

S h e l l f i s h a n d B e n t h o s C o m m i t t e e

By A.C. SIMPSON

M O L L U S C A

Belgium

(E. Leloup)

Oysters

The study on the growth-rate of the oysters cultivated in the sluice-dock (bassin de chasse) at the port of Ostend has been continued.

Mytilus edulis

As during previous years, investigations were carried out on the mussels living along the Belgian coast in order to ascertain the extent and degree of the infection by Mytilicola intestinalis.

Finland

(S.G. Segerstråle)

Benthos

Quantitative sampling of the benthos has been continued between June and September using a Van Veen grab at standard stations in the southern Baltic, Gulf of Finland and Gulf of Bothnia.

The biology of Mesidotea entomon and Harmothoe sarsi is being investigated, a survey of the Ostracod fauna made and the littoral fauna of the innermost parts of the Gulf of Bothnia is being investigated by diving. Quantitative studies of the macro-fauna of the Bornholm depression are being made in co-operation with the Zoological Station, Kristineberg, Sweden.

France

(L. Marteil)

Huîtres

Croissance et reproduction ont été étudiées chez Ostrea edulis et Crassostrea angulata des divers centres d'élevage du littoral.

Si la croissance d'O. edulis a été, cette année encore, excellente, celle de C. angulata a présenté une amélioration notable sur les années précédentes, particulièrement dans le bassin d'Arcachon. Cette amélioration semble avoir été favorisée par une modification des conditions de milieu.

Le processus sexuel a été accéléré par le réchauffement rapide des eaux à la fin de l'hiver 1965-1966. La ponte débuta partout très tôt: à la mi-mai pour O. edulis en Bretagne et à Arcachon, début juin pour C. angulata au sud de la Loire. En général, l'évolution des larves émises a été meilleure qu'en 1965 et les fixations sur les collecteurs plus importantes. Cela est vrai notamment en Bretagne pour l'huître plate et dans le bassin d'Arcachon pour l'huître portugaise.

Les laboratoires ont poursuivi la mise au point de différents modèles de collecteurs à huîtres fabriqués en matières plastiques; certains de ces collecteurs ont été expérimentés dans des zones nouvelles ou dans des conditions particulières, par exemple en eaux profondes.

Pour pallier aux insuffisances de la production nationale, de grandes quantités d'huîtres étrangères ont été importées: Ostrea de l'Adriatique, huîtres portugaises du Portugal. Le comportement des huîtres plates de l'Adriatique dans les eaux françaises a varié selon les lieux d'immersion, mais aussi suivant les conditions de pêche, de stockage et de transport. Développement et maturation des gonades ont été plus précoces chez ces huîtres que chez les produits indigènes.

Un essai d'élevage de naissain de C. gigas importé du Japon a été tenté dans la région de Marennes. Pour une même taille initiale, l'accroissement linéaire des huîtres du Japon a été de 1,6 fois supérieur à celui des huîtres indigènes.

L'étude de la mise en valeur des marais côtiers a été poursuivie, notamment en Vendée et en Gironde. Les conditions d'utilisation ont été précisées; âge et poids des sujets, mode d'élevage (en casiers), aménagement des marais ou des sols, emploi éventuel d'éléments fertilisants.

Partout, enfin, ont été expérimentés des procédés susceptibles de permettre l'exploitation de terrains nouveaux ou de favoriser la croissance. L'emploi de casiers surélevés ou l'utilisation de sacs de grillage à base de matières plastiques se sont révélés satisfaisants.

Moules

En Bretagne, les fixations de naissains et la croissance ont donné satisfaction. On notera, cependant, une infestation sévère des moules de bouchots implantés en baie du Mont St.-Michel par des trématodes (Bucephalus sp., Cercaria tenuans, etc...) dont la prolifération a pu provoquer la mortalité constatée à la fin de l'été.

Dans la région de la Rochelle, la fixation du naissain a été bonne en baie de l'Aiguillon; la croissance a été satisfaisante. Il faut signaler la présence d'un nombre considérable d'étoiles de mer sur les bouchots implantés le long des côtes vendéennes.

Coquilles St.-Jacques

Les recherches sur les coquilles St.-Jacques ont été entreprises, en trois points principaux, sur les côtes de Bretagne; dans la baie de St.-Brieuc, en rade de Brest et dans les coureux de Belle Ile.

Les divers gisements présentent souvent des différences quant à la composition par groupes d'âge; en baie de St.-Brieuc les groupes 1 et 2 dominant, en rade de Brest ce sont les groupes 3 et 4 qui représentent plus des trois quarts de la population, dans les coureux de Belle Ile le groupe 1 est nettement prépondérant. Ces stocks sont généralement surexploités, toutefois les rendements sont les plus importants en baie de St.-Brieuc où l'abondance de jeunes coquilles est intéressante pour l'avenir.

Les déplacements de ce mollusque ont été étudiés par marquages sur plus de 3,000 spécimens. Les recaptures faites jusqu'à présent montrent que les déplacements sont assez limités, généralement moins d'un mille, six exceptionnellement.

Germany

(P.F. Meyer-Waarden)

Mytilus edulis

Routine investigations on the growth and quality of wild and cultured mussels and on the infection rate with Mytilicola intestinalis have been continued by the Institut für Küsten- und Binnenfischerei.

Benthos

In order to study the distribution of the sole in relation to that of the benthic food off the coast of East Friesland, 89 samples of benthos were taken by bottom grabs and a dredge. Another 44 benthos samples were also taken by the Institut für Küsten- und Binnenfischerei on the occasion of a research cruise of the F.R.V. "Anton Dohrn" into the middle parts of the Baltic Sea during April and May 1966.

At special stations in the southern North Sea benthic communities are systematically sampled at monthly intervals with the aim of studying changes in species distribution and dynamic aspects of the eco-system by the Biological Station Heligoland. Special emphasis is put on molluscs, crustaceans and polychaetes.

At the Institut für Meeresforschung in Bremerhaven the distribution of micro-benthos in the southern North Sea is studied with special emphasis on nematodes, fungi and bacteria.

Iceland

(U. Skúladóttir)

Cyprina islandica

Routine observations on samples of Cyprina to study growth-rate etc. were continued.

Ireland

(F.A. Gibson)

Oysters

Investigations of the stocks of oysters in Tralee Bay were continued and expanded. A heavy natural spatfall was recorded in July and August, 1966. Each week during the summer the progress of artificially reared oyster larvae and spat was studied at a site on the west coast.

Mussels

A rapid decrease in the quantity and quality of mussels at Cromane, Co. Kerry in 1966 necessitated a recommencement of investigations on this stock. Initial examination of the area indicates that very recently there have been changes in the current system due to land drainage with resultant salinity and sediment alterations.

Netherlands

(P. Korringa)

Oysters

Since the disastrous winter 1962-1963 virtually wiped out the oyster stocks in the Oosterschelde only a few oystermen carry on. The present annual production of marketable oysters is almost entirely based on the relaying of foreign stock, predominantly Brittany oysters.

Though the winter 1965-1966 was not unusually cold, water temperatures dropped long enough below the critical level for French oysters to kill those which were left behind on the beds. In the storage basins low water temperatures and low salinities caused some trouble and led in January and February to noticeable losses among the stored oysters. This led some oystermen to construct storage ponds with re-circulated carefully filtered water, in which basins temperature, salinity and particulate organic matter can be kept under control. Assistance was rendered by forecasting spells of low salinities and by observations on a possible outbreak of Hexamita in these basins.

A careful study was made of the salinity pattern in the Oosterschelde as influenced by fluctuations in the run off of the river Rhine. Development of the Delta-project makes conditions temporarily more difficult, but it is expected that completion of the locks in the Volkerak will within a few years bring rather high and stable salinities. Therefore oystermen and lobster dealers try to carry on their business by using storage basins for the time being.

French oysters have been relaid on the Oosterschelde beds in the spring of 1966. Somewhat later in that year flat oysters fished on deep water beds in the Adriatic Sea, off the Italian coast, have been relaid on an experimental scale. It took a long time before these oysters showed any growth at all, presumably because of the great difference in salinity between the Adriatic Sea

and the Oosterschelde. The Adriatic oysters were carefully checked on arrival for the presence of parasites and predators, especially for drills and their egg-capsules. Laboratory investigations revealed that the Adriatic oysters are even more sensitive to low water temperatures than the French oysters, which in their turn cannot stand low water temperatures as well as the native Zealand stock.

Water temperature in the Oosterschelde rose to 20°C in the middle of June, too early to expect oyster larvae, but soon dropped to 16 and 17°C. In July water temperatures as high as 17 1/2°C., the critical temperature for the development of oyster larvae, were seldom observed, and only in the middle of August, too late for oyster larvae, were water temperatures of 18°C and over recorded. As a consequence spatfall of oysters was a complete failure in the year 1966.

Mussels

The low salinities observed in the Oosterschelde early in the year 1966 had no appreciable deleterious effect on the mussel industry. On cleaning plots near Yerseke salinities lower than 18‰ did not occur, and hence no mortality struck the mussels in stock there.

Considerable attention was given to the development of the project for studying experimentally all factors associated with cleansing and storage of mussels. The plant mentioned in the Administrative Report for the year 1965 was to be built in the south-eastern section of the Wadden Sea, in the polder Zuricheroord. Careful study of the salinities prevailing there in 1966, based on continuous recording, led to the conclusion that in years with a more than average run-off of the river Rhine, and hence with increased sluicing out of fresh water from the IJseelmeer, salinities at Zuricheroord are under 15‰ for prolonged periods. Salinities under 10‰ do then occur on an appreciable scale. Considering the time available for the experimental work the conclusion had to be drawn that the site chosen could endanger the whole project if in the years to come discharge of fresh water would be well above the average. Since building had not yet started the decision was taken to switch over to another site in the Wadden Sea where salinities are high and equable and where low salinities for experimental work can be created by admixture with fresh water drawn from a near-by polder. Building of laboratory and technical plant had not yet been started at the end of 1966.

Norway

(K.R. Gundersen)

During May-June the coastal areas of western and northern Norway from Møre to the Polar Circle were surveyed. Mya arenaria was scarce, and the few beds located were small and sparsely populated. Mytilus edulis was restricted to the inner part of the fjords, but beds of commercial value were not encountered, the mussels being small and of poor quality. Only those living below wooden piers were commercially sized and of a good quality. Large beds of Modiolus modiolus previously exploited for bait, were discovered again.

Mytilus edulis

In the Inner Oslofjord mussels from various localities were tested for taste of mineral oil; such a taste was only indicated in mussels taken near the city of Oslo. No oil taste was noticed in mussels close to the oil refineries in the fjord.

Cleansing experiments with mussels from sewage polluted areas were carried out in chlorinated water in tanks near Oslo. In January and February at a water temperature of 0-4°C and a water volume of 1 litre per mussel, they were cleansed completely from bacteria in three days. In July very few E. coli were found in the mussels, probably because of the bactericidal action of sunshine and plankton algae. The mussels got rid of the bacteria in 24 hours.

In the Oslo Fjord and Trondheimsfjord mytilotoxin (PSP) was not recorded in 1966.

Experiments on the cultivation of mussels were started. Six rafts made from porous plastics and wooden planks with spat collectors made from different materials suspended below the raft, were placed in various localities along the coast.

In most places a very successful settlement of spat took place in June. On the east coast the settlement was so heavy that most of the mussels slid off the collectors. Some of the mussels grew to a size of 50 mm during the autumn, and the average growth was very good. If there is a corresponding good growth during spring, the mussels will be of commercial size within one year.

Poland

(L. Zmudziński)

Benthos

Samples of bottom macro-fauna have been collected during the winter and spring months of 1966 on two hydrobiological stations situated in the Bornholm Deep (B₁) and the Gdańsk Bay (G₂).

Studies have been made of the qualitative and quantitative composition, and of the distribution of bottom macro-fauna off the Polish coast in the years 1964-1966 using 29 profiles of the coastal line down to the 2 m isobath.

The laboratory presentation of the shallow water macro-fauna of the Polish coast of the Baltic (up to isobath 40 m) has been completed, on the basis of the quantitative samples collected in the years 1963-1965 on 24 stations.

The biology and phenology of reproduction of some main species of the bottom macro-fauna have been investigated on the basis of the material collected in 1964-1965, as well as using experimental plates immersed in the waters at the Wladyslawowo port.

Portugal

(H. Vilela)

Oysters

Investigations were continued on spatfall, sulubrity and parasitology of Crassostrea angulata.

United Kingdom

I. England and Wales

(A.C. Simpson)

Ostrea edulis

Some 24 species of marine unicellular algae have been tested as food for rearing oyster larvae and spat and Tetraselmis suecica alone has proved equal to or better than the widely used Isochrysis galbana. Mixtures of different foods are being tested. Work is progressing on the testing of a range of antibiotics to combat bacterial contamination which can cause serious losses during large scale rearing. Aqueous extracts of oyster flesh applied to settlement surfaces have significantly increased oyster larval settlement. The active substance appears to be proteinaceous.

A semi-commercial scale oyster-rearing unit has been making satisfactory progress.

There has been negligible natural spat settlement on the oyster grounds of south-east England since the cold winter of 1962/63 and experiments are in hand to determine whether Norwegian poll-produced oysters can be used for stocking these grounds.

A further 6 oyster-purification plants came into operation during the year. Studies are being made on the occurrence of human viruses in oysters and on the effect of chlorinated sewage effluents on oysters.

Crassostrea angulata

Research is continuing on the effect of tidal exposure on the growth of Portuguese oysters. An investigation was also made into the unusually high mortalities among Tagus oysters imported into Britain during 1966.

Mytilus edulis

Continued study of the settlement and survival of mussels on artificial surfaces (including slabs of rubberised hair) have shown that the shore crab Carcinus maenas is a major factor in survival.

The maximum growth-rate that can be achieved under conditions in N. Wales appears to require some 21/2 years to reach a mean total length of 63 mm (2 1/2 inches).

Intensive studies of the growth and survival of mussels on an exposed rocky coast have been made.

Cardium edule

The study of the population dynamics of cockles in the Burry Inlet, South Wales, is being continued. The fishable stock is now composed almost completely of the exceptional abundant 1963 year-class. Work on the control of oystercatchers in the Burry Inlet continues.

A cockle dredge with hydraulic lift to the surface is being developed.

Mercenaria mercenaria

Large numbers of clams are now readily reared as required. Trials are being made to grow them on in heated sea water comparable to power-station effluents and lays of larger clams have been started at 16 sites round the coast. Studies on predation by Carcinus maenas continue.

Pecten maximus

Surveys are being made of scallop populations on the south coast and a study of seasonal changes in the gonads is in hand. Attempts are being made to study the distribution and growth of 0-group scallops.

Haliotis

Marking experiments in Guernsey has permitted the determination of growth-rates which agree reasonably well with estimates from shell rings.

Loligo forbesi

Studies on growth and reproduction based on weekly trawled samples off Plymouth have continued. Some recovery of populations of this and other cephalopods has been noted since the decline following the severe winter of 1962-63.

Venus verrucosa and Venerupis rhomboides

A further study of the benthos in the English Channel has been made and obtained on the mortalities of these molluscs in Poole and Weymouth Bays following the 1962-63 winter.

II. Scotland

(H.J. Thomas)

Pecten maximus

Data on catch-per-unit effort of scallops have been maintained for the Firth of Clyde and from the west coast fishery. Sampling has been undertaken by research ship, from commercial vessels and from the commercial catch. During the 1965/1966 season the stocks on the west side of the Firth of Clyde comprised a considerably higher proportion of small scallops than those on the east side. The catch-per-unit effort in 1965/1966 showed a decrease as compared with the previous season in both areas.

Cardium edule

Further studies have been made of the cockle beds at Barra. In a transplanting experiment the transplanted cockles survived as well as those which

were undisturbed and where transplanted from the main area of settlement in the upper levels to lower levels of the shore, the cockles showed a much more rapid rate of growth.

Mytilus edulis

Experiments on the rope cultivation of mussels have been initiated in Loch Ewe and Loch Sween. A further survey of the distribution of Mytilicola in Scottish waters has been carried out. The general distribution has changed little since 1961 but the percentage of mussels infected and the number of parasites per mussel have declined markedly.

Loligo, Alloteuthis etc.

Very few squid have been taken on the research vessels or by commercial boats. The data on commercial landings have been maintained.

Ostrea edulis

The oyster investigations carried out from the Marine Station, Millport in 1966 were concentrated on laboratory experiments in breeding, the culture of larvae, and the physiology of the larva of the European flat oyster, Ostrea edulis. Field experiments were also made on the suspended culture of adults.

Benthos

Loch investigations work has been concentrated on food-chain studies on a plaice nursery ground between high water mark on the beach and 10 m depth below low water mark.

Physical observations include temperature, salinity, particle size of the substratum, and movements of sand. Biological observations include an extensive faunistic survey. The meiobenthos (animals passing through a 1/2 m sieve) comprises mainly nematodes and copepods, with fewer turbellarians, ciliates and gastrotrichs. These were found down to 25-30 cm in the sand, but mainly in the top 10 cm. The macro-benthos, a typical Tellina tenuis - Tellina fabula community, comprises, on the beach, 5 dormant species (T. tenuis, Ophebia rathkei, Merine cirratulus, Eurydice pulchra and Bathyporeia pelagica) with an average wet weight of 13.7 g/m². Sublittorally a wider range of species has an average biomass of 18.3 g/m² wet weight. Tidal migrants (mainly amphipods, cumaceans and mysids) were sampled from a bottom plankton net towed in the surf zone of rising tides.

A study of the dominant species is being made to obtain estimates of growth mortality and recruitment for calculations of productivity.

Physiological work includes measurement of the filtration rates of Tellina tenuis, which plays an important part in the diet of young plaice. Experiments show that Tellina feeds, to some extent, from the water rather than from the sand.

The larger benthic animals in the bay have also been surveyed with particular emphasis on flat fish - mainly 0+ stages of plaice and cabs. Estimates have been made of population density and of mortality and growth-rates. The feeding of fish on the benthos has also been examined.

Benthos studies are being made in an artificial marine pond constructed in an intertidal area. Samples have been taken regularly since the pond was first flooded in the late summer of 1965. The elimination of the original intertidal fauna and the establishment of a true subtidal community is being investigated.

U.S.S.R.

(A. Pogdanov)

In summer 1966 the quantitative study of zoobenthos was carried out in the eastern area of the North Baltic, northern area of the Gulf of Riga and eastern area of the Gulf of Finland. A total of 226 specimens of zoobenthos were sampled at three different stations. The gear used was an Ocean-50 type bottom-sampler. As usual two quantitative samples were taken at every station, the temperature and salinity of the near-bottom water was determined, and the nature of soil was described.

C R U S T A C E A

Belgium

(E. Leloup)

Crangon crangon

The biological study of the shrimps was continued. Its aim is to ascertain the annual pattern of the stock of shrimps on the Belgian Coast.

Denmark and Greenland

(Aa.J.C. Jensen & E.L.B. Smidt)

Nephrops norvegicus

Investigations into the stocks of Nephrops in the Skagerrak and northern Kattegat were carried out in June and October.

Pandalus borealis

The stocks of Pandalus in the Skagerrak and northern Kattegat were also studied in June and October. Samples of Pandalus from the commercial fishery on the Fladen Ground, Farne Deep and west of Norway were analysed.

Fishing experiments with prawn trawls were carried out from R.V. "Dana" in the Davis Strait in July. Good catches were made north of Store Hellefiske Bank (depth 410-470 m), and relatively good catches were made off Sukkertoppen (depth 460-500 m), while poor catches were made off Holsteinsborg (depth 340-375 m).

Chionoecetes opilio

Experiments were made with a special crab trawl on prawn grounds in Godthåb district and in Disko Bay, but the results are still too limited to indicate if a commercial crab fishery is possible in Greenland waters.

Finland

(S.G. Segerstråle)

Crangon crangon

The biology of C. crangon in the south-west Finnish waters is being studied.

France

(R. Letaconnoux)

Homards et Langoustes

Les essais de repeuplement en homards et langoustes des côtes bretonnes et vendéennes ont été poursuivies par la création de nouveaux cantonnements.

En tout, 2,600 homards et 500 langoustes marqués ont été immergés en 1966; il s'agissait de femelles oeuvées. Les recaptures de ces crustacés en dehors des zones de mises en réserves ont apporté des indications sur leurs déplacements; cette étude doit se poursuivre.

Germany

(P.F. Meyer-Waarden)

Crangon crangon

The investigations of the Institut für Küsten- und Binnenfischerei to assess the share of undersized protected fish in the catch of the German shrimp fishery and the fluctuations in the abundance of fish species found on the shrimp fishing grounds were continued. 502 samples (=2,510 kg) of unsorted catch of the shrimp fishery were collected in Büsum, Cuxhaven, Neuharlingersiel and Dornumersiel, and analysed as to their species and length composition.

The tagging experiments were continued by the Institut für Küsten- und Binnenfischerei. 3,850 shrimps were tagged in the Cuxhaven area with coloured plastic tags by the silver ring method in summer and autumn. Also the investigations on the distribution of shrimp larvae in relation to hydrographic factors along the German coast have been continued.

Breeding experiments were completed at the Institut für Hydrobiologie und Fischereiwissenschaft of the Hamburg University and investigations on the biology and distribution of Crangon crangon in the Western Baltic were carried out by the Institut für Meereskunde of the Kiel University.

Pandalus sp.

56 samples of deep-sea prawn catches made by German fishing cutters in the Farne Deeps area from July to October, by the research vessel "Meteor" in the Skagerrak area in June, and by F.R.V. "Anton Dohrn" in December were analysed as to species and length composition at the Institut für Küsten- und Binnenfischerei.

Iceland

(U. Skúladóttir)

Nephrops norvegicus

Samples of Norway lobsters between mid-May and the end of August were worked up to give length distribution and sex ratios and to give information on breeding. From fishermen's reports effort and catch-per-unit effort were calculated and attempts were made to assess the maximum sustainable yield.

Pandalus borealis

Routine measurements of samples were continued and an attempt was made to distinguish the different year-classes. Catch/effort data were obtained from commercial catches.

Expeditions were carried out in March in Hunafloi and in April in Breidafjörður to find new prawn grounds. The latter was very **successful**.

Ireland

(F.A. Gibson)

Lobsters

Approximately 135 tags from moulted lobsters which had been liberated in 1965 were recovered during the 1966 season at Dalkey, Co. Dublin. A total of 886 lobsters were tagged and released in 1965 and to date 450 recaptures have been recorded. This very high recapture rate was due to our practice of purchasing tagged lobsters and releasing these again into the fishing area. In this way many are recaptured several times. A very considerable volume of data has been collected concerning the incremental growth after one moult, and one year at liberty under natural sea conditions.

Gear efficiency trials were carried out in which five different types of lobster trap were compared. The chief result of these experiments was to show that the U.S. parlour trap produced the greatest catch in terms of lobsters per 100 lifts and also that from them by far the lowest percentage of undersized lobsters were captured.

Crawfish

Studies of the biology of this species were recommenced in the summer of 1966 and a large collection of material was made from a number of areas along the south and west coasts.

Nephrops

This species was sampled, monthly, at set stations in the Irish Sea, particular attention being paid to the development of the gonads in the female.

Netherlands

(P. Korringa)

Crangon crangon

The view that protection of small shrimps could lead to bigger landings of consumption shrimps was brought to the attention of the shrimp fishermen. Although they were at first reluctant to lose some money by omitting the landing of small shrimps destined for the fish-meal plants, many fishermen followed the new line.

The first effort to predict the quantity of shrimps to be landed, based on a correlation between water temperatures in winter and the development of small shrimps, led to noticeable success.

The growth pattern of the brown shrimp was carefully studied. It could be demonstrated that some growth does occur between moults.

Norway

(K.R. Gundersen)

Homarus vulgaris

Tagging experiments on lobster in aquaria and in the field were continued. 145 tagged lobsters were released in the neighbourhood of Bergen (72 in Busepollen and 73 in Kvernhusosen).

Cancer pagurus

Tagging experiments on Cancer pagurus were continued during 1966. The Norwegian tagging method was used. In the Hjeltefjord area 1,472 tagged crabs were released and 125 in the Byfjord area.

Sweden

(B.I. Dybern)

Homarus vulgaris

The recording of the catches of the commercial fishery and of the fishery not reached by official statistics, i.e. summer guests and other private fishermen has continued. Tagging experiments have been made in different areas off the Swedish west coast.

Frog-man studies have been made of the habits and habitats of lobsters in the sea and the digging behaviour has also been studied in aquaria.

Cancer pagurus

Frog-man studies have been made of the behaviour and habitat of crabs with special reference to the vertical distribution and the most favoured bottom conditions.

Nephrops norvegicus

Research on Nephrops has covered the following:-

Continued trawlings during day and night in order to get further knowledge of the daily periodicity of the animals. Aquarium studies of the digging of tunnels and tunnel-systems. Histological investigations of the gonads. Experiments with different mesh-sizes of the cod-ends in the commercial trawling. Recording of the by-catches.

Pandalus borealis

Prawn investigations have included the following:-

Experimental trawlings at different depths and localities in the Skagerrak. Experiments with different sizes of the Vinge-trawl, carried out by commercial fishing boats. Inventory of the commercial prawn fishery, especially with the aid of some fishing boats giving daily information of their prawn and fish catches. In connection with the Pandalus investigations some other prawns have also been studied.

United Kingdom

I. England and Wales

(A.C. Simpson)

Homarus vulgaris

The investigation of the stock of lobsters off the coast of Yorkshire has been continued. Further tagging experiments gave a 58% fishing mortality and a stock of 140,000 lobsters of fishable size.

The mode of action of cockle-shell filters used in lobster-storage units is being studied.

Palinurus vulgaris

The study of the crawfish stocks off Cornwall continues and the first tagging experiments were made during the year. Total catch by commercial diving during the year was nearly as great as that using traps.

Cancer pagurus

1,000 crabs were tagged with suture tags and released off the Yorkshire coast and a further 500 were released off Suffolk to obtain more information on growth, movements and fishing-mortality rates.

Experiments are in progress to determine feeding rates in relation to temperature.

Pandalus borealis

Surveys of the population of P. borealis off the north-east coast of England (Farne Deep) have shown that while they are abundant there in a limited area, there are few large individuals present.

Nephrops norvegicus

Observations during 1966 were limited to routine size measurements of samples from the Irish Sea and off the north-east coast of England.

Palaemon serratus

A mass rearing of 150,000 larvae was made and methods of reducing the heavy mortalities due to cannibalism were studied. Various foods were tried for the post larvae, but Artemia remains the best at present.

II. Scotland

(H.J. Thomas)

Data on the landings of lobsters, catch-per-unit effort and catch composition for all major fishing areas have been maintained. In the fishery of the south-east coast, catch per 100 creel hauls has remained about 23, associated with a catch of 52 crabs. The mean carapace length of lobster landed is about 86 mm. In this area the catch per 100 creel hauls and the total weight of lobster landed is at its lowest level for over ten years whilst the mean carapace length is similar to the figure for 1950, i.e. before the minimum legal landing size was increased from 8" to 9" overall length. At other ports on the east coast the catch per 100 creel hauls is currently at its lowest level for the four years since catch/effort data have been available.

Cancer pagurus

Routine sampling of crabs and the collection of catch/effort data have been maintained in all the main fishing areas. In a claw tagging experiment off the north-east coast in May/June 12.8% of the 500 crabs released had been recaptured by the end of September. A suture tagging experiment was carried out off the south-east coast in order to obtain further data on growth and moult frequency.

Nephrops norvegicus

Monthly measurements of Norway lobsters have been inaugurated on board commercial vessels in the Firth of Forth area. About 37% of the catch by number and 17% by weight is at present being discarded as too small for economic handling. Catch-composition data show that whilst the peak of the main spawning season is in August some Norway lobsters also spawn at other seasons. It seems probable that larger Norway lobsters tend to spawn later in the year. Underwater photographs suggest that the Norway lobsters forage more actively over the periods dawn and dusk than at other times. In the aquarium a study has been initiated on egg development.

Pandalus bonnierii

The laboratory has co-operated in a survey for Pandalus bonnierii in the Minch.

U.S.S.R.

(A. Bogdanov)

The King Crab

Investigations into the acclimatisation of the King Crab in the Barents Sea were continued in 1966.

1. The following were transported by air:-
 - a) adult crabs - 131 specimens
 - b) crabs of age 5-8 - 250 specimens
2. The following were transported in tanks of sea-water:-
 - a) adult crabs - 97 specimens
 - b) crabs of age 5-8 - 250 specimens.

A group of divers carried out observations on the behaviour of crabs after release.