

The Commonwealth of Massachusetts. *Commissioner*
= *on fisheries and game.*

A REPORT

UPON

THE MOLLUSK FISHERIES

OF

MASSACHUSETTS.



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The Oyster Industry.

For the benefit of those who perhaps are not familiar with the methods employed in the oyster industry, the following brief account is given:—

I. *Selecting the Grant.*—The oysterman, in selecting a grant, has to consider first the nature of the soil; and secondly, the location as influencing the growth of the oyster. Not less important is the quality of the oyster, which means not only a good price, but also readiness of sale, as the oysters produced in certain localities are especially desirable in appearance and flavor.

As the oyster will not grow on all kinds of bottom, but demands a firm soil, free from soft mud and shifting sand, the oyster area of the State is naturally limited. Usually but part of an oysterman's grant is suitable for the cultivation of oysters, and he is forced to let the rest of the territory lie idle, unless he can, with shells or gravel, artificially change this waste area into suitable ground. Shifting sand perhaps can never be made suitable for oysters; but many acres of soft mud can be made productive, if the oysterman only has a reasonable guarantee that he would receive the results of his labor.

While the oyster culture is limited by the nature of the bottom, it is also restricted by other conditions. The salinity of the water has much to do with the rapidity of growth, and the oysters seem to thrive in localities where a slight amount of fresh water enters. The amount of food in the water is the principal factor in the rate of growth, and to this is due the fact that the rate of growth varies considerably in different localities. As a rule, the beds with good circulation of water (*i.e.*, currents) show the more rapid growth.

II. *Collecting the "Seed."*—The term "seed" is applied to one, two, three and even four year old oysters which the oystermen plant on their grants. These grants are in reality salt-water gardens, requiring constant supervision; and the obtaining of the "seed" for planting is a most important consideration. The gathering of the oyster "seed" is a simple process, but one which requires much research.

Early in the summer, usually during the months of June and July in these waters, the Massachusetts oyster spawns. Both sperm from the adult male and the eggs from the adult female oysters are extruded in considerable quantities into the water, and there the eggs are fertilized. As fertilization is somewhat a matter of accident, undoubtedly the great majority of eggs never develop. The fertilized eggs pass rapidly through various changes in the course of a few hours, and emerge as microscopic embryos, with thin, transparent coverings. At this period these forms are free swimming, and are found in great numbers in the water. They are extremely delicate, and great quantities are destroyed by natural agencies, such as cold storms, sudden changes in temperature, etc. They likewise are subject to the depredations of all sorts of marine creatures, and comparatively few in proportion survive. The survivors, after leading this free-swimming existence for several days, settle to the bottom, where they attach themselves by a calcareous fixative to stones, shells, pieces of wood, etc. Here, unless buried by silt and soft mud or killed by exposure, poisonous pollution, etc., the young oyster rapidly becomes of a size suitable for planting.

The economic utilization of this scientific knowledge is as follows: shells offer a very good surface for the attachment of the young oyster, and many thousand bushels are annually strewn over the bottom previous to the spawning season. Considerable judgment is needed in

choosing the right time to plant these shells, which after a few weeks in the water become so coated with slime that fixation of the "spat" becomes impossible. In Massachusetts the area between high and low water mark has been found by experiment to be the most valuable territory for this purpose, as shells planted here collect the heaviest set and can be handled with the least expense. A projecting sand bar or point with a current is also well adapted for catching oyster spat.

The scallop shell is the most serviceable in spat collecting, because it is more brittle, and the clusters of oysters when attached are readily broken apart. After the oysterman has obtained a successful set, he allows the young oysters to obtain a suitable growth before he makes a final planting, either in the spring or fall.

III. *Size of the "Seed" used for Planting.*—While many oysters are raised from native spat in the Buzzards Bay district, the greater part of the seed is purchased in Connecticut and Long Island, and is carried in schooners or steamers to Massachusetts waters. The usual price ranges from 35 cents to \$1 per bushel, according to size and quality. The oystermen cannot always choose the size of "seed" they desire for planting, as the set of any one year is very uncertain, and several seasons may pass before a large quantity of "seed" can be obtained. Thus the oyster planters are forced to take whatever size they can obtain, whether it be two, three or four year old "seed." As a rule, the small "seed" is most in demand, as it means relatively faster growth and less money invested. Often, when the ground is most favorable for fattening, large oysters are preferred for planting, and certain oystermen make this line of work a specialty. Certain localities where there is plenty of lime in the water are well adapted for growth, and yet produce poor-"meated" oysters, while in other grounds the reverse is true. The oystermen occasionally by a double transfer utilize both grounds, planting oyster "seed" for the first few years in the rapid-growing localities, and then transplanting the large oysters to the "fattening" ground six months before marketing.

IV. *Preparing the Grant.*—The first step in preparing the grant is to remove all débris. In the deep water, this is usually done by dredging; in the shallow water, by whatever means is the easiest. If the bottom is of firm soil, the grant is then ready for planting; however, if the soil is soft mud, it is necessary to shell the bottom in order to give it greater firmness. The oysterman continually has to keep a sharp lookout in order to protect his grant from enemies such as the starfish and the oyster drill, and to keep it clear of seaweed and other matter which would interfere with the growth of the oyster.

V. *Sowing the "Seed."*—The "seed" oysters are planted on the prepared bed by scattering them with shovels or scoops from the boats and scows. The oysterman, knowing the maximum amount of "seed" the bed will grow to the best advantage, plants the required number,

taking care that the oysters are properly scattered, as for the best growth oysters should lie separate and not in crowded masses. The amount of "seed" that can be planted on a given area depends upon the natural conditions of the locality.

VI. *Enemies.*—The oyster, having passed through the countless dangers of his embryonic career, is still harassed by several enemies. Of these, the most destructive is the starfish. This animal, commonly known as the "five-finger," occurs along the entire Massachusetts coast, and is especially abundant in Buzzards Bay. Occasionally whole oyster beds are wiped out by this pest, which sweeps over the ground in vast armies. The method of attack of the starfish is unique. By exerting with its tube feet a steady pull in opposite directions on both valves of the shell of the victim, the starfish tires the contracted muscle of the oyster, and the shells open. The starfish then extrudes its stomach so as to enwrap the prey, and in this curious manner devours the oyster.

A close second to the starfish in amount of damage is the oyster "drill" or "borer" (*Urosalpinx cinerea*). This little mollusk with its rasping tongue drills a small hole through the shell of the oyster, and then sucks out the contents.

A third enemy, according to the oyster planters, is the "winkle" (*Fulgur carica* and *F. caniculatus*). The method of attack is somewhat obscure.

Besides this dangerous trio of living enemies, the oyster is subject to constant peril from inanimate agencies. Probably the greatest of these is shifting bottom. Where oysters are grown on sandy soil, the violent waves of winter storms frequently tear up the bottom, or else the force of currents is such as to kill the oysters by completely burying them in the sand. Again, if the oysters are growing in very muddy bottom they are constantly liable to be smothered in the slimy ooze. Ice in winter frequently tears oysters from their beds and bears them to some unfavorable environment, where they soon die.

VII. *Harvesting the Oysters.*—The oysterman completes his planting about June 1. During the summer months, the growing period of the oyster, the grants remain idle except for the care and supervision of the oystermen. As the oyster takes from three to five years to attain its growth, the oysterman practically harvests but one-fourth to one-third of his entire stock each year, beginning about September 1 and continuing through the winter as the weather permits.

In winter the oysterman, to keep up the market supply, beds "culled" oysters near the shore, where he can tong them through the ice whenever it is impossible to obtain oysters from his grant.

The implements used in gathering the oyster harvest are of three kinds: tongs, dredges and rakes. Tongs are employed principally by the smaller oyster growers, and on ground where the water is com-

paratively shallow. A pair of tongs is really a pair of long-handled rakes, fastened together like a pair of shears. The pole, corresponding to the blade of the shears, varies from 8 to 16 feet in length. The rakes, some 2 to 2½ feet broad, are so fitted to the end of the poles that when extended by spreading the handles they rest upon the bottom parallel to each other. These tongs are usually worked from skiffs or flat-bottomed boats, the oystermen first separating the tips of the handles and then bringing them together, thus causing a corresponding movement of the two rakes, which with their 2-inch iron teeth gather in all the intervening oysters. The tongs with their burden of oysters are then lifted into the boat, emptied, and the process repeated.

Dredging is a much faster and less laborious method of oystering than tonging, and can be carried on over a much larger territory. The oyster dredge consists of a bag of woven iron rings attached to an iron framework. From each corner of the framework iron rods extend, converging at a point some feet away. At this point the rope is attached, by which the dredge is dragged from either a sail or power boat. The blade, resting horizontally on the surface, is armed with teeth which rake the oysters into the bag. When this bag, which holds from 3 to 8 bushels, is full, the dredge is raised, usually by a windlass worked by steam, gasolene or hand power, as the case may be, its contents dumped out and the dredge lowered for another haul.

Rakes, the third implement in general use, are not employed as extensively as tongs or dredges, but are used in still water, where the bottom is suitable.

VIII. *Marketing.* — The "catch" as soon as it is dredged or tonged is brought in boats to the oyster houses, where men with hatchets or similar implements break apart the clustered oysters and cast aside the empty shells, bits of rock, etc. Three different varieties of marketable oysters are usually sorted out, according to size: (1) large, (2) medium and (3) small. The respective sizes vary somewhat with the locality, demands of the market and the season; but the large oysters commonly count about 900 to the barrel, the medium 1,000 or more, while the small run 1,200 or over.

The different sizes as they are sorted out are packed in barrels and are then ready for shipment. The principal markets are of course New York and Boston, though the demand farther inland is increasing, and shipments to Chicago or places even farther west are frequently made.