

THE OYSTER-BARS OF THE WEST COAST OF FLORIDA: THEIR DEPLETION AND RESTORATION.

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One of the greatest benefits the State of Florida shall receive from the assembling of this Fishery Congress is the good influence on public opinion, and from the closing session of this assembly our people will not only know more about oysters and fishes and sponges, but they will realize that all these things are being exhausted, so far as the natural supply goes, and also realize that something must be done, and at once, in order to preserve these bounteous natural gifts so lavishly poured out by nature's hand. The fact is, the natural oyster-bars are a magnificent inheritance that has cost us nothing, and we are not only using but abusing nature's providence by the most extravagant wastefulness and improvidence, and it is only by the education of the masses along these lines that we may hope for success in the restoration of our depleted oyster-bars and sponge fisheries.

In 1876 I came to the west coast of Florida from one of the largest oyster-growing sections in the world, Chesapeake Bay. I landed at Cedar Keys and at once became interested in the oyster-beds of Florida. After spending three weeks at Cedar Keys, I cruised southward, examining the most prominent oyster-beds, such as Crystal River Bay, the bars of the Cootie region, Clearwater Harbor, Point Pinellas, Hillsboro Bay, Old Tampa Bay, and on to a hamlet I found at the mouth of the Hillsboro River known as Tampa; thence I continued southward to the Alafia River, Big and Little Manatee, Sarasota, Boca Grande oyster-bars and 100 miles farther south, and on every hand I found the same condition—oysters, oysters everywhere. How little did I then think that in less than twenty-five years every one of these bars would be partially or totally depleted. On every hand I found these immense reefs and beds of oysters in such seemingly inexhaustible supplies that it frequently occurred to me that the great God of nature must have gone ahead of me and, with hands wide open, scattered right and left and out into the depths so far that I failed to find their limits. On the shores, as we landed from time to time, I found for about 150 miles, at short intervals, great mounds of oyster shells, often 25 feet high and 200 feet long, monuments of a magnificent oyster supply antedating all records and traditions, feeding races so far back that ethnology shakes her head and declares, "I never knew them."

But I hear someone ask, "If this west coast of Florida be so thoroughly adapted to the growth of the oyster, how is it that these wonderful bars should all be either partially or totally depleted?" Let us ask a second question: How is it that every oyster-growing section in the United States has had to meet and settle, in one way or another, this identical question of depleted oyster-bars? The answer in each and every case is: As long as any of the oyster-growing States were in the hands of a few Indians the demand never approximated the natural supply, and even during the early occupation of the country by white men, with its sparsely settled communities,

the demands were insignificant, and the oyster-bars increased and multiplied; but when the tide of immigration set in, and the sparsely settled communities became thriving villages, and mere hamlets became splendid cities, and in the place of the Indian's canoe and the early settler's bateau, came the sloops, schooners, steamers, railroads, and even the ocean steamers, demanding these oysters to distribute them to the east, west, north, and south, to say nothing of the increased home demand—when we consider all these constantly increasing demands, we see very readily that the answer to the question is simply that the demand is an hundredfold in excess of the natural supply, and the artificial supply amounts to nothing, and never will amount to anything, in Florida, as it never has amounted to anything in any other State, until by proper legislation oyster-raising is put on a business basis, the State giving every citizen who wishes to engage in the oyster business the same opportunities, the same rights, and the same protection she gives her citizens to conduct any other legitimate business.

As matters stand to-day in Florida, the oyster interests (I mean their protection and propagation) are everybody's interest, and on the west coast of Florida there are thousands of acres of land covered with water that are more valuable for food production than the best hummock lands, and yet neither the State nor its citizens get one farthing's benefit from them, whereas, by proper legislation, these oyster lands now lying idle could be sold or leased and put under the head of taxable property, and thus immensely increase the revenues of the State. Then, and not till then, will public opinion respect the property a man has in oyster-beds.

On this west coast of Florida we have all of the natural conditions—climatic, geographic, and hydrographic—and the extent of territory to establish an immense oyster industry, which would pay into the treasury of the State such revenues as would appreciably reduce all other taxes, and in this way I believe public opinion can most readily and most speedily be educated on the oyster question. Show a man (and the same is true of a State) that you can and will make money for him, and immediately you enlist his interest and his sympathy, when all your moralizing and sentimentality fall flat as a flounder.

But let us come to the practical and tangible part of the subject. Here I have hundreds of specimens of oysters brought from these partially depleted beds of the west coast, by which I wish not only to show the wonderful processes of nature in adapting itself to the various circumstances and often peculiar conditions under which the eggs attach themselves to any suitable object they may find in their wanderings, but also to demonstrate that there are still on many of these beds enough oysters left to furnish seed for their restoration by proper protection and timely aid, either by the State or its citizens individually.

In order to understand the subject before us more thoroughly, let us look at the oyster himself. Here we have an animal living in a limestone house which he builds for himself. He begins this house-building when he is four days old, and he continues to build and, as necessity requires, to repair this house as long as he lives. In the ages past the oyster was a swimming animal, as he now is for the short period of from five to ten days. At this period his two shells are equal; but after the period of attachment, which is by the left shell, the lower shell becomes cup-shaped and the right or upper shell becomes the lid.

The oyster makes his shell out of the gummy secretion of his mantle, which catches and fixes the lime of the sea water by some special process not yet thoroughly understood, thus creating a substance out of which he not only builds his shell, but repairs

very neatly all damage done any part of his shell, even to the making of a new hinge; or, should any foreign substance enter his shell which he can not expel, he covers it with this substance, and so rapidly does he work that he will put on the first coat or film in about 24 hours.

Lime for shell making is one of the prime necessities for the rapid development of the oyster, and all waters deficient in lime are by just so much unfit for the perfect development of the oyster. Oysters in waters deficient in lime have shells so thin (in both young and mature oysters) that they fall an easy prey to their enemies, and for the same reason are ill-suited for shipping to any distant market. Here, again, the west coast of Florida, with its coral sea foundation and its wonderful phosphate deposits along the shores, sending additional lime to the oyster-beds by every inflow of fresh water, presents very great advantages for the most rapid and perfect development of the oyster. This inflow of fresh water from the many springs scattered along this coast is of peculiar advantage to the oyster, because it reduces the specific gravity of the sea water to a point generally admitted to be most suitable for the rapid development of the oyster.

As to its anatomy: The oyster has a heart and blood circulation, as we find in other animals. He has a pair of lips, and a mouth situated in the back or hinged part of the shell (and not, as popularly supposed, in the front or open end of the shell). He has a full set of digestive organs—stomach, liver, intestinal canal, etc. His food consists of about 90 per cent of vegetable matter, about 5 per cent of mineral matter, and 5 per cent of a mixture of the reproductive organs of seaweed, etc. This vegetable food is chiefly diatoms (a low form of vegetable matter having the peculiar quality of great activity in the water). These diatoms are much more active during a bright, sunny day than on cloudy or foggy days, and this is another of the many reasons why the oyster in Florida (the land of sunshine) grows more rapidly than in other sections subject to cloudy and foggy weather, to say nothing of snow and ice and a general temperature of the water frequently below the point of advantageous feeding.

The natural food for the oyster, found in all sea water, can be supplemented by many land products. The two most desirable in Florida are the pollen of our pine trees and the bloom of our palmetto. By using the bloom of both saw and cabbage palmettoes this food can be furnished them for about five months of the year.

The oyster has not only sensory organs of smell, but eyes also to see. These eyes are, however, not highly developed, self-focusing eyes, as we find in animals of higher order, but rather a rudimentary eye or eyes scattered all over the body of the oyster, and so constituted that they serve the oyster in or out of the water as admirably as do the eyes of animals of a higher organization. The oyster has also nerves and brains, not highly developed, but sufficiently so for all his needs and purposes. The reproductive organs of an oyster are simply wonderful as to their capacity for egg-production.

Unlike the European oyster (*Ostrea edulis*), which is hermaphrodite, our American oyster (*Ostrea virginica*) is unisexual. By this I mean that every oyster lays each season either (and only) male eggs or female eggs; but I believe that it is an established fact that the same oyster that lays male eggs one season may lay female eggs the next season, or vice versa. The female, according to size, age, and vigor, will lay from 1,000,000 to 40,000,000 eggs annually. This calculation is based on the size of the egg as compared with the size of the ovarium at the time of laying. Both male and female eggs at the spawning season are swept out of the ovarium into the water, where the female egg becomes fertile by contact with male eggs. It is highly probable that not

more than 10 per cent of this vast number of eggs ever become fertile. The eggs not fertilized are either dissolved by the action of the sea water or are eaten by fish or other sea creatures. As soon as the oyster egg is fertilized changes take place very rapidly, and in less than 24 hours it begins to swim and is drifted about by tides, currents, or winds, but is always ready with its hair-like tentacles (cilia) to catch hold of any clean object with which it may come in contact and remain there for life.

This now brings us to the answer of the second part of our subject, "How can we restore the oyster-beds on the west coast of Florida?"

(1) By utilizing the eggs from the oysters left on these bars. On all these bars there are still enough oysters left for egg production, and by scattering over these bars from year to year, and just before the laying season, clean oyster shells (or, what is better, the small shells found in great abundance on this coast) to catch this spat, our bars will, if left undisturbed for a few years, be so restored that a reasonable amount can be gathered annually, and if not unreasonably drawn upon they will soon recover themselves.

(2) As, however, we have all along this coast and in the neighborhood of these depleted bars thousands of acres of raccoon oysters,¹ that are in every way adapted for seed, to plant on these bars, we can restore them in a comparatively short time by combining the two methods. The latter method is the one used in restoring the depleted bars of our Northern States. It is a simple matter of history that when our Northern oystermen found their bars depleted they sent vessels to the Chesapeake Bay and as far as the James River and bought small or seed oysters and scattered them over their bars, and from year to year not only take up and sell those of marketable size, but continue to import and scatter about a regular amount of seed oysters annually. Now, then, if it pay the Northern oystermen—and if it did not pay them they certainly would not continue to do so from year to year—to buy oyster seed and transport it several hundred miles, will it not pay the oystermen on the west coast of Florida to simply pick up, free of cost, and transport only a few miles this seed from the raccoon bars?

Inasmuch, then, as this coast by nature is so admirably adapted for oyster-growing, and as the natural bars still contain enough oysters for spat production, and as the oysters and many other kinds of shells are here in greatest abundance to be used as a cultch, and as there are thousands of bushels of good seed oysters in the immediate neighborhood of the depleted bars, I see no reason why, with proper State legislation and an enlightened public sentiment, these oyster-bars on the west coast of Florida could not be restored to their original splendid condition and in a few years be the means of considerable revenue to the State.

TARPON SPRINGS, FLORIDA.

¹It is an established fact that we have but one species of oyster on the Atlantic coast (*Ostrea virginica*) and that the raccoon oyster is identical with the regular commercial oyster.