Summary of a Report on a Survey of the Fal Estuary Oyster Beds

(November, 1924),

With Notes on the Biology of the Oyster (*O. edulis*).

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INTRODUCTION

THE Summary given in the following pages is a condensed account of a report* on a Survey of the Fal Estuary Oyster Beds carried out by the surveyor, for the Fisheries Branch of the Ministry of Agriculture and Fisheries, with the permission of the Director and Council of the Marine Biological Association, Plymouth. Thanks are due to Mr. W. H. Lupton and Mr. F. Parkin, the respective Town Clerks of Falmouth and Truro, and their Oyster Committees, and especially also to the bailiffs, Mr. E. Searle and Mr. C. May, and also to many fishermen; all of whom materially assisted the surveyor in his work. The survey could not have been carried out in the detailed method adopted without the willing and valuable assistance of Mr. Stevenson, who was courteously spared for the work by Mr. H. E. Tresidder, the Falmouth Borough Surveyor.

* J. H. Orton. Report on a Survey of the Fal Estuary Oyster Beds (November, 1924), with Notes on the Biology of the Oyster (*O. edulis*). Published by subscription at Falmouth in 1926. (Copies can now be purchased from the Marine Biological Association, Plymouth, at the price of 2s. 6d. per copy.)

SECTION A.

Summary.

The spatfall in 1924, as in 1923, was very slight and from the point of view of the oyster-producer was a failure, and was little better in 1922.

The growth of oysters in the summer of 1924 was unusually great; this has had the effect of bringing a large proportion of small oysters to a legally takeable size.

The dredging results have, therefore, been much better than they were expected to be in the season of 1924–25, but the effect has been to deplete the beds still more of reserve stocks of small.

Practically all the present stocks of small oysters are of a size between 2 and $2\frac{1}{2}$ inches.

With only average growth in 1925 and 1926 a large majority of these small oysters will have attained a size which will not pass through a $2\frac{1}{2}$-inch ring; hence the beds are in a dangerous state.

If, therefore, dredging continues under the present conditions, almost the whole of the *present* stock of small will have grown to large oysters and be cleared off the beds in the season of 1926–27.

It is shown that although oysters may grow to a size of $2\frac{1}{2}$ inches at Falmouth in small numbers in three summers, yet four summers are required before a fair proportion of spat can be expected to attain a size of $2\frac{1}{2}$ inches.

Thus, even if a great fall of oyster spat occurs in 1925, this fall will not affect legal dredging in appreciable numbers until the season 1928–29.

As the beds will be almost cleared of *existing* stocks in 1926–27 if the present conditions of oyster dredging continue, there must be, in any case, a lean year for oyster dredging in 1927–28.

The proportion of large to small oysters on the average in dredge-hauls was, in October, 1924, on the Vilt grounds about 1 to 1; on the North Bank, 1 to 2; on Carclase Point, 1 to 1·3. In November the same proportion on the Truro banks generally was 1 to 1·6, but higher off Pill Creek and on the South part of the East Bank, and as high as 1 to 5 on the average on Turnaware Bar.

Hence the total stock of oysters remaining on the grounds at the end of the season cannot be very much greater than the total amount of large oysters present on the grounds at the beginning of the season 1924–25. Estimates of the total stock of oysters on the grounds were made from records of catches of sailing and rowing-boats by dredge hauls and grabbing. It is estimated that the total stock present on the Truro beds in April, 1925, will be about five million small and about half a million large; and on the Falmouth beds about one

and a quarter million small and *at least* one-eighth of a million large. To these totals can safely be added a quarter million oysters in those parts of the channels rarely dredged, giving a total of rather more than seven millions. The total stock on the Fal Estuary *main* dredging grounds in April, 1925, is estimated at six and a quarter million small and about five-eighths of a million large.

The rate of growth of the small oysters of different sizes and ages in 1924 was worked out in detail, and the average growth calculated. From this average growth of small in 1924 the average growth in 1925 is estimated, and on these assumptions it is calculated that the following totals may be dredged in the 1925–26 season at the given sizes of ring :—

	Ring $2\frac{1}{2}$.	Ring $2\frac{5}{8}$.	Ring $2\frac{3}{4}$.
Truro . .	$2\frac{1}{2}$ millions.	$1\frac{1}{4}$ millions.	$\frac{6}{10}$ million.
Falmouth .	$\frac{3}{4}$ million.	$\frac{4}{10}$ million.	$\frac{1}{4}$,,
	$3\frac{1}{4}$ millions.	$1\frac{3}{20}$ millions.	$\frac{17}{20}$ million.

Suggestions are made for obtaining estimates of the total stock in the future, and for obtaining returns of oysters taken from the grounds.

It is considered that the beds should be closed to reserve a minimum stock for spawning one month after it is found that not more than 13 oysters per man per hour can be dredged under good dredging conditions.

Of the present stock of oysters about 45% are dumps, which are thick shelled, somewhat Brazil-nut shaped oysters, apparently very slow in growing and almost certainly very useful for spawning purposes owing to their very good fish. These should be preserved if stocks do finally become very low.

Various matters are also discussed, namely, the distribution of cultch over the grounds, the mortality in 1924, pests, the improvement in "whiteness" of "fish" in Mylor Bank oysters, weight of fish in fast-grown oysters, and the beds of Falmouth Inner Harbour.

A relation between catching power of the grab, rowing-boat dredge, and sailing-boat dredge on Truro grounds is calculated as 13·75 is to 2·5 is to 1. The grab was usefully employed on parts of the ground where oysters were relatively abundant.

Biological recommendations and suggestions for the future administration of the beds are made.

Efforts are being made to obtain figures of the total number of large oysters dredged in 1924–25 to check the estimates made, and to obtain information of dredging results near the end of the season for the purpose of estimating the amount of large left on the beds at the close of the season.

Conclusions.

The depleted stocks of small, which are mostly near the present legally takeable size, should be eked out so that a maximum number may remain on the beds to provide spawn for re-stocking the beds. Of the total estimated stock of seven million oysters on the grounds, it is recommended that two million a year for the next two years be allowed to be taken from the beds, and the position be reconsidered at the end of those two years.

For the 1925–26 season it is estimated that, *with average growth* in the summer of 1925, about two million oysters will be dredgeable with a "ring" of $2\frac{5}{8}$ inches, and it is recommended that this ring should be adopted for the season 1925–26. The restriction in the output in the season 1926-27 should be regulated in accordance with the experience gained in the season 1925–26.

Other alternative methods of securing an output of two million oysters per year are suggested, but it is recommended that any alterations in the hours or days of work should be so made as to favour the regular dredgerman. The restriction in the output of oysters makes reasonable a restriction of licences to those dredgermen who have habitually worked on the beds in the past, but owing to the probable difficulty in effecting such a restriction, all possible means to help the regular dredgermen should be taken.

Power should be in the hands of the Truro and Falmouth authorities to shorten the dredging season by one month at each end as and when partially or wholly necessary until the beds are restocked with abundant young oysters.

Efforts should be made to provide a spawning stock of oysters as indicated, and to improve the beds, with a jury of dredgermen and a foreman.

Cultch laying of the kind indicated should be instituted at once, so that at least tilling, as well as harvesting, is done on the beds. There is every reason to believe that with care the beds will sooner or later recover their former prosperity, for the present shortage is certainly due to over-fishing, that is, taking more individuals from the beds than nature has replaced, during the last three years, and the beds and the oysters are in a healthy condition.

SECTION B.

I. Biological Recommendations.

(*a*) *Necessity of limiting the number of oysters to be taken from the beds in the next few years to one-fourth to one-third of the present stock per annum.* Owing to the facts that on all grounds the great majority of the small

oysters are of a size between 2 and $2\frac{1}{2}$ inches, and that the total number of oysters on the beds is relatively small, it is essential that the output of oysters by dredging be limited during the next three years, so that no more than one-fourth to one-third of the present stock is taken per year at least during the next two dredging seasons. Ways and means of effecting this result are discussed in the next section.

(*b*) *On the minimum stock of oysters which may be expected to restock the beds with spat, and the epoch when the beds should be declared closed.* The conclusion is reached that a practical definition of the minimum stock which must, under the present conditions, be retained on the beds for the purpose of re-stocking the beds with spat, may be given as follows: the beds should be closed one month after it is found impossible to dredge on the average more than 13 large oysters (whether with a $2\frac{1}{2}$-inch or $2\frac{5}{8}$-inch ring) per hour, in good dredging weather, or 90 per day of seven hours as is worked on the Truro beds, or 104 per day of eight hours on the Falmouth beds. This recommendation would be modifiable if a large number of big oysters could be retained on the beds by relaying them in a central position for the purpose of providing spawn.

(*c*) *Large oysters dredged from the Fal beds should be relaid on a central site on the beds for spawning purposes.* It is strongly recommended that in the immediate future efforts should be made to relay on a portion of the Fal beds the large oysters dredged from the main beds. These oysters might be relaid at the southward end of the East Bank, or some other suitable place to be decided, and retained for one or more years for the purpose of producing spawn. Suggestions for accomplishing the desired end are made in the following section.

(*d*) *Thinning out accumulations of small oysters.* The Truro authorities are recommended to thin out the small oysters, which are thick on Turnaware Bar, and also to some extent at Pill Creek, and at the southern portion of the East Bank. This thinning out can be accomplished to some extent in the same excellent way as was done last year, namely, by working at low spring tides and shovelling up the oysters. But another economical way would be to authorise the bailiff to load up cargoes of small from dredgermen working at these places during the present 1924–25 season, and spread them along with cultch at the same time over the poorer parts of the grounds. In the same way the Falmouth authority might thin out the accumulation of small at the north end of the Carclase Point grounds; and in both areas, if small have accumulated at any other points towards the end of the season, the bailiffs should be given authority to spread the excess on the poorer parts of the grounds.

(*e*) *Preparation for spat-catching by laying clean cultch.* A very serious matter on the Fal Estuary oyster beds is the fact that no preparation

and no attempt is made to catch oyster spat. So far as I know, at no other place in Europe where oyster-production is the chief source of income on the beds, is the sole reliance placed on nature. It may be argued that in the past this method has, except for certain periods, kept the beds stocked. The reply to that is that the stock has been maintained by chance, and might easily have been improved in the times of scarcity by a judicious laying of clean cultch. Indeed, if cultch-laying had been the practice on the Fal in the years 1920 and 1921 it is quite certain that the fishing in recent years would have been carried on with better results and the prospects for the future would be brighter. It is true that there are years when spat will settle on anything, at which times cultch-laying may be—but is not necessarily even then—superfluous. But these years of prolific fall are rare, and at other times the stock may be increased by preparing suitable material for the baby oysters to settle upon. The cultch in the water is, on the whole, either too dirty or overgrown too much with living organisms of all kinds, which compete for places on the cultch at the time the baby oysters are ready to settle.

Suggestions for the Supply of Cultch.

Any kind of clean shell, if placed on the beds *at about the time the oysters are settling*, will serve :—

(1) The handiest supply of shell is the oyster-shell cultch on the grounds ; but this must be taken out of the water and cleaned—exposure on the foreshore is sufficient—and put back again in suitable places at suitable times. Ways of doing this are suggested for choice in the next section.

(2) Mussels are present in quantity in certain parts of the river ; if these could be dredged with profit, and laid on the foreshore to clean, they would form useful cultch.

(3) Cockle shell or any other form of shell, such as limpet shell, if it could be obtained cheaply enough in quantity, would also serve. Local beaches might be found where limpet and other shell may be obtained cheaply in some quantity.

(4) Slipper-limpet shell, clean and dry, is available on the east coast, but may be too dear.

(5) Cheap supplies of oyster-shell may possibly be obtainable in the district, and local buyers might be able to supply a certain quantity. All sources of shell should be tapped and utilised.

(*f*) *Time for laying cultch.* The clean cultch should be laid when there is the maximum amount of oyster-young swimming freely in the water. This period will probably fall in July, but no actual date can be fixed,

because the spawning, and hence the setting free of the young oysters, is dependent on a moderate degree of warm weather. An approximate period when the shell should be laid would be the first to the third week in July, but if the weather continues warm throughout the summer cultch may be laid continuously with profit from that time until well into August. An early summer will necessitate an earlier laying of cultch, and the earlier in the year the spat can be caught the better for the fishery. If a lot of shell is to be laid by a few men, it is often necessary to make an early start in order to put it out in good time. In practice it is easier to fix the time to put out cultch from observations on dredged oysters. If oysters are left in the store overnight periodically from the middle of June it is possible to find out very nearly the percentage of female spawning individuals. When a small percentage of oysters—as low as 1 to 5%—are found *in this way* to be black-sick, it is time some of the cultch was in the water. The following figures for 1924 on an East Coast ground, where spawning is probably quite as early as on the Falmouth grounds, are instructive :—

1924.	Number of oysters left in store overnight.	Female spawning oysters. White-sick.	Black-sick.
June 11	2900	24	0
,, 12	4400	17	0
,, 12	3200 (small)	30	0
,, 13	2400 (small)	5	1
,, 13	2000	4	1
,, 25	1300	54	15
,, 26	1200	51	16
,, 27	900	32	29
,, 30	2400	16	5
July 3	1300	15	31

These oysters were mostly small and are therefore comparable with the stock at present available on the Fal beds.

If it is found impossible to investigate a sufficient number of dredged oysters for spawning an additional rule for laying cultch can be given, namely, that cultch-laying may begin when the body of the water in the Estuary is approaching in temperature 64° Fahrenheit. It will probably be found that cultch-laying can be begun earlier up the river than on the Truro Banks, and earlier on these banks than on the Falmouth grounds.

(*g*) *Place to lay cultch.* The best place or places to lay cultch on any oyster grounds can best be determined satisfactorily by persons who have known and observed their own beds for a long period of years. In 1924 spat fell more abundantly off Pill and Cowlands Creeks than anywhere else, but it does not follow that these will be the best places in 1925.

It is quite possible that the mouths of these creeks were good for spatfall in 1924, because the fresh water from the creeks cleaned the shell there. As the shell in the water in the river above Turnaware Point is likely to be cleaner than shell lower down, I recommend that the cultch be laid in 1925 on Turnaware Bar and the banks below, after consultation with the bailiff. Certain parts of the banks may be found to have a more consistent record for spatfall than others, and these places should have a larger supply of the available cultch, but it is urged that an effort should be made to spread cultch all over the banks in as great a quantity as can be obtained. It is certain that the banks will take more shell than the finances of the authorities can supply.

(*h*) *Observations required on the reproductive capacity of dumpy oysters.* It is most important that observations should be made this summer on the reproductive capacity of dumpy oysters. It has been shown that there is a very high proportion of this kind of oyster all over the beds. Since dumpy oysters are well fished and relatively old, it is probable that they will give a much larger number of oyster-young per individual than the remaining oysters. Hence, if it is necessary later to preserve a stock for spawning, these dumpy oysters, besides being less pleasing in appearance than the others, will probably be found to be more valuable for spawning purposes. Definite information is, however, required and can easily be obtained this summer.

(*i*) *Rate of growth in* 1925 *required to be known.* Observations should be made this summer on the average rate of growth of oysters on the Fal beds. This information will not be obtainable until the end of September, when it may be too late to be applied to regulations for the opening of the dredging season, if this occurs at the normal time ; but it would be available for estimation or regulation of the output later. It would be preferable to carry out actual experiments to determine the rate of growth, so that the experimental results can be compared with work on the beds. An important point to be noted in this work is the extent to which the spring shoot becomes infiltrated with a green colour—presumably an algal growth in the shell—towards the end of the growing season.

(*j*) *Experiments on spatfall in* 1925. There can be no doubt that the Fal Estuary is an ideal spot for oyster-production, and the lake formed by the Mylor-Parsons and the East Banks, along with the river reaches, together afford an excellent situation for studying the fall of spat. The hydrographical conditions are at present unknown, but the general conformation of the Estuary makes it plain that a continuous grading of conditions may be expected. Thus, if there are particular hydrographical conditions most suitable for the fall of oyster-spat—and there can be little doubt that there are—then suitable conditions have a good chance of

occurring here at some points every year. If, therefore, the places where the best conditions for the fall of spat are likely to occur could be found, the cultch could be spread mainly in these places to the benefit of all connected with the fishery. Thus, as is so often the case, there is in this problem the double interest of immediate economic application of the result sought for and the great general interest in finding out in some detail the underlying conditions which favour a fall of oyster-spat on a natural bed. It is recommended, therefore, that experiments be carried out on the conditions for and distribution of the fall of oyster-spat in the coming summer. In this branch of work it is important to realise that spat may fall on the shells and not survive in each year in the same proportion. Our information on spatfall at present is almost entirely limited to the amount which *survives* each year. An early report on the nature of the spatfall in 1925 would be useful to the bodies responsible for the care of the beds.

II. Suggestions for Future Administration.

1. *Necessity for restriction of output.* The low condition of the stocks on the oyster beds, as well as the fact that most of the small oysters are already 2 to 2½ inches in size and the impossibility of these being replaced in any adequate degree until 1928 at the earliest, will necessitate some curtailment of the taking of oysters from the Fal beds, so that a sufficiency may be retained for spawning purposes.

2. *Mode of restriction a matter of arrangement to suit particularly the dredgermen.* As, however, the output of the beds can be controlled to the same extent in several different ways, that is to say, the matter is one of politics, it is not intended to do more here than to suggest alternative methods of attaining the same end, while at the same time indicating the alternative which seems best to the surveyor.

3. *Joint administration of the Fal and Truro beds suggested.* It is convenient first to consider whether it would not be better to combine both the Truro and Falmouth beds under one authority. There would be many advantages in this course, namely :—

(*a*) The beds could be treated as a whole for administration.

(*b*) Supervision of the beds could be improved.

(*c*) Concerted action for improvement of the beds could more easily be taken.

(*d*) The public body chosen to control the fishery might be elected upon a new basis which would give the dredgermen direct representation, while at the same time maintaining the public character of the beds.

Whether the disadvantages in administration by a body of this kind would be greater than the advantages it is probably not easy to foresee until the matter is probed. In any event both Truro and Falmouth authorities should adopt the same administrative methods so far as this is possible.

4. *Conference of Truro and Fal administrators and representatives of dredgermen suggested to consider this Report.* In order to arrive at a solution of the present difficulties in administering the beds, the surveyor suggests the following procedure. A conference of representatives of the Truro and Falmouth authorities and dredgermen should meet as soon as possible to consider this Report. At this meeting it should be decided whether restriction of output to about one-third of the stock per annum, namely, about two million at $2\frac{5}{8}$ inches for the next two years, should be adopted. If this restriction is not adopted some statement should be made giving the general view of the conference, which could be dealt with according to circumstances. If the restriction is adopted, then the simplest procedure afterwards is to find the views of the fishermen as to the best way of meeting their needs whilst, at the same time, ensuring restriction of output, and to apply them, whilst also paying some attention to the needs of buyers. The dredgermen should be made to realise that the restrictions to be put on dredging are entirely for their ultimate benefit.

The following alternatives of effecting a reduction in the output of oysters may be summarised :—

(*a*) Adoption of a ring of $2\frac{5}{8}$ inches, with powers, to be used if necessary, to shorten the spring end of the season by one month, and to shorten the hours of work.

(*b*) Adoption of a system of weekly returns of catches, and closing of beds by one month's notice with ring at $2\frac{1}{2}$ or $2\frac{5}{8}$ inches.

(*c*) Drastic reduction of present hours of work on beds with ring at $2\frac{1}{2}$ inches.

(*d*) As in (*c*), but less drastic, with reduction of licences.

(*e*) In all the above cases it would probably be advisable to shorten the season at the opening period by a fortnight, and power should be asked for to shorten the season by as much as a month, if necessary, at each end of the season.

(*f*) The ring could remain at $2\frac{1}{2}$ inches and unrestricted dredging allowed until the minimum stock as defined remains on the beds, but the dredgermen would suffer ultimately and the beds may take many more years to recover than if a reasonable course is adopted.

From the fishermen's point of view, and probably also that of the buyer, it is essential to keep the beds open for dredging as long as possible.

Since, however, the beds will be dredged out before a fresh stock arrives, unless the conditions of dredging are altered, something must be decided as to how the stock is to be allowed to be taken.

5. *The preservation of the beds.* From a biological point of view the larger the stock which can be retained on the beds until a big spatfall is obtained, the better for the beds. We have seen that there is a total stock of about $5\frac{1}{2}$ million oysters on the Truro beds and about $1\frac{1}{2}$ million on the Falmouth beds available for the future and that the stock cannot be replaced until 1928 or later. A reasonable plan, therefore, would be to allow of an output for two years of approximately one-third of the stock each year, and revise the situation at the end of the dredging season in 1926–27. The problem, therefore, arises as to how to regulate the beds to permit of one-third of the oysters being taken each year for the next two years.

6. *Raising the ring to* $2\frac{5}{8}$ *inches recommended.* We have seen that if the ring remains at $2\frac{1}{2}$ inches the dredgeable oysters in the season 1925–26 will number about $3\frac{1}{4}$ million, which is too many. If the ring is $2\frac{5}{8}$ inches the dredgeable oysters will amount to nearly two million, which is about the number it is desired to lose from the beds. This procedure, i.e. the adoption of a ring at $2\frac{5}{8}$ inches, would be the simplest way out of the present difficulties, but if growth is good in the present summer, 1925, the number of dredgeable oysters will be greater than two millions. The great advantage of this method would be that the beds could be kept open and hours of dredging arranged in consultation with the dredgermen, so that work might be carried on continuously throughout the next dredging season.

7. *Hours of work to be arranged to suit the interest of the regular dredgermen.* The hours of work should be so arranged that non-dredgermen, already in other employments, should not find it worth while to change their occupation. Every effort should be made to retain for the dredgerman the work he has, and is obliged, to do, in times when the pay is poor and does not attract outsiders. This desirable result will be best obtained after consultation with the dredgermen. It is probable that an output of about two million large oysters from the whole of the beds could be regulated solely by a reduction in the hours of work permitted on the beds, whether dredging be restricted to certain days or certain parts of each day.

8. *Shortening of the season.* It is clear that something more than shortening of the season is necessary to restrict the output, but a restricted season will help and may be taken into consideration when the shortening of the hours of work is discussed. Power to shorten the season at the

spring end ought to be given to the administrators in the event of failure to restrict the output to the desired amount.

9. *Reduction in the number of licences.* If the necessity for reduction in output is agreed upon by everyone, then it will follow that a restriction of licences to *bona fide* dredgermen may be considered permissible. However, as has already been pointed out, this is a difficult matter to deal with and reach a quick decision upon, it would be advisable to consider the alternatives thoroughly before attacking it.

10. *The interest of the regular buyer should be considered.* Since no oysters would be dredged if they could not be sold, it is reasonable that the regular buyers from the Fal Estuary beds should be given an opportunity of stating their needs for retaining those establishments which have been built up to meet the requirements of the Fal Estuary in past years.

11. *Establishment of a spawning stock.* It has been already pointed out that it would be a great help to the beds if a large number of older oysters could be relaid in a central position on the beds for the purpose of providing spawn. Various ways of effecting this result may be mentioned :—

(1) The southern part of the East Bank and a part of the St. Just Flats might be put out of bounds for dredging.
(2) The Channels—to be defined—might be put out of bounds for dredging.
(3) The dredgermen could co-operate to relay parts of their catches on a portion of the ground which should be given to them temporarily by the authorities for this purpose, provided the oysters were retained on the allotted ground during one or more summers than would otherwise be the case.
(4) A portion of ground could be rented out to a buyer on the same conditions as mentioned in (3), and the rent so obtained used for buying new cultch.

It is suggested that arrangements be made to put this plan into operation for the summer of 1926 and continued until the grounds have again recovered to the extent of giving at least 20 small oysters of a size about 2 inches in an *average* haul from a sailing-boat dredge.

12. *Care of the beds. Cultch laying.* On the Fal beds at present the oyster-farmer is continually harvesting without doing any tilling or sowing. Nature's harvest is at times bounteous, but at others meagre, and can always be improved simply by depositing clean shell on the beds at times young oysters are ready to settle. The harvest of young oysters is, however, *great* only in years when the water is maintained warm and other conditions are suitable ; for this reason cultch should be laid and relaid in quantity each year until the desired fall of young oysters is obtained.

It is, therefore, desirable that those responsible for the care of the beds should be prepared to lay out as much clean shell as possible in the immediate future. But since one cannot predict when the suitable summer will come, the expenditure on cultch laying should be distributed over a number of years, so that some improvement in the stock is effected each year, and the cultch be in the water in the particular year when conditions are suitable for a good fall. There should at least be enough revenue raised from licences or catches to pay for the general administration of the beds.

13. *Co-operation among the dredgermen to improve the beds.* The dredgerman on the Fal Estuary beds at the present time is like a hunter who hunts continually the same animal on the same ground without taking or being allowed to take any steps to ensure the survival of the hunted animal. It is suggested that opportunity should be given to the dredgerman to take an active interest in the welfare of the beds in the following way.

14. *An elected foreman.* A foreman should be elected from among the dredgermen to undertake the general direction of the improvement of the beds in consultation with the bailiff and a member or members of the Oyster Committee. If the bailiff's duties were considered such that they did not clash, there is no reason why he should not take the place of the foreman, but the surveyor's view is that the bailiff needs all his time for his particular work.

In addition to electing a foreman,

15. *A jury of dredgermen to improve the beds.* The dredgermen should agree to give free, in rotation, a half a day's work on a jury. The jury would work under the foreman and do whatever was wanted to improve the beds. A roster could be arranged of three or more men for each half-day as required. The foreman should be paid a suitable wage to compensate for his continual loss of work.

In this way (1) cultch could be culled over, and the small oysters picked out and relaid on suitable parts of the beds, while the cultch could be continually deposited on the shore throughout the winter ready for the following summer; thus a regular supply of clean cultch would be ensured. In addition, accumulations of small on the beds could be distributed at no expense and for the general welfare. Mussels in certain parts of the beds could be dredged up and cleared away. Improvements in certain parts of the beds and efforts to form new beds could all be made. Further possibilities of forming beds for spat, for other young and for special kinds of oysters, would follow as the dredgermen realised the advantages of co-operation in this way. It would not be necessary to have a jury working all through the dredging season, and probably one

turn per man per season to give a jury for about a month would be as much as should be attempted at the beginning.

It would be necessary for the controlling oyster committees to be advised of all the work requiring to be done and approved.

16. *Returns of oysters taken from the beds.* It is essential that those administering the beds should have information of the numbers of oysters taken therefrom, especially when the stock of oysters is low. It is, therefore, recommended that the obligation should be placed on each licensee to report weekly the number of legal oysters taken from the beds. It is possible that the dredgermen may be able to suggest a more convenient way of making this return, but any alternative way may be adopted which will give the information required.

17. *Iron "rings" should not be permitted, and certified brass "rings" should be supplied with the licence.* It is strongly recommended that dredgermen should possess a brass ring for the purpose of measuring oysters. Most dredgermen are now using an iron ring which is rusted inside and "rings" doubtful legal oysters. In this way discussions and serious misunderstandings are bound to occur when the bailiff measures the same oysters with a brass ring. The brass rings should be issued with the licence, and stamped and certified as correct, so that the dredgerman using the ring cannot fail to recognise himself what is and what is not a legal oyster.

18. *Motor boat for Falmouth bailiff.* The Falmouth bailiff cannot be expected to do his work effectively in a rowing boat, and although the provision of a motor boat may not be possible out of the proceeds of the licences under the present arrangements, it would be worth while if the two authorities amalgamated as suggested above. Undersized legal oysters must be detected in the boat on the dredging ground, as the proportion of small oysters which just hang by shoots has been shown to be fairly large ; it is, therefore, too late to identify small oysters after they have been shot from one bag to another ashore.