights there, as we can bear witness with many others.

Similarly, Welsh found large pollock in schools feeding on the surface on shrimp (*Thysanoessa raschii*) off the Isles of Shoals and off Boon Island in April 1913, remarking in his field notes for the 25th that "in the last few days pollock have begun to appear in small schools of 400 to 500 fish with the appearance of large schools of feed (shrimp, 'all eyes'), the feed (shrimp) breaking water trying to get away from the pollock which are after them." He described the fish themselves as "rising and sinking at intervals; when at the surface swimming like porpoises, leaping up and over with open mouths, the feed being in dense streaks 6 inches to 1 foot down." these feeding fish were "very sluggish and tame on this feed and easily taken in the purse seines." All were "stuffed to capacity" with shrimps, and only a few contained herring.

Large pollock take morsels as small as copepods. Willey [5] for example, speaks of a fish caught near Campobello Island which contained proportionately as many of these as of euphausiid shrimps, and it is probable that the little pollock depend chiefly on copepods. Glass worms (*Sagitta*), too, have been found in pollock stomachs. Sometimes they consume considerable quantities of ctenophores; we found many pollock full of them on Cashes Ledge and on Platts Bank in August 1928; one had 105 of these watery organisms in its stomach. They also feed to a small extent on bottom-dwelling crustaceans on both sides of the Atlantic, thus crabs, and bottom-dwelling shrimp have been found in fish caught at Woods Hole and in the Gulf of Maine. They have also been reported as gorging themselves on herring spawn. They never take shelled mollusks, so far as we are aware. But they bite on clams as greedily as on fish baits. And fishermen speak of them as one of the few species that will bite, that is, feed, during the spawning period.

Experiments on fish kept in captivity at Woods Hole[6] have shown that the pollock captures its food more by its keen sight than by scent.

The pollock is a cool-water fish. We have never seen any large ones caught at the surface when the temperature there was higher than about 52° F., though there may be plenty of them a few fathoms deeper down where the water was cooler. Even the little "harbor pollock" of 8 inches or so do not appear in any great numbers at times or places where the water is warmer than perhaps 60° F. At the other extreme, pollock of all sizes from the 1-year-old fish upward must experience temperatures as low as 32° F. on the fishing grounds in the southern side of the Gulf of St. Lawrence, and on the more easterly of the Nova Scotian banks during the late winter or early spring, unless they descend then to considerably greater depths, a possible shift of which we have no direct evidence. But it is probable that the pollock's need of water as warm as about 38° F. for the incubation of eggs and perhaps of temperatures a little higher than that for the maturation of its sex organs is the factor that sets the northern boundary to the maintenance of a permanent resilient population.

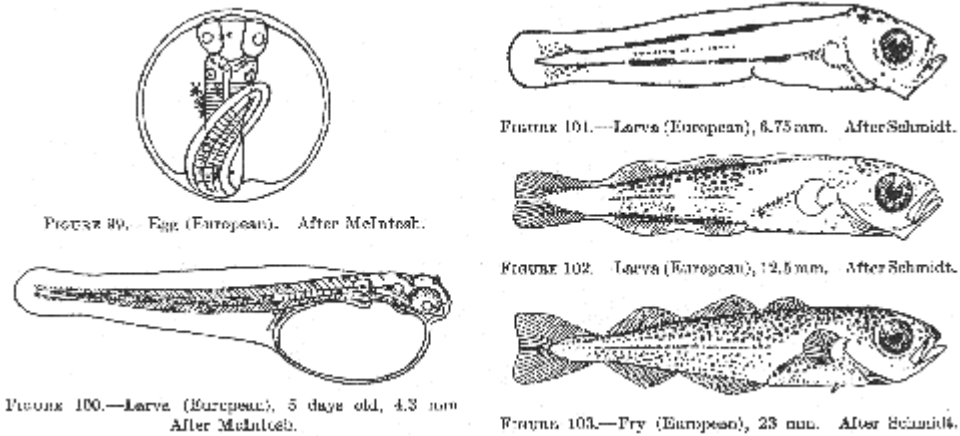
The pollock is a late autumn and early winter spawner, and the shortness of the spawning season with the fact that the vertical temperature gradient covers a range no greater than 3° to 5° F. down to 50 fathoms at that season, makes it easy to establish the physical conditions under which the eggs are produced and in which they develop. On the Massachusetts Bay grounds breeding commences when the whole column of water has cooled to about 47° to 49°, and is at its climax late in December, in temperatures of 40° to 43°, while the major production of eggs takes place long before the water has cooled to its winter minimum of 35° to 36° F. at the level at which the fish lie. Thus the pollock spawns on a falling temperature, with most of the eggs produced within a comparatively narrow range and in water several degrees warmer than that in which haddock spawn most actively. This agrees closely with the European pollock which spawns only in temperatures near 44.5°, so far as is known.

As the successful propagation of any fish depends as much upon the incubation of its eggs as on its spawning, we should note that incubation proceeds normally, and that the resultant larvae are strong and active over the whole range of temperature just outlined, that is, from about 38° to about 48° as proved by experience in the Gloucester hatchery.

The Massachusetts Bay spawning takes place in salinities ranging from as low as 32 per mille to as high as 32.8 per mille, according to precise locality, depth, and season, salinities much lower than those in which pollock breed on the other side of the Atlantic (35.14 to 35.26 per mille).

The number of eggs produced by a female pollock averages about 225,000, but more than 4 million eggs were reported in one fish of 23½ pounds. The egg is buoyant, has no oil globule, and averages about 1.15 mm. in diameter. Thus it is decidedly smaller than the egg of the cod or of the haddock. Incubation occupies 9 days at a temperature of 43°; 6 days at 49°.

The larvae are about 3.4 to 3.8 mm. long at hatching, slender, with large yolk sac, and with the vent situated on one side of the body at the base of the ventral fin fold as it is in other larval gadoids; they are sprinkled with black pigment cells. About 5 days' time is required for the entire absorption of the yolk sac and for the formation of the mouth; meantime the pigment of the post-anal section of the trunk becomes grouped in longitudinal bars, two dorsal and two ventral, the former longer than the latter. At this stage pollock closely resemble cod of the same size, but the ventral bars are longer than the dorsal bars opposite them in the cod, and usually three in number in the cod instead of two as in the pollock. These bars persist until the pollock grows to a length of about 15 mm., when the pigment becomes more scattered. The caudal fin rays appear at about 9 mm., all the dorsal and anal rays and the ventral fin rays at about 15 mm., the dorsal fins are separate from one another and also the anal fins at 20 mm. (at about 2 months), and fry of 25 to 30 mm. show most of the characters of the adult.



American pollock (*Pollachius virens*).

- Figure 99 - Egg (European). After McIntosh.
- Figure 100 - Larva (European), 5 days old, 4.3 mm. After McIntosh.
- Figure 101 - Larva (European), 6.75 mm. After Schmidt.
- Figure 102 - Larva (European), 12.5 mm. After Schmidt.
- Figure 103 - Fry (European), 23 mm. After Schmidt.

In European seas the young pollock lives near the surface for its first 3 months. The young fry have been taken similarly, in the tow nets near the surface at Woods Hole from January to May, and they are to be expected in Massachusetts Bay then, though we have no actual record of them there.

Rate of growth

Thanks to the shortness of its breeding season and to the readiness with which its scales can be "read" European students[7] have found it easy to trace the rate of growth of these "saithe" or "coal fish"; and this has been done for the American pollock by Mavor,[8] also by us. Judging from scale studies and from the sizes of the fry that are caught near Woods Hole in the spring, pollock hatched in mid-winter are about 1 to 2 inches long by the following spring, growing to 3-5 inches by late summer; to 5-7 inches in their first winter, when a year old; to 12-13 inches at two years of age; to 17-18 inches at three years; to 21-22 inches at four years; to an average of about 23 inches at 4½ years; of 25 inches at 5½ years; and of about 27 inches at 6½ years. Thus the 11-12 inch and 15-16 inch pollock that appear in such numbers along the New England coast late in summer are about 1¾ and 2¾ years old, respectively. The annual rate of growth thus is about 5 or 6 inches for the first three years, 2-4 inches for the next three years, and 1-2 inches for the next few years, after which they grow still more slowly.

These sizes are somewhat larger than the averages given by Damas for European fish of corresponding ages, but the difference is so small that it is safe to apply the European figures to older Gulf of Maine fish, for which we have no data. On this basis we may expect the American pollock to average about 28 inches at 7½ years; about 29 inches at 8½ years, and about 30 inches at 9½ years. Fish of 3 feet and upward are therefore of considerable age. The oldest recorded by Damas among the thousands he examined was in its nineteenth year. In European seas pollock grow faster in the southern part of their range than in the northern, but we have yet to learn whether this applies to the American fish.

The age at which Gulf of Maine pollock first mature is not known, but this is probably at a somewhat greater size than in Norwegian waters, where most of them mature by the time they are 1½ feet long; i. e., 3 years old. All of them that are 2 feet long, or longer, in summer have spawned at least once.

General Range

Continental waters on both sides of the North Atlantic in cool temperate and boreal latitudes; regularly in the west from the southwestern part of the Gulf of St. Lawrence[9] and northeastern Nova Scotia to New Jersey; southward occasionally to Chesapeake Bay and to Cape Lookout,[10] N. C., and northward in small numbers to the southern part of the Grand Banks, to the southeastern coast of Newfoundland, and to Sandwich Bay on the southeastern coast of Atlantic Labrador;[11] West Greenland; Spitzbergen; Iceland; and the coasts of northwestern Europe south to the North Sea, English Channel, and Brittany coast of the Bay of Biscay in the eastern Atlantic; occasionally to the Gulf of Gascony (Arcachon).

Occurrence in the Gulf of Maine

On our side of the Atlantic the pollock has its chief center of abundance in the Gulf of Maine, where it is caught in large numbers both on the offshore banks, and all around the coast line, from Nantucket Shoals and Cape Cod to Cape Sable. The only regional exception is in the inner part of the Bay of Fundy along the New Brunswick shore, where so few pollock are taken that they do not appear at all in the landings reported thence (Albert County).

The following statistics of the United States catch for 1945, combined with the Canadian catches for 1944 and 1946,[12] give a general idea of the regional abundance of pollock, on a broad scale, also of how universal they are, with the one exception just noted.

Browns Bank, about 965,000 pounds; western coast of Nova Scotia to the Annapolis County line, at least 7,300,000 pounds;[13] Nova Scotian shore of Bay of Fundy, about 500,000 to 1,000,000 pounds;[14] inner part of Bay of Fundy on New Brunswick side (Albert County), 0; mouth of the Bay of Fundy on New Brunswick side, about 2,000,000 to 3,500,000 pounds;[15] off eastern Maine, about 1,045,000 pounds; off central Maine, about 2,573,000 pounds; small fishing banks in west-central part of the Gulf, about 516,000 pounds; off western Maine, about 1,861,000 pounds; off eastern Massachusetts and off northern Cape Cod, about 7,347,000 pounds; Cape Cod out to the so-called South Channel, about 1,518,000 pounds; Georges Bank as a whole, about 3,184,000 pounds.

In general, pollock are more abundant around the coastal belt of the Gulf, out about to the 75 to 80 fathom line, on the isolated fishing grounds enclosed within that depth limit, and over the offshore banks than they are over the deeper central basin of the Gulf; though some are taken there also. And this has always been one of the principal fishes to be caught with hook and line on the various small banks and ledges in the inner part of the Gulf; near Lurcher Shoal for instance; on Grand Manan Bank; on Jeffreys Ledge, and on Stellwagen Bank at the entrance to Massachusetts Bay, while the neighborhoods of Boon Island and of the Isles of Shoals long have been famous pollock grounds.

Pollock are decidedly less plentiful on the Nantucket grounds in general (only about 56,000 pounds landed thence in 1947) and west of Cape Cod than they are either farther within the Gulf to the northward or on Georges Bank to the eastward. But commercial quantities are caught yearly (in season) along southern New England and New York. The landings for Rhode Island, Connecticut, and New York, combined, ranged, for example, between 787,000 pounds and 883,000 pounds for the years 1930 to 1933. And though the landings ran less than one-half as great (between 135,000 pounds and 452,000 pounds) for 1935 to 1947 we suspect that this decrease resulted from market conditions, rather than from any decrease in the numbers of pollock that are available there. A few hundreds or thousands of pounds of pollock are landed yearly[16] in New Jersey ports also. But this is the extreme southern limit for the pollock as a market fish.

To the eastward and northward, we find pollock caught in abundance all along the outer Nova Scotian coast and banks. In 1946, for example, 840,000 pounds were landed in Guysborough County, Nova Scotia, and 277,200 pounds along the Atlantic coast of Cape Breton Island, east of the Gut of Canso.[17] This, however, is the northeastern limit of our pollock as a market fish of any importance. True, a few thousand pounds were reported yearly from the southeastern side of the Gulf of St. Lawrence near the Gut of Canso during the early nineteen hundreds.[18] But the catch is so small that pollock have not been mentioned in the catch statistics for more recent years, nor anywhere else within the Gulf of St. Lawrence.

Small pollock, 8 to 10 inches long and weighing less than half a pound (1 or 2 years old) swarm inshore after early April, when we have seen thousands of them taken from the traps at Gloucester and Magnolia. In the southern part of Massachusetts Bay these "harbor pollock," as they are called locally, move out in June, probably to avoid the rising temperature, to return again in autumn. But they continue abundant all summer and autumn in the harbors and bays and among the islands along the coast northward from Cape Ann and eastward to Nova Scotia. Most of them seek slightly deeper water in winter, however, probably to avoid the cold.

The larger fish tend to keep farther offshore than the small ones; they live deeper on the whole, except when they are pursuing some particular feed, and they are caught in more definite localities, not everywhere and anywhere along the coast as are the little fish. In the southwestern part of the Gulf, as exemplified by Massachusetts Bay and by the belt from Cape Ann to the Isles of Shoals, large pollock are taken in greatest number in late autumn and early winter when the gillnet fishery taps the spawning fish (fig. 94). Few are caught there later in the winter after they finish spawning, showing that the spent fish do not winter on particular grounds, but scatter to and fro in search of food.

Along this part of the coast they often reappear in abundance at the surface near land during April and May and even into June. In 1951, for example, we heard of schools of large pollock at various points off the tip of Cape Cod, in the northern side of Massachusetts Bay, and off the Merrimac River during the first week of that month. They tend to move out again, and deeper, as the surface warms with the advance of the season, and very few large ones are taken inshore in the Massachusetts Bay region during July and August. But it is not likely that they travel far, or sink very deep, for good fares of fish 2 to 3 feet long are brought in by line fishermen from Jeffreys Ledge throughout the summer, most of them caught some distance above bottom.

North of the Isles of Shoals, pollock are more commonly seen on the surface during the hot months. Thus, we remember one year (1922) when small boats from Cape Porpoise and from neighboring ports were doing well trolling during July and early August; in 1951 schools were reported off Baileys Island, Casco Bay, during the first week of July. And great numbers of good sized pollock are caught all summer in the tide rips at the mouth of the Bay of Fundy; in Passamaquoddy Bay; in Digby Gut on the Nova Scotian side of the Bay of Fundy; and along outer Nova Scotia.[19]

No information is available as to the relative frequency with which pollock appear at the surface over Georges Bank and other offshore fishing grounds, though they are caught all through the year at deeper levels, with no greater seasonal fluctuation in the landings than might result from the various vicissitudes of fishermen's luck, the weather, and the market.

Pollock spawn in great numbers at the mouth of Massachusetts Bay, especially on the broken bottom southeast of Gloucester and along the seaward (eastern) slope of Stellwagen Bank, where most of the eggs were taken during the years when pollock were hatched in great numbers at the Gloucester hatchery of the U. S. Bureau of Fisheries.[20]

In some years many pollock spawn (and large quantities of their eggs have been collected for the hatchery) right up to Boston Lightship in the inner part of Massachusetts Bay, though this is not a regular annual event. And gill-netters also catch an abundance of ripe fish between Cape Ann and the Isles of Shoals, where breeding pollock congregate in such abundance that they have supported a lucrative fishery in some years.

This in general seems to cover the most productive spawning area so far as the inner parts of the Gulf are concerned. Few spawning pollock are caught in the Gulf south of the Massachusetts Bay region, while we find no report of them as breeding anywhere west of Cape Cod, although fry of the winter's hatch appear at Woods Hole in spring. On the other hand only a few ripe fish are seen along the coast of Maine, though the Boothbay hatchery has made diligent search for them east of Casco Bay; neither have we found pollock eggs anywhere north of the Isles of Shoals in our autumn or winter towings. And it seems that very few larvae are hatched at the mouth of the Bay of Fundy on the New Brunswick side, for none of their young fry have been found in the Passamaquoddy-Grand Manan region, though yearlings, half-grown fish, and adults are there in great numbers. Thus it is safe to say that no production of any importance takes place anywhere in the Gulf of Maine east of Cape Elizabeth.

We cannot offer any explanation for this regional contrast in pollock productivity. Temperature seems not the cause, for this differs by only a couple of degrees between Massachusetts Bay and Passamaquoddy Bay at the commencement of the spawning season. And while the coastal water as a whole is slightly cooler east than west of Cape Elizabeth at the height of the season, the differences from station to station have been small; and all the readings we have taken there during late December and early January have fallen well within the range at which pollock spawn freely in Massachusetts Bay, as appears in the following table:

Table 2. Water temperatures, Massachusetts Bay to Lurcher Shoal, 1920-1921

Depth in fathoms	Off Gloucester, Dec. 29, station 10489	Off Cape Elizabeth, Dec. 30, station 10494	Off Mount Desert I., Jan. 1, station 10497	Off Machias, Jan. 4, station 10498	Fundy Deep, Jan. 4, station 10499	Off Lurcher Shoal, Jan. 4, station 10500
0	42	42	40.5	42	42	42.5
10	43.7	42.5	41.4	42	42.4	42.7
20	44.4	43.1	41.8	42.1	42.6	43.1
40	44.4	44.9	42.3	42.1	42.9	43.9
75	44.6	—	—	—	43.5	—

Presumably the pollock of Georges and Browns Banks and of outer Nova Scotian waters to the eastward reproduce themselves there. But we have no definite information in this regard.

A few ripe fish are caught in the Massachusetts Bay region as early as the last week in October, and the first of November to the middle of January covers the most active production there, as illustrated by the following table supplied by C. G. Corliss, former Superintendent of the hatchery, where many millions of pollock eggs were once hatched yearly.

Year	First eggs taken	Last eggs taken	Eggs most plentiful	Total eggs collected
1911-12	Nov. 10	Jan. 22	-	499,875,000
1912-13	Nov. 1	Jan. 31	-	856,680,000
1913-14	do	Feb. 6	-	974,240,000
1914-15	do	Feb. 9	-	855,020,000
1915-16	do	Feb. 17	-	1,713,730,000
1916-17	Nov. 7	Jan. 27	Nov. 16 to Jan. 20	2,081,400,000
1918-19	Nov. 6	Jan. 23	Nov. 20 to Jan. 8	1,110,470,000
1919-20	Nov. 10	Jan. 16	Nov. 17 to Jan. 16	954,800,000
1920-21	Nov. 15	Jan. 21	Nov. 21 to Jan. 16	650,850,000

The first week of March is the latest that the gill netters have reported any spawning fish.

The pollock spawns considerably earlier in the Gulf of Maine than in European waters, where spawning does not begin until January, is at its height in March, and continues into April.

The Gulf of Maine pollock, like the cod and haddock, spawn in comparatively shoal waters. Thus we have towed a considerable number of pollock eggs over Stellwagen Bank where the water was only 16 fathoms deep (on November 8, 1916) and most of the ripe fish that supplied the Gloucester hatchery with eggs were netted in depths of 25 to 50 fathoms. Probably few spawn deeper than 50 to 60 fathoms, and there is no evidence in egg records, in captures of ripe fish, or in fishermen's reports, that any pollock eggs are produced in the deep basins of the Gulf. In European waters, however, this fish is described as breeding only in depths greater than 75 fathoms.

The gill netters have described it to us as spawning over hard bottom chiefly, though the pollock is not a ground fish at other seasons.

The migrations of the young pollock in our Gulf, from hatching until they appear on the coast as yearlings, are of special interest because of the probability that the great majority of all the pollock that frequent the eastern coast of Maine and the Bay of Fundy region are produced elsewhere. Some of them may come from spawning grounds (as yet unmapped) off southern or western Nova Scotia; our own observations throw no direct light on this point. But what is known of the general circulation of the Gulf in spring and early summer suggests, rather, that the bulk of them come from the spawning grounds on the western side, south of Cape Elizabeth, having circled around first southward, then eastward and northeastward, and so finally to the Bay of Fundy and to the east part of the Maine coast. Others, hugging the coast more closely in their involuntary journeyings, may follow past Cape Cod and so westward, evidence of which is the presence of an abundance of pollock fry in spring at Woods Hole, for pollock are not known to spawn in quantity anywhere west of the Cape.

Strangely enough, we have caught no pollock less than 8 or 9 inches long on the offshore banks either on hook and line or in our tow nets, nor have we seen any that had been trawled there. Whether this is because the young are too nimble to be taken in trawls, whether because they live well off bottom, or whether because they are scarce offshore, is not known.

The larger pollock of our Gulf seem to wander but little, for many that have been tagged by the U. S. Bureau of Fisheries have been recaptured within short distances of the localities where they were marked, and after long periods of time. And while a few of the marked fish are known to have made considerable journeys eastward, (one, for example, from Jeffreys Ledge to Sable Island), instances of this sort have not been numerous enough to suggest any mass movements.

Pollock appear to be similarly stationary all along the outer Nova Scotian coast, for they are caught there throughout the fishing season. But we think it likely that the few pollock that are caught within the Gulf of St. Lawrence wander in via the Gut of Canso. On the other hand, pollock are seldom caught west of Rhode Island after June,[21] and it is chiefly as cold season visitors that they appear off the coasts of Connecticut, New York, or New Jersey; the commercial catches reported thence are made mostly in winter and in early spring.

Importance

At the time the first edition of this book appeared (1925) our Gulf was yielding about 35 million to 40 million pounds yearly. In 1946, most recent year for which we have seen the Canadian catch statistics as well as those for the United States, the total catch for the Gulf was close to 48 million pounds,[22] say 5 million to 7 million fish.

A quarter of a century ago, the gill net was regarded as the most effective apparatus for catching pollock; hand and long lines ranking next; otter trawls yielding only a few,[23] while schools that were seen at the surface were often seined, especially the smaller sizes. But the relative proportions have been reversed with the great development of the otter trawl fishery. In 1946, for example, a representative year, a little less than $\frac{3}{4}$ of the pollock landed from the Gulf of Maine by United States fishermen were caught in otter trawls; a little less than $\frac{1}{5}$ in gill nets; with hand and long lines, traps of one sort or another, and purse seines accounting for the remainder in the order named.[24]

Some of our readers will be more interested in the fact that pollock will take an artificial lure and put up a strong resistance. Small ones up to 4 or 5 pounds will take a bright artificial fly freely (silver body with white wings of hackle or hair is good, especially with a touch of red). We have caught many fly casting from the rocks in autumn when smallish pollock are inshore after smelt or other small fish. And a pollock rises so fiercely to the fly and makes so long and strong a run when it is hooked that a small one gives fully as good sport as a trout caught on a light fly rod; a medium-sized pollock provides nearly as good sport as a salmon of equal weight. When the larger pollock are schooling at the surface near shore in May and June, many of them are taken by anglers trolling with spoons or with feather lures of one kind or another, from party boats out of Plymouth, Gloucester, Ipswich, Newburyport, Hampton, York, Casco Bay, and various other places along our coasts; also off Gay Head, Marthas Vineyard, and still farther to the westward. And pollock of all sizes bite eagerly on clams, minnows, or on bait of cut fish.

[99] This is the "coalfish, green cod, or saithe" of British, Scotch, and Irish fishermen. The European "pollack" is a different species (*Gadus pollachius*).

[1] We have seen them trawled as deep as this on the northern slopes of Georges Bank.

[2] Sars (Rept. U. S. Comm. Fish., (1877) 1879, p. 619-620) has given a graphic account of pollock rounding up schools of launce and of young cod in Norwegian waters.

[3] Smitt, *Scandinavian Fishes*, vol. 1, 1892, p. 503.

[4] Rept. U. S. Comm. Fish., (1896) 1898, p. 180.

[5] Proc. Amer. Acad. Arts, Sci., vol. 56, 1921, p. 192.

[6] Herrick, *Bull. U. S. Comm. Fish.*, vol. 22, 1904, p. 258.

[7] For résumé see Damas (Rapp. et Proc. Verb., Conseil Perm. Internat. Explor. Mer, vol. 10, No. 8, 1900, p. 167).

[8] *Contr. Canad. Biol.*, (1917-1918) 1919, No. 6.

[9] Pollock appear not to be known anywhere farther within the Gulf or in its northern side.

[10] Reported from Chesapeake Bay by Hildebrand and Schroeder (*Bull. U. S. Bur. Fish.*, vol. 43, pt. 1, 1928, p. 156) and from Cape Lookout by Coles (*Copeia*, No. 151, 1926, p. [105]).

[11] the pollock is listed in the Reports of the Newfoundland Fisheries Research Commission for 2 stations on the southern edge of the Grand Bank, from Bay Bulls, Newfoundland, and from Sandwich Bay, Labrador.

[12] We have not yet seen the Canadian statistics for 1945.

[13] U. S. catch, 492,400 pounds, 1945; Canadian catches 7,017,000 pounds in 1944 and 6,642,000 pounds in 1946, besides an indeterminate amount landed along this part of the Shelburne County coast line.

[14] 1944, 513,000 pounds; 1946, 983,000 pounds.

[15] Charlotte and St. Johns Counties, about 2,000,000 pounds in 1944, about 3,507,000 in 1946.

[16] Maximum, 10,700 pounds, minimum 600 pounds for the years 1930-1937 and 1939-1947, 101,200 pounds were credited to New Jersey in 1938; an amount so much larger than usual as to suggest that it was because of economic reasons that the fish were landed in New Jersey rather than in New York.

[17] Richmond County, Nova Scotia, 223,600 pounds; Cape Breton County, 53,600 pounds.

[18] Yearly catch, 1,600—4,000 pounds; for 1902 to 1906 and 1909 to 1915-1916, 61,500 pounds were credited to Inverness County in 1901, but this amount is so much larger than usual as to suggest some error.

[19] Near Canso good-sized fish are caught on hook and line at the surface from June to December, according to Cornish, *Contributions Canadian Biology (1902-1905)* 1907, p. 189.

[20] Information supplied by C. G. Corliss, former Superintendent of the Gloucester Hatchery.

[21] Two pollock tagged on Nantucket Shoals in June and October were caught off Block Island in the following May and July respectively.

[22] 47,670,776 pounds, plus an indeterminate amount for Shelburne County, Nova Scotia, that may have been caught on the Gulf of Maine side of Cape Sable.

[23] Bigelow and Welsh, *Bull. U. S. Bureau of Fisheries*, vol. 40, Pt. 1, 1925, p. 406.

[24] No statistics are available as to what proportions of the Canadian catch in the Gulf are made with the different kinds of gear.

Fishes of the Gulf of Maine by Bigelow & Schroeder is the seminal work on North Atlantic fishes. It was originally published in 1925 with William Welsh, a Bureau of Fisheries scientist who often accompanied Henry Bigelow on his research cruises. In the late 1920's, Bigelow began a long association with William C. Schroeder, publishing a number of papers and reports on fishes of the North Atlantic, including the first revision of *Fishes of the Gulf of Maine*. This excerpt is from that 1953 edition.

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