1932

A Study of the Fishing Industry in Boston and New England

A STUDY OF THE FISHING INDUSTRY IN BOSTON AND NEW ENGLAND

A Thesis

Submitted to Boston University

For the Degree

Master of Business Administration

By

Eileen Marie Weller

A. B. Smith College, Northampton, Mass. 1928
B. S. Simmons College, Boston, Mass. 1930

PART I. HISTORICAL BACKGROUND

"What society can venture her position to dispute?
She's the oldest of them all, and of the widest
spread repute."

In a city famous for tradition and reverence for the past, the fishing industry alone enjoys to this day the prestige and pristine vigor of its past. Like an old family jealous of an illustrious line, the fishing port of Boston has clung to its fine traditions, and at the same time has sponsored such a spectacular development toward modern efficiency that it today ranks first among wholesale fish markets in the world.

* * *

The maritime history of Massachusetts, as far as white men are concerned, began when some Basque or Norman or "Portingale" unknown, blown off the Grand Banks by a westerly gale, found shelter under the lee of Cape Cod or Cape Ann. Finding the Indians ready to truck, and the adjacent waters teaming with fish, he and his kind returned. The fishing trade as a regular employment can be traced as far as 1504.[1] Biscayan sailors of France and Spain led the way, while the merchants of Holland were more prompt than the English in securing profits. Bartholomew Gosnold in March 1602 made the first direct voyage from England across the Atlantic to New England and commenced the fisheries here; he named Cape Cod; and returned to England to spread reports of the riches of American waters. Other adventurers followed:- in 1605 George Waymouth, under English patronage published a report of his observations at Penobscot Bay; by 1611 there was a well established English settle-

1. Sabine's Report to Congress, 1853.

ment in Maine. Three years later Captain John Smith, leaving his fish to dry on the Island of Mohegan, explored the coast of Massachusetts and gave it a name. His "Description of New England" is a sane, conservative exposition of the natural advantages of Massachusetts.[1] Trusting in his prediction that there was more treasure in New England waters than in the "gold and silver mines of the king of Spain," English fishermen began to crowd their Celtic rivals from these waters. By the time the Mayflower sailed men in every fishing port from Bristol to Bilboa[2] could tell the bearings of Cape Ann from Cape Cod. When the Pilgrims were casting about for a permanent settlement, the pilot of the Mayflower recommended "a good harbor on the other headland of the bay, almost right over against Cape Cod---in which he had been once."[3]

While on Cape Ann, John White of Dorchester, England, a Puritan minister (but a non-conformist whose parishoners and friends were actively engaged in fishing) being troubled at the godless life and unruly conditions of the men employed in the trade, conceived the idea of establishing a settlement on land. The purpose was to assist crews in the busy season, to supply provisions and necessities by cultivating the soil and trafficing with the natives, and to afford religious instruction to both planters and sailors. In 1624 £3,000 of common stock was raised in England, and the first ship brought over fourteen men to the present site of Gloucester. For three years associates in England struggled against losses, and when in 1626 the capital was gone, the

1. S. E. Morison: The Maritime Hist. of Mass. 1783-1860 p. 8-10
2. Spanish port
3. Same as note 1.

company was dissolved, and the shipping and provisions sold. "The ill choice of the place for fishing, the ill carriage of the men at the settlement and the ill sales of fish" are assigned by Mr. White as reasons for the bad results. The people quarrelled among themselves, and finally most of them returned to England.[1]

Meanwhile the Plymouth Colony was more successful in its struggle for existence. Through many failures the settlers learned the secrets of fur-trading and fishing, but were mercilessly exploited by English financiers. Puritan immigration reinforced their numbers so that by 1628 there were 2,000 persons in the Colony of Massachusetts who were such successful fishermen that for 150 years the fisheries were the "corner-stone of New England prosperity."[2] The characteristic fishing, shipping and West Indies trade had already commenced, although the intention of the leaders, Winthrop, Dudley, Endicot and Saltonstall had been to "found a church and commonwealth for Calvinist Puritans according to the word of God---to preserve the goodly heritage" rather than to establish a maritime settlement.[3] The economic foundation was to be large landed estates modelled on those in old England manned by tennants and hired laborers. Instead of this policy (which was better realized in the plantations of the South) the constantly increasing number of immigrants inevitably congregated in towns. But, the poor soil and uncertain crops on which they depended for food were so alarmingly inadequate that a pioneer wrote home in 1637 "for the present

2. R. McFarland: The Hist. of N.E. Fisheries with Maps p 19
1. Justin Winsor: The Mem. Hist of Boston 1630-1800
3,4 S.E.Morison: The Maritime Hist. of Mass. 1783-1860

we make a shift to live; but hereafter, when numbers increase and the fertility of the soil doth decrease, if God discover not means to enrich the land, what shall become of us I will not determine."

God performed no miracle on the soil. He gave the sea. "Here thou mayest reap without sowing, but not without God's blessing; 'twas the Apostles calling." For two hundred years the Bible remained the spiritual, the sea the material sustenance of Massachusetts. An early settler unconsciously wrote the first enthusiastic advertisement for fish as a healthful food when he said,"Mothers view their children fat and lusty with feeding upon muscles, clams and other fish as they were in England with their fill of bread."[1] The same grateful pen recounts "how some were providentially furnished with abundance of fish in their nets, or on their hooks; how others without hooks and nets caught fish with their hands and were thus provided for till other food came."

Industrial fishing had not ceased with the Gloucester failure. Dorchester, the first community "that set upon the trade of fishing in the bay" was little more than a transference to New England of Dorset fishing interests. Scituate, Cohasset, Duxbury, Provincetown, on the South Shore, were already modestly supporting themselves from the sea, whereas the Cornwall and Channel Island fishermen at Marblehead were flourishing as a class aloof "caring neither for Lord Bishop nor Lord Brethren."[2] Literally true was a Marblehead fisherman's reproof to an exhorting preacher--"Our ancestors came

1. R. McFarland: The Hist. of N.E.Fisheries with Maps quoting E. Johnson, Wonder Working Providence of Sion's Savior in New England p. 55
2. S.E. Morison: Maritime Hist of Mass. p 13 et seq.

here for religion. Their main end was to catch fish."

Up to 1635 there was no organization of any kind among fishermen despite the fact that the export trade in salt and dried fish was securely developed with Europe and the West Indies. The best quality of cured fish found a ready market in Catholic Europe, while the poorer grades of dried and salted fish were sold to the natives of the West Indies in exchange for molasses, sugar, and slaves. The only capital investment was a small home fund; there was no central supply station for fitting out boats, nor was there a distinctive shipping port to which products of the sea could be brought before being shipped abroad. Men, however, were beginning to see, two centuries ahead of time, the need of greater capital, central storehouses, and more united action. Some foresaw possibilities in the development of the fishing industry, and of the evolution of scattered fishing stations into united settlements. Reverend Hugh Peter, minister of Salem, canvassed the neighborhood advocating an increase of commerce and fisheries as a purely business enterprise. He endeavoured to arouse a more generous spirit for the general welfare, and succeeded in raising a goodly sum of money "to set on foot the fishing business by setting up a magazine of all provisions and necessities for fishing in order that fishermen might have a local supply of apparatus at nominal cost."[1] The establishment of Salem was the result of Mr. Peter's endeavors.

The first protective legislative measure passed the General Court on May 22, 1639 for the "encouragement of men set upon fishinge" by exempting for seven years from duties and

1. Sabine. p. 125

public taxes all vessels employed in taking, curing, and transporting fish. During the busy season fishermen were to be excused from military service.[1] Favorable statutes regulating the price of bait, and the granting of four acres of land to the owner of every boat for the erection of stages and flakes for drying fish, were constant inducements to fishermen. Prosperity, and the first important expansion of the fishing industry followed. The first daring craft to push beyond the bay to the Isle of Sable left Boston in 1641. The invasion of the coasts of Nova Scotia, Newfoundland as far as the Arctic Circle, the South to Pacific waters, followed in succession. A writer of the day describes Boston in 1664 as having "14,300 souls; a great trade to the Barbadoes with fish and other provisions, and a fleet of 1,300 boats that fished at Cape Sable."[2] The crew of the small boats consisted of four men; a master and two men on the boat, and the fourth man on shore to cure the fish and do the cooking. The profit of a single voyage was often a share of £8 or £9 (the equivalent of half the value of the catch)--money all too frequently spent in spirituous liquors, termed in that day a "walking tavern." Three trips a season was the fisherman's maximum work at sea, but the drying and salting ashore consumed much of the time remaining. This schedule enabled the fisherman to live at home six months a year the simple life which attracted and satisfied men who could not afford mercantile ventures. The Yankee liked "fishing on his own hook", an expression which describes the system whereby each member of

1. Calendar of State Papers, Col., 1661-68. p. 532-33

2. McFarland p. 68

the crew supplied his own gear, bedding and food.

The fishermen developed their own distinctive customs, costumes, types and traditions, as well as a language quite their own. Their sons, who as youngsters swarmed about the incoming boats, were predestined to the sea. At six years a lad could help to cure the catch; he helped his mother mend the nets and cook in order to qualify for the coveted place as sea cook by the age of nine or ten. Subsequent advancement was to apprenticeship, catching, heading, splitting and salting. By fifteen a boy was an expert, experienced fisherman whose highest ambition was to save enough money to own a boat and live ashore from her earnings. More often he grew gray in the service, and then came back from the deep waters to putter about with lobstering, shore fishing, and clamming.

As early as 1676 thirty ships between fifty and one hundred tons went from Boston beside five hundred smaller vessels, while twenty-four years later, in 1700, some one-hundred ninety-four sea-going ships found their way to the Boston Fish Market, described by the chronicler as the "way from Mr. Antram's corner neigh the 5th Conduit leading from thence N-E^ly side of y^e Dock as far as Mr. Winsor's Warehouse." And, says Drake, "All the north side of the Dock seems to have been known at one time as the "Fish Market."[1] Richard, Earl Bellamount, Colonial Governor of Massachusetts at the close of the seventeenth century, and who as an enemy of the Stewarts was in sympathy with the fishing interests of the people, wrote, "I believe I may venture to say there are more good vessels belonging to the town of Boston than to all

1. Justin Winsor: Mem. Hist. of Boston. p. 547

Scotland and Ireland, unless one should reckon the small craft such as herring boats."[1] New England yearly exported more than ten million pounds of cured fish--outdoing the mother country in both quality and quantity, while Boston alone shipped annually 50,000 quintals[2] of codfish to foreign parts, three-quarters of which went to the Biscayan port of Bilboa. The Yankee boats were familiar sights in the harbors of Bilboa, Calais, Lisbon, Oporto, Madeira, Jamaica, and the Barbadoes where the exchange in wines, sugar and molasses was notoriously profitable. In 1699 codfish had sold on shore for 18sh. a quintal, but the following year the price had dropped to 12sh. because of the glutting of the markets by the French from the Maritime Provinces. (Antagonisms continued from this source until the ratification of the treaty following the Second French and Indian War in 1713) When the returns were made direct from Bilboa to Boston the merchants reckoned on a 50% return on their money; but if, instead, their receipts were invested for them in London in Colonial supplies, the profit was 100%.

The surplus and second grade fish supplied the West Indies market. As one writer expresses it: "As their salt, rum, molasses, provisions and utensils were purchased from the refuse fish unfit for European markets, and from fish oil, the said rum may be said to be all gained out of the sea."[3] 'Twas the beneficence of the sea which established the fame and fortune of many a Bostonian aristocrat. The colorful career of Peter Fanueil is typical: at Canso in

1. McFarland: N.E.Fisheries, p. 76
2. 1 quintal equals 112 pounds
3. Anderson, Origin of Commerce, II p. 172

the center of the fishing area on the eastern extremity of Nova Scotia, he established an agency which he kept accurately notified of market conditions and prices in Boston, and from whence he frequently ordered a shipment direct to the West Indies. The exchange might include a "straight negro lad, fifteen years old, having small-pox if possible," or perhaps, if the load of fish went to London, it might be returned in pepper.[1] Whether for rum, leather, negros, or pepper, the important fact is that fish not only entered every phase of life and form of industry, but that it was the basis of these industries--the ever-present article of trade with the West Indies, Africa and Europe.

Artificial stimuli continued to maintain the industry through good years and bad and compensate the men for resisting the adventurous impulse either toward the unsettled West or the factories of the East. To counteract these influences a unique public subscription for the encouragement of the codfishery was resorted to in Boston in 1753. The money was distributed as prizes to the crew returning the most fish in a season. The first three prizes were respectively $60, $50, and $40, with the remainder divided among the rest of the fleet.[2] At this time and up to 1775 the vessels averaged about forty tons, and had a crew of seven men. At the outbreak of the Revolution there were between nine and ten thousand men in New England engaged in the cod fishery alone, whose estimated annual value was $1,300,000, with all other fisheries valued at $500,000. In 1774 when the port of Boston was closed, the citizens

1. Weeden, II p. 614-15

2. Boston Evening Post, Feb. 18, 1754

of Marblehead graciously offered the facilities of their port to the fishermen and merchants of Boston.

The Revolution was the first great setback in the fishing industry of the Massachusetts colony, though there had been several lesser periods of depression caused by controversies with the French and English over rights on the fishing grounds, fluctuations in the catch, or in the foreign market. The Revolution, however, meant the complete suspension of the trade. Pursued by British men-of-war the doughty schooners fled for refuge in native harbors, laid by their lines, tubs and sounding leads, and re-equipped with cutlass and swivel set forth on the adventurous career of privateering. For its potential service in time of war the fishing fleet won new prestige--and future subsidies. In the War of Independence, however, the valor and heroism of fishermen were equally conspicuous at Bunker Hill and Trenton. The toll at Gloucester alone amounted to one third of its population of nine hundred. By the treaty of 1783 the renowned "Adams Diplomacy" secured for the states liberty on all coasts of the British in America equally with the British. The third article of the peace treaty was the fulfilment of the slogan, "Fisheries or no peace!"

To compensate for wartime losses of boats, equipment and money, the Federal Government continued its relief program. In 1789 Congress, through the influence of Elbridge Gerry of Marblehead, and Benjamin Goodhue of Salem, granted a bounty of five cents on every quintal of dried codfish or barrel of pickled fish exported.[1] Two years later the

1.S. E. Morison: Maritime Hist. of Mass. p. 135 et seq.

General Court of Massachusetts begged for additional protection. Senator George Cabot put through an act of February 9, 1792 granting a bounty of from $1 to $2.50 per ton (depending on the size) to codfish vessels engaged four months per year, three eighths of which went to the owner, the remainder divided among the crew.

Though the recovery of the smaller towns was slow--many never regaining their former prestige as fishing centers, Boston rapidly recovered its place as the center of commercial fishing. Business generally looked up again. The fishing boats once more were free to ply the "Bay" (of Chaleur) and the Labrador shore. "On Sundays New England fishermen swarmed like flies on the shore of the Gulf of St. Lawrence," said a British observer whose report was largely responsible for his government's efforts to restrict these grounds in the negotiations at Ghent.[1] Tonnage in Massachusetts (including Maine) increased from 10,000 pounds in 1790 to 62,000 pounds in 1807 when Jefferson's embargo brought another check. By 1808 three quarters of the dried fish exported from Massachusetts came from the "Bay" and Labrador coast; less than one quarter from the Grand Banks which required larger vessels with more expensive outfits. The fishing on the Grand Banks of Newfoundland was renewed in the fragments of the pre-Revolutionary fleet--the old fashioned barrel-bottomed schooners of seventy tons and less called "heel-toppers" because of the low waists and high quarter-decks. There were no improvements in the models until after 1815. These "bankers" made two or three trips

1. At the end of the War of 1812.

a year, and though they were priveleged to dry their fish on "any of the unsettled bays, harbors and creeks of Nova Scotia, the Magdalen Islands and Labrador,"[1] actually the greater part was done on the sands or ledges of the home port. From the post war period Boston emerged the chief mart for the sale of dried and fresh fish, and a resort for fishermen of all classes for outfits and equipment--the incarnation, as it were, of the ideal of the Reverend Mr. Peter.

After the War of 1812 the cod fisheries began to lose the uncontested leading role, though they still fed the West Indies, the Mediterranean, and the natives. Both cod and mackerel industries felt the effects of the treaty of 1818[2] by which Canadian and Provincial authorities undertook to withdraw the ancient access to Labrador and the Bay of Chaleur.[3] At this period fishing was revised on Georges Bank, one hundred miles east of Cape Cod. For generations fishermen had visited these dangerous ocean shoals, not daring to anchor for fear of being "drored under" by the tide. When Captain Samuel Wonson proved that a boat could anchor in safety, winter fishing there became the chief source of supply of the fresh fish business. The last important Government bounty inaugurated in 1819 gave to citizen boat owners who worked at least four months a year $3.50 a ton for catches between five and thirty tons, $4 for more than thirty tons, with $360 the maximum per boat per year.

1. Article III Treaty of Peace
2. Convention of 1818 held at Halifax to settle fishery disputes between British and Americans; unfavorable to latter.
3. Treaty of 1818 revised in the Reciprocity Treaty of 1854

It remained in force until the repeal of all bounties in 1866.

The trade in fresh fish received new stimulus when, in 1837, some smart Yankee combined ice, fresh fish, and the railroads. Fish were brought alive in salt water wells in the holds of the boats to Boston, then dressed, iced, and shipped inland. As early as 1843-4 one Boston firm was sending almost a half a million pounds of fresh cod, haddock and halibut to New York, Albany and Philadelphia. When the railroad line was extended to Gloucester in 1846, that town began to compete seriously with Boston. A few years later the Georges bankers began to carry ice in which to pack the fish at sea. This so enhanced the market value of fresh fish that haddock, halibut, and mackerel soon rivaled the cod.

The decade from 1850-60 marks an end of an era in the Massachusetts fisheries. During this period developed dory hand lining and trawling for cod; purse-seining for mackerel, and the perfection of the clipper fishing schooner. The Canadian Reciprocity Treaty in 1854 once more restored access to the "Bay" fisheries, and permitted free importation of Newfoundland herring for bait. It marks as well the last and final decline of maritime activity in the villages of Cape Cod. Their traditional conservatism opposed the adoption of new methods; and, lack of investing capital with which to establish them, together with poor transportation facilities, gave the profits to Boston wholesalers. Simultaneously with the end of the Civil War came the expansion of deep sea fishing; the rise of the mackerel fishery; the beginnings in the oyster, herring and menhaden industries.

By 1884 the Boston business had outgrown the accommodations of Commercial Wharf which had long been the center of the trade, and a union of dealers leased the entire property at T Wharf, an extension of Long Wharf (so called because of its physical likemess to the letter T, but having no connection with the famous party). The new wharf, sometimes called "Fish Wharf" became one of the city's most famous and important landmarks. From early morning it was a whirl of action, with often as many as forty boats unloading at once in picturesque confusion. All manner of boat from dory to costly yacht crowded in from the banks--from Le Have, Quereau, Cape Shore, Brownes, Cashes, Middle, Jeffrey's Ledge, or the nearby shore. The average catch of in-shore boats ranged from 7,000 to 11,000 pounds each, while the off-shore boats frequently landed 175,000 pounds from a single trip.[1]

Though
/The law prohibited selling until the captain "tied up;" at 7 a.m. when the dock bell rang, a medley of Yankee, Irish, Scotch, Swedish, Italian and Portugese voices were already calling excitedly to the captains on the boats, "How many pounds of cod have you, Captain? How many herring?"--and so on inquiring about cusk, haddock, hake, pollock and halibut. Then, the bidding commenced: "I'll give 4¢, 4½, 5" and so till the captain accepted. Despite the bewildering uproar both captains and dealers were shrewd, sure bargainers. As soon as the bargain was struck twenty to thirty men began bailing out each boat by pitch-forking the fish into great baskets which moved on pullies to the platform where they were

1. The World Today, March 1906. Vol 10. p. 581

received by weighing boxes of 500 pound capacity. Other men with forks filled two-wheeled hand carts holding just 100 pounds, which they wheeled to the near-by fish markets of the city. The captain himself paid the men on a share basis--a division of the profits after deducting expenses for provisions, bait, ice, a 10% commission for the captain, besides the wharfinger's bill on the basis of 30¢ per 1,000 pounds landed. When the accounts were settled the boats were washed, hand trawls rebaited, and the boat sailed off again before sun-down. The boats, though sometimes owned by the captain, were more frequently the property of a syndicate of business men or dealers. Besides the customary ten dories, the larger boats carried a crew of twenty-three men; twenty to fish, a spare man, a cook, and captain.

The days of T Wharf are still affectionately remembered as the "great days" by the old salts who, with feelings of real emotion and regret, heard for the last time the familiar dock bell summonsing them to follow in oilskins and boots the procession to more commodious quarters on the New Fish Pier. The official curtain had fallen on T Wharf, but still there loiter there a few Italian and Portuguese fishermen, not yet in step with the times.

The phenomenal and unparalleled development of the fishing business in the present century will be discussed in a later section of this paper.

PART II. THE DEEP-SEA FISHERY.

While the Boston market deals in almost every form of fresh fish ~~fresh fish~~ from the North Atlantic, the basic, fundamental species supporting this market are few in number. From the earliest explorations of Massachusetts Bay the supremacy of

the "sacred cod" has been acknowledged in diverse ways. History early threw a halo about its name, for was it not the cod which fed the impoverished settlers, and started foreign trade? "It is the only great staple which the country produceth for forraine parts, and is so benefitiall for making returns," writes the colonist, that profits pouring back to New England founded the "cod-fish aristocracy" whose splendor and lavishness rivaled the proudest households of England.[1] Impressive country seats with their rich entertainment of feast and pagentry; recreations at country inn and ballroom, trout-fishing and yachting kept early American society from the rut of monotony. The latest London fashions adorned the colonial ladies as they entertained graciously in the stately mansions of Salem, Marblehead, and Boston. Though their walls hung with portraits by Simbert, Blackburn and Copley, and their sons went to Harvard College, they were not ashamed of the source of their blessings. The Hon. Benjamin Pickman placed a half model of a codfish on every front stair end in his Salem mansion.[2] To this day various state seals, stamps, and even a recent automobile plate attest the same loyalty. The historian says, "The Revolution witnessed a struggle in diplomacy in which the codfish was the central figure. Our War of Independence upon the sea was won by cod fishermen from the capes and banks.....The cod, symbol of commerce, diplomacy, war; of victories won in all three fields."[3] Perhaps it was recognition of these facts that prompted the graceful tribute of John Rowe, a celebrated Boston merchant, who, on March 17, 1784 arose in the Representatives' Hall of the Old

1. S. E. Morison. p. 14 et seq.
2. S. E. Morison. p. 25
3. R. McFarland p. 277

State House offering a motion "that leave might be given to hang up the representation of the codfish in the room where the House sit, as a memorial to the importance of the cod-fishery to the welfare of the Commonwealth as had been usual formerly."[1] Leave was granted. Some years later the same wooden emblem presented by the genial "Johnny Rowe" wrapped in an American flag and deposited on a bier, was ceremoniously borne by members of the House in the procession of the Great and General Court to Beacon Hill, where it still faces the Speaker's desk---"a memorial of the Pilgrim, his privations and simplicity; an emblem significant of the hardiness, courage and faith of those who dare and defy the seas, and daily telling of the great and surpassing glories of Massachusetts and her sons."

The firm-fleshed cod of Massachusetts, besides being in demand as a fresh food, was unsurpassed for salting and drying. It was classified in three grades in the Boston market: (1) Dun fish, best "made" by alternating burying and drying the large cod till it mellowed sufficiently for the taste of Europe, finding its best market in Portugal, Spain, Southern France, and the "Western and Wine" Islands where it was exchanged for Cadiz salt, Canary wine, Bilboa iron, and Malaga grapes. (2) "Middling grade" of dried fish which was easy to transport, keep, and prepare. It was the principal winter diet of the colonial farmer. (3) Lowest grade of codfish, which together with bass and alewives were the principal medium in the West Indies trade--"La bas, où les Antilles blues
Se pâment sous l'ardeur de l'astre occidental."

1. S. E. Morison. p. 134

The method of catching cod and other ground fish by hand-line from the vessel continued to a limited extent down to 1860. By 1880 the method had practically given way to the use of dories. The process of trawl fishing from dories has changed but little during the years. By this method two men are sent out from the anchored vessel in each dory, bearing six tubs of trawls to be set. A tub of trawls consists of 60 lines, each with 50 hooks; in other words equipped with 18,000 hooks. A more efficient trawl is the so-called "otter trawl" which is a large claw-like net dragged along the floor of the ocean entrapping fish in large quantities without the use of hand labor. The increased cost of equipment and maintenance, however, is proportional to the increased efficiency. The trawlers are the best class of fishing vessels known to the waters of the coast. A modern "banker" of average tonnage costs about $150,000. Such a vessel manned by a crew of twelve men and making nine trips to the Banks, being at sea 302 days must support an expense account estimated, as follows:

Trawl gear	$1,023.
Vessel expense	1,824.
Provisions	1,426.
Gen. charges, ice bait, etc.	1,135.
	$5,408

But the man who ventures a trip on a trawler finds little romance and frequently meagre recompense in the "apostles' calling." Life on the banks is a continuous round of drudgery, braving storm and sea to set the trawls, remove the fish, rebait and reset the lines, and then clean and pack the day's catch.[1]

1. See schedule p. 19 from Bureau of Fisheries publication #961

LANDING BY FISHING VESSELS AT PRINCIPAL NEW ENGLAND PORTS[1]
January 1932.

	Boats	Trips	Days Abs	Cod Large	Cod Medium	Cod Small	Haddock Large	Haddock Small
Line Trawls								
Sable Is.	1	1	7	4,990	9,700		22800	
Cape Shore	16	6	76	36,800	78,300		141800	
Le Have	10	13	129	114,100	182,315		375180	
Browns	30	53	529	452,980	669,960		1500845	4800
Georges	1	1	11	3,200	1,485		14700	45100
So. Channel	4	4	28	19,200	10,040		64470	290
Highland Lt	1	1	5	2,800	1,000		1900	--
Chatham	2	2	15	1,875	1,650		11800	900
Cashes	4	4	21	11,960	10,760		21580	300
Pippenies	5	6	35	14,605	6,775	500	30650	425
Jeffreys	13	40	110	32,129	24,960	--	142385	4060
Tillies	2	2	6	530	350	1250	8850	150
Middle	7	9	36	5,250	3,775	--	34250	2375
Shore	14	24	81	30,241	20,725	1800	71530	1615
	164	166	1089	730,660	1021,795	3550	2442740	60015
Otter Trawl Large								
Sable Is.	7	8	10	42,870	105,670	--	284320	74950
Le Have	10	12	147	147,140	208,360	9130	377920	73890
Browns	6	6	71	192,110	59,765	3470	161580	57980
Georges	31	50	549	439,250	363,435	10760	1303345	971649
So. Channel	7	10	84	86,045	31,300	2100	260250	109300
Nantucket	1	1	7	600	200	--	39000	16400
	44	87	958	908,115	768,730	25460	2426415	1304169
Otter Trawl Medium								
Le Have	3	3	30	7,775	4,520	--	44950	12000
Browns	10	10	89	81,500	39,975	--	191000	36250
Georges	32	52	449	104,140	110,320	15500	498835	426880
So. Channel	8	10	92	13,610	19,665		139400	70875
Highland Lt	1	1	8	185	100		2000	2400
Chatham	2	2	13	2,850	6,850		16250	5375
Nantucket	11	14	120	9,365	20,570		235745	172580
Shore	10	35	97	3,630	1,040		13715	3890
	48	127	898	223,055	203,040	15500	1141895	730250
Otter Trawl Small								
Georges	2	5	32	2,270	6,125	--	42300	18350
Shore	19	67	164	5,180	3,010	325	23850	1985
	21	72	196	7,450	9,135	325	66150	20335

The cod-fishery reached its greatest development in the mid nineteenth century, leading all others until after the Civil War, and attaining the climax in 1859 when the figures for Massachusetts show 2,593 vessels in the field, with a ton-

1.Boston, Gloucester and Portland

nage of 129,637 tons, manned by 18,151 men. The annual compensation to fishermen from Cape Cod is estimated at $62.31
together with a government allowance of:..... 14.58
making a total of..... $76.89.
Additional profits from employment on the waterfront in curing, drying, salting, etc. should not be overlooked in any estimate of wages.[1]

In more recent history there arises consideration for other fish. The oyster fishery is a leader today in economic importance, even though it is doomed never to possess the interest that attaches to the cod-fishery. Lobsters and salmon are also important branches of the fisheries of the Twentieth Century. Although the cod has not entirely lost its place, we associate with it today the other ground fish of its kind: hake, haddock, cusk, pollock and halibut.

CATCH OF PRINCIPAL SPECIES OF GROUND FISH IN NEW ENGLAND[2]
Thousands of Pounds

	Cod	Haddock	Halibut	Flounder
1889	97,146	43,474	10,741	2,951
1898	89,208	45,676	10,828	4,109
1902	88,255	47,077	12,366	4,809
1905	75,065	76,617	3,018	5,761
1908	95,284	59,544	4,354	9,753
1919	84,918	89,406	1,960	15,541
1924	89,218	93,519	4,501	30,855

The process of curing cod, haddock, hake, pollock, and cusk is essentially the same as was practiced a century ago. As soon as the dories return to the vessels the dressing of the fish is begun. The usual gang aboard a Grand Banker consists of a "throater," a "gutter" and a "splitter." The first

1. McFarland. p. 170

2. C. E. Artman: Industrial Structure of N. E. p. 78

named person cuts the fish across the throat below the gills, slits open the abdominal walls, and cuts off the fishes' heads. The "gutter" removes the organs that are contained within the abdominal walls, the livers being thrown into a barrel to be saved for their oil, with the other parts being cast overboard. The fish then passes to the splitter who, with a knife that is rounded at the end, cuts along each side of the backbone from the ventral side towards the back and removes the bone. The fish are then thrown into tubs of salt water and thoroughly washed.

The salting of fish may be accomplished in either of two ways; namely, by the kench cure, or the pickle cure. In the former process the fish are thoroughly salted and placed in regular piles on top of each other, called "kenches." In this way the pickle that is formed can drain off freely. Pickle-cured fish are salted and then placed in large tubs or "butts" where the pickle is retained. The kench cured fish makes a drier product best suited for southern markets. Generally the fish are salted in kenches aboard vessels, and in butts on shore. Or, if the fish is to be sold fresh, it is sorted, as follows: large cod, over 22 inches
medium, between 16 and 22 inches
snappers, below 16 inches, cut and split on board
and packed between layers of ice in barrels which are stored in refrigerated rooms in the hold.

In recent years the decline in the cod-fishery has been more than offset by a corresponding increase in the haddock fishery.[1] The reasons are: first, the greater abundance of haddock, and second, an increased demand for haddock fillets. The relative importance of these two species are shown by the following statistics:

1. See chart p. 20

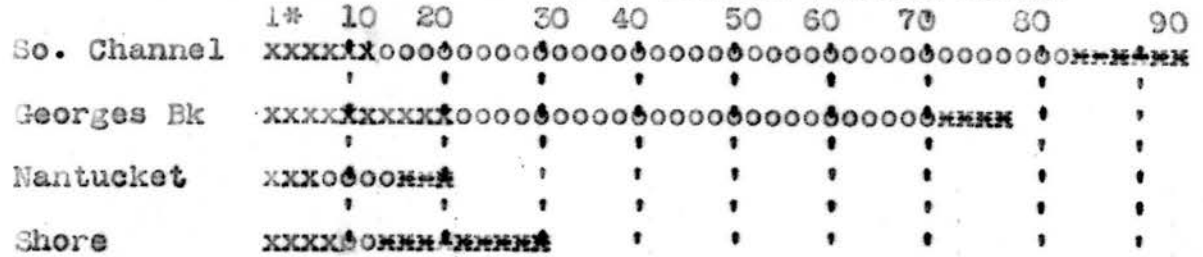
FISH LANDED AT BOSTON, WITH VALUES

	1931		1930	
	Pounds	Value	Pounds	Value
Cod, fresh				
Large	23,932,629	$794,081	24,068,140	993,288
Medium	25,730,600	620,059	28,211,846	690,620
Small	244,345	3,882	119,505	2,776
Cod, salted				
Large	12,690	440	--	--
Haddock, fr				
Large	106,023,345	3,819,572	159,276,930	5,838,526
Small	14,358,395	261,610	7,821,344	156,169
Hake, fresh				
Large	5,860,915	142,802	12,614,249	336,873
Small	43,420	1,144	81,375	1,534
Pollock	5,027,987	83,717	4,671,009	106,912
Cusk	3,447,091	68,290	3,411,741	90,134
Halibut	2,309,826	341,734	2,510,353	432,238
Mackerel				
Fresh	19,855,052	889,633	23,627,679	870,821
Salted	3,000	120	44,700	1,915
Flounder	9,493,487	420,205	13,095,404	596,412
Swordfish	1,526,342	399,629	3,078,274	666,922
Herring	5,700	142	--	--
Other	2,165,179	59,434	2,614,929	85,446
Total Fresh	219,929,313	$7,905,934	285,212,778	10,868,671
Salted	15,690	560	44,700	1,915
	219,945,003	$7,906,494	285,257,478	10,870,586

	Boats	Trips	Days Abs	Cod* Large	Medium	Small	Haddock* Large	Small
Sable Is.	8	9	107	47,860	115,370	--	307120	74950
Cape Shore	6	6	76	36,800	78,300	--	141800	--
Le Have	23	28	306	269,015	395,195	9130	798050	85890
Browns	46	69	689	726,590	769,700	3470	1853425	99030
Georges	66	108	1041	548,860	481,365	26260	1859180	1461979
So. Channel	19	24	204	118,855	61,005	2100	464120	180465
Highland Lt	2	2	13	2,985	1,100	--	3900	2400
Chatham	4	4	28	4,725	8,500	--	28050	6275
Nantucket	12	15	127	9,965	20,770	--	274745	188980
Cashes	4	4	21	11,960	10,760	500	21580	300
Pippenies	5	6	35	14,605	6,775	--	30650	425
Jeffreys	15	60	130	42,384	28,493	1250	153743	4060
Tillies	2	2	6	530	350	--	8850	150
Middle	7	9	36	5,250	3,775	--	34250	2375
Shore	62	311	527	194,281	34,036	2125	149064	7490
	194	657	3346	2034,665	2015,494	44835	6128527	2114769

*Landed at Boston, January 1932 (Figures published in Bureau of Fisheries Document #961)

RELATIVE PRODUCTIVENESS OF VARIOUS FISHING AREAS [2]



* Millions of Pounds
x Cod
o Haddock
ж Other

The mackerel fishery began to assume a place of importance before the end of the nineteenth century.

COD AND MACKEREL FISHERIES OF MASSACHUSETTS
1837-1865 [1]
LANDED AT BOSTON

	Boats	Value Cod	Mackerel	Hands Employed
1837	241	$488,010	$478,407	2,572
1855	109	4,500	331,364	1,264
1865	58	159,900	241,482	471

Unlike ground fish the mackerel swims near the surface of the water within sight of the boats. It is the mysterious fish of the sea whose habits have been closely and scientifically studied, without, however, ever really determining its wintry haunts. Fishermen for generations have pursued its yearly migrations from the Virginia coast in spring to the coasts of Nova Scotia late in the fall. Many devices for its capture have been invented, from the fish pole, the gaff and jig of earlier times to the wholesale methods of nets and seines. Ice houses now take the place of well-boats, while the speed of mackerel schooners has been effectively increased by sharpening and deepening the hull by introducing motor power, and more

1. S. E. Morison p. 375
2. Over the period of years from 1893-1928. Compiled by U. S. Bureau of Fisheries, reprinted in C.E.Artman: Industrial Structure of N. E.

recently the Diesel engine. The fishermen may depend only on the mackerel's swimming near the surface of the water, but there are a thousand other irregularities beyond understanding. Mackerel may appear in small detached schools, which will repay the fishermen with a few barrels and little profit; or perhaps in an immense school too large for a 1,200 foot seine to encompass. Many instances are on record of a single school extending for miles in length and breadth over the surface of the ocean. These fish are very sensitive to manoeuvres to catch them, and when they are lean and wild in the spring it is extremely difficult, if not impossible, for fishermen to take them. Though the amount of mackerel in the sea is beyond calculation, the season's catch may be only 10,000 barrels. But, constant hope of reward keeps the skillful seiner at his post. In a successful season the captain and crew make good wages, and the vessel owners may have a share large enough to pay for the first cost of the vessel.

When considered from its economic standpoint the mackerel fishery since the Civil War may be separated into two periods. The first twenty years were years of continued prosperity. Beginning with the year 1886 and continuing to the present, the mackerel fishery shows a remarkable and inexplicable decadence. In a single year the New England catch dropped from 329,943bbls. in 1885 to 79,998bbls. in 1886, less than one quarter of its previous volume,[1] and has never risen to any respectable semblance of its former proportion. Indications are that the New England mackerel fishery will be continued

1. Salt mackerel. Figures compiled by the Boston Fish Bureau; reprinted in Appendix R. McFarland p 369

in its present field, that is, the largest quantity of fish will be expected to be taken during the southern spring fishery along the cape shore, about Block Island, on Georges Bank and in the Gulf of Maine. Massachusetts is the principal state in the union to engage in the mackerel fishery.

In no fishery have modern methods and equipment been further advanced than in the mackerel fishery. The day is far distant when the bait was floated on the surface of the water to attract schools skimming the surface by moonlight. Today at the pilot's cry "School o' fish!" a huge and powerful net is lowered into the water at one end, while fishermen in a small dory row out encircling the school and gradually lowering the remainder of the net which is kept afloat by buoys at periodic intervals. At the proper time the seine is "pursed up" by drawing in the rope along the lower edge. The fish are thus entrapped, unhurt until they are bailed into the vessel by "dip" nets which are hoisted aboard by means of tackle blocks. Two of the crew dump the net as it comes over the rail, emptying about a barrelful of fish on deck as the net is thrust back into the water for another load. When all the fish have been taken out the dressing begins. If the mackerel are to be carried to market fresh the process is simple. Ice is hoisted on deck and crushed, to be packed between the layers of fish in barrels.

The salting of mackerel aboard ship requires more work and more handling of the fish. They must be split and cleaned and cast into barrels filled with water where they are allowed to soak ten or twelve hours. When removed they are thoroughly salted and carefully packed into barrels. After allowing one

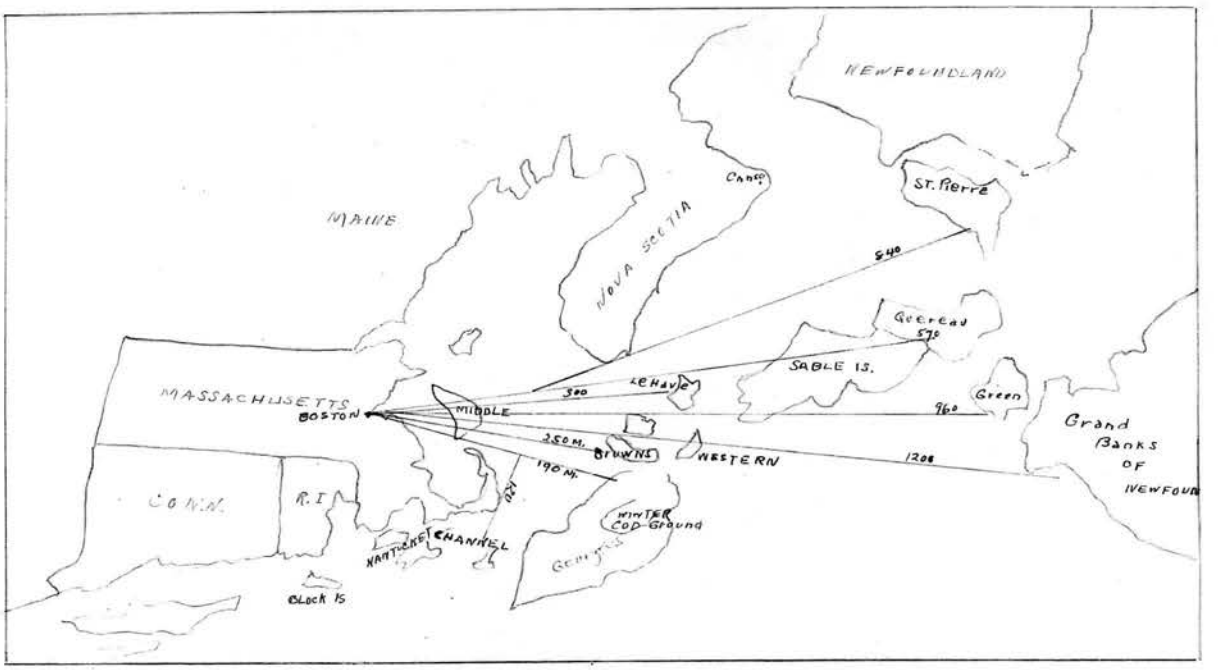
or two days for contraction to the normal size of pickled mackerel, salt brine is poured on, and the barrel is headed and stowed away in the hold.

To withstand the severe strain of work, weather, and speed the successful mackerel schooner requires the best possible equipment, and probably the world furnishes no fleet of vessels comparable to the New England mackerel fleet in staunchness, sailing qualities, and general appearance. On the best schooners the captain has his own stateroom finished in oak and furnished with a berth, a leather-covered couch, clothes closet, medicine chest, and locker. The crew is bountifully provided for. Each man has a berth, attractive, roomy, and well ventilated. Closets are furnished for drying wet clothes. The cook, the second best man aboard the schooner, has a culinary department and larder generously supplied.

The capture of swordfish, bluefish, and shell fish, though interesting and of importance, is not looked upon as possessing the same significance in the Boston market as that of the cod, haddock and mackerel, and so is not discussed in this section.

PART III. THE INDUSTRY IN BOSTON

The rise of Boston to a preeminent place in the wholesale trade of fresh deep sea fish was the inevitable result of many factors. In the first place, it lies in the region of the richest world fisheries above the fortieth parallel of North Latitude. The gently sloping sea bottom gives shallow waters far out--mostly 60 fathoms or 360 feet deep--which is decidedly advantageous. Twenty banks from 40 to 3,600 miles distant afford 63,000 square miles of fishing ground.



Though the fishermen use widely scattered areas from the Grand Banks to the southern banks of Virginia, the greater part of the catch comes from Georges, South Channel, Browns, Middle, Cashes and Western Banks within 200 miles from port. The harbor facilities make Boston a convenient and easily accessible haven, with ample provision for the entire fleet of 199 vessels.[2] It is the port of call for most of the larger vessels from the smaller cape towns, open to all boats without discrimination.

The availability of boat supplies and facilities for repair of damaged parts is a great convenience to fishermen. The street flanking the Fish Pier, parallel to the water front is lined with stores selling equipment of all kinds:-salt, nets, twines, barrels, paint, packing cases, lines, trawls, oilskins, cordage, rubber clothing, shipping containers, cans, etc. Much of the best gear is imported from The Great Grimsby Coal, Salt & Tanning Co., Ltd. of Grimsby, England, whose nets, said

2. Boston Transcript. June 8, 1932

to be the finest in the world, cost as much as $400 a piece. Since they are easily torn and rot quickly from exposure to sun or salt water, the United States Bureau of Fisheries, after careful study of the problem, has recommended that the nets be dipped in special chemical baths as a preservative precaution.

The oil used in the Diesel engines in the fishing boats alone makes Boston one of the country's largest consumers of fuel oil.

The proximity of Boston to large shipbuilding centers is another point in its favor, for the boats may easily put in for overhauling to the Fore River, Quincy, and Essex shipyards with a minimum of delay.

The concentration of financial interests of Massachusetts in Boston--and the consequent availability of capital for investment in fishing enterprises as well as others--has practically doomed the smaller towns of Cape Cod where local capital is inadequate for modern requirements.

The really significant reasons for the concentration of New England fishing in this city, however, are the presence of a market for the product and adequate transportation facilities to serve it. Since Boston and Gloucester were connected by railroad virtually all the Gloucester fresh fish has been reshipped and sold through the Boston market.[1] The New England section itself is the largest single consumer of Boston fish, with many of the larger cities being but a few hours distance by rail or motor truck. Large refrigerator trucks of the American Express Company carry most of the fish overland. New

1. See table p. 29

LANDINGS OF FISH BY FISH VESSELS 1893-1931
In Thousands of Pounds 1

	BOSTON		GLOUCESTER		PORTLAND		TOTAL	
	Fresh	Salted	Fresh	Salted	Fresh	Salted	Fresh	Salted
1893	66,518	1,077	29,479	45,323			95,996	46,400
1894	86,129	1,336	34,990	44,662			121,119	45,998
1895	73,612	196	26,065	50,567			99,677	50,763
1896	61,820	1,256	21,925	45,673			83,745	46,929
1897	62,704	200	32,960	31,002	Not		95,664	31,201
1898	53,494	1,186	54,387	34,337	Available		107,880	35,523
1899	63,450	1,274	63,824	48,226			127,274	49,500
1900	63,648	3,173	43,536	51,826			107,183	55,036
1901	56,855	2,137	39,584	52,589			96,439	54,726
1902	77,609	1,365	39,615	49,366			117,223	50,731
1903	78,383	1,883	33,059	44,167			111,442	46,050
1904	81,183	911	44,588	44,484			125,771	45,395
1905	101,085	222	68,451	35,131			169,535	35,352
1906	89,610	83	46,907	33,801			136,517	33,884
1907	87,717	394	64,057	39,403			151,775	39,797
1908	94,713	947	49,883	35,923			144,596	36,869
1909	92,085	491	32,546	47,980			124,631	48,471
1910	102,059	31	35,983	43,661			138,043	43,692
1911	93,629	131	51,236	40,158			144,865	40,289
1912	100,157	143	51,264	31,140			151,421	31,283
1913	92,203	149	41,768	28,098			133,970	28,247
1914	92,231	113	49,344	20,901			141,575	21,014
1915	97,397	502	49,678	24,018			147,075	24,520
1916	98,255	76	46,515	20,165	20,551	261	165,321	20,503
1917	98,155	496	40,062	18,073	18,566	79	156,783	18,647
1918	109,227	249	62,002	12,173	21,795	55	193,024	12,477
1919	103,209	183	61,622	9,749	21,713	6	186,544	9,938
1920	118,302	257	39,113	7,627	12,752	229	170,167	8,114
1921	104,277	91	26,747	6,270	13,235	246	144,256	6,607
1922	106,032	158	30,396	7,356	15,762	172	152,190	7,686
1923	123,982	253	29,012	6,018	15,221	475	168,216	6,746
1924	130,631	335	29,263	6,583	15,927	209	175,822	7,127
1925	148,723	315	42,161	7,311	18,133	226	209,017	7,852
1926	167,061	257	49,222	5,679	15,964	244	232,247	6,180
1927	194,877	64	46,056	6,497	16,226	131	257,158	6,691
1928	218,353	34	39,407	2,497	17,536	154	275,297	2,685
1929	286,929	99	49,135	4,745	17,445	50	322,203	4,893
1930	285,212 *	44*	43,663	3,696	18,166	19	347,041	3,760
1931	219,929 *	15*						

* For Money Value see p. 22

1. p. 77 Artman: **Industrial Structure of N. E.**

York City is the next largest purchaser of fresh fish, and every night at 6 p.m. from 28 to 40 carloads leave the spur tracks at the Pier for the Fulton Fish Market. Philadelphia and Baltimore, similarly, are distant but one night's journey by rail, and consume large quantities of New England fish. In Detroit and Chicago, Boston fish meets competition from the fresh lake varieties, but it is nveretheless consumed in substantial amounts. The difficulties of maintaining a distant market for fresh fish are almost self-evident. In the first place the fish must be preserved in ice, which is inadequate as a preservative. Decomposition of fish is of two kinds: autolytic and bacterial. Autolytic decomposition is natural self destruction or digestion of tissues brought about by ferments stored during life within the tissues. When death comes, these ferments break down the tissues (the process known as "ripening" in meats and poultry). Bacterial decomposition or putrefaction results from the action of bacteria on the tissues. It gives rise to offensive and later to putrid odors. Both types of decomposition are retarded, but not arrested by ice temperature. There seems to be a widespread idea that fish are good up to a certain point, then become bad--a belief commonly evinced by the question: "How long will fish keep?" This is an erroneous conception. Fish begin, under ice, to undergo decomposition from the moment of death, gradually becoming less perfect in condition. When they are spoiled depends on how bad a fish the consumer is willing to eat. The public served with iced fish, rarely gets really good fresh fish. People who say they do not like fish perhaps

mean, rather, that they do not like the kind of fish they have been able to get--stale fish, or fish in a state of incipient putrefaction.

With fish, say, 40% edible and 60% mon-edible, this figures out somewhat as follows, for 100 pounds of fish:

Fish, round	100	lb.
Ice	100	"
Box	25	"
	225	" weight to deliver

40 pounds of edible fish substance. On this 225 pounds, express was paid at the highest perishable rate. On reaching market, if business was good, the consignee would accept the shipment, but if business was not so good the shipment would be refused as spoiled, and the express company would find itself the proud owner of a box of fish to be sold for any price it would bring. This practice did not, of course, increase the profits of the business or the popularity of fish.

When the fish were accepted they were sold through a fish store or stand in a public market, or peddled. The stands were frequently in buildings that could not be rented for a more desirable business, in out-of-the-way locations. The business is mostly on Fridays with overhead to be paid for the entire week. Left overs must be disposed of at a sacrifice on Saturdays or Mondays, or else are lost by spoilage. The fishmonger had to keep up by telegraph with rapidly fluctuating wholesale prices, take what he could get when he could get it, speculate from week to week on sales, deceive his customers as to both kind and quality of fish--all in order to stay in business. Because of the great irregularity of production, the retailer could never build up a steady repeat demand for a single product. If he received one week a supply of good

mackerel, and his customers liked it, next week prices might be high, or the quality poor, or the fish unobtainable. Further, because of the distance from the point of production, he had to anticipate demand a week in advance; if trade was poor because of weather or other local conditions, he might be stuck with a surplus; or, vice versa, have brisk demand and small, unsatisfactory stock. Advertising except of the most general sort was out of the question under such conditions. While the same difficulties are felt to some extent by all retail dealers in fresh fish, they are more pronounced as the distance from the market increases.

The most noteworthy physical feature of the fishing industry in Boston is its pier famous both for the volume of fish handled and its unique management. It was opened in the spring of 1914 to the dealers who for years had made history at the old T Wharf. For two days the ceremonies of house-warming continued while thousands came to inspect and admire the most commodious, modern, and scientifically equipped fish pier in the world.[1] Constructed of brick, stone, and concrete it is 1,200 ft. x 300 ft. with berthing space for 80 vessels. The pier, which was built by and is the property of the Commonwealth of Massachusetts, is leased for a period of one hundred years to the Boston Fishing Mart Corporation, which in turn lets the store space to dealers for ten year terms. Rents are fixed on a basis determined by the city and state taxes. The Mart derives additional profit from the renting of the standard wharf scales on which all fish sold at the Pier is weighed. The expenses of maintaining the scales in order are minized by services of the scales shop

1. Boston Post. March 29 and 31, 1914

which is responsible for the up-keep of these scales exclusively. Furthermore, for each 1,000 pounds of fish sold, 30¢ is collected by the Fishing Mart Corporation.

Housed in a separate building between the two flanks of the pier, and on the water's edge, is the Boston Fish Exchange, an organization modelled on the Stock Exchange. The Exchange, when established originally in 1908 brought about a revolutionary change and improvement in the method of marketing fish. In the old days bidding often started in a disorganized fashion before the captains could secure payment and start off again. At present all captains and dealers who wish to sell their fish at the pier must be members of the Exchange, and sell only through it. A nominal membership fee of $100 entitles the smallest dealer to join and share the priveleges of association.

Through its agency the catches, which are listed before the selling begins at 7 a.m., are sold openly at auction in a special room designed for the purpose. Payments are made to the Exchange, which in turn pays the captains. All settlements are in cash, and must be completed by 10 a.m. daily. For this service the Exchange deducts ½ of 1% commission from the selling price.

In an anteroom of the Exchange a blackboard chart like an antiquated railroad bulletin, posts the boats expected, time of arrival, port from which they sailed, and cargo. Additional information is furnished dealers in the daily mimeographed statements of actual arrivals of boats, quantity, kind, and value of the sales. This bulletin is suggestive of the periodic sheets distributed by the Boston News Bureau to banks and brokers. The most recent figures compiled from these

sources by the Bureau of Fisheries show the magnitude of the current business:-

LANDING BY FISHING VESSELS AT BOSTON, MASSACHUSETTS[1]

	January 1932		February 1932	
Cod	Pounds	Value	Pounds	Value
Large	1,812,800	$53,097	2,397,825	$90,181
Medium	1,963,185	48,450	1,419,820	43,138
Scrod	40,960	775	17,940	359
Haddock				
Large	5,885,565	283,511	9,165,780	335,958
Scrod	2,101,119	47,701	3,209,090	78,035
Hake				
Large	616,150	14,435	638,230	21,585
Small	800	11	--	--
Pollock	752,300	7,668	588,445	14,589
Cusk	500,070	8,519	263,160	6,717
Halibut	65,982	12,657	158,183	27,369
Flounder	708,113	37,507	595,766	37,063
Other	194,382	3,533	231,565	5,490
TOTAL	14,621,426	472,864	18,685,804	660,364
(1931)	16,449,890	688,271	19,180,475	793,063

	March 1932		April 1932	
Cod				
Large	3,352,945	$105,495	2,467,689	36,395
Medium	2,212,555	54,627	1,900,153	20,345
Scrod	28,075	396	salted 3,700	92
Haddock				
Large	7,563,825	294,547	11,676,315	187,317
Scrod	2,051,440	48,627	1,223,170	12,289
Hake				
Large	398,261	14,206	212,400	3,603
Small	800	32	1,000	40
Pollock	479,785	13,867	670,590	4,746
Cusk	124,670	3,173	157,970	1,646
Halibut	138,390	17,375	263,210	31,184
Flounder	521,847	30,551	559,325	16,919
Other	348,140	9,487	428,105	6,431
TOTAL	19,220,732	$592,383	19,552,627	$320,842
(1931)	25,772,140	$887,774	19,606,998	$438,496

The wholesale dealers buying fish on the Exchange are of various classes: (1) agents for large distributors working on a 5-7% commission basis; (2) owners of the boats; (3) large chain stores such as the A & P or The First National Stores; (4) hotel and restaurant supply companies. Each of these works

1. Figures available in the files of the Boston Chamber of Commerce

through its own particular channels. The distributors sell directly to retail dealers, and are responsible for the overland transportation. Fourteen carloads of fish are shipped from Boston six days a week by express, besides a considerable quantity by freight. Though travelling salesmen are frequently sent to inland sections, a perishable product like fish requires more immediate and direct contact. The telephone, therefore, is of the utmost importance. While it is characteristic of the trade that the retailer takes the responsibility of ordering, the fact that the telephone bill of one large Boston dealer averages $3,000 a month shows no lack of initiative on the part of the wholesaler. When prices drop too low in the open market to make a sale profitable, the boat owners frequently bid in their own fish, and hold it in cold storage awaiting a more favorable market. The chain stores buy in large quantities for their own consumption, and store the fish in their own storehouses until needed in the trade. Their strategic position as powerful low-cost purchasers is responsible for many of the present day dilemmas of the local retail fish dealer. The hotel and restaurant supply companies buy in smaller quantities, enough only to supply the current demand.

Though the fishing business, unlike so many others, is still open to individuals and partnerships of modest capital, nevertheless there is a tendency toward more elaborate and complex financial structure. O'Brien Bros. and O'Hara Bros. are rapidly developing Boston concerns, but the Bay State Fishing Company, with its fleet of twenty boats is the largest. Latest available figures show Total Liabilities of $1,651,000,

with a debt stock surplus of $1,622,000.[1] Some suggestion of the present depressed state of the industry is given in the company's statement for the year ended April 30, 1932, which shows a net loss of $137,565 after all charges and depreciation, compared with a net loss a year ago of $169,183. The Balance Sheet of the same date shows current assets of $453,159; current liabilities, $28,247; and working capital, $424,912. This compares with working capital of $445,332 on April 30, 1931.[1]

Price ranges in the stock during the two year period are, as follows:

1929	135-148
1930	25-115
1931	3- 12

Similar fluctuations in the stocks of the Atlantic Coast Fisheries Company of Groton, Connecticut, and the Gorton Pew Company of Gloucester, show that the present derangement is not purely local:

	Atlantic Coast	Gorton Pew
1929	20-90⅜	62½-70
1930	4-28½	58 -70
1931	1-8	35 -48

A more simple picture of the situation is shown in the accounts (called Settling Sheets) kept for specific trips of each boat. Copies of Settling Sheets of two successive trips of the same boat illustrate the ever present gamble in the trade. (See page 37) While these statements represent a typical proceedure, the method of determining compensation ratios differs with the companies, the type of boats, species of catch, and general condition of the business. Thus, some

1. Boston News Bureau. June 14, 1932

SETTLING SHEET OF BOAT BOSTON [1]

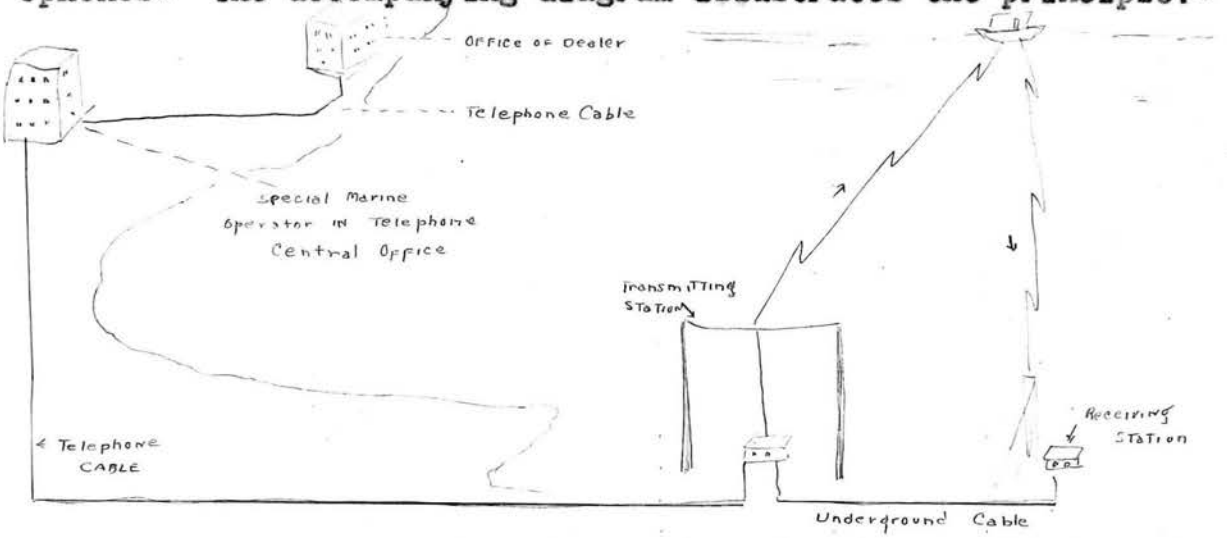
	#1 boat came in after 14 days 11/24/31		#2 boat came in after 8 days 12/3/31	
Gross sale of fish		$488.50		$2,004.75
Exchange discount	2.40		4.80	
Warfage	10.80		7.50	
Scales	3.00		5.00	
Total				
Net Stock from Exchange				
Wireless, operator, & V.C.Chg	130.00	146.24	95.00	112.30
(#1 25 75 30)				
(#2 25 40 30)				
Net stock for ship to take 50% of		341.26		1,892.45
Ship's 50%		170.63		946.22
Net stock for crew less exp.				
#2 P. Bal.			60.78	
Oil	244.55		140.85	
Ice	80.		80.	
Watch and lumper	7.50			
(#1 3 ice 4.50)				
(#2 3 39.50)			42.50	
Cook and Engineer	25.		25.	
Purser	5.		5.	
Provisions	104.36		134.38	
Water Coal	25.	491.41	25.	513.51
(#1 5 20)				
(#2 5 20)				
8 men @ 5		40.00		
Total Expenses		531.41		432.72
Balance (in debt)	360.78		432.72	
Shares per man				
#1 14 men	--			
#2 13 men			33.28	

companies work on a so-called "50-50 lay" (meaning that 50% of the profit goes to the company, 50% to the crew), others on a 40:60 ratio; dory trawlers sometimes take 25% to the boat, 75% to men less skipperage and outfits; swordfish boats 20% to the boat; mackerel crews usually get 50% less outfits, etc.

The most recent innovation in the equipment of the Boston fleet was the installation in June 1932 of the first marine telephone service on the trawler "Flow" of the Bay State Fish-

1. Name of boat fictitious; figures authentic--from the confidential files of a Boston company

ing Company. On the test trip telephone engineers sent and received messages covering both long and short distances from Seattle to Somerville with perfect success.[1] The telephone is made possible by adding a radio link to the chain of land telephones.[2] The accompanying diagram illustrates the principle:-



The two paths or "channels" shown between ship and shore are entirely separate so that those on one vessel cannot ordinarily listen to what is said on another. The voice coming from the shore, however, can be heard on all vessels, and the manager of a fishing company, may, if he desires, call all vessels of his fleet and talk to them at once. Those vessels not called can listen but hear only the voice from the shore and not the reply from the vessel. Secrecy when required for special communications can be arranged by use of code words. If so desired it is possible to carry on a conversation directly between boats, but the connection must be established by the operator on shore.

Reports of the catch may thus be made regularly by the boats to the home office; or, the captains may be called into port when the market is favorable, or advised to stay away

1. Boston Transcript. June 25, 1932. p. 1 Magazine Section
2. Fishing Gazette. May 1932 p. 9

anticipating a rising market. It is another avenue for reporting distress or trouble, or ordering replacement parts for disabled machinery to be available on the boat's arrival, thus saving valuable time heretofore wasted on shore. Distress signals can be transmitted direct to government agencies, so affording greater security to life and property at sea. It is believed to be only a question of time when all boats will find this service of such practical value that it will no longer be considered a luxury.

The most dynamic innovation in the fish industry in the twentieth century, as part of the propaganda to make fish a more popular food, was the introduction of the fresh fillet of cod and haddock. It was begun in a small way in Boston in 1921, and by 1928 there were 51 firms in New England engaged in the field.[1] Large amounts of capital from other sources entered the fish business, so hopeful were the early prospects of this idea which was to:

(1) Eliminate the purchase of waste parts
(2) Reduce the cost of shipping
(3) Market fish through regular grocery store channels
(4) Regulate the quality
(5) Develope a more easily advertized product
(6) Eliminate unpleasant appearance and handling

The fresh fillet business, however, from the start encountered the same serious difficulties as fish in the round, with an added disadvantage of increased cost to the consumer. Freezing was clearly the needed supplement to the fresh fillet. A treating process was developed which prevented both the loss of nutritive juices, unfavorable change in color, and the development of a "fishy" odor. Various competing processes have been perfected and are used by Boston dealers; most conspicuous of these are the Arctic, Tasty and Nordic brands of frozen

1. Artman. p. 86

haddock and cod fillets. The fish is wrapped in parchment paper and packaged by machine, eliminating the unsanitary methods of hand packing.

Assured now of a continuous year-round supply, the large companies campaigned for the western market. Aggressive sales talks and other forms of advertizing easily captured the middle west, beyond reach of the fresh fish and fresh fillet competition. Satisfactory shipments in silica gel cars have been made as far as San Antonio, Texas, Mexico, and the West Coast. As part of the program of popularizing sea foods, particularly in the goitre belt in the west, research laboratories have published convincing proof of the health-giving qualities of sea foods. Radio talks, pamphlets, and magazine articles have emphasized the vitamin and chemical value of fish by explaining in detail the reaction of rains seeping through the land for millions of years, dissolving the soluble substances as they gradually find their way to the ocean. This cycle has robbed the land of its chemicals, now stored in the sea--the soluble ones in water, the insoluble precipitates in ooze or mud on the bottom of the sea. Of the 92 chemical elements 39 are definitely known to occur in the ocean. All of the elements that are necessary for life are found in the sea:

x Aluminum
Argon
x Arsenic
Barium
- Boron
Bromine
Caesium
o Calcium
o Carbon
o Chlorine
+ Cobalt
+ Copper
x Fluorine
Gold
o Hydrogen
o Iodine
o Iron
Lead
Lithium
o Magnesium
o Manganese
x Nickel
o Nitrogen
o Oxygen
o Phosphorus
o Potassium
Radium
Rubidium
- Silicon
Silver
* Strontium
o Sulphur
* Vanadium
x Zinc

o Essential to life
+ Found in human body; probably necessary
x " " " " ; function, if any, unknown
• Present and probably necessary in plants
* Present and necessary in certain marine plants

Fixed nitrogen and phosphorus are among the most deficient chemical groups on land. It is estimated that the ocean deeps contain 250,000 million tons of nitrate-nitrogen and 75,000 million tons of phosphate phosphorus.[1] Since the ocean is throughout its extent almost uniform in composition, it follows that foods derived from the sea are a reservoir of all elements necessary for the human diet. In the light of recent medical research this fact acquires added significance. Formerly it was thought that about 11 elements were all that were needed in food. Several years ago it was proved that iodine, in small amount was essential. In the land areas deficient in iodine, goitre is endemic. Iodine exists throughout the oceans, and all sea foods so far analyzed contain adequate amounts to meet all dietetic needs. Recently it has been shown that copper is important in maintaining red corpuscles, and manganese aids in respiration. Cobalt is suspected as being concerned in insulin formation; and it is proved that fluorine is necessary for proper formation of teeth. Calcium or lime is now realized to be inadequate generally in our common foods and water; it occurs to about five times the extent in haddock and cod that it does in beef.

Not only do the chemical elements and energy content of sea foods compare favorably with all others, but the form and suitability are likewise highly favorable. Fishes are tender because, being of the same specific gravity as water,

1. Taylor. p. 3

and therefore being buoyed up, they do not need to support themselves. For this reason the tissues of fish are not tough, and are not bound together by strong sinews, skins and tendons. Being tender, they readily disintegrate, require little chewing and are readily attacked and digested by the juices of the human body. The fats of fish are all liquid at human body temperature, and for that reason are readily emulsified and digested. They contain in almost every case vitamins A and D (those found most abundantly in cod liver oil) The proteins of fish are known to contain all the essential groups, comparing favorably with the choicest protein foods such as poultry.

It is through the agency of the Massachusetts Fisheries Association, under the able direction of Mr. E. H. Cooley, that these scientific facts are popularized by educational advertising. He and other officials talk over radio station WBZ and WBZA, varying the subjects from quotations of physicians' endorsements of sea foods to descriptions of the habits and kind of fish and the best way to prepare them for the table. Demonstration cooking classes have been given through the cooperation of GoodHousekeeping, The Ladies Home Journal and the Boston Gas Company, with the Massachusetts Fisheries Association contributing a souvenir pamphlet of receipts. By these methods much has been done to break down the prejudice against fish, especially against frozen and canned fish. A growing feeling of "fish-for-health consciousness" may be seen in the recent popularity of the sea foods restaurants, of which Pieroni Bros., Kimballs, and Hugo's are most representative in and around Boston.

Co-equal with the theoretical research work in the fish industry has been that in the development of by-products. With the growing demand for fillets came the problem of finding some profitable disposition of the waste parts. In recent years the scientific solution has led to the beginning of several new and distinct enterprises. One immediately thinks of the utilization of cod heads in the manufacture of glue by the Le Page Company of East Boston. After the heads are washed continuously for twenty-four hours, they are slowly boiled under thirty-pound steam pressure for twenty-four hours, and then filtered. The remainder, known as "chum" is then used in making fish meal, a highly desirable feed for cattle and poultry. The chief ingredient of fish meal is the waste of haddock and cod after the fillets have been cut. (This amounts to 50% of the dressed weight) Menhaden waste, after the oil element has been extracted for soap, quick drying paint, and a substitute for linseed oil, is also used. This material crushed and boiled under vacuum at 100 degrees retains all the food elements, is 97% digestible, odorless, and will keep indefinitely. Five tons of raw fish, costing $5 a ton, make one ton of meal. Until 1931 the entire output of the Dehydrating Process Company, one of the largest Boston firms in the fish by-products business, sold its entire output in Hamburg, Germany. As the idea has become better known in this country, the farmers of the West, particularly in Pennsylvania, Ohio and Indiana, are now large purchasers, with a cooperative farmers' association in Buffalo being the largest single American purchaser.

The recent competition from Japanese poorer quality meal, selling at about $27 a ton in comparison to $40 for the higher

grade domestic quality is causing grave concern among the Boston companies. Last year 35,000 tons were imported at Boston. Agitation is on foot to have a protective tariff introduced to safe-guard the industry. The highest price received at Boston for the best quality meal was $92 per ton in 1929. Quality is determined by the oil content, the best "white" meal being from 2-8% moist, while the poorer grades of "brown" meal are sometimes 50% oil. When treated with a sulphuric acid preservative this meal may be used as fertilizer.

Increasing attention is being given to fish flour in the diet of children afflicted with bone diseases. One of the large hospitals in Washington is experimenting with it as a cure for rickets, mixing from 12½-15% fish flour with regular flour in highly seasoned foods like molasses cookies. This field is as yet too undeveloped to present definite prospects.

Fish skins, which were heretofore useless, are now sold in large quantities for $2 a barrel to the Russian Cement Company of Boston. Experiments have shown that there are qualities in the fish skins which give added durability and firmness to cement. Tests substituting fish skins for leather have been successful, particularly with small objects like card and cigarette cases, wallets, etc., but some use has also been found for them in the shoe business.

Fish frankforts, recently advertised in the newspapers by O'Hara Bros., are the latest novelty from the Boston Fish Pier, but it is doubtful if the idea will prove of any significance.

The ice and cold storage business has long been intimately associated with the fishing industry. In Boston the Commonwealth Ice and Cold Storage Company, located at the end of the pier and connected directly with the dealers' stores by a system of elevators and overhead conveyors, for many years had an uncontested monopoly of the business. It supplied ice to all boats leaving the pier[1] at an average price of $4 per ton. This charge is excessive, but the company retains the business because it can pay a $20 dividend on its stock, most of which is held by the dealers. Recently The Massachusetts Fish-Ice and Cold Storage Co. has developed a competing plant. These two companies store practically all the surplus fish after it has been "sharp frozen." This process is intermediary between slow and quick freezing. Mackerel, salmon and flounder are frozen whole; haddock and cod, in fillets.[2] The fish are put in 500 pound boxes, and put in the "cold room" at 20 degrees below zero, where by a system of blowers, the air is circulated around each individual box for twelve hours. (The "slow freeze", which is less effective, takes fifteen hours) The fish is then stored at zero, and in accordance with government regulation, may be kept for twelve months. Because fish frozen by these methods can be sold cheaper than the costly Birdseye and Taylor processes they are extensively used in Boston.

Notwithstanding the almost limitless possibilities in supply and future scientific development, the fish business has been generally unprofitable. The reasons are many:

1. From 5-50 tons depending on the size of the boat and the season of the year.
2. Fillets frozen in the final package container.

(1) The exclusion of fish as a regular American diet. It enjoys less than 1/10 the consumption of meat per capita and then is limited to the seaboard states and a few inland cities.

(2) The general aversion to preparing and cooking fish.

(3) The prejudice against frozen fish, and fear of ptomaine poisoning from canned fish.

(4) The seasonal character of the industry, causing alternate gluts and scarcity with consequent fluctuations in price.

(5) Perishability of the product necessitates quick turnover, prohibiting large inventories of fresh fish.

(6) Difficulty of marketing: high express charges, and expensive refrigerator cars.

(7) Competition with low cost staple foods.

At present the dealers generally are almost uniformly pessimistic, while the men on the boats frequently receive as little as $2-$3 for a twelve-day trip--a condition almost unprecedented in the industry. Until some solution to these problems is devised, there is little likelihood that the business will be expanded beyond its present scope. Mute evidence of the general lethargy of the industry are the eighteen trawlers tied up at the docks of a large Massachusetts fish company which is now operating but two boats.

In a report to stockholders of the Bay State Fishing Company, President Barker says: "The past two years have been unusually difficult ones in all industries, but in the fishing industry the particular difficulty has arisen from a scarcity of fish and consequently higher cost of production at a time when prices of other foodstuffs were falling rapidly, thus making it almost impossible to produce and market fish at a profit. The investigations of the United States Bureau of Fisheries seem to indicate that fish will not be plentiful again for about another year, but there are already signs of better catches and we may not have to wait so long."[1] This is

[1] Boston News Bureau. June 14, 1932

obviously a reserved and conservative acknowledgment of the difficulty, yet it suggests the characteristic faith in a golden future which will continue to send men "down to the sea in ships."

PART IV. THE IN-SHORE FISHERY

Though the deep-sea fishery dominates in New England the value of the in-shore species should not be overlooked. First of importance in this category is the herring, a fish of great commercial significance. Its value is due to its great abundance, the small amount of capital necessary for catching by net or seine, and the variety of ways in which it may be profitably marketed. The herring industry is principally in Maine, where Eastport and Lubec are the acknowledged centers of the trade. The fish are found there on the off-shore banks, in the bays and harbors, and in the rivers where they ascend for hundreds of miles in the interior.

Alewives, or river herring, are the most abundant river food-fish on the coast, being particularly plentiful in the Damariscotta, Connecticut, Taunton, Merrimac and Penobscot Rivers.[1]

The shad fishery, though almost universal on the Atlantic Coast, has been of particular significance in New England, where, like the alewife, it ascends the rivers in large quantities. Important catches on the Housatonic, Connecticut, Merrimac, Kennebec and Penobscot Rivers made a profitable business until the latter part of the nine-

1. McFarland p. 221
2. Ibd. p. 217

teenth century, when obstructions from dams and contamination of the water from factory wastes doomed this industry almost to extinction.

Shell fish are an item of considerable value in the in-shore fisheries. Lobsters, which outrank all other shell fish in importance, are most plentiful on the coast of Maine where they constitute 36%[1] of the total value of all marine products. Massachusetts is second in the New England group, but in comparison with Maine is of little importance. The lobster catch reached its height in 1889, after which the supply has steadily decreased. A constant, if not increasing demand, however, has occasioned a rise in the price out of all proportion to the diminishing supply, so that actually the value of the total catch has never been reduced. A comparison of the years 1889 and 1919 bears out this statement:-[3]

	1889		1919	
	Pounds	Value	Pounds	Value
Maine	25,001,351	$574,165	5,545,884	$1,411,548
New Hampshire	137,[illegible]	6,415	298,012	73,203
Massachusetts	3,353,787	148,492	2,387,636	516,393
Rhode Island	456,000	21,565	1,694,327	360,679
Connecticut	1,501,290	83,099	740,848	189,157
	30,449,603	$833,736	10,666,707	$2,550,980

Protective legislation has been enacted in both Maine and Massachusetts to safeguard the industry by preventing further unnecessary depletion.

The most important clam fishery in the United States i[illegible]

1. Tressler. p. 586
2. McFarland. p. 238
3. Tressler. p. 586

in Massachusetts where over three million pounds are produced each year. The Maine clam industry ranks second, the production being in excess of two million pounds, but there is also a well developed industry in Rhode Island and Connecticut. The hard clam industry became important in the beginning of the twentieth century when the popular demand for "little necks" or small quahaug clams spurred production to the limit of the natural clam resources.[1] The deep water industry, which is vastly more productive than that in shallow water, is centered in the Cape towns, Chatham, Eastham, Edgartown, Fairhaven, Orleans, Wareham and Wellfleet. If the market for hard clams happens to be dull at the time of catching, they are frequently reserved on the tidal flats embedded in sand until the demand increases. Or, to prevent redigging some fishermen spread the clams on floats dowered into the water where they are kept alive until needed.

The principal oyster fishery in America is likewise along the eastern seaboard, from Cape Cod south to Florida. Wellfleet Harbor on the north shore of Cape Cod, Chatham along the eastern shore, and Cotuit Harbor and Poponesset Bay on the south side are the principal oyster areas in Massachusetts. Extensive beds occur also in Narragansett Bay, Long Island Sound, and Chesapeake Bay. In this country the principal business is in raw shucked oysters, i. e. the meats are removed from the shell. Highly skilled workmen open the oysters by means of a delicate knife. Some shuckers crack the thin ends or "bills" for the insertion of the knife, while others thrust the knife between the shells at the side

1. Dressler. p. 538.

or at the thin end. Ten to twelve gallons is the usual day's average for one man. Good oysters shuck six quarts of meat per bushel.[1] The meats are then thoroughly washed, first on a perforated table and later in galvanized tanks to which they are conveyed through troughs by running water. Ordinarily tap water is used, but to prevent swelling or dilution regulations sometimes require addition of salt. The oysters are next graded according to sizes called "standards," "selects," "counts," and "extra selects," the largest variety; drained, placed in containers, and packed in ice for shipping.

While cod, haddock, halibut, mackerel, swordfish and lobster constitute 80% of the total amount of all fresh fish sold in the Boston market,[2] there is a moderate demand for alewives, butterfish, carp, flounders, salmon, smelts, suckers, clams, crabs, and oysters. Some 54 species of New England fish find a market in Boston. That certain of these are not consumed in greater quantities dealers explain, as follows:[3]

SPECIES OF FISH FOR WHICH THERE IS A SMALL SALE IN BOSTON

Bluefish	Popular, but price considered high
Blue pike	" among Jews
Bonito	" " Italians
Buffalo fish	" " Jews
Bullheads	" " Greeks; supply limited
Catfish	" " Italians
Chubs	" supply limited
Ciscoes	" among Jews
Cunners	Supply limited
Cusk	Unpopular
Eels	Limited demand
Hake	Unpopular fresh; usually salted; substituted for cod, haddock when price hig
Hickory shad	Unpopular
Horse mackerel	Popular with Italians; canned as tuna
Lake herring	" " Jews

1. Tressler. p. 524
2. Hopkinson, L. T. p. 19 Trade in Fresh & Frozen
3- Fishery Products & Relating Marketing Considerations in Boston, Mass. 1923

Lake trout	Hotels, demand increasing; limited supply
Perch	Popular with Chinese and Jews
Pike or pickerel	Popular; supply limited
Pike, yellow	" with Jews
Pollock	Unpopular
Pompano	Expensive; limited supply; demand decreasing
Red snapper	Restaurants; foreigners
Rock bass	Popular with Jews and Greeks
Sanger	Unpopular
Scup	Popular in season
Sharks	Bought chiefly by Italians
Sheepshead	Supply limited
Skates	Unpopular except with a few Italians
Sea trout	Hotels, restaurants; limited supply
Squid	Italians use for bait
Striped bass	Very popular; expensive
Sturgeon	Popular; supply limited
Suckers	Unpopular
Sunfish	Supply limited
Tautog	Unpopular
Tilefish	"
Tomcod	"
White bass	Popular; supply limited
Whitefish	" with Jews
Whiting	" " Italians
Scollops	Supply limited
Mussels	Used for bait
Cockles	" " "
Winkles	" " "
Shrimp	Demand increasing; substitute for lobster
Tongues, cheeks & sound	Chiefly salted; limited demand
Frogs	Limited supply; expensive

FISHERIES OF THE NEW ENGLAND STATES, 1929 [1]

	Maine		New Hampshire	
Fish	148,799,469	$2,337,561	252,850	$10,387
Shell Fish	14,140,022	2,559,609	125,198	41,684
	162,939,491	4,897,170	378,048	52,071

	Massachusetts		Rhode Island	
Fish	431,312,510	15,446,386	20,747,438	974,045
Shell Fish	16,376,614	2,606,100	7,653,830	1461,301
	447,689,124	18,052,486	28,401,268	2435,346

	Connecticut	
Fish	45,429,011	2,112,725
Shell Fish	9,449,144	1,522,768
	54,878,155	3,635,493

1. Fishery Industries of the U. S. 1930
Fiedler, R. H. p. 192

YIELD OF PRINCIPAL FISHERY PRODUCTS IN NEW ENGLAND, 1929 [1]

PART V. PRESERVATION

Because of the seasonal fluctuations in both supply and demand for fish, it is obvious that all catches cannot be sold fresh to dealers. The problem of preservation arises, the various methods of which will be mentioned in turn.

Salting is the earliest known preservative, used in Europe hundreds of years before the Pilgrims found it profitable on Cape Cod.[2] In the interim the essential methods have not been modified in any important detail. Salt preserves fish by extracting enough water from it to form a brine coating. At the same time salt passes into the tissues and soon the body juices are transformed into a concentrated salt solution. When the solution inside the cells of the fish tis-

1. Fiedler, R. H. p. 191
2. Tressler. p. 307

sues is of the same concentration as that of the brine, the salting process is complete, and the fish is said to be "throughly struck."

The salt cod industry is second to none in the United States. In 1919 62,902,037 pounds of cod valued at $12,643,357 were prepared; the value of all other salted fish was less than $6,000,000.[1] Gloucester and Portland, long famed for this industry, monopolize the New England output. The importance of this product has been greatly reduced in recent years by the increasing popularity of fresh fish, made possible by modern methods of refrigeration and transportation.

Although some cod caught at great distances from market is salted on board the schooners, the bulk of the catch is merely iced and brought to Boston or Portland. If the demand for fresh fish is slack, it is disposed of to the large salting firms in Gloucester and Portland. After the preliminary cure in butts[2] or kenches[3] the fish is washed in sea water, ... placed on low wooden frames, and weighted to press out the surplus brine. The partially dried pieces are then arranged flesh side up on racks or lattices called "flakes" built in the open air. To conserve space the drying yard or flake yard is often located on the roof of a building, usually on that of a fish salting establishment. Drying under proper conditions effects a considerable bleaching of the cod. Since the direct rays of the sun are harmful, canvass covers are used to prevent the fish from being sun-burned. The time taken for this process depends chiefly upon the weather ~~and~~

1. Tressler. p. 315
2. Cask
3. Pile

and the amount of drying and bleaching desired. When there is a strong dry wind two lots may be dried in a single day, but during bad weather a week or more may be required. The degree to which the fish is dried depends upon the trade. If it is to be sold in the southern states it must be much drier than if it is to be marketed locally. Fish for export must be dried as completely as possible, flake drying is usually insufficient in the moist New England climate, therefore such fish are dried further in specially constructed driers. Considerable hand labor ensues in sorting, skinning, splitting and boning before the cod meats are packaged and put in storage awaiting shipment.

Though fresh mackerel, like cod, has become a more popular food than the salted variety, the preservative is still used on schooners at such a distance from port that the fish could not be delivered fresh in prime condition. The barrels of salt mackerel are removed from the vessel to a cool storehouse until needed for market. From time to time additional brine may be added to replace any lost by leakage or evaporation, otherwise the exposed fish would spoil by rusting.[1] Before marketing, salt mackerel is sorted by grades, weighed, and repacked in fresh brine.[2] Despite the decreased output of salt mackerel, constantly rising prices have maintained the value of the total marketed.

Whiting, a fish formerly of little commercial value, came into prominence during the War when other varieties were relatively scarce. The fish is caught in traps and

1. Growing yellow.

2. Stevenson, C. H. p. 430 et seq. The Preservation of Fishery Products for Food

delivered direct to the salting plants in Gloucester, where it is immediately treated. Like other fish the whiting is split, washed, salted in butts, and repacked in barrels for shipping.

Large quantities of clams were formerly shucked and salted in barrels to be used for bait by New England fishermen, but the decline in hand line fishing effected a similar decline in the clam bait industry, and at present only a few barrels of salted clams are prepared annually in this region.[1]

Preservation of fish by smoking and drying is closely associated with salting, for salt is used in almost all processes of preservation of fish as a condiment, or antidote for objectionable taste or odor, or as an auxiliary preservative. Smoked fish is always salted; sometimes the lightly smoked type is heavily salted, but since the fish possesses the smoked flavor, it is considered as "smoked fish."

Small fish are usually smoked round (without cleaning other than washing and scaling). Large fish are split, cleaned, beheaded and frequently cut into strips.

The two main processes in current use are hot-smoking and cold-smoking. By the former method the fish are kept close to the fire and so are wholly or partly cooked while smoking; by the latter, the fish are hung some distance from the fire and smoked at a temperature not exceeding 80 degrees Fahrenheit. The time required for cold-smoking varies from a few hours, as in the case of kippered products, to several weeks, as in curing hard herring--whereas the hot-smoking process is always completed within a few hours. The cold smoking process is that in use in the United States

1. Tressler. p. 546

for curing herring, alewives, mackerel, halibut, haddock, although sturgeon and eels are largely hot-smoked.

Herring was one of the first marine products to be preserved on a commercial scale by smoking. The important centers, Eastport and Lubec, in Maine, produce about 13,000,000 pounds of smoked herring annually. There are three important methods of smoking herring, by which three widely different products are obtained. Those that are thoroughly salted and smoked until they are hard and dry are termed "red" or "hard" herring. "Bloaters" are lightly salted and smoked round herring intended for immediate consumption. "Kippered" herring are split, cleaned, lightly salted, and smoked.

The first step in the smoking process is pickling, or salting--effected by placing the fish in butts, tanks, or vats filled with strong brine. This may be done either on the schooner or in the salting sheds at the docks. Fish and salt in alternating layers are put in large tanks,[1] the small fish remaining in the brine from twenty-four to thirty-six hours, while the larger ones are treated for about forty-eight hours. In cold weather the fish are exposed for longer periods in the brine. When properly salted the herring are dipped out of the vats by means of "dip" or "wash" nets, rinsed in salt water or brine, drained, and finally strung twenty-five to thirty deep on thin sticks to dry. A single person can string from five hundred to one thousand sticks a day. The herring are then washed in a trough of sea water and hung across rectangular frames called "herring horses," each holding about forty-five sticks. On this apparatus the fish are drained and slightly dried in

1. Four hogshead capacity

the open air. If it is foggy or rainy the drying is done in smoke-houses. These may be of almost any shape and size, from a barrel inverted over a pit to an elaborate brick building with outside furnaces. The style of house depends chiefly upon the quantity of fish which is to be smoked at one ti e. The average size herring smoke-house is about 30 feet long, 18 feet wide and 25 to 30 feet high.[1] Flues are constructed at the top of the house for the escape of surplus smoke. Hard woods are chiefly used in the fires since soft woods containing resins usually give the product a disagreeable taste. The most important consideration is that the wood burn slowly and produce a large volume of smoke.

Inasmuch as herring are obtained in relatively small quantities, since the business is conducted on a small scale, some time may be required to fill a smoke-house. Even when herring are obtained in large quantities the smoke-house if filled by degrees in order to insure thorough and uniform drying. If the houses were completely filled at one time, the atmosphere would become entirely saturated with moisture, which, when condensed, would spoil the fish. When one day's supply of herring has been placed in the smoke-house, the fires are kindled and the fish smoked for twelve to fifteen hours. The partially smoked herring are then shifted to a place further away from the fire, being replaced by a fresh lot before the preliminary smoking is repeated. Usually about two weeks'

1. Tressler. p. 350

time is taken in filling the smoke-house, and then the herring are given an additional smoking of about three weeks' duration. The fish remain in the houses until they are to be packed or boned, when they are removed to the packing room to be sorted and graded. The principal varieties of hard herring are "medium-scaled," "lengthwise," "No. 1," "tuck-tails," and "Magdalens."

In the preparation of boneless smoked herring, the fish are dumped on wooden tables, the heads and tails are clipped off with scissors, and the fish weighed. Women and girls remove the skin and bones with their fingers, the faster workers preparing from one hundred to one hundred and fifty pounds of herring daily. The prepared herring are packed in wooden paper-lined boxes ready for shipment. Some boneless fish is packed in small jars, bottles, or tins. One hundred pounds of smoked fish yield about thirty pounds of boneless herring.

The haddock smoking industry (finnan haddie) is second in importance only to that of herring. In 1919 nearly 9,000,000 pounds of haddock were cured in Maine by smoking, with some 13,000,000 pounds the total for New England.[1] The fish is salted, smoked and dried for a few hours. The oak fire used in smoking is allowed to burn freely from eight to eighteen hours when it is partially smothered in sawdust to produce a dense smoke. The fish is smoked for about six hours before being packed in boxes ready for the market. Inasmuch as the fish is still

1. Tressler. p. 361

only partially cured, it must be sold immediately, and is rarely marketed in summer.

Smoked alewives constitute an important industry in Taunton and Boston, and in the towns along the Connecticut River, and in Eastport, Maine.

PRODUCTION OF SALTED & SMOKED FISHERY PRODUCTS IN 1929[1]

NEW ENGLAND

Salted	Lbs.	Value
Alewives	816,500	$26,590
Cod	9,935,093	917,432
Cusk	521,941	21,340
Haddock	2,504,899	115,967
Hake	6,966,468	264,773
Herring	15,345	1,076
Mackerel	6,210,948	489,376
Sounds	18,039	1,527
Pollock	2,239,202	126,909
Tongues & cheeks	19,782	1,691
Other	484,350	30,892
	29,732,567	$1,997,573

Smoked		
Alewives	530,000	18,035
Cod fillets	406,157	65,171
Cusk	746,955	104,560
Finnan Haddie	1,688,467	199,273
Haddock fillets	355,404	60,284
Hake fillets	62,540	9,115
Halibut	31,150	8,985
Herring	7,313,944	722,116
Mackerel	209,056	47,395
Other	376,000	155,320
	11,719,673	1,390,254

With improved modern methods re-establishing confidence in canned foods, another important channel for the distribution of fish has developed. No other preservative is so completely satisfactory for sea foods from the point of view of transportation and stability of market and quality.

1. Fiedler, R. H. p. 68 Fisheries of the U. S. 1930

Canned kippered herring, the most valuable herring product, has come to be a favorite among connoisseurs of smoked fish. Like mackerel the fish is split down the back from head to tail as soon as landed, placed in strong brine for about an hour. After it has been drained and slightly dried it is hung in the smoke-house from six to sixteen hours before being packed for shipment. Since this salting and smoking process is insufficient to keep the fish for more than a day or two at ordinary temperatures, kippered herring is a perishable product and cannot be shipped great distances unless it is canned.

Sea herring too small for smoking are valuable substitutes for the European sardines formerly imported into this country in large quantities. The fish are commonly taken in traps or weirs--large circular or heart shaped enclosures formed by upright stakes and netting--into which they are diverted by barriers across their course of travel. They are captured by seines and transferred to power boats provided with special tanks holding usually from 10,000 to 50,000 pounds of fish. After being conveyed to the cannery through sluices and running water they are placed in strong brine for an hour or two, and then spread mechanically on "flakes" or ¼ inch mesh galvanized wire trays, and steamed in a steam box from three to fifteen minutes. From there the racks of steamed fish are run into large drying chambers through which heated air is drawn by fans. The drying takes from one to two hours at a temperature of about

115 degrees Fahrenheit. After cooling the dried fish are carried on flakes to the packing tables where women spotlessly clothed in white, remove the heads and pack the cans. As the cans move along on automatic conveyors they are mechanically oiled, and passed through the sealing machines which attach the covers. They are then "processed" or sterilized by heating for an hour and a half to two hours in boiling water. The cans are usually cleaned with sawdust while hot, and after cooling are tested and packed in cases each containing either one hundred ordinary small cans, or forty-eight large ½ pound cans.

Improvements in the mechanical preparation of sardines has been important during recent years--particularly the development of a machine for cutting off the heads of the raw fish. A machine has also been patented for frying the raw fish directly in cans. Two types of machines for separating fish according to size are used: the first consists of a revolving cylinder constructed of coiled pipes set at gradually increasing distances apart, and the second is a set of inclined rotating rollers, the distance between which gradually increases as the fish pass down along them.[1]

A considerable quantity of Maine sardines are fried after partial drying of the raw fish. The frying device most used consists of a long iron tank which contains a horizontal set of steam heating coils about eight inches above the bottom. Water is run into the tank to within an inch or two below the coils and then sufficient vegetable oil, usually cottonseed or olive oil, is added to cover the coils and give sufficient depth of oil above them to properly fry the fish in the wire baskets used to hold them. The temperature of the

1. Tressler p. 391

oil maintained in the fry bath is about 240-260 degrees Fahrenheit.[1]

Sardines in oil constitute the great bulk of the Maine pack, and for this purpose cottonseed oil is most commonly used, five or six pints being used per case of 100-¼ tins. Considerable quantities of the higher grades are packed in olive oil. These are sometimes flavored with bay leaf, clove, or mustard sauce containing mustard, salt, pepper, cayenne, turmeric, and other spices mixed with vinegar.

Though the business centers at Eastport, there are some sixty-five canneries scattered along the coast of Maine, having an average annual output of 2½ million cases.

The only important process of preservation of clams is canning, in fact the New England output of canned clams exceeds in value the quantity of clams marketed fresh. Maine and Massachusetts are the important centers of the New England industry. Labor-saving machinery is used to shuck, dress and clean the meats which are then cut and washed in a special washing machine, and finally minced in a meat grinder. The ground meats are placed in the hopper of an automatic filling machine which feeds the desired quantity of clam meat into the cans passing under it on an endless belt. Some clam juice is added to the filled cans before they are topped and "exhausted"[1] for about eight minutes at a temperature of 210 degrees Fahrenheit. The tops are then sealed, and the cans processed for an hour or more at 220 degrees Fahrenheit, after which they are quickly cooled by

1. Cooked

streams of cold water to prevent the meat from becoming tough. The surplus liquor is canned separately under the name of clam "nectar," after it has first been cooked for an hour at a temperature of 240 degrees Fahrenheit.

Although some crabmeat is canned in Maine, the industry is not firmly established there, and cannot compete with the scope of the trade in the Middle Atlantic and Southern States.

The lobster canneries in Maine were short lived because with the gradually diminishing supply and constantly increasing demand it was more profitable to sell the fish fresh. There are now no lobster canneries in this country, but in Canada the value of canned lobsters exceeds that of fresh lobster. Great quantities of fresh lobsters are also imported at the Boston Pier from Nova Scotia.

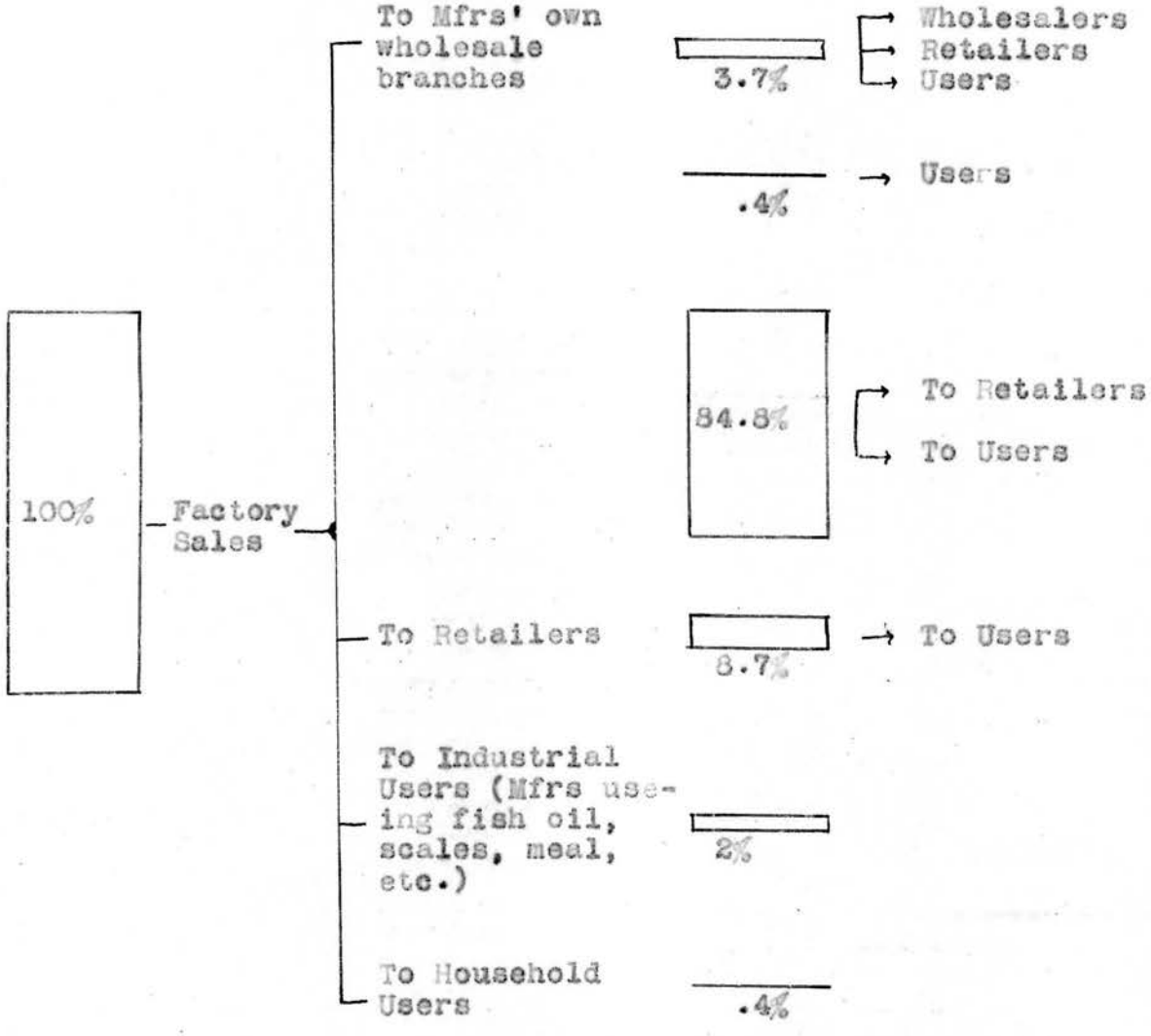
The canning of oysters developed as a means of extending the market and overcoming the difficulties of storage and transportation. The oysters are unloaded at the canneries into latticed iron cars which are pushed into a straining room where they are cooked from three to ten minutes before they are removed from the shell. The meats are washed and packed in cans varying in weight from three to ten ounces. By an endless belt the filled cans are conveyed to capping machines, and thence to the retort where they are steamed at a high temperature for a short time before being cooled in running water, labelled, and shipped.

Finnan haddie is canned in small amounts. Canned cod it is thought may gradually replace salt cod, some experts

predicting that the volume of canned cod will some day rival that of salmon.

Distribution of Sales, 1929

MANUFACTURING PLANTS IN THE CANNED & PRESERVED FISH & SHELLFISH INDUSTRY [1]



The most modern preservative used in the fish industry, and threatening to surpass all others, is refrigeration, a form practiced more extensively in the United States than in any other country in the world. The principal species frozen

1. Maynard, Weilder, & Beckman. p. 45. Principles of Marketing

in New England are herring (mostly for bait), mackerel, whiting, halibut, whitefish, cod, haddock, hake and pollock. The fish are frozen during the summer and fall, and are held until winter and spring. The greatest holdings are in New England and the Middle Atlantic States. Fish freezing plants, like almost any other class of plants for commercial operations vary from simple, crude, and inexpensive outfits to large, complex and costly buildings and machinery. Most of them are on or near the water; many of them are not exclusively fish freezers, but take other perishables for cold storage. Most of them make ice; some do a public fish warehousing business; others are entirely private. The public houses freeze and store fish for customers at a fixed charge; the private houses own the holdings outright, buying fish in the producing season and selling in the consuming season.

As the fish is landed from the boats it is inspected, graded, washed, and panned--the arrangement depending upon the size and shape of the fish. (Swordfish and sturgeon are butchered and cut into pieces of convenient size, usually about two feet long). When the pans are packed they are moved by conveyors to the sharp freezers, where they are deposited on the pipes arranged in shelf-like formation. To get the best results the room should be cooled to about zero before the fish enter, gradually lowering the temperature to ten degrees below zero for the actual freezing. The time required to freeze the different species is not as important as it might appear to be. The filled pans are almost always left in the freezer over night, but large

fish such as halibut and salmon are left in a sharp freezer over two nights. The capacity of the freezers ranges from 12,500-60,000 pounds.

To prevent the desiccation, rusting and loss of flavor to which frozen fish is subject during the period of storage, various methods have been evolved. Wrapping with impervious paper, glazing, covering with wax or tallow, and freezing in ice blocks have all been tried. The simplest, cheapest and most practicable is glazing, which, if properly done, answers all requirements. If the fish is, while frozen, dipped into cold water, and withdrawn into the air of a cold room, the adhering film of water freezes, forming a transparent envelope of clear ice adhering firmly to the fish. The ice glaze at once brightens the coloring of the meat, prevents all evaporation and loss of flavor, and retards rusting. The immersion takes from one half to one minute. The cakes of fish are then weighed, boxed and stored, or stored without boxing. If reglazing is necessary the unboxed cakes may be readily glazed in a trough brought into the storeroom; boxed fish may also be immersed in tanks, box and all, for glazing. Fish not in cakes and not boxed may be sprayed with cold water with an air brush or sprayer such as is used for whitewash or for spraying shrubbery and trees.

Storage is a vitally important factor in successful freezing. The loss of moisture and development of rust are the great enemies of stored frozen fish, nor is there any cure for rust once the process has begun. Sometimes, however,

the appearance may be improved by scrubbing with a stiff brush wet with warm water in which baking soda is dissolved. For successful storage, the following points should be observed:[1]

(1) Fish should be thoroughly covered with a uniform glaze before storage, and glazing should be repeated as often as necessary by dipping or spraying.

(2) The storage temperature should be +5° F. or lower for fat fish, and is preferable for any fish. Temperatures as high as 10 are permissible for leaner fish and for a limited time. The temperature cannot be too low.

(3) The temperature in the cold storage rooms should be held constant, lights cut off, and doors kept closed.

(4) Unless circumstances make necessary, fish should not be butchered for freezing, but should be frozen and stored "round." If stored gutted, the glaze should be perfect, and the temperature held very low to prevent rust.

Fish that were boxed before storage may be shipped as they are. Those that have not been boxed must be boxed before shipment. Some dealers first wrap the fish in parchment paper to retard defrosting and rust and to make the packages more attractive. To prevent abrasion boxes should be filled as full as possible, though ice is not put in the box. For railroad transportation refrigerator cars are used with bunkers at either end filled from the top of the car outside--each bunker containing from 6,000 to 7,500 pounds of ice.

Ships equipped for refrigeration have been used for transporting frozen fish. The holds are insulated with cork

1. Taylor, H. F. p. 17 Refrigeration and Cold Storage of Fish

or lith and are piped, like ordinary cold storage rooms so that they compare in every way with the efficiency of cold storage plants on land.

There are other methods of freezing in extensive use in this country--notably the brine freezing method, as opposed to the air freezing method, which is based on the fact that brine is a better conductor of heat than is air. Accordingly brine will freeze fish faster at the same temperature than air. The essential idea of the Taylor method is that the fish while suspended on movable bars, are slowly conveyed through a tunnel in which a heavy shower of brine is flowing. The brine flows rapidly over the fish, strikes cooling coils, is circulated through a centrifugal pump and back again on the fish.[1] Before striking the brine shower, the fish receive a shower of fresh water to wash them, and after emerging from the shower they receive two or more other showers of water to remove the brine and glaze them.

Brine frozen fish can readily be shipped long distances without ice either by express in wooden boxes, or by parcel post in strawboard containers. These facts put brine frozen fish not only in the class of frozen fish for prolonged storage, but also in a position to compete with iced fresh fish for immediate transportation and consumption.

While the development of refrigeration extended the area of the market for fresh fish, the development of the quick freezing process is bringing the interior of the country within the market area, and thereby greatly increasing

1. Taylor, H. F. p. 21 Regrigeration and Cold Storage of Fish

the volume of sales. The United States Bureau of Fisheries estimated that the consumption of packaged fish increased 350% during the fiscal year 1929 over the preceeding year.[1]

PRODUCTION OF FROZEN FISHERY PRODUCTS, 1930
IN NEW ENGLAND[2]

Bluefish	41,000
Butterfish	230,000
Catfish	127,000
Cisco	29,000
Cod, haddock, hake pollock	3,650,000
Flounders	552,000
Haddock fillets	18,146,000
Halibut	299,000
Herring	5,380,000
Mackerel	8,398,000
Salmon	194,000
Scup	161,000
Shad	267,000
Shellfish	774,000
Smelts	33,000
Squid	3,487,000
Whitefish	9,000
Whiting	7,870,000
Miscellaneous	2,975,000
	52,602,000

1. Stiffler, C. W. p. 821 Commerce & Finance April 23, 1930

2. Fisheries of the United States, 1930. p. 178

PART VI. MARKETING AND DISTRIBUTION

Probably the greatest single problem in the fishing industry of the New England district is that of marketing and distribution. Its satisfactory solution will mean the dawn of a new day in the industry, inasmuch as it has been conservatively estimated by prominent men in the trade that the vessel landings of ground fish could be doubled in the brief space of ninety days, provided the market for the fish was sufficiently expanded to absorb the increase.[1] The actual availability of a potential market of sufficient size to absorb such increased production is evidenced by the fact that the center of distribution for Boston fish (as revealed in the map p.74) lies about 750 miles northeast of the center of population of the United States shown in the United States Bureau of the Census population statistics for 1920.

The marketing of shell fish is a distinct problem in itself:- Lobsters are sold either alive, boiled, or canned. Since boiled lobsters spoil quickly, the greater portion of lobsters is marketed alive. Each fisherman has a live-car[2] in which he keeps his catch moored at a convenient spot close to the shore until needed for market. A large proportion of the Maine lobsters are caught along the shores which have no direct rail connections, and they must, therefore, be transported by water either to a market or to a railroad station where they are shipped on ice to distant markets. Specially constructed well-smacks make regular routes to the various fishermen to purchase the lobsters and transport them alive to the city markets.

1. Hopkinson, L. T. p. 2 Trade in Fresh & Frozen Fishery Products and Related Marketing Considerations in Bos n

2. Capacity about 2,500 lobsters

Lobsters are usually expressed in barrels packed with ice. A one hundred pound cake of ice is split lengthwise into three pieces, one of which is placed upright in the center of a barrel with the lobsters packed snugly about it. When the barrel is nearly full, the lobsters are covered with seaweed or paper and the rest of the space is filled with cracked ice. The top is covered with a piece of sacking and fastened under the upper hoop of the barrel.

Since live lobsters are preferred in nearly all markets, comparatively few are boiled before marketing, although in many districts retail dealers boil live lobsters for their patrons after purchase. These will keep for a week if carefully packed in ice. Much of this meat is removed from the shell and sold for salads and other purposes.

Clams are marketed in the shell, or "shucked out"--but in either case they must be carefully washed. Small clams suitable for steaming are ordinarily shipped to market in the shell, as are also the fine appearing sand clams. Mud clams and very large clams are usually shucked. A bushel of clams produces about seven quarts of shucked clams. Those shipped in the shell are usually packed in second-hand barrels, while shucked clams are shipped in kegs or butter tubs. The chief markets for New England quahaugs are Boston and New York, yet because they live out of water much longer than soft clams, they may be safely shipped inland even in summer as far as the Mississippi Valley.

Oysters are prepared in a manner similar to clams, and may be shipped long distances in refrigerator cars or in

"cold rooms" of vessels. In this way they may be shipped across the continent or to Europe.

The only authoritative study of the distribution of New England is that of L. T. Hopkinson. As the basis for his discussion he has confined the figures to one typical month, namely, September, 1922. (This is still the most recent document on the subject). During this period there were 14,283,761 pounds of fresh and frozen products received in Boston, consisting of 13,244,074 pounds fish

616,355 " lobsters

338,964 " clams

80,544 " oysters[1]

3,824 " scollops.[2]

Of the quantity of fish received there were:-

11,056,709 lb. distributed fresh or frozen

458,587 " salted

391,788 " lost in shrinkage

349,263 " smoked

50,000 " canned

937,727 " stored, leaving a

total distribution of all classes of fresh and frozen fishery products amounting to 12,096,396 pounds. Of this amount 99% was distributed to points in the United States and 1% to points in Canada.[3]

Distribution in the United States was largely confined to Massachusetts and the neighboring states of Connecticut, New York, Pennsylvania, and Rhode Island, this group receiv-

1. Or 10,068 gallons
2. " 478 "
3. Hopkinson, L. T. p. 3

89% of the total quantity distributed in the United States.

Out of the total quantity distributed from Boston during September 56% was consumed within the State of Massachusetts.

Summary, by States and Canada--listed according to amount received--of fresh and frozen fishery products distributed through Boston, Massachusetts, during Sept., 1922.

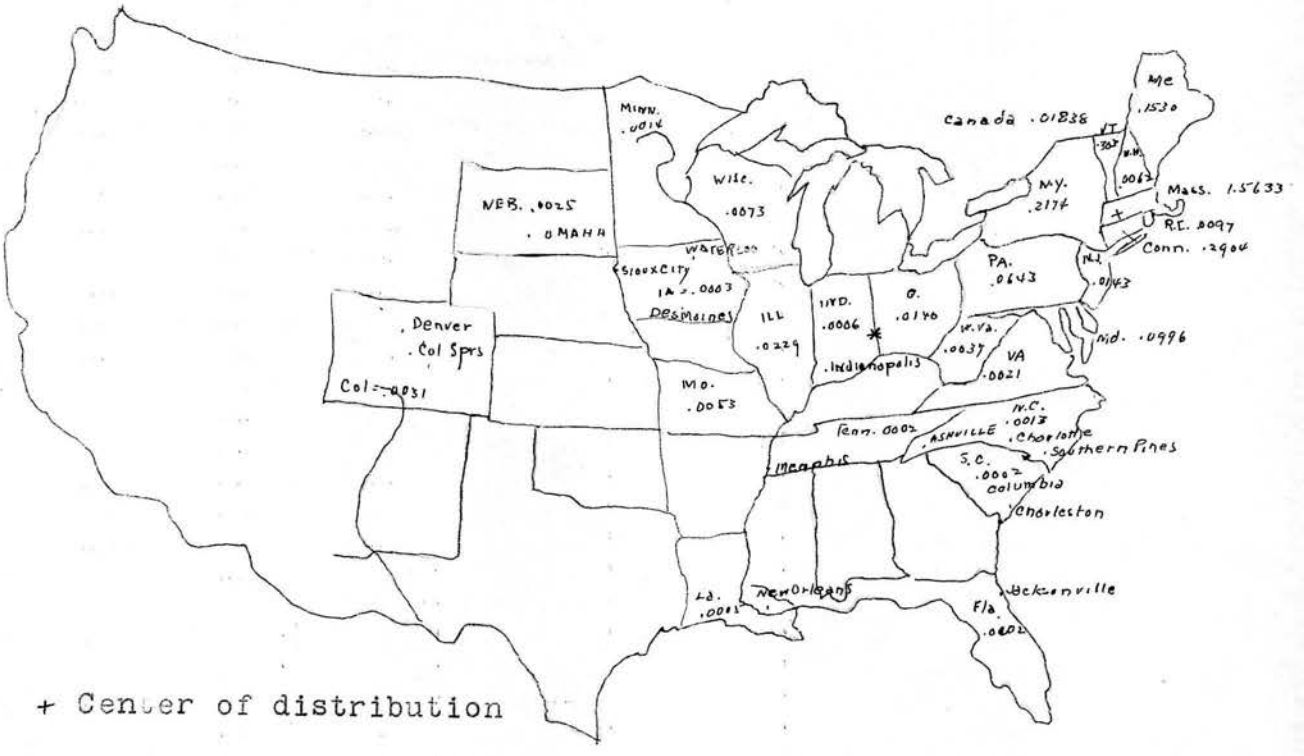
	Fresh & Frozen Lb	Lobster Lb	Clams Lb.	Oyster Lb.	Scollop Lb	Total	%
Mass.	5,023,525	384,177	279,456	61,080	3,088	6,751,326	56
N. Y.	2,257,697	80,629	6,867	1,536	240	2,346,969	19
Pa.	560,551	53,023	4,560	448	--	618,582	5
R. I.	585,002	--	133	64	--	585,199	5
Conn.	400,961	16,978	30,104	648	--	448,691	4
N. H.	274,258	3,556	4,438	5,608	--	288,060	2
Ill.	148,258	21,326	1,750	--	--	171,334	1
Md.	144,323	6,557	--	--	24	150,904	1
Canada	132,443	--	1,024	912	--	134,369	1
Maine	117,479	86	1,961	7,200	8	126,734	1
Vermont	106,979	2,103	4,596	2,680	--	116,358	
Ohio	80,379	11,239	1,475	240	272	93,605	
Mich.	54,642	3,186	1,115	--	--	58,943	
N. J.	44,853	11,153	--	80	--	56,086	
D. C.	47,732	5,175	60	--	--	52,967	
Wisc.	19,124	2,965	--	--	--	22,089	
Mo.	18,038	2,255	595	--	--	20,888	
Del.	12,955	590	250	--	--	13,795	
Minn.	3,439	4,086	--	--	80	7,605	
W. Va.	5,463	793	--	--	--	6,256	
Neb.	3,233	1,687	580	--	--	5,500	
Va.	4,923	232	--	--	--	5,155	
Col.	2,918	1,761	--	--	64	4,743	
N. C.	3,228	203	--	--	--	3,431	
Ind.	1,748	700	--	--	16	2,464	
La.	895	--	--	--	--	895	
Ky.	--	807	--	--	--	807	
Tenn.	545	260	--	--	--	805	
Iowa	613	72	--	--	--	685	
S. C.	365	--	--	--	--	365	
Utah	--	250	--	--	32	282	
Cal.	--	200	--	--	--	200	
Fla.	150	--	--	--	--	150	
Ga.	--	126	--	--	--	126	
Ala.	--	90	--	--	--	90	
Okla.	--	90	--	--	--	90	
N. D.	--	--	--	48	--	48	
	11,056,709	616,355	338,964	80,544	3,824	12,096,396	

1

1. Hopkinson. p. 3

The same figures projected to show per capita consumption of Boston market fish is shown on the accompanying map.

Per capita consumption of Boston fish for September, 1922, with center of distribution compared to center of population [1]



\+ Center of distribution

* Center of population

Massachusetts' consumption of Boston fish exceeds 1½ pounds per capita, more than five times the quantity used in Vermont, the state standing next as a per capita consumer of Boston fish. Moreover, this 1½ pounds of Massachusetts is thirty times greater than the average per capita consumption of the 29 other states receiving Boston fish.

1. Hopkinson. p. 15

It is also evident that some states that, by reason of the heavy shipments received, seem to be great consumers of Boston fish, are relatively light users. Instances are that Vermont is eleventh in the quantity of Boston fish received, but second in per capita consumption; whereas Rhode Island, which is third in importance as a market for Boston fish, rates eighth as a per capita consumer. Similarly New Hampshire, sixth in amount received, is sixteenth as a per capita user.[1]

Massachusetts consumes eight times more Boston lobsters per capita than Connecticut, the second largest user, and thirty-eight times more than the average per capita consumption for the other thirty states that receive lobsters from the Boston market. Whereas New York and Pennsylvania occupy second and third places in quantity of lobsters received, their per capita consumption is fifth and sixth respectively. Conversely, the District of Columbia and New Hampshire, which rate nineth and eleventh in receipts, stand high in the list of consumers--being third and fourth. Illinois, which receipts 21,000 pounds--than which only three states receive more[2]--is eleventh in per capita consumption, and only one place above Delaware which received only 590 pounds. The market for New England lobsters is more widely dispersed than that of any other local sea food,- Denver, Colorado, and Los Angeles, California being among the western purchasers.[1]

Boston clams are marketed in fifteen states, Massachusetts taking almost five times more than the other fourteen

1. See p. 73 and 74
2. Mass., N. Y. and Pa.

combined, which represents for Massachusetts a per capita disposal 1,800% greater than the average for all other states receiving clams from Boston.

Massachusetts consumes exactly 2/3 of the entire quantity of oysters distributed from Boston, accomplishing this by a per capita use five times the amount of the average for the other ten states that sent to Boston for supplies of shellfish. The three states, New Hampshire, Maine and Vermont purchase 92% of what oysters Boston does not sell in Massachusetts, and all four states mentioned are closely comparable in the per capita use, constituting a class unapproached by any of the other purchasers of this product.

SUMMARY.

In summarizing the study of the fishing industry in Boston and New England it is most logical to observe the same subject divisions as in the paper itself.

Part I. Historical Background. Without some impression of the early aspects of the fishing industry--its scope, problems, struggles, and successes, there is no basis by which to gauge the achievements of the present. For this reason alone--despite the intrinsic interest quality--a survey of the historical background of the early fishing communities is necessary. Reference is frequently made to the gradual rise of Boston to its preeminent place in the industry, and rightly so, for this city is now the focal point of the New England fisheries, the channel through which almost all products are marketed, and operations directed. The colorful era of T Wharf--unique and epochal--is mentioned as the transition between the past and the present.

Part II. The Deep-Sea Fishery. A consideration of the deep-sea fisheries typical of this region constitutes this chapter. Cod, haddock, and mackerel which dominate the trade are discussed from the point of view of the boats, crew, equipment, and methods characteristic of each species. Since these three species alone surpass all others in quantity and value, it was thought justifiable to devote an entire section to their treatment.

Part III. The Industry in Boston. In many respects this division is the most important in the paper, for it

attempts to crystalize the varied aspects of the present day industry, with its allied and subsidiary affiliations, in order to show how the port of Boston became and continues the leading wholesale mart of fresh fish in the world. Statistics are frequently used to support this statement. Among the points mentioned are the physical aspect and management of the Fish Pier, the Massachusetts Fisheries Association, the Fishing Mart Corporation, and other organizations peculiar to Boston; the manner in which the fish is handled, prepared, and shipped; the variety of the fish-by-products industries, particularly the fish meal, fertilizer, and glue companies; and finally, an impression of the financial condition and problems of today.

Part IV. The In-Shore Fishery. While the deep-sea fishery does in a real sense surpass all others, the aggregate of the less significant fisheries constitues a valuable asset to the region. The importance of the herring, alewife, and shell fish, including lobsters, clams, and oysters is here emphasized because these occupations still predominate in many towns in Maine and Massachusetts.

Part V. Preservation. The problem of preservation of fish for food is next taken up, with an outline of the fundamental methods in current use; namely, salting, drying and smoking, canning, and freezing. The characteristic features of each process, together with mention of the specific species to which it applies, are given in some detail. Numerous recent statistics from authoritative

sources support and clarify the statements.

Part VI. Marketing and Distribution. The important question of marketing and distributing fish is still the greatest problem confronting the industry, as yet not adequately solved. The limited scope of the market for Eastern fish compared with the potential market, is the result of transportation and preservation limitations only recently being overcome by modern developments. Figures and maps bear out these statements to show the location and volume of the fish marketed, together with the per capita consumption for specific species.

The purpose of this paper has been to give a comprehensive, though concise, view of the fishing industry in the New England section--the Boston market in particular--from the earliest Colonial days until the present. If less attention has been given to the development of the smaller towns, it is only because they are proportionally less significant. The pursuit of the subject, revealing as it has unexpected channels of interest and importance, has proved a profitable and pleasurable experience.

* * *

July 1932

BIBLIOGRAPHY

Artman, Charles E. Industrial Structure of New England. U. S. Dept. of Commerce, Bureau of Foreign and Domestic Commerce. U.S. Gov. Printing Office. Series #28, 1930. Information concerning fishing at Boston.

Boston Fish Bureau, Bureau of Fisheries 49th Annual Report. Current 1932 statistics.

Connolly, J. B. The Book of the Gloucester Fishermen. --The John Day Co., N. Y. 1927.

Cooley, E. H. Radio Talks: Methods of Marketing July 23, 1930
Vitamin A, Oct. 1, 1930
Vitamin B, Oct 23, 1930
Vitamin C, Nov 26, 1930
Clams, May 18, 1931
The Gt. Fishing Industry Aug. 13, 1931
Salt Fish (undated)
Oysters "

Dunklee, Ivah. The World Today, March 1906. Vol. 10 p. 581. A Modern Miracle of Fish. Description of T Wharf and trade.

Fiedler, R. H. Fishery Industries of the U. S. 1929 Doc. #1096; also 1930. Current statistics for New England.

Fishing Gazette. May, June, 1932.

Fulham, J. N. Radio Talk: Mackerel, May 23, 1932.

Gerish, E. F. Commercial Structure of New England. U.S. Dept. of Commerce. Bureau of Foreign and Domestic Commerce, 1929.

Hopkinson, L. T. Trade in Fresh and Frozen Fishery Products and Related Marketing Considerations in Boston, Mass. Bureau of Fisheries Doc. #939.

Mass. Fisheries Assn Blue Waters and Crystal Depths. General description and advertising.

Maynard, H. H.
Weilder, W. C.
Beckman, T. N. Principles of Marketing. The Ronald Press Co. N. Y. April, 1932.

McFarland, Raymond. The History of New England Fisheries with Maps. D. Appelton & Co. Agts for Univ. of Penn. 1911.

Morison, Samuel Eliot. The Maritime History of Mass. 1783-1860. The Riverside Press. 1923. Sections pertaining to Boston

Nash, A. D. Radio Talk: The Truth About Crabs June 11, 1931

Palmer, C. B. Down to the Sea with a Trawler and Radio Telephone. Boston Evening Transcript. June 25, 1932.

Pyle, J. F. Marketing Principles. McGraw-Hill Book Co. 1931. Section on Fish.

Sibley, F. P. Five Exciting Days Aboard Trawler off Georges. Boston Globe. Feb. 24, 1929

Smith, Hugh M. The National Geographic Magazine, June 1916. p. 546. America's Surpassing Fisheries.

Stevenson, C. H. The Preservation of Fishery Products for Food. Wash. Gov. Printing Office 1899.

Taylor, Harden F. Dept. of Commerce, Bureau of Fisheries Doc. #1016. Appendix VIII to Report to the U. S. Dept. of Commerce and Fisheries, 1926. Refrigeration of Fish.

Tressler, D. K. Marine Products of Commerce. The Chemical Catalog Co., Inc. N. Y. 1923

Winsor, Justin. The Memorial History of Boston 1630-1880 Including Suffolk County, Mass. James R. Osgood & Co., Boston, 1880. Section on Fishing.

Boston News Bureau. June 14, 1932 Bay State Fishing Co.

Boston Evening Transcript. June 8, 1932. Boston Fishing Fleet Still Leads.

Boston Post. March 29 and 31, 1914. Opening of the New Fish Pier.

New York Times. Dec. 28, 1920. p. 23. Statistics of Boston catch.
May 29, 1932. Fishermen at Sea To Talk to Offices.

INTERVIEWS

Whalen, M. J. O'Brien Bros., Fish Pier, Boston

Ryan, John. Dehydrating & Cold Storage Co., Pier 4, Boston

Sturgis, E. A. Marine Engineer.

UNPUBLISHED RESEARCH REPORTS AND RECORDS

Taylor, Harden F., Treas. Atlantic Coast Fisheries Co. Some Considerations of Our Aims and Policies in the Fishing Industry.

Osborne, S. de J. The American Fishing Industry--A Report on the Present Condition of the Industry, on its Future Growth & on Specific Companies in the field; with Suggestions as to Financial Opportunities.

Sturgis, E. A. Fishing on Georges Banks

OUTLINE INDEX