
DEPARTMENT OF AGRICULTURE AND TECHNICAL
INSTRUCTION FOR IRELAND.

**THE PUBLIC OYSTER BEDS ON THE
COASTS OF COUNTIES WICKLOW
AND WEXFORD,**

BY

E. W. L. HOLT.

(Appendix No. II. to Part II. of the Report on the Sea and Inland Fisheries
of Ireland for the Year 1901.)

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i.—INTRODUCTORY.

The investigation with which I am about to deal arose out of applications made to the Department on behalf of the fishermen of Arklow and Courtown to take steps with a view to the revival of the once important oyster fishery of the neighbouring coast.

I am not here concerned to discuss in detail the various methods by which it was suggested that the desired end might be achieved; but, in brief, it was proposed from Arklow that the Department should bear the charges of a scheme for placing the oysters on the English market at a price remunerative to the fishermen.

Whatever the merits of such an enterprise, or the possibility of its modification to a degree compatible with the restrictions imposed by statute on the Department's powers in the expenditure of public money, it was obviously necessary to ascertain to what extent the available supply of oysters would seem to warrant the inception of an extensive fishery, accompanied, as it needs must be, by the expenditure on the part of owners of fishing boats of a considerable capital in the purchase of gear and fittings.

Reports on this subject were most conflicting. In former days dredging was pursued on grounds extending, practically without interruption, from Wicklow Head to Carnsore Point, chiefly inside the line of sandbanks which fringe the coast in this region. It was matter of common knowledge that these beds had been so seriously over-fished that the industry became but little profitable on that account alone; though a slackness of demand for oysters and the diversion of the energies of Arklow to the spring mackerel fishery, were no doubt causes in part contributory to its practical abandonment.

The recent uncertainty of the mackerel and herring fisheries recalled attention to the oysters, and it was asserted by some that the beds, after lying fallow so long, had completely recovered and were as well stocked as ever. Further, it was held that there was evidence of the existence on off-shore grounds of productive beds which had never been worked at all.

Other information suggested that the grounds near the fishing ports were very poorly stocked, while as the more remote inshore beds did not appear to have been worked for many years, it was evident that nothing very exact could be known about them.

I was accordingly directed to make a survey of the whole of the known grounds, and to search for the supposed off-shore beds. Work was commenced in the early spring of 1901, and has been continued, as the weather, and other duties of the "Helga" per-

mitted, ever since. Interruption from both these causes has been frequent, and the survey has not yet been completed in such detail as I originally contemplated; but for our present purpose the information already acquired will probably suffice, and a more detailed report may be left to form part of the systematic examination of all our eastern fishing grounds, which is an item in the work of the Scientific Section of the Fisheries Branch.

With a view to locating the grounds known to have been productive in former years, we secured the services of James Craan, of Arklow, who was engaged in the industry in the days of its greatest success. He acted as our pilot and fishing master from Wicklow Head to Glasgorman; while Michael Wafer, of Courtown, performed a similar function from Pass to Ballyvaldon. Matt. O'Brien, of Arklow, fishing master at the Marine Laboratory, was employed when some of the ground was re-examined. In our search for the off-shore grounds we were guided by a chart marked at Arklow.

We did not restrict our dredging, either inshore or off-shore, to the localities indicated, but generally quartered the whole coast as closely as the time at our disposal permitted. Thus, although isolated patches may have escaped us, it is unlikely that we missed any oyster-bearing ground of sufficient extent to be of much importance in a large fishery.

Dredges of approved pattern were supplied to us from Arklow and Courtown, and in their manipulation we were guided by the instructions of the experts whom I have named. The "Helga," a vessel of 345 tons, is rather large for the work, but by choosing suitable states of tide and taking advantage of her twin screws when required, we found her handy enough.

I have thought it permissible to assume that a professional sailing dredger working over the same grounds would have caught rather more than we did, dredge for dredge, while she would usually work a larger number of dredges: though, as will appear, the superiority of the sailing dredger is perhaps not constant (see p. 34). It is possible, therefore, that my conclusions as to the stock may be unduly optimistic, but as the numbers taken are stated, readers are in a position to form their own opinion.

The catches of individual hauls are set forth below, but I may at once summarise our results by stating that, in so far as I can form a judgment, the great Ballyvaldon bed inside the Blackwater sandbank is the only ground which seems at present capable of meeting the requirements of a considerable fleet of powerful vessels. It is a ground of large extent, but that it is capable of long withstanding an important fishery, I should hesitate to affirm. There are, at many other places which we examined, isolated patches of productive ground, capable of supporting a reasonable fishery if the oysters were of sufficient market value to compensate for the periods of enforced idleness inevitable on a coast at once so exposed and so devoid of good harbours.

Of the alleged off-shore grounds, I can only say that we found no evidence of their existence, though here and there we met with an occasional oyster.

Before proceeding to a statement of our hauls, it may be of interest to review briefly the past history of the industry, so far as it can be gathered from the reports of the Fisheries Office, and other sources.

ii.—HISTORICAL AND ECONOMIC NOTES.

I have not been able to learn at what period the fishery commenced to assume importance, and have no knowledge of the number and class of the boats by which it was prosecuted in the first half of the nineteenth century. In or about the year 1806 there were complaints of exhaustion of the stock, which may probably have referred only to the beds in the immediate neighbourhood of the ports. It is evident that there was a considerable industry, even in the late thirties, of which Arklow was the headquarters. Courtown boats probably landed their catch at Arklow, as in recent years, and Wexford men seem also to have been occupied in dredging to a considerable extent. At this period the Arklow men at least were in the habit of conveying some considerable proportion of their catch to Beaumaris, where the oysters were relaid to fatten for the English market. That others were relaid at Clontarf and Sutton is probable, but I find no mention of the fact until some years later. The price appears to have been so low that it is only by taking into account the change in the value of labour that it is possible to regard the industry in these early years as remunerative. Herring fishing seems to have been the staple industry.

In the early forties a great stimulus was given to the trade by the arrival at Arklow of English buyers, who carried off stock to replenish the Kent and Essex beds, and are stated to have made purchases at Arklow to the value of £8,000 in the spring of 1843. It must be remembered that at this period the French and Dutch beds, which now play an important part in the restocking of English and even Irish beds, and in the direct supply of the English market, were in bad condition. The deep-sea Dutch grounds were, I believe, unknown, and there was no importation from America.

The legal close season was from the 31st April to 31st August, but in 1846 dredging, for stocking purposes only, was permitted during the month of May. In the same year it is noted that the system of relaying at Beaumaris, abandoned when the English buyers appeared at Arklow, was at least in part resumed, as being more profitable than sale at Arklow. The enforcement in 1856 of the provisions of the French Convention Act, which applied to Beaumaris though not to Ireland, appears, by closing the month of May, to have dealt a serious blow to this trade.* At what period the Irish close season became really effective is not clear, but it seems to have been observed in the forties, while in previous years the fishery was regulated by an unofficial close time of September to January, during which the "home beds" were left unmolested.

The year 1856 may be taken to approximately mark the inception of the experiments in oyster culture which have resulted in the complete rehabilitation of the French and Dutch oyster trades. In 1859 it is reported that "nearly all the public natural beds" in Ireland had "been worked out by over-dredging and improvident neglect in not restoring the unsizable oysters to the banks": but this statement was of a general application, and not apparently intended to refer specially to the east coast grounds, which certainly remained productive for some years longer; though we shall find in the returns ample

* Mention is made, however, of buyers of Arklow Oysters at Beaumaris as late as 1880.

evidence that the output was much in excess of their recuperative power. That these beds were already suffering seems to be indicated by an application from the local fishermen "to prevent the improvident dredging of oysters by limiting the number of boats." Such an administrative measure, however beneficial its probable effect to the public not less than to the individuals whom it might favour, being in the nature of an infringement of public rights, has never been within the powers of the Fishery Authority nor, perhaps, of Parliament.

In 1862 is reported a general scarcity of large deep-water oysters, for which there appears to have been a good demand. Indeed, even in high-grade oysters, a large size and coarse shell seems to have been no disadvantage, so long as the fish was good. For several years it is probable that French buyers had been operating at Arklow, in part, at least, on behalf of the Imperial Government, which was then expending considerable sums on restocking the public beds, and in providing breeding stock for the cultural experiments, from which has resulted the present seed-industry of Auray and Arcachon. Dutch buyers receive little mention in the reports, but are well remembered by old fishermen of Arklow, and seem to have taken a lot of oysters away for restocking purposes. Boats from England and Jersey seem to have been taking a share in the fishery for some years.

In 1863 we are for the first time able to deal with actual figures of the catch, or rather of the number of barrels sold at Arklow. The returns—furnished by Mr. P. Maher, harbour master at Arklow from 1863 to 1869—are not complete, as in some cases only the catch of the spring fishing is given.

The total for 1863 is 58,165 barrels, value £12,281, average price 4s. 3d. Of these 44,500 barrels, value £9,695, were taken by the spring fishing, 1st January to 31st May. There were despatched to the Irish coast, chiefly Dublin, 7,988 barrels; to the Welsh coast (Beaumaris?), 2,860 barrels; to France, 2,600 barrels; and to London and Kent, 20,590 barrels.

It is probable that a considerable number of the oysters taken on the eastern beds do not figure at all in these returns, since I believe the Jersey men did not land all their catch; while, as will appear below, their boats fished harder than those of the local ports. Their boats also appear, from the present recollection of Arklow, to have been larger and more efficiently equipped for dredging, and able for fishing grounds not usually accessible to the Arklow fleet. The barrel seems to have been of the same size as that now used for herring, and has been stated to me to have contained from four to six hundreds* of oysters at the period with which we are dealing. If these statements are approximately correct it is evident that the Commissioners' note in the previous year of the scarcity of large deep-water oysters was amply justified, since at present unsorted oysters from any of the Eastern grounds, cleaned and tightly packed, would not average three hundreds to the barrel. To some extent this difference would be one of shell rather than of fish, as constant dredging with the chain-ring net in use at Arklow must have the effect of checking the exuberance of shell-growth, tending

* Three to five hundreds of 126 in 1880, according to evidence given at an inquiry held that year. Four and a half hundreds is mentioned in a report from the Coast Guard in the seventies.

to produce a small deep oyster rather than the big shallow form which is now the most common on the beds. It is probable that this furnishes the interpretation of a statement made at Arklow, to the effect that when a bed is first dredged "old men," *i.e.*, very large oysters (of little market value) are first taken, and that when these have been skimmed off a smaller and better quality is found underneath them. But the history of this and other fisheries seems to show that although heavy dredging may for a time improve the quality of the oysters, it almost infallibly results in their practical extermination. There is, I think, now no means of knowing how the return for this year compares with the unrecorded catches of previous seasons, nor of forming an opinion of the extent to which the output may have been affected in different years by variation in the number of boats and dredges at work. Every succeeding season shows a decline in the catch, and since the price largely increased, it is reasonable to suppose that there was at first no great reduction in the fishing power employed. It is probable that the take of 1863 was considerably exceeded by that of previous years, as indeed was indicated by the evidence laid before the Commissioners in the succeeding year.

The total for 1864 is returned at 52,818 barrels, value £16,790, average price 6s. 4d. Of this the spring fishery contributed 34,038 barrels, value £10,829, 600 to 700 (about 5 to 6 Arklow hundreds) to the barrel.

In this year the Commissioners held an inquiry on the petition of the fishermen of Arklow, Gorey, Courtown, and Wexford. It was sought to withdraw the permission to dredge for stocking purposes during the month of May. Special protection was desired for the Arklow, Pass, Roney, Ballyvaldon, Blackwater, and Wexford beds, which are described as being at less than a mile from the shore, varying in breadth from half a mile to four miles, and extending in almost unbroken series from Wicklow Head to near the Tuskar. It seems to have been abundantly proved that the beds were seriously depleted, and it was mentioned that the "Barrack" bed (the position of which I have not been able to ascertain), though discovered only a year previously, was already dredged out. Arklow men wished the close season to be from the middle of May to the end of October, as they could occupy themselves with the herring during the autumn months; but Courtown men, who were not equipped for following the herring, wished to close the whole of May and leave the autumn months open. English buyers objected to any alteration on the ground that if the beds were not constantly dredged the quality of the oysters would deteriorate. There appears to have been considerable feeling against the Jersey men, who were alleged to fish day and night, week days and Sunday.

The Commissioners fixed the close season for all grounds between Lambay to Carnsore from 30th April to 1st October. There appears, from their report, to have been at this time a practically unlimited demand for Arklow oysters on the part of English and French buyers.

In 1865 the total fell to 23,065 barrels, value £14,936, average price about 13s. The spring season, 1st January to 30th April, yielded 15,851 barrels, value £11,319, average price 14s. 3d. These were despatched—to the Dublin beds, 2,274; to London

and Kent, 11,407; to France, 2,130 barrels. The autumn season, 2nd October to 4th November, gave 7,214 barrels, which were despatched—to Dublin, 2,050; to Clontarf, 500; to Fal-mouth, 1,994; to London and Kent, 2,670 barrels.

The decline in the catch is of course in part due to the curtailment of the open season, which at first caused some dissatisfaction; complaints, however, were dissipated by the advance in price, which averaged quite double that of the previous year. The Commissioners note a complaint received from Carlingford of the practice of relaying in the Lough oysters from the alleged poisonous water of Arklow and selling them as genuine Carlingford natives. About this period the reports contain frequent allusion to the discovery of new beds, but without detail of locality. It seems probable that these refer rather to extensions of the known productive areas of the main beds than to entirely new tracts of ground; and, taking into consideration the strength of the tide on this part of the coast and the certainty of its occasional modification in direction by wind action, it may be suspected that spat may from time to time be carried to and stock a new area, which would remain productive only for the life-time of that particular stock, its offspring not being allowed by the tide to settle on the same spot.

Allusion is also made in several reports to the supposed existence of oyster-bearing tracts in deep water, beyond the reach of the Arklow fleet of that period.

In 1866 the total was 15,790 barrels, value £8,693, average price 11s.

During this year dredging appears to have been more than usually interrupted by the weather, and although reference is made to an improvement in the harbour, it is evident that it remained in a most unsatisfactory condition for some years longer. Arklow boats found employment in May in working for the Wicklow copper mines. The number of boats engaged in dredging is stated to have greatly increased, but no comparative figures are forthcoming.

In 1867 the total was 25,924 barrels, value £13,001, average price 10s. Of this the autumn fishing, from 1st to 24th October, and from 10th to 21st December, yielded 9,160 barrels, value £4,050, average price 10s. 6d.

The number of boats dredging is stated to have been 200, and the bulk of their catch came from two new beds off Arklow, the name of which is not mentioned. The Commissioners permitted dredging for stocking purposes during the first half of May, but commenced to take steps to extend the operation of the close season beyond the exclusive limits of Ireland.

In 1868 the total was 30,628 barrels, value £19,440, average price about 12s. 9d.

The spring season, from 27th January to 15th May, yielded 21,644 barrels, value £13,601, average price 12s. 6 $\frac{3}{4}$ d. Of these were despatched—to Dublin, Sutton, and Clontarf, 12,334; Carlingford, 250; Beaumaris, 240; London and Kent, 8,110; and to Holland, 710 barrels.

The autumn season, from 1st September to 17th October, gave 8,984 barrels, value £5,839, average price 13s. Of these were despatched—to Dublin and Dublin Bay, 4,884; and to London and Kent, 4,100 barrels.

The Commissioners withdrew the permission to dredge during the first half of May, but permitted dredging in September. The

fishing was indifferent so long as the boats were confined by weather to the old beds, but improved when the new grounds became accessible.

1869 is the last year in which a special report was received from Mr. Maher, and it is incomplete. The spring season, from the 6th January to 30th April, yielded 13,702 barrels, value £12,148, average price 17s. 9d.; 5,854 barrels were despatched to Dublin, Clontarf, and Sutton; and 7,848 to London and Kent. About 106 to 108 boats were engaged in the fishery. Subsequent reports contain no mention of the disposal of the oysters, so that it ceases to be possible to ascertain what foreign buyers were operating, nor is it certain during what period the local fleet was augmented by boats from Jersey and elsewhere. I have heard, however, from an old fisherman, that French and Dutch,* as well as English buyers, were at Arklow in 1869. Supposing the preceding returns to be approximately correct, it is evident that some additional allowance should be made for home consumption, and, perhaps, as I have noted above, for oysters taken by Jersey boats to their own ports.

In 1869 an Order in Council prohibited dredging within twenty miles of a line drawn from Lambay to Carnsore Point between 30th April and 1st September, the inshore beds having been similarly dealt with by the close season order of the previous year. There is no evidence that the greater part of this area was ever fished or positively known to be worth fishing, but the very serious depletion of the known grounds appears to have been universally acknowledged. In 1870 the price per barrel was 15s. to 20s., the fishery being noted as declining.

In 1871 the price was from 13s. to 18s., the take being less than that of the previous year. An oyster company was formed, but of its subsequent fate I have no information. It is evident that in this year defective harbour accommodation interfered with all branches of fishing.

In 1872 the catch was returned at 16,000 barrels, price 16s. to 20s.

The fishery was not improving, and no recent discovery of new beds was reported. During the next few years the reports are not of an encouraging nature. Some private beds acquired under license remained neglected, and indeed the conformation of the coast and the small rise and fall of tide offer little promise to this form of enterprise.

In 1873 the catch was 13,640 barrels, value £13,000, price 16s. to 22s. In 1874, 7,520 barrels, value £7,236, price 18s. to 24s. 6d. The number of boats dredging is stated to have varied from 12 to 240.

24s. 6d. per barrel is the highest price mentioned in the official reports during the course of the fishery, but the statements of old fishermen mention higher prices. Thus in 1865 the average price given in official returns is 13s., but I have heard it stated that as early as February in this year the price reached 20s., and became 24s. later in the year, touching 29s. on one occasion. The same price is said to have been paid in 1869, the average price given in the official return being 17s. 9d. The earnings during this period are said to have been from £2 to £5 per week per man, and, allowing for reduction from gross to nett, with some margin for lapse of memory, it is evident that in the late sixties the fishery was a fair means of subsistence.

* Dutch buyers ceased operating in Scotland in 1871.

In 1875 the catch was 9,622 barrels, value £9,426, average price 19s. 7d.

In this year reports as to the existence of new grounds off-shore "at a greater distance from land than those frequented by the "dredgers" caused the Inspectors of Fisheries (who succeeded the Inspecting Commissioners in 1870) to obtain "the use of H.M.S. "Goshawk" for the purpose of making investigations." They "provided suitable dredging apparatus, and sent an experienced "dredgerman on board to conduct the operations. The result of "the investigations, carefully carried out by the commander, was "such as to satisfy" the Inspectors "that no amount of oysters," "worth the trouble of dredging for, existed at the place indicated." "Some investigations carried on more northward met with a similar result." The grounds explored comprised the neighbourhood of the Kish Bank, whence an employé of the Lights authorities seems to have carried a tale of oysters to the ears of Arklow. The gunboat also dredged outside the banks from Dublin to Blackwater, and northwards along the coast as far as Belfast Lough. A new ground was reported this year off the Blackwater.

In 1876 the value of the catch is returned as less than £7,000. Some spat was imported during this year, but it all died. Reference is made in this and in succeeding years to the observation of spat on the beds, the reports being generally unfavourable.

In the period from 1877 to 1881 the catch shows a gradual decline, 8,706 to 2,609 barrels, the value from £8,706 to £4,313, the average price fluctuating between 13s. and 20s.

In 1883 the output was 765 barrels, value £863, average price 22s. 7d. In 1887, the next year for which a return is available, the output was 526 barrels, value £313, average price 12s. The output rose to 1,040 barrels in 1888, but the average price fell to 10s. 8d., the value being £550. The takes in 1891 and 1892 are not given, but as the values are returned at £1,029 and £1,100 respectively, the output must have shown a considerable revival.

In subsequent returns the oysters are given in hundreds instead of barrels, and these returns include all oysters taken within the Wicklow Coastguard, whereas the previous reports referred only to Arklow (and Courtown, since Courtown boats landed their oysters for sale at Arklow). A comparison is therefore impossible, but the decadence of the industry is shown by the fall from 13,032 hundreds in 1894 to 898 hundreds in 1899, the price quoted in the latter year being 3s. 3d. per hundred. At 20s. per barrel of 4½ hundreds, the price would be about 4s. 6d. per hundred, which would seem to be about the average price in the prosperous years of the industry.

In 1879 Arklow men petitioned for an extension of the open season, to enable dredging to be carried on in fine weather on supposed productive ground further to seaward than the beds which were worked at that period. H.M.S. cutter "King George" was sent to Arklow to superintend dredging experiments, which were carried on for three days by one boat in water from 14 to 30 fathoms, with the following result:—

4th September,	6 dredges,	369 oysters.
15th ,,	8 ,,	1,052 ,,
16th ,,	8 ,,	701 ,,

All the oysters are described as fine, but no small ones or spat were found. The ground explored was between the South Arklow and Blackwater Lights, and shorewards to the neighbourhood of Glasgorman Bank.

"The experiments proved that oysters are to be found outside" "the grounds usually fished, but whether in sufficient numbers to" "prove remunerative to fishermen at such a distance from the" "shore, would appear to be questionable." The Inspectors doubted whether the inshore beds could be adequately protected if the seaward beds were opened during May. In the end they refused to extend the open season, and made a by-law prohibiting the removal of oysters of less than two inches from the beds between Wicklow Head and Raven Head.

In 1882 reference is made by the Inspectors to the decline of the fishery, which is ascribed to over-dredging and to the failure of spat for many years.

In the old days we hear of a boat catching thirty and even seventy barrels in twenty-four hours' fishing, and, even if we are inclined to regard these statements with some little doubt, it is evident that before the "eighties" the supply must have so far diminished that the maintenance of price was no real compensation to the fisherman. It is equally evident that the demand continued fair for some time during the decline of the industry, but as the price was not enhanced in face of the diminished supply, it may be taken that the demand was slackening. That the hardship entailed by shortage of supply was not of an immediately pressing nature is to some extent accounted for by the discovery, as one may term it, of the spring mackerel fishery, to which the energies of Arklow began to be diverted in the year 1872, and which, in the course of the next ten years, became a regular industry for Arklow boats. To prosecute this new industry, a fleet of powerful boats was equipped at Arklow, largely by means of loans administered by the Fishery Office—which loans, it may be added, were, with very few exceptions, punctually repaid.*

* Complaints which have been made in public of harsh treatment by the Office of Irish Fisheries of Arklow fishermen who obtained boats by loan, seem to be effectually disposed of by the following statement of facts, which relate to the only boats taken from the borrowers:—

Boat—	"True Light."	"Two Brothers."	"St. Peter."
Amount of Loan,	£500.	£500.	£500.
Repayable in,	8 years.	8 years.	8 years.
Half-yearly instalment, ...	£34 17s. 4d.	£34 17s. 4d.	£34 17s. 4d.
Expiring,	November, '96.	November, '96.	March '97.
Sold in,	June, '95.	January, '96.	January '96.
For,	£275.	£300.	£300.
At a loss of,	£58 3s. 7d.	£70 7s. 4d.	£105 4s. 8d.
Last payment made before sale. }	July, '93.	December, '93.	July, '93.
Total repaid,	£209.	£176.	£139.

Now, whatever be the reason, the spring mackerel fishery has become uncertain, and has proved of recent years a speculation of most doubtful value. Arklow men, in distinction to most other Irish fishermen, have nothing to look to except the sea, and their attempts to face the situation by deep-sea trawling appear to have been frustrated by difficulties which are likely to remain unsurmountable. It is natural, therefore, that they should look to the oyster trade as a possible resource, but the circumstances have so far changed that it may be doubted whether their hopes are at all likely to be realised. Supposing even that the beds had completely recovered after the comparative immunity which they have enjoyed for a number of years—a supposition which, with all due deference to the opinion of Arklow, I think is not justified by the facts; we have still to face a condition of demand entirely different from that which formerly prevailed.

Price alone does not furnish an exact guide to the market, since prices do not exactly follow the demand, but are to some extent guided by the cost of production. The price at present obtainable for Arklow oysters seems to vary from about 2s. 6d. to about 4s. 6d. (or a little more), per hundred on the quay, and is thus not much, if at all, less than in the days when the fishery flourished. But the few buyers now operating are only able to handle a very limited output for local consumption, and outside buyers show no disposition to deal. The typhoid scare of 1895 had a most disastrous effect upon the oyster demand generally, and injured the product of absolutely safe beds not materially less than those upon which suspicion might with some show of reason rest.* The partial recovery which was noticeable in the last few years is again threatened by a recent outbreak of typhoid, supposed to be traceable to an oyster-laying in the South of England.

But supposing the demand revive, as we may reasonably hope it will, Arklow oysters have now to face competition absolutely unknown in the great days of the industry. At that time the Continental beds appear to have been almost completely exhausted, and so far from contributing anything to the London market, France† and Holland were importing Irish oysters not only for providing parent stock for their home beds, but for immediate sale for consumption. I do not know that Arklow oysters were much employed for the latter purpose, but at least one brand of Irish native, now hardly cultivated, seems to have had a great reputation in Paris. The English beds, as one may judge from the Report of the Irish Oyster Commission, 1871, and from contemporary literature generally, were not well stocked; and, as we have seen, English merchants were among the largest buyers at Arklow. Now, thanks to the success of cultural work, impossible in the case of deep-sea beds like those with which we are now dealing, France can supply the British market with an apparently unlimited number of brood and oysters suitable for relaying, as well as oysters fit for immediate consumption. The latter have averaged about 5s. per hundred since their first introduction to the London market. The price of the most expensive grades of the brood is only about 15s. 6d. per thou-

* *cf.* the average price of English natives—1891 to 1896, 20s. per 100; 1897 to 1903, 17s. per 100.

† Consignments were received from France as early as 1866, but the amount, prior to 1872, was inconsiderable.

sand (of 1,050),* the cost of transport being inconsiderable when large quantities are handled. French oysters, relaid on English beds until fit for consumption, can be sold wholesale at Billingsgate as low as 4s. per hundred, the average price being, I believe, about 6s. Holland, formerly a customer of Arklow, can supply oysters for relaying at about 28s. per thousand, apparently in any quantity, while the largest cultivated class, fit for table, make 6s. 6d. to 9s. per hundred.† Falmouth, whither went, as we have seen above, at least one large consignment from Arklow, makes now a large output for relaying at 13s. per thousand, and the various natural beds about the mouth of the Thames appear now to produce sufficient stock to admit of the sale of brood at very low prices.

To turn to Ireland, the Tralee public bed now produces a few million oysters per annum, the price paid to the dredgers not exceeding 1s. 6d. per hundred, a considerable proportion being fit for immediate consumption. The price, to the dredger, of Carlingford natives, which have a high table repute, fell to 3s. 6d. last season, and the Clarenbridge output this year sold at 4s. 6d. The Cork dredgers, who have a large market close at hand, get about 4s. per hundred, and here and there along the coast, where there is the remnant of a natural inshore bed, the dredgers and pickers are able to dispose of their small catches locally at a fair price.

Now, all the classes of which I have made mention are either immediately marketable for table purposes or of a quality to make high-grade oysters after relaying on a fattening bed, yet the best of them, which find their way to Billingsgate as Irish natives, have recently been quoted wholesale as low as 6s. to 7s. per hundred.‡ Arklow oysters, however, are of a different class, a very considerable proportion of the catch being at present too large for any but cooking purposes, while of the smaller ones many are very poorly fished in comparison to the size of shell. The classes which most nearly resemble them, and with which they would come into competition in the London market, are, as I am informed, the ordinary North Sea common oyster (Deep Seas), Mumbles oysters, Capes (or large oysters caught on the French side of the Channel), and Boston oysters.§ These are all used for sauce, except in a few shops where they are used as large seconds. The market price of all these oysters for the last few years has been 3s. 6d. to 6s. per hundred, but a few extra good make 8s. Americans, first imported to England about 1875, and first mentioned as relaid in Ireland in 1888, must be considered as most formidable competitors with any coarse native oyster. Even after relaying they have been quoted as low as 3s. 6d.

* Viz. Arcachons, 35 to 36 kilo. per 1,050. Aurays, yearling brood, cost 4s. 8d. per 1,050.

† Nearly five millions were sent from Holland to England alone in 1894. They first came into the London market, as I am informed, in 1875-6, fetching up to 18s. per hundred. A high price was maintained until about 1900, after which a temporary deterioration in their quality and an improvement in the supply of English natives combined to materially reduce the price, which has been known to fall as low as 2s. 6d. per hundred. From 1896 to 1901 the importations have averaged 356 cwt. a year.

‡ It goes without saying that much larger prices are got by direct supply to the consumer or caterer, but I think it is a question whether there could be established a connection of this kind sufficiently extensive to be of much importance to a very large fishery.

§ Deep-sea Dutch oysters, from the Terschelling grounds were first brought to the London market about 1880, but I understand not many are now received there.

per hundred. Of late years the annual importation has averaged about 84 millions, a number which was largely exceeded previous to the 1895 scare. For soup and cooking purposes generally oysters have not of late been in much demand, and for such a market the large Arklows would have to face the competition of Portuguese (imported since 1881 in large numbers—about 20 millions a year of late), at 2s. 6d. to 3s., or less, as well as of the kinds already mentioned and of Americans.

Though, as I have already mentioned, the quality of the Arklows might possibly be improved by constant dredging, if the supply held out long enough to make continued work profitable, it does not seem probable that the present state of the "commons," etc., which have been well dredged for a considerable period, would be surpassed; and from all the facts of the market known to us, I doubt if unsorted Arklows would command a higher price. Relaid on beds which proved to suit them, it is possible that their price would suffer from the coarse appearance of the shell, and against whatever might be the increment in saleable value must be placed the rent of beds, cost of transport and cultivation, and loss from mortality. These expenses would of course be lessened if the work were carried out on the co-operative principle proposed by the Arklow men, but must still be reckoned as not inconsiderable.

I have found by experiment on various beds on the West coast of this country that Arklow oysters are capable of acquiring the distinctive flavour of a good bed and of making a very fair fish, and it is probable that they would do better still in some of the rich estuarine beds which I have not had an opportunity of testing. There is, however, a complaint from the London market that Arklow oysters arrive weak; because, in the ordinary course of the trade, they have hitherto been sent in bags and have got dry in transit. Samples which we have sent, properly packed in barrels, to the English markets, are reported to have arrived in excellent condition; but, as the expense of returning empty barrels is considerable, the cost of the barrel, as well as the freight, must be deducted from the profits of the consigner. Even with all possible precautions of packing and rapid transit, I have found the larger oysters of consignments particularly liable to mortality soon after arrival, if relaid for fattening. It is probable that this might to a large extent be obviated were it possible to adopt the French system of "education," under which oysters destined for considerable journeys are believed to learn to close their shells tightly by gradual exposure on different levels of the foreshore from near low-water mark upwards. Certainly oysters so treated arrive very strong, but the contamination of the river Ovoca renders the adoption of this principle impracticable at Arklow itself, while the nature of the coast does not offer facilities in the immediate neighbourhood. It might be done at Courtown, but that port would not suit the big Arklow smacks. The difficulty might be got over by a frequent cutter-service to store or relaying beds, but unless there is a full cargo for the cutter every day or few days, the extra expense would not seem likely to be compensated by the improved vitality of the oysters. Moreover, as there seems to be little demand for these very large oysters, it would seem better to return them to the beds to spat than to spend money on "educating" them. Oysters of medium size, properly, *i.e.*, very tightly packed, deep shell down, in barrels or boxes seem to travel well enough without "education."

In the case of a direct supply to market a difficulty is likely to arise as to the size of oysters and their condition. Merchants appear most unwilling to take unsorted lots, including an unknown number which are too large to be of much use, coarse or sponged, or "clods," *i.e.*, adorned with a mass of "mums" (*Sabellaria alveolata*), often much exceeding the weight of the oyster. On the other hand the fishermen, as I am given to understand, object to sorting; and this objection, while tending to unduly reduce the price in any sort of transaction, might prove an entire bar to any dealings with those relayers who handle only table oysters of moderate size. It appears that there is a demand from this class of customer for direct deep-sea oysters of medium size, though it is not certain that the price would be satisfactory to the dredgers.

I have been told by Arklow fishermen that they do not consider it would be worth their while to dredge for less than 4s. 6d. per hundred unsorted; and the aspirations of Courtown are about the same, though it seems that something in the nature of a contract to take all oysters delivered is there more desired than a rise on recent prices.

It is, however, to be feared that the facts as to competition and price, as put forward above, are not calculated to lead to the belief that so high an average price would be obtainable unless the market materially improve or foreign supplies slacken. Small consignments which we have sent to the London and Liverpool markets have not, in all cases, even paid the expenses of carriage and barrels. Larger consignments would, *pro rata* to the number of oysters, show a less heavy charge for these items; but the market is at present very shy, and whenever it recovers there must surely be a large accumulation of higher grade oysters to be worked off at a comparatively low figure, with a result prejudicial to Arklows, even if relaid on an English fattening bed.

It is obvious that if a boat could now take thirty barrels (say 120 hundreds), as alleged in the old days, there would be a fair living even at 1s. per hundred, making allowance for weather and the close season. I cannot convince myself that such a take is approximately possible even on the Ballyvaldon bed; much less that the beds as a whole are capable of furnishing a continued supply to such a fishery as would be entailed by diverting to dredging the fleet which is now occupied with mackerel in the spring and herring in the autumn. We know the effect that a large dredging fleet had in the past on a supply which I believe to have been incalculably greater than that which now exists; and though the Inspectors, in a report to which attention is drawn above, considered that the decline was in part due to failure of spatting for many years, it appears that such failure is a necessary consequence of over-dredging. The amount of spat occurring on any fishery seems to be in direct proportion to the amount of parent oysters, and, although even on poorly-stocked grounds exceptionally favourable circumstances of weather may at rare intervals allow a considerable fall of spat, it is only in those places in Europe where the natural bulk of spawning oysters is maintained that heavy spatting is a feature of regular occurrence.* Moreover, while within certain limits dredg-

* *cf.* Bashford Dean, Bull, U. S. Fish. Comm. XI., for 1891, 1893, p. 402; also for an exhaustive account of the circumstances which led to the extinction of the Firth of Forth fishery—Fulton, 14th Ann. Rep. Fish. Bd. Scot., 1893, Pt. III., p. 243.

ing is without doubt beneficial to some beds (though, probably, not to all), if carried to excess it may result in such an alteration of the bottom as to favour the irruption of sand and lessen the productive area. Whether some such cause has resulted in the present barren (though clean) condition of some East coast grounds, once well stocked and long unmolested by man, is a matter upon which I cannot offer an opinion.

In concluding this section of the Report I must express to Mr. J. Wrench Towse, Secretary to the Worshipful Company of Fishmongers of London, my indebtedness for much of the information as to imports and prices in the London Market which I have incorporated above. I have also to thank Mr. George Tabor, of Billingsgate Market, for similar assistance.

iii.—SURVEY OF BEDS.

ARRANGEMENT OF RECORDS.

The positions were fixed in the usual way by cross-bearings at the beginning and end of each haul, but are indicated below by the bearings and distance of the nearest convenient object on the chart, and by the direction and length in miles and cables of the haul.

Although for the purpose of this report the hauls have been grouped in sections according to their locality, they are numbered as in my manuscript records, to avoid confusion with future work. I propose when the ground has been surveyed in greater detail to prepare for publication a chart on which each haul will be marked.

In the case of most of the hauls a note was made of every kind of animal brought up by the dredges, but at present reference will only be made to those animals which, for the reasons set forth below, seem to be of importance in connection with the oyster fishery.

The common starfish, cross-fish or five fingers (*Asterias rubens*) is a notorious destroyer of oysters, which it has the power of opening by a continuous strain applied by means of the suckers on the underside of its "arms" upon the two valves of the shell, subsequently devouring the "fish" by protruding its stomach between the valves. That a starfish can exert sufficient force to open a perfectly healthy full-grown oyster seems to me doubtful, but I have dredged on these grounds full-sized oysters which bore in the semi-macerated condition of the "fish" evident signs of having been so opened. Oysters for re-stocking or relaying, arriving weak after a long voyage, appear to be an easy prey to starfish, and though the latter can certainly open small oysters even when healthy, it would seem probable from the company in which they were mostly found on the eastern grounds that starfish there prey chiefly on beard mussels (*Mytilus barbatus*) and a small bivalve (*Nucula nucleus*), resembling a cockle in shape but smooth and dark brown externally. The latter seemed to be everywhere plentiful in coarse sand or gravel, but was seldom seen unless one of the heavy dredges brought up a load of soil.

Certainly we found starfish in much greater numbers on barren ground, such as the Point beds, than at Ballyvaldon, though a good many oysters there were opened by starfish.

Beard mussels, besides nourishing a crop of starfish, and so endangering the welfare of oyster spat which might settle in their vicinity, are probably inimical to the beds owing to the dense masses which they tend to form there, favouring the settlement of silt and mud on ground otherwise suitable to oysters. In regard to common mussels, very scarce on deep-sea beds but frequently abundant in estuaries, I have known it to be asserted that starfish, by keeping down these mussels, compensate for any depredations which they make on the oysters themselves.

Sun-stars, animals like starfish, but having about thirteen instead of five arms, are not known to attack oysters, but, on the contrary, devour starfish and whelks.

Whelks (*Buccinum undatum*) are reckoned among the enemies of the oyster, being able to bore through its shell.

Almond-whelks, queen-whelks or smooth whelks (*Fusus antiquus*), distinguished from common whelks by having a smooth instead of a corrugated shell, have a ribbon-saw of teeth not very dissimilar from that of the common whelk, but as they appear to attain their greatest size on grounds where there are no oysters and apparently few bivalve shell-fish of any sort, I think it is improbable that they can be regarded as enemies of the oyster. I have nevertheless noted their occurrence in the records which follow.

Borers (*Murex erinaceus*), small whelk-like animals, with strongly marked knobbed ridges on the shell, are perhaps the most deadly foes of young oysters on the inshore grounds, where they are chiefly found. They appear, however, to be rare on the beds with which we are now dealing, but, being small, might often pass through the chain-net of the dredge and so escape detection.

Crabs of several kinds occur on the eastern beds, but none, I think, are of much importance in this connection. The shore-crab, so common between tide marks, is a serious enemy of young oysters, but is not found on the grounds with which we are dealing. Hermit-crabs or "peely-men"* (*Eupagurus bernhardus*) are, so far as I know, harmless.

The honey-comb-like masses of sand, called "mums" by the fishermen of this coast, are built by colonies of worms (*Sabellaria alveolata*), and are detrimental to a bed in two ways. In places where the worms find a suitable home they appear to cover with their architectural efforts every spot suitable for the settlement of oyster spat, and very probably choke any old oyster that may be there. On some other grounds, where they do not settle in great quantity on anything else, mums choose for the foundation of their house the deep shell of a living oyster, and upon it raise such an edifice of sand that the shape of the whole may be practically a hemisphere. An oyster so "mummed" is known as a "clod,"† and though it does not appear to suffer from its burden, it has little market value until cleaned,—a somewhat laborious occupation. The boring sponge (*Cliona*) honey-combs and disintegrates

* Arklow.

† On the West Coast I have found the word "clod" in use for an old oyster with very thick shell, such as seems to be known at Arklow as an "old man." In this report "clod" is only used to denote a heavily mummed oyster,

the shell, rendering the oyster so unsightly as to be only marketable for cooking purposes. A worm (*Serpula*) forms a hard white curved tube on stones, shells, and other objects, and sometimes encrusts the shell of a living oyster almost to the same extent as mums. Such encrustation is very heavy and very difficult to get off, but a few of these tubes are not of importance. Their presence on dead oyster shells seems to be looked upon as a good sign of a ground, whereas old worn clean shells are held to denote that the ground is not presently suitable for living oysters.

Sea squirts (*Ciona intestinalis*) in moderate numbers are also held to denote good ground, but cause some trouble in removal from oysters destined for market.

Crows, saddle-backs, miesalauns, arigalauns, or howsoever known (*Anomia ephippium*), I have not noted below as they occur everywhere, and are not, that I know of, harmful, except for the trouble involved by their removal from the oyster. If left on, they die very quickly, and, by putrefaction, injuriously affect oysters raised or dumped for market.

LIST OF HAULS.

N.B.—“Dredge” means a dredge of ordinary Arklow pattern. “Large dredges” refer to dredges specially made for us at Arklow on the recommendation of experienced fishermen for deep-water work. They are about five feet, three inches on the sword, and very heavy.

INSHORE BEDS.

SECTION 1.

MIZZEN HEAD.

Station 1.—1·35 mi. S. by W. of Wolf Rock. Towing N.N.E.
 $\frac{1}{4}$ E. 1·1 mi.

2 dredges, Oysters, 1.

A rough ground, as indicated by the quantity of stones in the dredges. Old oyster shells present in moderate number. Starfish and sun-stars fairly plentiful, the former probably feeding chiefly on beard mussels, which appeared, from the fair number of living examples and great quantity of empty shells, to have been plentiful. Whelks numerous, but small. The result of the haul is confirmatory of the opinion expressed by Arklow men that the region is too rough for dredging, and as there was no indication of a good supply of oysters it was not further explored.

Station 2.—0·8 mi. S.E. by E. of Mizzen Head. Towing N.N.E.
 $\frac{1}{4}$ E. 1 mi.

2 dredges, Oysters, 9.

Stones, shells, and stiff muddy sand. Many old oyster shells. Several starfish, many beard mussels, a fair quantity of small whelks and of almond whelks.

Station 3.—In continuation of Station 2. Towing in same direction 1 mi.

1 dredge, Oysters, 25.

Stones and a large quantity of mums, but my notes give no indication that the oysters were "clods" (*i.e.*, encrusted with mums). Oyster shells numerous, both old and recently emptied. Only two starfish; several sun-stars; not many beard mussels.

Two dredges were shot here, but one came fast as soon as shot, and was lost.

Station 121.—0·9 mi. E. $\frac{1}{2}$ N. of Mizzen Head. Towing N.E. by N. $\frac{1}{2}$ N. about 0·7 mi. 10 $\frac{1}{2}$ fath.

3 dredges, Oysters, 21.

A few stones, many oyster shells, one starfish, one sun-star, two bunches of beard mussels.

Station 122.—0·6 mi. E. $\frac{1}{4}$ S. of Mizzen Tower. Towing N.E. by E. $\frac{1}{2}$ N. about 0·6 mi. 10 $\frac{1}{2}$ fath.

3 dredges, Oysters, 31.

Starfish fairly plentiful, several sun-stars. No "mums" in this and preceding haul.

Station 4.—2·1 mi. S.E. by S. $\frac{3}{4}$ S. of Mizzen Head. Towing W.N.W. $\frac{1}{2}$ W. 1·7 mi.

2 dredges, Oysters, 25.

A few stones, and many oyster shells. A few sun-stars, small whelks, almond whelks, and beard mussels.

Station 5.—1·7 mi. S.S.W. $\frac{1}{4}$ S. of Mizzen Head. Towing N. $\frac{3}{4}$ W. 1·6 mi.

2 dredges, Oysters, 17.

Much the same as Station 4 in regard to the bottom, and refuse catch, but a few starfish also present.

Station 6.—2 mi. S.S.W. $\frac{1}{4}$ S. of Mizzen Head. Towing N.W. by N. 1·6 mi.

2 dredges, Oysters, 2.

A great quantity of mums, and comparatively few oyster shells. Beard mussel shells fairly plentiful, but no living mussels. Whelks and almond whelks fairly plentiful.

Station 50.—1·7 mi. E.S.E. of Mizzen Head. Towing N.W.
 $\frac{3}{4}$ N. 1·5 mi., 9 to 11 fath.

1 dredge,	Oysters, 2.
1 large single dredge,	Oysters, 19.

A few stones. Starfish very numerous; sun-stars fairly plentiful; many beard mussels; a few whelks and almond whelks.

Three other dredges shot on this haul did not appear to have been fishing properly.

Station 51.—3·2 mi. S.S.W. $\frac{3}{4}$ W. of Mizzen Head. Towing S.E.
 by S. 1·8 mi., 13 $\frac{1}{2}$ to 13 fath.

1 dredge,	} Oysters, 1.
1 large single dredge,	

A few stones and two lumps of mums. The greater part of the ground covered was evidently sandy and unsuitable for oysters.

I consider that oysters are present in some number in isolated patches within a circular area about 2·4 mi. in diameter, of which the centre is about 1·4 mi. E. by S. $\frac{1}{4}$ S. of Mizzen Head, but it is evident that even within this area they are not widely distributed in quantities. The ground is rather full of hitches, to avoid which, according to our pilot, James Craan, it is necessary to keep Arklow chimney outside Mizzen Head; but a good number of oysters (*cf.* Stations 3, 121, 122) seem to be on the inner part. Indeed the ground known as "Jack's Hole," which has been worked by Arklow boats in 1902 with considerable success, seems to extend quite close into the shore. Fifty oysters per dredge in an hour's work has been mentioned to me as a fair catch on this ground, which lies from $\frac{1}{2}$ mi. to 1 mi. N.E. of Mizzen Head, and extends along the coast about half-way to Jack's Hole.

In saleable quality the oysters compare well with the average of any ground further south. They are mostly clean and fairly regular in shell, though a good many are old and thick, and perforation by sponge is not infrequent. In the best examples, ranging from about 3 $\frac{1}{2}$ to 4 $\frac{1}{4}$ inches across the shell, the weight of the fish averages 14·36 gr., that of the shell 160 grammes.

I found no indication in 1901 that the beds were in process of maintaining their stock, as the smallest oysters which we got, even with a fine mesh net in the dredge, were probably not less than three years old. To some extent this may be due to want of dredging having permitted accumulation over much of the area of beard mussels, which seem to support a large stock of starfish. There were a few very young oysters among those taken by Mr. Farran at Stations 121 and 122 early this year,

SECTION 2.

ARKLOW BAY.

Station 82.—0.7 mi. S. by W. $\frac{3}{4}$ W. of Ennereilly River. Towing S.W. by S. 1 mi., $7\frac{1}{4}$ fath.

2 dredges, Oysters, 33.

There is no record of the nature of the bottom in this haul, which was made by Captain Macauley.

Station 7.—1 mi. S. $\frac{1}{2}$ E. of Redcross River. Towing S.W. by S. 1.2 mi., 8 fath

2 dredges, Oysters, 7.

Some stones and many oyster shells. A few sun-stars, several beard mussels and almond whelks. Whelks fairly plentiful. One borer (dead shell only). Several of the oysters were "clods" (*i.e.*, encrusted with mums), but there was no other appearance of mums on the ground.

Station 8.—In continuation of Station 7. Towing S.W. $\frac{1}{4}$ W. 1.1 mi., 8 fath.

2 dredges, Oysters, 10.

Ground much the same as last. The larger oysters were "clods."

Station 12.—1.1 mi. S.E. $\frac{1}{2}$ E. of Arklow Pier. Towing N.N.E. $\frac{1}{2}$ E. 1.3 mi., 7 to 9 fath.

2 dredges, Oysters, 4.

Many stones and a little dark blueish clay. Many oyster shells. Several starfish, a few sun-stars; whelks and almond whelks fairly plentiful.

Station 13.—1.2 mi. S.E. $\frac{1}{2}$ S. of Ballymoney River. Towing N.E. $\frac{1}{2}$ N. 1.5 mi., 8 to 9 fath.

2 dredges, Oysters, 23.

Many stones. Starfish fairly plentiful; several sun-stars, etc., as in last haul.

Station 83.—1.9 mi. S. $\frac{1}{4}$ E. of Ennereilly River. Towing S.W. by S. 1 mi., 9 fath. (?).

2 dredges, Oysters, 0.

Sand, shells, and stones on lead.

Station 11.—1·6 mi. S.E. $\frac{1}{2}$ S. of Arklow Head. Towing N.
 $\frac{3}{4}$ W. 1 mi., 8 to 10 fath.

2 dredges, Oysters, 0.

Sandy ground, with a few stones and some oyster shells. Several whelks.

Station 15.—In continuation of Station 14. Towing S.W. $\frac{3}{4}$ S.
1·2 mi., 9 fath.

4 dredges, Oysters, 0.

Many stones and oyster shells. Several starfish. Whelks fairly plentiful, large. A few lumps of mums.

Station 14.—1·3 mi. S.E. $\frac{3}{4}$ S. of Redcross River. Towing S.W.
 $\frac{3}{4}$ S. 1·5 mi., 9 fath.

3 dredges, Oysters, 0.

Many old oyster shells. One starfish and two sun-stars. One horse mussel, a few whelks, and almond whelks.

Station 9.—2·5 mi. E. by S. $\frac{3}{4}$ S. of Arklow Pier. Towing S.W.
 $\frac{1}{4}$ W. 1·6 mi., 8 to 10 fath.

2 dredges, Oysters, 1 (a clod).

Many stones, few oyster shells. Large quantity of mums. A few whelks.

Station 16.—2·9 mi. S.E. $\frac{3}{4}$ S. of Arklow Pier. Towing N.E.
 $\frac{3}{4}$ E. 1 mi., 13 to 12 fath.

4 dredges, Oysters, 0.

A sandy ground, with a few oyster shells and stones, the latter encrusted with mums.

Station 52.—3·9 mi. S.E. by E. $\frac{1}{4}$ E. of Arklow Head. Towing
N. by E. $\frac{3}{4}$ E. 2·3 mi., 14 to 11 fath.

1 large single dredge, Oysters, 0.

Ground apparently covered by mums. Many old oyster shells.

Our pilot, James Craan, selected the grounds covered by Stations 7, 8, 14, and 15, which did not prove to hold many oysters. The remaining stations I selected myself with a view to quartering all the bay. At Station 13 we found oysters in fair quantity, and I

understand that this part of the bay has since been worked, by the few small boats which now dredge, with some profit. Some hauls recently made by Mr. Farran over the same ground show a distinct improvement, but I do not consider that any part of the bay is sufficiently stocked to warrant a large fishery: though the beds show signs of recuperation, as there is a fair proportion of young oysters among the take. Seawards and to the south of Stations 12 and 13 the ground seems unsuitable, being either sandy or choked with mums. There is, however, a patch of dredging ground between Arklow and Arklow Rock (from about $1\frac{1}{2}$ mi. off shore landwards) where the Arklow boats dredge when the weather does not suit for the northern grounds, but Mr. Farran, in several hauls made recently, found very few oysters there. Northwards it does not appear that the productive ground is continued to the productive part of the Mizzen Head beds. Station 6, included in the Mizzen Head section, which comes close to Station 15 of this section, was found barren, but there may be oysters further inshore.

SECTION 3.

GLASGORMAN BEDS.

Station 20.—2 mi. E. by S. $\frac{1}{4}$ S. of Glasgorman No. 2 buoy.
Towing S.S.W. $\frac{1}{4}$ W. 1·4 mi., 18 fath.

4 dredges, Oysters, 0.

No oyster shells. Evidently fine sand, but uneven, as the dredges hitched occasionally. No stones and no animals associated with stony or gravelly ground.

Station 10.—0·8 mi. S. by E. $\frac{1}{4}$ S. of Glasgorman No. 2 buoy.
Towing S. by W. $\frac{3}{4}$ W. 0·7 mi., 14 to 17 fath.

2 dredges, Oysters, 0.

Small stones, gravel and broken shells. A few oyster shells. One borer, one almond whelk, several whelks, a few beard mussels. Many shells of the latter, and several shells of *Nucula*. My notes contain no entry of starfish.

Station 89.—2 mi. E. by N. $\frac{1}{4}$ N. of Glasgorman No. 3 buoy.
Towing N. E. $\frac{3}{4}$ N. 2·1 mi., $12\frac{1}{2}$ to 16 fath.

2 dredges, Oysters, 0.

Stones, starfish, small shells. (Record of contents of dredge incomplete)

Station 22.—1·3 mi. E.S.E. of Glasgorman No. 3 buoy. Estimated course N.E. $\frac{3}{4}$ N. 2·9 mi., 14 to 15 fath.

(A thick fog came on in the course of this haul, rendering it impossible to verify the position at the end of the haul).

3 dredges, Oysters, 42.

Small stones and shell fragments. Many oyster shells. Starfish and sun-stars fairly plentiful in first half of haul, scarcer in second half. Whelks and almond whelks fairly plentiful in first half, not noted in second half. A few beard mussels in first half, many shells in both halves. A few lumps of mums in each half of the haul, but only a few of the oysters slightly encrusted. The dredge which was last shot in second half of haul had only one or two oysters.

Station 90.—1·7 mi. S.W. by S. $\frac{1}{2}$ S. of Glasgorman No. 2 buoy. Towing N.E. $\frac{3}{4}$ N. 1·6 mi., 15 fath.

1 dredge, Oysters, 5

Starfish and whelks. (Record of contents of dredge incomplete.)

Station 88.—0·8 mi. E. by S. of Glasgorman No. 3 buoy. Towing N.E. by N. 2·3 mi., 11 to 12 fath.

2 dredges, Oysters, 2.

Stones, oyster shells, and starfish. (Record of contents of dredge incomplete.)

Station 23.—Estimated position—2·1 mi. S.S.W. $\frac{3}{4}$ W. of Glasgorman No. 2 buoy. Estimated course—S.W. $\frac{3}{4}$ S. 0·7 mi., 11 $\frac{1}{2}$ fath. (Impossible to fix position with certainty, owing to fog.)

3 dredges, Oysters, 9.

Stones, sand, many oyster shells. A few starfish; several sun-stars, and almond whelks. The two dredges first hauled had only three oysters between them.

Station 116.—2·8 mi. N.E. by N. of Glasgorman No. 3 buoy. Towing N.E. $\frac{1}{2}$ N. 1·8 mi., 9 fath.

2 dredges, Oysters, less than 9.

Oyster shells.

Station 20 is outside the ground recognised as the Glasgorman bed, and is merely one of a number of hauls made with a view of ascertaining the nature of the bottom in places as to which no information was forthcoming from our pilots. The remaining stations in this section cover at fairly close intervals the ground outside the bank between about 9 and 14 fathoms.

Station 10 was the first chosen by James Craan, and as the day was clear and marks easily visible it probably represents a site formerly productive, though now quite barren. Station 22 was also chosen by Craan, but owing to a fog which came on in the course of the haul the ground covered could only be estimated by soundings, lead of warp, tide and time. In Craan's opinion the end of the haul was "too far down among the dirt."

The oysters, though not very numerous considering the length of haul, were the finest which we found on any part of the eastern grounds. They were remarkably clean and regular in shell, and though some were very large the shell was comparatively thin. A haul nearer in to the bank than the last gave only a few oysters, and the ground proved hitchy. The remaining hauls were made by Captain Macauley at my direction, but produced little result.

I think it probable that there are a good many oysters scattered over the ground, but only in considerable quantities in isolated patches. As we found no young oysters at all, I fear the bed cannot be considered to offer much inducement to dredging on a large scale.

SECTION 4.

PASS BEDS.

Station 85.—0·5 mi. E. $\frac{1}{4}$ S. of Kilmichael Point. Towing S.W. $\frac{1}{2}$ S. 1 mi., 7 $\frac{1}{2}$ to 6 fath.

2 dredges, Oysters, 0.

Sandy. Some old oyster shells.

Station 86.—0·8 mi. S. by W. $\frac{3}{4}$ S. of Kilmichael Point. Towing S.W. $\frac{1}{4}$ W. 9 mi., 6 fath.

2 dredges, Oysters, 0.

Sandy. Some old oyster shells.

Station 87.—0·5 mi. S. by E. of Doorogue Stream. Towing 1·5 mi. S.W. $\frac{1}{4}$ W., 5 $\frac{1}{2}$ fath.

2 dredges, Oysters, 0.

Sand and shells. Some old oyster shells.

Station 47.—1·4 mi. S.W. by S. of Kilmichael Point. Towing S.W. by S. 1·6 mi., 6 $\frac{3}{4}$ fath.

5 dredges, Oysters, 16.

Stores. Many oyster shells. A few beard mussels, one almond whelk; starfish fairly plentiful; sun-stars few. Mums fairly plentiful. All the large oysters "clods." Judging from contents of dredges most of the ground worked over was sandy.

Station 48.—2·7 mi. S.S.W. of Kilmichael Point. Towing S.W.
 $\frac{1}{4}$ W. 0·6 mi., 6 fath.

5 dredges, Oysters, 2.

Stones, a few worn oyster shells. One almond whelk, two starfish, one sun-star.

Almost all the ground covered by this haul was evidently sandy.

The first three hauls enumerated above were not on the part of the ground supposed to be productive, but were made with a view to seeing how far a bottom suitable for oysters extends into the narrows between Glasgorman banks and the land. The actual bed, which lies inside the southern tails of the two banks, seems to be of rather small extent, as in two attempts Michael Wafer failed to locate it to his satisfaction.

I think some part of it is fairly stocked, but as it has the reputation of being peculiarly rich in "clods" it cannot be regarded as a bed that ought to be fished. We got on it a fair proportion of young oysters, and, if left alone, it should be valuable as a centre from which spat may be carried to neighbouring grounds. I understand that when oysters were sold by the barrel "clods" from this bed were considered useful, but in the present delicate state of the trade they would do more harm than good to the dredgers.

SECTION 5.

RONNEY.

Station 99.—1·8 mi. S. $\frac{1}{2}$ E. of Courtown Pier. Towing S. by
 W. 1 mi., 5 fath.

2 dredges, Oysters, 0.

Fine sand.

Station 108.—0·4 mi. E. by N. $\frac{1}{2}$ N. of Glasscarrig Point. Towing
 N. by E. $\frac{1}{4}$ E. 1·3 mi., 7 fath.

2 dredges, Oysters, 8.

Sand and shells.

Station 49.—0·9 mi. E.N.E. $\frac{1}{2}$ N. of Glasscarrig Point. Towing
 N. $\frac{1}{2}$, 1·5 mi., 7 to 6 fath.

3 dredges, Oysters, 31.

Some stones. Starfish fairly plentiful; sun-stars few; several whelks; some mums, but not much on oysters. Five dredges were used, but two forled, while the remainder, owing to wind against tide, did not fish very well.

Station 107.—1·1 mi. S.S.E. $\frac{1}{4}$ E. of Ballymoney Coast Guard Station. Towing S.S.W. $\frac{1}{2}$ W. 1·8 mi., 6 fath.

2 dredges, ... Oysters, 0.

Very fine sand. Nothing on it.

Station 37.—1·9 mi. E.S.E. of Courtown Pier. Towing N.E. $\frac{1}{2}$ N. 0·9 mi., 8 fath.

3 dredges, ... Oysters, 0.

A few small stones, but most of the ground sandy. Some old worn oyster shells.

Station 114.—1·2 mi. E. by N. $\frac{1}{4}$ N. of Roney Point. Towing N.N.E. $\frac{1}{4}$ E. 1·6 mi., 8 fath.

1 dredge, ... Oysters, 11.

Stones, sand and shells.

Station 110.—1·1 mi. E.N.E. $\frac{1}{4}$ N. of Roney Point. Towing N.N.E. 1·3 mi.

1 dredge, ... Oysters, 2.

Large stones.

Station 34.—2 mi. N. by E. $\frac{1}{4}$ N. of Roney Point. Towing S.S.W. $\frac{1}{2}$ W. 0·7 mi., $7\frac{1}{2}$ fath.

3 dredges, ... Oysters, 7.

Stones and old worn oyster shells. One starfish, one sun-star, one almond whelk. Mums fairly plentiful. Most of the oysters were "clods."

Station 113.—1·6 mi. E.S.E. $\frac{1}{2}$ S. of Roney Point. Towing N.N.E. $\frac{1}{4}$ E. 1·5 mi., 9 fath.

2 dredges, ... Oysters, 4.

Stones. Some starfish.

Station 111.—2·5 mi. E. by S. of Cahore Point. Towing N.N.E. $\frac{1}{2}$ E. 1·8 mi., $12\frac{1}{2}$ fath.

1 dredge, ... Oysters, 1.

The dredge full of oyster shells.

Station 35.—3 mi. E. $\frac{1}{4}$ S. of Roney Point. Towing S.S.W. $\frac{1}{2}$ W.
0·8 mi.

3 dredges, Oysters, 0.

Many stones; some large. A few oyster shells. One starfish, one sun-star; a great quantity of mums.

The real Roney bed was dredged in Station 49. According to Wafer, it had for many years been worthless, but was showing signs of recovery. This our haul to some extent confirmed, as we got a fair number of oysters (considering how badly the dredges appeared to be fishing), and they comprised a certain proportion of young ones. The "quarry," inaccessible to the "Helga," lies close inshore S. of the Roney rocks, and was said to have held a fair stock of oysters up to a few years ago, when they began to get scarce. The bed seems to have since been left alone.

Our numerous hauls outside the Roney were made in the endeavour to locate some once productive grounds, including the "Cuckoo's Nest." Although we got a few oysters here and there it does not seem probable that there is any well-stocked ground of important extent in the neighbourhood.

SECTION 6.

POINT BEDS.

Station 41.—0·4 mi. N.E. by E. of Sluices Buoy. Towing S.W.
by S. $\frac{1}{4}$ S. 0·9 mi., 8 to 9 fath.

4 dredges, Oysters, 9.

Stones. Starfish very numerous; several sun-stars, one whelk. Mums fairly plentiful, but not noticed on oysters.

Station 42.—0·8 mi. E. by N. of Sluice's Buoy. Towing S. by E.
 $\frac{1}{4}$ E. 1·3 mi., 9 fath.

5 dredges, Oysters, 91.

Stones and small gravel. Starfish fairly plentiful; a few sun-stars, one whelk. Several clusters of mums. No "clods" noted.

Station 43.—1·9 mi. S.E. by E. $\frac{1}{4}$ E. of Poulduff Pier. Towing
S.S.E. by E. 2·1 mi., 11 fath.

5 dredges, Oysters, 17.

Stones; oyster shells. Some beard mussels attached to oysters. Starfish very numerous; sun-stars few; a few whelks. Several clusters of mums, and some on oysters, but not enough to make clods.

Station 109.—0·5 mi. E. of Cahore Point. Towing N.N.E.
1·4 mi., $8\frac{1}{2}$ fath.

2 dredges, Oysters, 0.

Large stones, sand, and shells.

Station 112.—1·2 mi. E. by N. of Cahore Point. Towing N.N.E.
 $\frac{1}{4}$ E. 0·5 mi., $9\frac{1}{2}$ fath.

2 dredges, Oysters, 4.

Stones. Starfish.

The last two hauls belong perhaps rather to the grounds which I have placed in the Roney Section, but they are evidently not of much importance.

Station 42 passed through a part of the Point bed, which seems fairly well stocked, but as the 91 oysters taken included only two young, it cannot be said to be in a very satisfactory condition. An extraordinary number of starfish characterised Stations 41 and 43, which seem to have been about the margins of the bed.

SECTION 7.

COPPER BED.

Station 44.—2 mi. N.E. by N. of No. 1 Blackwater Buoy. Towing
S.S.W. $\frac{1}{4}$ W. 1·6 mi. $12\frac{3}{4}$ to 15 fath.

3 dredges, Oysters, 6.

Stones and a very large quantity of old worn shells. A few starfish and sun-stars; one almond whelk; a small quantity of mums. None of the oysters were "clods."

Station 106.—2·1 mi. N.N.W. $\frac{1}{2}$ W. of Blackwater Light. Towing
S.W. by S. 1·4 mi., 16 fath.

2 dredges, Oysters, 0.

Stones and old oyster shells.

Station 46.—1·3 mi. N. by E. of Blackwater No. 1 Buoy. Towing
S.S.W. $\frac{3}{4}$ W. 1·9 mi., 19 fath.

5 dredges, } Oysters, 0.
1 large dredge, }

A few stones, some large. Some old worn oyster shells. A few starfish. Mums fairly plentiful in first part of the haul. Most of the ground covered was evidently sandy.

These hauls were made in search of the Copper Bed, which does not seem to have been worked for a good many years, and was always of very limited extent. Of the few oysters we got most were fine shelled, but there were no young ones.

SECTION 8.

SHELL BEDS.

Station 62.—0.6 mi. W.N.W. $\frac{1}{2}$ N. of No. 1 Blackwater Buoy
Towing S.S.W. $\frac{1}{4}$ S. 0.8 mi., 7 to 3 fath.

4 dredges,	}	Oysters, 0.
1 large dredge,		

A few worn oyster shells. Nothing else in the dredge, which had evidently passed over fine sand.

Station 63.—1.2 mi. N.W. of No. 1 Blackwater Buoy. Towing
S.S.W. $\frac{1}{4}$ S. 0.4 mi. *ca.*, 8 fath.

1 dredge,	}	Oysters, 18.
1 large dredge,		

The dredges full of stones and old oyster shells encrusted with white worm tubes (*Serpula*). A few starfish, sun-stars, and whelks. Three other dredges shot here were lost.

Station 69.—1.6 mi. W.N.W. $\frac{1}{2}$ N. of No. 2 Blackwater Buoy.
Towing N.W. $\frac{3}{4}$ N. 1.5 mi., $9\frac{1}{2}$ to $9\frac{1}{4}$ fath.

1 large dredge,	Oysters, 12.
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Stones encrusted with white worm tubes, gravel, broken shells, and an immense quantity of old oyster shells. Several whelks, one borer, several starfish, one sun-star. The oysters more or less encrusted with white worm tubes; some slightly encrusted with mums.

Station 70.—6 mi. N.N.W. $\frac{1}{2}$ W. of Blackwater No. 3 Buoy
Towing N.W. $\frac{1}{2}$ N. 1.9 mi., 10 to 8 fath.

Small otter trawl (very light ground rope), Oysters, 9.

The ground fine at commencement, but rough towards end of haul. A few starfish, one sun-star, and two lumps of mums; one constructed of very coarse sand.

Station 68.—2.4 mi. S.E. $\frac{1}{4}$ S. of Tinnaberna. Towing S.W.
1.1 mi., 9 to 10 fath.

A large dredge, capsized, but with lacing open, so that it would have picked up some stones and shells had any been there. It appeared to have encountered only sand.

The Shell. Shells, or Shelly bed, as I have heard it variously called, was located by our pilot between the southern end of the Rusk and the northern end of the Blackwater Bank, but nearest to the latter.

We had not an opportunity of trying it at slack water. At other times the tide is so strong that the ground cannot be properly worked by a big vessel like the "Helga," as the ground is exceedingly rough and foul. There is smooth ground, fit for trawling, between the Shell and the Ballyvaldon beds, and, apparently, as will be seen from Station 70, a smoother part of the Shell bed extends to the edge of this.

We found some young oysters, and though we could not properly explore the bed, I think it not at all improbable that a sailing dredger might find a fair quantity of oysters in parts of it, but she would be a good deal troubled by hitches. The oysters, however, on the main part of the bed are very much encrusted with white worm tubes, which add greatly to their weight, and are practically impossible to remove.

SECTION 9.

BALLYVALDON BED.

Station 39.—0·4 mi. E.S.E. $\frac{1}{2}$ E. of Norris Castle. Towing S.W. by W. 0·6 mi., $5\frac{1}{2}$ fath.

3 dredges,	} Oysters, 73.
1 large dredge,	

Stones and fine gravel. Starfish and sun-stars fairly plentiful; several almond whelks; white worm tubes plentiful on oyster shells; a small quantity of mums, but no "clods."

Station 38.—1·05 mi. N.W. $\frac{1}{2}$ W. of No. 2 Rusk Buoy. Towing S.E. $\frac{1}{2}$ E. 5 mi., 7 fath.

4 dredges,	Oysters, 148.
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Many starfish; sun-stars fairly plentiful; a few whelks and almond whelks; white worm tubes common on oysters; mums not plentiful, and not seriously encrusting oysters.

Station 40.—0·9 mi. E. by S. $\frac{1}{2}$ S. of Tinnaberna. Towing N.N.E. $\frac{3}{4}$ E. 2·1 mi., 7 fath.

3 dredges,	Oysters, 78.
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Much the same as last; the starfish much more plentiful at the end than at the beginning of the haul.

Station 53.—1 mi. E. by S. $\frac{1}{2}$ S. of Norris Castle, 7 fath.

A large dredge was shot, but hardly moved, owing to foul wind and tide; when hauled it contained two oysters.

Station 56.—1·3 mi. E.S.E. $\frac{1}{2}$ S. of Norris Castle. Towing W.
 $\frac{3}{4}$ S. 0·8 mi., 7 fath.

2 dredges, Oysters, 33.

Working across the tide, dredges not fishing well.

Stones and shells. Starfish fairly plentiful; several sun-stars; a few beard mussels. The oysters cleaner than in preceding hauls.

Station 61.—1·7 mi. E. of Tinnaberna. Towing 0·5 mi. N. E.
 by N., 7 fath.

2 dredges, } Oysters, 30.
 1 large dredge, }

Tide too slack to bring dredges along well. Stones, several starfish, a few sun-stars, and beard mussels. The oysters fine in shell.

Station 60.—1·1 mi. S.E. by E. of Ballyvaldon Gap. Towing
 N.E. by E. 4 mi., 8 to 7 fath.

3 dredges, } Oysters, 333.
 1 large dredge, }

Stones, especially towards the end of haul, which went too near the Rusk Bank. Many oyster shells, mostly in first half of haul. Starfish fairly plentiful in first half, numerous in second half; sun-stars fairly plentiful; a few whelks; white worm tubes common on old shells, and some on living oysters. A few lumps of mums in second half of haul.

I have included in the name Ballyvaldon bed the whole stretch of ground, about $5\frac{1}{2}$ miles long by $1\frac{1}{2}$ mile wide, which follows the coast from Ballyvaldon Gap towards the Sluices, though parts of this area appear at times to have been known by other names. It is by far the best stocked bed on the coast, and may, I think, be considered in a satisfactory condition, since the catch comprised oysters of all ages. Indeed it seems not improbable that this bed has acted as the distributing centre of spat to other grounds to the north, where we found no evidence of oysters in sufficient number to maintain the stock. To the south of the Gap there is a long stretch of sandy ground, and, as far as I can gather, there never were any important beds in that direction, save about Wexford Harbour, which still yields some return to the local boats. The number of oysters which we dredged may not appear large, but are greatly in excess of what we encountered on any other bed, while the continuously productive area is also much larger. I was given to understand that the Ballyvaldon oysters were smaller, with more fish to shell than those of the northern beds, but I could not see that this was the case. "Clods" are certainly conspicuous by their absence, and comparatively few of the shells have any serious weight of white worm tubes on them; but in addition to the "fern" (*Sertularia abietina*), which is not disfiguring, there are a good many soft worm tubes (*Terebella*, or the like), sea-squirts (*Ciona intestinalis*), and small shell-fish (*Crenella discors*) to be cleaned off. Dredging might improve the condition, giving a smaller, deeper shell, but on the other hand it is at least not improbable that the bed owes its present stock to its remoteness from fishing centres, and consequent freedom from human molestation.

A fair idea of the sizes of oysters now present on the bed is obtainable from the following list, being the summary of several hauls made in April:—

Number.	Size in inches.	Condition of shell.
3	2	thin.
2	2	thick.
14	$2\frac{1}{2}$	thin.
16	$2\frac{1}{2}$	thick.
15	3	thin.
22	3	thick.
21	$3\frac{1}{2}$	thin.
107	$3\frac{1}{2}$	thick.
6	4	thin.
105	4	thick.
1	5	thin.
2	5	thick.

The sizes were taken by gauges, the oyster being held at the hinge and passed through the gauge. An oyster passing through a $3\frac{1}{2}$ in. gauge, but sticking in a 3 in. gauge, is counted as measuring 3 inches, and so on. The condition "thin" implies a very thin flat shell, containing, in sizes below $3\frac{1}{2}$ inches, only a very small fish. In the larger sizes it becomes a matter of some difficulty to draw the line of demarcation. The shells here classed as "thick" are all fairly well fished, but there is great variation in the weight of shell. Comparatively few were found seriously sponged on this ground.

A Wexford boat, dredging this bed last year, is reported to have taken 700 oysters in four hours, which is the only indication which I possess of the relative efficiency of a professional dredger and the "Helga." The best haul made by the latter took 166 oysters in forty minutes, but most hauls gave about 100, or less, per hour.

Inside the ground which we worked I am informed that there once existed a bed in very shoal water, where the oysters were of a smaller class, more like what are known as "natives" than their fellows from the deeper grounds. Whether this bed still exists I had no means of determining, as the "Helga" draws too much water to permit of our making search.

SECTION 10.

PRUSSIA BEDS.

I made hauls at the places indicated as the sites of the Prussia beds, viz.:—

2·9 mi. E.N.E. $\frac{1}{4}$ N. of Greenore Point (Wexford). Towing N.N.E.
1 mi., 16 fath.
and
3·8 mi. E. by S. $\frac{1}{2}$ S. of Rosslare Point. Towing N.E. 2·1 mi.,
 $12\frac{1}{2}$ to $12\frac{1}{4}$ fath.

These hauls yielded stones, muddy sand, and several oyster shells,

old, worn, and blackened by mud. Also some whelks, much larger than the average further north, and other animals of no importance in this connection.

As these beds are very remote from Arklow and Courtown, and never seem to have been of much importance, I did not explore the neighbourhood further.

I have made no attempt to examine the home beds which still supply the Wexford fishermen with a small harvest.

OFFSHORE GROUNDS.

On the chart marked at Arklow for our guidance are shown three spots, lettered A, B, and C, as to which is written, "the fishing" "boats during summer season, when herrings were plentiful, have" "had their nets sunk to the bottom by weight of fish, and oysters" "of small shell, dark in colour, full of fish like 'Red Banks' and of" "fine quality, have been found in the nets when hauled."

A is about four miles E. of the South Arklow Light, about 34 fathoms. In a circular area of 6 miles diameter, of which A is the centre, we made six hauls, covering about $9\frac{1}{2}$ miles, and got, in two hauls, a few shells, but no oysters in any. Several hauls recently made by Mr. Farran in this locality gave no indication of the presence of oysters.

B is about $7\frac{1}{4}$ miles S. by E. $\frac{1}{4}$ E. of the South Arklow Light, about 34 fathoms. We made four hauls, covering six miles, within a circular area four miles in diameter, of which B is the centre. One oyster was taken near the point B, and five in the most seaward haul, logged by Captain Macauley as 10.1 miles E. of the Blackwater Light, towing N.E. $\frac{1}{2}$ N. 1.9 miles. Some oyster shells and many starfish were also taken in this haul. On other parts of the ground there were a good many shells of horse-mussels.

The oysters were small, old, thick-shelled, and of no commercial value.

The ground will be explored further to seaward when opportunity offers, but work here, when the weather is suitable for dredging, is apt to be much interrupted by haze.

C is about 9 miles W.S.W. of the Blackwater Light, about 36 fathoms. We made eight hauls, covering $11\frac{1}{4}$ miles, in the neighbourhood, over an area extending $4\frac{1}{2}$ miles inshore, 2 miles off shore, and 5 miles to the southward (the ground covered by the hauls about B is immediately to the northward).

In the most easterly haul we got one small old oyster. A few old shells occurred in most of the hauls, and the oyster "fern" (*Sertularia abietina*) was of pretty frequent occurrence; but although this hydroid appears to be only abundant, on the inshore beds, where oysters are also plentiful, this may be due rather to the exceptional facilities which a clean living oyster offers for its lodgment inshore than to any community of interest.* Mums are rather plentiful over this area, and in one haul scallops were

* The Hydroids, of which the oyster fern is one, though plant-like in appearance, are really colonial animals, feeding like the oyster on very minute organisms, and it may be that the constant association of the fern with the oyster is due to a similarity in food.

encountered. There were also a good many shells of horse-mussels, besides other animals of no special interest.

At a spot marked D on the chart it is stated that oysters of large size were got by the "Favourite" of Arklow. The place is about 10 miles E. by S. of the Lucifer Light, 43 or 44 fathoms. Three hauls, covering 5 miles, were made in an area of about 4 square miles around it, but oysters were only represented by one shell.

We made several hauls between the areas I have mentioned above and the banks, but found nothing of interest. It will, I think, be allowed that there is very little indication of the existence of oysters in paying quantity and of marketable quality on the off-shore grounds, and even if our subsequent explorations further seaward reveal the presence of oysters in some number, I do not think it will be of much importance to fishermen unless they prove to be distributed in reasonable quantity over large areas. That oysters may be found here and there, even in bulk on isolated tracts, is not unlikely, since much of the bottom is suitable for the settlement of spat, which, by the combined influence of tide and wind-drift, might be carried many miles from the parent bed. The soundings, however, of this part of the sea-floor are so even and haze is so frequent in weather suited for dredging, that small beds, though well stocked, could not often be found. Moreover, it has yet to be shown that these deep off-shore grounds are capable of producing oysters of better quality than the few stunted specimens which we encountered.

