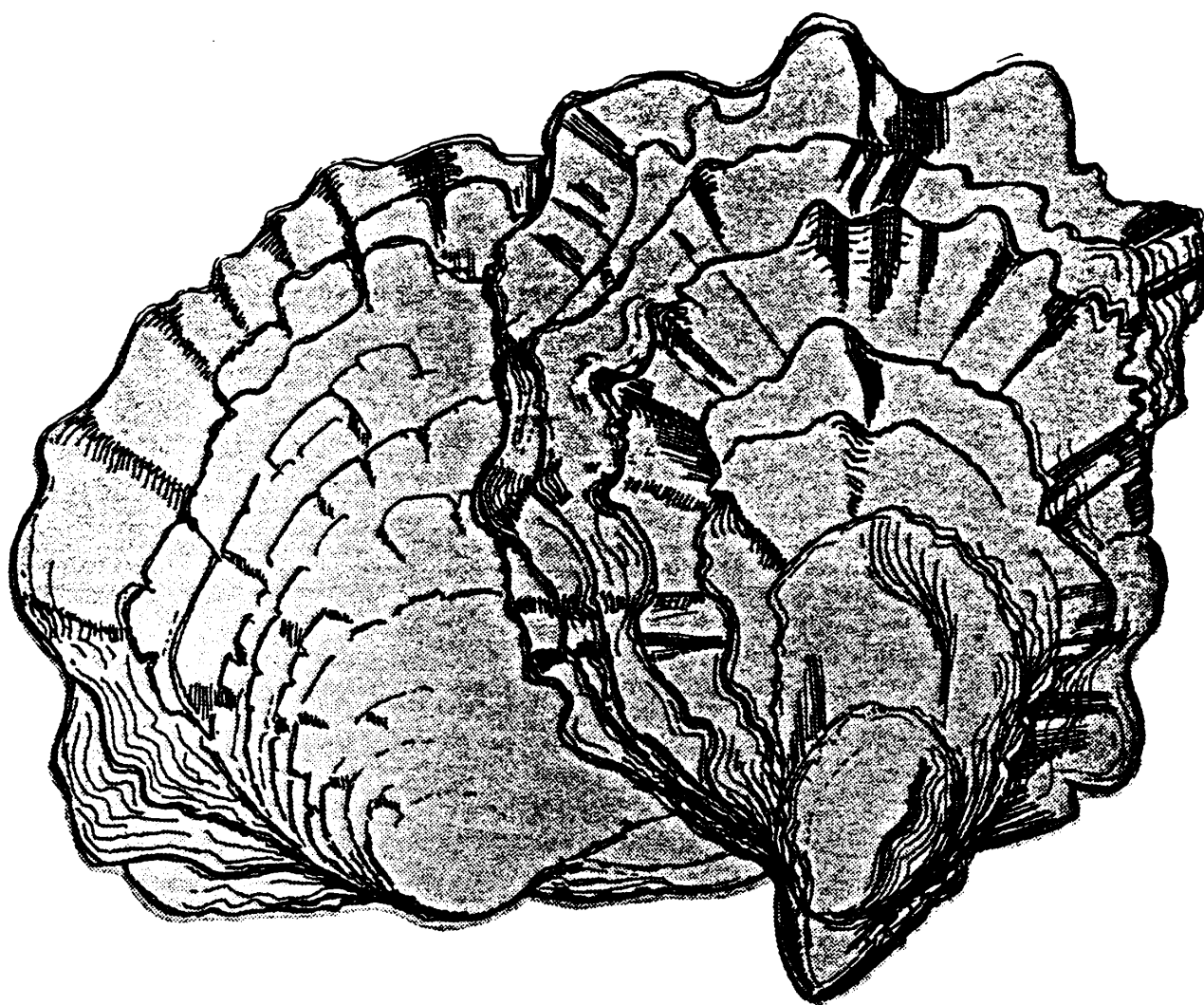


MINISTRY OF AGRICULTURE FISHERIES AND FOOD
DIRECTORATE OF FISHERIES RESEARCH

OYSTER FISHERIES OF ENGLAND AND WALES

BY P. DAVIDSON



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The author Peter Davidson is a Higher Scientific Officer in the Shellfish Section of the Fish Stock Management Division of the Directorate of Fisheries Research stationed at the Fisheries Laboratory, Burnham-on-Crouch, Essex.

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OYSTER FISHERIES OF ENGLAND AND WALES

INTRODUCTION

The harvesting of the European flat oyster (*Ostrea edulis*), sometimes called the native oyster, has provided a long established fishery in England and Wales. At one time, oysters formed a staple part of the diet of the poorer sections of the community. During the last 150 years there has been a steady decline in landings, and at present the industry can provide only sufficient oysters to support a highly-priced restaurant trade.

Production of oysters has varied considerably (Figure 1a). Annual landings of about 8 million oysters were recorded during the 1950s and, following good natural settlement of young oysters in 1957, 1958 and 1959, the industry anticipated an improvement in fishing. However, the east coast beds which constitute an important part of English oyster fisheries, were virtually destroyed during the severe winter of 1962/63. The small stocks of oysters available during the 1960s led to a reduction in fishing effort and grounds were lost owing to siltation and infestation by pests such as the slipper limpet (*Crepidula fornicata*). Many fishermen left the industry and in the late 1960s landings fell to a low level of only 3 million oysters. Although, as a result of research, improved methods are available, expansion of oyster fisheries has been prevented, mainly by the lack of seed oysters to replenish the stock and by the high cost of labour.

The recent discovery of a large stock of oysters in the Solent has helped to stabilize the industry to some extent. It has enabled beds long devoid of oysters to be restocked, and it is hoped that, as a result, natural settlement will again take place in the traditional oyster-producing areas. In addition, the development of hatchery production of seed oysters and of techniques for handling them has led to expectations of expansion in this new field. The prospects for a substantial revival of the oyster industry in this country are therefore more promising than hitherto.

SPECIES AND TECHNIQUES OF CULTIVATION

The three species of oyster which form the basis of the industry in England and Wales are the European flat oyster (*Ostrea edulis*), the Portuguese oyster (*Crassostrea angulata*), and more recently the Pacific or Japanese oyster (*Crassostrea gigas*) (Plate 1).

The fishery for the European flat oyster (*Ostrea edulis*) continues to use traditional techniques and gear which are often peculiar to a specific locality. Harvesting methods range from small dredges towed by rowing boats (Plates 2 and 3) to 6 ft (2 m) dredges on 40 ft (13 m) powered vessels (Plate 4). Most of the oysters reaching market have been relaid from a spatting ground, where the young oysters (or spat) settle, to a growing and fattening ground, where growth is good and the meat condition improves. This may involve moving oysters

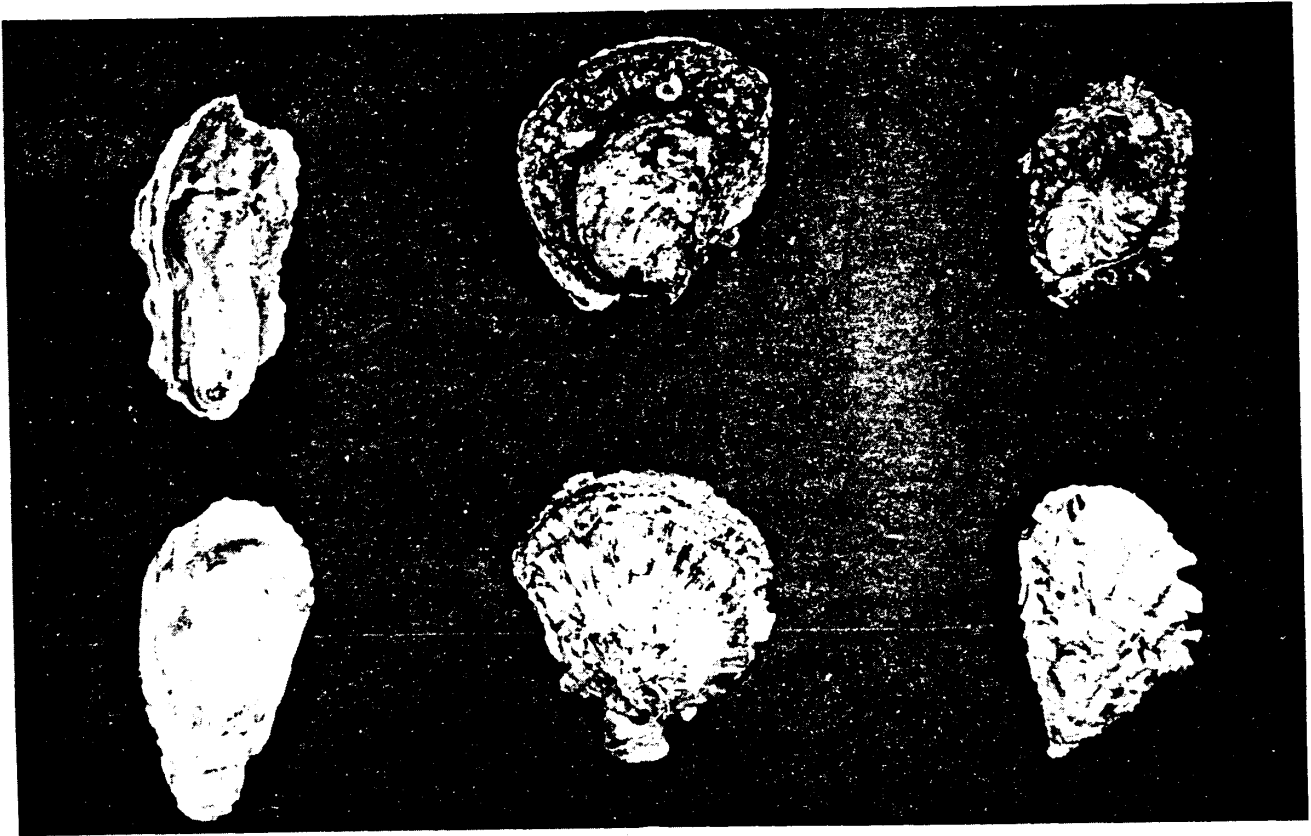


Plate 1 The three species utilized by the British oyster fisheries.
Left to right: Portuguese oyster (*Crassostrea angulata*); native flat
oyster (*Ostrea edulis*); and Pacific oyster (*Crassostrea gigas*).

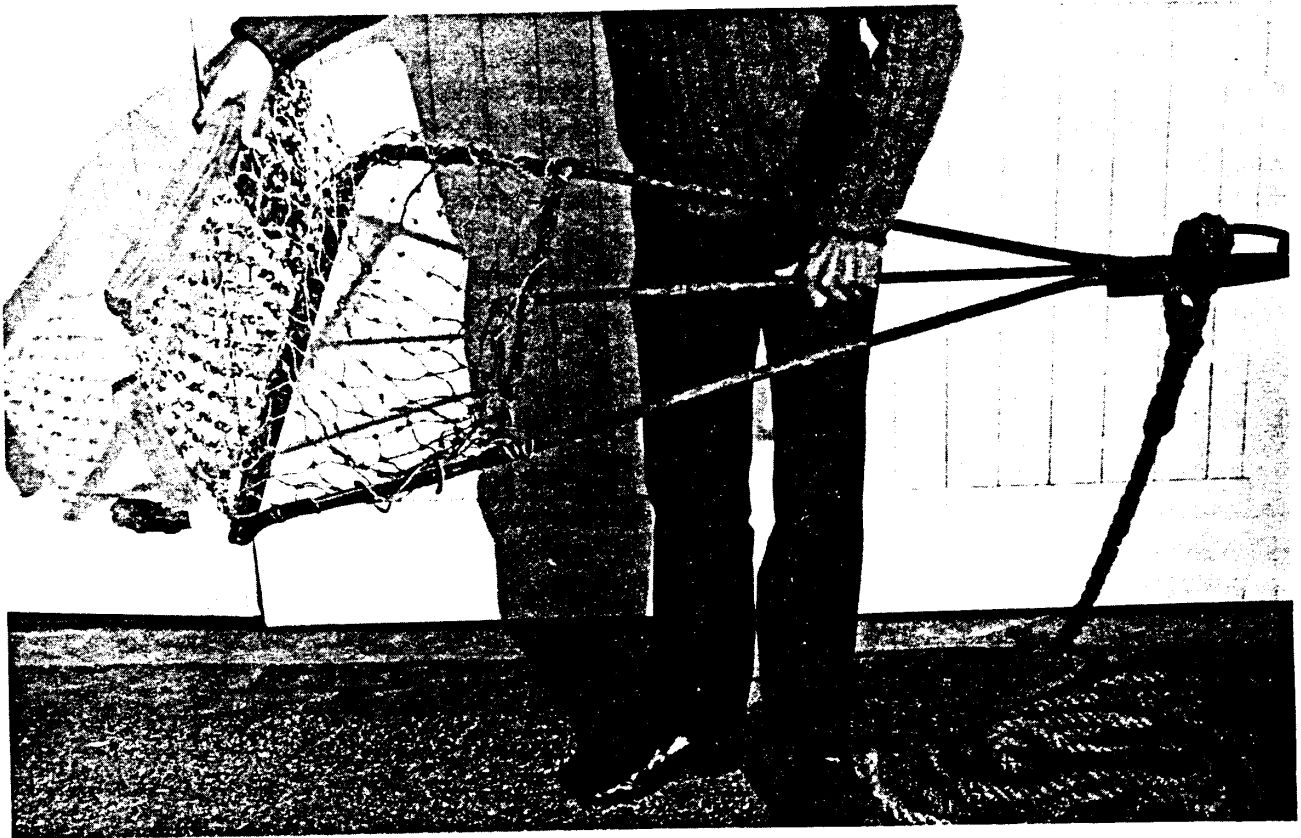


Plate 2 East coast pattern hand dredge.



Plate 3 Haul-tow boat used in the Truro fishery.

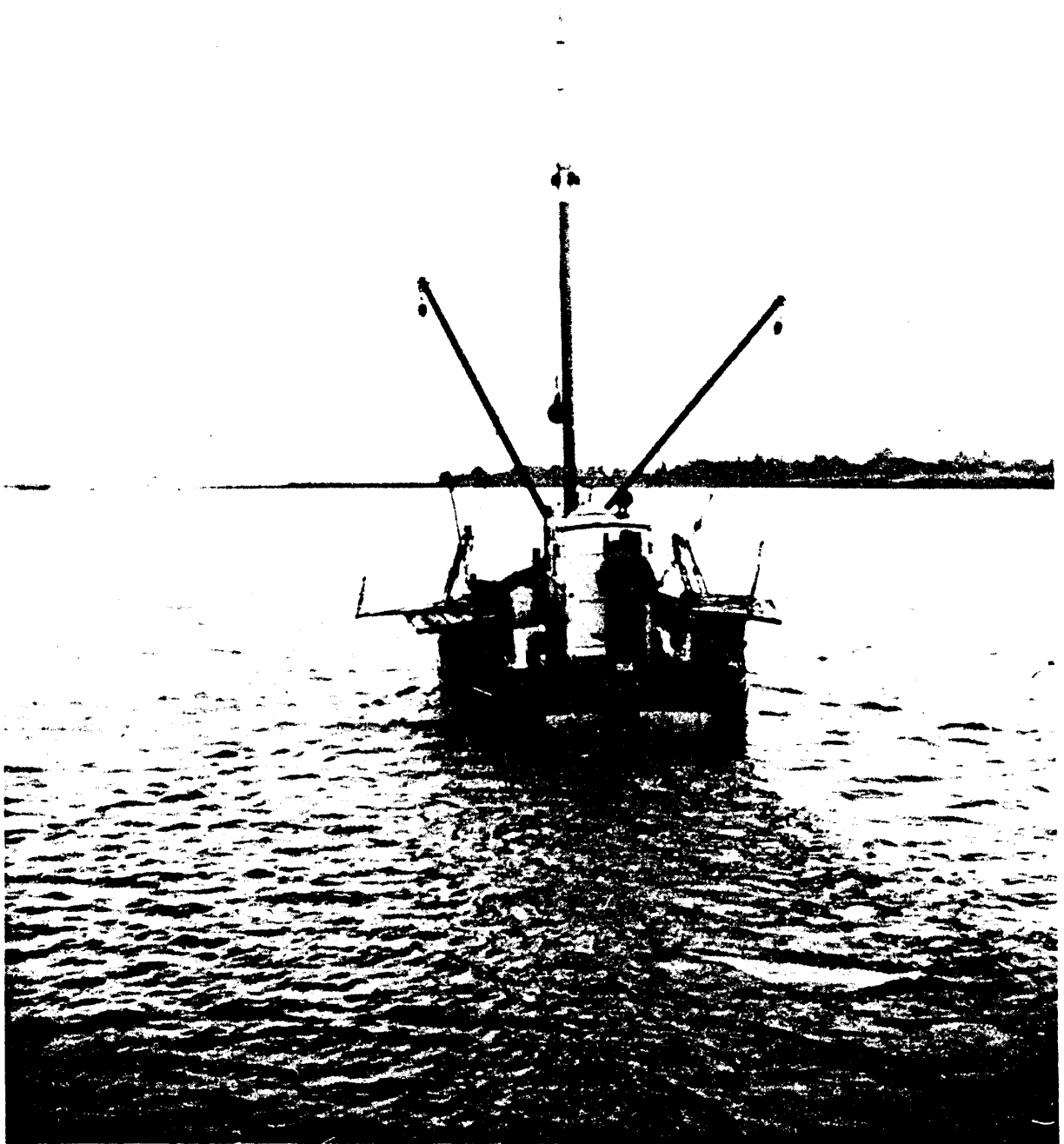


Plate 4 Typical powered oyster dredge.

within a river system or taking oysters from one part of the coast to another in early spring. Artificial collecting surfaces for the gathering of spat are not commonly used in England and Wales because spatfall is irregular, although mollusc shell is sometimes laid on oyster grounds to increase spat collection. The shells of mussels (Mytilus edulis) and queen scallops (Chlamys opercularis) have been used recently in attempts to revive under-productive grounds. In order to protect breeding stocks during the summer when spawning takes place, the sale of native-grown flat oysters is prohibited by law between 14 May and 4 August each year, but fishing is not generally resumed until September or later.

The Portuguese oyster (Crassostrea angulata) is imported as seed from Portugal in the spring and laid on grounds on the east coast of England to grow and fatten. The oysters are harvested in the summer of the same or the following year. This species requires a higher water temperature for spawning than Ostrea edulis and rarely reproduces in the relatively cool waters around the British Isles. This makes it particularly suitable for sale in summer when the flat oysters are spawning and are not available for sale. Crassostrea species are exempt from the legal restrictions which govern the sale of flat oysters in the summer months.

In the 1950s, in order to overcome the decreasing supply of brood oysters from spatting grounds both in the British Isles and from the Continent, the Ministry investigated various means of artificially increasing spat settlements. The research was carried out at its laboratory at Conwy in North Wales. These trials were aimed at developing methods of encouraging natural spat settlement by improving the design of spat collectors and more accurately timing the provision of these collectors. However, they proved unsuccessful owing to the shortage of adult oysters for spawning on the fisheries and the irregularity of spawning due to the variable climate. Attempts were also made to obtain settlements in large tanks but the output of spat was too small to be commercially viable.

The decision was then made to investigate fully controlled hatchery techniques. At first Ostrea edulis was used but later a wide range of Ostrea and Crassostrea species was studied. The oyster finally chosen as being the most suitable was Crassostrea gigas (the Pacific or Japanese oyster) for which highly successful culture techniques have now been developed and which has been found to grow well in many of our coastal waters. Like the Portuguese oyster, which it is replacing, it is unlikely to spawn in our coastal waters because the temperatures do not normally reach a sufficiently high level and it is thus ideally suited for the summer trade.

Four commercial hatcheries are now operating in the United Kingdom - at Whitstable, Oban, Orford and Brynsciencyn (Anglesey) - with a potential output of several hundred million spat a year, but few of these oysters have been grown to a consumable size on traditional English oyster grounds. Large quantities of small seed have been exported direct from hatcheries to the Continent, where techniques already exist for handling small spat detached from their settlement surfaces, or to Northern Ireland where an entirely new oyster fishery is being developed. Some of these oysters have been re-imported as part-grown brood oysters for growing on to market size in British waters.

Although at present the market in the United Kingdom for live oysters of the Crassostrea type is limited, it has been demonstrated that a demand can be easily created on a local scale. The prospects for a processed product are promising but, to date, there has not been sufficient mature stock available to launch a large-scale promotion of the new product. Failure to utilize existing seed stock is due to (i) lack of expertise in growing the small oysters (2 mm to 3 mm) to a size suitable for laying on oyster grounds, (ii) the large expenditure needed for trays, rafts and labour in order to on-grow the small seed, (iii) the lack of an assured market outlet. Several individuals and commercial concerns, not traditionally associated with oyster cultivation, are showing interest in growing this species and it is hoped that, when the market potential has been clearly demonstrated, there will be an increased demand and large quantities of Pacific oysters will be grown to commercial size in British waters. The Ministry at its laboratories at Conwy and Burnham-on-Crouch has put considerable effort into investigating methods of handling the small oysters, comparing growth on rafts with growth in trays on trestles fixed on the beach at the low water spring tide mark, and investigating growth rates at various localities around the coast.

So far Crassostrea gigas has proved to be more suitable than Ostrea edulis for hatchery rearing and artificial growing. This is due, in part, to the more resilient nature of the Crassostrea species, which thrives in a wide range of conditions: it usually grows faster than the flat oyster and a saleable product can be achieved in a shorter period of time and therefore at a lower price. In the last year or so the hatcheries have reared larger quantities of Ostrea edulis spat and, using the knowledge and expertise gained with C. gigas, it is expected that more flat oysters will be reared artificially in the coming years, thus boosting British production of this species as well.

RIGHTS AND OWNERSHIP OF OYSTER FISHERIES

In England and Wales any individual may fish for oysters on a public fishery, provided there is no contravention of the bye-laws made by the local Sea Fisheries Committee. There are three other arrangements controlling the rights of oyster fishing; the rights obtained by private ownership and those obtained under (a) Regulating Orders, (b) Several Orders granted by the Minister of Agriculture, Fisheries and Food under the Sea Fisheries (Shellfish) Act, 1967.

Private ownership

Some areas of tidal water are held privately by landowners, local authorities, estates and companies under ancient charter. These rights were granted by the Crown until 1215 AD and existing private rights must date back to that time, although ownership may have changed many times. The owner in these cases has sole right to make use of the sea bed or to let, sell or transfer his rights as he pleases.

Regulating Orders

A Regulating Order may be granted by the Minister of Agriculture, Fisheries and Food to any responsible body such as a Local Authority, Harbour Board, or Sea Fisheries Committee. A fishery subject to a Regulating Order

may be fished by the public provided a licence is held and providing any bye-laws, regulations or restrictions made by the controlling body are observed. Bye-laws may be made to control the fishery, conserve the stock or exploit the fishery rationally. They may limit the period or times of fishing, impose minimum size limits and quotas, and specify the type of boat and gear used. Levies may also be imposed to pay for the running of the fishery, for removal of pests, laying of shell and other tasks associated with improvement.

Several Orders

A Several Order granted by the Minister of Agriculture, Fisheries and Food may give an individual, a company, or other body sole rights for fishing for molluscan shellfish in a defined area. A Several Order is granted for a definite period; until recently, 60 years was common, but nowadays a much shorter period is usually adopted. Applicants for Several Orders must satisfy the Minister that they will bring benefit to their holding by cultivation. Annual returns must be made to the Minister, describing various aspects of the fishery. If in the opinion of the Minister the ground is subsequently not fully utilized, the Order can be 'determined', or ended, by him.

THE MAIN OYSTER FISHERIES OF ENGLAND AND WALES

East coast fisheries (Figure 2)

The east coast is one of the most important oyster-producing areas in Britain. For a period of 10-15 years prior to 1962 the stocks of oysters had increased generally and many of the layings of both full-time and part-time fishermen, particularly in the estuaries of the Rivers Crouch, Roach and Blackwater, were well stocked. However, these fisheries suffered heavily from mortality caused by the exceptionally severe winter of 1962/63 and cultivation of the oyster beds virtually ceased, the ground becoming derelict. Where stocks did survive, they were soon fished out because the value of oysters rose rapidly during the general shortage making it economic to fish low density stocks (Figure 1b). Grounds which did not go out of production were those then held by the larger oyster companies where capital was available to restock and enable the company to survive the period of non-productivity.

The River Colne fishery is privately owned by the Colchester Corporation and leased to one company which uses boats with power-operated dredges (Plate 4). Large stocks of Ostrea edulis are now established in the Colne following natural spatfalls and imports from Cornwall, Brittany, Norway and more recently from the Solent.

The West Mersea fishery consists of a large number of private layings worked by individual fishermen or by small companies. Both flat and Portuguese oysters are grown from relaid stock and between 25 and 30 men are employed in the area, either on a full-time or part-time basis. For many years this area has been the main centre for growing imported Portuguese oysters.

Production from the River Blackwater remains far below that achieved immediately prior to 1962, but in some areas natural recruitment has shown some improvement in recent years. There is a public fishery and also areas

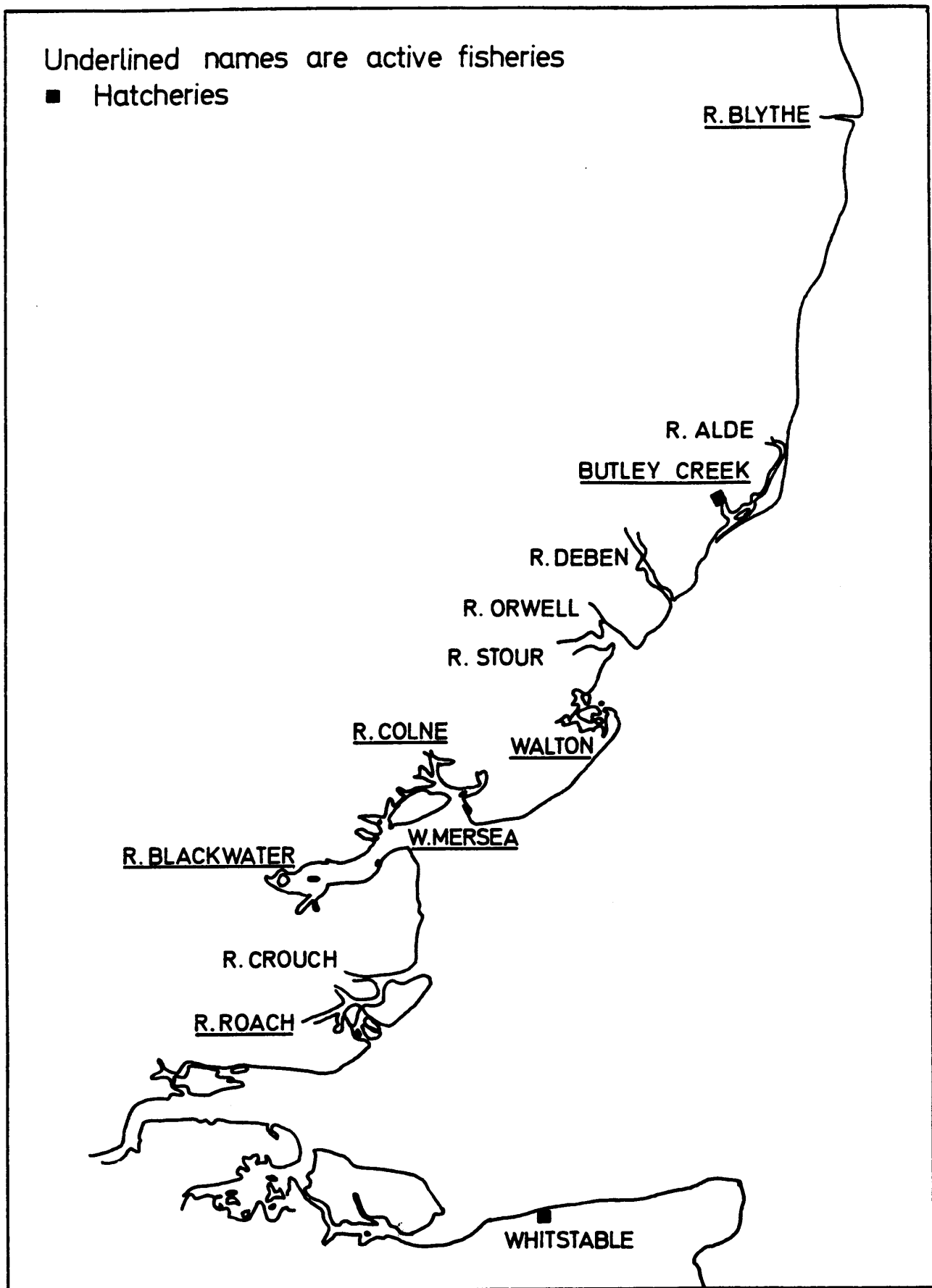


Figure 2 Oyster fishery areas of the east coast of England.

subject to a Several Order and grounds held under Royal Charter granted to the old Maldon Borough Council. Some stock is moved each year by one company from a ground covered by a Several Order to private layings in the Mersea area.

The estuaries of the Rivers Crouch and Roach are mainly privately owned or held under a Several Order by the Kent and Essex Sea Fisheries Committee. This latter body leases grounds to individual fishermen. Recovery from the 1962/63 winter has been very slow, although there is now evidence of an increasing interest in cultivation of established layings. Only five or six lays are being worked commercially with several others being used for experimental work by the Burnham Laboratory of the Ministry of Agriculture, Fisheries and Food. There has been no substantial spatfall for many years, although some settlements have occurred in localized areas. A limited restocking programme has taken place using oysters from the south coast and it is hoped that these increased stocks may bring about larger natural spatfalls in the future.

In Kent the waters adjacent to Whitstable were once one of the major oyster-producing areas in the country. There is now little oyster cultivation on the sea bed although one company is concerned with hatchery production of seed oysters.

In addition to these traditional oyster-producing areas, a number of smaller layings are also worked. For example, the fishery at Walton, Essex, is being worked under a Several Order and other fisheries are proposed or already exist in the Rivers Blyth, Deben and Butley in Suffolk and at Thornham, Brancaster and Blakeney Harbours in Norfolk. The majority of these fisheries are concerned with the Pacific oyster (Crassostrea gigas) using hatchery-produced seed. An oyster hatchery is in operation on the Butley River. Altogether upwards of twenty people are involved in these scattered operations, mostly on a part-time basis.

South coast fisheries (Figure 3)

The complex of inlets from Chichester Harbour to Poole Harbour is among the most active oyster-producing areas in the country at the present time. The Emsworth/Langstone Harbour complex was once a major oyster-producing area and at present it includes a Several Order and public fisheries. Although in recent years the stock has declined to a low level, with the increased availability of seed from other areas and the advent of hatchery-produced seed, interest has been renewed and future prospects are good, both here and in the Portsmouth area. Landings reached 15 000 oysters per month during the 1972/73 season, the best catch for several years.

Stocks of seed oysters taken from public and Several Order grounds in the Stanswood Bay area in the Solent have provided the greatest impetus for the United Kingdom flat oyster fishery for many years. Since the abundance of the stocks was first appreciated in 1970/71, several hundred tons of oysters have been dredged. The quality of these fast-growing young oysters made them acceptable to the British industry for relaying only. Because of the high price realized for this stock on the French market a large part of the catch has been exported, although seed oysters taken from this area have also been used for restocking many areas on the east and south coasts. Some have gone to the River Fal, traditionally recognized as an area of brood production.

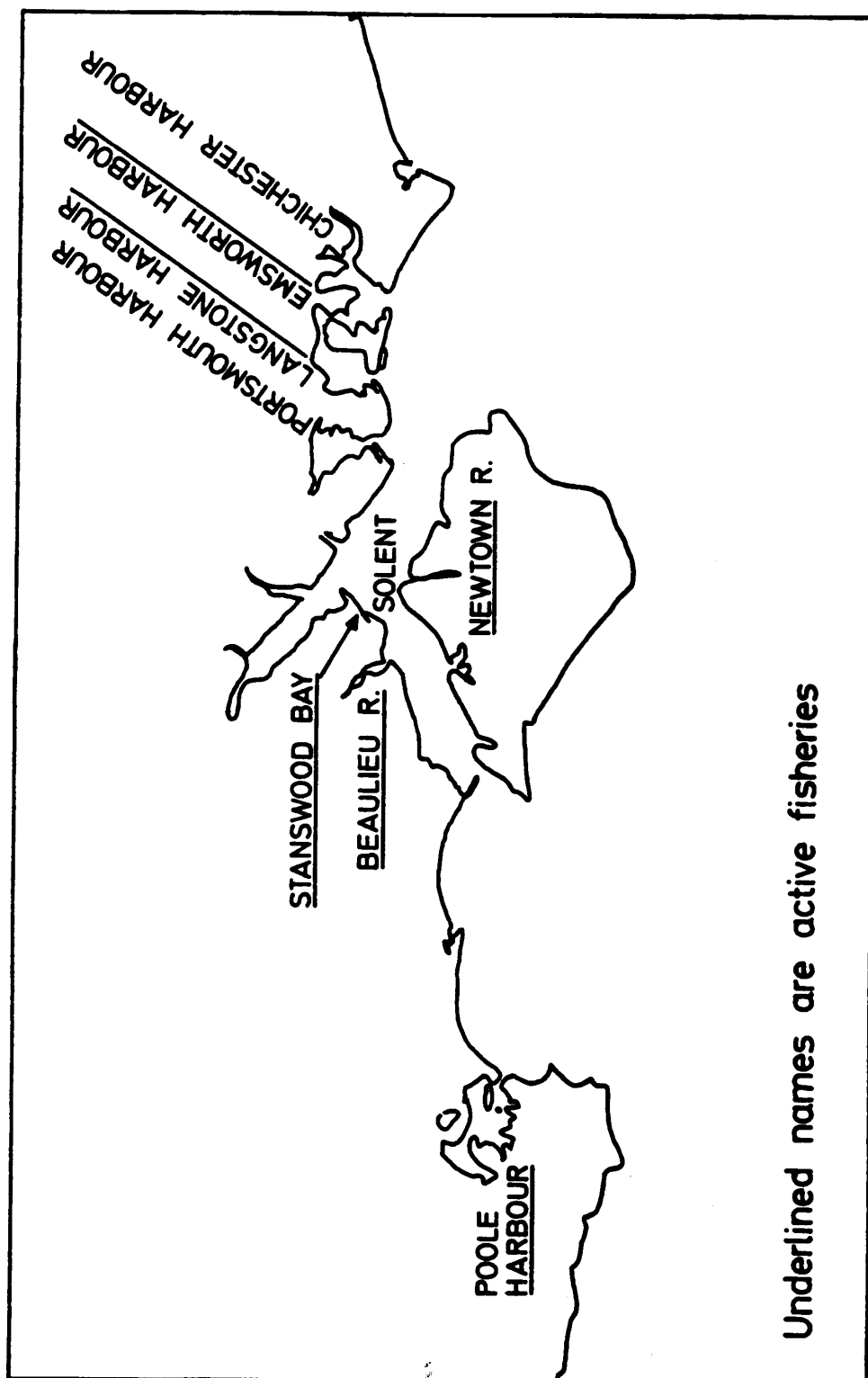


Figure 3 Oyster fishery areas of the south coast of England.

During recent years local and East Coast oystermen have fished the Solent heavily and the main stock has been reduced substantially. About 25 licensed boats and 65 men have been working the area. Boats now tend to dredge further afield in other parts of the Solent and have located additional stocks. At the peak of fishing over 50 boats and 150 men were working in the area during recent seasons.

The Solent is subject to the bye-laws made by the Southern Sea Fisheries Committee and by the British Transport Docks Board (Southampton), who hold the Sea Fishery Committee powers for Southampton Water.

The Southern Sea Fisheries' bye-laws restrict fishing in most of the area to a period from 4 August to 15 May and this period has been adopted for the major part of the free fishery licensed by the British Transport Docks Board. The public fishery area of Stanswood Bay is however subject to further limitations and fishing is restricted to a two-month period from 15 March-14 May.

Throughout the area a 2 inch minimum ring size is in force on public grounds.

The Newtown River on the north side of the Isle of Wight is fished by one private company. A private fishery also exists in the Beaulieu River to the west of Southampton Water, where considerable stocks have been built up over the years from an original importation of Brittany oysters. It is thought that spat-falls in Stanswood Bay have originated from parent stocks in the Beaulieu River.

Poole Harbour provides one of the major areas on the south coast for the culture of both flat and Pacific oysters. All areas suitable for oyster cultivation are held under Several Order by the Southern Sea Fisheries Committee, which has leased parts of the fishery to two private companies and to several groups of local fishermen. One company has developed an oyster hatchery and is growing the seed on rafts in the harbour. About 30 men are employed in the fishery, some on a part-time basis only.

South-west England (Figure 4)

Most of the rivers in the south-west are suitable for oyster cultivation but overall oyster production in this area has declined during the last 20 years. With the availability of seed from several sources during the past few years, there has been increased interest in reviving production in areas where oysters were once grown. The main centres of natural production are the Truro fishery in the River Fal and the Helford River. The Truro fishery of the River Fal extends nearly to Falmouth Harbour. It is a public fishery managed under a Regulating Order held by Carrick District Council. Bye-laws made under the Regulating Order restrict the days and times of fishing, limit the fishing to rowing boats (Plate 3) and sailing boats (Plate 5), and prohibit the removal of oysters of less than $2\frac{5}{8}$ inches (66 mm) diameter from the fishery. For the last two or three years yields from this fishery have been declining from a peak reached during the mid-1960s. When the fishery was well stocked and demand for seed was high, up to 100 licences were issued to full-time fishermen to dredge this area. Oysters are normally relaid for growth and fattening either on intertidal grounds adjacent to the fishery or in other areas of England, including the nearby Helford River and the East Coast.

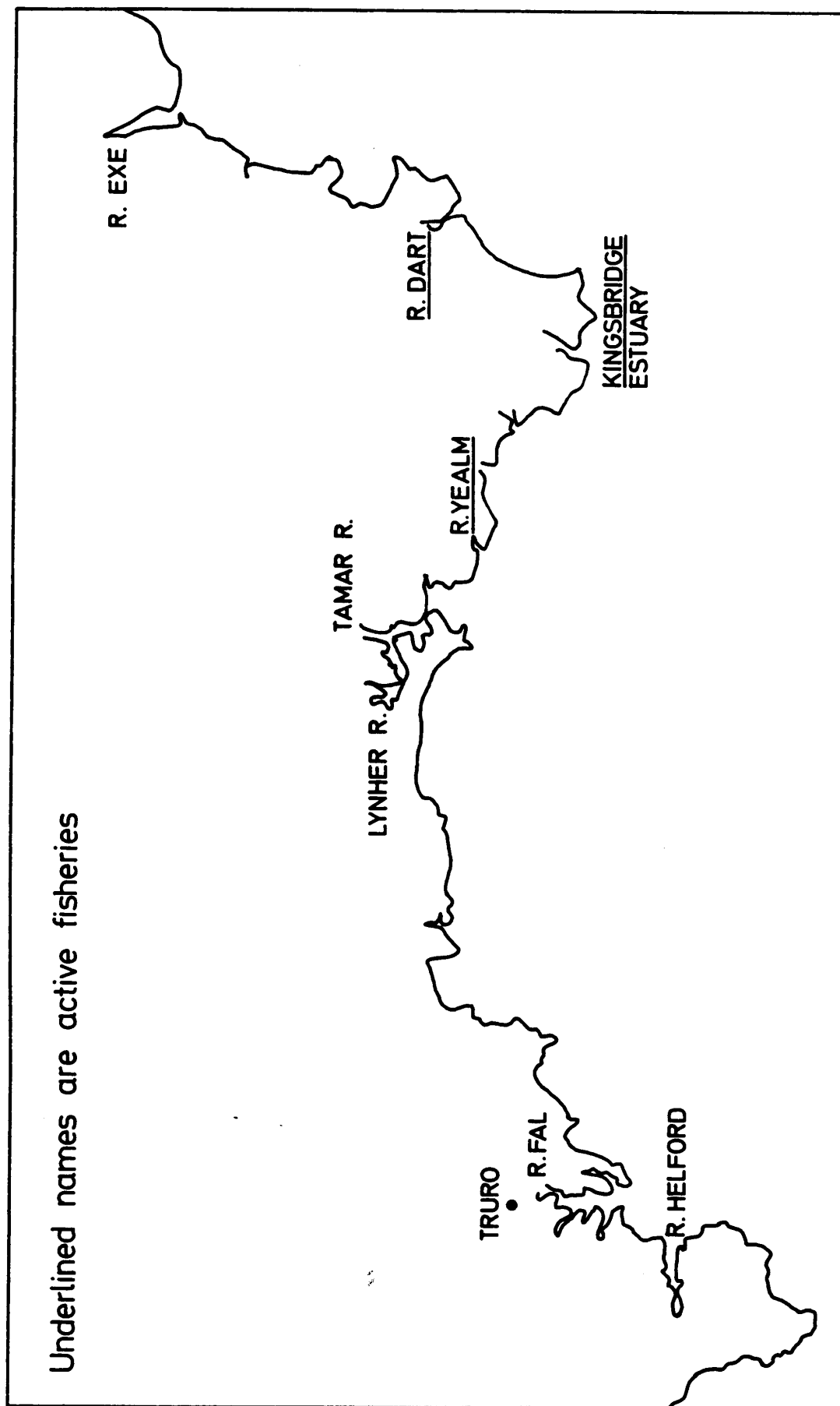


Figure 4 Oyster fishery areas of the south-west coast of England.

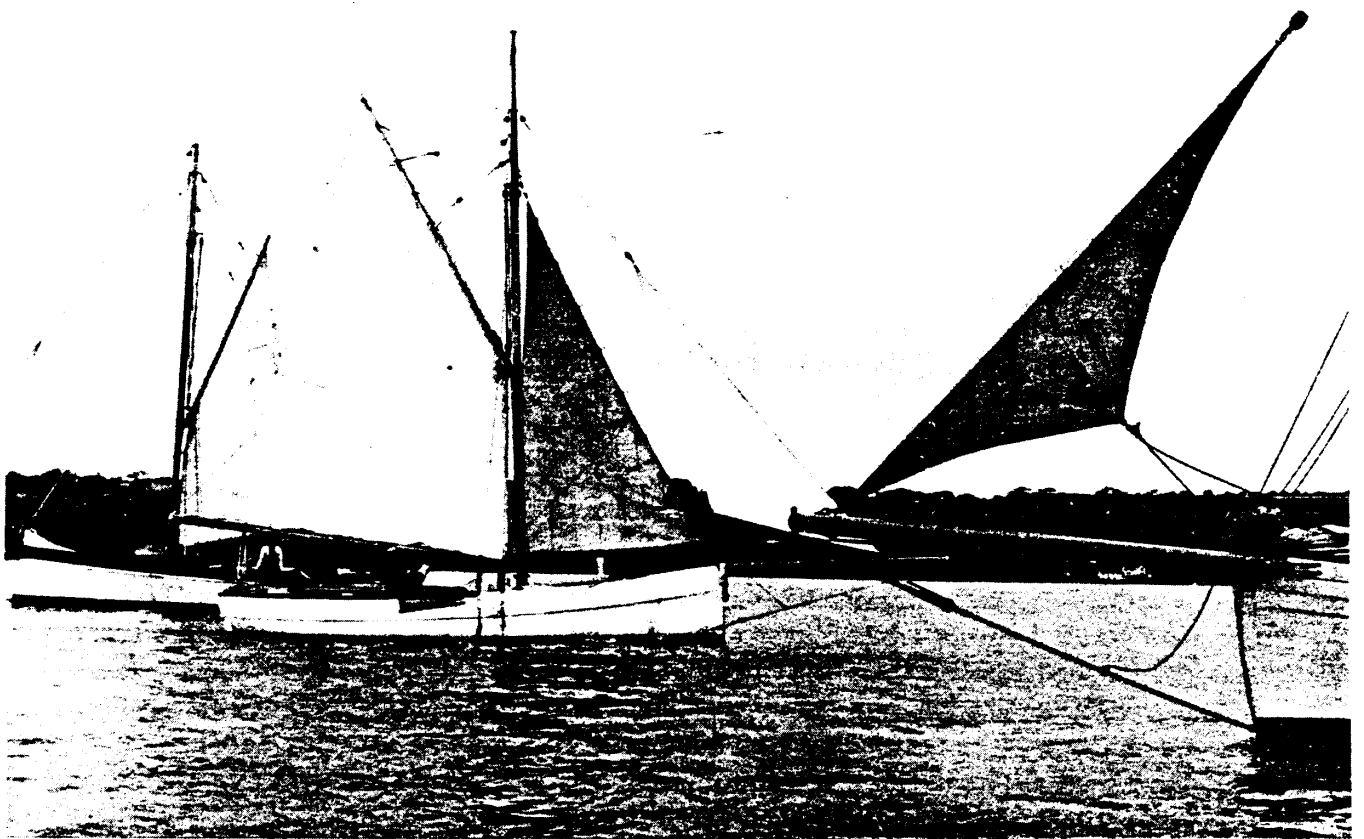


Plate 5 Sail boats fishing on the Truro fishery.

Further towards the mouth of the Fal estuary is the area of the Falmouth free fishery which is a public fishery. This fishery is now practically devoid of oysters, although a few are dredged by power boats in the Falmouth harbour area. Important private lays are farmed in the Penryn and Percuel Rivers which adjoin the harbour area. Stocks for these areas are obtained from other spat-producing fisheries, namely the Truro fishery, the Solent and Brittany.

The Helford River fishery is privately owned and the majority of its stock is obtained from the Truro fishery. It is not recognized as a good spatting area but stock grows and fattens well in this estuary.

The River Yealm is traditionally an area for fattening oysters. It has been the site of a private hatchery producing mainly Pacific oysters, but operations there now are concentrated on the growing on of this species. There are small layings in the Kingsbridge Estuary and in the River Dart, the former growing hatchery-reared Pacific oysters, and the latter both flat and Pacific oysters.

The Rivers Tamar and Lynher hold stocks of oysters which are settled naturally. There has been a Closing Order on this fishery for public health reasons now since 1966, but it is hoped to reopen this area as a brood stock fishery again in the near future.

Recently there has been considerable interest in exploiting other west country rivers, notably the Teign and Exe where culture of hatchery seed of both European flat and Pacific oysters could be established soon.

Wales

In South Wales there were once important oyster fisheries at Mumbles in Swansea Bay and in the River Cleddau, near Milford Haven. These areas have since been fished out but both are considered suitable for the introduction of Solent oysters and of Pacific oysters, and trial layings are either contemplated or are under way.

In North Wales there is a private hatchery on the island of Anglesey. This uses the Menai Straits as a growing area for its seed. In addition, there is a private oyster fishery in the Menai Straits.

PESTS AND DISEASES

With the potential expansion of the industry, increased stocking of beds with oysters from other areas and new opportunities for export of molluscs, the problems relating to the spread of pests and diseases assume greater importance. At present most of the major pest and disease problems in this country occur along the east and south coasts, an area to which American oysters with their associated pests were imported during the 19th and early 20th centuries. Along the Essex and Kent coasts the slipper limpet (Crepidula fornicata) and the American whelk tingle (Urosalpinx cinerea) have established themselves in great numbers. Over the years Crepidula have gradually spread to other areas, particularly along the south coast.

Another localized molluscan pest is the red worm (Mytilicola intestinalis), a Mediterranean copepod parasite usually found in mussels (Mytilus edulis). Although this parasite is relatively harmless to oysters it can be carried by them into areas where it could do great damage to mussel beds.

As a result of the importation of oysters probably in the early 1960s, a gill-disease of oysters was introduced to this country from France. Earlier a shell disease had been introduced from Holland. Fortunately, these diseases affected oysters in only one or two limited areas and they have not generally been a serious problem. More recently a fungal disease has taken great toll of the French flat oysters and in order to protect our own stocks a total ban has been imposed on the importation of French oysters into Britain.

To prevent the spread of these pests and diseases within England and Wales and from abroad, strict control has been imposed by the Ministry of Agriculture, Fisheries and Food under the Molluscan Shellfish (Control of Deposit) Order, 1974. Movement of shellfish into the country and between certain areas within this country is prohibited except under licence. Details of the scheme can be obtained on application to the Ministry.

FUTURE PROSPECTS

The total number of people currently involved in the industry is probably less than 250, including part-time fishermen. Shortage of seed oysters prevented immediate revival of the fishery in the 1960s, and after a lapse of 10 years it is only in areas where there is either capital available, or the fishermen can work the grounds in conjunction with other activities, that there is any sign of revival. The stocks available from the Truro fishery in the late 1960s and the Solent stocks, which became available in the early 1970s, have been used for re-establishing a few areas. A large proportion of the Solent stock was, however, exported before being grown to its full market value.

There are many good oyster grounds which could be brought back into cultivation. At present the Ministry of Agriculture, Fisheries and Food makes grants available to assist in reclaiming grounds which are affected by pests and diseases, such as Crepidula or shell disease. These grants are worth £225 per acre for the cleansing of the ground, plus half the cost of restocking with oysters to a density of at least 100 000 oysters per acre, up to a maximum of £550 per acre.

The fishery based on the Portuguese oyster (Crassostrea angulata) has declined and, because of difficulties with imported stock, it seems unlikely that there will be any great revival of these stocks in the future. However, restocking of traditional Portuguese oyster fisheries and large-scale expansion of the industry in other areas is likely to come from the hatchery-rearing of the Pacific oyster. Seed of this oyster is now available from commercial hatcheries and many people, both inside and outside the traditional industry, have started cultivation of this species. With the possibility of growing Pacific oysters to marketable size within two years, there appears to be good prospects for this form of culture, provided the problem of handling small hatchery stock without excessive loss can be overcome. To assist in the development of this new potential in the oyster industry, investigations have been made by the Ministry's Directorate of Fisheries Research to develop the handling techniques and growing conditions required by Pacific oysters. The experience gained by direct experimental work and post-hatchery growing-on trials is now available to the industry.

With the advent of tray and raft culture for the Pacific oyster seed, the condition and nature of the sea bed becomes less important. Production need not be restricted to the traditional oyster areas. Where old layings are used to grow-on Crassostrea gigas the effect of working them may well stimulate native spat production.

The major market for the Pacific oyster in the United Kingdom will probably be concerned with prepacked, frozen or ready-cooked products. The flat oyster market may be slightly enhanced as people in England become used to eating oysters again.

The new techniques developed for handling Pacific oyster seed are being adapted for use with flat oysters, thus enabling that part of the industry to become less reliant upon natural spat settlement, a factor which has been the major restriction on its expansion in the United Kingdom. The hatcheries are turning their attention more and more to the production of Ostrea edulis seed.

LABORATORY LEAFLETS

- No. 1 Newfoundland Fishing. December 1962.
- No. 2 Spotlight on the American Whelk Tingle. December 1962.
- No. 3 Yorkshire Crab Investigations 1962. May 1963.
- No. 4 Trawling Prospects off West Norway. September 1963.
- No. 5 Notes on Escallops, and Details of the Baird Sledge Dredge and its Handling. February 1965.
- No. 6 Studies with the Woodhead Sea-Bed Drifter in the Southern North Sea. February 1965.
- No. 7 The West Greenland Cod Fishery. March 1965.
- No. 8 Future Prospects in the Distant-Water Fisheries. May 1965.
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- No. 10 Protecting British Shell Fisheries. April 1966.
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- No. 13 Lobster Storage and Shellfish Purification. August 1966.
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- No. 17 Yorkshire Crab Stocks. September 1967.
- No. 18 The Torrey Canyon Disaster and Fisheries. February 1968.
- No. 19 Oyster Pests and their Control. May 1969.
- No. 20 The Production of Clean Shellfish. September 1969.
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- No. 24 Marine Fish Farming: an examination of the factors to be considered in the choice of species. January 1972.
- No. 25 Genetics and Fish Farming. March 1972.
- No. 26 The Cockle and its Fisheries. April 1972.
- No. 27 Prawn Culture in the United Kingdom: its status and potential. June 1972.
- No. 28 The Fishery for the Pink Shrimp, Pandalus montagui, in the Wash. June 1973.
- No. 29 The Impact of Mechanical Harvesting on the Thames Estuary Cockle Fishery. November 1973.
- No. 30 Norfolk Crab Investigations, 1969-73. November 1975.

NOTE

Although the complete list of Laboratory Leaflets is given to show the scope of the series, it will be appreciated that many of these leaflets are topical and therefore of interest chiefly at the time when they are written. For this reason most of the earlier ones are being allowed to go out of print when present stocks are exhausted; few copies are available of those prior to No. 13.