

THE OYSTER-GROUNDS OF THE WEST FLORIDA COAST: THEIR EXTENT, CONDITION, AND PECULIARITIES.

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The oyster-grounds of the west coast of Florida extend the whole length of the coast. Oysters are found growing in great abundance in the waters between the mainland and keys, and are particularly noticeable clinging to the roots of the mangroves which fringe the mainland and keys along the southern coast. These oysters of the extreme southern waters of Florida are mostly of the raccoon type and are not very palatable, being "coppery" and of poor quality.

The oyster regions of the central and northern part of the coast are found in the many inclosed bodies of water, and are located in the vicinity of the mouths of rivers in waters where the density is affected by the fresh water of such streams. The question of density is of prime importance in connection with oyster growth, and edible oysters can only grow where the salt water is influenced by that of less density. If the normal sea water is taken at 1.026, then 1.016 represents the most favorable density for oyster life. However, the densities in which oysters seem to thrive cover a great range, and in nearly all beds oysters are subjected to the extreme ranges between the different stages of the tide. In freshets oyster-beds are sometimes destroyed, owing to the long-continued prevalence of fresh water.

The oysters of the west coast of Florida are all found in very shoal water compared to those found in the Central and Northern States, and a glance at the chart will show the comparative shallowness of all the inclosed bodies of water along the west coast. Marketable oysters are taken in water from 10 feet to 1 foot in depth, and in less than 1 foot and above low-water mark are found the raccoon oysters. Large beds of the latter type lie exposed at low water and thrive, even in their exposure to the hot sun or cold air, during the low ranges of the tide. The shells of these oysters are long and pointed quite sharply, and the oysters are more flat than those of the marketable type. These oysters, culled and transplanted, often do well on cultivated grounds.

The bottoms of the coast waters which contain oysters are almost invariably very soft mud, and it appears remarkable how the solid beds are ever formed on such yielding material. The mud is often of the nature of ooze, and a pole may be thrust down many feet before finding any resisting strata. An examination with a steel-pointed probe usually shows the following strata on the beds: The crust of the bed, composed of shells to a depth of 2 or 3 feet; a layer of soft sand, extending down about 5 feet, and then hard sand or hard mud. The beds are almost entirely long and narrow in extent, and rise precipitately from the muddy bottom, forming reefs dangerous to navigation, as no warning of their presence is given by the soundings. On these reefs there is usually 2 or 3 feet of water at low water. In some localities the oysters are scattered over the bottom, forming beds like the northern beds, but it may be said generally that the oysters of the natural beds grow on the densely packed reefs before mentioned.

In the oyster regions of Apalachicola Bay the survey made in the winter of 1895-96 by the *Fish Hawk's* party showed the condition of the beds with great detail. The oysters there were found in clusters, and ranged in size from very small to full size in each cluster, the crowding of the oysters in the clusters being a serious retardation to their growth. In addition, the whole mass was invariably thickly covered with mussels, so that without doubt great good would result in breaking up and separating the oysters of the clusters. In the Apalachicola work the average number of oysters to the square yard was taken on the different beds, with a view to forming a comparison at a future survey, and thus determine the increase or decrease of each bed.

The questions of temperature and food supply are very important; the former affects the spawning season directly, and the latter depends to a great degree on the currents. Generally speaking, the spawning season extends from the middle of April to the middle of July, but these limits of time vary with the temperature to a considerable degree, a cool spring causing a late spawning season. However, it is probable that in the waters under consideration the oysters spawn to a greater or less degree all the year around. This is evidenced by the fact that the spat is observed in all stages of development during the year. It is generally considered that oysters reach a spawning age at the end of three or four years.

The current concerns the food supply materially; the bottoms most favorable to oyster growth, as those over which there is gentle flow, changing in direction as the tide changes from ebb to flood. The long, narrow reefs which form the beds are almost invariably at right angles to the direction of flow of the current, and the banking up of the water caused by its meeting an obstruction in the form of the bed gives it an increased velocity, so that usually the locality of the bed is at once shown by the tide rip. Of course, at slack water no such material aid is given in finding the beds. It is a singular fact that almost without exception the beds are crescent-shaped, with their concave surfaces all on the same side of the areas of the beds.

The enemies of the Florida oysters are few in number. The starfish, the pest of oysters in Long Island Sound and other localities, is rarely found, and the loss from injury by drills is very small. Parasitic growths, in the form of mussels and barnacles, are injurious; but they may hardly be classed as enemies, as their harmful effects are indirect. It may be said that the Florida oysters are singularly free from exposure to enemies that oysters of other sections are subjected to.

The three great natural conditions that work destruction to the beds are the freezes, hurricanes, and freshets that occasionally occur, and the first two take place principally in the northern sections of the coast. The cause of the deterioration of the beds other than from natural sources is almost invariably due to overworking. The demand is too great for the supply, and the beds are worked until they no longer yield profitable results, and usually until they are so depleted that years are required for them to recuperate. Add to these causes the facts that the oystermen are so shortsighted that they pay little attention, as a rule, to the laws regarding culling and taking undersized oysters, and it can readily be seen that there is a small chance for the productiveness of the beds to increase. Fortunately, dredging is prohibited by law, and it is the one law that is usually observed, and only because the use of dredges would be immediately noticed and complained of. Again, dredging as practiced in the North could not easily be carried on advantageously, on account of the shoal water.

As measures for the improvement of the beds, I would recommend that no oysters be taken from April 15 to October 15; that the law now in force regarding the culling

of oysters on the grounds and the law regarding the taking of undersized oysters be strictly enforced. Oystermen as a rule pay little attention to the laws that affect them so materially, but it is noticeable that the more enlightened men of larger interests, as, for example, the canners, are much in favor of having proper laws and having them enforced. The fact of such intelligent men being anxious for the enforcement of the laws seems a strong argument in favor of such enforcement.

All that has been said applies to the natural beds. Oyster cultivation has become a great industry in the Northern and Central States, and is now beginning to extend to the Southern coasts. Florida has been far behindhand in this industry, but it is hoped that the great importance of it can be proved to those interested, and that in the near future Florida shall have her share of the great sums brought into the State treasuries of some of the States from taxes alone, not to mention the advantages accruing to individuals. The United States Fish Commission has already done much to encourage the cultivation of oysters in Florida. The section of the coast about Apalachicola Bay was surveyed, as already mentioned, and a chart showing the exact delineations of the natural beds and the areas of good planting-grounds made. By means of this chart any person of average intelligence can locate himself on the best ground possible for planting. Having such knowledge, a mere scattering over the bottom of shell to form a cultch to which the spat may attach itself, with the necessary overhauling from time to time, would result in profitable beds. Or, again, seed may be taken from the best natural beds, as it is known that the beds differ very materially. In connection with the cultivation of oysters the United States Fish Commission's Manual¹ on the subject will furnish the best possible suggestions, and all those new to the business will do well to study it.

All natural conditions are favorable to the planter, and as for the seed, as already mentioned, the beds vary greatly even in the same locality, but there are beds all along the coast where the oysters are of the very best quality and compare favorably with the finest-flavored oysters of the most famous districts on the Atlantic seaboard.

The one great impediment to oyster cultivation in Florida is that the laws protecting planters are not enforced. There are instances where men have been obliged to give up the work of cultivation on account of the lack of protection. The laws are perhaps sufficient, but it is imperative that they be enforced. First of all, the oystermen must be brought to a realization of the fact that the protection of oyster cultivation does not in any way infringe upon their rights, and that on the contrary it is directly for their best interests. All have equal rights and any man having sufficient thrift and energy may without doubt better his condition by undertaking the cultivation of oysters and uniting with others to respect the laws. The moral sentiment among oystermen is not in favor of protection, and this is due principally to their misunderstanding the subject. The law makes a distinction between cultivated beds and natural beds and relates wholly to the cultivated beds, but oystermen think that any protection given to the planters is of the nature of a monopoly and is an encroachment on their rights. Of course such is not the case, as the laws protecting planters do not in any way interfere with oystering as now carried on on the natural beds. All the oyster cultivation would be carried on away from the natural beds, and in some cases in localities entirely remote from them.

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¹ Oysters and Methods of Oyster-Culture. By H. F. Moore. Report U. S. Fish Commission for 1897, pp. 263-340.