THE OYSTER INDUSTRY.

BY I. B. OWENS.

A visit to the smaller cities and towns bordering salt or brackish waters, where oysters are cultivated, and another to the great fish markets, such as are found in Boston, New York, Philadelphia, and Baltimore, or even in New Orleans, Chicago, and San Francisco, where oysters are sold, will give some idea of the extent and importance of the oyster industry. Thousands are employed. Even in these days of billion-dollar enterprises, a large capital is invested. It is incorrect to suppose that the oysters are merely caught in their natural state and brought untreated to the market. They must be carefully cultivated from inception to maturity, and skill and experience go far in the make-up of the successful oysterman.

The young or "seed" oyster results from the spawn, much the same as with fish, and this seed is the one essential thing to the oyster planter. At present the waters adjacent to New York and New Jersey supply the seed not only for the New York industry, but for localities so far away as San Francisco. In the early days of the New York oyster business, however, the seed was brought from the Chesapeake Bay, and more than a little romance is woven into what was known as the "Virginia oyster trade." The seed oysters were freighted to New York in small sailboats which, in order that the seed could be planted in season, were raced up and down the Atlantic coast with a skill and desperate daring known only to the American boatman of forty years ago. Famous among these boats was the sloop "Admiral," of only 29 tons gross burden, owned by the late Joseph Ellsworth. This boat, to use the expression of her skipper—now a grizzled veteran of seventy years—"ran the beach loaded decks-to in the dead of winter," making on each trip thousands of dollars for her owner.

When the seed acquires in its natural bed or "reef" a growth of from one to three inches in length, it is gathered from the water and carefully culled or sorted. The perfect seed are then replanted in other localities where their growth can be carefully watched. From then on the crop must have ceaseless attention for from two to three years, in which time the growth is complete and the marketable product results. During this time the oysters must be kept from the attacks of the starfish and other destructive parasites; they must be kept spread out thinly on the bottom so that their growth will not be hampered, and they must be protected from the many other things (not excepting thieves), on the absence of which the life of the oyster depends. To prevent theft of the oysters, men are stationed in watch-boats which are anchored over the beds. The watch-boat shown in one of the illustrations is owned and maintained by a community of oystermen whose beds lie off Keyport, N. J. When the growth of the oysters is

Unloading the Oysters from a Dredge Boat into a Scow for Transportation to Fresh Water.

complete they must be taken up for market. In some cases the beds run dry at low tide and then the oysters are raked into heaps and taken off the beds. In most instances, however, the beds are always under water and the oysters are then taken up either by hand-tongs or dredges. The tongs have long wooden handles terminating in groups of iron fingers in which the oysters are caught. Tonging is slow and extremely laborious work and is fast being supplemented by the dredge. This instrument is formed of a large and heavy iron rake, to which is attached a bag, partly of iron links and partly of heavy cotton mesh. The dredge is dragged along the bottom and will catch, according to its size, from one to ten bushels at each haul. In the early days the dredges were hauled by sailboats and pulled aboard either by hand or by hand-operated winches on the decks of the boats. Now steam and gasoline-driven dredge boats are almost exclusively employed and these are fitted with power operated hoisters, by means of which the dredges with their loads are raised on deck. Usually the dredge boats have the engines in their after-ends and are provided with shafts driven from the engine and running forward to the hoisting drums, which are placed in the bows between decks, the chains, to which the dredges are fastened, being passed up through the deck and over sheaves hung from a mast or stanchion. These boats range from five to two hundred tons burden. The boats shown in the illustrations are about fifteen tons burden and under favorable conditions are capable of dredging up five hundred bushels of oysters in ten hours' work.

After Having Been in Fresh Water, the Oysters are Transferred to Baskets and Carried to the Oyster House.

As the contents of the dredges are thrown on the decks of the boats, the shells, dead oysters, debris and the like are carefully culled from the marketable oysters. As a rule, when the mature oysters are gathered from the beds, they are poor or shrunken, and oysters from some localities, when fresh from the beds, have a bitter, coppery taste. To swell or "fatten" the oysters under these conditions they are put through the process of "drinking;" that is to say, they are sunk for a short time in fresh or only slightly brackish water. Usually this is done when the oysters are still in the shell, they being unloaded from the dredge or other boat in which they are first gathered and transported to fresh-water creeks or springs, where they are thrown overboard and allowed to lie for from six to ten or twelve hours. They are then taken up and are ready for the market. In some cases the oysters are not "drunk" until opened. Then the oysters, removed from the shells, are placed in troughs or vats and covered with fresh water. In either case, the oysters throw off their natural bitter or coppery taste and, absorbing the fresh water, swell out or "fatten," as the oystermen term it, taking the plump, rounding form which they usually bear when sold to the consumer. The oysters are transported to the market or opening houses in various ways, depending upon the locality and traffic conditions. Most of the oysters reach New York market in bulk by boats, as will be appreciated when one inspects the large fleet of oyster boats always to be seen at Gansevoort and Fulton markets, New York city, during the oyster

After the Oysters Have Lain in Fresh Water for Six Hours, They are Removed to the Oyster House.

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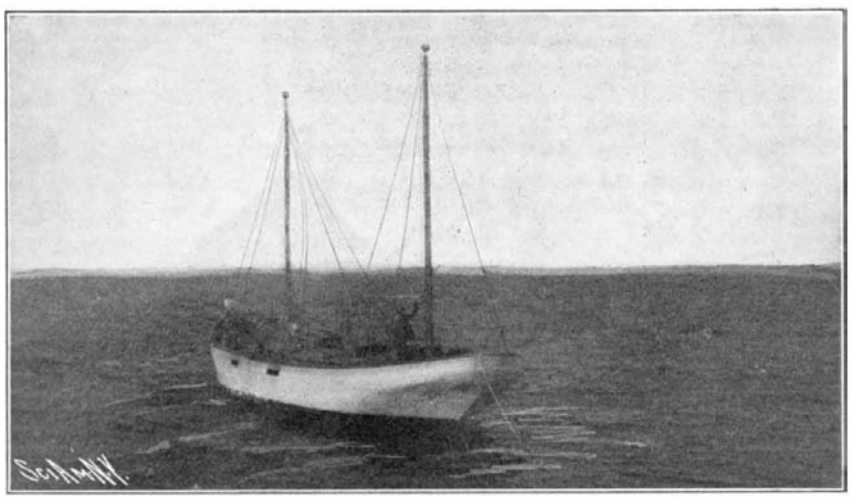
season. Some of the product is, however, shipped in barrels by rail and steamboat transportation lines. Market oysters are divided into three grades, known by the oystermen as box, cullings, and cullintines, the largest being called the box oysters, the medium-sized cullings and the smallest cullintines. According to the practice usually followed in the New York market, the oysters are not "culled" or sorted until reaching the market or opening house. Here they are separated into their proper grades and those intended for local consumption are usually delivered in their shells to the buyer. A vast part of the product is, however, shipped far inland to be consumed either fresh or to be preserved or canned, as may be desired. In shipping the oysters inland, it is customary to open them and place them with their liquor and a cake of ice in cans or tubes. In this form they may be safely transported long distances. The thoroughness with which this part of the business is understood is attested by the fact that the writer has been served in Omaha, Nebraska, with raw oysters on the half-shell, although the restaurateur, when pressed hard on the point, admitted that the shells were as much a part of his equipment and were used by one customer and then another with the same frequency as his cups and saucers. These oysters for the inland trade are opened in the oyster houses which are usually erected on the shores adjacent to the oyster grounds or beds. One of the engravings shows the men at work opening or "shucking" the oysters. In the Chesapeake Bay this part of the trade has been highly developed, thousands of men and even women being given employment by it and the "shucking houses," so called in that locality, being located at almost every point along the bay shores convenient to the railroad and steamship lines.

Opening the Oysters for Market.



Guard Boat Watching for Oyster-Poachers.

Storing of Sun Heat in Liquids.

A storing of sun heat in some of the small salt lakes of Hungary was observed as far back as in 1901 by Kalecsinsky, who recorded the results of his investigations in a paper before the Hungarian Academy of Sciences. He showed the warm layer of the Szovata salt lakes, which lies at a certain depth below the surface between two colder layers and which is several meters in depth, to have necessarily derived its heat from the sun. Both natural and artificial salt lakes, he further showed, can be heated to any higher extent only in case their surface is covered with a layer of fresh or diluted salt water. Such salt lakes accumulating the heat of the sun up to 70 deg. C. for rather a long time, are to be considered as heat accumulators.

According to information in the German press, Kalecsinsky has since been engaged in continuing his own researches in this direction, in conjunction with the work of other authors. His latest results are recorded in a memoir, likewise presented to the Hungarian Academy of Sciences.

In this interesting paper it is stated that the phenomena in question, so far from being confined to the salt lakes of the Szovata district, are shared both by Roumanian, Norwegian, Siberian, and other salt lakes and can be reproduced artificially in artificial salt water. In fact, concentrated solutions of Glauber salt, sal ammoniac, soda, etc., on being exposed to the sun, will become heated in the same way as a salt lake, provided their surface be covered with a layer of either fresh water or diluted salt water. Even fresh water, however, can be heated in the same way if it be covered with a layer of either petroleum or oil.

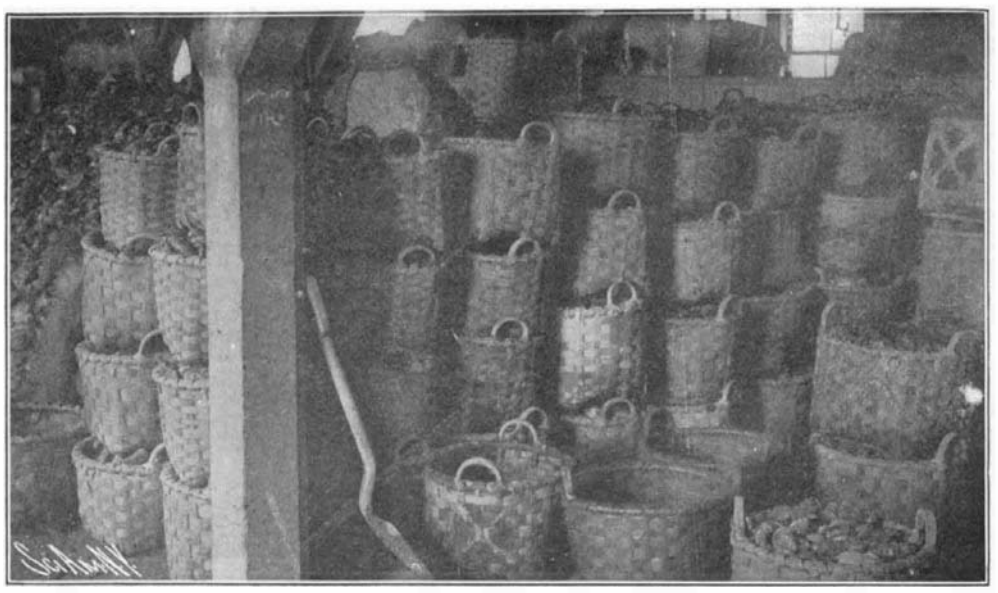
These phenomena are accounted for by the physical properties of the liquids and depend mainly on their arrangement. In the case of salt water covered with fresh water, the maximum heat will mostly be stored at the contact points of the two layers. If the fresh-water layer be evaporated without being heated, the temperature will be compensated for. Since oil and water do not diffuse into one another, as is the case of fresh and salt water, the maximum temperature in oil-covered water will mostly be found immediately below the oil layer.

The heating undergone by such water can be raised so far as to kill any animal and vegetable life below the layer, if the lower water be not renewed. In the Ostravik Lake, in Norway, the oysters thus died in 1885, until the salt water was put in connection with the open sea. As soon as this connection had been produced, the oysters thrived very well. Many temperature phenomena observed in large continental seas, such as the Baltic and Mediterranean, are explained in this way. Strong currents of cold, fresh water will, for instance, flow in the northern Mediterranean from Italy into the hot salt-water basin. So far from producing any cooling, the light and cold fresh water will, however, maintain the heat in the salt water, so that at a certain depth the water in the northern Mediterranean is warmer than in the southern part where this protective fresh-water supply is missing.

Some greatly interesting conclusions may be drawn as to conditions prevailing in primitive ages. It is likely that salt lakes existed then as they do now, as there would otherwise be no such salt deposits as that of Stassfurt. These salt deposits mostly consist of alternative layers of different salts. The researches of Van't Hoff and others have shown the elements contained in water to combine to quite different salts depending on the temperature, each salt having a formation temperature of its own. Now, as in the evaporation of the primitive lakes, such salts as corresponded to the actual temperature of the strata are likely to have been deposited, there might have been a similar accumulation of sun-heat by covering layers, the different salts produced by the variations in temperature constituting, so to say, a geological thermometer.

The French physician, Dr. Marage, has experimented on the perception of vowels, the note of emission, and the distance at which the perception occurs. His experiments were made by means of the "vowel siren," for in the human chant the output of air cannot be measured. According to his observations, every vowel is perceived at a certain distance for a minimum of energy employed on a determined note. In consequence, the ear hears better certain vowels, when they are emitted on certain notes. This explains why singers are led to slur certain words in singing. The *e* and *i* need the sharp notes; the *o* and *a* carry the voice. The education of the ear is of no consequence in these experiments. Tests of audition have been made on a professional singer, and on a countryman destitute of all knowledge of music. By these means the auditive acuteness of a patient may be measured. The acumeter ought to be able to render, like the "vowel siren," sounds of which the tone and height are constant, the intensity alone varying. Dr. Marage concludes that there is probable occasion for modifying the note emitted by the sirens of the lighthouses, a note which is at present *re;* there are other notes which would carry farther with less expenditure of energy.

Deck of a Dredge Boat, Showing Crew Repairing a Break in the Dredge.



Culled Oysters Ready for Market.

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