

Special laws relating to Cape Cod were passed in 1870, and remain in force, to the following effect:

SECTION I. No person not an inhabitant of the town of Wellfleet shall take any clams, quahaugs, oysters, or other shellfish within the waters of said town, without first getting a permit from the selectmen, nor shall any person being an inhabitant of said town take any of said fish for bait, at any time, exceeding three bushels, including their shells, or for the purpose of selling the same, without a permit from the selectmen of said Wellfleet, who may grant the same for such sum to be paid to the use of the town as they shall deem proper; but the inhabitants of said town may take said fish for family use without such permit.

SEC. II. Whoever takes any shellfish from within the waters of said Wellfleet in violation of the provisions of this act, shall, for every offense, pay a fine of not less than five or more than ten dollars and costs of prosecution, and one dollar for every bushel of shellfish so taken; said fine and forfeiture imposed under this act to be recovered by indictment or information before a trial justice in the county of Barnstable.

D. TAUNTON RIVER AND COLE'S RIVER, MASSACHUSETTS.

17. OYSTER-CULTURE AND TRADE ON MASSACHUSETTS AFFLUENTS OF NARRAGANSET BAY.

PECULIARITIES OF THE SOMERSET NATIVE STOCK.—A discussion of this small district forms a natural division of the subject, since the Taunton river beds are isolated, and lying between Narraganset bay and the Cape Cod district, furnish seed for both. The river itself flows into Narraganset bay, and the region immediately about its mouth is included.

There lies in the Taunton river, at Dighton, a large rock, well known to archæologists, on account of some inscriptions which it bears; these, though untranslated, are supposed to be the work of Norse voyagers who early visited these waters. The foundation for this supposition is very fully and attractively stated in Thoreau's *Cape Cod*, to which the reader is referred. These earliest comers were pleased to find shellfish abundant in the region, and the English settlers, three or four centuries later, record their thankfulness on similar grounds. From time immemorial, then, oysters have been natives of this district, and no such mistake as has been made north of Cape Cod could ever be put forward to deny that they are here indigenous.

LEGISLATION AND LICENSE.—It was long ago recognized that the Taunton river was a valuable oyster-property, and legal measures were early adopted looking toward its preservation. The present plan of operations came into effect about thirty years ago, and though differing slightly in the various towns bordering the river, consists, in general, of the leasing of the ground for raking and planting purposes, during a term of years, at a fixed rental. Most of the towns do this under the general law of the state, already explained in the chapter on the south coast of Massachusetts bay district (C); but Somerset had a special act in her favor, passed by the legislature in 1847, which reads as follows:

SECTION 1. The town of Somerset shall have the exclusive control of the oyster-fishery in that part of Taunton river within the limits of said town, and may sell at public or private sale * * * the right or privilege of taking oysters * * * for a term of not less than three nor more than ten years at any one term; and all money arising from such sale or sales shall be paid unto the treasurer of said town, for its use, etc. (Chapter 44.)

Beyond this, every householder has the right to take three bushels each month for family use.

The privilege of this town now rents for \$800 a year, and is owned for five years by the Somerset Oyster Company, composed of citizens of the town.

In Fall River, the lease is held by a firm from Wellfleet, Massachusetts, at \$600 a year.

In Freetown, the holder of the lease is a Providence man, who pays about \$1,000 annually for the privilege.

The lessee of the privileges of Dighton, also, is a citizen of Providence, at a cost of \$475 a year.

Berkeley rents its oyster-banks to a Somerset company at \$1,300 a year, for a long term.

Assonet is leased for ten years, with Providence capital, at \$1,225 a year.

The total income, therefore, derived by the towns along the bank of this small river, only a dozen miles long, is \$5,400. This is wholly for the privilege of raking the bottom for seed, besides which the towns reserve the right of each citizen to take such oysters from the river as he needs "for family use". I know no other district in the United States which is made to serve the public treasury so well.

In respect to this matter of leases, however, it may be said, that it was evidently the intention of the makers of the law to parcel out the privilege among many persons; but the shape of the business has changed, capital has overcome weak opposition, where it existed, and where there was a score of owners of the water-front twenty-five years ago, there is now only one. It is probably to the general advantage, however, in this case, that the business should be thus centralized.

SOMERSET OYSTERS: THE HISTORY OF THEIR DETERIORATION.—The oysters from all parts of Taunton river (the producing extent is about 12 miles long) are known as "Somersets". Formerly they were considered extremely good eating, and grew to a large size. Within the last twenty-five years, however, they have assumed a green appearance and lost quality. It is popularly asserted, locally, that this is owing to the influence of the impurities discharged by the copper-works, by the rolling-mills, and by the print-works, which are situated some miles above the oyster-beds. But this has been denied, on the ground that not enough of the mineral matter thus thrown into

the current could get down there to affect the oysters so seriously, and also on the better ground, that chemical analyses fail to show the presence of anything to account for the greenish stain, which is precisely that so highly esteemed a few years ago in the French oysters of Marennes, and other districts. I was assured that this greenness varied in different parts of the river, and with different seasons, and that if any oysters happened to have grown high up on the bridge-piers, or elsewhere off the bottom, they were not green at all. Just how deleterious to health these green Somerset oysters are, I could not learn satisfactorily. Nobody pretends that their effects are fatal, and some say they are as good as any other inferior oyster. The general opinion, however, is, that eating a dozen raw ones is certain to be followed by violent sickness at the stomach. No doubt prejudice has much to do with it, for there is no food which the imagination would more quickly influence the stomach to reject, than the soft, slippery, and somewhat insipid fresh-water oyster. The same green appearance occurs of late in the oysters of Seekonk river, to be spoken of later on; and in both cases transplanting entirely removes the stain and elevates the quality, which is said to be slowly improving. In consequence of this stain, the eating of Somerset oysters, in their natural state, has been nearly given up, and the whole trade of the river is devoted to the production and sale of seed. Of course no planting of any sort, beyond the occasional transference of "set" from one part of the river to another, has ever been undertaken.

CULTURE OF SEED-OYSTERS IN TAUNTON RIVER.—The number of young oysters born every fall in Taunton river varies, but there is never a year wholly without them. The season of 1877 was a good one, and about ten years previous, the autumn of "the great September gale", saw an extraordinary production, or "set", as the appearance of the young oysters is termed here. The rocks and gravel along both shores are covered to a greater or less extent, but in addition to this, every owner spreads down great quantities of clean shells every summer, in the hope of catching spawn. Generally, they are successful, and sometimes extremely so. Some experiments have been tried with sunken brush; but though the spawn attached itself well enough, the currents and winds are so strong and uncertain as to drift it all away and lose it to its owner. Perhaps 25,000 or 30,000 bushels of shells are spread in this river annually. The favorites are scallop shells, because they are thin and brittle, so that the young oysters anchored to them are easily broken apart or detached. Scallop shells are somewhat scarce, and 3,000 bushels put down at Assonet in 1878, cost \$300. The result, nevertheless, is often very gratifying. Mr. S. R. Higgins told me, that from 500 bushels of shells placed near Fall River, he took up the following year 3,500 bushels of young oysters. The annual product, in seed, of the different town-fronts along the river, is given approximately, as follows:

Berkeley	Bushels.	Somerset	Bushels.	Assonet	Bushels.
Dighton	11,000	Freetown	6,000	Fall River	13,000
	3,000		10,000		8,000
Total "Somerset seed"					51,000

Putting an average value of 45 cents a bushel on this (the sales of the Somerset Oyster Company in 1879 netted them 42 cents), gives the sum of \$22,950 as the value of the yearly crop of Taunton river seed. Of this, \$5,400 is paid as revenue to the towns, and the balance mainly to native assistants in dredging, tonging, and transportation. The river-towns may, therefore, be said to derive about \$20,000 as the annual value of their fisheries to them, besides the oysters needed "for family use". This money is widely distributed. While the law permits the raking of the river during nine months of the year, it is nevertheless the fact, that the main part of the work must be done in a much shorter time. As soon as the weather permits, or about April 1, the proprietors put gangs of men at work, and keep at it until the end of May. The catch is nearly all contracted for before it is caught, and every one is straining to fill their orders at the promised time. The water is from three to twenty feet deep, and the tonging not very difficult. The tongs used do not work by the twisting of the grain of an oaken pivot, but on a brass swivel-pivot, known as the "Somerset" tongs. All, however, do not approve of the invention, averring that it wears out the tongs. During the months of April and May, about 60 persons are employed in Somerset alone, and in other towns in proportion—perhaps 400 along the whole river—who, as a rule, live along the bank, and often own the boats they operate—if not owned, one is hired from their employer at 25 cents a day. The catching is all done by the bushel. Now from 10 to 15 cents a bushel is given, according to the scarcity of the mollusks, and a smart man might make \$2 a day, though the average will not exceed \$1 50. Formerly wages were higher: and perhaps the lowering has induced that constant effort on the part of the catchers to cheat the buyers, through false measures, etc., which is so freely charged against them.

The ground is cleaned up pretty thoroughly by the time the 1st of June is reached, and in the fall little raking is done, it being considered poor policy. A well-known lessee on the Freetown shore, however, thinking, at the expiration of his lease a few years ago, that he would be unable to renew it, resolved selfishly to dredge his whole land in the autumn, leaving as barren a ground as possible for his successor—a proceeding quite characteristic of the locality. He did so, but succeeded in renewing his lease, and returned to his raking the ensuing spring rather ruefully, expecting to find little or nothing. To his astonishment, he picked off of an area that had usually yielded him 6,000 to 7,000 bushels, no less than 12,000! Hence, he concluded that the thorough scraping had done the bottom good, though where he got the spawn at that late day is a mystery. This small seed, less than a year old, and about the size of your thumb nail, is widely distributed, going to beds on Cape Cod, in Buzzard's bay, along the

southern shore, and in all parts of Narraganset. It is highly esteemed on account of its hardness. Wonderful stories are told of the cold and heat, drought and exposure, water too salt and water too fresh, which it has survived and prospered under. There is no difficulty about selling to planters all that can be raised, and the present high prices are due to the rivalry which has been brought about between buyers. The vessels which come to carry it away are small sloops and schooners, of 30 or 40 tons, which carry from 300 to 1,000 bushels. None, I think, is sent anywhere by rail. Starfishes, nowadays, are few in Taunton river; but the borers, *Urosalpinx cinereus*, are growing more and more numerous and troublesome.

CULTURE AND PROTECTION IN SWANSEA, MASSACHUSETTS.—After leaving Taunton river, therefore, pointing westward, the first point at which oysters of any commercial consequence are met with, is in Coles river, which flows into Mount Hope bay, almost on the boundary between Massachusetts and Rhode Island. It was known long ago that oysters had inhabited this stream, and also Lee's river, near by, and immense dead shells are occasionally brought to light, but it had almost been forgotten, until a few years ago, when there was suddenly discovered near the mouth of the inlet a large bank of living oysters of fine quality. Everybody at once rushed to rake them up, evading or discarding the special law enacted in 1867 for the protection of the oyster-beds in these very rivers, and which I condense herewith:

SECTION 1. Defines the scope of the act—Cole's and Lee's rivers, town of Swansea.

SEC. 2. Penalties—fine of \$5 to \$50.

SEC. 3. Any householder, an inhabitant of Swansea, may take for family use two bushels a month; but selectmen may give a written permit for a larger quantity.

SEC. 4. The town of Swansea * * * shall have the exclusive right to and control of the residue of the oyster-fisheries in Cole's river and in Lee's river, within its limits, and the selectmen * * * shall have the right, from time to time, to sell to any person, at public or private sale, for any term not exceeding five years, the privilege of taking oysters from their beds therein * * *, under such regulations as they may in writing permit and designate. But at any legal meeting, called for the purpose, the town may, by vote, direct the limit and extent to which the selectmen shall thereafter exercise the powers herein conferred.

SEC. 5. The town may recover treble damages against offenders under this act.

SEC. 6. Any deputy-sheriff, constable or selectman may arrest and detain persons found offending.

SEC. 7. Any boat or vehicle containing oysters from Cole's or Lee's river in violation of this act, may be seized awaiting regular process of law (described in the context).

SEC. 8. Preserves the right to grant licenses for oyster-culture, and also Indians' rights.

The result of this onslaught was, that two or three seasons of it nearly extirpated the colony, and the few to be obtained now are only got by hard effort on the part of a few professional river-men, who peddle them in the neighborhood, or take them to Fall River.

The extensive banks and tide-flats of this river, however, have long abounded in young oysters, which were buried by the digging for clams, which is extensively carried on here, or frozen by the winter weather, so that few, if any, survived, and none to speak of were gathered. Lately a large gravel-bank has been thrown up by the changed currents against the pier of the railway-bridge, and the number of infant mollusks attached to the pebbles here became so great as to attract the attention of Providence oystermen, who have created a demand for this seed. It is therefore gathered and sold now, about 1,000 bushels, it is estimated, having been collected during 1879. This is hardy, of good shape, and produces a round and remarkably fine oyster. Some attempts have been made at Cole's river to plant and rear its own oysters, and the town granted areas for this purpose, but they have not been successful thus far. Litigation has resulted, in several cases, from a clashing of alleged rights, and anchor-frost and starfishes, or drifting sand, have done the rest. I fear it is not a favorable locality for this purpose. Of Lee's river there is nothing to be said.

STATISTICAL RECAPITULATION FOR TAUNTON AND COLE'S RIVERS:

Number of planters (not counted elsewhere).....	10
Extent of producing area..... acres.....	13
Number of men employed (a few days in spring).....	400
Value of shore property and cultch.....	\$5,000
Number of boats employed.....	250
Value of same.....	\$5,000
Annual sales of native oysters..... bushels.....	52,000
Value of same.....	\$23,000

E. COASTS OF RHODE ISLAND.

18. LEGAL REGULATIONS OF RHODE ISLAND OYSTER-FISHERY.

ORIGIN AND HISTORY OF THE OYSTER-LAW.—When the people of "The Colony of Rhode Island and the Providence Plantations" felt themselves sure of future stability, they applied to the king, Charles II, to grant them a charter, which he graciously did in the year 1683. This charter was a wonderful document for those days, because of the well-nigh perfect liberty it embraced, and its hospitality to every conscientious belief, whatever the name of the religious banner it rallied under. Among the privileges and liberties it insisted upon was the right

of free-fishing in every shape. The relations of the fishermen to the owners of the shores were defined with great minuteness, and were calculated to make all the fish of the sea, and all the molluscous denizens of the muddy tide-flats, as available as possible to every citizen. Thereafter they were jealously preserved for public benefit. In 1834-'35, for instance, the first session of the assembly at East Greenwich was distinguished by an act for the preservation of oysters, which the thoughtless inhabitants were burning in large quantities for lime; and, in October, 1766, an "act for the preservation of oysters" was passed, forbidding them to be taken by drags, or otherwise than by tongs, under a penalty of ten pounds. Parents and masters were held liable for the violation of this law by their children or servants, and the owners of boats engaged in evading it were subject to a double fine. When (and it was not many years ago) the state constitution was adopted, no clause was so scrupulously worded against possible evasion, as that which declared that in respect to the rights of fishing and of taking clams, etc., everything should remain precisely as decreed in the old charter.

The oyster-law, therefore, is based upon the principle, that between high-water mark and the public highway of the ship-channel, the land and water are controlled by the state as public property, to be administered for the greatest good to the greatest number. Rhode Islanders are extremely tenacious of these shore- and water-rights, and there has been no little quarreling over some actions of the legislators and decisions of the courts with respect to this subject; but, upon the whole, there has been little alteration of the original law. I condense it below, including all of the emendations up to 1880:

ABSTRACT OF THE OYSTER-LAWS AS AMENDED UP TO 1880:

GENERAL STATUTES. CHAPTER 132.—*Of the free and common fisheries.*

- SECTION 1. Prohibits taking oysters from the "free and common fisheries", or exposing for sale between May 15 and September 15; and north of Field's point, Providence river, between May 1 and November 1.
- SEC. 2. Prohibits one person taking more than 10 bushels of oysters a day; penalty, \$20.
- SEC. 3. Refers to quahaugs and clams.
- SEC. 4. Forbids dredges "or any other method more destructive to oyster-beds than the usual method of taking them by oyster-tongs"; penalty, forfeiture of boat and all apparatus, and a fine of \$300 upon every person engaged.
- SEC. 5. Exempts "under-rakes" from the force of section 4.
- SEC. 6. Fines any person willfully breaking up, dumping upon, or otherwise damaging any free oyster-bed; \$500 for each offense.
- SEC. 7. Prohibits planting on any private bed oysters taken south of a line from Hill's wharf to the commissioner's monument on the Seekonk shore (penalty, \$20 for every bushel); "provided, however, that the planting upon private beds of young oysters found above low-water mark, or found adhering to the shells of oysters fit for market or present use, shall not be deemed a violation of this section."
- SEC. 8. Enjoins culling, and the restoring to the bed of the shells and all small oysters unfit for market.
- SEC. 9. Forbids raking at night.
- SEC. 10. "No person not a citizen of this state shall be allowed to fish for oysters or other shellfish within the waters of this state."
- SEC. 11. Gives the shellfish-commissioners the right to "buoy off", *i. e.*, seclude any bed from being raked, when they think it is becoming exhausted, until it has again become sufficiently productive. They may also "buoy" any new beds discovered.
- SEC. 12. Enjoins proper publication of the placing and removal of buoys.
- SEC. 13. Prohibits the raking of "buoyed" beds or tampering with the buoys.
- SEC. 14. The penalties for violation of sections 8, 9, 10, and 13 are: fine of \$20 for each offense, and forfeiture of boat and all apparatus.
- SEC. 15. Persons convicted of a second offense against the oyster-laws forfeit their right to fish for three years thereafter.
- SEC. 16. Establishes Quicksand pond, in Little Compton, Point Judith ponds, and all the Charlestown ponds, except Powaget, as free-fisheries.
- SEC. 17. Enforces the regulation concerning close season (see section 1).
- SEC. 18. Repeals all previous laws inconsistent with these amendments.

CHAPTER 133.—*Of private and several fisheries.*

- SECTION 1. Provides for the election of three state commissioners of shellfisheries, by the legislature, who shall hold office for five years. [Previous to 1864 there had been one and sometimes two commissioners, serving without pay.]
- SEC. 2. These commissioners may lease, by public auction or otherwise, to any inhabitant of the state, any land "covered by tide-water at low tide and not within any harbor line, to be used as a private and several oyster-fishery for the planting and cultivation of oysters thereon", upon such terms and conditions as they may deem proper, but not for more than ten nor less than five years, at \$10 a year rent for every acre leased, "and not leasing more than one acre in one lot or parcel to one person or firm".
- [Strict adherence to this last clause is avoided by common consent, most of the leasing being done, when there is no opposition, in lots of several acres. The commissioners evade the technical obstacle by writing, "This land is leased in parcels of one acre each, but included in one lease for convenience".]
- SEC. 3. Gives the commissioners power to modify and cancel leases or to remit rent.
- SEC. 4. Forbids the letting of "any land north of a line extending across Providence river from the south side of Hill's wharf, to a freestone monument at Lyon's point in East Providence, or letting any of the ponds in Little Compton, South Kingston, Tiverton, Charlestown, New Shoreham, or Westerly, or letting Long bed, Rock island bed, Muscle island bed, or Long Neck flats, in Providence river."
- SEC. 5. Enjoins publication of applications for leases.
- SEC. 6. Gives the commissioners power to compel the attendance of witnesses, etc.
- SEC. 7. Persons aggrieved may appeal from the commissioners to the court of common pleas.
- SECS. 8, 9, 10. Define appeal-proceedings, and judgment in appellate court, and proper execution of leases.
- SEC. 11. Requires the commissioners, before granting a lease, to have the land surveyed and platted; to cause proper bounds to be set up on the shore in order to define the limits of the leased area; to see that such land is inclosed with stakes or buoys not more than two rods apart (when not interfering with navigation); and to have the plats of all the leases bound in a book.
- SEC. 12. The expenses incurred under section 11 must be borne by the lessee, and the commissioners shall receive from the applicant their necessary expenses in supervising, and \$1 50 a day for actual service.

SEC. 13. Penalties of \$20 fine and double damages ensuing for tampering with boundaries of oyster-grounds.

SEC. 14. "The oysters planted or growing in any private oyster-ground leased as aforesaid shall, during the continuance of the lease, be the private personal property of the lessee of such oyster-ground; and the taking and carrying away thereof * * * shall be larceny * * * and shall be punished accordingly; and, in addition to the penalty prescribed by law for larceny, the person convicted shall forfeit his boat * * * and all the implements used in the commission of said offense." In addition to this the owner of the oysters stolen has a private action for damages against the thief.

SEC. 15. Requires the commissioners to see that the terms of the leases are properly fulfilled and rents punctually paid; in case of failure they must terminate the leases.

SEC. 16. Enables them to proceed against delinquent lessees.

SEC. 17. "The commissioners may take possession of any lot leased upon which the rent or assessment shall not have been paid, and may dispose of such lot, with all of the oysters thereon, by public auction, to the highest bidder, upon giving one week's notice * * * in some newspaper printed in Providence."

SEC. 18. Prohibits fishing at night, under penalty of \$20 fine and forfeiture of boat and apparatus.

SEC. 19. "Any person who shall wrongfully take and carry away oysters from a private oyster-bed shall, for the first offense, be fined \$50, and for any subsequent offense shall be fined \$100 and be imprisoned for six months."

SEC. 20. Willful injury to any private oyster-bed or to any land leased for oyster-culture, subjects to a fine of \$500 and confiscation of all apparatus involved.

SEC. 21. Deprives of the privilege of fishing for three years, in addition to the other penalties, upon second conviction for offences under this chapter.

SEC. 22. Forbids taking more than two bushels of oysters a day from Trustan pond, South Kingston.

SEC. 23. Makes each of the commissioners a special constable to enforce the law and seize the property of those violating it, and similarly empowers all police constables.

SEC. 24. Declares that nothing is intended in the oyster-laws to "prevent any citizen of the state from digging clams or quahaugs on the shores of the public waters".

FORM OF LEASE OF GROUND FOR OYSTER-CULTURE.—The form of lease by which ground for oyster-culture is conveyed by the state of Rhode Island, to lessees, is appended herewith:

No. —.

This indenture, of two parts, made and entered into on this — day of —, in the year of our Lord one thousand eight hundred and seventy—, by and between the state of Rhode Island and Providence Plantations, on the one part, and —, in said state, of the other part, witnesseth:

That the said state doth hereby lease, demise, and let unto the said — a certain piece of land in —, lying and being and covered with tide-water, containing about — acre—, and bounded and described as follows, to wit:

To have and to hold to — the said —, executors, administrators, and assigns, to their use as a private or several oyster-fishery, for the planting and producing of oysters, for and during the term of ten years from the day of the date hereof, on the terms and conditions (among others) that the said lessee—, executors, or administrators, shall pay therefor to the general treasurer of said state, during the said term, the yearly rent per acre of — dollars, in manner hereinafter provided. And the said state doth hereby covenant with the said lessee—, executors, administrators, and assigns, that they may and shall occupy the premises hereby leased during the term aforesaid, peaceably and quietly, and free from all lawful claim and demand of all persons whomsoever, other than as hereinbefore or hereinafter set forth: the said lessee for —, — executors, administrators, and assigns (with a reservation of his right to claim remission or abatement, as by law provided), doth covenant with said state, that — will pay to the general treasurer, for the use of said state, the sum of — dollars, on the first day of January in each year during the term aforesaid.

Furthermore: This lease is made and accepted, *subject to* the provisions of existing laws relating to oyster-fisheries, and to a reserved right of the state to amend said laws as it shall deem expedient (reference to the same being here made); and also, *subject to* the further conditions following, to wit: First. That he shall at all times erect, place, or renew the bounds, stakes, or buoys, with marks thereon, for defining the premises, as and when required by the commissioners. Second. That he shall pay all expenses of surveys of lots, and renewing stakes or bounds, and rent, to the general treasurer, as aforesaid. Third. That he shall not underlet or assign the premises to any person whomsoever, without the assent, in writing, of the commissioners. Fourth. That he will not knowingly or willfully violate any provision of the laws at any time in force relating to the oyster-grounds or oyster-fisheries within the state; and Fifth. That, in the event he shall refuse or neglect to comply with or conform to these conditions, or any or either of them, the said commissioners may, on the part of said state, re-enter upon said leased premises and terminate the lease, and declare the same forfeited, and dispose of the lessee's interest in the said land, together with all the oysters thereon, at public auction, to the highest bidder, upon giving one week's notice of such sale in some newspaper printed in the city of Providence; and the lessee—, executors, administrators, or assigns, shall be holden to pay all damage that shall thereby be sustained by said state.

In witness whereof, the commissioners of shellfisheries hereunto subscribe the name of said state, and set their names and seals as commissioners, and the said lessee— hereunto sets — hand— and seal— the day and year aforesaid.

THE STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS,

By — [L. S.]

Commissioner of Shellfisheries.

Signed, sealed, and delivered in presence of—

— [L. S.]

— [L. S.]

Assistant Commissioners of Shellfisheries.

STATISTICS OF RHODE ISLAND SHELLFISHERIES IN 1860 AND 1865.—This general statute, in substantially its present shape, came into force in 1864. Previous to that time the state had let oyster-grounds at \$1 rent per acre, and not much business was done. The condition of the shellfisheries in 1865 is exhibited in the following table, extracted from the census report for that year.

In 1861 the Rhode Island Society for the Encouragement of Domestic Industry stated, that while the continental shore-line of Rhode Island is only 45 miles, it has 320 miles of shore washed by the tides. Five out of

the 32 towns that compose the state are situated on islands. The bays embraced within the state, and the extensive salt ponds near the southern coast, abound with shellfish.

To ascertain the extent and value of these fisheries, the society made great exertions, but without success, at the time of the general census of 1860. A statement, nevertheless, exists in the report of 1860, that the oysters of Rhode Island were valued at \$382,170, out of a total of about \$6,000,000 for all the fisheries, excluding whales. In 1865, this point was made a special feature, and much fuller information was gathered. "These statistics," says the report of the general assembly's committee, "must, from the nature of the case, depend to some extent upon estimates. For example, the clams on the shores are free to all the inhabitants of the state who choose to dig them. Persons come to the shores from all quarters, and often from distances of several miles, and dig as many clams as they choose to eat or carry home. Nothing is exactly known of the quantities thus removed. The only estimates which could be made were from the opinions of the owners of shore-farms."

I give below the table of the product of the shellfisheries, by towns, presented by the committee in 1865:

Towns.	Bushels of clams.	Bushels of quahaugs.	Bushels of scallops.	Bushels of oysters.	Total value of all shellfish.
Barrington	962	457			\$2, 313
Bristol	200				200
Warren	1, 215	10			1, 225
East Greenwich.....	1, 415	339	6, 635	13	6, 313
Warwick.....	9, 127	2, 953	1, 627	242	13, 949
Jamestown.....	162	6			98
Little Compton.....					
Middletown.....	119				232
Newport	(Lobsters.)				2, 200
New Shoreham.....				4, 200	1, 680
Portsmouth.....	7, 715	145	500		4, 331
Tiverton.....	576	55			468
Cranston	200				200
East Providence.....	3, 405	830		12, 100	19, 602
Providence city.....	404	2, 966	3	50, 450	54, 122
Charlestown.....	200			1, 812	1, 515
North Kingston.....	5, 740	1, 480	870		6, 791
South Kingston.....	257		18	3, 070	3, 345
Westerly.....				7	11
Total.....	31, 697	9, 241	9, 653	71, 894	118, 655

OPPOSITION TO EXISTING LEGISLATION.—Although the amounts in the above table ought to have been doubled to represent the truth in each case, on the average, yet they show that when the new law, putting a rent of \$10 an acre and organizing the oyster-interest under careful control by the state, went into operation, the whole value of the industry was very small, compared with the present. Since the passage of this statute the oyster-interest has steadily grown in importance.

Nevertheless, there has always been more or less grumbling on the part of the owners of leases, who pleaded that they are paying an exorbitant rent. The general financial depression of 1873-'76 heightened this discontent, and in the winter of 1878-'79 it came to the surface in a contest before the legislature, which brought up several mooted points. The great bone of contention was the construction put by the commissioners upon who were suitable persons to receive leases. It was notorious that many Boston dealers planted oysters and operated business generally in Narraganset bay, upon ground leased in the name of some "inhabitant of the state", who might or might not act as their agent at the scene of operations. This practice was deemed by many native fishermen an infringement of law, and an injury to them. They, therefore, endeavored to procure the passage of a bill through the legislature, making it a misdemeanor for any lessee of oyster-beds to be interested with any person not a resident in the state, with a penalty of \$100 and a cancellation of the lease, for such "interested" connection.

The supporters of this bill averred that its object was to secure to the citizens of Rhode Island the right to supply the demand for oysters grown and cultivated in waters of this state, and to induce the capital invested in that business to be located here, where it and the profits accruing might be subject to taxation, and thus made to help pay the revenues of the state* beyond the mere rent-money of the ground. It was claimed that it was not intended as a restraint upon trade; did not imply that no lessee might borrow capital from outside the state, or might not contract to sell his oysters outside; and, also, that it was not with the intent to create a monopoly.

The opposition to this bill was strong, and was put in tangible shape by the application of Mr. George N. Bliss, an ex-commissioner of shellfisheries, for lease of ground in Providence river, in his name, as a partner in a Boston firm. A hard fight before the general assembly and before the commissioners resulted. Those opposing him

* I am of the opinion that the capital from other states invested in oysters in Rhode Island is between \$200,000 and \$250,000.

stated that the superior capital of outsiders was securing all the ground that was good for anything, and was thus keeping away citizens who wanted to plant on a small scale in their home-waters; moreover, that the great firms could afford to undersell individual planters because of their large facilities and production, and worse than that, that they brought oysters of poor grade, already opened, from Norfolk, mixed them with Providence river oysters, and so lowered the price and hurt the reputation of the honest native dealers.

In reply, Mr. Bliss said that the law which was then before the legislature was unconstitutional, and if passed it would be impossible to enforce it. The state could not dictate whose money, or where obtained, a man should use in his business. The oysters within the state were taxable, and therefore Boston owners paid their proportionate revenue. Nor could the state say what a licensee shall do with his oysters, to whom or where he shall or shall not sell them. As to the scarcity of land, that had been the cry for ten years, yet the state was leasing from one to two hundred additional acres of ground every year, and there would be more and more leased for years to come. Instead of harm, there was a positive benefit arising from the introduction of foreign capital, since there was not money and enterprise enough within the state to successfully keep it out by fair pre-occupation of all opportunities. The more beds leased, the larger the number of oysters produced and the cheaper. The Rhode Island market, he stated, takes only one-tenth of the oysters grown in the state. The remaining nine-tenths are sold outside. The price of oysters in the Providence market has decreased each year since 1866, when the price was \$1 75 per solid gallon, to 1878, when it was from \$1 15 to \$1 20, and to 1879, when it was only 90 to 95 cents. It appeared, therefore, that year by year oysters were increasing in quantity and lessening in price. This was the result of good legislation; and so long as it continued, the state was bound to consider the present regulations proper and foster them. If the effects had been as terrible upon the resident oystermen as had been predicted, they would have been driven from the field long ago; but there is not one of them who is not still in business and annually enlarging his planting area. The state could not legislate for the aggrandizement of these few owners, but must study the general benefit of the whole commonwealth.

The result of the fight was that the bill failed to become a law, and Mr. Bliss secured his new leases.

A DEFENSE OF EXISTING LEGISLATION.—The above sketch partly answers the question, whether the law is equally wise in charging \$10 an acre. From a careful study of the case, I, myself, believe that it is. The report of the commissioners of shellfisheries for 1878, reviewing the previous twenty years, proves this quite satisfactorily. It is admitted that at \$5 an acre, for instance, the state would not have received so much money.

In 1857 the revenue from oyster-rents was only \$30. In 1858, when there was a commissioner to look after it, \$685 22. From 1859 to 1861, there appears no mention of oyster-rents in the state treasurer's reports. I believe all dues were remitted on account of the universal destruction of oysters by starfishes at this time. In 1862, there were collected \$82; 1863, \$60; 1864, \$61. Then came the present law charging \$10 an acre, and the net proceeds of oyster-rents to the state at once advanced, as follows:

1865	\$ 737 72	1872	\$2, 772 95
1866	661 27	1873	4, 483 88
1867	1, 568 50	1874	4, 997 05
1868	1, 814 40	1875	5, 276 00
1869	1, 949 15	1876	5, 300 00
1870	1, 527 65	1877	6, 045 25
1871	2, 186 63	1878	6, 582 90

This shows that, in spite of a rent of \$10 an acre, in spite of the fact of lively competition with Boston capital, in spite of the fact of the general financial depression just passed, and in spite of the steady decrease in the selling prices of all grades of oysters, the revenue to the state has steadily grown, and new leases are continually applied for. It is, moreover, an admitted fact, that assignments of oyster-ground are continually taking place, at a bonus of from \$75 to \$200 an acre. If the state is to make any alteration in this state of affairs, she would do better to advance than to reduce the rent upon productive ground.

"But," say the dissatisfied ones, "we can never be sure that a piece of ground will be suitable for oyster-growth until we have tried it. If we take out, say ten acres, as an experiment, and perhaps are not able to plant it that year, or try it for two or three years, and then find that it won't do, we suffer a heavy loss, paying several hundred dollars upon useless ground."

The reply is, that men constantly do find it worth while to take the risk, even at \$10. One person I know of, has applied for 100 acres, beyond any territory heretofore thought suitable; and that in case they fail, or show that they have not been able to begin to use certain land as soon as they expected, the commissioners may, and often do, remit a part or the whole of the rent. This very year rent was remitted upon 47 acres belonging to one person. However, in their report for 1878, the commissioners referred to this alleged grievance as follows:

At the present time nearly all the oysters grown on private beds are imported from Massachusetts, Connecticut, New York, and Virginia, and although oysters spawn here freely, it is only at rare intervals that there is what the oystermen call a set, when the spawn attaches itself abundantly to sticks, stones, shells, and other substances, and grows to mature oysters. If, in some way, we could stop this great waste of spawn, so that it might produce oysters, an incalculable increase in our oyster-business would naturally follow. In Connecticut the oystermen throw into the water immense quantities of oyster-shells at the exact time of oyster-spawning, and are thus very successful, as the spawn readily attaches itself to clean, bright shells. The holders of oyster-beds here say that they would try

similar experiments, but they cannot afford to pay \$10 an acre annual rent for such a purpose, especially as several years must elapse before they would get returns, even if successful, and that the Connecticut men have the advantage of paying only \$1 annual rent for each acre.

Under the present law the commissioners are not allowed to lease land for less than \$10 annual rent for each acre, and we respectfully suggest that the general assembly inquire into the expediency of granting more favorable terms to persons who may wish to experiment, with a view of making productive our annual crop of oyster-spawn.

It is probably unnecessary to say anything further with respect to the law, unless it be to state, that although not required by any express provisions of the statutes, the commissioners have always held themselves ready to attend to the prosecution of offenders against the oyster-laws, whenever reasonable evidence has been presented to them, and have prosecuted many offenders, without charge for legal services. "It is evident," they reported, "that there have been combinations for the purpose of stealing from these beds, which is done in the night-time by men in row-boats, with watchmen ready to give alarm at the approach of danger, and thus, in many instances, they are able to escape detection." The arrest and conviction of several put a strong check upon these thieves, who stole the oysters and then inflicted additional injury upon the bed-holders, by underselling them in the markets.

19. THE PLANTING-GROUNDS OF NARRAGANSET BAY.

THE EAST SIDE OF NARRAGANSET BAY.—Tradition says that oysters used to grow in Mount Hope bay proper, below the mouth of the Taunton river; but I could get little trustworthy testimony on this point. Beyond that, on the eastern side, I could not learn of any oyster-beds, ancient or modern, until I reached Newport, where now none are growing or planted (the city deriving all its supplies from Providence), but where, in some of the larger salt-water ponds, they formerly existed in considerable quantities. They were described to me as a large, round, scalloped oyster, quite different from those anciently found in the pond on Block island, which were said to be long, slender, and very good. It is probable that a careful survey of ponds and inlets along the eastern bank of the Scoconet river, and around Scoconet point, would disclose the remains of many extinct beds, and perhaps some living colonies of oysters. The same may be said of Newport neck and Conanicut island.

The Kickamuit river is an inlet of Narraganset bay, at the extreme eastern boundary of the state, which has an entrance only a stone's throw in width, but expands interiorly into a bay about three miles long and one wide, the narrow upper portion of which is called Palmer's river. The water is shallow, of course, and the bottom of a very varied character. Forty-one acres have been leased, distributed among eight planters. Native oysters grew there of good size and quality, and some are got yet, but the chief value of the ground is for planting; and as yet the experiment is too slight to afford much judgment. There seems good reason to expect success, since it used to be a famous place for "set". The bottom is also said to be full of fresh springs, which is highly in its advantage.

Westward of the Kickamuit river are Warren, Barrington, and Palmer rivers, joining in an inlet of Providence river. In these three streams is leased a total of 173 acres, distributed among thirteen proprietors, some duplicating Kickamuit, Drownville, Providence, and Boston names. The shell-heaps strewn upon the knolls along all four of these rivers, show that the succulent bivalves have lived in their waters since time immemorial. Occasionally the natural oysters are still to be found; and that twenty years ago many remained, is shown by the fact that in 1860 an extraordinarily large number of infant oysters "set" on the shores. These native oysters were very large and long and slender. Their shells were not usually very heavy, and they were held in high esteem. At present there are none to be had of marketable size, and there are not enough young ones to be found in these rivers to amount to anything. Nevertheless the Warren and the Barrington are among the best places in Rhode Island, apparently, for oyster-culture. The water is wonderfully pure, sparkling, and salt, and flows in and out with a swift tide. The bottom is very hard, as a rule, and in places rocky. This fact makes the oysters there come to have a round outline, and a firmer, better substance within, though they do not grow so fast as they would lying upon mud.

A score of years ago planting was begun above the road and railway bridges, in Barrington river, and among the first leases taken out was one for the acre or two of "quick-water" between the bridges; but it is only within two or three years that operations have been extended below this part into the main river, where the water is salt, and ranges in depth from 9 to 18 feet, over a hard bottom.

The Virginia oysters bedded here do very well, indeed. They are handled mainly by one planter. His plan is to lay 75 bushels on an area 50 feet square, distributing them by shoveling overboard from the large crafts known as "planting-boats". Ten men, the usual number engaged on a single cargo, will thus unload and put upon the beds from 2,000 to 2,500 bushels a day. The Virginia oysters cost, put down, about 35 cents a bushel. On good ground the growth is gratifying, although about one-fourth of the original number put down are expected to perish. The large amount of cultch spread upon this gentleman's territory, had thus far yielded him no return of consequence, since he had planted with it only a few natives. On the contrary, another prominent lessee in Warren river, gave his whole attention to rearing native oysters, and paid no attention at all to "Chesapeakes". He procures his seed, like all the rest of the dealers, from Somerset, Wareham, Pocasset, etc., but mainly from the Connecticut shore. Formerly he got it much cheaper, but now it costs him from 50 to 70 cents a bushel. The several hundred bushels he put down three years ago lived well, and he now considers them trebled in value. He has adopted the

plan of not planting until June. "When the weather gets warm," he says, "the slime rises from the sand and rocks on the bottom of the river and floats away. There remains a clean bottom, and I wait to take advantage of this most favorable condition of things for my young oysters, who will have a hard enough time, under any circumstances, to live through it." Being fortunate enough to have a tract where the swift tide never permits serious freezing, he is able to wait until all his competitors are frozen up, when he can sell his easily accessible stock at a large advance upon the ordinary price, which averages about a dollar a bushel.

Rumstick point juts out from the southern end of Rumstick neck, a peninsula dividing the Warren river from the waters of Providence river. It is the site of a dangerous shoal, and the bottom is hard and in places rocky. There is only one owner of ground there, who leases 12 acres, but it is probable that a hundred acres more will be let there during 1880.

PROVIDENCE RIVER AND THE WEST SIDE OF THE BAY.—Proceeding now up the eastern shore of Providence river, at Nayat point (which stands opposite Canimicut, and marks the real mouth of the river on this side), 46 acres are now planted by a Providence firm. The beds are north of the point, on the sandy bottom around Allen's ledge.

The next point above this is Drownville, where the oyster-bottom is owned by three men, who divide 25 acres. Many other dealers, however, make Drownville their opening and shipping point, among them, several Boston firms having large opening-houses and shipping extensively. So many citizens, not less than 125, are given employment, therefore, in the winter, that the remark of one was justified: "Drownville would evaporate if it were not for the oysters." The starfishes and periwinkles have been troubling the Drownville planters of late more than elsewhere.

Reaching back into the country north of Drownville, and protected from the outer bay by Bullock's point, is Bullock's cove, a shallow estuary, by many regarded as the very best place to plant oysters in the whole state. It is certain that, uniformly, the best oysters now put into the market come from this immediate neighborhood. The only reason I have heard assigned is, that the bottom has many springs in it, supplying constant fresh water. In Bullock's cove 13 acres are taken up by two men; but the ground at Bullock's point (239 acres) is held by 12 lessees.

At Sabine's point, just above, there is only one owner, whose tract of 64 acres lies in a crescent between the light-house and the point. Just north, a single acre is let at Pomham rocks; and beyond, at Fuller's rocks, 9 acres are divided among four persons. This brings us to Field's point, on the western side, the northern limit of oyster-culture, and a scene of considerable operations, 23 acres being under lease to 9 persons. South of Field's point the river widens suddenly, but the channel hugs the opposite (eastern) shore, leaving extensive shallows all along the western shore. Southward from Field's point to Starvegoat island (familiarly condensed into Stargut island) runs a reef which is pretty nearly dry everywhere at lowest tide. This reef was among the earliest tracts taken up by the veteran oysterman, Robert Pettis. When, about 1861, the starfishes were depopulating the beds all over the bay, he alone was so situated that he could get at them at low tide and destroy them, and his good luck was the occasion of great profit to him. At Starvegoat island the beds now operated are 27 acres in extent.

There were formerly natural oysters growing abundantly all over this part of the river; but the main deposit was just south of Starvegoat island, in the center of the tract of 160 acres, now known to oystermen as Great Bed. This in old times was the great scene of oyster-raking, and it is more than thirty years since these beds were wholly exhausted. Once in a while, then, they used to get a few enormous specimens from there, and peddle them about town at 10, 15, and 20 cents each; but even these disappeared long ago. The owners on this bed are no less than 21 in number, and at Patuxent 63 acres more are taken up by five men.

At Gaspé point, 10 acres, and at Canimicut point, 60 acres, both being in a little salter and deeper water than any of the rest, complete the list of plantations, except one acre in Wickford harbor and another at Westerly.

In former years beds grew naturally clear up to the city of Providence, and oysters were even found in the "Cove", that pretty circle of water near the railway station, the banks of which have been converted into a park. Now, however, any leasing of ground north of Field's and Kettle points is impracticable and prohibited, because of the large amount of impurities thrown into the water by the city's drainage. The few beds up there—Long bed, West bed, Diamond bed, etc.—have, therefore, now been abandoned, and are not counted, though a few leases have not quite yet expired.

At its January session, in 1878, the Rhode Island general assembly passed a resolution enjoining the commissioners to visit the Great Salt pond (also known as Powaget pond), in Charlestown. It lies on the southern border of the state, and communicates with the open ocean by a narrow inlet, which frequently becomes closed by the shifting of the sand in the autumnal storms. In this pond the spawn of the oyster sets abundantly each year, and grows rapidly until the closing of the breach connecting the pond with the ocean cuts off the daily supply of salt water, which causes the oysters to die in immense quantities. If a permanent connection of this pond with the ocean could be secured, the natural oysters, which are of excellent quality, could be grown with great success, and large quantities of seed-oysters could be obtained for stocking the oyster-beds of Narraganset bay.

Such was the report of the examining committee, and such is the opinion of the people generally. Accordingly, the legislature appropriated \$1,500 to defray the expense of constructing a sort of riprap wall, in such a way that the currents and waves should help to keep the breach open, instead of closing it, and so maintain a constant influx

and efflux of sea-water. This work is not yet completed and tested. If it should succeed, a large, new territory will be added to the oyster-grounds of the state.

PAWCATUCK RIVER.—The Pawcatuck river divides the state of Connecticut from Rhode Island, and is subject to tides as far up as Westerly, at least. From a mile below Westerly to its mouth it is inhabited by oysters, though of poor quality, and hence of small commercial importance. These are of two sorts: one kind, the “rock-oyster”, attaches itself to the rocks along the shores and in the bottom of the stream, and grows singly to a good size; the other, called the “bed-oyster”, grows in dense clusters, in crowded beds, and is of very small size; it is rarely brought to market, and is considered by the fishermen worthless to transplant, on account of the clustered condition. Sufficient painstaking in the matter would, of course, overcome this objection. For some years the oysters of all kinds in this river have been affected by a disease which interferes with their sale, because, whether for good reason or not, they are supposed to be unwholesome. The disease was described to me as producing little “boils” on the body, inside the mantle, as near as I could understand. It appeared first as a greenish spot, then became yellow, and finally turned into a black, rotten pustule. Various causes are assigned, but none are satisfactory. Dry seasons, like the present, seem to augment the disease, which is perhaps a fungoid growth that finally “eats out a hole”, as the fishermen say, and it is not essentially different from the “greenness” of Somerset and Seekonk oysters.

A large set occurs regularly in this river, but in some years to a greater extent than in others. Three years ago was said to be an exceedingly productive year. Young oysters were found upon everything all through the river, and upon some rocky points down toward the mouth, they were said to have been seen lying on the shore “in windrows a foot deep”; this is an exaggeration, no doubt, but gives evidence that there was a vast quantity. This was immediately following a dredging-out of the channel. Nothing of any account was done toward saving them to stock beds anywhere. Pawcatuck river is not considered suitable for oyster-bedding to any extent, unless the ground should first be prepared by paving the mud and killing out the eel-grass. There are many impurities in the water, also, arising from drainage and the waste of many mills, print-works, and other manufactories. In Ward’s pond, on the contrary, a sheet of water affected by the tides, which lies four miles east of Westerly, is found a most excellent place for oysters, wild and cultivated, but the people who inhabit the shores do little themselves, and object to attempts on the part of outsiders. This pond contains between one and two hundred acres, and is nearly everywhere gravelly or sandy on the bottom, with considerable fresh water flowing in. I was told that nowhere in this whole region did oysters grow so fast, and acquire so fine a relish, as here, but not having inspected the pond myself, I cannot corroborate these glowing reports by personal observations.

AREA OF PRE-EMPTED OYSTER-GROUNDS IN RHODE ISLAND.—To recapitulate, I append a list of localities where oyster-ground is let in Rhode Island, and the areas in 1879:

Locality.	Acres.	Locality.	Acres.	Locality.	Acres.
Kickamuit river	35	Sabine point	64	Canimicut point	60
Palmer’s river	5	Pomham rock	1	Wickford harbor	1
Warren river	141	Fuller’s rocks	9	Ward’s pond, Westerly	1
Barrington river	27	Field’s point	23		
Rumstick point	12	Starvegoat island	27	Total number of acres	962
Nayat point	46	Great Bed	160		
Drownville	25	Pawtuxet	63	Number of lessees	56
Bullock’s cove	13	Gaspé point	10	Average tract	17.2
Bullock’s point	239				

FUTURE OF THE SHELLFISH-INDUSTRY IN RHODE ISLAND.—To the question: “Is all the suitable ground in Narraganset bay taken up?” the oystermen almost always reply: “Yes”. But they have been doing so for years and years, yet from 100 to 300 acres have been added to the leased area every year, and applications for more are now in. Below Canimicut point is an extensive basin, with plenty of hard bottom, entirely unoccupied, owing to the depth of the water, which, however, over large tracts, is no deeper than is planted in Connecticut. The same is true of Greenwich bay, where one man assured me a thousand acres would some day come under oyster-cultivation. Not much experimenting has been done in either of these districts as yet, however, the cost of leases and the active opposition of the scallop-interest deterring. It may be said, in general, that land enough unoccupied remains in Rhode Island to give scope to all the capital likely to be invested there for many years to come. It has been asserted more than once by the commissioners, that the revenue from her shellfisheries ought to, and in time will, pay all the expenses of the state.

20. SOUTHERN OYSTERS: TRANSPLANTING AND TRADE.

BEDDING VIRGINIA OYSTERS.—Thus far the bedding and fattening of Virginia oysters, mainly to be sold opened, has been the most profitable branch of the business. Of these oysters about 500,000 bushels are laid down annually, at present. The vessels employed in bringing them are mainly owned on Cape Cod, and have already been named. None, so far as I could learn, hail from Rhode Island ports. The freight is about 15 cents a bushel, in the fall and winter, falling to 12 and 10 cents in the spring, when quicker voyages for planting purposes can be made. What part of the Chesapeake bay furnishes the best oyster for these waters is a question that has received much attention. One gentleman told me that he had lost the whole of two years’ labor, by trying to put down

cargoes from the Rappahannock. Another planter, equally experienced, said these succeeded well enough if brought here and planted before the weather became at all warm. Oysters from the St. Mary and Potomac rivers are troublesome, because mixed with many obnoxious mussels, and, besides, they do not grow well, as a rule. Those from Tangier sound are pretty good, and are largely bought. The general verdict, however, is, that the best Virginia oyster for this bay is to be had in the James river. These show the largest growth at the end of the season, developing a hard, flinty shell and white meats; on the contrary, I was told that at New Haven, Connecticut, the James river oysters cannot be used at all. But many cargoes are planted here, the exact southern home of which is never known.

The laying down of southern oysters must all be done early in the spring. If they would only survive the voyage as late as June, Mr. Bourne thought that month would be the best time to plant them. When I suggested the use of steamers to expedite the transfer, he said it would not help matters, for the jarring of the cargo, caused by the throb of the engine, would kill the mollusks; he did not even allow any wood to be split on his oyster-vessels, for fear of this species of damage. Of the half a million bushels bedded in Rhode Island yearly, about half are owned in Boston.

TRADE IN NORFOLK OPENED OYSTERS.—During the winter of 1878-'79, the Norfolk opened oysters were brought to Providence in large quantities, by several dealers. The following is a statement of shipments, furnished by the steamship company:

Oysters shipped from Norfolk to Providence, Rhode Island, via Merchants' and Miners' Transportation Company, during 1878 and 1879.

Month.	1878.		1879.	
	Bushels.	Gallons.	Bushels.	Gallons.
January.....	261	1,727	1,983	930
February.....		103	3,210	53
March.....			2,262	
April.....			5	1,742
May.....				36
September.....		10		37
October.....		347	153	1,930
November.....		802	1,737	3,523
December.....	1,362	353		
	1,623	3,342	9,348	8,651

The result of this experiment was so unsatisfactory, however, that the importation of this opened "barrel-stock" has been almost wholly abandoned. What now comes (so it is darkly hinted) is chiefly used to adulterate genuine "Providence rivers".

21. NATIVE AND SEED-OYSTERS.

DEARTH OF YOUNG OYSTERS IN RHODE ISLAND.—The fattening of Virginia oysters is only half the business, though, perhaps, the most profitable part, in Rhode Island. A vast number of "native" oysters are raised in Narraganset bay, though but a portion of them are born there. There are only a few places in the bay where a "set", as it is called, occurs with any regularity or of any consequence. In the Warren and Barrington rivers it has not happened for twenty years, and the same is true of the whole eastern shore, except Cole's, Kickamuit, and Seekonk rivers. Providence river itself never produces young oysters now, nor does any part of the western shore, except Greenwich bay and the ponds in the extreme southern part of the state, deriving their salt water directly from the Atlantic. The cause of this dearth of spawn and seed, where once every shore was populous with it, can only be ascribed, I think, to the antecedent disappearance, through persistent raking, of all the old native oysters. In Cole's river a heavy "set" occurred three years ago, and from 500 to 1,000 bushels are obtained every year. In the Kickamuit, the shores are dotted with infant ostreae annually, and supply the planted beds there, while old oysters of very good quality are not infrequent. In dredging back and forth throughout the whole extent of Greenwich bay, the scallop-fishers frequently take up large oysters, evidently "to the manor born", and they are now and then seen on the shore-rocks. About 1872 there was a very large "set" here and in Potowomut river, just below. Boats came down from Providence and elsewhere and were filled again and again. But all of the crop left was swept away by starfishes, which were then very abundant, or was buried beneath drifting sand and wrack, and so no establishment of a natural bed there was possible. If these young oysters were not all picked out of Greenwich bay in the fall, they would live through the winter, even where the ice rested fully upon them at low tide, and would soon repopulate the bay. But now their annual value to any one is insignificant and constantly decreasing.

THE SEED-OYSTERS OF SEEKONK RIVER.—There remains one river, nevertheless, where, under protection, the oysters are able to reproduce regularly every year. This is the Seekonk, which flows down past Pawtucket and Providence, with East Providence on its left, and numerous bridges and small shipping to worry its swift tides. The Seekonk has always been a favorite home of the oyster, and year by year the river contributes its quota to the tongers, through a space from the Wicksbury pier to nearly five miles above. This is due largely to the fact

that the oysters of the Seekonk, like those of the Taunton river, are vividly green. No better reason can be assigned than in the former case, and, like the others, this seed, when transplanted for a few months, entirely loses its verdant tint. Seekonk oysters, therefore, never go to market, but are all caught for the seed. This catching begins November 1, according to law, and must close on May 1. These dates are arranged with the purpose to prevent successful planting, and so protect the fishery; but the planters buy as long as the weather remains "open" and warm. Very little raking is done in this river in the spring. The men who catch it are rivermen, who work at this a few weeks in November and December, and the rest of the year do other water-work. The law forbids taking more than 10 bushels in one day to each boat, but if the seed is plentiful, this law is very often violated, since there is no officer to watch. Perhaps it is a direct good effect of these regulations, that 1878 and 1879 have witnessed the largest yield of Seekonk seed known in a dozen years. The main buyers are Wilcox, Browne, Wall, and Adams, of India point; but everybody buys a few bushels who can. The catchers have to take what pay is offered them, but competition sometimes produces a good rate, the usual price being 25 cents a bushel. This being public ground, and everybody having a chance at it (many of the heavy owners send spare boats and crews up this river to rake at odd times), it is impossible to come at any close estimate of the amount of seed oysters taken from the Seekonk during the last year. The truth I believe to be somewhere between five and ten thousand bushels. It is a shapely, hardy seed, opening well, and is in general demand, some planters putting it at the head of the list for its good qualities. One year on its new bed suffices to remove totally the green tinge, and two years to make it marketable.

SEED-OYSTERS FROM ADJOINING STATES.—The remainder of the seed-oysters planted in Narraganset bay come from the Connecticut shore, East river, Fire island and the Great South bay, Somerset (planted chiefly by those owning privileges in Taunton river), and from various parts of Buzzard's bay. I often asked which was best, but could never get evidence of much superiority in any one kind. The success of a planting does not depend on the kind of seed put down, so much as it does upon a thousand circumstances of weather, water, and bottom. The seed which would do excellently in one cove would behave badly in the next, and *vice versa*, individual preferences being founded upon these varying and unexplained experiences. The seed from the south shore of Long Island used to be cheapest of all, and good; but a Boston demand ran up the price beyond the pockets of Rhode Island planters. In general, it may be said that any seed transplanted to Narraganset bay develops into a better oyster than it would have come to be if left in its native waters.

UNDECIDED QUESTIONS IN OYSTER-PLANTING.—Similarly, it is hard to tell what has been the outcome of a particular planting—that is, how much profit is made—because it is inextricably mixed with various other work. Native seed put down and ready to grow, has cost on an average about 60 cents a bushel. To estimate profits on it is out of the question, until the oysters are all sold, nor even then. If all does well, treble value is calculated upon in three years' growth.

It is not even decided whether it pays best to grow "natives" or fatten "Chesapeakes". The first year you plant a piece of ground the oysters do the best; the next year poorer; the third year they fail. Consequently, the oystermen try not to plant the same area continually, but shift their oysters around to allow the old ground to be revived by free contact with the rejuvenating sea. If left down in one place more than three years, it is said that many of the oysters die, from no reason but exhaustion. It is the universal opinion, that the character of the bottom has quite as much to do with their nourishment and good growth as has the water. On sand they grow slower than in mud, but are of better shape and flavor. Similarly, they need to be far enough apart not to crowd one another into deformity.

Much ground that is not now suitable might be made so, but needs to be carefully prepared, if the planter has any hopes of catching spawn,* and the more intelligent say that carelessness in this respect, and a lack of any source of spat, is the reason why in the Warren river and at other points no "set" has occurred for many years, and the depositing of cultch, in the shape of old oyster-shells, has been in vain. It is found on the seed-grounds, that the more a spot is raked (not denuded by a dredge, but often raked), the more it produces. Cat point, Seekonk river, is one example of this; Somerset, after the fall-dredging, is another instance. To prepare a muddy tract, you need to pave it with shells. This is done early in the spring, 10,000 bushels of shells, say, being thrown on, at an expense of from \$250 to \$300. Then in June, when the shells have settled well into the mud and formed a strong surface, throw down more clean shells, and scatter a quantity of large living oysters just ready to spawn—100 bushels of "mothers" to three or four thousand bushels of shells. Scallop-shells make the best stools or cultch, because they are thin and brittle, and can easily be broken away from the seed when it is to be taken up and transplanted. You thus have the source of spawn, and its most suitable resting place, side by side.

Great success in several instances has followed this plan, particularly in Greenwich bay and Apponaug cove, so far as the catching of spawn is concerned. One planter told me that he put down, in 1877, about \$125 worth of cultch and mother-oysters at the latter place, and calculated that he obtained, in a few weeks, \$10,000 worth of seed; but a little later it all died—why, he is unable to guess. Another gentleman, at the same place, last year, put down 1,600 bushels of shells and 60 bushels of spawning or mother-oysters. In the immediate vicinity of these he got a

*The very meager account given of this form of true oyster-culture is supplemented in the chapters G and H on Connecticut and the East river, where the process is carried to a much greater degree of perfection.

good set; but on a closely adjacent bed, where there were no "mothers", not a young oyster was to be seen. He had had the same experience in the Kickamuit. On the other hand, the simple tumbling over of shells in the hope of catching drifting spawn, has proved almost universally a failure here. One man told me he had planted shells steadily for thirteen years in Providence river, and had got only one set worth mentioning.

NATIVE OYSTERS AT BLOCK ISLAND.—On Block island, many years ago, there was an abundance of small oysters living in the pond that occupies so much of the interior of the island. For some reason, however, they were rarely found in a fit condition for food, but would serve to transplant. The oystermen at Clinton, Connecticut, and elsewhere, used to buy them, the price being 25 cents a bushel, delivered at their destination. The shells of these Block island oysters were so delicate, one planter told me, that it was easy to pinch your thumb and finger through them, and often there would be so much air and fresh water held within their half-vacant shells, that they would float when thrown overboard in planting, and drift away. All these oysters long ago disappeared, and no cultivation has been tried to replace them.

Returning northward, I find that, at Bristol, several attempts to raise oysters have failed, and that the markets of this ancient and beautiful village are now supplied by Providence.

22. ENEMIES OF THE OYSTER IN NARRAGANSET BAY.

MEN AND STARFISHES.—The active enemies of the oyster in these waters are five: human thieves, popularly known as "ten-fingers"; starfishes, or "five-fingers"; winkles, drills, and annelid worms. I will not dwell upon these here, because the subject is fully discussed in another chapter devoted especially to these pests. Stricter measures of both guarding and punishing have, of late, put a stop to the stealing to a great extent. The starfishes have not been seriously troublesome, except in limited spots, since their memorable visit in 1860 and 1861, when they all but extirpated the business, and compelled it to move up to West and Diamond beds, now abandoned, where the water was too fresh to permit the starfishes to follow, and where a heavy fall of snow came to the aid of the oystermen, and finally killed the five-fingers, by freshening and chilling the water beyond their endurance. During the last two or three years, however, starfishes have become more numerous, particularly in the Bullock's Point region, and have done much damage.

MOLLUSKS AND WORMS.—The winkles, or "wrinkles", *Sycotypus canaliculatus*, seem also to be on the increase, and commit considerable damage. In many parts of the bay drills, *Urosalpinx cinerea*, occur abundantly, and rapidly destroy the seed and younger oysters, not attacking the old ones so readily. In Taunton river, a few years ago, this little mollusk made clean work, eating nine-tenths of all the seed between Somerset and Assonet. In Pawtuxet, this year, the oystermen have been greatly troubled by multitudes of annelid worms, *Serpula*, whose tortuous, cylindrical cases are formed thickly upon every shell, and serve to collect a coating of cases, sand, mud, etc., which is often half an inch or more thick. This is known locally as "sanding-up" or "loading", and under its infliction the mollusks suffer greatly in quality, probably through the fact that the parasitic worms, which feed upon the same organisms as the oysters, extract much of the nourishment from the water, which otherwise would go to make them fatter. One or two other minor animal agencies inimical to the oyster are at work all the time.

23. STATISTICS OF THE OYSTER-TRADE OF RHODE ISLAND.

CAPITAL INVESTED.—The amount of capital invested in this district it is almost impossible to come at. It probably approaches \$1,000,000, including perhaps \$300,000 or \$350,000 worth of seed-oysters growing on the beds. One-third or more of this property is owned in Boston, and the necessary money for carrying on operations comes thence, but is represented by men who also do more or less private planting on their own account. Of course this is chiefly in the hands of a dozen or more planters on the list; the forty or fifty others will not average a greater sum than \$1,000 each invested in this business, which is chiefly conducted personally, close to their bay-side homes, and without hired help, by selling to home-shippers. The expensive warehouses required by some of the wholesale dealers and shippers in the city of Providence count largely in the estimate of capital involved; and the boats used are of a good class.

YIELD AND VALUE OF THE OYSTER-BEDS.—The yield of the beds and its value, appears in the following table:

1879. Native oysters produced on beds owned in Rhode Island	Bushels. 108,200
Southern oysters, ditto	274,300
Native oysters produced on beds owned out of the state	40,000
Southern oysters, ditto	238,000
Total Narraganset production	660,500

The total value of this, and some additional annual business, will amount to at least \$600,000, at the original wholesale price paid the producer.

PRICES AND WAGES.—The prices at which oysters were sold by wholesale dealers in the city of Providence, during 1879, were the following: Virginias, in shell, selected, \$1 to \$1 25 per bushel; Virginia plants, common, 90

cents per gallon; Virginia plants, selected, \$1 25 per gallon; natives, in shell, \$1 25 to \$1 50 per bushel; at retail, 25 to 35 cents a quart, of all kinds. Some "fancy" lots, of course, brought higher rates than these prevailing market prices. In "Arnold's" and other restaurants the most palatable oysters possible are laid upon the counter to tempt the appetite. Those from Gaspé point, purely native-grown, are recognized as the very best of all, and sell for five cents a piece. They are delicious. So great an industry, of course, gives support to a numerous body of citizens in this district, at least during part of the year. In the summer so little is done that comparatively few are employed, this number including only the proprietors of beds, the dealers and assistants who are obliged to keep their shops open, and the few men required for catching oysters for the feeble market, for spreading shells and planting seed, and for watching the safety of the beds. Reckoning the proprietors as perhaps 100 in all, the addition of the rest employed the year round would bring the total up to about 250; but this varies considerably from year to year. They are paid by the week, as a rule, wages running from \$7 to \$14, and averaging about \$10. For the colder half of the year, "the season," as it is called, large additional help is needed, both on the water and in the opening-houses that are placed close to the shore at various points, or on the wharves in the southern part of Providence city. Taking all the oyster-houses together at the head of Narragansett bay, I find about 350 openers employed. Add this to the 250 counted up as otherwise employed, and I have 600 men as the total. A very large proportion of these men are married; and I believe it would not be unfair, all things considered, to multiply this 600 by 4, which would give us 2,400 persons of all sexes and ages supported chiefly by the oyster-industry in the Rhode Island district. I believe this is short of the truth. The sum of the wages paid is somewhere about \$125,000 annually.

OYSTER OPENERS AND THEIR METHODS.—Separating the meat from the shell is known in Providence as "cutting out" an oyster. The "cutters" or openers are taken from a low grade of society, as a rule, and are about one-half foreigners, mostly natives of Ireland. During the summer many of them go "bony-fishing", *i. e.*, in chase of the menhaden, *Brevoortia tyrannus*, others get a living in various capacities along the shore and on the water, and a large portion of them are common laborers. No women are employed here in the opening houses. I was told that an experiment made in employing them some years ago was regarded as a failure. Very few boys are to be seen, also. Here the only method followed is that known as "side-opening". The opener holds the oyster in the palm of his unsupported left hand, which is protected by a sort of gauntlet of leather, while he pries the shells apart with his knife. This is a quicker method than any other, but it is very laborious, causing a hard strain upon the muscles of the hand and wrist, and upon those of the left side. It has an advantage, however, of producing less breaking and refuse than any other style of cutting out. The oyster-meats, nevertheless, are carefully washed by being stirred about in large collenders, through which clean water is running. This gets rid, at the same time, of course, of all the natural moisture or liquor of the oyster, and the result is known as "solid" measurement.

The payment for opening oysters is made at the rate of so much per gallon "solid" or "in liquor", as agreed upon; if the former, 12 cents is the usual price the present season; if the latter, 17 and 20 cents is demanded. From \$1 to \$2 a day is earned while work lasts. The amount of difference between a gallon of oysters measured "solid" and one measured "in the liquor", depends on the condition of the stock. It is the universal complaint this year, that all Rhode Island mollusks are "opening poor"; that is, there is too much liquor and too little meat in the shells. This is universally attributed to the fact that the present autumn (1879) has been very dry; more rain would have made the oysters "fatter". At present it takes three liquor-gallons to make two solid ones, at their best; but in some years the difference is almost nothing, and then the oystermen will say: "You couldn't press the meat back into its own shell, after opening," so rich and elastic are the juicy bodies.

STATISTICAL RECAPITULATION FOR RHODE ISLAND:

Number of planters	100
Number of lessees in 1879	56
Extent of ground cultivated	962 acres..
Value of same (about)	\$15,000
Value of shore-property (about)	\$75,000
Number of boats engaged	100
Value of same, with outfit	\$20,000
Number of men hired by planters or dealers through the whole year	150
Annual earnings of same	\$75,000
Number of men hired half the year	350
Semi-annual earnings of same	\$50,000
Number of families supported, exclusive of retail-trade, about	500
Annual sales (1879) of—	
I. Native oysters	bushels.. 148,200
Value of same	\$205,500
II. Chesapeake "plants"	bushels.. 274,300
Value of same	\$200,000
III. Fancy stock	bushels.. 15,000
Value of same	\$20,000
IV. Baltimore and Norfolk "opened stock"	gallons.. 8,650
Value of same	\$5,000
Value of oysters raised in Rhode Island, but owned elsewhere	\$250,000
Total first value of all oysters produced in Narragansett bay, annually	\$680,500

F. COAST OF CONNECTICUT.

24. OYSTER-INDUSTRIES EAST OF NEW HAVEN.

NATURAL AND ARTIFICIAL BEDS NEAR NEW LONDON.—The extreme eastern point on the Connecticut shore where any oysters occur, is in the neighborhood of New London. A few miles east of the mouth of the Thames, in the township of Groton, is an inlet and river known as Pequonock. In 1877 several gentlemen leased about 35 acres of ponds on the east side of this river. In one of these ponds, containing about 15 acres, native oysters grew upon the rocks and around the edges. A portion of the bottom of this pond they prepared for oyster-raising, by spreading scallop-shells over six acres, and gravel and beach-sand over two acres. Here they planted some 2,500 bushels of seed from Stony Creek, Clinton, and Fair Haven, Connecticut, at a total expense of between \$4,000 and \$5,000. These oysters have grown finely, but as yet few have been taken to market. This year (1879-'80) has been a comparatively poor one for them.

The oysters in Pequonock river are deep and cup-shaped, not of large size, and with a thin, white, flinty shell. Locally, they are very highly esteemed. Another locality where this firm has undertaken oyster-cultivation, is in the Niantic river, an inlet just west of the Thames, where they have had 20 acres set off for the purpose, and have already planted some seed. In Alewife cove, between Niantic bay and the Thames, they have also several acres of ground which they purpose preparing in the near future. A few oysters are now being put upon the market from these ponds, and have met with a good reception, at high prices. These planters believe that a grand success awaits them: others assert that the waters are unsuitable, and that little of importance will result. Three persons are employed.

In the river Thames, years ago, were great numbers of indigenous oysters. Thousands of bushels were annually obtained for the markets of the neighboring towns. These oysters were of good quality, and generally of immense size. Planting, however, was never a success, owing to the great freshets which often sweep down the river, and also owing to the impurities that are cast so plentifully into the stream from the drainage of the towns and from multitudinous factories along the tributary streams. Nevertheless, a few native "Norwich river" oysters are annually caught, except in the close season, between March 1 and November 1, and there are half a dozen persons in Norwich who deal in them and in other oysters, but the whole city's trade, probably, does not amount to 10,000 bushels a year of "natives" and "Chesapeake" combined, and is decreasing.

At New London, the oystermen own ground at Bullock's point and Drownville, in Providence river, Rhode Island. Upon those tracts, in 1879, they bedded about 15,000 bushels of Virginia oysters, in addition to receiving a winter's supply of 35,000 bushels. New London and its neighborhood also consumes about 700 bushels of fancy oysters annually, mainly brought from Providence, Rhode Island. The prices at this point, in 1879, were, for southern oysters, 80 cents to \$1 a gallon; for native stock, 50 cents a quart, or \$1 60 a gallon, wholesale. Twenty cents a solid quart is paid for opening.

There are employed here in the winter months 12 men on oyster-vessels and 25 men on shore, besides the principals. These are mostly heads of families, who engage in menhaden-fishing in summer.

OYSTERS IN SAYBROOK.—Moving westward from New London, the first village of consequence is Saybrook. There is a small stream here called Oyster river, that produces a variety of the bivalves after which it is named, which are said to be of superior quality. Mr. John N. Clark kindly made inquiries for me, and reports that the production is trifling. Fifteen or twenty persons engage in these native fisheries at odd hours, getting so few bushels each, that the total gathered in the whole season will probably amount to no more than a hundred. Five years ago the town appointed a committee on the subject, and several persons received grants of land for the purpose of cultivating oysters, but the obstacles (chiefly thieving) were so many that no one has persisted in the attempt, either to bed southern oysters or to raise native stock.

OYSTERS IN CLINTON.—At Clinton, a little village settled under the name of Kenilworth (afterwards corrupted into Killingworth), at the mouth of the Hammonaset river, the oyster-business is of long growth, and is somewhat peculiar. The harbor, in old times, contained an abundance of large, succulent oysters, but these have been all-but exhausted in one way or another. About twenty-five years ago the planting began in the harbor, the seed then used being caught mainly at home or brought from Block island. The harbor, at present, contains about 200 acres suitable for oyster-growth. Formerly there was much more, but a few years ago the sea made a breach through the peninsula which incloses the harbor, by which the southerly storms are given so fierce an entrance into the bay, that any attempt at oyster-work, or even at navigation, over much of the water-space, is rendered utterly futile. If this breach, locally known as the Dardanelles, could be filled up—and the cost, I was informed, would not exceed \$1,000—a thousand acres, or more, would be added to the oyster-bottom. The bottom is hard, the water nowhere too deep for tonging, and of about the right degree of freshness. Mud and sand drift so badly in winter, however, that no oysters can be left down during that season. The practice, therefore, is to put down not only Virginias, but natives of so large a growth that they shall be marketable the next winter. Years ago a much larger number

of Virginia oysters were planted than at present—often 20,000 bushels—but the business has changed, until now only 8,000 bushels a year are demanded. The freight from the Chesapeake is 12 cents a bushel, and the following four schooners find employment: J. H. Chaffee, 130 tons; Mary Stow, 160 tons; G. A. Hayden, 108 tons; Helen P., 146 tons.

A fair "set" occurs in Clinton harbor every year, and in 1877 there happened a very heavy one. A certain quantity of this survives, and about 1,000 bushels are utilized annually. The majority of the "native" oysters, however, are raised from seed bought along the shore to the westward, that from Norwalk being preferred. This costs from 75 cents to \$1 a bushel, and is planted in April. It is ready to take up late in the following autumn, and has grown rapidly, and into handsome shape. The quality, also, is most excellent, such oysters selling for from \$1 to \$1 50 a bushel, at wholesale. The annual production of this stock amounts to 2,000 bushels. The only enemy of the oyster here is the drill; but this is sadly abundant.

To recapitulate, Clinton produces annually—

	Bushels.
Of southern plants, about.....	8,000
Of Connecticut plants, about.....	2,000
Of native oysters, about.....	1,000
Total.....	11,000

The total investment here, which at present will not exceed \$10,000, is divided among about fifteen planters, and affords a partial livelihood for perhaps a score of families.

The bottom of the margin of the sound off the villages of Madison and East River has been staked off to a considerable extent, but is utilized by only one firm of oyster-producers. Mr. Elihu Kelsey has kindly reported to me, by letter, upon the extent of their operations. Their beds consist of six acres or more, and are near a small island called Overshore. This area is protected on its southern side by high reefs of rocks. They have a second bed of about 12 acres extent, a mile and a half eastward near Tufas island, in 20 feet of water, with hard, sandy bottom, where they are experimenting. They also own a third bed near Guilford harbor of 24 acres, on which they have spread "2,000 bushels of shells and a good many small stones, on which the oysters 'set' and grew for four years, and were the best in the world; but the water is too shoal without artificial protection, and the storms and thieves have ruined the bed". As not enough "set" is caught upon the stools, a thousand bushels or so of seed-oysters are annually raked from the natural beds in the vicinity of East River, or bought from dealers in Stony Creek and New Haven and planted upon the beds. These various beds yielded, during 1879, about 1,200 bushels, the most of which were sold in the shell at \$1 to \$1 50 per bushel. For opened oysters \$1 60 a gallon was received. No southern oysters were handled in any shape. In respect to the drawbacks and general condition of the business at East River, Mr. Kelsey writes: "The first drawback to success is the lack of good protection from storms which might be remedied by the construction of a breakwater. The second is the constant alteration of the state laws designed to protect the industry. The third drawback is thieving. The present condition of our producing beds is good; and the prospect is, that with plenty of hard labor our venture will be remunerative. We find the character of the soil to be of the greatest importance. On our producing-bed the mineral ingredient of the soil is iron. This renders the oysters healthy and of the finest flavor, so that our customers say they cannot be excelled."

OYSTER-CULTURE IN GUILFORD.—At Guilford some inshore ground is cultivated, but this is not of great capacity. Outside, west of Goose island, they have improved about 160 acres in water from seven to ten fathoms deep, upon a hard, sandy bottom. This outer tract has not as yet had time to yield much. The spreading of shells in the hope of catching spawn, appears futile, for the sufficient reason that there are no living oysters in the vicinity to produce the spat. A large quantity of seed has therefore been placed on this area. This seed was procured partly in the Guilford river, although there is great opposition to its being taken, and has largely been bought in the western part of the state. Besides this, several hundred bushels of large-sized oysters have been scattered among the planted shells, to produce the spawn which it is desired to catch. A small set has already been obtained, and next year some harvest will begin.

The oysters heretofore and at present obtained at Guilford, from the artificial inshore beds which have been in existence for thirty years, are of large size and fine shape. Their flavor is excellent. Formerly they were sold regularly to Hartford buyers at \$8 and \$9 a barrel; now, however, they are worth only \$4 to \$5. About 800 bushels a year comprise the total yield at present. No Virginia oysters are planted at Guilford. Experiments showed that the practice was not successful. The great drawback upon the inshore ground is the drifting of sand and mud, which is likely to occur in storms; the drills, also, are troublesome, but I did not hear that starfishes had caused much damage thus far.

The native river-oysters at Guilford formerly lined the whole river, opposite the town, for three or four miles. A town-regulation early prohibited the taking of more than two bushels a day by one person, but this has been more or less evaded, and now the fishery is of little value, all the oysters taken being very small; yet there is so strong a popular prejudice against utilizing any of this product in seeding the artificial beds, or against allotting

the suitable ground in the exhausted river for cultivation, that the town voted to not avail itself of the privileges granted by the state, in general statutes, which are as follows:

SEC. 12. "The selectmen of Guilford may lease, for not exceeding ten years, all ground of the town in East and West rivers, suitable for planting or cultivating oysters, to the highest bidder," at public auction; but no lease shall be made to any person of more than five acres, nor to a minor. "The leases shall be executed by the selectmen, as deeds of real estate, reserving to said town the rents for such grounds, * * * and any lessee shall, during the term of his lease, be the owner of all the oysters thereon, but shall not take any oysters therefrom in the night season."

This ratification, as I have stated, was refused, and a two-bushel protective regulation was made instead.

About 600 acres of land have been set apart for oyster-cultivation in the waters of the sound, outside of this harbor, besides that already mentioned near shore. No improvement, however, has yet been made upon this area.

OSTER-CULTURE IN STONY CREEK.—The next point of oyster-culture is Stony Creek, where the large collection of islets known as The Thimbles affords excellent opportunity for planting and raising. Organized business here is of comparatively recent date, but native oysters of extra quality were always to be had for the raking in the harbor. The largest dealer is the Stony Creek Oyster Company, N. P. Miner, president, which was established in 1868, and now owns 400 acres of ground devoted to the growing of oysters, and has a capital stock of \$42,000.

The Stony Creek Oyster Company raises annually about 15,500 bushels of natives, and employs six men. All the stock is sold in shell, shipping in barrels, and opening little or nothing. The other persons engaged in planting have spent a good deal of money here in getting the foundation of a business laid, but with small actual results as yet. There is also a large class of citizens who cultivate for personal use, or sell to a trifling extent, and so get a partial support out of the industry. It was very difficult to gather any exact or approximate figures, therefore, outside of the oyster company's report; but I judge that all the other producers together, added to the 15,500 bushels reported by President Miner, will not bring the total production of Stony Creek, in 1879, above 20,000 bushels.

The prospects at this point seem very good. Some large sloops are employed in dredging, and it is proposed to employ steam very soon. An air of unusual thrift is observable about the oyster-houses on the shore, which do not, as is too often the case, disfigure the pleasant scene. Stony Creek is a favorite source of seed-supply to the planters of Rhode Island, and probably one-fourth of the year's yield is sold in the spring for this purpose, the purchasers sending sloops to be loaded. Stony Creek beds had a good set in 1879, very little in 1878, but a massive collection of spawn in 1877. The great obstacle to success along this part of the coast, is the lack of smooth, hard bottom, and the liability of the ever-present mud, to be moved about and settle upon the oyster-beds in such quantities as to kill the young and stunt the old ones. The oysters grow in clusters, and are likely to be of large size, long and slender, forming "coon-heels" and "razor-blades". They are so clogged with mud when brought ashore, that a stream from a hose must be turned upon the heap before the clusters can be broken apart, preparatory to the culling for size.

OSTER-CULTURE IN BRANFORD AND EAST HAVEN.—At Branford, a few miles westward, about the same state of things exists, and there are some additional discouragements, making the prospect less bright than at Stony Creek. Some who have tried it assert, that Branford is good for nothing as an oyster-nursery, but others have a brighter faith. It formerly had more prosperity than at present, in this line. The river was a great natural oyster-bed, but has now become nearly depopulated, and it is hard to get any seed for the outer beds. The starfishes are reported to have damaged the beds very greatly in 1878, and the drill is an ever present enemy. Southerly storms often bury the oyster-beds here wholly out of sight. This misfortune happened to one planter, after an expenditure of over \$1,200 on artificial beds inside of Stony island. The whole product of the locality last year, was about 3,500 bushels, and half a dozen families are supported. Off Branford and East Haven's coast, in the deeper water of the sound, more or less ground has been granted to strangers, but the results are nothing, as yet.

At the village of East Haven about 80 acres are under cultivation in the off-shore waters of the sound, devoted wholly to native oysters, for which seed is procured from neighboring beds, or spawn is caught on planted shells. In 1879 the catch was 3,000 bushels, all of which were sold in the shell at an average price of \$1 per bushel. It is supposed there remain 20,000 bushels of oysters on the ground, subject to risks from heavy storms and creeping enemies. The mode of catching is by dredges at all seasons, and three men find employment at \$2 wages per day.

STATISTICAL SUMMARY FOR EASTERN CONNECTICUT.—Recapitulating the statistics of this eastern district of Connecticut, we find the following result for 1879:

Number of acres improved, about	900
Number of families supported, about	100
Number of bushels of "natural growth" oysters marketed, about	8,700
Number of bushels of southern oysters used	65,000
Number of bushels northern planted oysters sold, about	34,000
Number of vessels engaged: schooners, 6; sloops, 20	26
Amount invested in fixtures, etc., about	\$75,000

25. EARLY OYSTER-TRADE AT NEW HAVEN.

ABUNDANCE OF OYSTERS IN FORMER DAYS.—New Haven is one of the principal depots of the oyster-trade in Connecticut, and in the United States. With New Haven, however, I include Fair Haven, South Haven, West Haven, and Milford, since the business all around and off the mouth of the harbor is substantially united.

From the earliest times the borders of the Quinepiac river, on the eastern boundary of the city of New Haven, have been the scene of oyster-operations. Shell-heaps along its banks show how the aborigines sought in its waters, season after season, the best of bivalves, and the earliest settlers followed their example. Natural beds of oysters were scattered over the bottom of the whole river for three miles, clear up to the North Haven salt meadows, and at intervals along the eastern shore of the harbor, where favorable coves existed. At all points these mollusks were convenient of access. The result was that the raking of oysters in this river, and along the eastern shore of the harbor at its mouth, which was a free privilege, was early adopted as a business by many persons who lived near the banks, and a considerable retail peddling-trade was thus kept up throughout the neighborhood, in addition to the home-supply. Wagon-loads of opened oysters in kegs, traveled in winter to the interior towns, even as far as Albany, and thence westward by canal.

26. ORIGIN AND DEVELOPMENT OF THE SOUTHERN TRADE.

IMPORTATION FROM NEW JERSEY AND THE CHESAPEAKE.—It came about, that among the first places in New England to import oysters from New Jersey, and then from Virginia, to be transplanted for additional growth, was Fair Haven; and it is probable that far more oysters were brought there from the Chesapeake twenty years, or even ten years ago, than now are. At that time a large fleet of Connecticut vessels was employed in this traffic every winter, and some stirring traditions remain of perilous voyages during that icy season. They were better oysters that came in those days, also, than now. While a large majority of these cargoes were at once sent into the current of winter-trade, and distributed to customers all over the state (for no other harbor fattened "Chesapeakes" to any extent), a quarter or so of the whole season's importation was regularly bedded down, in April and May, to supply the summer and fall demand. The favorite bedding-ground then, as now, was "The Beach", a sand-spit running off into the harbor for more than a mile from the Orange (western) shore. This is bare to a great extent at low tide, but covered everywhere at high tide, and is the best possible place for its purpose. The ground on this beach rents at from two to five cents a bushel, according to location. Those occupying the Beach each year—in 1879 they were 23 in number—form themselves into a mutual protective association, and provide watchmen who never leave the ground. Formerly these watchmen lived in boats housed in, but now, upon opposite extremities of the Beach, piles have been driven and two houses have been built, where these men live, and whence they walk or row about day and night to guard the property. They go on duty at the time of the first planting, and remain until the last oyster is gathered, a period usually about nine months long. Their wages are only \$40 a month, and it would seem to be an extremely tedious duty; yet there is no lack of volunteers for the places. But I have shot ahead of my subject, in following out this matter to its present status; let me return to a past period.

The Virginia trade began about forty or fifty years ago, Captain Merritt Farran having been the first man to bring them. His cargo was a sloop-load of about 600 bushels, profitably sold. The trade rapidly grew into immense proportions. Just when it was at its zenith it is hard to say—probably about thirty years ago—and it was then very profitable. The Fair Haven establishments had branch-houses in all the inland cities, as far as Chicago and St. Louis, and it was reported that the profits of a single house, from 1852 to 1856, amounted to \$25,000 a year. Levi Rowe & Co., alone, in 1856, are said to have employed 20 vessels, and 100 openers, and to have sold 150,000 gallons of oysters, while companion-houses shipped from 1,000 to 1,500 bushels per day throughout the season. In 1857-'58, according to De Broca, from 200 to 250 schooners were employed in supplying the establishments of Connecticut from the Chesapeake and Fair Haven, which alone, he says, made use of 2,000,000 bushels, but this undoubtedly was a large exaggeration; one-half of that would certainly more than cover the facts. Half a dozen years later, when De Broca wrote, the decline was very perceptible.

DE BROCA'S DESCRIPTION OF NEW HAVEN IN 1862.—Some extracts from Lieutenant De Broca's report, made in 1862, to the French government, upon the oyster-industries of the United States, and reprinted in the first report of the United States Fish Commission, will present interesting, if not wholly trustworthy, reminiscences of New Haven at that time, where Lieut. De Broca is well remembered. This writer says:

New Haven, the capital of Connecticut, ranks next to Boston in importance, in the oyster-trade. The business is divided into two distinct branches, the culture of oysters and the various occupations connected with their transportation to the towns of the interior.

The principal plantations are situated in the bay. Commencing at a short distance from the head of the great pier, they extend over a distance of about three miles, almost without interruption; on the one hand to the southern part of the sandy point, and on the other to Morris creek, always leaving free the channels of navigation leading to the harbor.

The maritime ground on which they are established is partially exposed at low tide. In some cases, however, the plantations are constantly submerged, and are at a depth varying from 1 to 6 feet, when the water is lowest. The soil is formed of sand and mud, mingled with sea-weed, and the stratum of mud, upon which the oysters rest, is about three inches thick.

The spectacle presented on entering the harbor is most curious. As far as the eye can see, the bay is covered with myriads of branches, waving in the wind, or swayed by the force of the currents. It looks as if a forest were submerged, the tops of the trees only rising above the surface of the water.

At certain distances on the plantations, large boats are anchored or moored to posts, having a small house built upon them for the accommodation of the men appointed to watch the grounds. They are four in number. The wages of these guardians of the property amount to about \$30 a month, and are paid by the association of planters. This system of surveillance is indispensable, since most of the plantations are at a distance from the harbor, and might be invaded with impunity, especially at night.

About five hundred men are employed in planting oysters in the spring, and in gathering them in the proper season to supply the necessities of commerce.

The New Haven banks have a very high reputation, and the number of bushels planted annually is estimated at 250,000.

The establishments engaged in the transportation-business are mostly at Fair Haven, a charming village, beautifully situated. Some are at Oyster Point, on the western part of the bay. At Fair Haven the Quinepiac is about a mile and a half wide,* and is protected from the winds on the south and east by a chain of wooded hills, lying parallel with its course. It forms a beautiful smooth sheet of water, until its entrance into the bay, where the currents are very strong, but not sufficiently so to disturb the plantations established in the bed of the river. Some of the dealers, before using the oysters, deposit them for two or three days in the Quinepiac, the saltish water giving the flesh a better appearance.

The establishments of the dealers are on both sides of the river, and many of them are built partly in the water, in order that the fishermen may discharge their cargoes with greater ease.

The dealers send raw oysters away in small wooden barrels, called kegs, or in tin cans, containing about a quarter of a gallon. During the winter, wooden barrels are considered a sufficient protection; but in warm weather, and when the mollusks are to be sent to a distance, tin boxes are used exclusively. The work of packing is accomplished in the same building where the oysters are shelled, or in one near at hand; and whatever may be the receptacle used, it must contain only a quarter of its capacity of juice. A tinner is employed in each establishment to close the cases, by soldering a small round piece of tin over the opening. The cases are then placed in a refrigerator, where they remain until sent to the railroad. When dispatched to distant cities, those of the West for instance, the cases are inclosed in a box of pine wood containing about a dozen. These are tightly packed, and a space is left in the middle of the box for the reception of a piece of ice, which preserves the oysters until they reach their destination.

The number of barrels and boxes or cases required annually, at Fair Haven, is so great that two large manufactories have been established for the manufacture of these articles, and they employ about one hundred and fifty persons. That for the making of kegs uses steam as a motive power. Everything in the establishment is done by machinery. One machine cuts out the staves, a second the bottom; others pierce the holes, and form the plugs. The kegs, at wholesale, bring the following prices: Kegs containing a gallon, \$1 08 a dozen; kegs containing a half-gallon, 94 cents a dozen. Tin cases are worth \$5 50 a hundred.

Oysters without the shell are divided into two classes—those of large size selling for twenty cents a gallon more than the others. They sell at the rate of \$3 for half a dozen cases, each of which contains from seventy to one hundred mollusks.

THE FAIR HAVEN OYSTER-TRADE IN 1857.—A very careful account of the business, as it seems to me, was printed in the *New York Tribune* of January 9, 1857, access to which I owe to the liberality of Mr. Thomas F. DeVoe, of New York. It says that 80 vessels were then bringing oysters to Fair Haven. They were mainly schooners of 2,000 to 4,500 bushels capacity, and were generally owned in Fair Haven, but many additional ones were occasionally chartered. The capital invested there was considered little short of \$1,000,000.

Describing the village and its methods during the busy season, this article continues:

There are the openers, the washers, the measurers, the fillers, the packers, etc., each of which performs only the duties pertaining to its own division. At this season of the year (January) few of the oysters are "planted", but are generally taken directly from the vessel to the places occupied by the openers, who form a large number of operatives, and are composed of females and boys, who earn from \$5 to \$9 per week. An expert at this branch will open 100 quarts per day, but the average is not perhaps over 65 quarts. The standard price is, I think, 2½ cents per quart. This work gives employment to many hundreds, and much of the work is performed at private dwellings, thus affording opportunity for labor to many who cannot go into a general workshop. The oysters, as they come from the vessel, are heaped upon the center of the room, the operators occupying the wall-sides. Each person has before him a small desk or platform, some 3 feet in height, on which is placed, as occasion requires, about half a bushel of oysters, from which the opener takes his supply. On the stand is a small anvil, on which, with a small hammer, the edge of the shell is broken. The operative is provided with a knife and hammer, both of which are held in the right hand at the time the shell is broken, when the latter is dropped and the knife does its work. Two tubs or pails, of about three gallons capacity each, are placed within about 3 feet of the workman, into which he throws, with great dexterity and rapidity, the luscious morsel which is to tickle the palate and gratify the taste of some dweller in the far West. The object of placing these vessels of reception so far from the operator is to prevent, as much as possible, the deposit of the original liquor with the oyster. * * * From the opening-room the oysters are taken to the filling-room, and thence to the packing department. In the filling-room, on a platform, are placed a dozen or more kegs or cans, with the bungs out. The oysters are first poured into a large hopper pierced with holes, in which they are thoroughly washed and drained, when they are ready to be deposited in packages. This is done by placing a funnel in the aperture of the keg, by one person, while another "measures and pours". This operation is performed with great rapidity, two or three men being able to fill some 2,000 kegs in a day. After depositing the requisite number of "solid oysters", as they are termed, in each package, a pipe conveying fresh water is applied, and the vacant space filled with nature's beverage—the bungs placed and driven home—when it is ready to be shipped.

In hot weather, the article adds, kegs are placed in boxes surrounded with broken ice. One firm, Rowe & Co., used 150,000 kegs a year, costing about \$15,000.

THE OYSTER-TRADE OF FAIR HAVEN IN 1879.—Except that the use of the little wooden kegs has been abandoned for the most part, and that opening is no longer done at the homes of the workmen, but wholly at the planter's warehouse, the foregoing report presents a good picture of the Fair Haven of to-day.

* The Fair Haven iron bridge is just 150 paces in length.—E. I.

With the growth of so extensive a business, in so confined a space, came the attendant evil of too severe competition. About 1850, therefore, one or two Fair Haven men of energy conceived the idea of taking their warehouses to the oysters, instead of bringing the mollusks so far to the salesroom. They therefore opened branch houses in Baltimore. Others followed, and the names of Maltby, Mallory, Hemingway, Rowe, and their confrères, long familiar in Connecticut, and identified then as now with the oyster-business on the Quinepiac, became equally well known along the Chesapeake, and, through wide advertisements, over the whole country. All the great Baltimore firms of old standing originated in Fair Haven, just as Wellfleet, an obscure village on Cape Cod, supplied Portland, Boston, and Providence, with its oystermen. The result was the same in both cases; the home interests retrograded when metropolitan advantages began to be used in competition, and at Fair Haven considerable and rapid changes in methods, as well as the results of trade, have come about.

All of the foregoing remarks have applied to the imported Chesapeake oysters, which were brought in the spring, fattened on the sand-bars in the harbor, and taken up in the autumn. Then, as now, New Haven harbor had no competition in this branch of trade worth speaking of anywhere else in the state; and it may be dismissed, so far as the whole of Long Island sound is concerned, with the remark, that many or all of the old dealers continue to bring and plant southern oysters, which they open in the fall and winter, but a good proportion confine themselves wholly to raising and disposing of natives.

The Chesapeake oysters brought into this locality in 1879 amounted to about 450,000 bushels. Those from the Rappahannock are the favorites for winter use, and are imported almost exclusively; for planting purposes, however, Rappahannock oysters are undesirable, and those from Fishing Bay, Saint Mary's, and Chrisfield, are preferred. But this may be wholly changed in a year or two. The names of the principal dealers appear in the appended table.

THE NEW HAVEN OYSTER-FLEET.—The vessels employed in this trade are rarely owned in New Haven, as used to be the case, but mainly hail from New York. The following is the list, so far as I have been able to complete it—all schooners:

Name.	Tons.	Name.	Tons.	Name.	Tons.
William Farren	75	J. F. H. Langrel	—	Garry P. Wright	—
Ellie F. Long	98	Morning Star	55	Stephen Wood	12
Mary C. Decker	91	Minnie Griffin	—	David Carl	125
James Phelps	112	Ella H. Barnes	190	Mary Ellen	—
John Mosser	93	R. Mason	51	John A. Chaffee	130
Orvetta	128	Wm. H. Van Name	97	Harvest Home	—

The smaller of these schooners are preferred, as they make quicker passages, but the larger will carry for less money. Freights, therefore, vary with the vessel and the season, from 10 to 18 cents. It is estimated that 3 cents will plant the oysters, which makes their cost from 22 to 28 cents a bushel. The selling price will average at least 75 cents, and probably more.

27. NATIVE OYSTERS AND OYSTER-PLANTING IN THE VICINITY OF NEW HAVEN.

EARLY OYSTER-CAMPAIGNS ON THE QUINEPIAC.—The remainder of my history will apply to the gathering, transplanting, and propagating of native oysters in the waters of Long Island sound, opposite New Haven.

It has already been mentioned, that native beds existed within recent years, if they do not now flourish, in every harbor westward of the Thames river, and that many of these old localities, as Stony Creek, Branford, and so forth, still furnish large quantities of small oysters for the plantations. None of these localities ever equaled, however, the importance of the Quinepiac and its tributaries at New Haven as a natural field of oyster-production, while this harbor was equaled, if not surpassed, by several inlets still further west.

Until lately, however, all this wealth was used up in private consumption, sold in the shore-towns as "fancy", or mixed in with the southern stock, without being taken into account. The fishing was done mainly for each man's winter-supply, and nobody paid much attention to any regulation of it beyond the close-time in summer. Gradually, however, these public river oysters became more rare and coveted. The law was "off" on the 1st day of November, and all the natural beds in the state became open to any person who wished to rake them. In anticipation of this date, great preparations were made in the towns along the shore, and even for twenty miles back from the seaside. Boats and rakes, and baskets and bags, were put in order. The day before, large numbers of wagons came toward the shore from the back country, bringing hundreds of men, with their utensils. Among these were not unfrequently seen boats, borne on the rigging of a hay-cart, ready to be launched on the expected morning. It was a time of great excitement, and nowhere greater than along the Quinepiac. On the day preceding, farmers flocked into Fair Haven from all the surrounding country, and brought with them boats and canoes of antique pattern and ruinous aspect. These rustics always met with a riotous welcome from the town-boys, who hated rural competition. They were very likely to find their boats, if not carefully watched, stolen and hidden before they had a chance to launch them, or even temporarily disabled. These things diversified the day and enlivened a community usually very peaceful, if not dull. As midnight approached, men dressed in oilskin, and carrying oars, paddles, rakes, and

tongs, collected all along the shore, where a crowd of women and children assembled to see the fun. Every sort of craft was prepared for action. There were sharpies, square-enders, skiffs, and canoes, and they lined the whole margin of the river and harbor on each side in thick array. As the "witching hour" drew near, the men took their seats with much hilarity, and nerved their arms for a few moments' vigorous work. No eye could see the great face of the church-clock on the hill, but lanterns glimmered upon a hundred watch-dials, and then were set down, as only a coveted minute remained. There was a hush in the merriment along the shore, an instant's calm, and then the great bell struck a deep-toned peal. It was like an electric shock. Backs bent to oars, and paddles churned the water. From opposite banks navies of boats leaped out and advanced toward one another through the darkness, as though bent upon mutual annihilation. "The race was to the swift," and every stroke was the mightiest. Before the twelve blows upon the loud bell had ceased their reverberations, the oyster-beds had been reached, tongs were scraping the long-rested bottom, and the season's campaign upon the Quinepiac had begun. In a few hours the crowd upon some beds would be such that the boats were pressed close together. They were all compelled to move along as one, for none could resist the pressure of the multitude. The more thickly covered beds were quickly cleaned of their bivalves. The boats were full, the wagons were full, and many had secured what they called their "winter's stock" before the day was done, and thousands of bushels were packed away under blankets of sea-weed in scores of cellars. Those living on the shore, and regularly engaged in the trade, usually secured the cream of the crop. They knew just where to go first; they were better practiced in handling boats, rakes, etc.; they formed combinations to help one another. That first day was the great day, and often crowds of spectators gathered to witness the fun and the frequent quarrels or fights that occurred in the pushing and crowding. By the next day the rustic crowd had departed, but the oysters continued to be sought. A week of this sort of attack, however, usually sufficed so thoroughly to clean the bottom, that subsequent raking was of small account. Enough oysters always remained, however, to furnish spawn for another year, and the hard scraping prepared a favorable bottom, so that there was usually a fair supply the next season. It was not long, however, before the old-fashioned large oysters, "as big as a shoe-horne," were all gone, and most of those caught were too small for market. Attention was therefore turned to the cultivation of oysters, and as the Chesapeake trade declined, this subject began to receive more and more earnest attention, and to arouse an unexpected opposition upon all sides.

LEGAL ALLOTMENT OF PLANTING-GROUNDS.—The laws of the state provided for the setting apart of tracts of land under water for the planting or cultivating of oysters. The position and amount of these tracts that were to be set apart were left to the judgment of the people of each town, who chose a committee of three to five electors, termed the oyster-ground committee, to act in such matters. Two restrictions, however, were always jealously insisted upon: first, that no "natural oyster-beds" should be set apart or "designated" (the legal term) for purposes of planting or cultivation; second, that no more than two acres should be allotted to each applicant. All the early designations made in New Haven harbor, therefore, were in the shallow districts near and below the mouth of the Quinepiac, where no natural beds existed, and the allotments were of various sizes. They were owned by women and minors as well as by voters, and thus it was possible for a citizen who cared to do so, to acquire for his use several acres, being those taken out in the name of his wife, his sons, and even of his relatives of remote degrees. Moreover, it was permitted to assign these rights and privileges; but any one who applied for grants of land "for the purpose of speculation", was guilty of a misdemeanor. It was thus an easy matter for a man who desired to cultivate native oysters extensively, to get under his control a large amount of land, through assignments from family and friends; nor, in the great majority of cases, was any money consideration given for such assignments. It soon became common, indeed, for an application to be made by "A, B, and others", a score or more, perhaps, everybody understanding that while the "others" were actual inhabitants of the town, they had no intention of making any personal use whatever of the privileges. This, of course, was an evasion of the law, which practically amounted to its annulment, yet no one objected, for the spirit of the statute was not considered to have been broken; perhaps it ought to be said, no one objected at first, for within the last few years there has been loud murmuring against the largest dealers, who have obtained the control of hundreds of acres, and who have found it necessary to secure amendments and additions to the laws in order to make their titles sure and strong.

ORIGIN OF OYSTER-PLANTING IN LONG ISLAND SOUND.—It will be understood by this, that the business of catching and cultivating native, home-bred oysters at New Haven had grown, out of the old haphazard condition, into a definite and profitable organization by the time the last decade began. It was not long before all the available inshore bottom was occupied, and the lower river and harbor looked like a submerged forest, so thickly were planted the boundary stakes of the various beds. Encroachments naturally followed into deeper water, and this proceeded, until finally some adventurous spirits went below the light-house and invaded Long Island sound.

Who was the originator and pioneer in this bold move is undecided; the honor is claimed by several with about equal right. At any rate Mr. H. C. Rowe first showed the courage of his opinions enough to take up some hundreds of acres outside, in water from 25 to 40 feet in depth, and to begin there the cultivation of native oysters.

Incessantly swept by the steady and rapid outflow of the Quinepiac and Housatonic (whose current flows eastward), the hard sandy bottom of Long Island sound, off New Haven and Milford, is kept clean throughout a considerable area, beyond which is soft, thick mud. There are reefs and rocks scattered about, to be sure, and

now and then patches of mud; but over large areas extends only a smooth, unencumbered bottom of sand or gravel. This makes this region peculiarly adapted to oyster-culture.

CONFLICTING CLAIMS OF PROPRIETORSHIP IN OYSTER-GROUND.—This new departure, or unlooked-for expansion of the business, caused considerable excitement as it rapidly developed. It was soon seen, in the first place, that the existing statutes, which never had contemplated this sort of thing, would not fit all the exigencies, and after the codification of 1866, alterations and amendments rapidly followed one another, in which the conflicting interests of the deep-water cultivators and the small inshore-owners were sought to be harmonized or guarded against opposition. Although recognized by law and acknowledged by clear heads since the earliest times, the rights of proprietorship under the water, and the notion of property in the growth and improvement ensuing upon ground granted and worked for oyster-culture, have hardly yet permeated the public mind and become generally accepted facts. Cultivators of all grades found many and many instances in which their staked-out ground was reappropriated, or the oysters, upon which they had spent a great deal of time and money, were taken by their neighbors even, who angrily resented any imputation of stealing. Not uncommonly the proceeding was much after the manner of mining in a new gold or silver region, such as the Leadville district of Colorado, for instance, where prospectors "located claims" on top of one another, and all went to digging side by side, the first one to strike "mineral" having a right to any or all of his rivals' territory, within stipulated limits.

Having put some oysters on a piece of ground and found them to do well, a man would put in a claim for a grant of that piece, and feel greatly abused because it had previously been designated to some man who knew that the only proper or safe way was to get legal possession of the ground first, and make a trial afterwards.* Then number one would claim the right to remove his oysters, and in doing so would be sure to be charged by number two with taking more than belonged to him. It was easy, too, for unscrupulous persons to dump seed or large oysters upon ground that they pretended not to know was already granted, and then, in taking their stuff away, to rake up a large addition.

If a man neglected to take out a title to his ground, or omitted any technicality, somebody stood always ready to rob him of all the results of his work in open daylight, with the calmest effrontery. "All that is under water is public property," was the maxim of the million, "unless every form of law is observed;" and unless it is watched with a shot-gun besides, they might have added. An authentic incident that happened many years ago, will illustrate this temper; and I should not devote so much attention to this matter, were it not that this false philosophy has been almost universal; has proved the greatest stumbling-block to the prosperity of efforts at oyster-culture along this whole coast, and is almost ineradicable from the 'longshore mind.

Two of the veterans of the native oyster-business at this point, were born and spent their boyhood on the shore, and early became accustomed to the habits and haunts of all the fishes and mollusks. When they were lads of seventeen they sought out a suitable place near the western shore, and gradually accumulated there an artificial bed of native oysters, which soon attained a merchantable size. There were several hundreds of bushels, and the young men were congratulating themselves as fall approached, that upon the early completion of the engagements, which then occupied their time, they would reap a rich harvest from their labor and patience. The time when they intended to take them up was only a few days distant, and no harm by storm or otherwise had come to the bed, when one morning they went out only to find that every oyster had disappeared! It was a cruel disappointment, but inquiry soon solved the riddle. In the darkness of the preceding night several teams, fully prepared for the work, came down from miles and miles back in the country, from away up about Westville and Woodbridge and North Orange, and their owners had raked up the whole bed, and carted it away to hide in their cellars. No robbery could be plainer, and there was little attempt to secrete it; but there was no redress, and the perpetrators chuckled over it as a good joke, without a scruple about the propriety of the thing. Nothing in the sea was private property.

LEGAL PROTECTION FOR OYSTER-PLANTERS.—A vast amount of this sort of stealing and interference with proprietary rights granted by the state, was perpetrated and sanctioned by the great majority of the watermen, under the plea that the locality in question was "natural ground". Any definition or restriction of this ground was impracticable and resisted. The only resource for the man who had invested money in oyster-culture, and wanted the opportunity to develop his investment, was to declare that no "natural oyster-ground" existed in New Haven harbor, and that designations past and to come were valid, even though the areas so designated might once have been natural oyster-beds. This checkmated the men who "jumped claims", yet refused to be considered thieves; but it caused a tremendous howl against the movers, in which a large number of persons, having small information of the facts, joined, on the general principle of "death to the capitalist". It may have worked discomfort in a few individual cases, as all sweeping changes must, but on the whole, considering how nearly exhausted and worthless the Quinepiac fisheries had become, I think it must be regarded as not unjust. At any rate, the legislature of 1875 passed an amendment exempting Orange, New Haven, and East Haven from the enactment prohibiting the setting apart or "designation" of "natural oyster-beds" for purposes of planting or cultivation, leaving, however, the law intact for the rest of the state. Had this measure not been passed, systematic cultiva-

* Perhaps some excuse or explanation of this sore feeling is found in the fact, that the town of Branford allowed a man to apply for and try a quantity of land a year; at the expiration he could pay for it or "leave it up", as he thought best. This was a purely local regulation, however.

tion would have been vastly hindered, if not altogether killed, by thieves and malcontents, so far as New Haven harbor is concerned. Elsewhere, under different conditions, no such necessity exists as yet, in order to be able to prosecute the artificial raising. Instantly upon the passage of this act, there was a rush by everybody for the possession of lots in all parts of the Quinepiac and West rivers. The oyster-committee of the towns decided that each owner of land abutting on the river should possess the right to the bottom opposite his land for 100 feet from high-water mark. This was a concession to popular feeling, though that opinion had no foundation in law whatever, since the title to riparian real estate in this state terminates at the high-water tide limit. Between these boundaries, or "wharf lines", tracts equal in width to each man's water-front, and extending to the channel, were allotted to the land owners at \$10 to \$15 an acre; but the majority of them were not more than half an acre in extent. Lucky receivers of these river-grants at once found themselves able to sell for from \$25 to \$50, and before long there was brisk demand and little sale, at prices ranging from \$100 to \$150. The deep-water men found this river property of great use as a nursery for seed, and as a place to make temporary deposits of surplus stock, etc. The Quinepiac thus began to bristle with boundary stakes, much as the harbor had done for many years previous, and many of these river-lots are now valued at more than \$500.

In 1877 a very full set was obtained everywhere in the river and harbor; in 1878, however, there was almost a total dearth; but 1879 again saw a partial set.

28. PRESENT CONDITION OF OYSTER-CULTURE IN THE VICINITY OF NEW HAVEN.

ORANGE OR WEST HAVEN.—Situated on the western shore, the township of Orange (West Haven) owns the western half of the harbor of New Haven. These shores have always been populous with oysters, which were raked as public property. If any attempts at cultivation were made until within a few years, they were desultory and of small account. When the general oyster-statutes were passed, Orange at once acted under them, but delegated to its selectmen the powers of an oyster-committee instead of erecting a second board, as was done in all the other towns. This arrangement has been found to work very well. The first designation was made in April, 1864, and all the suitable ground in West river and in the harbor was soon set apart, amounting to about 45 acres. Mr. Samuel Smith, chairman of the selectmen, tells me that nothing was charged for this ground, but that it was put under taxation, and now pays on valuations running from \$50 to \$500. When, four years ago, the experiment of deep-water cultivation was begun, Orange issued designations, almost wholly to citizens of other towns, for about 2,450 acres, at \$1 an acre. It is impossible to come nearer than this to the town's revenue from its oyster-lots, since no separate account is published by the treasurer. The deep-water area is taxed at a merely nominal rate at present.

Only two producers of any consequence now reside in West Haven. The small allotments in West river which they possess, are nearly ruined by the drifting of sediment, and the total product of the river last year would hardly exceed 500 bushels. One planter told me he had had 12 acres in one lot in the harbor spoiled by becoming covered with mud.

NEW HAVEN.—Between Orange and East Haven lies New Haven, priding herself upon her harbor. She had begun to set apart oyster-planting ground for the use of her citizens. Before long, however, it was claimed that she was allotting spaces of bottom over which she had no jurisdiction. This brought on suits at law and aroused inquiry. The forgotten fact was then brought to light, that in 1803 a joint commission (of which Noah Webster, the lexicographer, was a member) determined the boundary between New Haven and East Haven to be, in general terms, the ship-channel down the Quinepiac and down the harbor. This was ratified by the general assembly. A few years later some disputes caused the appointment of a commission to settle upon the boundary between New Haven and Orange. This was reported to be the middle of West river, and thence eastward to the ship-channel in the harbor. It seems to have been the intention of this commission that this line should intersect and terminate at the East Haven line, but by some error this was not quite done. The recommendations of this commission were adopted by the legislature and decreed to be the boundary between the two towns. This left to New Haven only the waters just about her wharves and a very narrow, wedge-shaped strip down the channel. When, by later laws, it was decided what of the deeper ground of the sound should be "designated" by East Haven and Orange, respectively, New Haven was allowed a strip 1,500 feet wide, running southward into the sound from a line drawn from the old light-house to Savin rock.

Although these boundaries were settled nearly a century ago, the New Haven oyster-committee not long ago designated ground in Orange waters, where they had no right to. Unscrupulous persons at once took possession, and in some cases refused to yield to the legal owners deriving their designations properly. Hence expensive suits and much personal animosity has arisen. Many lessees, however, learning their mistake in time, took out new deeds from the rightful authorities, and so saved themselves. But this was done at additional expense, for New Haven had never charged anything for her privileges.

29. LAWS OF CONNECTICUT RELATING TO OYSTERS.

LAWS RELATING TO THE FISHERIES FOR SHELLFISH.—Having thus briefly reviewed the circumstances and growth of the oyster-business of New Haven and its vicinities; touched upon the decline of the Virginia trade and the beginning of organized cultivation of the native stock; noted the drawbacks and opposition with which this had to contend, and the extraordinary jealousy which shows itself among the river-men and producers, it is a proper time in which to introduce a careful digest of the state-laws pertaining to the oyster-business, an examination of which will reveal the many reasons why specific acts for the protection of this interest were deemed needful from time to time.

The oyster-statutes of Connecticut, in force in 1880, were as follows:

CHAPTER IV. FISHERIES.—PART I. FISHERIES IN TIDE-WATER AND RIVERS.—ART. I. *Fisheries for shellfish.*

SECTION 1. Describes the particular territory within which the selectmen of East Haven may "designate" or grant ground for the planting and cultivation of oysters; describes within what other waters the oyster-committee of the same town may designate; and gives to the selectmen of Orange all the powers of an oyster-committee.

SEC. 2. Provides that any other town except East Haven and Orange may appoint a committee of not more than five electors, which shall designate to applicants suitable places in the navigable waters of the town for planting or cultivating oysters, clams, or mussels.

SEC. 3. Any person desiring to plant or cultivate oysters, clams, or mussels may apply in writing for a suitable place, and such committee or selectmen may make such designation, not exceeding two acres in extent, after the applicant has proved that the ground has not previously been set off for this purpose; that the ground is within town limits; and that fees due to the town for this designation have been deposited. Town clerks may grant the required certificates, and town treasurers receipt for payments of fees. Violations of this act by members of town committees are punishable. Having received his designation, the applicant must mark the boundaries of his ground by buoys or stakes, set at suitable distances, and labeled with the name or initials of the owner; and until then he shall not be permitted to catch oysters upon the ground. Designations may be made to several in common.

SEC. 4. Every person who shall plant or cultivate oysters, clams, or mussels in any such place shall own them, and also all other oysters, clams, or mussels in such place, and have the exclusive right of taking up and disposing of them, and of using such place for the purpose of planting or cultivating oysters, clams, or mussels therein, which shall be transferrable by written assignment, but nothing herein contained shall affect the rights of any owner of lands in which there may be salt-water creeks or inlets, or which may be opposite or contiguous to such navigable waters; nor the existing by-laws of any city, town, or borough; nor authorize any committee or selectmen to designate, or any person to mark, stake out, or inclose any natural oyster-bed (except in New Haven harbor and its tributaries, and for a distance not exceeding two miles from the mouth of said harbor), or infringe the free navigation of said waters, or interfere with the drawing of seines in any place established and customarily used for seine-fishing.

SEC. 5. Any person procuring oyster-ground "for the purpose of assigning rights which he may acquire for profit or speculation", shall be fined \$50.

SEC. 6. Amended and replaced by subsequent legislation, adds to the powers of the New Haven committee the power to designate ground for oyster-planting and cultivation in the waters of Long Island sound, which lie between East Haven and a line parallel to its boundary and 500 yards to the westward; and the selectmen of Orange may designate between this tract and a line due south from Savin rock, even though such ground "may have been natural oyster-beds". And the committee's previous designations in this territory are hereby confirmed.

SEC. 7. Enjoins that all designations of oyster-ground, when made, shall be exactly recorded in the office of the town clerk, together with all descriptions and assignments; "and all attested copies of such applications, designations, and assignments, with a certificate that they have been recorded, shall be conclusive evidence of the fact of such record, and *prima facie* evidence of the validity of such application, designation, and assignment."

SEC. 8. Any owner who has lost the evidences of title to oyster-ground, after having filed them with the town clerk, may apply to the town committee, and if he satisfies them of his claim, he may receive from them a new title; but there are heavy penalties for fraud under this provision. In case of boundaries being lost, or when the committee authorized to stake out oyster-grounds have described the boundaries incorrectly, the superior court, as a court of equity, may, upon petition, order such uncertain boundaries to be re-established, according to prescribed methods, except in cases where a map of the ground has been filed with the town clerk, in which case uncertain bounds are to be established by a surveyor appointed by a judge of the superior court.

SEC. 9. When there are more than thirty designations in any one town the selectmen shall procure a map of the district.

SEC. 10. An owner desiring to dam or lock an inlet or salt-water creek for the purpose of cultivating oysters therein, the selectmen shall visit the spot and report upon the propriety of the request at a meeting of the town; if the meeting approves, the owner may build a dam, etc., as indicated by the selectmen, and maintain it during the pleasure of the general assembly.

SEC. 11. When any natural oyster-bed is set apart, contrary to law, the superior court in the same county has power to revoke the designation, if it deems it best; but must give the owner time to remove any oysters and improvements on the property.

SECS. 12 and 13. Conferred privileges upon Guilford which that town declined to ratify.

SEC. 14. No person, except the authorized committee or selectmen, shall stake out or inclose any oyster-grounds in navigable waters, unless such person shall own this ground under the provisions of this chapter; penalty, fine not to exceed \$50.

SEC. 15. Any member of a committee who shall designate ground for oyster-cultivation upon natural oyster-beds, or in any other place where it is prohibited by law, shall forfeit from \$25 to \$200, excepting in Orange, New Haven, and East Haven.

SEC. 16. Any other person than the owner, who shall unlawfully remove any shells or shellfish from a place designated for oyster-planting, shall be fined not exceeding \$300, or imprisoned not more than one year; but if the offense be committed at night, heavier penalties are decreed.

SEC. 17. Forbids taking any oysters or oyster-shells from the Thames river between March 1 and November 1.

SEC. 18. Every person who shall willfully injure any inclosure legally designated for oyster-planting, remove any buoys or stakes, injure any oysters, remove any shells from such inclosure, or willfully deposit mud there, shall be subject to heavy penalties, after trial before a justice of the peace, with right of appeal to the superior court.

SEC. 19. Provides penalties for injury to dams or locks of any oyster-pond.

SEC. 20. Prohibits taking "shells or shellfish" between sunset and sunrise, from any navigable waters of the state (except clams in Branford harbor from April to October), under fine of \$50 to \$100, or imprisonment, or both.

SEC. 21. Prohibits the taking of shellfish, or the use of spears for taking fish, within any area designated for oyster-planting, within two miles of the shores of Branford or East Haven; penalty, fine of from \$7 to \$100, or imprisonment.

SEC. 22. Prohibits the use of dredges in New Haven harbor west of a line from Farm river to Scotch cap, and north of a line from Scotch cap to Southwest ledge, and then westerly to Hines' place in Orange; prohibits taking shellfish in Morris creek, except on or adjacent to one's own land; and prohibits dredging *by steam* anywhere away from upon one's own ground, more than two days in the week, under heavy penalties, which may be imposed by a justice of the peace, subject to an appeal to the superior court. Dredging on one's own ground is allowed, however, in East Haven waters to the owners of ground southerly of a line drawn from The Chimneys, through Quix's ledge and Adam's fall, until it intersects a line drawn from the old light-house to Savin rock.

SEC. 23. All sheriffs and constables shall, and any other person may, seize any boat or vessel illegally used in dredging, with its tackle, apparel, and furniture, wherever found, within one year thereafter; and, if condemned, the boat, etc., shall be sold after the prescribed form.

SEC. 24. When there shall be found in any waters of this state, on board any boat or vessel, illegally used under the provisions of this chapter, any dredge or shells and shellfish, it shall be *prima facie* evidence that said boat or vessel was used contrary to the provisions of said chapter.

SEC. 25. No person shall gather shells or shellfish in any waters of this state for himself or his employer, unless he and his employer are at that time, and have been for six months previous, actual inhabitants of the state.

SEC. 26. Refers to lobsters.

LAWS OF 1875.—Since the revision of the statutes in 1875, the following additional laws have been enacted:

MARCH 16, 1878.—When oysters have been planted on any ground legally designated, and doubt arises as to the jurisdiction of neighboring towns over it, prosecutions against the owner may be made in either of the three towns nearest.

MARCH 27, 1878.—No committee or selectmen of any town shall designate, and no person shall mark, stake out, or inclose for the cultivation of oysters, clams, or mussels, any natural clam-bed.

MARCH 27, 1878.—No person shall take or carry away from Branford or Farm rivers any oyster-shells or seed-oysters, for the purpose of planting them on private beds; or more than two bushels of oysters in a single day; or shall use tongs for taking oysters there between May 1 and October 1; under penalty of forfeiting \$14 before a justice of the peace in Branford or East Haven, with a right of appeal to the superior court.

NAVIGATION LAWS.—There are two clauses in the state's navigation laws (chap. viii) which concern oysters, as follows:

SEC. 19. Every person who shall deposit any substance except oyster-shells in the harbors of New Haven, Bridgeport, and Stamford, shall be fined from \$50 to \$500, or imprisoned, or both.

SEC. 20. Gives the city court or a justice of the peace jurisdiction in such cases.

REMEDYING WEAK TITLES.—By a series of amendments and resolutions the legislature has "healed" many weak titles to oyster-ground, by enacting that designations of ground for planting and cultivating oysters, clams, or mussels shall be valid and confirmed, including:

I. All granted informally under the provisions of chap. 3, sec. viii, although the owners may have lost their evidences of title after having filed the same with the town clerk (July 17, 1875).

II. All in which the applicant may be a married woman or a minor (March 16, 1878).

III. All in which the application was made for the purpose of transferring the privileges; and all such transfers are confirmed (March 27, 1878).

IV. All designations for "planting", where "cultivation" is not mentioned.

V. All designations of ground described as containing not over two acres to each applicant, exclusive of muddy or rocky bottom, although the total quantity of ground embraced in the designation may be more than two acres to each applicant (March 27, 1878).

VI. All designations previous to March, 1879, by the town of East Haven, between its westerly boundary and a line drawn due south from the center of the mouth of East Haven river.

ESTABLISHMENT OF A STATE COMMISSION FOR LOCATING OYSTER-GROUNDS.—Finally, some months subsequent to the compilation of the previous legal information, the legislature of 1881 passed an act, which is given herewith in full, which reconstructs the methods hitherto in vogue, and reads as follows:

AN ACT establishing a state commission for the designation of oyster-grounds.

GENERAL ASSEMBLY, JANUARY SESSION, A. D. 1881.

Be it enacted by the Senate and House of Representatives, in General Assembly convened:

SECTION 1. The state shall exercise exclusive jurisdiction and control over all shellfisheries which are located in that area of the state which is within that part of Long Island sound and its tributaries, bounded westerly and southerly by the state of New York, easterly by the state of Rhode Island, and northerly by a line following the coasts of the state at high water, which shall cross all its bays, rivers, creeks, and inlets at such places nearest Long Island sound as are within and between points on opposite shores, from one of which objects and what is done can be discerned by the naked eye upon the other. And all shellfisheries not within said area shall be and remain within the jurisdiction and control of the towns in which they are located, under the same laws and regulations and through the same selectmen and oyster-committees as heretofore, except that such selectmen and committees shall hereafter only act as the agents of their respective towns. If a difference shall arise between any town and the commissioners as hereinafter provided for, as to the boundary line between said town and the area so to be mapped, said town, by its selectmen, may bring its petition to the superior court for the county within which said town is situated, to determine said boundary line, and said court, upon reasonable notice to the parties, shall hear said petition and appoint a committee to ascertain the facts in such case and report the same to said court, and said court shall thereupon make such order as may be proper in the premises.

SEC. 2. The three fish-commissioners of the state now in office, and their successors, shall also be and constitute a board of commissioners of shellfisheries, and be empowered to make or cause to be made a survey and map of all the grounds within the said area in Long Island sound, which have been or may be designated for the planting or cultivation of shellfish; shall ascertain the ownership thereof, and how much of the same is actually in use for said purposes; they shall also cause a survey of all the natural oyster-beds in said area, and shall locate and delineate the same on said map, not to exceed \$2,500 in cost, and shall report to the next session of the legislature a plan for an equitable taxation of the property in said fisheries, and make an annual report of the state and condition of said fisheries to the legislature, and the said commissioners shall be empowered to appoint and employ a clerk of and for said board, and they shall each give a bond for the faithful performance of their duties, and for the payment to the state treasurer of all money that may come into their hands under this act, in the sum of two thousand dollars.

SEC. 3. The said commissioners shall also be empowered, in the name and in behalf of the state, to grant by written instruments, for the purpose of planting and cultivating shellfish, perpetual franchises in such undesignated grounds within said area as are not, and for ten years have not been, natural clam or oyster-beds, whenever application in writing is made to them through their clerk, by any person or persons who have resided in the state not less than one year next preceding the date of said application. The said application and the said grant shall be in manner and form as shall be approved by the chief justice of the state, and all such grants may be assigned to any person or persons who are or have been residents of the state for not less than one year next preceding such assignment, by a written assignment, in manner and form approved by said chief justice; and the said commissioners shall keep books of record and record all such grants and assignments therein, and the same shall also be recorded in the town clerk's office in the town bounded on Long Island sound, within the meridian boundary lines of which said grounds are located, if lines were run due south from present termini of town lines.

SEC. 4. When any such application is filed with the clerk of said commissioners, he shall note on the same the date of its reception, and shall cause a written notice, stating the name and residence of the applicant, the date of filing the application, the location, area, and description of the ground applied for, to be posted in the office of the town clerk of the town bounded on the said Long Island sound, within the meridian boundary lines of which said grounds are located, where such notice shall remain posted for twenty days. Any person or persons objecting to the granting of the grounds applied for, as aforesaid, may file a written notice with the town clerk, stating the grounds of his or their objections, upon the payment to said town clerk of the sum of twenty-five cents, and at the end of said twenty days the town clerk shall forward all such written objections to the clerk of said commissioners; and in case such objections are so filed and forwarded, the said commissioners, or a majority, shall, upon ten days' notice in writing, mailed or personally delivered to all the parties in interest, hear and pass upon such objections at the town in which such grounds are located as aforesaid, and if such objections are not sustained and the area of ground is not, in the opinion of the commissioners, of unreasonable extent, they may, for the actual cost of surveying and mapping of such grounds, and the further consideration of one dollar per acre paid to the said commissioners, to be by them paid over to the treasurer of the state, grant a perpetual franchise for the planting and cultivating shellfish in such grounds, or in any part of the same, in the manner aforesaid, and when no objections are made such grants may be made for the considerations hereinbefore named. At all hearings authorized by this act the said commissioners may, by themselves or their clerks, subpoena witnesses and administer oaths as in courts of law.

SEC. 5. The said commissioners shall, previous to the delivery of any instrument conveying the right to plant and cultivate shellfish on any of said grounds, make or cause to be made a survey of the same, and shall locate and delineate the same, or cause it to be located and delineated upon the map aforesaid, and upon receipt of said instrument of conveyance the grantee shall at once cause the grounds therein conveyed to be plainly marked out by stakes, buoys, ranges, or monuments, which stakes and buoys shall be continued by the said grantee and his legal representatives, and the right to use and occupy said ground for said purposes shall be and remain in said grantee and his legal representatives: *Provided*, That if the grantee or holder of said grounds does not actually use and occupy the same for the purposes named, in good faith, within five years after the time of receiving such grant, the said commissioners shall petition the superior court of the county having jurisdiction over the said grounds, to appoint a committee to inquire and report to said court as to the use and occupancy of said grounds, in good faith, and said court shall in such case appoint such committee, who, after twelve days' notice to petitioners and respondents, shall hear such petition and report the facts thereon to said court, and if it shall appear that said grounds are not used and occupied in good faith for the purpose of planting or cultivating shellfish, the said court may order that said grounds revert to the state, and that all stakes and buoys marking the same be removed, the costs in said petition to be paid at the discretion of the court.

SEC. 6. When, after the occupancy and cultivation of any grounds designated as aforesaid, by the grantee or his legal representatives, it shall appear to said commissioners that said grounds are not suited for the planting or cultivation of oysters, said grantee, upon receiving a certificate to that effect from said commissioners, may surrender the same, or any part thereof. Not less than one hundred acres to the state, by an instrument of release of all his right and title thereto, and shall, on delivery of such instrument to the said commissioners, receive their certificate of said release of said grounds, the location and number of acres described therein, which shall be filed with the state treasurer, who shall pay to the holder the sum of one dollar for every acre of ground described in said release, where said sum has been paid therefor to the state. And the said release shall be recorded by the said commissioners in their record-books, and in the town clerks' office in the town adjacent to and within the meridian boundary lines of which said grounds are located.

SEC. 7. Said commissioners shall provide, in addition to the general map of said grounds, sectional maps, comprising all grounds located within the meridian boundary lines of the several towns on the shores of the state, which maps shall be lodged in the town clerk's office of the said respective towns; and said commissioners shall also provide and lodge with said town clerks blank applications for such grounds and record-books for recording conveyances of the same, and all conveyances of such grounds and assignments, reversion, and releases of the same shall be recorded in the books of said commissioners, and in the town clerks' offices in the towns adjacent to and within the meridian boundary lines of which said grounds are located, in such books as are provided by said commissioners, subject to legal fees for such recording, and the cost of all such maps, blank-books, surveys, and all other expenses necessary for the carrying out the provisions of this act, shall be audited by the comptroller and paid for by the treasurer of the state, and the said commissioners shall each receive for their services five dollars per day for the time they are actually employed, as provided for in this act; their accounts for such service to be audited by the comptroller and paid by the treasurer of the state.

SEC. 8. All designations, assignments, and transfers of ground in Long Island sound heretofore made for the purpose of planting or cultivating oysters, clams, or mussels, excepting natural oyster-, clam-, or mussel-beds, are hereby validated and confirmed.

SEC. 9. All the provisions of the statutes of this state relating to the planting, cultivating, working, and protecting shellfisheries, upon grounds heretofore designated under said laws, except as provided for in section eight of this act, and as are not inconsistent with this act, are hereby continued and made applicable to such designations as may be made under the provisions of this act.

SEC. 10. When it shall be shown to the satisfaction of the said commissioners that any natural oyster- or clam-bed has been designated by them to any person or persons, the said commissioners shall petition the superior court of the county having jurisdiction over the said grounds, to appoint a committee to inquire and report to the said court the facts as to such grounds, and said court shall, in such case,

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appoint such committee, who, after twelve days' notice to the petitioners and respondents, shall hear such petition, and report the facts thereon to said court; and if it shall appear that any natural oyster- or clam-beds, or any part thereof, have been so designated, the said court may order that said grounds may revert to the state, after a reasonable time for the claimant of the same to remove any shellfish he may have planted or cultivated thereon in good faith, and said court may further order that all stakes and buoys marking the same be removed, the costs in said petition to be taxed at the discretion of the court.

SEC. 11. Any commissioner who shall knowingly grant to any person or persons a franchise, as hereinbefore provided, in any natural oyster-bed, or clam-bed, shall be subject to a fine of not less than one hundred dollars, nor more than five hundred dollars, and if such franchise is granted the grant shall be void, and all moneys paid thereon shall be forfeited to the state; and said commissioners shall in no case grant to any person or persons a right to plant or cultivate shellfish which shall interfere with any established right of fishing, and if any such grant is made the same shall be void.

SEC. 12. All acts and parts of acts inconsistent herewith are hereby repealed, but this act shall affect no suit now pending.

TOWN LAWS OF EAST HAVEN: TAXATION.—It will be observed that the first section of the old law gave the right to grant land in East Haven to both the selectmen and the oyster-committee. The former had long been accustomed to set apart oyster-ground, and retained this privilege for the river and upper shores, while the committee designated in deep water. In a special meeting of the town of East Haven, held in September, 1865, to ratify the late legislature's enactments, an oyster-committee of five was appointed; and it was

Voted, That the committee aforesaid shall stake out the grounds aforesaid in squares of one acre each (where the nature and extent of the said grounds will permit), and employ a surveyor to survey and make a map of the same, and lodge it with the town clerk of said town.

Voted, That each person who makes application to the committee aforesaid * * * and receives from them a written description of ground set apart to them, shall * * * pay to the said town clerk at the rate of \$10 per acre, which money is to be used in paying the expenses incurred in making out the aforesaid survey.

Voted, That the town clerk pay the surplus, if any, into the treasury of the town.

The succeeding spring, in order to give the young oysters in the river a chance to get some growth, all raking was prohibited "from April 9, 1866, to March 9, 1867".

The reason why this area was restricted to one acre, was in order that there might be enough to go around; applicants were so numerous, at first, that designations were *allotted* literally by drawing the number of the designation from a dark box. The favorite locality was Morris cove. For all the land set apart by the selectmen, \$10 or more an acre was received; when application was made for grants outside, the oyster-committee thought the experiment so foolish that they were ashamed to ask more than \$1. In addition to this, there was a charge of 90 cents for making and recording each deed, besides (until late years) a 50-cent revenue stamp on each document, and a second one in case of a transfer. About 750 acres were designated at \$10 an acre, and about 1,500 acres at \$1. In all, East Haven had granted 2,523 acres of oyster-ground up to January 20, 1880. My authority is the Hon. C. A. Bray, who has had official charge of these matters for many years in that town. To this may be added 650 acres set apart but not yet paid for. Since 1877 East Haven has taxed these grants, under the head of "personal property", at valuations of \$5, \$10, and occasionally more, per acre, the rate last year being 12 mills on the dollar. The reports of the treasurer show that East Haven has derived the following satisfactory revenue from the sale of her oyster-culture privileges:

Previous to 1867	\$3,325 00	In 1874.....	\$220 00
In 1867	222 00	In 1875.....	430 00
In 1868	300 00	In 1876.....	883 95
In 1869	197 50	In 1877.....	479 85
In 1871	97 50	In 1878.....	79 90
In 1872	1,554 00	In 1879.....	569 75
In 1873	68 00		
		Total.....	8,427 45

The expenses of surveys, etc., used up about one-half of this; the other half went to the treasury. All the \$1 designations have been "net" to the town.

RESOLUTIONS OF THE LEGISLATURE IN 1879.—These and other provisions and alterations of the oyster-laws have caused much discussion, and showed satisfactorily the existence of much discontent, though no one seems able to propose a better arrangement. The best opinion, I believe, is that few changes are desirable. In compliance with the wishes of the oyster-interest of the state, the legislature of 1879 passed the following resolutions:

Whereas, the raising of oysters from the spawn in the deep waters of this state, in Long Island sound, has proved by experience to be a success;

Whereas, there is an immense tract of available oyster-ground between the town boundaries and the southerly boundaries of the state, which cannot at present be used, because the state has granted no authority to designate it;

Whereas, these grounds can be disposed of so as to bring a large sum into the treasury of the state: Therefore,

Resolved by this assembly, That a commission, consisting of three persons, be appointed by the governor to prepare a plan, and report to the next session of the general assembly, for the gradual disposal of the grounds in the waters of this state which are suitable for the cultivation of oysters. Said commission shall examine all existing statutes relating to oyster-grounds and town lines in the sound, all customs and by-laws in different parts of the state, and such other matters as pertain to oyster-fisheries, so that the system devised shall be of general application, and enable the state to dispose of the franchise of the grounds to the best advantage.

The commissioners appointed were: the Hon. Robert Coit of New London (chairman), the Hon. H. B. Graves of Litchfield, and the Hon. Charles W. Bell of Norwalk. They held meetings during the autumn of 1879, in various shore-towns, which were well attended by the oyster-growers, and to their report is probably due the new law passed in January, 1881, and already quoted, in respect to the designation of grounds by the state.

Such are the circumstances under which the oystermen in New Haven harbor and the contiguous sound are able to do business.

30. LIMITATIONS OF OYSTER-CULTURE IN THE NEW HAVEN REGION.

SELECTION OF OYSTER-GROUND.—As I have already remarked, the cultivation of native oysters has grown up within comparatively recent years, to supply the altered conditions of the business and fill the demand for the home-bred stock. It soon expanded beyond the limits of shallow water, until now the hopes of all cultivators of any consequence are centered upon the deep-water ground, to which the inshore tracts are held as subsidiary, being largely used only as nurseries wherein to grow seed for the outside beds.

The process by which a man secures a large quantity of land outside has been described. It is thought hardly worth trying unless at least 50 acres are obtained, and many of the oyster-farmers have more than 100. These large tracts, however, are not always in one piece, though the effort is to get as much together as possible. He obtains the position of his ground, as near as he can, by ranges on the neighboring shores, as described in his leases, and places buoys to mark his boundaries. Then he places other buoys within, so as to divide his property up into squares an acre or so in size. In this way he knows where he is as he proceeds in his labors. Having done this, he is ready to begin his active preparations to found an oyster-colony.

The bottom of the sound opposite New Haven, as I have said, is much of it smooth, hard sand, with occasional little patches of mud, but with few rocks. The depth varies from 25 to 40 feet. This area is almost totally void of life, and no oysters whatever were ever found there, except after some "dumps" were made outside the light-house, by the dredging boats which had been cleaning out the channel and deposited many living oysters along with the other dredgings in the offing. These dumps very soon became, in this way, oyster-beds, supplying a considerable quantity of seed, which was public property, to be had for the dredging and taking their share in the incessant controversies as bones of contention.

PREPARATION OF A DEEP-WATER OYSTER-FARM.—When a cultivator begins the preparation of a deep-water farm, his first act is to scatter over it, in the spring (about May), a quantity of full-sized, healthy native oysters, which he calls "spawners". The amount of these that he scatters depends on his circumstances; from 30 to 50 bushels to the acre is considered a fair allowance here, I believe. The rule is, 1 bushel of spawners to 10 bushels of cultch. He now waits until early in July (from the 5th to the 15th is considered the most favorable time), when he thinks his spawners must be ready to emit their spat. He then employs all his sloops, and hires extra vessels and men, to take down to the harbor the tons of shells he has been saving up all winter, and distribute them broadcast over the whole tract of land he proposes to improve that year. These shells are clean, and fall right alongside of the mother-oysters previously deposited. The chances are fair for catching of spawn. Sometimes the same plan is pursued with seed that has grown sparingly upon a piece of ground; or young oysters are scattered as spawners, and the owner waits until the next season before he shells the tract. Sometimes there must be a preparation of the ground, before any operations can be begun upon it, by elaborate dredging or otherwise. Within the harbor, for instance, considerable muddy bottom has been utilized by first paving it with coarse beach-sand. No spot where there is not a swift current, is considered worth this trouble. The proper amount is 200 tons of sand to the acre, which can be spread at the rate of five sharpie-loads a day, at no great expense. The sand forms a crust upon the mud firm enough to keep the oyster from sinking, and it need not be renewed more than once in five years.

EXPENSE OF AN OYSTER-FARM.—In either case, therefore, the planter's expense has not been enormous. I present herewith two statements of the outlay under the operations outlined above, which are as follows:

No. 1.—Fifty acres.

2,000 bushels spawners, at 30 cents.....	\$600 00*
15,000 bushels shells, at 3 cents.....	450 00
Planting 15,000 bushels shells, at 4 cents.....	600 00
	<hr/>
	1,650 00

No. 2.—Sixty acres.

2,000 bushels of spawners, at 56½ cents.....	\$1,130 00
17,000 bushels of shells, at 4 cents.....	680 00
4,453 bushels Bridgeport seed, at 10 cents.....	445 30
	<hr/>
	2,255 30

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In a third case Captain George H. Townsend gave me a statement of the expenses of starting a farm of 25 acres off the mouth of East Haven river. This was a more elaborate arrangement, but on the other hand was accomplished, through a variety of favorable conditions, cheaper than would have been possible with ground otherwise situated:

2,000 bushels small river oysters, at 25 cents.....	\$500 00
Spreading same and staking, at 5 cents.....	100 00
600 bushels dredged seed, at 40 cents.....	240 00
10,000 bushels of shells, put down at 4 cents.....	400 00
	1,240 00

I think it would not be unfair to average the cost of securing, surveying, and preparing the deep-water beds at about \$40 an acre, or about \$4,000 for 100 acres. To this must be added about \$2 an acre for ground-surveys, buoys, anchors, etc. But now that he has got his set everywhere upon this 50 acres of shells, the planter's anxieties have just begun. The infant mollusk, when first it takes hold upon the stool, the merest speck upon the surface of the white shell, is exceedingly tender. The chances in its favor in the race against its numberless adversaries are extremely few, almost as few as befriended the egg when first it left the protection of the mother-mantle. The longer it lives the better are its chances, but the tender age lasts all through the autumn and until it has attained the size of a quarter-dollar piece; after that it will withstand ordinary discouragements. It often happens, therefore, that the "splendid set" proves a delusion, and Christmas sees the boasted bed a barren waste. The cultivator finds his work as risky as mining. "You can't see into the water," he says; and the miner quotes back his proverb: "You can't see into the ground." A sufficient cause may usually be assigned for the death of large districts of infant oysters which appeared to get a good start. Starvation is probably the true explanation. Some evil current bore away from them the necessary food. In other cases specific causes, the most potent of which are storms, can be pointed out.

VICISSITUDES AND LOSSES OF OYSTER-PLANTING.—In the fall, just when the young oyster-beds are in their most delicate condition, occur the most destructive gales that afflict the Connecticut coast. They blow from the southwest, and if, as occasionally happens, they follow a stiff southeaster, producing a cross-sea of the worst character. The water is thrown into a turmoil to a depth, in some cases, of four or five fathoms, and everywhere between that and the beach the oyster-beds are torn to pieces, all boundaries are dissolved, and windrows of oysters, containing thousands of bushels, are cast up along the whole extent of the beach. Although so great a disaster as this is rare, it does occasionally happen, and hardly a winter passes without more or less shifting of beds or other damage by tempest. The burying of beds under drifted sand is more uncommon off New Haven than easterly; but in the harbor, where the bottom is soft, mud is often carried upon the beds to such an extent as to smother, if not wholly to hide, the oyster. All that part of the harbor near the mouth of West river is so liable to this accident that oystermen have abandoned that district altogether. It is believed by many that the beds in the sound, in water more than twenty-five feet deep, are safe from disturbance from gales; but others decline to put their faith in any depth thus far planted. Frequently oysters cast up by storms, if attended to immediately, can be saved and replanted with profit.

MANAGEMENT OF THE OYSTER-FARM.—Having secured a colony of young oysters upon the stools which have been laid down for them, they are left alone until they attain the age of three, four, or five years, according to their thrift and the trade for which they are designed, by the end of which time they have reached a large size and degree of fatness, if the season has been favorable. If, as is largely done by those planters who live at Oyster point, the oysters are to be sold as seed to Providence river or other planters, they are taken up when only one or two years old. Not a great quantity of this seed was so disposed of last year—not over 20,000 bushels, I should say. It is not considered, as a rule, so profitable as to wait for the maturity of the stock.

EXPERIENCES OF CAPTAIN TOWNSEND IN OYSTER-PLANTING.—In no way, probably, could I better illustrate the series of slow experiments and expensive trials by which the more intelligent of the New Haven planters have succeeded so far as they have done, than by giving an abstract of a diary kept for several years by one of the most energetic of these experimenters, Capt. Chas. H. Townsend. I am able to avail myself of it through his consent, and the kindness of Prof. A. E. Verrill, of Yale College, to whom it had been intrusted for scientific use. Captain Townsend lived at South Haven, where his brother, Mr. George H. Townsend, still continues the business on a large scale. Captain Townsend was in command of ocean steamers for many years, and took special pains, when in Europe, to study the methods of oyster-culture in vogue on the French coast, and was able to apply many hints there obtained to his plantations on this side, though he found so great a difference of circumstances and natural history between French and American oysters, that his transatlantic experience was of less use here than he had expected it to be. The "fort", to which he often refers, is old Fort Hale, on the rocky eastern shore of the harbor, near the mouth. It was a picturesque brick structure in 1812, but had become dilapidated at the time when the civil war of 1861 broke out, and so was razed and transferred into a series of earthworks and bomb-proofs. The moat and its tide-slucice became the scene of Captain Townsend's experiments, detailed in the account condensed herewith.

The first memorandum in this interesting book informs us, under the date "1867", that the author "commenced stocking the ditch at Fort Hale with native oysters, of two years' growth, in September and October of 1867, for the purpose of experiment". Only 51 bushels were laid down. To 1868 is devoted only one page, as follows: "In September and October, 1868, we notice a thrifty set of young oysters along the edge of the ditch and on the stones near the sluice; also, on the piles of the bridge and in the brook that leads into the ditch. We are also sorry to note that about one-half of the oysters laid down as an experiment, for spawners, have been killed by becoming buried in the mud." Subsequently (June 10, 1870), the author records that "one of our neighbors took from the ditch, one night last fall, 23 bushels of the oysters planted by us and sold them in New Haven". Betwixt mud and thieves, experimental knowledge appears to have been a dear acquisition.

The next record is under 1869 :

From the last two years' experience we have decided to stock the ditch with native oysters, of three years' growth, this fall, for the purpose of having them in thriving condition during the spawning-season of 1870. We have now down the following quantities:

	Bushels.
Remaining, four years old, say	25
Remaining, of spawn	100
Selected natives, planted November 3 to 29.....	150
This year's growth, taken from the edge of the ditch.....	25
Total.....	300

The next entry is a list of the names of the 48 original proprietors to whom the oyster-lots, subsequently transferred to the Townsend Brothers, were first granted by the town of East Haven. The lots run from No. 389 to No. 482; each lot consisted of two acres.

In July, 1868, Mr. Townsend began spreading shells upon seven of his lots, and between the 16th and 29th threw overboard 4,487 bushels, estimating that each lot required from 700 to 750 bushels. The expense of this he sets down at 8 cents a bushel; 2½ cents cost of shells; 5 cents for boating and spreading; ½ cent for staking, etc.

Following this comes a "memorandum of sound and cove seed-oysters, planted August and September, 1868". This states, very particularly, the date of planting, who did the labor, the exact location of the work, and the number of bushels put down each time, with occasional additional note, regarding quality, etc. A large number of the Fair Haven oystermen appear to have been furnished with steady employment at this season. Succeeding this entry, are similar memoranda of Fair Haven river seed-oysters planted at the same time upon different ground. In all, 834 bushels of cove and sound seed and 2,595 bushels of river seed were planted, both kinds a year old. This seed, says a subsequent entry, was laid down at the rate of 25 bushels to 30 feet square, or 1,000 bushels to the acre; eighteen months afterward it was decided to be too thick to thrive well.

At this time he began taking up some Virginia oysters. One cargo, planted April 24, 1869, on lot 455, consisted of 765 bushels from Fishing bay. They cost, to bed down, 31½ cents a bushel, and sold, December 1, at 48 cents a bushel. Another cargo, planted on lots 406 and 407, April 25, 1869, consisted of 2,280 bushels from Great Anamassie. They cost, to bed down, 34½ cents, and sold, on the ground, for 50 cents per bushel. The oysters remained down, on the average, six months, and increased in growth one-third.

Between July 14 and 26 he shelled the east side of lots 428, 429, 430 with 900 bushels of "stools", in a strip about 100 feet wide, and put 200 bushels on Black Rock bar.

This completes the diary for 1869. I continue to quote:

January 1, 1870.—Paid W—— F——, for service as watchman, 10 days, at \$2 50, \$25.

F—— was relieved to-day by A. Moulthrop, whom I have employed, for the Townsend Brothers, to cultivate oysters, and otherwise, for one year, at the rate of \$75 per month.

January 26, 1870.—Spent several hours to-day with Moulthrop on the oyster-beds in the harbor. I also told him of my plans for developing the ditch at Fort Hale. We walked around it and I gave him an idea how much of the ditch we had stocked; I also showed him the mussel-patch in the sluice, and gave him directions to get brush ready to lay over the mussels for the purpose of catching their spawn, similar to the French plan. I also told him to prepare stakes, boats, etc., for work in the spring.

March 26, 1870.—I find the cold weather had killed many of our finest oysters near the sluice at the fort. We were employed scraping and trimming up the ditch, etc.

March 28, 1870.—Moulthrop and myself busy on the oyster-grounds getting ready to transplant seed from spawn of 1868.

On the following day the transplanting was begun. Lot 409 had been "shelled" in July, 1868, at the rate of 1,000 bushels to the acre. These shells had caught a large amount of spat, which had lived and was now ready to be transferred. Between March 29 and May 26 there were taken from this lot, as follows:

	Bushels.
Transplanted to lot No. 426.....	650
Transplanted to lot No. 406.....	645
Transplanted to lot No. 403.....	630
Transplanted to lot No. 402.....	540

Before transplanting, the lot which was to receive this seed was divided off into "squares", 30 feet in breadth, and about 15 bushels was placed on each square. Mr. Townsend made a plat of each lot, so planted, in his notebook. I will transcribe one, as a sample of the many that occur all through, since it may be suggestive. On each square is noted the date of planting and the number of bushels, thus: "April 14—15."

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		28	30	30	30	30	30	30	feet.
WEST	08	This strip, 30	ft. wide, planted	July and A	ugust, 1868,	with 210 bush	els F. H. seed.	Replanted	
	08	April 18-15.	April 18-15.	April 18-15.	April 11-15.	April 7-15.	April 12-20.	April 11-15.	
	08	April 18-15.	April 15-15.	April 14-15.	April 11-15.	April 7-15.	April 5-15.	Mar. 31-17.	
	08	April 16-15.	April 15-15.	April 14-15.	April 13-15.	April 7-15.	April 5-15.	Mar. 31-18.	
	08	April 16-15.	April 15-15.	April 14-15.	April 13-15.	April 7-15.	April 5-20.	Mar. 30-17.	
	08	April 16-15.	April 14-15.	April 14-15.	April 13-15.	April 6-15.	April 6-15.	Mar. 30-18.	
	08	April 15-15.	April 14-15.	April 14-15.	April 13-15.	April 6-15.	April 6-15.	Mar. 29-15.	
		90	90	90	90	90	100	100	bush.
		SOUTH.							

Turning the pages still further, it appears that other spat had been caught on stools and was now transplanted, over 8,000 bushels being gathered from ten or twelve acres. Meanwhile, seed was being imported from outside sources. Cove seed, for instance, was caught up from lot No. 415 and laid down on lot No. 444, on Black Rock bar, to the amount of 750 bushels; while on June 15, 30 bushels of Long Island seed was put on lot 417, at a cost of 25 cents a bushel; and on July 25, 110 bushels of Morris Cove seed, at 20 cents, was planted on lot 415.

Meanwhile, in May, the schooner Albert Field brought Mr. Townsend a cargo of Wycomico river oysters from Virginia, which he bedded on Crane bar and on Black Rock bar, under the following expense:

3,000 bushels, first cost, at 15 cents	\$450 00
3,000 bushels, at 14 cents freight	420 00
2,940 bushels, bedded, at 3 cents	88 20
Total	958 20
Add cost of 4 tubs	4 00
Add branding 12 tubs, at 50 cents	6 00
Grand total	968 20

DIARY OF CAPTAIN TOWNSEND.—Going back a little, now that this subject of transplanting has been followed to the end, the diary shows that Mr. Townsend conducted many experiments in propagating oysters during the summer. I copy the record of this practical study:

May 25, 1870.—I have carefully watched the growth of oysters planted in the ditch. A large proportion of the first laid down have died, having been badly mudded; but the young ones, from the spat or spawn of the oysters, laid down in 1867 and 1868, have grown very rapidly. The shells are thin and generally thrifty.

June 18.—I have this day been employed * * * running east and west lines, as per map No. 1 of oyster-grounds, in New Haven harbor within the limits of East Haven. [Here follows technical description of boundaries and ranges corrected from the survey of 1866.] * * * I have taken great pains to have this survey made, and spared no expense, as it is very important that some landmark should be made, as the ice carries away all stakes in winter, and it is remarkable that the one stake we have used has remained so long; but it is sure to go next winter, for the sea-worms have eaten it badly.

June 23.—Laid down near the bridge 15 bushels very large and fine single oysters taken from lot 422.

June 29.—Employed all day. Employed all day with two carts, three men, and Sergeant Maxwell, at the fort, carting oyster-shells preparatory to shelling the ditch. We have dumped 27 loads, of 25 bushels each, in piles 60 feet apart. Will spread the shells at the rate of 12½ bushels to a space 30 feet square. We call the ditch 30 feet wide at the bottom.

July 2.—Maxwell finished spreading shells in the ditch for the present. For the past week I have kept the ditch with about 4 feet of water in it in order to let the sun heat the water and make the oysters all spawn about the same time. I have also shut out the tide and let flow in as much fresh water as possible, as an abundant supply is supposed to benefit the oysters while spawning.

July 10.—Examined shells and oysters in the fort ditch this morning. The native oysters of the ditch seem to be about half-done spawning, while those taken from lot No. 422—very large, fine, single oysters, say four years old—seem just ready to spawn. The shells put in July 1 are coated with slime, fine sea-grasses, and now and then a speck which looks as if it might be spat.

At the end of July the author sums up his summer's labors, and counts over 10,000 bushels of stools planted, at a cost of from 5 to 7 cents laid down, or a total of \$688 50.

July 23.—I have also laid down, as an experiment, what is equal to 50 bushels an acre of smooth stones on lot 179, to keep the shells from shifting, and also to see if the spawn will set on the stones.

We are offered any quantities of shells for 2 cents per bushel in the heap, or laid down for 5 cents. We have paid as high as 5 cents a bushel for shells brought from Fair Haven river, but can now get the same work done for 4 cents, and 3½. H—— G—— has planted 177 bushels of shells taken from the saltpeter works for 2½ cents; William E. B—— furnishes shells, laid down, for 5 cents per bushel; and William G—— will let us have 5,000 bushels for 2 cents, or have them laid down for 5 cents.

On August 1, Mr. Townsend tabulated his estimated wealth in oysters—the season being now over—as follows:

	Bushels.
Young seed, from shells	8, 150
Old seed, river and cove	6, 000
Fort ditch	1, 500
Scattering sources	1, 500
Virginia plants	3, 000
Total	20, 150

August 2.—This day examined two oyster-lots in Morris cove, the first a triangular lot near Morris' wharf. * * * We find it well stocked, and also affording good clamming, but the growth of oysters there is very slow. This is one of the oldest beds in the cove, and there are oysters on it seven or eight years old. The second, off Nettleton's, ranges as follows: * * * This lot was seeded in 1866-'67, and the oysters have not grown since the first year. Clams in abundance.

I notice that the oysters at Morris' and in the harbor are out of spawn, but we see no signs of young oysters yet.

September 1.—Have examined carefully the shells laid down to catch spawn, and have not as yet found one young oyster, either in the fort ditch or in the harbor lots. We hear of a slight set in the cove and off the light-house. Moulthrop has been employed in the cove, and has brought up and laid down on lot No. 413, about 150 bushels of oysters, which were very fat, but had not grown enough to pay for planting, in three years; and I am convinced from actual observation that Morris cove, inside of the base-line, is not a productive spot for seed-oysters. Off-shore, and between Morris' wharf and the light-house, they may do better, as they get more current and fresh water. If the brook running east of Thompson's house could be let into the cove about at Parker's house, I think it would improve oyster-culture between the fort and the light-house, \$100 per annum.

Moulthrop has taken several bushels of clams from lots 250 and 267, and reports good clamming, something we will pay attention to next year.

The Virginia oysters planted on Black Rock bar have "sanded" somewhat, and, with the exception of a small spot in the sluice, the ground north of a line running to Hugh Waters' is not fit to plant on again, as I notice that some sand-ridges have shifted two rods since spring. These oysters (a lot of 1,080 bushels, from schooner Albert Field, planted May 14, being all that lived out of a cargo in bad condition when put down) have grown about 50 per cent. in three and a half months. If allowed to remain until December 1, they ought to be double their size when put overboard. Some of them are still in spawn, but are fit to open now, and their flavor is the same as that of the fort oysters.

We also planted 1,920 bushels, from the same vessel, on Crane's bar, in 2 and 3 feet of water (low tide) and on softer bottom, and in less current; they have not done as well.

Oystermen report native oysters fat, but cannot account for it, as we have not had rain for three months. They say the reason the spawn has not matured this year is because the water has been so salt that it has killed the spawn.* Moulthrop has also caught up 500 bushels of natives planted on lot No. 401, and has laid them down for fall use on the flats off the mouth of the creek.

October 1.—During the last two weeks we have sold about 175 bushels of oysters, and bought about 400 bushels of cove seed, and laid it down for next year. We have also begun to open a few oysters to try the market, but the weather is so warm dealers do not care to buy. The seed planted in the spring looks thrifty and clean. The drills have made some havoc, and we hear of starfish off the Pardee buoy.

October 23.—Returned from Boston last night, and this afternoon went out with Moulthrop to examine the oysters laid down as an experiment, on Black Rock bar. We find that the tidal wave occasioned by the shock of an earthquake last Thursday, has done considerable havoc among the oyster-beds. For the last two summers the growth of sea-weed on the flats has been very abundant, and as there was no ice last winter to clean it off, this year's growth, with the old growth, made the quantity double; the hot sun this summer having killed it all, and left it to decay. When the tidal wave came up the harbor from south-southwest to north-northeast, it is reported to have combed up 2 feet, by captains of vessels lying at anchor, and it swept before it all the mass of loose decayed sea-weed, and piled in windrows all the way from the Townsend creek to Crane's bar, completely smothering 500 bushels of oysters laid down at the mouth of the creek. It also altered the whole south and west side of Black Rock bar, and has destroyed hundreds of bushels of fine Virginia oysters, the sand in some places being 2 feet high. It has also tossed the oysters about in every direction, and our loss cannot be counted up at present, but we found oysters half a mile from their beds, which shows the strength of the tidal wave to have been great.

I find the oysters laid down as an experiment have all done well, except those laid down just north of the breakwater, off King's island. They are poor, which I attribute to not having fresh water, and I will in the spring open a creek through the meadow, which will give a good supply; as I believe the salt meadows are full of fine springs of fresh water, and if drained will not only benefit the

* This and the previous sentence refer to popular traditions which no evidence supports as true.—E. I.

meadow, but the fresh water will furnish a large supply of food necessary for the oysters to thrive well. The seed laid on the flats in May last has increased 100 per cent., and on Black Rock bar about 50 per cent. The young cove- or lighthouse-seed, bought of Captain Luddington in August, has at this moment increased 100 per cent., and astonishes us all. It is my opinion, that if we lay down any more, in order to thrive well they should be put down at the rate of 10 bushels to the square of 30 feet. By so doing, the seed will be large and sound in about one year's time.

I have not examined the oysters in the ditch at Fort Hale for two months, but when looked at they were in a thrifty condition, and will be ready for market this fall, if required. The two beds opposite ship-yard in Fair Haven river, are being taken up, and Mr. George Baldwin, the ship-builder, who has charge of them, says they are fat and looking well. The oysters in the cove are small, as they lie out of the current; but the clams are very abundant. Next year we shall clean up the cove. I write this in haste, as I leave for New York to take command of steamer Ontario to-night, and expect to make a voyage to Europe. Will commence next March to cultivate in earnest.

After his return from this voyage, Captain Townsend resumes his diary:

January 1, 1871.—Having closed the oyster-season last month, and being away at sea, my brother, George H. Townsend, decided to keep Anson Moulthrop watching oysters until I returned.

Having arrived at Boston, January 12, and home, January 15, I find the oyster-interest has been well looked out for, and as ice has closed up the harbor, we will wait until spring, before making farther beyond watching, etc.

March 1.—The ice has now broken up and left the shore and salt meadows in a very bad condition, having had several south-south-west gales, which reached their height about high water, piling the cakes of ice, some of which were 2 feet thick, one on the other, and the heavy surf kept them in constant motion, so that the whole length of the beach has been stirred up from Fort Hale to the creek, and thousands of tons of sand have been driven upon the meadows north of the creek. On the whole, the north part of the farm has been improved, but my point (the south water-front) badly injured. I also notice the ice has plowed deep furrows along the flats, and large rocks have been taken from the beach and left on the flats; and that oysters left in holes on Black Rock bay, have been washed out, and more than one-half carried out to sea by the ice. Those that remain, however, are of good quality, and in the sluice where the water was deep enough to keep them from coming in contact with the ice, I find them very fat and sweet. This winter has proved one thing, however, that all oysters must be taken off the flats before the harbor freezes up, or frost will kill what ice does not carry off. Of the 300 bushels of Virginia oysters left on Crane's bar, in 4 feet of water at low tide, about three-fourths have died, but the one-fourth now living have the same flavor as the native oysters, and are very fat. The native oysters have all done well. Those planted on the off-shore acres have increased about 200 per cent., and those in-shore about 150 per cent. I think we can safely estimate that the 8,500 bushels of seed taken from about 3,000 bushels of shells laid down in 1868, and transplanted in April and May, 1870, will now turn out 22,000 bushels of thrifty stock.

April 1.—Began working and watching oysters. * * * We now have the ground all staked out, and find that the whips put down last fall have all remained in their places, unbroken by ice, as were the larger. Hereafter we shall use whips instead of stakes. The original stake on the south line is gone.

April 10.—Mr. F—— began cleaning ground of the Virginia oysters planted last fall, and putting them inside of the eel-grass above the creek. The mud in the ditch at Fort Hale has smothered a great many of the oysters under cultivation there, and all the shells spread last summer have disappeared. The heavy gales last winter have destroyed the southwest sea-wall, and killed large quantities of fine oysters put there for the purpose of multiplication. We shall, however, shell the ditch again this summer, and keep up the cultivation.

April 20.—I find that the 198 bushels of seed-oysters planted along the north line by Anson Moulthrop, April 8, 9, and 20, have not thrived well, as the sea-weed grew up and choked them; many, also, have been eaten by the sea-drills.

April 22.—Have carefully examined the lots planted with shells, except the two most southern ones, and have not found one single young oyster.*

May 18.—Began taking up and planting, and am pleased to find the different beds looking so fine.

June 24.—I find that on the acre No. 414 (planted in August and September, 1868, with Fair Haven river seed), where we laid down 2,595 bushels of oysters, we have taken off and planted on other acres 5,070 bushels. The gain, although considerable, is not as great as it would have been had the oysters been transplanted last year. On some squares of 30 feet we took up 100 bushels. I find our great mistake has been that of planting the oysters too thick. New Haven harbor seed, one year old, on mud bottom, should be planted at the rate of 12 bushels to 30 feet square. Then, when three years old, they will be fit to open, and if allowed to remain four years, they will take up at the rate of 75 bushels to the square.

June 28, 1871.—I have this day taken several of the brick piers used in the foundation of the barracks, just taken down at Fort Hale, and placed them at intervals of 30 feet along the north line of the oyster-tract adjoining land occupied by Mr. G—— and I—— B——. The ice having destroyed our stakes, I have taken this means to preserve our north line.

July 15, 1871.—I have carefully examined the shells this day, laid down July 7, by Goodale, and find a set of shells known as "boats,"† which are the forerunners of the young oysters, and look very much like them to the inexperienced. I have not yet been able to discover, even with the help of a glass, any signs of spat.

July 20.—The native oysters are now about half out of spawn, and I notice on the shells laid down July 7 and 11, a set of a greenish color in spots, which may be the oyster-spat. It is my opinion, from careful observation during the last four years, that oyster-spawn, after leaving the oyster, remains floating about, say a day or a week, until it matures, when it adheres to any clean, hard substance which has been just thrown into the water, and is free from slime. After this the coating breaks and the spat takes the shape and form of an oyster. Clean bits of wood, leather, bones, glass, iron, and stone have been picked up covered with young oysters, which proves that almost any substance thrown into the water, when it is impregnated with spat, will catch it. For catching and propagating oyster-spawn the French use brush, but we find that oyster-shells are better. Young New Haven native shells are considered the best, as they are thin, and when the oyster grows large enough to keep out of the mud, the shells break asunder and the oyster grows in better shape. Where there is much motion in the water, stones have been used, and where the water is quiet, scallop shells are preferred by some.

August 1.—The shells are becoming covered with some kind of spawn, green, black, and a silver color, which may be the eggs of the oyster just ready to break.

*An entry made July 16, 1871, reads: "I find, on examining again, the set was, in spots, good enough to pay expenses."

†The slipper limpet or deck-head, *Crepidula*; three species occur in Long Island sound, of which the *C. fornicata* is the best known.—E. I.

August 4.—I can now safely say that the spat has begun to adhere to the shells. I have several very fine specimens. The eggs at first look (under the glass) like very fine pearls with a black spot, which adheres to the shell and seems then to break out and take the form of an oyster.

August 5.—I notice to-day that the young oysters on shells laid down July 31 are as large and abundant as on the shells laid down July 7 and 15; and, from a careful examination, I am sure the little pearly specks with a black dot, noticed on the shells from, say, July 25, were really oysters in their incipient state. On one shell I have counted, with the naked eye, over 200 well-formed oysters; and under the glass they are too numerous to count with certainty. Calm and hot weather, from July 10 to August 10, is necessary to make the spawn mature and adhere to the shells properly.

August 7.—I have proved to-day, to my own mind, that the green spots first seen on the shells laid down early in July are not oyster-spat or spawn. The dark, muddy substance on the shells, I am inclined to think, comes from the oysters and envelops the spawn, protecting it while drifting around until it becomes fit to adhere to a stool and hatch out. The eggs, when they leave this covering, look like fine sand, transparent under the glass, with a black dot. I have proved this by opening several oysters on Saturday, August 5, and, after removing the meats, carefully laying the shells down near a stake in the center of a bed of oysters just out of spawn; to-day, August 7, just 48 hours later, I find on these shells a fine "set" of young oysters, some of them just formed, others just attaching themselves and dropping off at the slightest touch.

I also notice that the young oysters which have attached themselves to shells on Black Rock bar, and are hardly ten days old, have an enemy in the small black wrinkle or snail,* and in the drill, which bores holes in the shell and destroys them by the hundred.

August 8.—I have decided to put down 600 bushels more oyster-shells, as I find the water is full of spawn.

August 9.—Have put down 300 bushels to-day off Black Rock bar, along the edge sand and mud, and 400 bushels to August 9, which finishes spreading shells this year. Total amount 5,190 bushels. Shells bought at the copper-works have cost us 7 cents laid down. Shells from Fair Haven 2½, and 5 cents boating, equals 7½ cents laid down. Shells from oysters opened by our own help 2½ cents laid down.

August 10.—Have examined carefully the shells laid down July 31, and find an increase in the set, and a very rapid growth. I find that by opening oysters and laying down the shells, that in three tides we find a set of spat, which proves that the water is now full of spat. I have also noticed that for the first two days after the young oysters have been taken from the water they seem to increase in size. They then die and some drop from the shells.

I estimate the total amount of bushels now planted as follows:

	Bushels.
Spawns of 1868 planted in 1870, and now doubled by increase.....	16,200
1868 seed (spawn of 1867) transplanted	6,130
Fort Hale (spawn of 1866), planted on Black Rock bar.....	3,225
Oysters on beds (spawn of 1869) transplanted last year.....	1,250
Fort ditch, Fair Haven, and Cove	1,000
Young seed on shells of 1870.....	1,000
Total.....	28,805

Allowing the growth of this to increase one-fourth this season, and adding this 7,000 bushels to the 28,805, we have 35,805 bushels of oysters actually growing. To this may be added 5,190 bushels of shells well set, to say nothing of the set on the shells laid down in 1870, which will amount to something. The estimate, therefore, sums up as follows:

	Bushels.
Total oysters planted.....	28,805
Increase through growth.....	7,000
Stools and set.....	5,190
Total property.....	40,995

August 19.—The spawning-season is now over, and I find this year's experience should not advise laying down shells later than August 10 or earlier than July 10. The spawn seems to have drifted in flakes. Some areas have a better set than others. The drills and small black snails are killing the young oysters by the millions, and where it runs bare at low water it is worse.

September 1.—I notice that where the spat has set on oyster-stakes in the eel-grass, that the grass sweep the young oysters off the stake; but out of the reach of the grass the oysters are solid and reach up within a few inches of the water-surface at high tide, and the grass seems to prevent the drill from getting up the stake to the young oysters. Oysters are very poor, except those laid in the sluice.

September 25.—We have caught up, sent to market, and laid on the flats, about 500 bushels three years old. Oysters over three years old are now large enough for shell-oysters. I saved a specimen of oyster set on a stake, and will next year try brush for the spat to set on.

EXTENT OF OYSTER-CULTURE IN NEW HAVEN.—Out of the seven or eight thousand acres "designated" in New Haven harbor and its offing, only from 3,000 to 3,500 are in actual use as yet. The largest possession is Mr. H. C. Rowe's; he operates upon about 1,500 acres. Several other planters have from two to six hundred, while many have a hundred acres under cultivation. The major part of this is in deep water, and is yet regarded to a great extent as an experiment, particularly by those who live in other parts of the state. Thus far the success has been encouraging. One gentleman calculates that he has 200,000 bushels of oysters of all ages on his offshore land. Another planter gives me his estimated wealth as follows: On 70 acres, 75,000 bushels, suitable to be sold as seed in the spring of 1880, at an average of 50 cents a bushel; on 50 acres, shells and a good set; elsewhere, in one tract, about 3,000 bushels of young spawners, on which shells are to be thrown; on another tract, 20,000 bushels of seed useful in 1880; and, lastly, an area holding about 5,000 bushels of "set". A 30-acre lot yielded this firm 12,000 bushels in three years, which were sold at 70 cents.

* *Trilia trivittata*, or perhaps *Ilyanassa obsoleta*. No doubt various of the small gasteropods devour incipient oysters and other young mollusks.

RAVAGES OF STARFISHES AND THIEVES.—As yet starfishes have not proved a resistless enemy to the outer beds, although individuals have suffered great harm through their ravages in isolated cases. There are not so many rocks and hiding places for them here as exist in the western part of the state, which may account for the present partial immunity. It is feared, nevertheless, that continued planting will cause a gradual increase of the plague, since elsewhere starfishes have increased in proportion to the expansion of the planting. A greater obstacle to success here is the liability of the bottom to move in gales and bury or scatter the beds. The drawback from thieving has already been touched upon. This nuisance has been greatly abated, and a much healthier public sentiment prevails, but there still remain lawless men who will watch their chance to push out from some cove, or come in from the sound, and steal the bivalves. Hence a watchtower has been built at Long Wharf, in New Haven, in which a man is kept night and day. Another is built on the flats that run out from the West Haven shores. Still others are kept off the Light-House point, and at a point off Branford harbor. The oyster-planters share the expense of such provisions for keeping their property from thieves, each paying according to the amount he has at stake.

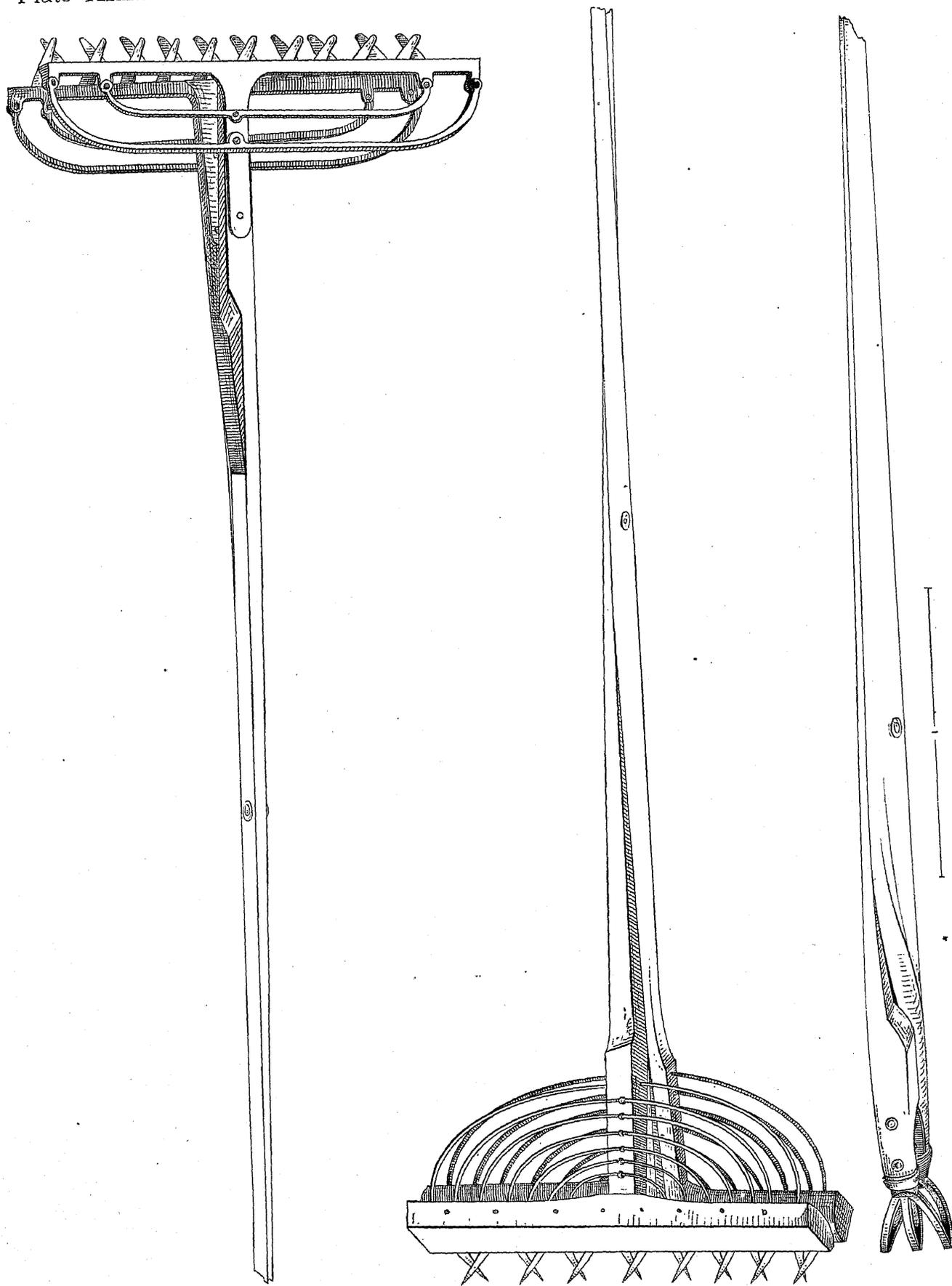
QUALITY OF OYSTERS IN 1879-'80.—The present season (1879-'80) the native oysters grown in all parts of river and harbor, especially in the neighborhood of Morris cove, are of very unusually poor quality. I have heard suggested but one plausible explanation of this. During July and August, 1879, a series of heavy inland storms occurred, and the Quinepiac and its tributaries were swollen with successive freshets; as a consequence, the water of the harbor, throughout its whole extent, was so roily that in place of its accustomed purity it was thick and brown for weeks together; it does not seem improbable that such an unusual condition not only proved fatal to the spawn in all parts of the harbor, as something certainly did, for no set was obtained, but cut off also the food of the adult oysters to such an extent that they were unable to recuperate from the long fast. The fact that oysters will "fat up" in a day, under good circumstances, is opposed to this theory, which is worth only so much as a suggestion.

31. OYSTER-CULTURE AT MILFORD.

HISTORY OF MILFORD AS A FISHING TOWN.—Leaving New Haven, the first stoppage for oyster-studies is at Milford, one of the most interesting and beautiful places in the state. It was settled in 1639, and long ago had an extensive West India trade and ship-building industry. The business in that line declined forty years ago. The gulf, harbor, and estuaries have always been more or less prolific of shellfish. Milford long-clams have a good reputation. Milford point, at the mouth of the Housatonic river, was a famous oystering place many years ago. Old citizens remember a row of huts, built of wreckage and covered with banks and thatching of sea-weed, which used to border this wild beach. In these huts lived fifty or sixty men, who made here their home during a greater or less part of the year, and devoted themselves to clam-digging and oyster-raking. Many of these men, who were utterly poor, thus got together the beginnings of a fortune, which, invested in active agriculture, placed them among the most influential inhabitants. But for the last thirty or forty years such sea-industries as these have been declining, until nothing whatever was done on the water by Milford people, except the catching of menhaden, for the utilization of which two large factories have been built.

EXPERIMENTS OF MR. WILLIAM H. MERWIN.—About eight years ago, however, Mr. William H. Merwin, knowing what had been done about New Haven, began his valuable experiments in cultivating native oysters. He and some others had once before started an enterprise of raising oysters in the "Gulf pond" at the mouth of the Indian river. But the other stockholders, being older men, disregarded his advice, though he had always lived by the shore, and the effort failed. They insisted upon damming the river, so that the sediment brought down by the stream was deposited upon and smothered the oysters. It is this episode that gave rise to section 10 of the oyster-statute.

Eight years ago Mr. Merwin resolved to try oyster-planting for himself. He took up a few acres off the shore in water 8 feet deep at low tide. He had just got his oysters well planted and had high hopes of success, when a storm destroyed them all. His labor and money got no return but costly experience. He then tried again, further out toward the sea, in 18 feet depth of water, near the government buoy. He got so heavy a set, and his young stock grew so well, that he estimated his crop at 10,000 bushels. Cultivators from Providence and Boston came down and bargained with him to take it all about the middle of April, but the last of March there came a gale which drifted so much sand upon the oysters that they had not strength, after the severe winter, to "spit it out", and before they could be taken up so many died that only 3,000 bushels were sold. There had been an immense excitement over the seeming success of oyster-culture; a joint stock company had been formed and the whole harbor taken up; but this storm put an end to the enthusiasm, and everybody, except Mr. Merwin and his two sons, retreated. Mr. Merwin, however, saw that the trouble lay in the shallowness of the water. He therefore went down to Pond point, eastward of the harbor, and buoyed off 200 acres in water from 25 to 40 feet deep, upon a hard, gravelly, and sandy bottom. He placed upon this ground a quantity of full-grown oysters and shells and secured a large set, which has been augmented each year since, until he now has 100 acres under cultivation. In 1877 there was a very heavy set hereabouts; in 1878 less, and in 1879 least of all.



OYSTER TONGS AND NIPPERS.

THE MILFORD OYSTER-STEAMER.—Having thus got assurance of a profitable farm, for storms no longer seemed able to affect him, Mr. Merwin saw that he needed more rapid and sure means of harvesting his crop than the row-boats and skiffs afforded. He therefore employed the firm of Lockwood & Co., of Norwalk, to build him a steamer for the express purpose of dredging, and introduced the proper machinery for that work. With this steamer, which is, to a large degree, independent of wind and weather, he can do three times the amount of work possible for the same number of dredges worked without steam (500 bushels is not an uncommon day's result with two dredges), and do it best on the "dull" days, when it is too calm for his neighbors' sloops to work. Its owners often find profitable employment for their leisure in chartering the steamer to other oystermen, who desire aid in dredging or in raking off the starfish that infest some beds. One single instance of the advantage the use of steam was to this firm will be pardoned. In the spring of 1879 a Rhode Island planter sent a sloop, capable of carrying 1,500 bushels, to New Haven to buy small seed. The Merwins were invited to contribute to the cargo, the captain of the sloop buying on the principle of "first come, first served", until he had filled up, haste being the great desideratum. It happened, that upon the very day the sloop arrived a dead calm fell, and not a sloop from Fair Haven or Oyster point could haul a dredge. Meanwhile Mr. Merwin's steamer was puffing back and forth through the quiet sea, without an hour's cessation, and in two days placed 1,200 bushels of seed upon the sloop's decks.

LOCAL OPPOSITION TO OYSTER-CULTURE.—There are two rivers which come down to the sea at Milford, the pleasant Wepawaug, along whose banks the town lies, and whose upper waters turn numerous mills; and Indian river, which empties into the harbor close by the mouth of the former stream. Indian river debouches in an estuary called the Gulf, or Gulf pond. Except in one little spot no oysters grow now, or ever did grow, in this inclosed salt-water pond, although it would be the best possible place to cultivate them. But the popular feeling of the town is so strongly against the utilization of these advantages by private effort, that no ground is permitted to be set off, and any oysters put down there are liable to be seized as public plunder. Once, indeed, the oyster-committee assigned to Mr. Merwin a tract in the gulf; but as soon as it was found out, an indignation meeting was held and mob law was loudly threatened. Cooler judgment overruled that, but any cultivation of this valuable ground, otherwise wholly useless, was sternly interdicted.

PRESENT STATE OF OYSTER-CULTURE AT MILFORD.—Inspired by Mr. Merwin's success and pluck, various persons have taken up ground in the vicinity of his tract off Pond point, amounting in the aggregate to about 750 acres, divided among eight owners. One of these gentlemen, in addition to 100 acres here, has several smaller tracts at different points along the shore to the westward; in all, about 400 acres, upon which some thousands of bushels of young oysters are growing. There is plenty of good bottom still remaining off this shore, however.

32. METHODS OF CATCH AND DISPOSAL.

HOW GROUND IS OBTAINED.—The mode of obtaining ground under the new law of 1881, says a correspondent of the *New York Sun*, will be as follows: The person desiring ground must make application in the prescribed form of a blank, legally approved by the chief justice of the state, setting forth the quantity of ground he wishes, prescribing exactly where it is, and showing that it is not and has not been within ten years a natural oyster, clam, or mussel bed. A notice, which includes an exact copy of that application, is sent to the town clerk of the town opposite which the ground asked for lies, and must be posted in a conspicuous place in his office for twenty days, in which time objectors to the grant, if there are any, must file their objections with the town clerk. If no objections appear, the commissioners are authorized to give the applicant a deed of the ground, upon his paying the state \$1 per acre therefor and the expense of surveying and mapping the lot, which is covered by a charge of ten cents per acre. If any objections are filed with the town clerk they must be returned with the application to the state fish commissioners, who will institute an investigation and decide the case as seems to them just and lawful. The grounds for objections are, either that the grounds applied for are natural beds, or that some person claims ownership by virtue of many years' possession and enjoyment, or under a deed from the town. Fifteen years' possession is held to confer rights of ownership. In the matter of forbidding the designation to private individuals of natural shellfish beds, the law is especially severe, prescribing that the commissioner who knowingly does such a thing shall be subject to a fine of not less than \$100 nor more than \$500, and that the person illegally obtaining such natural beds knowingly shall lose his designation and forfeit all he has paid for it. Provision is made for the return of a purchaser's money in case his designated ground proves to be unfit for the cultivation of shellfish, and to prevent speculators from getting possession of ground and holding it indefinitely for a rise in value instead of for honest work, there is a clause compelling the cultivation of ground within five years from its allotment. A clause in the bill prescribes that no person can hold ground taken from the state, or from a grantee of the state, unless he has been a resident of the state for one year prior to his entering upon such possession. This clause the commission will probably ask the legislature to strike out. Not only is its narrow proscription an offensive feature, but conditions are easily conceived in which it would work great injury to persons desirous of retiring from business, and to heirs, beside shutting out much desirable capital. The law provides for the plain marking out of designated grounds by the grantees by permanent "stakes, buoys, ranges, or monuments", so that hereafter, or, rather, after operations are fully commenced under this law and commission, there need be no more confusions of property rights to ground under water than respecting real estate high and dry on a hill.

TONGS, RAKES, AND DREDGES.—In gathering seed near shore, and somewhat otherwise, tongs and occasionally rakes (those with long curved teeth) are used; but the marketable oysters are nearly all brought from the bottom by dredges of various weights and slight differences in pattern. In the case of all the smaller sail-boats, the dredges having been thrown overboard and filled, are hauled up by hand—a back-breaking operation. The oysters themselves are very heavy, and frequently half the amount caught is composed of shells, dead oysters, winkles, and other trash, which must be culled out, thus compelling the oystermen to twice or thrice the work which they would be put to if there were nothing but oysters on the ground. The work of catching the oysters by any of these methods is, therefore, very tiresome and heavy, and various improvements have been made, from time to time, in the way of labor-saving, from a simple crank and windlass to patented complicated power-windlasses, similar to those commonly used in the Chesapeake boats. When a proper breeze is blowing, dredging can be accomplished from a sail-boat, with one of these windlasses, with much quickness and ease. In a calm, or in a gale, however, the work must cease, as a rule.

Under these circumstances, and as the business increased, it is not surprising that the aid of steam should have been enlisted; nor, perhaps, is the controversy which has ensued to be wondered at, since the introduction of novel or superior power into some well-traveled walk of industry has ever met with indignant opposition.

BOATS.—In former times all oystering was done by means of small row-boats. That this has not been wholly abandoned is shown by the fact, that there are yet to be found fifteen or twenty dug-out canoes at and about New Haven, devoted to catching both seed and marketable oysters. Some of these canoes are of large size and good pattern, but few or none are now made new, so that their number diminishes, and they will before long disappear. These canoes are to be seen nowhere else along our coast between Maine and the Chesapeake, and with their decay goes a monument, not only of old oystering, but of all aboriginal life in New England.

The substitute for the old canoe is found in the square-ended skiff, which is only a small scow-boat. Of these, which are worth perhaps \$10 each, a walk along the Quinepiac will disclose a hundred or more, all devoted to oyster-work, chiefly as tenders on the sail-boats in the planting of seed, the bedding down of Virginia stock, and the transporting of cargoes. Many of these small boats, however, are used by planters of small means, who cannot afford to run a sail-boat.

The sail-boats of New Haven harbor are almost universally of the sharpie model, which is well known for its speed-giving and room-affording qualities. It is the boast of the Connecticut oystermen, and to them the world owes the perfection of this admirable craft, which has been developed to supply the need of a large-stowing, swift-running craft, which, at the same time, should be flat-bottomed and draw so little water as to run safely over the scarcely submerged oyster-beds. There are nearly 100 sharpies in the harbor, worth perhaps \$15,000.

OYSTER-STEAMERS.—The first utilization of steam in this business, so far as I can learn, was by Capt. Peter Decker & Brother, of South Norwalk, about 1870. They first put a boiler and engine in the sloop *Early Bird*, to turn the drums in which the dredge lines were hauled, still retaining the sails for the propulsion of the vessel. After a time they extended their facilities, by inserting a small screw in their sloop, to assist in propelling her when the wind was light, and at length, after further trial, they took this machinery out and put in a larger boiler and engine, with special winding apparatus, and discarding sails altogether. These changes cost \$1,300, and now, at an expense of 3 to 4 bushels of coal a day, this little steamboat hauls two dredges, and can take up 150 to 200 bushels per day.

After the Messrs. Decker's experiments, Mr. W. H. Lockwood, of Norwalk, not an oysterman, but an enthusiastic believer in steam-dredging, built the steamer *Enterprise* expressly for the business. Her length is 47 feet; beam, 14 feet; she draws 4 feet of water. She handles two dredges; has a daily capacity of 150 or 200 bushels.

These were followed by several other steamers. Mr. Joshua Levinness, of City island, has a very large boat built for the purpose, and fitted with very heavy machinery; but it is said to be inconveniently arranged and expensive to run. She hauls four large dredges over the stern, and caught oysters so fast on the public oyster-grounds in the state of New York, that the owners of sailing-boats induced the New York legislature to forbid the use of steam on the public grounds.

The Merwins, of Milford, and Mr. Wheeler Hawley, of Bridgeport, also have steamers of large capacity, so that there are now in all seven in Long Island sound, but it is generally acknowledged that the most thoroughly equipped boat for this purpose, of the fleet, is owned by H. C. Rowe & Co., of Fair Haven, Connecticut. It is named the "*William H. Lockwood*", and is comparatively new, and cost between six and seven thousand dollars. The dimensions of this boat are: length, 63 feet; beam, 16 feet; draught, 5½ feet. Her boiler is larger and her engine more powerful than usual in a boat of her size, and she can therefore be used for towing, and can force her way through heavy ice in the winter, so that her owner is sure of a supply of oysters for his customers when other dealers may be unable, with sailing-vessels, to get them. Beside her regular propeller engine, she has a double engine for hauling dredges, which hauls all four dredges full of oysters at once, and lands them on deck, two on each side, at the rate of 800 bushels a day, if needed. This employs a crew of ten men, who are protected from the weather by a housing which covers in the whole deck.

OPPOSITION TO STEAM-DREDGING: GROUNDS OF OBJECTION.—Those who were not in possession of the steamers, however, quickly began to look askance at the rapidity and comprehensiveness of their work, and early

began to attempt to form public opinion and secure legislation tending to repress this dangerous competition. An early success was had, in so far that steam-dredging was permitted on public seed-ground in the sound only on two days of each week. Not satisfied with this, however, laws were sought which, if they did not prohibit the use of steam altogether, should at least restrict it to the designated planting-ground of the owner. The controversy which ensued then was long and bitter. In my inexperience it would be presumptuous in me to assume a judicial function; and here, as elsewhere, I shall restrict myself to a brief presentation of the arguments opposed, merely pointing out, before I begin, that this contest is apparently the same which has always been waged by hand-labor against machinery, and by poor machines against those more adequate to the work—a fight originating in ignorance and unprogressiveness, and perpetuated through jealousy and personal feeling. I do not say this of this controversy alone, but of the whole history of invention and progress in the arts. I have no doubt the Indians and first settlers thought the mollusks of the coast would be exterminated, when some enterprising Puritan or Knickerbocker brought the destructive rake and tongs or the terrible clam-hoe to bear upon them; and the owners of these again were filled with dismay, when the first dredge was explained to them and boldly thrown over, first from a row-boat and then from sloop and schooner. The transition to steam-power seems only another similar step, and the complaints against it are equally valid against superseding steam cotton-looms to hand-weaving, or the swift circular-saw to the old pit method. There is hardly any branch of the seine-fisheries now where steam is not profitably employed, having overcome opposition, and its service is widening every day. And as steam has won before, and approved its title to the crown by its results, so I feel confident it will again be victorious—for the world does move.

The arguments by which the employment of steam-power on Connecticut's public oyster-beds is sought to be abolished are about these, as I gather them, chiefly from a minority report to the legislature of 1881, on a bill before that body:

There are within the boundaries of the waters of Connecticut, at various points along the northern shore of Long Island sound, in the aggregate about 6,000 acres of "natural oyster-beds" of the state.

On a comparatively small portion of this area, lying in the channels of rivers and in shallow waters near the shore, oysters are customarily allowed to grow to maturity, and are gathered for market and for their own consumption by the poorer classes of the people. On a much larger portion of the natural oyster-beds the oysters are ordinarily collected when small, to be planted by oyster-cultivators as seed upon their private beds. The gathering of these seed-oysters is accomplished by means of dredges attached by ropes to boats in motion, and so drawn along the bottom over the oyster-beds.

There are directly interested in this business of gathering and planting oysters, about 3,000 citizens of the state, most of them small operators with limited capital, owning from two to twenty acres of designated ground for oyster-planting—and small vessels propelled by sail or oars. Some of them own no ground at all, but gain their livelihood by gathering the seed and selling it to larger proprietors. Seven individuals of the entire number of our citizens engaged in this pursuit employ steam tugs or propellers in dredging. The state, by previous legislation, has prohibited this use of steam-power on a tract which includes about 633 acres of the public natural growth, leaving a tract which includes about 5,100 acres subject to such use. The object of the desired legislation is to prohibit the further use of this steam-power, and to place all our citizens on an equality in the means employed in the collection of this their common property from this common or public domain. Such legislative prohibition seems to be called for as a matter of fairness and justice to all persons who, by virtue of their common proprietorship, are equally entitled to gather oysters and other shellfish from the public domains of the state, and more particularly to that large class of our citizens who depend upon the prosecution of this business for the livelihood of themselves and their families. It has been found, from evidence submitted to state-authorities under oath, that by reason of the limited resources of this large class of our citizens but very few, if any of them, are, or are likely to be, able to provide themselves with steam-power; that by the use of this power a single vessel can, in a given space of time, collect of this common public property a quantity twelve times larger than can be gathered by an average sailing-vessel; thus being independent of wind and tide, a steamer can prosecute its work about twice as many days in each week, and many more hours in each day; that the earlier part of the dredging season is equally subject to calms, and that by a combination of these various causes, together with the fact that the annual crop of seed-oysters is limited, and in any given season is liable in a great measure to be exhausted, the favored few, if steam-dredging on the public property is allowed to continue, will inevitably gain a vast and unjust advantage over the larger and poorer class, and practically drive them from the field, deprive them of their employment, in many cases reduce them to destitution, and create a monopoly of the business in the hands of a few individuals.

To this view of the case, it is objected, that though these facts may be undeniable, yet it is counter to the spirit of the age, and a blind and inequitable suppression of private enterprise, to deprive any individual of the free use of all the improvements which science and his own resources have placed at his command. This would have weight if the subject under consideration were simply a matter of private rights, if it were simply a question what improvements might be employed by individuals in connection with the use of their own private property.

But it is to be remembered, that this is a matter of public and common right, and that it is not only the privilege but the duty of the state, in relation to this common property, to see that it is fairly and evenly distributed among those to whom it equally belongs, and that no person or class of persons shall obtain more than a just share of its benefits. This principle is invariably recognized and acted upon in our legislation, relative to our inland fisheries; relative to game; relative to steam-dredging on private grounds in certain localities; relative to the taking of mature oysters, and even in the designation of grounds for the planting and cultivation of oysters, and any legislation that ignores this principle, by favoritism in the granting away of public land, or any other public property, is justly subjected to the reproach of its constituents.

Further, it is for the preservation of the public oyster-grounds. We have seen that the area was limited, there being in all only about 5,728 acres of the 500,000 acres covered by the waters of this state. This comparatively small fraction of the whole is the sole natural nursery of all our oyster-growth; and the existence of this natural oyster-ground depends entirely upon the condition of the bottom.

In order that any portion of the bottom may constitute a natural oyster-bed, it is essential that it should be composed of cobble-stones, gravel, shell, or other similar hard substance, from which, by the action of the water, slime and other impurities are naturally removed. Without these conditions the spawn, which is floating in the water, will not be deposited and adhere; no germ will be deposited; no oyster-bed be formed.

It is obvious, therefore, that any practice which tends to remove, diminish, or cover up this indispensable foundation for the bed, inevitably leads to the destruction of the bed itself, and reduces the area of the natural oyster-grounds of the state. The process of dredging necessarily removes, together with the seed gathered, some portion of this essential foundation of the bed; but by the style of construction and the comparatively light weights of dredges ordinarily employed by sailing-vessels, this objectionable feature of the business is in a large measure obviated; while we find that by the different style of construction and much greater weight of the dredges naturally and almost invariably used by the steamers, they sink deeper and penetrate further into the bottom; they more readily overcome resistance; they gather up and remove much larger quantities of the foundation-material of the beds, leave the surface in a broken and uneven condition, more liable to be buried in sand and rendered barren by the action of the waters in a storm; and they plough under, smother, and thus destroy the seed-oysters they do not gather up. We find, from the evidence, that such has actually been the result of steam-dredging on certain portions of public oyster-growth.

Prior to the fall of 1878, on the tract known as the "Shippen" bed off Stamford, there had been for years a good annual growth.

In the fall of that year a steam-dredge was worked over a very considerable portion of that bed, which portion, since that time, has been tried and found totally unproductive; but on other portions of the bed, immediately adjoining the place of her operations, a good supply has since been annually obtained.

Prior to the fall of 1879 the "Noroton" bed, a tract of some 300 acres, was for the most part yearly covered with an ample "set" of seed. A steamer dredged on a portion of that bed in the summer of that year, and thereafter the ground on which she dredged was found unfruitful.

For many years off Fairfield bar there had been a valuable bed. Two steamers worked it, and since that time no oysters have been found there.

In 1879 two steamers dredged upon a small tract of natural ground known as the "Pond point" bed, off the mouth of Milford harbor, which before that time had borne large quantities of oysters. It has since yielded nothing.

The owners of steamers argue that they will go into deep water and make beds, and assert that "only a few years ago the natural bed off Bridgeport was only a little patch. By the work of the vessels it has been spread out until it is five miles long and nearly a mile wide. There is no reason why it should not be made four times as large by the introduction of steam".

In respect to this a citizen of South Norwalk remarks as follows, claiming to know whereof he speaks:

The Bridgeport bed was discovered in July, 1867. Then it extended from Black Rock harbor to Point-No-Point, at least four miles, and was from one-half to one mile wide, covering about three thousand acres. Capt. Samuel Byxbee, Joseph Coe, and William M. Saunders were the first to go on it from this town. In one drift, in a light breeze, they caught over 300 bushels of seed. Capt. J. Levinness, in going across the bed three times, took 1,000 bushels. Capt. Barnes piled the deck of a fifty-ton sloop in one drift. Catching seed there was a constant letting go and hauling, and men became so exhausted they fell down from sheer fatigue. At one time 450 sails were counted at work on the bed and they had plenty of room. That number of vessels could not be set on three acres, place them side by side. Now the bed does not actually cover 40 acres, and is in small patches, scattered over the ground of the former bed. It has been worked almost to death, and it only needs one season of steamers to exterminate it entirely.

This same gentleman expressed the sentiment of many of his neighbors, too, when he wrote to the *Sea World* in 1879:

Permit me to say that your correspondent uses sophistry in his argument that steam and machinery have the right of way, and that manual labor must quietly submit to be displaced by it. It is the right and duty of every citizen of this state to ask that the legislation be for the benefit of the many and not the few; in the interests of labor rather than capital; the weak rather than the strong; and that the public domain be reserved for the benefit of all its citizens.

On the other hand, in the language of the minority report referred to above:

No evidence has been offered to show, and it has not been claimed, that similar disastrous consequences result, or have anywhere resulted, from the operation of dredges drawn by sailing-vessels, but, on the contrary, sailing-vessels in the act of dredging, being compelled to pass beyond the borders of the beds (a movement not necessary or customary in vessels controlled by steam), thereby enlarge the borders of the natural ground, and so far work a common public benefit.

As to the effect of steam-dredging on the general public, it appears to us that in the event, either of the monopoly heretofore suggested, or of the gradual extermination of the natural oyster-grounds menaced, the price of oysters would ultimately advance, to the detriment of the consumer.

In addition to the foregoing considerations, and as a fact of very great consequence, it is to be observed that some states of the Union having large oyster-interests, particularly New York and Maryland, have totally prohibited steam-dredging within their waters; and other states, to wit, Rhode Island, New Jersey, Delaware, and Virginia, have gone even further and prohibited all dredging of every kind upon their natural beds.

Lastly, it is asserted that one or two considerable dealers have tried steam, and given it up as unprofitable.

ARGUMENTS IN SUPPORT OF STEAM-DREDGING.—Opposed to this, those in favor of the use of steam as a motive-power in dredging, set forth the following facts and arguments:

The number of steamers now in use is seven only, yet this small number has extended the cultivation, increased the production, and as a consequence, has materially reduced the price of oysters.

Prior to the introduction of steam, oyster-dealers of Connecticut were obliged to purchase oysters in other states to supply the home demand; now the production within the state is sufficient, not only for local demands but also for a large export. A business so increasing is of benefit to the whole state, particularly in enlarging the supply and reducing the cost of an important article of food.

The owners of sailing-vessels engaged in this business, and having interests on the shores of Long Island sound, west of Bridgeport, are the only opposers of steam, and they have local, political, and selfish reasons, outside of the merits of the case. Is it the duty of law-makers to pass a law prohibiting this use of steam, to the injury of the people of the state, to gratify the jealousy of a class, and thereby hinder the development of the oyster-culture and discourage enterprise and progress? In the same way the introduction of steam in the manufacture and transportation of cottons, woolens, grain, and for many other purposes, was bitterly opposed by those with whose labor it came into competition; yet no one doubts the wisdom of its introduction, because the sequel has proved that the application of steam-power to any branch of industry decreases the cost of the product. The claim that steam, as applied to this business, was objectionable, is effectually disposed of by these indisputable facts:

1st. That the steamers are used by their owners on their own private beds ten months of the year. Does any man of sense believe they would be so used if they damaged the beds? And if the private beds are not damaged, how should the public ground suffer?

2d. It is ridiculous to claim that an iron bar, dragged on the bottom by steam-power, will have a materially different effect than if dragged by wind-power. On the contrary, the motion of a steamer is more steady and certain than that of a sailing-vessel, and a dredge drawn by it must, of necessity, leave the bed smoother than one drawn by any power less steady and certain. The dredges used by steamers are not heavier than those used upon the larger-sized sailing-vessels without objection by any one. "It was proved that twenty-two sailing-vessels from New Haven and vicinity dredged on the Bridgeport bed during 1880, using a dredge as heavy as the average dredge used by steam vessels."*

3d. The "Bridgeport bed" has yielded a larger catch this last season; was greater than it has been since the year of its discovery. Steam-vessels had dredged all over this bed during the preceding season, and seem to have increased rather than diminished the size and productiveness of the bed, while many of the beds from which the steamers were excluded had an inferior set.

4th. The statements made against steam have been assumptions. It has been asserted that the dredging *would* injure beds and oystermen not thus operating; but no evidence appears that it has hurt either in any part of the state.

5th. To follow the example of New York and other states would be anti-progressive, since before they adopted this policy they sold thousands of bushels annually to Connecticut; whereas now Connecticut largely supplies the seed for the beds in both those states.

*These are the words of a majority report made to the Connecticut legislature in 1881, but it is extremely difficult to get at the truth. A year previous a letter from South Norwalk contained the following statements:

"Sailing-vessels use dredges weighing from 15 to 35 pounds, which hold at the most but three pecks. Steamers use dredges weighing from 60 to 100 pounds, holding a barrel. One goes over the bottom lightly; the other subsoils it, burying everything it does not catch. In the fall of 1878 W. R. Lockwood's steamer worked three weeks on the Shippen bed, taking off 1,600 bushels of seed. During the entire summer period Adison Merrill worked with a 22-foot sail-boat on the same bed and caught but 500 bushels. After the steamer left sail-boats could not dredge at all. The bottom had been so subsoiled the light dredges filled with sand and could not be hauled. During that spawning-season men with small boats worked on it a long time for the sole purpose of cleaning the bottom for the spawn. As soon as the spawn set the steamer came, caught, and destroyed it all. The next spring nothing could be caught on that bed. In the summer the sailing-vessels stirred it up again. The spawn set—Hoyt Brothers' steamer worked on it a few days and the seed was either on their private beds or smothered. The same thing was done at Roton point, destroying that bed entirely."

CONNECTICUT LAWS REGULATING STEAM-DREDGING.—The existing law at the time of this controversy was the "Compromise Act". It allowed sailing-vessels only to dredge on natural oyster-beds west of the Bridgeport bed, and permitted all classes of vessels to dredge upon Bridgeport and other beds. This law was accepted as satisfactory to all interested, and was regarded as finally settling the controversy in this business between steamers and sail-vessels; and, acting upon that assumption, investments have been made in steamers by various persons who asserted that they would suffer greatly if steam was prohibited in dredging. Nevertheless the legislature of Connecticut, at their spring session in 1881, adopted in place of it the following, which is now the law:

AN ACT regulating the dredging for shellfish and shells.

Be it enacted, etc.

SECTION 1. It shall not be lawful for any person or persons to use a boat, or any other contrivance, dragged, operated, or propelled by steam, in taking up or dredging for oysters, oyster-shells, clams, or other shellfish in any bay, river, or other waters within the boundaries or jurisdiction of this state; *Provided*, however, that this section shall not be so construed as to prevent the use of steamboats in taking up, or dredging for, oysters on private, designated grounds in any such waters, by the owners thereof.

SEC. 2. Any person who shall violate the provisions of the preceding section shall be deemed guilty of a misdemeanor, and shall be punished, in the discretion of the court, by a fine not exceeding the sum of one hundred dollars, or by imprisonment in the county jail not exceeding six months, or by such fine and imprisonment both.

SEC. 3. Prosecutions under this act may be heard and determined by a justice of the peace, subject to the right of appeal by the accused to the superior court, as in other criminal cases.

SEC. 4. All acts and parts of acts inconsistent herewith are hereby repealed.

SEC. 5. This act shall take effect from its passage, but shall not affect any suit or prosecution now pending.

FRESHENING OYSTERS.—It is customary, on bringing the oysters in from deep water, to throw them overboard into the fresh flood of the Quinepiac and "give them a drink", as the oysterman expresses it. To this purpose some planters devote wholly their river lots. Others have small areas near their shore-houses where the bottom is planked; while some put the oysters in large floats which are moored by the wharf or shore.

NEW HAVEN PRICES.—During January and February of 1880 the following prices were asked at Fair Haven:

For Virginias, clear, per gallon	75 to 85 cents.
For Virginias, mixed, per gallon	90 cents to \$1 00.
For natives, clear, per gallon.....	\$1 00 to \$1 25.
For natives by the bushel.....	\$1 00.

OYSTER-OPENING AND OYSTER-OPENERS.—As nearly all of the trade in Virginia oysters is carried on at Fair Haven, so to this locality alone is confined the business of opening the oysters for shipment to any considerable extent. The openers or "shuckers" are mainly women of all ages, though some men are constantly at work. They are mainly American in nationality, and many of them are in good circumstances and only work to provide themselves with pin-money. It is an occupation no refined girl would choose, nevertheless, for the whole person becomes at once spattered with mud and water, and the hands are inevitably bruised and lacerated beyond repair. The method used in opening the shell originated here, but has spread elsewhere, and is known as "breaking" or "cracking". The shucker stands or sits before a stout bench (which may be a long table partitioned off into working spaces for each one, or may be an individual bench that can be moved about) and has her oysters in a pile before her. Immediately under her hand is a block of wood into which is firmly inserted an upright piece of iron about two inches long, one inch high, and a quarter of an inch thick, called the "cracking-iron". The shucker is also provided with a square-helved double-headed hammer, and a stiff sharp knife in a round wooden handle. On her left hand she wears a rough woolen, rubber, or leathern half-mitten, known as a "cot", to protect the skin. Seizing an oyster in her left hand, with the hinge in her palm, she places it upon the cracking-iron, and with one blow of the hammer breaks off the "bill" or growing edge of the shell. In the fracture thus made the strong knife is inserted and pushed back between the meat and the shell until it cuts off the attachment of the adductor muscle to the flat "upper" valve, after which, with a quick, dexterous twist, the other "eye" is severed, the meat tossed into the receptacle, which stands handy, and the shells are dropped through a hole in the bench into a barrel or tub placed underneath. Practice teaches extreme celerity in this operation. The knife and hammer are held in the same hand when the oyster is cracked, which does away with the expense of time and trouble in dropping one to pick up another; and the knife hilts very soon have a long spiral groove worn in them by the chafing of the hammer-handle. The oysters, as fast as opened, are flung into a tin receptacle called a "measure", holding five quarts. Much of the liquor of the mollusk also goes in with the meat, and when the measure is full it is taken to the foreman and poured into the "skimmer", the shucker receiving in exchange a tin or brass check, entitling him to a shilling or 12½ cents, at the rate of 2½ cents a quart. There are also "half-measures" of 2½ quarts. This is called "liquor" measurement; if all the liquid was strained out only about two-thirds of the measure would be filled. One shucker told me that five quarts of large-sized oysters counted about 475 in number.

A good day's earnings for an oyster-opener at Fair Haven is \$1 50; this, of course, is often exceeded, but the books of one firm showed me that the average wages for a whole season was only about \$20 per month. It very frequently happens that no work is done at one or another establishment for several days, or only a little opening each day. Hence about 350 openers serve the whole business by moving around. Men, as a rule, earn more than women.

In regard to the population supported by the oyster-business in this neighborhood, I find it extremely difficult to get accurate statistics. It is a variable and partial quantity. I estimate the number of principals—planters, dealers, and shippers in and about New Haven—at 125; of laborers (men), at 135; and of openers (chiefly women), at 340.

PACKING AND SHIPMENT OF OYSTERS.—As soon as the oysters are opened they are placed in a flat pan with a perforated bottom, called a skimmer, where they are drained of their accompanying liquor. From time to time a quantity is dipped out and put into a large colander, or conical basin with perforated bottom and sides, which is placed over a tall cask. Here a stream of water is turned upon them, and they are stirred about until washed clean, after which they are put into wooden tubs for shipment, or tin cans for local traffic. The tubs are all labeled with the name of the owner, and are returned by the customer. Their covers fit with exactness, and lock with rivet and seal in such a way that they cannot be opened on the road without certain discovery.

The expressage of oysters from Fair Haven to the interior of New England is so large that the afternoon trains have one car, and sometimes two cars, devoted exclusively to the carriage of these goods. Large shipments were formerly made in wagons to Albany and thence westward, especially to the large towns in central New York. Now these oysters go by rail, of course, but also much farther westward, even to Cincinnati, Chicago, and San Francisco.

STATISTICAL RECAPITULATION FOR NEW HAVEN HARBOR, CONNECTICUT :

Number of planters, wholesale-dealers, and shippers	135
Extent of ground cultivated..... acres.....	2,600
Value of shore property	\$100,000
Number of vessels and sail-boats engaged :	
Steamers.....	2
Sail-boats.....	100
Row-boats.....	150
	252
Value of same, about.....	\$30,000
Number of men hired by planters or dealers	200
Annual earnings of same.....	\$50,000
Number of women hired.....	275
Annual earnings of same.....	\$30,000
Total number of families supported, about.....	400
Annual sales of—	
I. Native oysters..... bushels.....	128,250
Value of same.....	\$130,000
II. Chesapeake "plants"..... bushels.....	450,000
Value of same.....	\$350,000
Total value of oysters sold annually.....	\$480,000

G. THE HOUSATONIC AND SAUGATUCK REGIONS.

33. OYSTER-FISHERIES OF BRIDGEPORT AND WESTPORT.

NATURAL BEDS AND SEED-OYSTERS.—Having passed to the westward of New Haven and Milford harbors, we come upon a new feature of the oyster-business. This is the systematic dredging of natural beds in the sound and along the inlets of the shore, for seed to be placed upon the artificial beds in the eastern part of the sound, in the East river, and on the south shore of Long Island. This department of the business will demand more and more attention, as I progress toward its headquarters at Norwalk. The most easterly natural bed which these dredgers attack is one off Clark's point, just east of the mouth of Oyster river. (In Oyster river itself, by the way, no oysters have ever been known, within the memory of tradition, although that name appears in a map drawn prior to 1700.) The next natural bed consists of a reef, five acres in extent, on the western side of Pond point. Beyond that, off Milford point, at the mouth of the Housatonic, lies the Pompey bed, which afforded sustenance to the sea-lut colony that used to frequent Milford point, and where now a crop can be gathered about once in five years.