

SOME FACTORS IN THE OYSTER PROBLEM.

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The annual product of the oyster-beds of the United States is estimated to be worth \$17,000,000, approximately one-third of the entire yearly value of our fisheries. Geographically this income is very unequally distributed, the eight maritime States between Cape Cod and Cape Henry receiving 90 per cent and the same number of States south of Cape Henry, notwithstanding their greater coast line, but 7 per cent.

While there are good economic reasons why the oyster yield from Virginia northward should be greater than from North Carolina southward, it may well be doubted if there be sufficient reason for the great discrepancy that now exists in the production of the two regions. The northern beds are, generally speaking, in the midst of our densest population and in the vicinity of our greatest cities. About 60 per cent of our population dwells in the compact area lying north of North Carolina and Tennessee and east of the Mississippi River. Such populous cities as Boston, New York, Philadelphia, Baltimore, and Washington are within a few hours travel of the beds, and the cities on the Great Lakes and in the interior of the middle West are scarcely a day's journey removed. Oysters are more commonly consumed in such places rather than in more sparsely settled regions. In rural districts the oyster is looked upon as a luxury rarely to be enjoyed, but in the cities and towns of the East they are a familiar article of diet even among the poor.

So far, then, as the near-by demand is concerned, the Northern oystermen are incomparably more favored than their Southern brethren, but certain advantages which the South possesses should to some extent offset this and enable the Southern growers to obtain more equitable distribution of the business and its accruing profits. It has been to some extent demonstrated that the distance of the Southern beds from the Northern market is not an insuperable bar to profitable competition, but, granting that the oysters from the Gulf coast can not compete in the markets of the Atlantic seaboard north of the Chesapeake, there still remains a large field which may be entered upon with advantage.

Dealing with air-line distances, Baltimore is nearly 400 miles nearer Chicago than is Mobile, the nearest important city on the Gulf coast; but westward of the Mississippi the Gulf States can compete on equal or superior terms, so far as distance is concerned, with any of the great oyster markets of the East. Geographically, therefore, they are more favorably situated with regard to 80 per cent of our territory and 40 per cent of our population than are the States of the North Atlantic coast. As many of you are aware, oysters have for some years been shipped from Gulf ports to Chicago and other trans-Appalachian cities, and dealers in several places are carrying on trade with the entire region west of the Mississippi, even as far as the shores of the Pacific, and there appears to be no sufficient economic reason why this trade should not be vastly increased.

After speaking of the arrest in the development of the canning industry at Apalachicola, Lieutenant Swift, in his excellent report upon that region, comments as follows:

That the canning business can not be carried on to any great extent for any length of time is due to the fact that the supply of oysters is insufficient to supply the demand, notwithstanding that the packers have used every means they could to preserve the oyster-beds by refusing to take oysters under proper size, or out of season, or not properly culled, as well as alternating the use of different beds each season.

This is perhaps an extreme case, yet sooner or later, corresponding with the wisdom with which the oyster question is administered, there must result a similar depreciation of the natural beds along the entire coast. I can see no hope of the continued productiveness of our natural beds if they are made to bear the brunt of the yearly increasing demand.

How to forestall the destruction of the natural oyster-reefs and how in a measure to prevent it by lessening the demands made upon them are the questions with which this paper sets out to deal. Those who have studied the problem are a unit in the belief that the solution lies in the general adoption of oyster-culture under private ownership and as a result of private enterprise. Government can do but little. Wise laws rigidly and judiciously enforced can stimulate private ventures and retard reckless waste of the public possessions, but our oyster-beds can never be repopulated by the methods which have in many cases proven so beneficial in restocking our streams with food and game fish. It is not my purpose to deal here with the methods and details of oyster-culture, as these subjects have been recently treated of in the publications of the U. S. Fish Commission,¹ but rather in a general way to point out the conditions which make for success and to consider in an equally general manner the extent to which those conditions are fulfilled on the Gulf coast from Florida to Texas.

The Gulf States present many physical and biological characters which render them especially favorable to oyster-culture, and they also present some serious drawbacks. In determining the qualifications of any given region six important factors have to be considered—(1) density of the water, (2) temperature of the water, (3) character and consistency of the bottom, (4) the quantity of oyster food, (5) the presence or absence of enemies, and (6) the character of the legislation and the success with which it is enforced. Each of these factors with its cognates will be considered in turn.

DENSITY OF WATER.

If a chart of the oyster-grounds of the Atlantic and Gulf seaboard were prepared it would show that the oyster is confined almost exclusively to bays, sounds, and estuaries, and that it is never found in places remote from inflowing streams. On the other hand, it is sooner or later killed when exposed to the fresh water or that which is nearly fresh, and it is therefore only where the fresh and salt waters blend that it is able to establish itself and thrive. It is customary to measure the salinity of sea water by weight, an equivalent bulk of distilled water being accepted as the unit of comparison. So expressed, the best conditions of salinity for our eastern oysters are met when the density measures between 1.009 and 1.020. Oysters will live indefinitely in a density 4 degrees below or 2 degrees above the limit stated, but they then rarely or never attain their best conditions of shape, flavor, and general excellence. Prolonged

¹ See Report U. S. Fish Commission 1897, pp. 263-340.

exposure to a density of less than 1.005 or more than 1.022, if not fatal to the individuals, is at least fatal to the species, as young are not produced to take the place of the old ones which are dying off.

In many places where the salinity is favorable during a large part of the year it happens that at certain seasons a heavy influx of fresh water produces a temporary reduction below the desired minimum. This appears to be particularly liable to occur on the Gulf coast, where many great streams and innumerable small ones become swollen by the rains and discharge large quantities of fresh water close to the oyster-beds. Two facts, however, tend to mitigate the evil which might result. In the first place the oyster is able to tightly close its shell when subjected to objectionable conditions, and thereby the fresh water may be for a time excluded, and Professor Washburn has recently shown that they will live for upward of ten days in the water of running brooks. Then, too, the fresh water, being lighter than the salt or brackish, tends to spread over the surface of the bays into which it is discharged, and it is usually found that the bottom density is greater than the surface density, even after long-continued freshets. The changes are therefore more gradual and less radical than if the salt water were driven out before the fresh, and the oyster finds conditions more favorable at bottom than it would be subjected to if it were a surface-dwelling organism. In selecting planting grounds the question of liability to the influence of freshets should always be given consideration, as disaster may result from its neglect.

TEMPERATURE OF THE WATER.

Adult oysters are not ordinarily adversely affected by temperatures ranging between the freezing point and 90° F. Those upon flats exposed at low water are often frozen during the winter and subjected to the high temperatures of the direct rays of the summer sun, and yet many of them live to a ripe old age measured by the span of an oyster's life. During the spawning season, however, a temperature too low or too high, or changes too sudden and too violent, will either kill the spat or prevent spawning altogether. In the Long Island and Chesapeake regions cold rains and periods of low thermometer are not infrequent in summer, and multitudes of oysters in their swimming stage end their career in sudden adversity. On the Gulf coast such fatalities are of less frequent occurrence, and the probabilities of obtaining a set, other things being equal, is correspondingly enhanced.

CHARACTER OF THE BOTTOM.

To be suitable for oyster-culture the bottom should be of such consistency as will prevent the oysters becoming engulfed in the mud or covered by shifting sands or ooze. The several surveys that have been made of the Gulf coast by the Fish Commission indicate that suitable bottom, unoccupied by a natural growth of oysters, may be found with but little effort. These sections of our coast, however, appear to be rather more liable than the northern oyster-grounds to shiftings of the bottom by stormy seas, and the prospective oyster-grower should not be misled by deceptive appearances, as a loose sand in shallow water exposed to heavy or even moderate wave action may in a short time change its location in a manner disastrous to the planter. With large areas of suitable bottom open to occupation, it is not necessary to point out to the Gulf coast oyster-grower the means by which his Connecticut brother has made available to his purposes many thousand acres of bottom by nature wholly unadapted to the oyster.

ABUNDANCE OF FOOD.

That the nature of the food supply is a consideration of the utmost importance requires no demonstration. The conditions which make an abundant food supply are complex, depending upon density, temperature, and especially the supply of inorganic materials in solution in the water. The bulk of the oyster food consists of diatoms, which, although endowed with powers of locomotion, are nevertheless plants, and acquire their nourishment from the same class of substances as do the common plants about us. It is true that they have no roots penetrating the soil in search of saline solutions, and they spread no broad foliage in quest of atmospheric oxygen and carbon dioxide, but the whole plant is bathed in the nutritive sea water, from which they receive their supply of liquid and gaseous food. If the water be impoverished of salts the same adverse conditions obtain as in barren and exhausted fields and the growth of plant life is in the same manner diminished. Now, how is the Gulf coast situated as regards this inorganic material, indirectly, but no less imperatively, necessary to the growth of the oyster? Along the entire shore line there are numerous streams of all sizes which bring down mineral matter derived from the soil and nitrogenous substances from the decomposition of the rank vegetation of marshes, swamps, and fertile fields. Some of these materials are in solution, and at once available for conversion into oyster food through the medium of the microscopic plants already mentioned, but a large quantity is held merely in suspension, to be deposited on contact with salt water and slowly passed into solution through the lapse of time. With the abundance of food thus furnished, and nurtured by the warmth of semi-tropical waters, it is not surprising that microscopic plant life should flourish.

The rate of growth of the oyster depends upon the rate with which it is supplied with food. When well fed its growth is rapid; when poorly fed its increase is slow. In one locality an oyster may reach a growth of 6 inches in two years, and in another place the same size is not attained under four or five years. On some of the more profitable beds in Long Island Sound the latter is the case, while last summer, in Plaquemines Parish, Louisiana, I saw oysters 6 inches long which, from known data, could not have been over 23 months old and may have been slightly less, and there are doubtless many places on the Gulf coast where the growth is equally rapid. This rapidity of maturation is an important matter to the oyster culturist. He is able to receive quicker and greater returns for a given area and a given investment of capital, and his beds are less liable to disaster and recuperate more rapidly than if the growth be slow. Large oysters are less readily covered by deposits of mud and sand than smaller ones, and are more rarely destroyed by enemies, the latter usually proving more destructive before the shells have become thick and the adductor muscle strong. The drill is comparatively harmless to an oyster after it reaches a length of 3 inches, and the starfish opens and the drumfish crushes large oysters with much less facility than small ones. It follows that the mortality on a bed of well-grown oysters is less than when they are small, and the more rapid the growth the less the death rate from extrinsic agencies. The value which an oyster possesses in the market is dependent largely upon its fatness and flavor, and both of these are principally and primarily dependent upon its food. Oysters may reach a large size, yet not become fit for the market, and in certain parts of the Atlantic coast the difficulty has been keenly felt by those engaged in oyster-culture. The United States Fish Commission is now experimenting with a view to enable planters to fatten their oysters at will, but defi-

nite results have not yet been reached. It may be stated, in passing, that these experiments have nothing in common with the pernicious process of plumping through the osmotic influences of fresh or brackish water.

ENEMIES.

The Gulf coast is fortunate in its comparative immunity from enemies of the oyster. Two of the most destructive inhabitants of oyster-beds in the North, the starfish and drill, are practically harmless in the South, and to those familiar with the vast amount of money and energy annually expended in protecting the beds of Long Island this fact is very significant. In six years the vessels of one deep-water planter caught nearly 10,000 bushels of starfish, and another in a single year is said to have expended \$90,000 in protecting his beds from the same pest. There are, however, certain enemies on the Gulf coast which do more or less harm. The drumfish is apparently more destructive than in the North, and the sheepshead is said to also do considerable harm. Should either of these fish prove troublesome it would be quite feasible, as has been demonstrated on the Pacific coast, to protect many of the planted beds by stockades or fences. The economic practicability of the plan, however, would be conditioned by the price of oysters and the location of the beds which it is sought to protect. The conch and a somewhat allied gasteropod, the crown shell, known to naturalists as *Melongena corona*, are said to cause more or less harm to oysters in the Gulf. Mr. Joseph Wilcox, of Philadelphia, says in regard to the latter that they are able to insert their long tongues or proboscides between the valves of the oyster and then leisurely destroy it. He further says that upon one occasion he picked up on the west coast of Florida a cluster of oysters with 20 *Melongenas* attached. Owing to the comparatively large size of these forms it is probable that by exercising care to destroy the animals and their egg capsules whenever found much could be done toward securing some immunity from their inroads.

Summing up, we find that the Gulf coast possesses both advantageous and disadvantageous features from the oyster-grower's point of view. The advantages are principally biological; the disadvantages, economical. The physical conditions are mainly favorable, but occasionally disastrous. The temperature and density are both suitable over a large part of the region, enemies are comparatively few, food is abundant, and the growth and recuperation of the beds rapid; labor is cheap and the weather is less likely to interfere with operations than in the North, where oystermen are often compelled to work in intense cold and on boisterous seas. The disadvantages have principally to do with the freshets and crevasses which at certain seasons are liable to lower the density and deposit sediment upon the oysters, the occasional severe storms and tidal waves which tear up and destroy the beds, and finally the distance from the centers of population and the principal markets of the country.

LEGISLATION AND ITS ENFORCEMENT.

In most of the maritime States the statute books are burdened with lengthy oyster laws, and a large part of the time and energy of the legislative bodies are occupied in the discussion of these laws and their enforcement. In all of these laws and in most of the discussions the close season is an important factor by which it is hoped that the natural beds may be preserved from destruction. It is invariably designed to prevent the capture of the oyster during the breeding season on the hypothesis that when

taken at that time there results not only the destruction of the adult but also of the progeny which that adult is capable of producing, and it never occurs to the advocates of this form of legislation that the same objection applies to the capture of an oyster at any other time. If the oyster were more easily captured during the spawning season, as are certain species of fishes, or if it were a timid creature fleeing from alarm and easily driven away, or if it cared for its young after the manner of the higher animals, there would be perhaps some warrant for the present belief in the all-sufficiency of the close season as a protective measure. But the oyster does none of these things; it stays where it first lodges and there passively awaits such fate as may be in store for it, doing nothing of its own volition, either to defer or expedite its capture.

Bearing these facts in mind, let us examine the effect of the close season upon two hypothetical beds, one of which is closed during the period when the oyster is spawning, the other when it is not. We will suppose, for the sake of definiteness, that each of these beds contains 10,000 bushels of oysters; that spawning takes place only during the six months between the 1st of April and the 1st of October; that the oystermen have the skill, industry, and purpose to remove every oyster during a working period of six months, and finally that the dead shells are culled out and returned to the beds. Let us first consider the case of the bed which is closed in the usual manner during the spawning season. The oystermen will begin on the 1st of October and labor unceasingly until the 1st of April, when, *ex hypothesi*, there will not be a single oyster left to spawn and the reproductive capacity of the beds will be zero. Compare with this the bed which is closed during the six months when the oyster is not spawning. At the beginning of reproductive activity the bed is intact; it contains 10,000 bushels of oysters, each, we will say, capable of producing its kind. At the end of the six months, as in the former case, not an adult oyster is left, but the condition of the two beds is not otherwise comparable. In the first place not an oyster has spawned; in the second case, supposing the daily catch to be approximately constant, one-half of the spawn has been given opportunity for discharge and a considerable portion of the spat should have attached itself to the culled shells and other material returned to the bed. In the one case, if the bed be isolated, absolute extermination has been accomplished; in the other case the bed still contains the elements of recuperation. In practice, of course, the extreme conditions mentioned never obtain, but the principle is the same whether the oysters be taken in whole or in part.

In practice also, where some oysters always remain on the beds, even after the most thorough working economically possible, the close season has a utility not yet touched upon. In its early attached stages the oyster is not the hardy, heavily armored animal that we see in the market. Its shell is thin and fragile as an eggshell, and closely adherent to the foreign body which furnishes its place of attachment. Tongs, and especially dredges, however carefully handled, must crush them by multitudes, and the impact of the oysters against one another as they are thrown into the boat costs the lives of many more. A large proportion of the young spat is often attached to marketable oysters, and however well-intentioned the oysterman may be in his efforts to comply with the culling law, it is quite impossible to detach the spat without killing it. When the close season ends immediately upon the cessation of spawning a very large proportion of even the earliest set is subject to the perils pointed out. If the young oysters could be protected until such times as the shells

become strong enough to withstand the mechanical effect of capture and culling, a distinct advance would be made in the administration of our natural reefs. The prolongation of the close season for a period of six weeks or two months would, in a region of rapid growth, permit the shells to attain a strength sufficient to prevent crushing, and a size that would allow some of them to be culled from the marketable stock. Economic objections may be well offered to this proposition, for in many cases it would cut off the fisheries at a time when the financial inducements are large. It is a matter, however, worthy of consideration by those engaged in framing oyster laws; and I believe that in some localities a close season beginning, say, two months after the commencement of spawning and extending two months beyond its cessation will have a better result than an equal period adjusted to the spawning season only.

Another plan would close the beds, each in rotation, for a term of years sufficient to allow them to recuperate from the effects of the fisheries. Doubtless this would be the most efficient type of close season, but it presents alternative difficulties in administration. If the areas closed be large, those deriving their living therefrom must either travel long distances to prosecute their calling or temporarily abandon it; if, on the contrary, the areas be small and correspondingly numerous, the regulations would require a large oyster police for their enforcement. Another plan, on our extensive oyster-grounds still more impracticable than the preceding, is to limit absolutely the number of oysters to be taken from the beds. This has been the only regulation able to protect the oysters in certain parts of France and Germany; but it involves elaborate governmental machinery, officers for administration, guards for protection, and scientific men for determining the condition of the beds and estimating the number of oysters which may safely be removed. Such elaborate measures are possible where the beds are few in number and limited in extent, but are entirely inapplicable to the conditions prevailing in our waters.

Another almost universal feature of oyster regulation—and, in my opinion, a more important one than the close season—is the requirement of culling upon the beds from which the oysters are taken. Most States have in this respect good laws, but unfortunately they are often neither enforced nor voluntarily observed. It is not difficult to prevent young oysters from being put upon the market, and there is but little temptation to so dispose of them if the limit be fixed, as is common, at $2\frac{1}{2}$ inches; but as seed such oysters may be sold without the limits of their native region, and to its great detriment. Then also, when the beds are distant from the places of sale, there is always a strong temptation for the oysterman to save time by culling them on the way to market. In some cases this may produce no harm, and may even result in the establishment of new beds, but in general the practice is to be deprecated from the probability that young oysters thus culled would fall upon soft or shifting bottoms, or be otherwise placed under adverse conditions.

It is self-evident that if the young oysters and the objects to which they may become attached are systematically and persistently removed, there must follow a scarcity of adults, and in time economic if not biological extinction of the beds will result. In due course such beds may, and often do, become restored and regenerated, but the process is usually slow as compared with the demands of our markets. I regard it as a misfortune in some respects that the vast spawning capacity of the oyster is so generally understood. The knowledge that the female emits annually millions of eggs has begotten an impression that the beds need no protection, and

that when they fail it is due to starfish or drills or mud or any one of a dozen other factors, rather than to improvident management. It must be remembered that but a modicum of these eggs reach maturity, else our bays and estuaries would long ere this have been converted into beds of limestone. Broadly speaking, nature provides for the perpetuation of her species either by means of a few eggs well protected, or many eggs left, as it were, to chance. To the biologist the simple fact that the oyster is so prodigiously prolific is ample indication that its existence from the egg is a precarious one. Its life is a constant passive struggle with physical conditions, its enemies, and its brethren, and fortunate indeed is the oyster region where, of every million eggs produced, one reaches marketable dimensions.

An important, in fact an essential, element in the oyster's salvation is the presence of a solid body to which to affix itself when it is ready to settle down at the conclusion of its free-swimming condition. It is then so exceedingly minute that a film of mud not thicker than a sheet of paper is sufficient to stifle it. It will attach itself to almost anything fairly free from sediment, but on the oyster-beds such objects are almost exclusively living oysters or dead shells. A depleted bed differs from a vigorous one in two particulars: In the scarcity and scattered distribution of spawning individuals, and, perhaps more disastrously, in the paucity of suitable places of attachment for the young. From both causes the reproductive capacity of the bed is reduced, but were the culled and dead shells returned to the bed both conditions would be ameliorated. Under any system, however, even with good culling laws and close seasons, it is hopeless to expect to supply the demand for any length of time wholly from the natural beds. The only way in which to prevent their ultimate depletion is to supply our markets largely from other sources; that is to say, we must resort extensively to oyster-culture; and the character of legislation and the success with which it is enforced are determining factors in the success or failure of the undertaking.

Liberal measures must be adopted, and opportunities, if not inducements, must be offered. Private ownership must be established, and more especially the rights of property in the planted beds must be vigorously enforced. More than this the State can not well do. The methods of fish-culture are not now, and probably never will be, available in propagating the oyster. Fish-culture in many of its phases is a legitimate and proper function of government, as all members of the community, whether they be catchers or consumers of fish, partake of its benefits. In most cases, owing to the nomadic character of the species propagated, private enterprise has no inducements for engaging in it except those of philanthropy. Not so with oyster-planting as at present practiced, for only he who sows reaps. Dr. Ryder once said "Oysters are like potatoes, they stay where they are planted." All that the planter need ask of the Government is to be placed on an equal footing with every other citizen; to be permitted to acquire, without prejudice to others, property adapted to his calling, and to be protected in his rights after acquirement.

With this understanding the first question to arise is how and where he may obtain such property. In some cases he may go into the markets and purchase lands conveying to him the ownership of coves or salt ponds, but such cases are rare and oyster-culture so confined would be unimportant indeed. Again, he might buy land on tide water and excavate ponds, but oyster-culture has not reached a stage where such methods would in general prove profitable. The only course left him, then, is to

occupy tide lands, which in most cases are held by the State. To enable him to do this legislation is necessary, and the lawmakers at once ask, What shall be the character of his tenure and how is it to be acquired? Shall he be granted a leasehold for a term of years or shall he be permitted to occupy it in perpetuity, the State retaining only the right of taxation and its related powers? Whichever policy be adopted no impediments should be unnecessarily introduced in the way of a *bona fide* planter. The returns from oyster-culture are often large, though not exorbitant, but the risks are many and disaster not infrequent. Those who undertake the work and thus add to the State's resources should be treated with every consideration to which their courage, enterprise, and industry entitle them.

The tide lands in most cases are worthless and doubtless will ever remain so for purposes other than oyster and sponge culture, and they can be occupied without prejudice to any other business whatever. The policy of the State should be to encourage their occupation, and in this connection a lesson may be learned from the liberal policy which has induced the rapid settlement of our vast agricultural estate. The logic of our history would dictate the throwing of the tide lands open for occupation, yet in how many States are the laws, and more especially public opinion, practically, if not intentionally, prohibitive? A policy far different from that in land above tides is supposed to be justifiable in dealing with that portion of the State's domain lying beneath the sea. There is reluctance to part with the tide lands, and it is thought preferable to allow them to lie barren rather than to permit individuals to acquire permanent possession. There can be no doubt but that the best results are to be obtained when the oyster-grower holds his lands in fee simple. Under proper management the bottom becomes more favorable the longer it is cultivated. It yearly becomes firmer and freer from extraneous organisms and the miscellaneous rubbish which accumulates in shore waters, and the man who improves it is the one who should reap the benefits.

It is to the advantage of the State to interest a thrifty class of citizens in the subject, and such persons are the very ones who will hold aloof if they are to be subjected to the frequent possibility, if not probability, of dispossession. The land should be granted under the freest possible terms. If revenue be desired it should be derived from the subsequent increase in taxable value rather than from sales or rentals. The primary function of government is the welfare of its citizens, and, contrary to the apparent standpoint of some legislators, taxation is but an incident which the first consideration renders necessary. The first cost of the oyster-lands granted by the State should be little more than enough to defray the expenses of survey and registry, and not such as would debar those of small means from partaking of the benefits. In Connecticut the State lands are sold for \$1 per acre and the additional payment of 10 cents per acre, the estimated cost of surveying and recording, when the tract applied for is not, in the opinion of the shellfish commissioners, of an unreasonable extent. Under these provisions over 71,000 acres, owned by almost 300 persons and giving employment to thousands, were under culture in 1896, the amount of material deposited thereon in planting and improving the beds being over 8,000,000 bushels. Other States are still more liberal, permitting the occupation of oyster lands under provisions practically similar to the United States homestead laws. But Connecticut has so far been easily first in the development of oystering in naturally unproductive waters. This is largely due to her advantageous geographical position with regard to the mar-

kets, but it can also be attributed in part to the natural industry and enterprise of her citizens and to the enlightened public opinion which places planted oysters on a par with other property and respects the right of the planter to reap the fruits of his labors.

Of enterprise and industry Connecticut has no monopoly, but unfortunately there are many parts of our seaboard where the oyster-planter is regarded as the usurper of the common rights to the fisheries and his legal rights are interfered with by an adverse public opinion. This is one of the greatest difficulties with which he has to contend. Theft of property beneath the tide is palliated by some as an act of retributory justice against a common enemy, and men will steal oysters who would scorn to enter their neighbor's poultry-house. This peculiar moral obliquity is rooted in ignorance and must be combated by education, supplemented by more than occasional salutary castigations from the strong arm of the law.

Summarizing: Those who wish to perpetuate and extend our oyster wealth should procure a rational culling law rigidly and intelligently enforced; the close season should be at such time and of such duration as will protect, not so much the spawning oysters, but the delicate spat during the period when it is especially susceptible to injury from the ordinary working of the beds; public opinion must be formed to regard oyster-planting in its true light, as a benefit to the whole community; liberal laws must foster and encourage the occupation of the tide lands not natural oyster-beds; the oyster-planter should have the same treatment as the cotton-planter, sugar-planter, or the market-gardener, with liberty to hold or dispose of his property as he pleases, paying a just proportion of the taxes and no more.

WASHINGTON, D. C.