PART VII.

NEW JERSEY AND ITS FISHERIES.

By R. EDWARD EARLL.

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PART VII.

NEW JERSEY AND ITS FISHERIES.

A.—GENERAL REVIEW OF THE FISHERY INTERESTS OF THE STATE.

136. STATISTICAL RECAPITULATION.

GENERAL SUMMATION.—New Jersey produced in 1880 $3,176,589 worth of fishery products, taking the sixth place in the list of fish-producing States. In some special fisheries it takes a higher rank. Its oyster products, valued at $2,080,625, are exceeded only by those of Maryland and Virginia. Its crab fisheries, from which the fishermen realize $162,612, are more extensive than those of any other State, while its quahaug fisheries are second only to those of New York. In the menhaden fisheries it stands fifth on the list, the oil, scrap, and compost produced in 1880 being valued at $146,286. Its river fisheries are of minor importance, the total yield being only 2,752,000 pounds, netting the fishermen $91,435.

STATISTICAL RECAPITULATION.—The following statements show the extent of the fishery interests of the State for 1880:

Summary statement of persons employed.

Persons employed	Number.
Number of fishermen	5,659
Number of shoremen	419
Number of factory hands	142
Total	6,220

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels (10,445.91 tons)	590	$545,900
Boats	4,065	225,963
Pound-nets	27	19,800
Fykes, pots, and baskets	3,417	15,966
Gill-nets	852	25,203
Purse-seines	20	8,000
Drag-seines	415	30,570
Minor apparatus, including outfit		132,800
Factories and other shore property		470,000
Additional cash capital		20,000
Total capital		1,492,202

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Grand total for fishery products	65, 151, 486	$3, 176, 589
Sea fisheries.		
Bluefish	3, 635, 000	82, 125
Cod	1, 667, 000	31, 256
Clams (hard)	3, 132, 280	195, 767
Clams (soft)	660, 280	33, 014
Crabs	1, 470, 300	162, 612
Lobsters	156, 800	5, 880
Menhaden, for oil and compost	29, 064, 600	146, 286
Oysters	13, 825, 000	2, 080, 625
Squeteague	4, 430, 000	132, 900
All other species	4, 358, 226	214, 689
Total for sea products	62, 399, 486	3, 085, 154
River fisheries.		
Alewives	1, 200, 000	17, 335
Shad	750, 000	35, 000
Sturgeon	300, 000	15, 000
All other species	502, 000	24, 100
Total for river products	2, 752, 000	91, 435

B.—THE NEW JERSEY SHORES OF NEW YORK BAY.

137. STATISTICAL RECAPITULATION.

In the discussion of the sea fisheries of the various localities, the State has been divided into three districts, namely, the New Jersey shores of New York Bay, the ocean shore of Northern New Jersey, including the coast-line between Sandy Hook and Barnegat, and the southern district of New Jersey, including the shore between Barnegat Inlet and Cohansey Creek, on Delaware Bay.

STATISTICAL RECAPITULATION OF THE SEA FISHERIES FOR 1880.

THE NEW JERSEY SHORES OF NEW YORK BAY.—Mr. Fred. Mather, while engaged in the investigation of the fisheries of New York State, visited the New Jersey shores of New York Bay and gathered the data from which the following statistics of the sea fisheries have been compiled. He has also furnished the succeeding discussion of the fisheries of the three bays which are comprised in this division.

Summary statement of persons employed.

Persons employed.	Number.
Number of fishermen	75
Number of shoremen	5
Total	80

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Boats	70	$4,200
Pound-nets	5	3,000
Fykes, traps, and baskets	100	7,000
Gill-nets	200	4,000
Drag-seines	10	1,000
Minor apparatus and outfit		750
Factories and shore property		2,000
Additional cash capital		1,000
Total capital		22,950

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Fish *a*	664,000	$19,476
Terrapin	3,800	633
Hard and soft crabs	24,000	2,650
Soft clams	10,000	500
Quahaugs	87,272	5,454
Miscellaneous products (including seaweed, mussels, &c.)		7,000
Total		35,713

a Including 150,000 pounds used for fertilizing purposes.

138. SANDY HOOK BAY.

LOWER BAY.—The fishing interests of New Jersey in this bay are confined to the manufacture of menhaden oil and guano. Five large factories are in active operation during the summer months, most of them doing a large business. The oil and guano factory of Day & Shipman, at Highland Park, is a small one which runs only part of the season. Next come the establishments of Carter & Co., Vale & Griffin, and Osborn & Vail; all of which are located near Port Monmouth. Half-way between the latter place and Keyport is the large phosphate factory of Preston Brothers. This firm makes some oil and scrap, but their main business is the manufacture of fertilizers. They buy scrap from other oil works to be mixed with phosphates, which they bring from the beds near Charleston, S. C.

In early spring a good many menhaden are taken in pounds and fykes, but when the water gets warm few are caught, as at this time the fish are schooling near the surface, and it is said they will then seldom enter the traps. Twenty pounds, and five gangs of fykes, with from six to ten baskets each, are fished along the beach near Port Monmouth. Each gang has a leader like that of a pound, with two fykes set opposite each other at intervals throughout its length. Various kinds of fish are taken, some of the larger ones being used for food, though the menhaden and all of the smaller and worthless fish are sent to the factories.

During my visit to the locality in May, besides menhaden, I saw the following fishes go into the boilers at the factories: Small butter-fish, perch, and blackfish; goosefish or anglers, skates, sting-rays, and alewives; besides several species of crustaceans.

Oyster-culture is practiced quite extensively at Keyport and Perth Amboy, in Raritan Bay.

139. UPPER BAY.

The fisheries of the New Jersey shore of the Upper Bay are mainly for shad. The fish are taken in fykes which are set at the end of hedges made of brush, and in gill-nets. Thirty hedges

with two fykes each are usually fished in the bay. Eight men are engaged in the fishery, the catch for 1880 amounting to 20,000 shad, in addition to 50 tons of other fish. Joseph Slater sets two fykes for shad off Constable Hook, and two for other small fish, while Mr. Nicholas and others have a number at Bayonne. Mr. Slater reports 12 to 15 shad a fair catch for a fyke in twenty-four hours. The shad season usually lasts from the middle of April until late in May, but other species, including bass and weakfish, are taken up to the middle of December. In 1880 the price of shad ranged from $8 to $15 per hundred. The principal fisheries, if we except the gill-net shad fishery, which is carried on to a limited extent by these fishermen in New York waters, are off Bergen Ridge, between Bergen Point and Communipaw. Bergen Ridge separates Upper New York Bay from Newark Bay, and fishermen living on it often fish in both localities.

140. NEWARK BAY.

The fisheries in this bay are said to have been greatly injured by coal oil. Newark Bay shad formerly sold at high prices in the neighboring towns, but as they often taste of oil they have lost their reputation. At times even the oysters in the bay are tainted with coal oil, and the fishermen complain loudly against the emptying of such substances into the rivers, as well as against the practice of carrying oil across them in submerged pipes.

Ten men fish regularly throughout the year, and in the shad season as many more fish with gill-nets in New York waters; $1,500 are invested in nets, with $300 additional in small boats. The catch of shad for the past two seasons has been very light. In 1880 it amounted only to 4,000 in number, with 32 tons of other species. A few crabs are taken here for local consumption. The smelts which enter this bay are esteemed beyond those of other localities. They are taken chiefly about the Hackensack and Passaic Rivers. They are quite small, seldom exceeding five inches in length. The catch is now quite insignificant, but when Eastern smelts are selling in New York at from 5 to 15 cents per pound these find a ready market at 25 cents.

C—THE COAST FISHERIES OF NORTHERN NEW JERSEY.

141. STATISTICAL RECAPITULATION.

THE VARIOUS FISHERY INTERESTS.—This district, which includes the ocean shore from Sandy Hook to Barnegat Inlet, has extensive fisheries. They are carried on exclusively from small open boats, and sloops and schooners under 5 tons measurement. The fishing is chiefly about the mouths of the brackish bays and coves, and along the outer beach, though a number of species are taken several miles from land. The fishing begins in early spring and continues without interruption till late in the fall, after which most of the fishermen turn their attention to clamming, though a few of the larger boats are employed in the winter cod fisheries.

STATISTICAL RECAPITULATION.—The following statements show the extent of the sea fisheries of the district for 1880:

Summary statement of persons employed.

Persons employed.	Number.
Fishermen	1,800
Shoremen	50
Total	1,850

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels	.....	.....
Boats	1,331	$58,160
Pound-nets	13	16,000
Fykes, traps, and baskets	2,453	6,125
Gill-nets	260	5,968
Drag-seines	111	9,130
Minor apparatus, including outfit	.....	18,000
Factories and other shore property	.....	30,500
Additional cash capital	.....	11,000
Total	.....	154,883

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Fish *a*	9,356,766	$278,735
Terrapin	2,800	467
Lobsters	150,800	5,880
Crabs	1,343,300	150,412
Soft clams	630,430	31,522
Quahaugs	550,720	34,420
Miscellaneous products	.....	3,000
Total	.....	504,436

a Including 200,000 pounds used for fertilizing purposes.

142. GENERAL ACCOUNT OF THE VARIOUS FISHERY INTERESTS.

The material for the following description of this district and of its more important fisheries was gathered during a personal visit to the locality in the fall of 1880:

THE GEOGRAPHY OF THE REGION.—That portion of the coast lying between Sandy Hook and Barnegat Inlet, for convenience of treatment called Northern New Jersey, has, for the most part, a low sandy shore, which is interrupted at several points by shoal and narrow inlets that open into shoal-water bays or rivers, extending a short distance from the sea. The Shark and Squan Rivers are the most important ones in the section. These have extensive tide-flats along their shores. They receive a limited amount of fresh water from small and unimportant streams that reach some distance into the interior, but are affected to such an extent by the ocean tides that in their lower portion they are usually quite salt during a greater part of the year. There are also shoal-water bays or lagoons of larger size extending parallel with the coast at a short distance from it. These are fed chiefly from the sea, but they also receive a limited quantity of fresh water from the small creeks that drain the surrounding country.

The bays running parallel with the coast often expand into large sheets of water, and frequently separate the outer shore from the main land by a considerable distance. Such is the case at Sandy Hook, where the outer shore is reduced to a low and narrow sand bar, some 10 miles in length, formed by the action of the tides and currents. This bar is separated from the main land by the waters of Sandy Hook Bay and its two important branches, known as the North and South Shrewsbury Rivers.

The southern portion of the district is of similar formation, the outer shore being reduced to a low barren sand bar separated from the main land, for a distance of 20 miles, by the northern arm of Barnegat Bay, which varies from one-quarter to 4 miles in breadth.

The ocean-bed slopes rapidly downward, and a depth of 5 or 6 fathoms is reached within a short distance of the shore. From this point the descent is very regular and gradual, and for a considerable distance to seaward the bottom is a level plateau of sand, interrupted here and there by small patches of rocks, and larger areas of clay and mud.

NORTHERN NEW JERSEY AS A SUMMER RESORT.—The district, especially in its northern portion, is one of the most popular resorts for invalids and pleasure-seekers in the entire country, and during the summer months the beaches are lined with people from the larger cities of the interior, who seek to avoid the sultry weather by coming to the seashore. Many of them have bought land and are building cottages along the shore, while a larger class take rooms at the fashionable hotels that may be found at short intervals for miles along the coast. The region is then one vast summer resort, and a large percentage of the resident population are employed in catering to the wants of the visitors during their sojourn in the locality. Owing to the nearness of New York and Philadelphia another class are extensively engaged in supplying these markets with produce and fish.

NORTHERN NEW JERSEY AS A FISHING DISTRICT.—The natural advantages of the region as a fishing district are perhaps a little above the average, but the fact of having good markets for the catch and facilities for shipping are matters of much greater importance to the fishermen. The fishermen of other regions find no difficulty in catching an abundance of fish, but they are so far from the larger cities that it is often quite impossible to market their catch, while in other cases the cost of transportation is so great as to make such a course unprofitable. Under such circumstances they are obliged to content themselves with supplying the home demand, which is often quite limited. With the fishermen of this region the case is quite different, for fish can be put upon the markets of New York or Philadelphia a few hours after they are taken from the water. They are thus in excellent condition, and bring higher prices than those sent from a distance, while the cost of transportation is proportionately less. The large local demand for the hotel and cottage trade also tends to make the prosecution of the fisheries more profitable here than in other districts.

The fishing season begins early in May and continues till November, while a small number of men fish for cod in winter. The fishing is chiefly in the salt water at the mouths of the various bays and rivers, where many of the species congregate in considerable numbers in the spring, and remain throughout the season for the purpose of feeding and spawning. The crabs and clams are also most abundant in these localities, and a large number of men and boys devote the entire season to their capture. Many of the species are also abundant along the outer shore; and along its northern portion, or in that section lying between Squan River and Sandy Hook, an extensive fishery has been developed.

This coast fishing, as distinguished from that of the bays, is of two kinds. The first, called ground or bottom fishery, is confined to the capture of such fishes as live and feed at the bottom. These seem to have no special feeding grounds, but are distributed on all of the hard and rocky spots, of which there are many scattered along the entire coast. The second is confined to the migratory species living and feeding at or near the surface, and is of considerable importance.

There is also another fishery extensively prosecuted by the fishermen of the region in the fresh water at the head of Barnegat Bay during the winter months. Rock (*Roccus lineatus*) and perch are the principal species taken. They are caught chiefly in haul-seines, a single draught of several tons being occasionally made.

Shrewsbury is one of the oldest oyster regions in the neighborhood of New York, and the oysters from this region have always stood high in the markets. There are no natural beds here,

but the stock is raised from transplanted young, obtained chiefly at Keyport. At Shark River about 200 lots of oyster-beds are leased, but the product is only enough to supply the local consumption at the summer hotels.

THE PRINCIPAL FISHING CENTER.—There are no large cities or even villages of note that can be treated separately as fishing centers. The fishermen very naturally gravitate toward the bays and rivers that have been mentioned, and toward the shore at that portion where the coast fisheries are extensive. There they usually become scattered along the water-line, owning small farms or gardens in the rural districts. The nearest approach to a fishing center is Seabright, a few miles south of Sandy Hook, which, owing to its landing and shipping privileges and its nearness to the fishing grounds, has become a popular resort for the fishermen of various localities during the fishing season. The whole section from Sandy Hook to Long Branch is an important one, and many fishermen live within these limits. There are also several settlements along the bays and rivers, where the majority of the inhabitants are dependent on the fisheries for a livelihood. The more important of these are Fair Haven, on the Shrewsbury River, and Manasquan, on the Squan River, where crabbing and clamming are extensively carried on; and Waretown, near Barnegat Inlet, is a center for the gill-net fishing of Barnegat Bay during the summer months.

THE FISH-LANDINGS NEAR LONG BRANCH.—The property along the shore between Sandy Hook and Long Branch, owing to the demand for building sites, is now very valuable, and, as the region has become more thickly settled, the fishermen, who formerly landed their catch where it was most convenient, have gradually been driven from place to place until they are now obliged to use property set apart exclusively for this purpose. Such places are called fish-landings. A company of men now usually own or rent a piece of ground fronting on the water, and after building a large number of ice-houses on it, and arranging with the railroad company to have a convenient shipping station established, they rent privileges at the landing, together with the use of an ice-house, to any and all fishermen who may desire them. The usual price paid for the privilege of landing is $5 a year for each boat, equal to $2.50 per man, while the rent for the ice-house varies according to its size and the number of men that are interested in it.

The ice-houses are from 75 to 100 feet in circumference, and have a conical roof. They are about 14 feet deep, with the floor usually 8 feet below the surface of the ground. The portion above ground is well banked with sawdust, tan-bark, or earth, to protect it from the weather. The average ice-house costs about $200, and holds from 150 to 250 tons, according to its size. Several of the fishermen use an ice-house in common, and divide the expense of rent equally. The price paid averages about $15 a year. With the line-fisheries it is customary for eight men, or the crews of four boats, to join for this purpose, but in pound-fishing one or even two ice-houses may be required for each net. The fishermen gather their ice in winter from the ponds in the locality, doing their own work as far as possible, but hiring men and teams whenever it may be thought necessary. If the labor of the fishermen is neglected, the cost of filling the house is about $60; and all who have assisted in the work and contributed toward the expense are at liberty to use as much ice as is needed for the preservation of their catch until the supply is exhausted. The men, however, are never extravagant in its use, as they must pay freight on all that is shipped with the fish, and care is taken that each package shall be as light as possible. In all cases where the fish are shipped, ice-houses similar to those described are constructed and filled from ponds in the locality. When there is a scarcity of ice the fishing is often discontinued, as it is not profitable to import it from other regions for fishing purposes.

Owing to the high price for land, the fish-landings are fewer than formerly, and from 50 to 75 boats have their headquarters at the same point. The most important landings are at Sea-

bright, Monmouth Beach, and Long Branch. At other places along the shore and in the bays the fishermen are more scattered and the ground is less valuable. Here they are allowed to land at various points, and they frequently use the public or other landings, or have small landings of their own.

THE DISPOSITION OF THE FISH.—As a rule the fishermen ship their own fish. A few are sold to middlemen, but these are chiefly for local supply. On reaching the shore they at once clean, box, and ice their catch, and ship to the commission dealers of New York and Philadelphia by the first train. They never weigh the fish, but merely keep account of the number of packages, trusting to the dealers to send correct returns. The rates charged by the dealers are 10 per cent. of the selling price, and the transportation charges vary from $1 to $1.50, according to the size of the package and the distance it has been carried. These with the cost of packages make the expenses about one-quarter to one-third of the gross sales.

143. DESCRIPTIONS OF THE MORE IMPORTANT FISHERIES.

THE DIFFERENT FISHERIES OF THE DISTRICT ENUMERATED.—The fisheries of the district may be divided into branches as follows: Bluefish trolling, still-baiting, the pound-net fishery, the gill-net fishery, the haul-seine fishery, the hand-line fishery, the winter cod fishery, the eel fishery, the lobster fishery, the crab fishery, the quahaug fishery, and the soft-clam fishery. Of these, all are to a greater or less extent separate and distinct, though the fishermen often engage in two or more during the year, while some may be interested in several at the same time.

TROLLING FOR BLUEFISH AND OTHER SPECIES.—Trolling, or "squidding" as it is sometimes called, is chiefly confined to the region lying between Sandy Hook and Squan River, and to Barnegat Inlet. Open boats and small sloops are generally employed for this purpose, each crew using from one to four lines. The "squids" vary considerably; some are made of bright metals in the form of a fish and are provided with a single hook, others are painted in brilliant colors and may have several hooks, while a piece of red or white cloth attached to an ordinary fish-hook sometimes answers the same purpose. The lines are towed through the water at an average speed of 2 to 4 miles per hour. The principal species taken are bluefish, Spanish mackerel, and bonito. The average daily catch for a boat with two men is from 300 to 400 pounds, though the quantity varies greatly and may exceed 1,000 pounds.

The method of trolling was introduced into the region at an early date, and was more extensively adopted by the fishermen ten years ago than at the present time, as other methods have since been introduced that are thought to be more desirable. Trolling is now extensively practiced only by the "still-baiters" and gill-net fishermen. At Sandy Hook the vessels and boats using this method usually fish a number of miles from the shore and trolling is confined largely to the months of May and June, a few following it at intervals during the greater part of the summer. At Barnegat trolling is the method employed by the pleasure-seekers during the entire season, the fishing being confined to the waters near the inlet.

THE METHOD OF STILL-BAITING DESCRIBED.—"Still-baiting" was not extensively followed by the fishermen of the region prior to 1870, but the method is rapidly growing in favor. It is probably the outgrowth of the old method of mackerel "hooking," and, as far as known, is peculiar to the fishermen of Sandy Hook and Long Island. By this method two men usually fish from the same boat, one chopping and throwing the bait, which in most cases consists of fresh menhaden, to toll up the fish, while the other catches them on a hook baited with pieces cut from the backs of the menhaden. The season continues from the last of May till November; and the fishing grounds

extend from one-half to 6 miles from the shore. Bluefish (*Pomatomus saltatrix*) constitute about four-fifths of the entire catch, the only other species taken in any numbers being bonito (*Sarda mediterranea*) and Spanish mackerel (*Scomberomorus maculatus*). The "still-fishermen" also fish with hook and line occasionally for "bottom-fish," and with gill-nets for other species. The total catch of these fishermen amounts to $800 to the boat during the season.

THE POUND-NET FISHERY.—Pound-nets were introduced into the region by Mr. George Snediker, of Gravesend, Long Island, about 1855. The first used, being of small size, were set in Sandy Hook Bay for protection from the ocean storms. They did not come into general use till about 1873, when it is said they were first extensively used on the outer beach. With the exception of one fished during a part of the seasons of 1878 and 1879 near Barnegat Inlet, and small ones in the Shrewsbury Rivers, the pound fishery has been confined to the vicinity of Sandy Hook. In 1879 there were six pound-nets between Long Branch and Sandy Hook, stocking an average of $10,000 each, and clearing fully $7,000 apiece on fish taken during the season. In 1880 there were eleven pound-nets in the same section, and two smaller ones in Sandy Hook Bay. These outer pounds averaged about $8,000 each, and cleared $5,500, the best one having a gross stock of nearly $12,000. The pounds are set in May and fished regularly when the weather is suitable till November. Placing the gross stock at $8,000, the catch of each pound, according to reliable estimate, would be as follows: Weakfish (*Cynoscion regale*), $4,800; Spanish mackerel (*S. maculatus*), $1,200; butter-fish (*Stromateus triacanthus*), $700; bluefish (*Pomatomus saltatrix*), $500; sheepshead (*Diplodus probatocephalus*), $300; bonito (*Sarda mediterranea*), $125; shad (*Clupea sapidissima*), $55; other species, $300.

THE GILL-NET FISHERY.—Gill-nets were formerly used almost exclusively for the capture of bluefish in this region, and are now largely used for that purpose, but they are also extensively used for Spanish mackerel, and, to a limited extent, in the rivers and bays for weakfish and other species. Between Sandy Hook and Squan River, nets of 3½ to 4 inch mesh, 100 fathoms in length, are extensively used at a distance from the shore between August and November. These were formerly "set straight" and caught only bluefish. Later they were used as sweep-nets for Spanish mackerel with indifferent success. About 1873 it was accidentally learned that by having sharp angles in the net Spanish mackerel could be readily taken. This led to various experiments, which have resulted in an extensive fishery. The nets are now set in a manner similar to that on which the pound-net is constructed. Two nets are set together, one taking the place of the leader, while the other is set in various shapes as a pocket for the fish. The nets are held in position by anchors and lines. The more common "sets" are known as the square-set, t-set, and harpoon-set. A gang of two nets fished in this way has stocked $1,092 between August and November. The average stock for the nets north of Long Branch is about $400 for each gang, one-half of the money being for Spanish mackerel and the remainder about equally divided between bluefish and weakfish. Between Long Branch and Squan River the nets are more commonly "set-straights." A fisherman in this locality with two nets usually stocks about $250, of which $150 are for bluefish and the balance for Spanish mackerel and weakfish in equal proportion.

At Waretown nets of 3¼-inch mesh, 25 fathoms in length, are extensively used. These are usually anchored at one end and allowed to swing with the tide. One man fishes four of them and stocks from $200 to $250 in a season, three-fourths of the entire catch being bluefish.

At different points along the bays and rivers, especially in the Shrewsbury Rivers, small gill-nets are used for catching weakfish and other species for local supply, but the business is unimportant.

Gill-nets of large mesh are also used for taking sheepshead in the vicinity of Barnegat Inlet, where they are allowed to drift over the feeding-grounds of the fish. This fishing is carried on chiefly at night. It is seriously objected to by the line-fishermen, who claim that the nets frighten the fish away and "break up" the fishing.

THE SEINE-FISHERY.—Haul-seines were formerly extensively used in many of the rivers and bays of the district. They are now used at different points along the shore by the crews of the various life-saving stations for rock (*Roccus lineatus*) and other species, and to a limited extent in some of the bays and rivers. In most regions, however, their use in the rivers is prohibited by law, and as the run of rock along the shore is quite small, the seine-fishery is now of little importance, except in the winter rock and perch fisheries of Metedeconk Neck, at the northern end of Barnegat Bay. Here one hundred and ninety-six men with forty-nine seines are engaged in fishing from November till April, hauling their seines both in the open water and under the ice. Rock and perch are said to have been first taken in this locality about the beginning of the present century, and for the last forty years the fishery has been extensive. A single haul of 80,000 pounds is reported about 1850, while 15,000 to 25,000 pounds are occasionally taken in a day by a single seine at the present time. The total catch in the winter of 1879–'80 reached over half a million pounds, netting the fishermen $36,700. After this fishing is over a few of the nets are hauled for herring (*Clupea vernalis* and *C. æstivalis*) in the locality for several weeks, while others are taken to the Delaware River, where they are used in the capture of shad and herring.

THE HAND-LINE FISHERY.—The hook-and-line fisheries, when separated from the still-baiting, trolling, and the winter cod fishery, include only the catch of such parties as are employed in the capture of the different species with hand-lines in the bays and rivers, together with those engaged in "bottom-fishing" on the various rocky spots along the shore. The former class comprises a large number of men and boys of all ages and occupations who fish occasionally or with considerable regularity for pleasure and profit during the summer months, together with the summer visitors, who fish extensively for amusement. The catch of this class is composed chiefly of weakfish and bluefish. The second class is made up of the professional fishermen who fish for "bottom-fish" on the rocks whenever gill net fishing, still-fishing or trolling ceases to be profitable.

It often happens that for some reason the bluefish are less plenty, or that they refuse the hook either at certain times of the tide or for days together. The fishermen usually carry lines and bait, and on such occasions spend their time in fishing on the rocks. At certain seasons of the year a considerable number of fishermen devote their entire attention to "rock-fishing," and the catch is often quite large. The principal species taken are sea bass (*Serranus atrarius*), blackfish (*Tautoga onitis*) and porgies (*Stenotomus chrysops*), though it is said that the last-named species is much less abundant than formerly.

A DESCRIPTION OF THE COD FISHERY OF THE REGION.—About the 1st of November the codfish reach the shore, and the other species having mostly disappeared, many of the fishermen between Sandy Hook and Squan River engage in the cod fishery during the winter months. This fishery is confined wholly to the locality named, with the exception of an occasional trip by the crews of the various life-saving stations further south. At first hand-lines are used, but later in the season these are superseded by trawls or scrawls as they are often called. These have an average of two hundred to two hundred and fifty hooks each, and a boat with two men usually carries two of them. They are set at a distance varying from one-half to 6 miles from the shore, and allowed to remain for an hour and a half, after which they are hauled and the boat returns. The gangings of many of the trawls are provided with corks; these were introduced into the

region about 1875, and answer the purpose of keeping the bait off the bottom. The fishing continues during pleasant weather, the regular fishermen averaging five fishing days in each fortnight from November till the middle of April. The fish leave early in May.

Cod are quite abundant, as shown by the large catches that are often made. Late in November, 1880, four men caught 1,600 pounds with hand-lines in three and one-half hours, and December 7, six men landed 2,600 pounds, as the result of four or five hours' fishing.

From a careful investigation of the subject it seems quite probable that the cod fishery of this region is destined to become important, and that the number of men engaging in this fishery, both here and in other portions of the State, will increase from year to year, until many of those who now spend a greater part of the winter in idleness will find remunerative employment in this way. The present difficulties are the lack of suitable vessels, and the small size of the trawls. The limited number of harbors will, of necessity, confine the vessel fisheries to a few localities, but by the use of larger boats, together with trawls having three or four times the present number of hooks the business could doubtless be made very profitable.

NORTHERN NEW JERSEY THE SOUTHERN LIMIT OF THE LOBSTER FISHERY.—Lobsters are found all along the New Jersey coast, but not in sufficient numbers in its lower half to warrant the fishermen in engaging in their capture. The lobster fishery of the State is therefore confined to its northern portion, or to the region lying between Sandy Hook and Squan River, this being the southern limit of the lobster fisheries of the United States. The fishermen of Northern New Jersey have been engaged in the capture of the lobster for many years, and about 1860 the fishery is said to have been quite important. From that date the business gradually declined, until in 1870 the capture of the species was almost wholly discontinued. In 1872 the fishery again began to revive, and at the present time large quantities of lobsters are taken in the region. In 1880 there were fourteen boats with twenty-eight men engaged regularly in the capture of lobsters in connection with their work in the line and net fisheries, the catch being sold partly in New York and Philadelphia and partly to the local trade. The pots, which are covered with netting, are usually set in May, and the fishing continues till October, though a few men begin fishing early in March, and others fish till the last of November.

THE CRABBING INTEREST.—The crab fishery of this district is perhaps more extensive than that of any other portion of the entire coast. It furnishes employment to over five hundred men and boys during four months of the year. The crabs are very abundant in all of the shoal-water bays and rivers of the district, coming out of their winter quarters in the mud in the early spring. The season for shedding begins about the 20th of May and lasts till October. During this period all of the old boats and scows that will float are pressed into service, and many of the unemployed men and boys, and even a number of women, engage in the fishery. There is a limited trade in hard crabs for fish-bait, but usually these are discarded by the fishermen, who reserve only the soft ones and those that are beginning to shed. This is a very profitable employment, and the best fishermen will make $1,000 during the season, while the average for all (boys included) is fully $250. The crab fishery has been prosecuted in this district for a long period of years. As early as 1855 cars were towed behind the boats to receive the "busters" or such as were taken in the act of casting their shells. About twenty years ago the shedding-pens were introduced, and from that date "comers," or those that give evidence of shedding in a day or two, have been saved. For some reason crabbing is confined largely to particular localities—Shark, Squan, and the North and South Shrewsbury Rivers being the most important places. The people of other places almost as favorably located give little attention to crabbing, probably owing to a lack of information of the

money made by those who engage regularly in the business. A large part of the catch is sent to New York, and the remainder is divided between Philadelphia and the local trade.

THE FISHERY FOR QUAHAUGS AND SOFT CLAMS.—The quahaug fishery of the district is confined largely to Sandy Hook Bay and to the waters about Barnegat Inlet, where the species is taken from low-water mark to a depth of 20 feet. The fishing is chiefly during the summer months, many small vessels from different ports of Raritan Bay fishing about Sandy Hook during the height of the season. Four methods are employed in this fishery, as follows: Dredging, raking, tonging, and treading. Dredges are used by vessels, usually sloops of from 5 to 30 tons, and also by smaller boats; tongs, similar to those employed in the oyster fishery, are used from small boats; rakes are used from boats, and by men who wade about upon the shoals; and treading is a method by which the men, who wade in the water up to their waists, feel the clams with their feet. The average fisherman who makes a business of clamming clears from $150 to $200 in a season. Two-thirds of the entire catch is carried to New York by the vessels, and the remainder used locally or shipped to Philadelphia by rail.

Soft clams are very abundant on the sand and mud flats in the salt water at the mouths of the rivers and in the various bays; but in the former they are occasionally killed by freshets, so that fishing in such localities often becomes unprofitable for several seasons. It is said that such was the case in Shark River in 1880, when the clammers of that region were obliged to turn their attention to the other fisheries or to visit other places in order to find clams of marketable size. This fishery is prosecuted during the entire year, but it is most extensive during the spring, fall, and winter months, as many of the fishermen turn their attention to the quahaug fishery in summer. The fishing is at present confined largely to Sandy Hook Bay, including the mouths of the Shrewsbury Rivers and to Squan River; and, though the species is very abundant all along the New Jersey coast and may be taken in fair numbers as far south as Cape Charles, Virginia, Squan River marks the southern limit of the extensive fishing for the species for shipment to the principal markets. A few are, of course, taken at different points farther south for bait and local use, but no extensive shipments are made to other points, though the business might be carried on with profit as far down as Cape May.

D.—THE COAST FISHERIES OF SOUTHERN NEW JERSEY.

144. STATISTICAL RECAPITULATION.

THE VARIOUS FISHERY INTERESTS.—The fisheries of this district, which includes the coastline between Barnegat Inlet, on the ocean shore, and Cohansey Creek, on Delaware Bay, are less extensive than those of the district just described. If we exclude the cod fleet at Atlantic City and the small vessels from Delaware Bay that are occasionally employed in the capture of the different species, the fisheries are confined almost wholly to the waters lying between the outer sand bars and the mainland, which are the resort of immense numbers of fish during the summer months. Owing to limited shipping facilities, the commercial fisheries of many localities are little developed, the fishermen engaging in the business chiefly to supply the hotels at the various summer resorts and to furnish food for themselves and their neighbors. Nearly all of them are engaged in oystering and clamming during a considerable portion of the year, while some devote their entire attention to the crab fishery during the summer months.

STATISTICAL RECAPITULATION.—The following statements show the extent of the fishery interests of Southern New Jersey for 1880:

Summary statement of persons employed.

Persons employed.	Number.
Number of fishermen	2,205
Number of shoremen	30
Number of factory hands	12
Total	2,247

Detailed statement of capital invested and apparatus employed.

Apparatus specified.	Number.	Value.
Vessels (98.64 tons)	8	$10,500
Boats	1,812	85,003
Pound-nets	9	800
Fykes, traps, and baskets	530	2,173
Gill-nets	58	1,735
Drag-seines	274	10,940
Minor apparatus and outfit		23,450
Factories and other shore property		10,000
Additional cash capital		5,000
Total capital		149,601

Detailed statement of the quantities and values of the products.

Products specified.	Pounds.	Value.
Fish *a*	4,060,460	$141,339
Terrapin	2,400	400
Crabs	103,000	9,550
Soft clams	19,850	992
Quahaugs	2,494,288	155,893
Miscellaneous products (including 3,690,000 pounds of king crabs)		9,920
Total		318,094

a Including 200,000 pounds used for fertilizing purposes.

145. THE PRINCIPAL FISHERY CENTERS DESCRIBED.

THE GEOGRAPHY OF THE REGION.—The ocean shore of Southern New Jersey, including the coast-line from Barnegat Inlet to Cape May, is formed by a number of low sandy islands, varying from 3 to 20 miles in length and from a few rods to a mile or more in breadth. These are separated from each other by shoal and narrow inlets and from the mainland by a net-work of tide creeks forming a salt marsh usually several miles in width. In the northern portion of the district these creeks unite to form a large bay, known as Little Egg Harbor, which may be regarded as a southern prolongation of Barnegat Bay. At other points where rivers of any considerable size empty into the ocean large shoal-water bays are found, the two most important ones being Great Bay and Great Egg Harbor.

On the Delaware or western shore a similar belt of low land or salt marsh extends for a considerable distance, while the water lying beyond the shore-line deepens so gradually that extensive mud and sand flats are exposed at low-tide.

THE PECULIARITIES OF THE INHABITANTS.—The inhabitants are scattered along the higher lands overlooking the marshes, or congregate to form small settlements at the head of the shoal

creeks several miles inland. The shore islands, with the exception of such as have become popular as summer resorts, are almost uninhabited, and even these places are often deserted during the winter months. Many of the people are wholly dependent on agriculture, but the greater number of those living near the water own small patches of land, on which they raise scarcely enough to supply their own tables. These are largely dependent on the bays for a livelihood. There is also a large class that "follow the bay" during the entire year, oystering in winter and fishing or clamming at other seasons.

It is urged by some that the fisheries are a positive injury to the State, in that they encourage idleness and cause the people to neglect the cultivation of the soil. It is doubtless true that the great wealth of sea products lying at their very doors has given these people a feeling of security that works to their disadvantage, for with their knowledge that there is an abundance of fish, oysters, or clams that can be had at any time for the taking, and that these will not only supply food, but can readily be turned into money, they soon become improvident, spend a greater part of their time in idleness, and go to the bays only when necessity compels.

THE MORE IMPORTANT FISHING CENTERS DESCRIBED.—There is more or less fishing for local supply along the entire shore, and almost every man living near the water catches a few fish and gathers a sufficient quantity of clams and oysters for his own table, while some in nearly every locality fish to supply the country trade, except in that portion of Delaware Bay lying to the north of Dennis Creek, where the fishing for marine fishes is limited to the capture of weakfish, which occur in such small numbers that the fishing is not extensive.

The commercial fisheries of Southern New Jersey center about the larger summer resorts along the shore. These either afford an excellent market during the summer months, or, from their location, offer superior advantages for shipping. The principal centers are Barnegat, Tuckerton, Atlantic City, and Cape May.

Barnegat, a settlement of 1,100 inhabitants, is a favorite resort for the sporting classes from the larger cities of the interior. Being located near Barnegat Inlet, it is chiefly important on account of the large number of bluefish taken by trolling. It ranks low as a market, as the inhabitants are largely supplied with fish free of charge by the pleasure fishermen.

Tuckerton, a village of 1,400 inhabitants, is situated nearly opposite New Inlet, in the center of the most extensive quahaug fisheries of the entire coast. It affords good shipping facilities by both land and water, and many of the people for miles in either direction are largely interested in clamming and fishing. There is also an excellent local market both in Tuckerton and at Beach Haven, a few miles distant.

Atlantic City, the largest summer resort of Southern New Jersey, is located on one of the islands of the outer beach at Absecon Inlet. It is the principal fishing center of the district. It has a winter population of 5,500, which is increased during the summer months to many times that number, every hotel and boarding-house being packed from the middle of June till late in September. During this season the demand for fish is very large, and six firms, with eighteen men, in addition to a large number of fishermen and hawkers, are engaged in catering to the trade. According to Mr. J. V. Albertson, fully $30,000 worth of fish and $35,000 worth of oysters are consumed in the city each season. The principal species used are weakfish (*Cynoscion regale*) and sheepshead (*Diplodus probatocephalus*), and market-boats often go 20 to 30 miles to get their supply.

In addition to its advantages as a market, Atlantic City is favorably situated for the prosecution of the ocean fisheries. There are two well smacks that supply the city in part with sea-bass (*Serranus atrarius*) in summer, and it is more largely interested in the winter cod fisheries than

any other city in the State. It is the only port on the entire coast south of New York where a vessel is licensed for the fisheries.

Cape May, at the southern extremity of New Jersey, is also a favorite resort, and it is said that not less than 10,000 people spend their summers there. There is a large demand for fish at this season, and many fishermen, for miles on either side of the cape, are engaged in fishing for this market with seines, pounds, and hand-lines. According to Mr. J. H. Farrow, who is one of the principal dealers in the place, not less than $12,000 to $15,000 worth of fish are consumed yearly, a majority of them being taken within 15 miles of the city.

146. DESCRIPTION OF THE MORE IMPORTANT FISHERIES.

THE HAND-LINE FISHERY.—More fish are taken with hook and line than by any other method. The summer line fishing begins about the 1st of June and continues till late in October. At this season the water of the shoaler bays and flats becomes very warm, and the fish are often driven into the deeper channels beyond the reach of the seines; while in some portions of the district seining is prohibited by law during certain months, so that the hand-line is necessarily employed. In addition to those who fish for local supply only, many of the professional net-fishermen, oystermen, and clammers, together with a number of farmers and mechanics, engage in the line-fishing during the summer months, selling their fish to the numerous hotels along the shore, or shipping them to the larger markets. The average fisherman makes from $1 to $1.50 daily in this way. The catch is composed largely of weakfish and sheepshead, the former representing fully three-fourths of the money value.

Weakfish are very abundant in all of the bays and creeks on both the ocean and bay sides from May till October, and the catch is governed wholly by the demand. These fish are quite small, averaging only one-half to 1 pound each, and many of the smallest are thrown away as unfit for market. In the fall, schools of larger individuals, varying from 2 to 8 pounds each, are found along the outer shore, and a few fishermen from the vicinity of the inlets are now beginning to engage in their capture. This fishery promises to be a very important one, for, while the fishing is at present very limited, and the catch is used almost exclusively for local supply and for salting, the large size and abundance of the fish will make their capture very profitable.

Sheepshead weighing from 3 to 10 pounds are very abundant about the principal inlets on the ocean side, and, according to Mr. J. E. Otis, of Tuckerton, one hundred and sixteen boats have been counted at one time fishing for them at the inlet opposite that city. At Atlantic City three men fishing from one boat have made $40 in a single day. In Cape May County sheepshead are taken in considerable numbers in the larger creeks and channels some distance from the inlets. They are seldom seen on the bay side.

THE HAUL-SEINE FISHERY.—Haul-seines from 30 to 80 fathoms in length are extensively fished in this district for weakfish during the spring and fall. The seines are owned at various points along the shore, and fished with more or less regularity, but the more important seine fisheries are confined to the vicinity of Atlantic City and to Cape May County. On the ocean side the fishery is confined to the inner bays, while on the bay side the seines are usually hauled on the outer beach.

A seine with a crew of four men, fished regularly during the spring and fall, will stock from $300 to $500 net, two-thirds of this sum being for weakfish, and the remainder chiefly for Cape May goodies (*Liostomus xanthurus*), and rock (*Roccus lineatus*).

PLEASURE-FISHING.—The pleasure-fishing from the many summer resorts of the district comes next in importance when the quantity of fish taken is considered.

At almost every village fishermen own small yachts for carrying pleasure-parties on fishing or sailing excursions. At Barnegat there are about twenty-five of these boats; at Tuckerton and Beach Haven, thirty; and at Atlantic City, eighty. These, added to the number owned at other smaller places, swell the total for the district to one hundred and eighty-five yachts, with fifty additional row-boats, engaged in pleasure fishing and sailing from the middle of June till late in September. These yachts vary in size from 1 to 50 tons, and have an average value of $400 to $600. They are fully provided with fishing-gear and bait, and carry from one to two men each to sail the boat and assist in baiting the hooks. At Barnegat trolling for bluefish (*P. saltatrix*) is a favorite pastime, but at other points the fishing is chiefly for weakfish with hand-lines. The catch, which is often very large, is usually given to the boatman to dispose of as he may think proper, or taken to the boarding-house where the parties are stopping; some, however, box their fish and ship them to friends at a distance. The village of Barnegat is nearly supplied with fish taken by the pleasure-seekers, and at Atlantic City many of the cottages receive an abundance from the same source.

THE EEL FISHERY.—The eel fisheries of the district are of considerable importance. In the northern portion the fishing is usually with spears during the winter months, the greater part of the catch being taken near Oceanville; but in Cape May County haul-seines, 25 to 50 fathoms in length, are employed during the summer. A small vessel, owned by Captain Mitchell Howell, of Dyer's Creek, is engaged in the fishery. She has a crew of three men, who, having provided themselves with eel-pots, fish at different points along the shores of Delaware Bay.

In addition to the above, many of the farmers, mechanics, and men engaged in other branches of the fisheries, fish occasionally for eels during their leisure hours both in summer and winter. The bulk of the entire catch is consumed locally, while a small part is sent to the New York and Philadelphia markets, netting the fishermen from 4 to 5 cents a pound.

THE WINTER COD FISHERY.—The winter cod fishery comes next in importance. Codfish make their appearance in this region about the middle of November and remain till the last of April. They seem to be quite generally scattered over the bottom, and may be found along almost any part of the coast from one-half to 10 miles from the shore, though they are more abundant on the rocky and clayey spots.

THE FISHING GROUNDS FOR COD.—As far as known there is but one important fishing-bank off the New Jersey coast. This lies nearly east of Cape May, about 12 miles distant, and, according to Captain George Hildreth, extends 15 miles in a northeast and southwest direction, and has an average width of nearly a mile. This is known as "Five Fathom" or "Hereford Bank." There is also a larger bank known as "The old grounds," lying to the southeast of Cape Henlopen. These banks have long been frequented by a number of the New York market-smacks during the winter months, and at the present time no less than thirty of them engage regularly in the cod fisheries here and at other points along the New Jersey coast.

THE COD-FISHERMEN OF ATLANTIC CITY AND TUCKERTON.—When the residents of this district only are considered, the capture of the cod is confined to the fishermen of Atlantic City and Tuckerton, though a few are taken by the crews of the various life-saving stations along the shore, and by the pilot-boats in the vicinity of Cape May.

At Atlantic City the cod fishery began, according to Capt. Washington Yates, fully forty years ago, when the fishermen went out occasionally in boats or small vessels, selling their catch locally. There was no regular fishing, however, and the practice was soon discontinued, so that between 1855 and 1871 very few cod were taken. In 1871 Captain Yates, who is a harbor pilot at Atlantic City, visited the fishing grounds and, finding cod plenty, engaged regularly in the fishery. In 1875 three other boats joined him, and trawls were then introduced. From that date

the business has increased until, in the winter of 1880–'81, there are thirty-eight men with six vessels and several boats engaged in the cod fisheries from this city. This is the only point between New York and Charleston, S. C., where vessels are engaged in the shore line fisheries. The fishing is in 7 to 8 fathoms of water, from one-half to 5 miles from the shore, the average catch being about 100 pounds of fish daily to the man.

Tuckerton is also engaged in the cod fisheries to a limited extent. The fishery here is said to be of recent origin. Small open boats are exclusively employed, and the fishing is carried on with little regularity, the men going out only one or two days in each week.

THE POUND-NET FISHERY.—The pound fisheries of Southern New Jersey are confined wholly to that portion of the Delaware Bay lying between Cape May and Dyer's Creek, and, with the exception of a pound fished for several years in Great Bay, none are known to have been fished elsewere in the district. These pound-nets are much smaller and less expensive than those at Sandy Hook, having an average value of only $90. According to M. J. W. Gandy, of Cape May Court-House, pound-nets were introduced into the region by Mr. Holmes, of Green Creek, about 1870. In 1880 there are nine of them on the flats along the shore, some having 2 or 3 feet of water at low tide, while others are entirely dry. They differ considerably from the pound-nets of other portions of the coast. The leader is about 50 fathoms long, and in the place of the fore-bay are two wings each 25 fathoms in length. The pound proper, or bowl, is divided into two compartments, the first being intended for king-crabs (*Limulus polyphemus*) that are taken in enormous numbers during the early summer. The second compartment is connected with the first by means of a funnel-shaped opening large enough to allow the fish to enter, but too small to admit the crabs. The lower part of the pound is made of stakes imbedded in the mud and extending a foot or more above it. To these stakes the netting is attached, the object being to keep it above the crabs that would otherwise destroy it.

The pounds are fished only from the 1st of March to the middle of June, after which they are taken up, as the water on the flats becomes so warm that the fish retire to the deeper channels. Weakfish constitute fully three-fourths of the entire catch, the remainder being mostly rock and Cape May goodies. Often enormous quantities of weakfish are taken, the catch being so great that it is found desirable to save only the largest individuals. It frequently happens that the price is so low that the fishermen are not warranted in shipping the fish, and the entire catch is often turned back into the bay. On account of the difficulty of finding a market for their catch the net stock for each pound is quite low and in 1880 averaged only $400.

THE GILL-NET FISHERY.—The gill-net fishing is quite unimportant, and there are no professional gill-net fishermen in the district. A number of small nets are owned at various points along the shore, and fished irregularly, for local supply; and at several of the inlets nets of 60 to 100 fathoms are allowed to drift with the tide over the feeding grounds of the sheepshead, and longer ones are used as sweep-nets in the principal channels.

FISHING FOR BLUEFISH OFF CAPE MAY.—Off Cape May there was formerly a limited amount of gill-net fishing for bluefish between the 1st of October and the middle of November. Mr. J. W. Gandy says that large bluefish may be taken within a few miles of the shore during a greater part of the summer, and that they follow the menhaden into the shoaler water in October. These fish vary from 5 to 18 pounds in weight, the average being about 10 pounds.

In 1875 the fishing vessels, while en route for the bluefish grounds of the North Carolina coast, found these fish and set their nets for them. For two or three years the vessels fished in this locality, as many as thirteen being counted at one time. For the past two seasons, however, the vessels have abandoned these grounds as the fish have been less abundant. The boat-fisher-

men of the shore, who formerly engaged in the fishery to a limited extent, have also given it up, and in the fall of 1880 there was but one net, 150 fathoms in length, set off Cape May. This was fished but a few days and took only twenty-five fish, or an average of 250 pounds, daily.

THE WINTER ROCK AND PERCH FISHERIES.—The winter rock and perch fisheries of the district are confined largely to Mullica and Great Egg Harbor Rivers, where these species remain in the fresh waters during the winter months. At the former place the fishing is prosecuted from November to April by means of diving-nets, hoop-nets, and haul-seines. The diving-net originated in and is peculiar to this locality. It consists of a large funnel-shaped net opening into a small bag or pocket, and is so arranged that it can be set at various depths. The hoop-net is simply a large bag attached to poles, by means of which it is raised and lowered through an opening in the ice. In Great Egg Harbor and Great Egg Harbor River seines are extensively used for the capture of the above species in the principal channels and in the numerous creeks, and the catch is often very large. Small gill-nets of 3¼ inch mesh, without lead-lines, are also fished to a limited extent along the grassy flats in the larger bays during the first of the season.

There are one hundred and twenty men engaged in this fishery during a part of the winter, most of them being included with the clammers or with the summer fishermen. The catch reaches fully 200,000. It is shipped largely to Philadelphia and New York, about one-third going to the latter place. The net value of this fishery to the fishermen is about $10,400, divided equally between the two species.

THE MENHADEN FISHERY.—The menhaden fisheries of Southern New Jersey are quite important. According to Capt. George Hildreth, the first oil and guano factory built in the district was located on the shores of Delaware Bay, some distance above Cape May, in 1861; but this, on account of the shoal water, proved unprofitable, and was soon abandoned. In 1874 another factory was built at Dyer's Creek, but it was run only a year or two. Mr. J. E. Otis informs us that the first factory on the ocean side was built at New Inlet, near Tuckerton, by Mr. C. N. Smith, in 1868. In 1880 there were five factories in the district, three of them being located at New Inlet and two near Great Egg Harbor Inlet, all being provided with kettles and pans for cooking the fish. These five factories employ eighty-nine fishermen, with eleven sail vessels and one steamer which was brought into the district from Long Island in 1880. The catch during the season reached nearly 19,000,000 of fish, making 1,138 barrels of oil and 1,850 tons of crude-dried guano. There were sixty-two laborers employed at the factories. In addition to the catch of the factory fishermen, a good many menhaden are taken in seines by farmers and professional fishermen for use on the land, and many are taken in the pound-nets of Delaware Bay. A purse-seine was also fished for a few weeks near Cape May, in the summers of 1879 and 1880, by one of the farmers, who used the fish for enriching his land. The total catch, therefore, for the entire district must have reached about 21,000,000 of fish.

THE CLAMMING INTERESTS.—Probably no portion of the Atlantic coast has such extensive quahaug fisheries as that at present under consideration. Almost every bay of any considerable size between Barnegat Inlet and Cape May contains large numbers of these clams. Especially is this true of Little Egg Harbor, Great Bay, and Great Egg Harbor, which are doubtless the most important clamming grounds in the United States. They occur only in limited numbers in the waters of Delaware Bay, and the fishermen of that region are obliged to cross to the ocean side to engage in the fishery.

Nearly all of the fishermen and oystermen living along the shore engage in clamming during certain months, while many follow it throughout the entire year. In some localities the fishing is chiefly in spring; in others, in the spring and fall, and in still others during the summer also. It

is not so extensive in the winter on account of the ice in the bays and the limited demand for clams in the markets, where oysters are usually preferred.

The only methods in use in this district are "treading" and "tonging," the latter being the more common. Treading is said to have originated with the Tuckerton fishermen, and to have been introduced by them into other States, both North and South. The clammers work but a few hours in a day. They usually go out at "half-ebb" and return at or before "quarter-flood," thus fishing only during the four or five hours of low water. The average fisherman will "tong" from 1,000 to 1,200 clams in a day, but 4,000 to 5,000 have been frequently taken. The total value of the clams taken in this district is over $117,000 yearly. The catch is usually bought by the captains of small vessels at from $1.25 to $2 per thousand and carried to the New York and Philadelphia markets; but at times the captains merely "freight" and sell the clams, receiving one-third of the gross sales for their services. Many are also shipped by rail to these markets and to the other cities of the interior.

Soft clams (*Mya arenaria*) are quite plenty, but they are used chiefly for bait, and only to a limited extent for food, by the fishermen of the region. None are dug for shipment to the larger markets.

THE CRAB-FISHERIES.—The crab-fisheries are of little importance; and though soft crabs are very abundant in most localities, the people have not yet learned that good wages can be made in catching and shipping them. The principal fishing is by boys and men to supply the line-fishermen and visitors with bait. Many are also taken and sold to the hotels at Beach Haven, Atlantic City, and Cape May; though, on account of the small size of the crabs, many of the hotels get their supply from a distance.

Hard crabs have little value, except for bait, and none are now shipped from the district. An attempt was made several years ago by the fishermen of Tuckerton to establish a winter fishery for the species, but it proved unprofitable. The method of fishing was a novel one. At the approach of cold weather the crabs bed in the mud, where they remain till spring, and for this reason they cannot be taken in the ordinary way during the winter months. The fishermen visited these bedding places in boats, and took the crabs out of the mud with clam and oyster tongs. This is the only instance known to us where crabs have been taken for market in this manner.

At Atlantic City crabbing is a favorite pastime for the visitors, and from twenty to thirty men and boys are engaged in taking pleasure parties out to engage in this fishery. On any pleasant day during the summer season from fifty to one hundred people may be seen engaged in crabbing, and it is now considered by many as better sport than fishing or sailing. Part of the catch is used for bait by the line-fishermen.

FEW TERRAPIN TAKEN.—Terrapin, though not abundant, are occasionally taken by the fishermen during the late summer, and after they have bedded in the mud for the winter. They are usually found on the flats, but not in sufficient numbers to warrant any extended fishery. No traps, dredges, or seines are used in their capture.

THE OYSTER INDUSTRY.—At various points from Barnegat to Atlantic City and Lake's Bay, on the ocean side of New Jersey, and at Maurice Cove, on the shores of Deleware Bay, the oyster industry is important. Mr. Ingersoll fully discusses this industry in his special report; concerning the abundance of oysters along the Jersey shores of the bay, he says:

"The center of the present oyster industry in the Delaware Bay and River, on the New Jersey shore, is at Maurice Cove, in Cumberland County, which is reached by the Cumberland and Maurice River Railroad from Bridgeton. This shore is bordered all the way by extensive marshes, through which innumerable small creeks find their way from the interior, and which contain many

open places called 'ponds.' Throughout these creeks and ponds, in the tide-ways and along the edges of the sedge-plats and islands, oysters have always grown in great profusion. In addition to this the bottom of the bay and of the Delaware River, from Cape May beach clear up to and a little above Cohansey Point, at the southern end of Salem County, a distance of not less than 50 miles, is everywhere spotted with oyster-beds. These oyster-beds are not confined to the shallow waters near shore, or to the sedge plats, but are apparently scattered over the whole bottom of the bay. Even the ship channel, 90 fathoms deep, contains them, as experimental dragging shows. How this might have been a century ago I know not; but such is the present condition."