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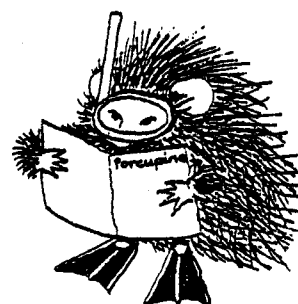
THIS ISSUE, the last of Volume 3, includes the reports from the Spring Meeting at the MAFF Laboratory at Lowestoft. Outstanding "exotics" articles are being held over until after the Autumn meeting, to which they have greater relevance.

APROPOS A REQUEST received recently by the Hon. Editor, readers are reminded (informed) that copyright on all articles in PN resides with the authors of those articles (except in instances where other copyright is indicated/acknowledged in publication), and not with PORCUPINE. Publication elsewhere of any other material within PN should at least be credited with some form of acknowledgement - we would hope that courtesy is a companion of scientific integrity.

SOME MEMBERS are still in arrears of membership payment. We have to date refrained from deleting members whom we feel are guilty of nothing more than oversight. However, owing to the financial pressures that such charity has induced, it is assumed henceforth that members failing to respond to repeated reminder requests for payment may indeed no longer wish to remain Members of PORCUPINE.

FUTURE MEETINGS at Pembroke on September 26 - 27th 1987, and at Millport on March 6 - 7th 1988 are detailed on p.273.

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REPORTS FROM THE SPRING MEETING, LOWESTOFT

PERSPECTIVES IN CONSERVATION AND MANAGEMENT

by D.J. Garrod

Deputy Director, M.A.F.F. Fisheries Laboratory, Lowestoft

"It gives me a genuine pleasure to welcome you as the PORCUPINE Society to this Laboratory. We have watched the growth of the Society as a barometer of public interest in marine conservation affairs and we are glad to have the opportunity to show you the scale of MAFF involvement. Lowestoft is off the geographical centre and because, being a Government Department, we tend not to push our public image, too few people are aware of the scope of our responsibilities, interest and activities. In round terms we have about 400 staff and 2 research vessels. The 400 includes about 80 research scientists, half on the fisheries side and half in environmental protection: the fisheries interests covering all marine and freshwater affairs, shellfish, fish cultivation and fish diseases in England and Wales; environmental protection - the effects of the extraction from or disposal into the sea of any minerals, aggregates and anthropogenic substances etc..

The issue which concerns us all, and which provides a major stimulus to the PORCUPINE Society, is the increasing demand for the utilisation of the marine environment, especially the coastal margin, with sharp competition between what I may call exploitation and amenity sectors. Amenity is of course only one aspect of exploitation, but it is non-extractive and is usually regarded in a different light. Utilisation falls under a number of headings:

Extraction of living resources : conventional and (conceivably)
introduced species
Disposal of waste products : domestic, industrial & agricultural
Mineral extraction : hydrocarbon, aggregates
Amenity : recreation, education
Rights of passage

Broadly speaking, there are three constituencies with an interest in utilisation. These are industry with predominantly short-term (i.e. high yield) interests, especially where non-renewable resources are concerned, balanced by the non-exploitive users who take a much longer view, and on the whole attach some importance to the status quo as being in the public interest as they see it. The third constituency is the administration, with the duty of protecting the nation's long term heritage, and reconciling it with the short term interests of keeping the country supplied with raw material, etc.

In this context, the aim of MAFF in respect to living resources (almost entirely fisheries) is to maximise long-term landings, at a reasonable price to the consumer while maintaining an economically viable fishing industry. With respect to the

environment, MAFF monitors the physical and chemical characteristics in order to advise on the impact of disposal of waste materials of various kinds on marine ecosystems, and the health hazards that might arise.

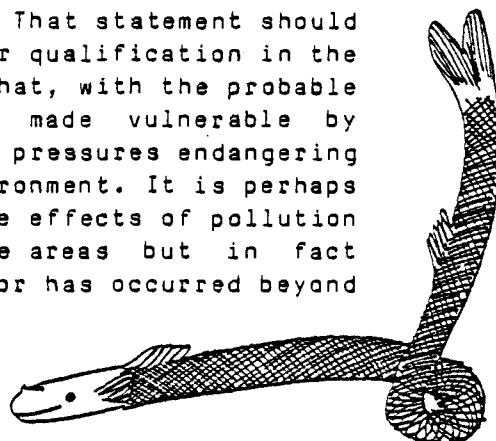
The two are of course closely linked. On the fisheries side, we conduct such ecological research and monitoring programmes as are necessary to understand the current status of the system and how it operates, with, as a primary output, annual estimation of the production surplus of various species and management of the offtake. Our environmental colleagues model and monitor hydrographic conditions and the dispersal of anthropogenic agents, researching their entry and passage through marine food chains to understand, estimate and if necessary propose measures to nullify the impact on the biological system or the risk of exposure of the population through marine food products.

We are primarily concerned with the biological health of resources and the environment. In two words, conservation and management. That is preserving the relativities of the present system with the possibility of manipulating it to increase productivity through a deeper understanding.

In that context, we find ourselves in agreement with the general tenets and purposes for the conservation of (terrestrial) nature set out in 1947 and reiterated in relation to the marine environment by the NCC/NERC Joint Working Party on Marine Wildlife Conservation, the main points of which were:

1. Conservation and maintenance of representative communities.
2. Survey and research to develop the understanding required to underpin informed strategy.
3. Reserves for experimental purposes (as an adjunct to 2).
4. Education.
5. Amenity.
6. Promote the responsible use of natural resources.

Concern in MAFF is focussed more on impact assessment over wide areas than the merits of particular localities. In that respect, the proposal that areas be set aside for experiment is an interesting one. Manipulation to test hypotheses appears at first sight to be the antithesis of conservation. That is not necessarily so. Very little information is to be gained from a stable system. It sits there like a pudding and won't divulge its characteristics. Like a nervous system, it has to be perturbed to stimulate a response. Sidney Holt proposed experimental exploitation for whale management. The provision of a protected if not controlled habitat for experimental purposes may be a most valuable feature of Marine Nature Reserves. That statement should also be seen in conjunction with another qualification in the NERC/NCC Report which we would endorse, that, with the probable exception of marine mammals and reptiles made vulnerable by having to breathe air, the massive human pressures endangering species seldom exist in the marine environment. It is perhaps less convincing in relation to the pervasive effects of pollution and its potential capacity to sterilise wide areas but in fact there is so far no evidence that this can or has occurred beyond



very localised areas and on a very temporary basis. No informed marine biologist sees the slightest possibility of a marine poikilotherm or invertebrate becoming or being extinguished even if that were desirable and there were unlimited funds available to do it. They may change, but they are not at risk.

The mutual concern of all of us charged with some responsibility in marine affairs is to understand the system well enough to tailor our response to the circumstances: conservation in the sense of preservation on the rare occasion a system or species is pushed to its limits (e.g. North Sea herring), conservation in the sense of constructive management if a system is functioning within the limits of its natural variability and can generate surplus production without irreversible damage.

In all these issues we ask ourselves four key questions:

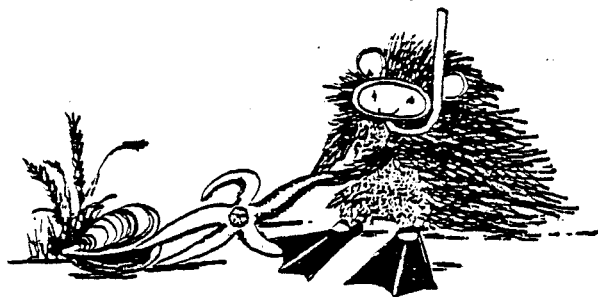
- a - Can we measure the attribute that is concerning us?
- b - If we can, is a change taking place? Detection of change is in fact extremely difficult because of the intrinsic variability of marine ecosystems.
- c - If there is a change, is it reversible and can it be controlled? This has to do with the robustness of the system, the complexity of the communities involved, spatial and temporal heterogeneity of the species or communities, and the existence of niches and refuges from whatever is happening which may provide the basis for recovery if that should be necessary. Sometimes one may find a situation where one can see how it should be controlled, but the cost would outweigh the benefit (North Sea halibut).
- d - Does it matter: natural systems are in a constant flux. It is the essence of the system and driver of natural selection. I have already said it is not possible to derive information without change, but how does one decide if a change matters: given the state of knowledge of marine systems, it is invariably a value judgement, and in this same sense one must include the potential for positive restructuring through the introduction of new species, even, dare I say it, looking a long way ahead, transgenic species.

The response of a marine community to change, and therefore the importance of it, depends very much on the stability characteristics of the system in question. Taking a little ecological licence, I characterise high latitude communities as having low diversity and high dependence on seasonal environmental circumstances so that they appear to change over a wide range at any particular geographical point. In that sense they are fragile. Similarly, many tropical communities living in a relatively stable environment become very diverse and highly structured with well defined and critical interdependence between species, which makes them very fragile in the structural sense of the word. The temperate ecosystems are in an environment which, though seasonally variable, seldom moves outside well-defined limits, and the species have one overriding characteristic - adaptability. Temperate marine systems are extraordinarily robust. It would be difficult to destroy a species, and judging

from the lack of impact of utilisation to date it will continue to prove extraordinarily difficult to create even a desired change. There are too many adaptive feedback response systems.

This is fortunate, but not a matter for complacency. And management is not complacent. Attitudes to exploitation and most recent international treaties have reflected the demands of public opinion. Responsibility has been moved from preventive action, depending on the conservationist demonstrating that harm is being done, to the exploiter demonstrating that his interventions will not cause an unacceptable change. Evidence can be seen in the consideration of licences for mineral extraction and the general importance of impact studies.

However it is monitored and controlled, the system and man's requirement of it will not stand still. The production of natural living resources is close to its potential. Appropriate management is necessary to maintain that potential, but there will be a demand for more. Japan has shown that production can be augmented in limited areas. We may be able to do the same (new species, designer fish, habitat modification) but should we? This is the challenge and the opportunity - to manipulate the existing resources and develop them or new ones where the opportunity exists, whilst preserving the basis for reversal if necessary. This is the basis of the MAFF approach. At present we believe we have sufficient if not comprehensive knowledge of wild resources to begin looking beyond to areas where augmentation could be achieved."



BIVALVE CULTURE - ITS PROMOTION WITH CARE

by B.E. Spencer

Fisheries Laboratory, Conwy, Gwynedd

INTRODUCTION

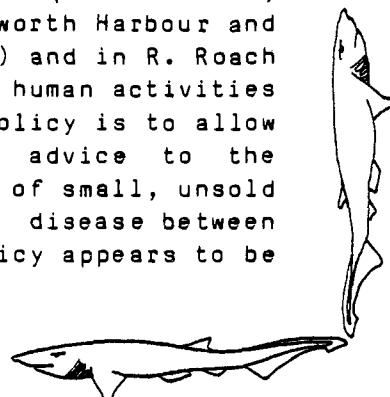
In 1864, almost 500 million oysters, equivalent to 30,000 t (almost 100 t/day) were sold at Billingsgate in London. Official statistics for more recent years, however, give annual landings of 28.4 million oysters in 1903-1914 and 7.6 millions in 1970-1977. This substantial but dwindling fishery received boosts from overseas with importations of the American oyster (Crassostrea virginica) up to 1939 and the Portuguese oyster (C. anquilata) 1926 - mid 1960s. Up to 8 millions (300 t) per annum were relaid on British beds for one growing season to fatten for the market. In addition to these, imports of flat oysters from Holland and France (1870-1960s) were deposited on British beds to supplement natural stocks which were failing to produce

sufficient seed for home demand.

The outcome of these uncontrolled imports from America was the introduction into parts of England and Wales of two of our three main bivalve pests, the American tingle (Urosalpinx cinerea) and the American slipper limpet (Crepidula fornicata). The third pest, the gut parasite Mytilicola intestinalis occurs commonly in mussels in some areas of our shoreline. The presence of these pests on cultivated oyster grounds was generally considered to cause decreased production and higher working costs, and it was recognised that to protect the long term interests of the industry it was necessary to prevent the spread of these pests. There was a need therefore to control (a) imports of molluscs and (b) movements around the country. From this need arose the Molluscan Shellfish (Control of Deposit) Order of 1965, subsequently revoked and the control strengthened by a new order made in 1974 under the powers of the Sea Fisheries (Shellfish) Act of 1967. This order essentially prohibits the deposit of molluscs from outside England and Wales and the transfer of molluscs from one area of England and Wales for deposit in another, except under licence. The operative word 'deposit' refers to immersion of the shellfish in coastal waters, in other tidal areas, or on adjacent land where there is a risk that effluent from tanks, pits, ponds or hatcheries may be discharged into designated waters.

To allow imports from overseas for deposit in our waters we require certification from the authorities in the exporting country that the shellfish are pest and disease free. In recent years we have allowed deposits of mussels from Ireland and hatchery seed from Guernsey and Scotland.

The transfer and deposit of shellfish between areas around the coast needs to be administered flexibly to avoid undue constraint to trade but with care to avoid the spread of pests and diseases. To facilitate these aspects, the coastline is divided into 27 designated areas which are related to the incidence of the major pests (Fig.1). This map shows the distribution of Mytilicola, Crepidula and Urosalpinx around the coast with their prevalence on the east, south and parts of the west coast. In 1982 a disease of flat oysters, caused by the sporozoan Bonamia ostreae, became evident in the R. Fal, and before effective control measures could be introduced, had been transferred to the Helford River and to north and mid-Essex with oyster deposits. As a result, these areas, and also the main natural oyster producing area of the Solent, were subdivided administratively to try to isolate the disease. Hence, in 1983 a Variation Order was introduced which subdivided areas 8, 12 and 14 and restricted movements from these areas. Subsequent to this, outbreaks of the disease have occurred in Emsworth Harbour and River Beaulieu (12A), in Poole Harbour (12B) and in R. Roach (8C). The disease appears to have been spread by human activities rather than by natural conditions. The present policy is to allow Solent oysters into the infected areas but with advice to the grower for one season's culture, the destruction of small, unsold stock to reduce the risk of carry-over of disease between seasons, and to stock at low densities. This policy appears to be



Areas designated and numbered in the
 Molluscan Shellfish (Control of Deposit) Order 1974 as varied by
 The Molluscan Shellfish (Control of Deposit) (Variation) Order 1983

N.B. 1. These indications have no legal force. For definitions of boundaries, reference should be made to Order itself. A copy of the relevant definitions is available on application to: Ministry of Agriculture, Fisheries & Food Fisheries Division II, Great Westminster House Horseferry Road, London SW1P 2AE

2. The incidence of the main oyster and mussel pests in mid-1974 is indicated in broad terms, but local variations will be taken into account when applications for licences are considered.

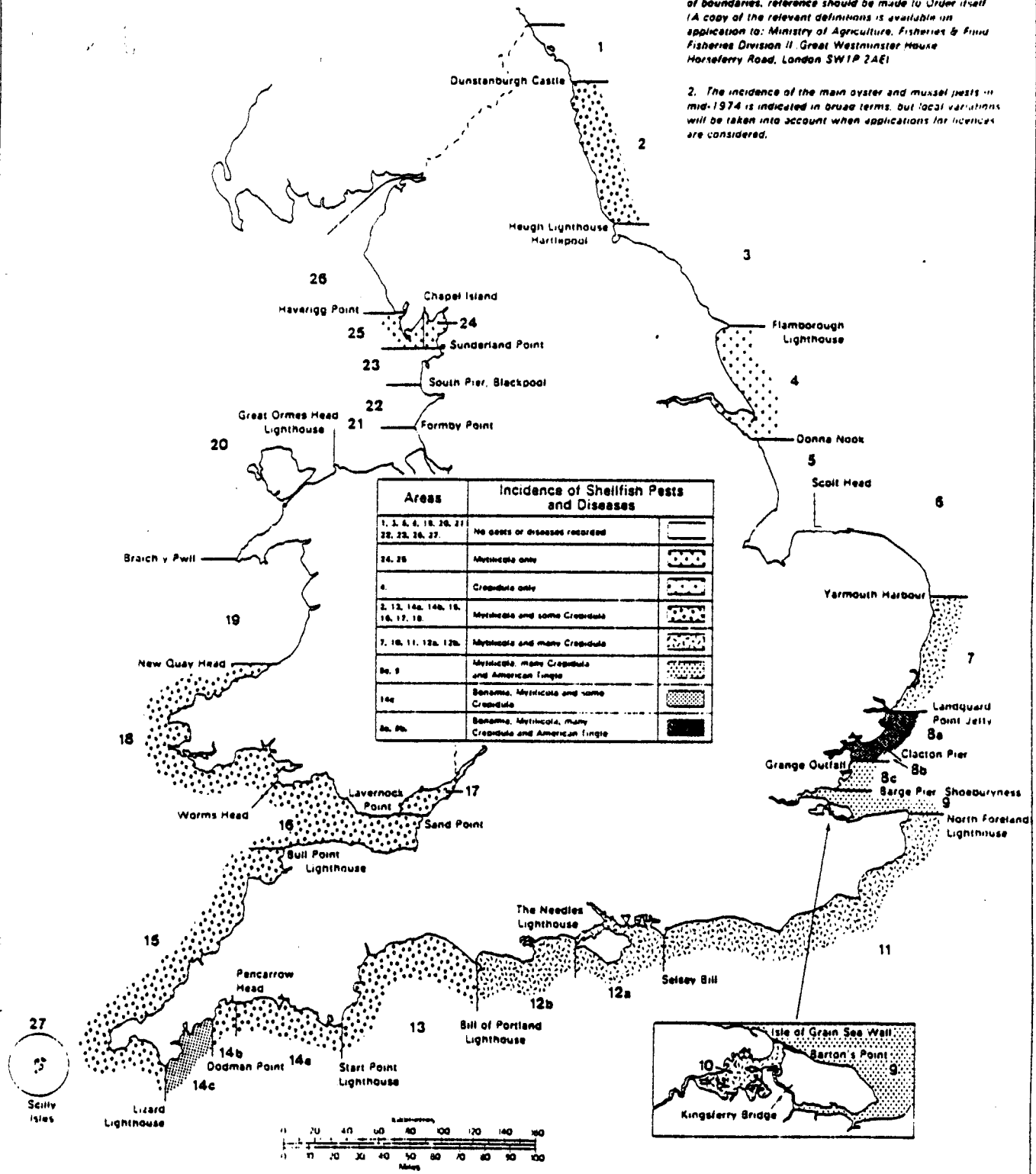


FIGURE 1.

producing a viable industry again in the Essex creeks.

The administration of movements around the coastline is made by a system of licensing, of which there are two types of licence.

The GENERAL licence permits the deposit (i) anywhere within the designated area from which they are taken, or (ii) between areas of similar types of infestations.

The SPECIAL licence is required for the deposit of molluscs from an infested area to areas which are free from infestation. Recently, however, in Bonamia areas the general licensing scheme has been replaced by the special licence to serve the special needs there. It is also clearly inadvisable to move stock from "hot spots" of infestation to clean areas within a designated area.

DEPOSIT OF MOLLUSCS FROM COMMERCIAL HATCHERIES

The control of movement of shellfish originating from natural beds also applies to seed produced in commercial hatcheries. Ideally the hatchery would like to exercise three options:

- (a) to use broodstock from other areas;
- (b) to use broodstock from other countries (this could include non-native species);
- (c) to distribute seed molluscs nationwide.

Any of these options may be requested by the hatchery or ongrower, and approval could be granted under special licence subject to a number of conditions which reduce to an acceptable level the risk of transferring pests, etc. To ensure that the licensing scheme is effective it is worked in conjunction with a system of inspection whereby MAFF inspectors may visit before or during a transfer of shellfish to ensure that the conditions of the licence are being fulfilled.

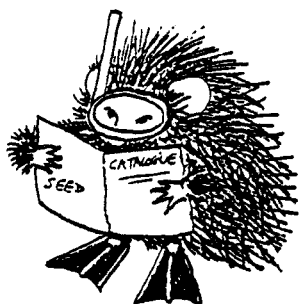
Option (a) is uncommon, but in response to an application the Ministry would have to be satisfied that the stock, the effluent and the eventual disposal of the stock were treated properly, before a licence was issued.

Option (b) is not allowed. Introductions of non-native species are made through the MAFF hatchery at Conwy (see below).

Option (c). The sale of hatchery seed throughout the country is clearly an essential requirement for normal trading. Commercial hatchery seed is screened periodically by the Fish Diseases Laboratory, Weymouth, to confirm their freedom from disease.

Hatchery seed at first sale are usually <10 mm, and kept in land-based nurseries either in 'clean' areas or areas infested with Crepidula and/or Mytilicola. Crepidula is killed by brine dipping without harm to the seed; Mytilicola rarely occurs in C.gigas of <25 mm and O.edulis of <12 mm so that deposit of seed less than these sizes is considered an acceptable risk.

The administration of the Control of Deposit Uroer has to some extent hampered shellfish production. Since 1965 there has been little evidence



of spread of Urosalpinx and Mytilicola, and spread of Crepidula has been slow and due to natural dispersion of larvae along the coast. When Bonamia appeared in 1982 it was feared that the disease would run through the oyster fisheries, but movement control, and good advertising, appears for the present to have been effective in protecting our main natural oyster grounds in the Solent.

INTRODUCTION OF NON-NATIVE SPECIES

Table 1 lists the species of non-native bivalves which have been introduced under quarantine via Conwy since 1962. Some of them proved unsuitable for cultivation and these were destroyed. Others, however, showed enhanced growth and survival, and were given to commercial hatcheries for large-scale production. There are two reasons why new species are introduced:

- (a) MAFF assessment of favourable traits, e.g. Pacific oyster for its fast growth and good survival; New Zealand oyster for its flat oyster appearance and for its short larval life which favours settlement; American oyster for its flat oyster appearance, its tolerance of high silt load, its resistance to Bonamia and its greater tolerance to TBT leachings from antifouling paints.
- (b) Commercial pressure, e.g. Manila clam - introduced as a result of competition from the French hatcheries for this highly lucrative species, which grows faster than our native species; Mangrove oyster, which was requested by Southampton University for physiological studies by overseas students, but has no potential for cultivation in our waters.

In 1973 an ICES working group produced guidelines and a code of practice for the "Introduction of Non-indigenous Species" for member countries. The guidelines are:

1. Consideration of ecological consequences.
2. Historical documentation of past introductions.
3. Seek advice from ICES on particular introduction.
4. Adopt code of practice and report progress.
5. Develop legislation controlling introductions, i.e. licensing system.
6. Propagate under quarantine in a hatchery.
7. Examine offspring for disease/parasites/pests before transfer to the sea.

The code of practice adopted for the treatment of imported stock requires careful cleaning of the external surfaces, sterilisation of the effluent water before discharge into the sea, and careful disposal of the broodstock once F1 seed have been obtained. The seed are also kept in quarantine for about 8 months, during which time samples are examined at about 2-monthly intervals. Each test involves the sectioning, staining and scrutiny of 150 animals for evidence of pathological abnormalities. The seed may only be placed in the sea if these tests show them to be disease free; a further and final test is made 4 months later.

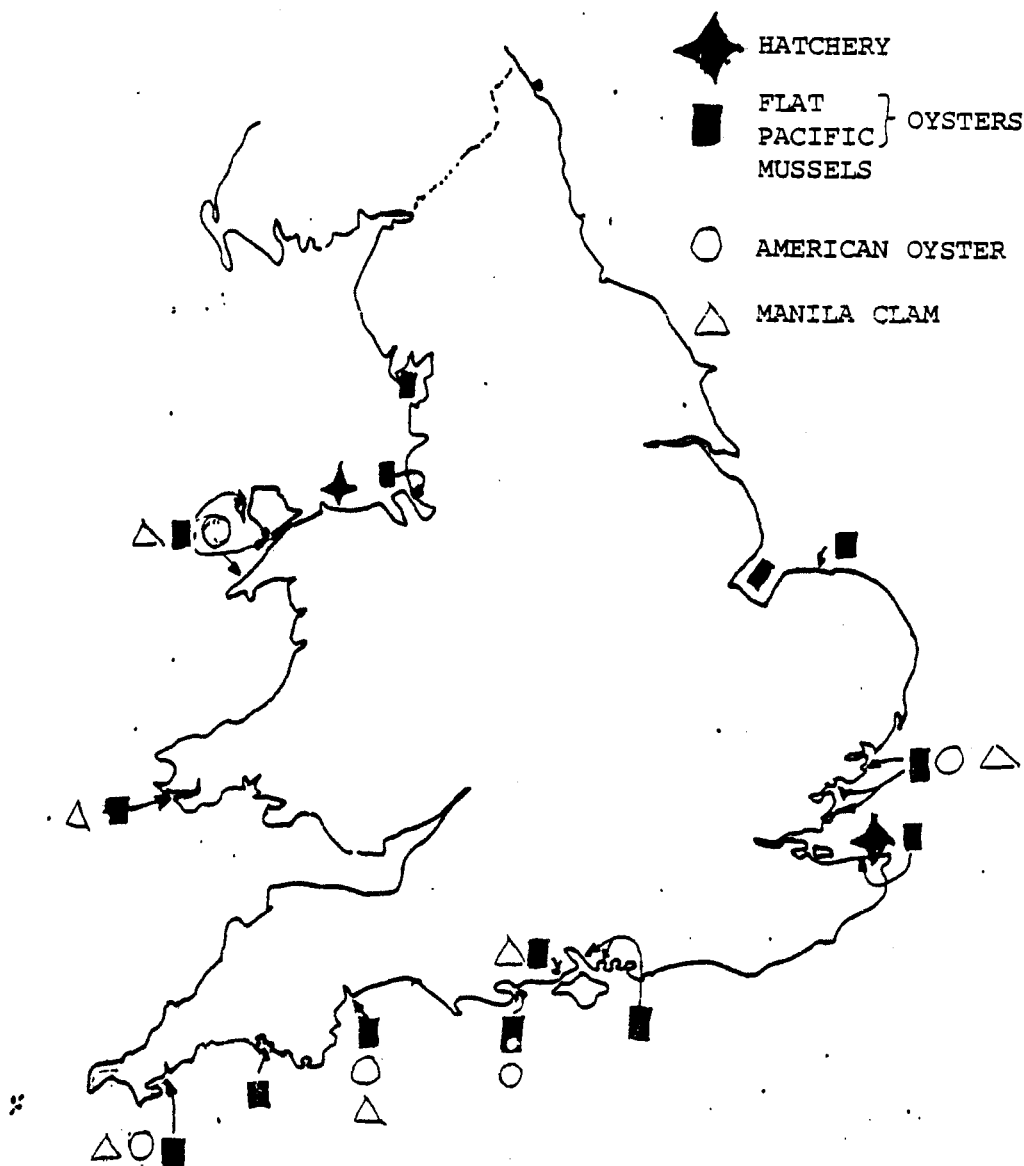
Table 1: New Species of Bivalves Introduced into the U.K. by the Fisheries Laboratory, Conwy.

1. Chilean Oyster	1962 **	4. Pacific Oyster (Canada)	1964 & 1972*
2. Chilean Mussel	1965 **	5. Manila Clam (USA)	1980 *
3. New Zealand Oyster	1963 & 1966	6. Mangrove Oyster (Brazil)	1980 **
		7. American Oyster	1984

** Stock destroyed intentionally

* species produced in commercial hatcheries.

FIGURE 2. SITES FOR TRIAL PLANTINGS (SINCE ca1970)



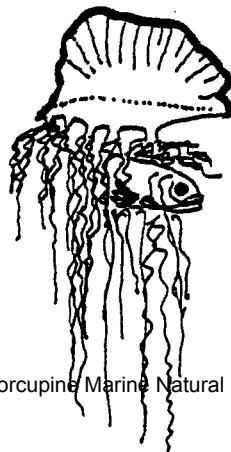
Probably the most contentious issue with introducing new species is their breeding potential. We believe that with the recently introduced Manila clam and American oyster the risk of creating self-reproducing populations is so low as to be acceptable. However, an aid to control reproduction of new species is currently under investigation at Conwy, involving the production of sterile offspring by inducing triploidy in the egg shortly after fertilization. At the moment the success rate is quite low, only 20% of the eggs developing into viable larvae, although of these 98% show the triploid condition. In addition to sterility there are reported advantages in heterozygosity, in growth rate and in meat content, and clearly these are favourable traits for the shellfish industry. We shall be testing for these when we have enough stock of the right size; at present we have small numbers of triploid American oyster, Manila clam and Pacific oyster.

Figure 2 shows some of the areas where we have made experimental plantings of hatchery-reared bivalves. This is an important aspect of the hatchery work, as it is only possible to define the suitability of a site in very general ways. Usually we select sites on their past or present record, that is whether they have been or are being used for cultivation. The two types of investigations are to test new species in a variety of areas, and to test new systems, e.g. the crab-proof fence and the floating upwelling system.

The areas marked on the map show sites where we have planted Pacific and flat oysters and mussels. The Menai Strait is one area which we use most commonly on our Several Order ground adjacent to those operated by various other commercial growers. Structures such as the crab-proof fence have been erected here, in the R. Teign, at Brancaster and in the Wash, to see how they behave under a variety of conditions. The floating upwelling system has been tried in the Menai Strait, in Milford Haven and in the R. Blackwater, the latter by a commercial grower.

Other areas marked show sites where Manila clam and American oyster have been planted. Usually a few hundred are planted, either in trays (oyster) or in the soil in wood frames covered with plastic mesh (clams). This is normal practice to prevent predation by shore crabs, but it is also a requirement under the Wildlife and Countryside Act 1981 to avoid an escape into the wild.

These types of field trials produce quantifiable results with valuable information on growth rates, stocking density, survival, etc. in the various systems under test. They also have the effect of advertising our work to the fishermen of the area and hopefully stimulating their interest.



SOME STANDARD BIOLOGICAL SURVEYS OF THE MARINE ENVIRONMENT
CONDUCTED BY MAFF DIRECTORATE OF FISHERIES RESEARCH FROM
LOWESTOFT

by J.H. Nichols
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INTRODUCTION

This contribution highlights some examples of routine biological monitoring, concentrating on those which have the common thread related to the management of fish stocks. Such surveys can be divided into three basic types: bottom trawl or groundfish surveys, surveys of young fish or pre-recruits before they enter a fishery, and plankton surveys of eggs or larvae of fishes. Groundfish surveys provide a regular index of adult abundance, supplementing the data collected from the commercial fishery. They also provide useful information on species which are not well sampled by the commercial fleet. The pre-recruit surveys provide estimates of the abundance of year groups before they enter a fishery. Such information is a vital component in the assessment of fish stock size and in the allocation of quotas. Finally, the plankton surveys provide a special additional input to stock assessment via an estimate of the production of planktonic eggs or larvae.

These surveys are also used to collect additional physical and biological data concurrently. For an example, surface temperature and salinity are routinely monitored on most surveys, together with frequent depth profiles. Trawl surveys are also used to sample the epibenthos and to collect water, fish and shellfish samples for the analysis of caesium 137 content.

GROUND FISH SURVEYS

The major groundfish survey is of the North Sea in August/September, and has continued since 1977 (Figure 1). In addition to species distributions, trends in species abundance with time can be observed (Figure 2). A steady decline in the abundance of both cod and haddock can be seen over the ten year period of the surveys.

The specific differences in distribution, when subjected to a cluster analysis, fall into distinct area-specific groups (Woolner, 1984): the shelf edge group, in which saithe, haddock and Norway pout dominate, a central group, where haddock, whiting and cod are dominant, and a southern North Sea group in which dab, whiting and gurnards are found. A similar series of groupings is obtained for the epi-benthos, with one additional group associated with the deep water of the Norwegian Trench, in which the holothurian Stichopus tremulus is dominant (Dyer et al., 1983).

PRE-RECRUIT SURVEYS

There are two types of survey conducted routinely. One is for the young of pelagic fishes and gadoids which may have either demersal or pelagic fry. The other is for the young flatfishes which after metamorphosis tend to spend the first few months of

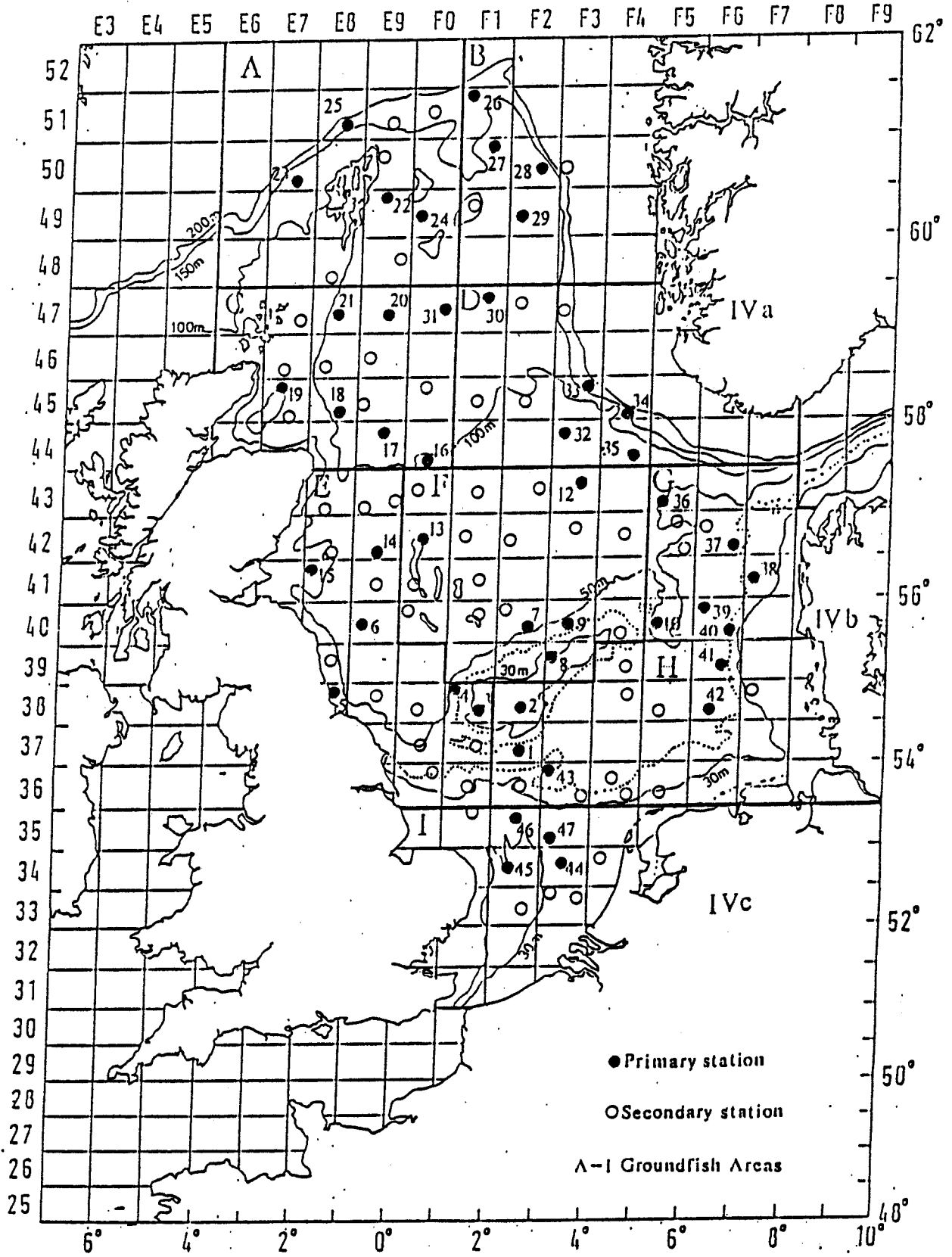
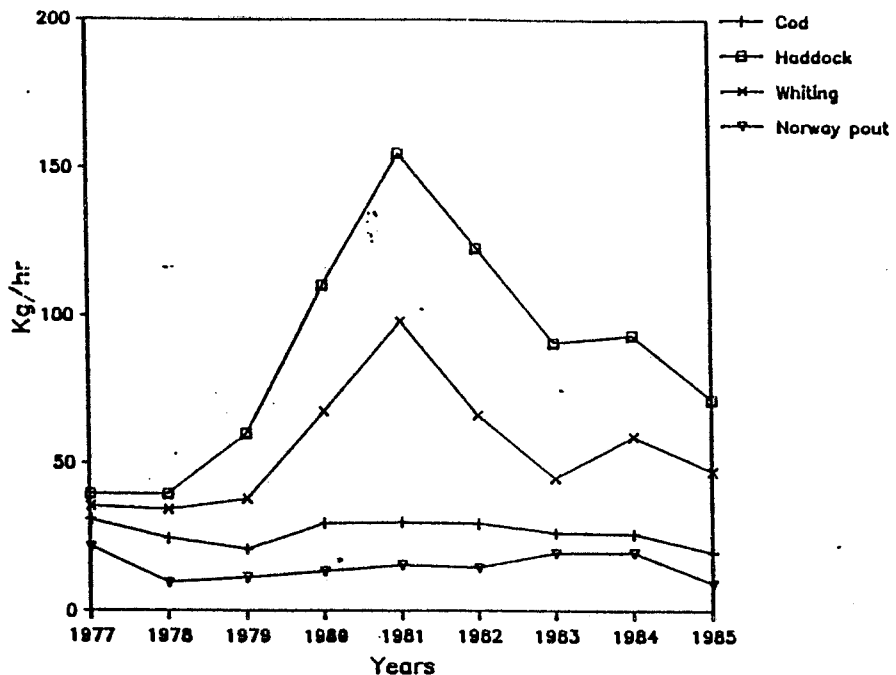
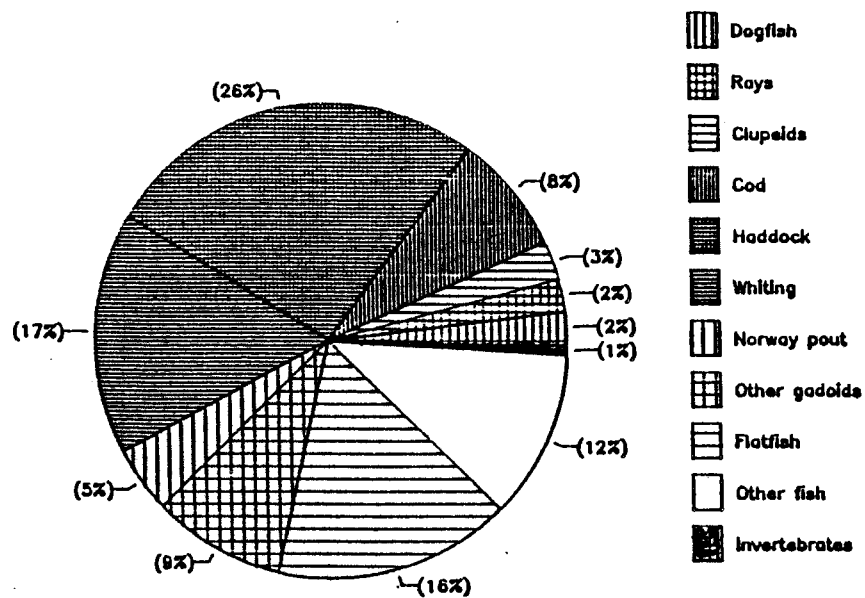


Fig 1



Combined data 1977-1985

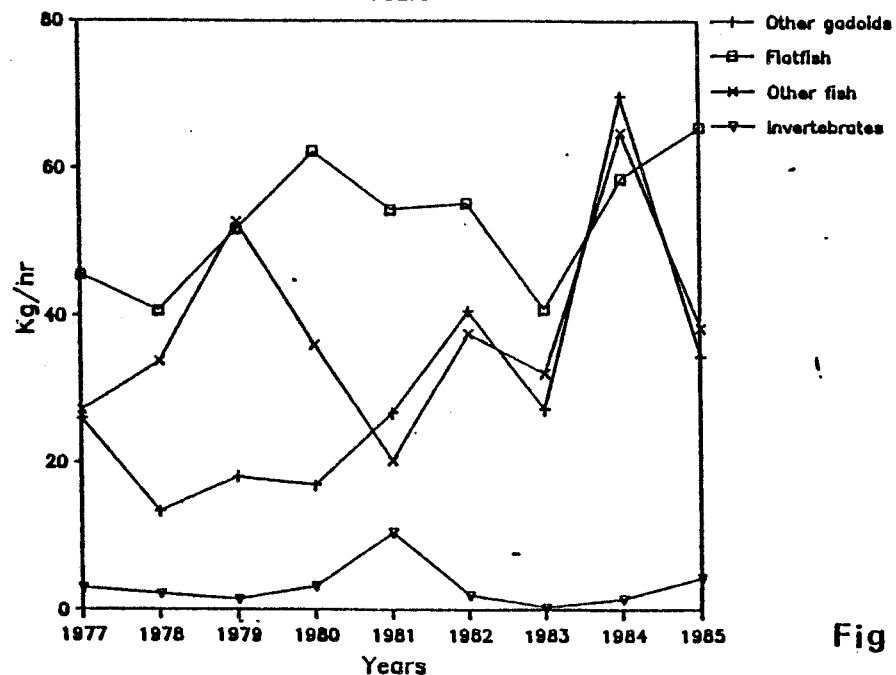
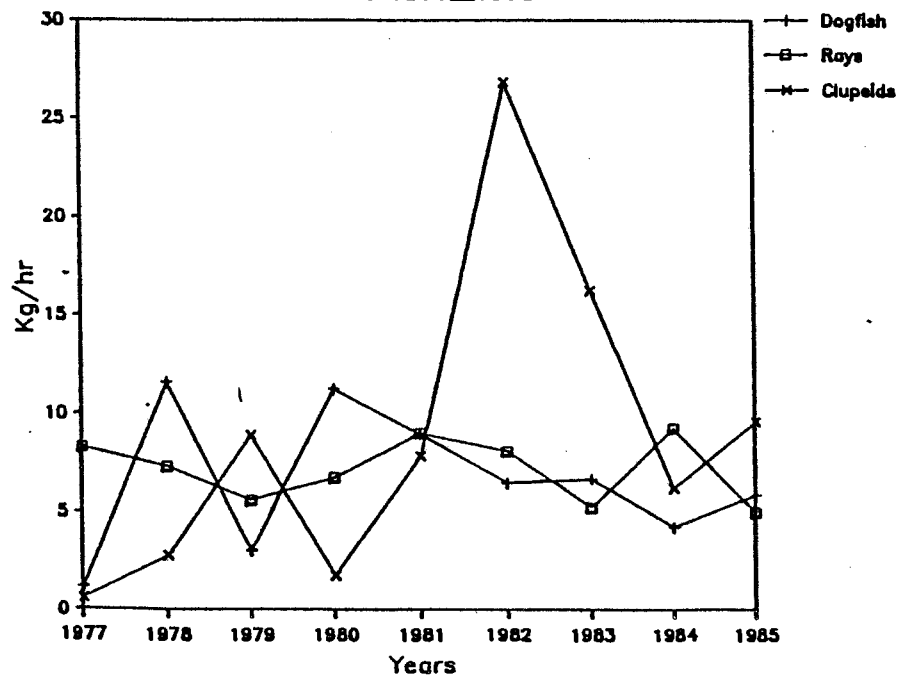


Fig 2

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their lives close to the shoreline, generally in flat sandy areas.

The young gadoid and pelagic fish surveys are conducted annually in the North Sea (Figure 3), and have the full international participation of ICES countries bordering that area. They provide basic information on the location of nursery grounds and an index of the abundance of the one- and two-year-old groups of the commercial species (Anon, 1986).

Similarly, the flatfish surveys, which are now confined to the south and east coasts from Flamborough to Durlston Head, identify nursery areas and provide abundance indices for the commercial species (Riley et al., 1986). In addition to this regular survey, an extensive data base has been built up on the near-shore nursery grounds around all the English and Welsh coastline. These data are invaluable in the assessment of seabed usage requests, and in the issue of licences for sludge dumping and disposal of industrial effluents.

PLANKTON SURVEYS

Stock assessment surveys based on the production of planktonic eggs or larvae are carried out for a number of species but only for herring and mackerel on a regular basis. The annual international herring larvae surveys are conducted over the North Sea and neighbouring waters south of latitude 62°N (Anon, 1985). These surveys have in the past been used as an index of spawning stock biomass (ssb) from the historical regression of larvae abundance against ssb in each area. More recently larvae production has been calculated and used together with fecundity to estimate ssb directly (Anon., 1987a).

International mackerel egg surveys of the spawning grounds west of Britain are conducted on a triennial basis, and are used as a direct input to the assessment of that stock. Briefly, from an estimate of the total seasonal production of recently spawned eggs and a knowledge of fecundity, the number of participating females can be calculated (Lockwood et al., 1981). This number can be converted to a total mature stock biomass using international catch and length/weight data from the commercial fishery. These surveys have been carried out since 1977 when the ssb in the area was calculated at 3.2 million tonnes. The most recent survey, carried out in 1986 (Anon., 1987b), gave an estimate of ssb of 1.5 million tonnes.

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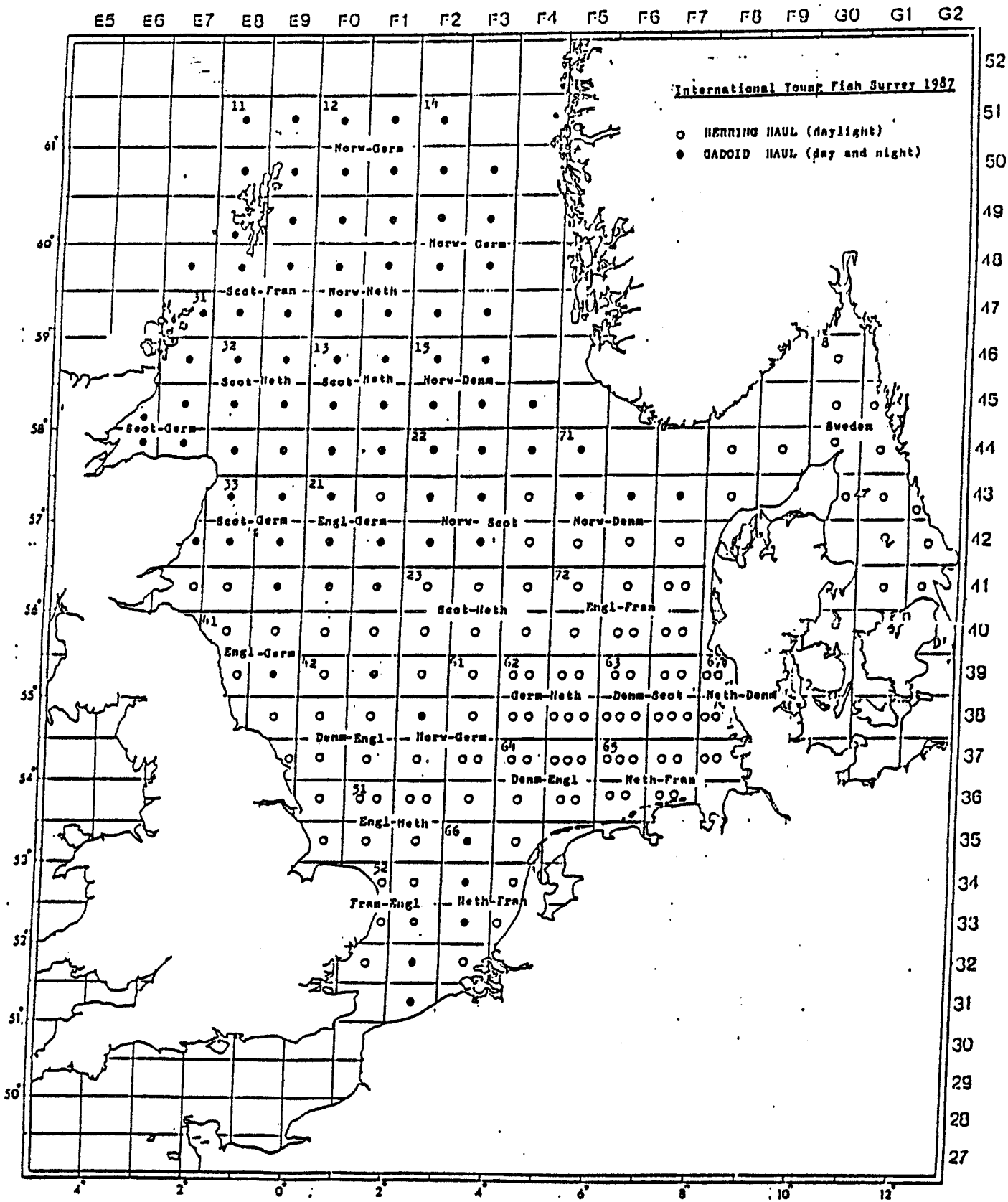


Fig 3

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NOTICES

HINTS, TIPS & LITTLE BITS

1. WHY ARE so few Members/Readers submitting copy for this section/aspect of the NEWSLETTER? One hopes to offer the opportunity to communicate with your fellow PORCUPINES - requests for information or material, snippets of interest, additions, corrections, or responses to other Articles, observations of the natural world or printed word, news of what goes on out there, announcements for meetings, etc. etc. - so don't be shy, SUBMIT! There are readers waiting to hear from you.
2. WHAT NEWS, if any, of the recent cold winter? Or is it only the Hebe's in my garden that have noticed this years negative temperature anomaly (and died)? We hear of subjective indications that certain estuarine littoral soft-sediment faunas are somewhat thin on the ground this year, while elsewhere Ulva is having a good season, turning the average salt-marsh mud bank into what looks like the 12th green at St Andrews after a shower. Do members have any data on the effects of the last few winters, with their notable cold spells, indeed is anyone measuring sea-water temperatures these days? (Has anyone got a Hebe seedling?)
3. GOULIOT SUPPLEMENTARY - Further to the Channel Isles article by Roger Bamber in the last edition (PN3(9), 235 et seq.), the "Sabellidae indet." listed in Table 2 from the Gouliot Caves hydroid/bryozoan/sponge epifauna has been identified as Oriopsis armandi. Thanks Pete and Phyllis.

4. ESTUARINE AND BRACKISH-WATER SCIENCES ASSOCIATION, jointly with the Challenger Society, the Royal Society of Chemistry and the Marine Chemistry Discussion Group, are holding a Symposium on Marine and Estuarine Methodologies, at The University of Dundee from 14 to 18th September 1987. Booking Forms and full details from Mike Elliot, Forth River Purification Board, Estuary Laboratory, Port Edgar, S. Queensferry EH30 9SQ, or Dr J. McManus, Dept. of Geology, University of Dundee, Dundee DD1 4HN (closing date for bookings August 1987). Talks cover remote sensing, chemical and physical analytical techniques, benthic logistics, use of computers and humans, water quality, telemetry, spectrophotometry, laser-diffraction, sieves, fungi, cockles and limpets (and a host of other topics)!

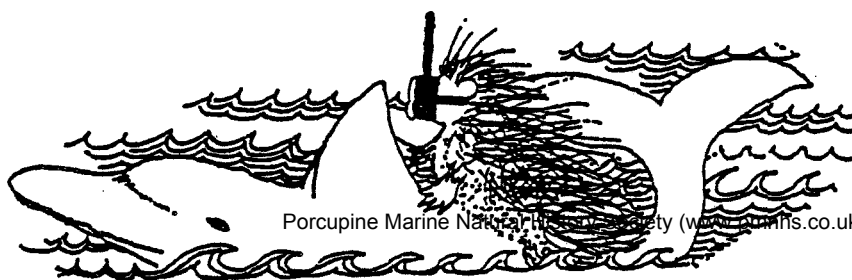
5. THE FISHERIES SOCIETY OF THE BRITISH ISLES in association with the Estuarine and Brackish Water Sciences Association is holding an international meeting on Fish in Estuaries, from 18 to 21 July 1988 at Southampton University.

Call For Papers in the following or related subject areas: the estuarine environment; evolution of the estuarine habit; physiology of estuarine fish; migratory fish in estuaries; estuaries as spawning and nursery areas; feeding in estuaries; resident estuarine species; water quality and fish in estuaries; anthropogenic impacts on estuaries (impoundments, barrages, power stations, industry); conservation/recovery of estuaries; estuarine fisheries; population dynamics of estuarine fish.

If you would like to offer a paper (20 minutes spoken or poster) please send the title and short abstract (150 words) to: Dr A.W.H. Turnpenny, Fish in Estuaries Conference, Marine Biology Unit, CEGB, Fawley, Southampton, Hampshire SO4 1TW before 1st December 1987.

6. THE BRITISH MICROPALAEONTOLOGICAL SOCIETY is holding the Tenth International Symposium on Ostracoda in July and August 1988, on the major theme of Ostracoda and Global Events. The scientific sessions will be held at the University College of Wales, Aberystwyth (ref Dept. Geology) between 25 and 29 or 30 July, and there will be a series of pre- and post-symposium excursions. Papers concerning the use of Ostracoda to recognise global events, and the effects of such events on the evolution of ostracod communities are particularly requested; papers will also be accepted concerning the utilization of Ostracoda biostratigraphy, environmental monitoring, palaeoenvironmental analysis, palaeoceanography, etc., as well as papers on the biology, evolution, ecology or zoogeography of ostracods.

The symposium will consist of both invited and contributed papers, poster and discussion sessions, workshops, demonstrations of scientific equipment etc.. Details, with instructions to authors will appear in a subsequent announcement.



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CONSERVATION IN THE MARINE ENVIRONMENT:
THE VOLUNTARY APPROACH

by Bob Earll

The World Conservation Strategy considered conservation, put at its simplest, to be "the wise use of the earth's resources". Approaches to the conservation of the marine environment by man will, for a number of reasons, be rather different than our approach to conservation on land. These reasons include the following:

The sea is seldom "owned" under present regimes.

The sea is effectively a 'fenceless' environment - and there is a traditional freedom of the seas which allows rights of access and navigation.

Many pollutants are highly mobile within the marine environment and are not affected by 'lines on the map'.

There are a great many activities carried out on the sea, and consequently many 'user groups'. These include Government or its agencies, economic, environmental or recreational groups.

There are a great many threats to the marine environment resulting from man's activities.

Shore-based activities can have an impact on marine areas, and there are therefore complications relating to conventional boundaries of ownership, legislation, etc..

Managing or 'policing' any area is much more complex.

No single government department takes a lead on marine matters, and there are over 20 government agencies with legal duties covering the marine environment.

There are a variety of measures available to organisations wishing to achieve significant advances for marine nature conservation. One such way is to bring the users together in a voluntary forum. It is clear that whilst the many user groups often have good communications within their network of organisations, they often only come into contact with other organisations when problems arise - usually as confrontations. This is not a very productive state of affairs.

The Marine Conservation Society has been involved in such forums at a number of geographic scales and including a wide range of users:

Local scale - voluntary marine conservation areas

Regional scale - e.g. Dorset, Northumberland, Suffolk

Whole-sea scale - Irish Sea, North Sea

The geographic scale of the unit imposes various differences between groups, but the strongest unifying feature is that there is a group of representatives who share a concern for a particular body of water.

Great care has to be taken over the organisation of the meetings of such groups, otherwise they may become counter-productive. There are ways of organising such meetings so that they can work very effectively and offer a number of

positive spin-offs:

- Facilitate communication between users who would otherwise not meet; this can lead to better understanding and minimise confrontation.
- Can lead to productive liaison and cooperation on issues of mutual interest where previously the individual users were isolated.
- Can identify and focus on important 'jobs to be done'.
- Allow users to think ahead and anticipate events.
- Promote 'sensible use' (consideration of other users or at least an appreciation of their needs).
- Generate a local concern for the area in question.

This voluntary approach, on whatever geographic scale and incorporating the widest range of users, can help to lead towards a rational use of the marine environment which is not dependent upon a government agency to take the lead. Its voluntary nature makes it particularly appealing, and actions should be taken to encourage such groups.



THE NORTHERN IRELAND LITTORAL SURVEY

by Ian Fuller, Trevor Telfer and Martin Wilkinson
Institute of Offshore Engineering, Heriot-Watt University,
Edinburgh.

INTRODUCTION

Since 1984 a survey has been carried out on the intertidal region on behalf of the Department of the Environment (Northern Ireland) with a view to ranking sites on the coastline for their conservation value. This survey compliments a subtidal survey already completed by the Ulster Museum. The paper delivered at the Lowestoft PORCUPINE Meeting described the survey under four headings:

- (i) The ideas and assumptions which influenced the design of the survey.
- (ii) The methods which were adopted as a result of those ideas and assumptions.
- (iii) A summary of the habitats and communities found round the Northern Ireland coastline.
- (iv) Lessons which have been learned from this survey which might prove useful to any future intertidal survey.

Of these, only (iii) will be discussed here. The coastline will be divided into two categories: the open coast and the sea loughs.

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THE OPEN COAST

Physical Background

This is a general description of the physical background to the Northern Ireland Coastline: statements will be made about factors such as substrate type which may hold true generally for a length of coastline, but may not be accurate for individual sites.

Around the Northern Ireland coastline, the intertidal physical habitats available to biological communities are largely formed by a combination of three main factors:

- (i) Exposure
- (ii) Tidal range
- (iii) Major shore type

These three factors all change in a clockwise direction round this coastline from north-west to south-east.

Wave exposure is strongest on the north coast, which is often hit by gales from the open Atlantic, and more moderate on the east coast, which fronts onto the Irish Sea.

Tidal range is very narrow along the north coast (Mean Spring Tide Range is 1.0 m at Fair Head) and increases down the East Antrim coast (M.S.T.R. 2.4 m on the open coast south of Larne) to its maximum range along the outer coast of Co. Down (M.S.T.R. 4.0 - 4.6 m).

The main rocky shore types present are the sheer basalt and limestone cliffs, boulder bays and wave-cut platforms of the north coast, the boulder and block scree shores of east Antrim, and the intertidal ridges of sedimentary rock round County Down (which also has a high proportion of boulder shores in the south of the country).

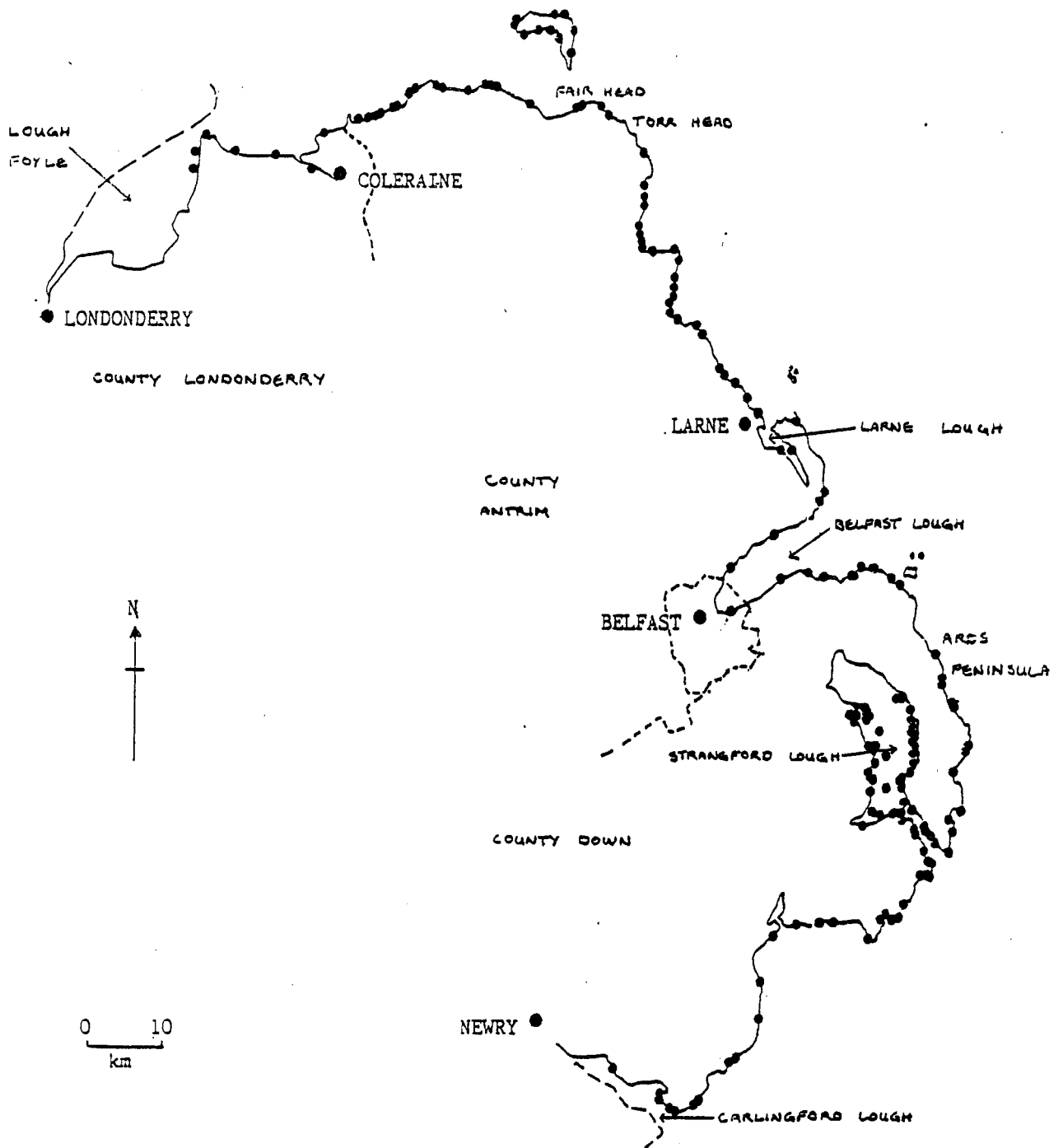
There are very few sedimentary beaches along the east Antrim coast. Those along the north coast of Londonderry and Antrim are very wave-exposed, and those outside Co. Down are exposed only to moderate wave action, although the general degree of exposure does increase slightly towards the south of Co. Down.

Biology

The decrease in wave exposure between the north and east Antrim coasts is reflected in the biological communities present. The exposed cliff faces of the north coast are dominated by barnacles and limpets, with Alaria and coralline algae at low water and littorinids living high into the supralittoral. Boulder shores support a greater animal diversity and intertidal wave-cut platforms (usually dominated by a community of red algae and/or Mytilus on the surface) have a greater algal diversity in pools than cliff sites.

South of Torr Head, as far as Larne, a large proportion of the more sheltered boulder shores are dominated by Fucoid algae, although some stretches are dominated by barnacles and limpets.

South of Belfast Lough the situation changes dramatically. A wide tidal range, a relatively sheltered stretch of coastline and a substrate composed of creviced sedimentary rocks combine to make northern Co. Down the richest part of the open coast around Northern Ireland for both animals and plants. Crevices in the rocks hold proportionally more rock pools than the hard basalt



Distribution of Stage II Sites surveyed, Oct. 1986.

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and limestone further north, and even along more exposed stretches of coast the ridges provide shelter from wave action.

Intertidal extent is determined by the orientation of the sedimentary rock outcrops. Outside the Ards Peninsula they form long, low intertidal platforms, as much as 200 m across, which are separated by wide sedimentary areas; however, in some other parts of Co. Down they form a relatively narrow intertidal.

Biologically, the wider platforms are dominated by Ascophyllum and other fucoids whereas the narrower intertidal regions are "patellobarnacle" on exposed surfaces and fucoid dominated in shelter.

There are also differences in the infauna of sedimentary shores. On the north coast the exposed sandy beaches support only a few species of crustacean (Haustorius arenarius, Bathyporeia spp.) and polychaetes, while the northern Co. Down infauna is more diverse, including the bivalve Tellina tenuis and a much greater amphipod and polychaete diversity.

The southern part of Co. Down is more wave exposed than the northern, with limpet and barnacle dominated boulder shore becoming common alongside sedimentary outcrops. Perhaps the most interesting aspect of southern Co. Down is the appearance of a number of more southerly species such as the reef-building polychaete Sabellaria alveolata and the prosobranch Monodonta lineata.

THE SEA LOUGHS

Each sea lough in Northern Ireland has its own distinct character. The common factor linking all five is that, apart from parts of Belfast Lough, they are all more sheltered from wave action than is the open coast.

Lough Foyle

Lough Foyle is characterised by very wide intertidal sand flats, with large mussel beds towards the southern end of the Lough. No significant rocky shores are present. The lough is important to overwintering waders and wildfowl.

Larne Lough

Larne Lough holds extensive intertidal mudflats, especially in the south. The lough seems to be silting up, perhaps due in part to the activities of a cement works.

Belfast Lough

There is a population concentration along the north and south banks of Belfast Lough. The lough is polluted by sewage and industrial waste, but has mud flats at the inner end which support a good bird population.

Strangford Lough

This and the next are the two most interesting sea loughs in terms of intertidal biology.

Strangford Lough is a wide, shallow sea lough connected to the sea by a narrow channel less than 1 km wide and about 9 km long, through which tidal currents pass at velocities up to 8

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knots. The north end of the Lough holds wide sand and mud flats which support large populations of overwintering waders and wildfowl. The most interesting intertidal habitats, however, are the sheltered Ascophyllum dominated boulder shores on both banks and around the islands in the lough, which support the greatest numbers of intertidal invertebrates in Northern Ireland.

The Strangford narrows also supports a diverse fauna, including some species which are usually found sublittorally, e.g. the ascidian Clavelina lepadiformis, the sunstar Crossaster papposus and in sedimentary shores the anemone Cerianthus lloydi and Echinocardium cordatum, the sea potato.

Carlingford Lough

This "emergence phenomenon" is also found at the narrows at the entrance to Carlingford Lough. Here again Echinocardium is found in sedimentary intertidal habitats, and Clavelina in rocky habitats; Metridium senile and Antedon bifida have also been found in intertidal rock pools. Some of the boulder shores inside Carlingford Lough rival those of Strangford Lough in terms of species richness.

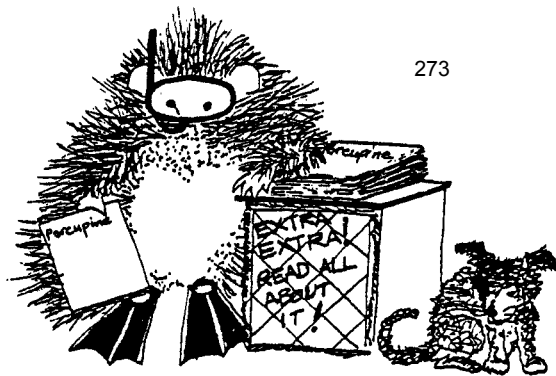
NOTICES

7. WANTED - LITERATURE, SPECIES RECORDS, and any spare specimens of Suffolk marine flora and fauna. David Lampard (Assistant Curator, Natural Sciences, Ipswich Museum, High Street, Ipswich IP1 3QH) is trying to produce a bibliography of marine studies in Suffolk, as well as trying to find details of species distributions of the Suffolk Coast and inshore waters: there appears to be little information around.

8. APPEAL FOR NUDIBRANCHS! "We are wishing to obtain samples of a range of intertidal dorid nudibranchs (especially Adalaria proxima, Onchidoris muricata, O. bilamellata and Goniodoris nodosa) from localities all around the British Isles. Would any member who is aware of productive, or likely, localities anywhere in the British Isles please contact Dr C.D. Todd, Gatty Marine Laboratory, St. Andrews KY16 8LB, Scotland. Likely shores would include those with stable areas of boulders or sheltered localities with heavily-fouled Fucus serratus plants. Localities would preferably be accessible by road and if a grid reference were available we would be very grateful. All assistance, advice and guidance would, of course, be duly acknowledged."

9. TO SHOW THESE PLEAS ARE (SOMETIMES) SUCCESSFUL, and further to Gouliot material (vide Notice 3), the nematodes and hydroid - bryozoan - sponge material I offered in the last P.N. have all found a good home, and we hope for informative P.N. articles!

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*****FUTURE MEETINGS*****

The 1987 Autumn meeting of PORCUPINE will be held at Pembroke on Saturday 26th and Sunday 27th September, on the theme of Aliens and Immigrants. The Saturday and Sunday morning sessions will include papers on immigrant echinoderms (Paul Tyler), alien serpulids (Thorpe & Zibrowius), ostracods (Roger Bamber), bivalves (Ian Laing), Mercenaria and others (Roger Mitchell) and algae (Bill Farnham), with species at zoogeographic extremes (Mike Kendall, Shelagh Smith), plus entertaining videos of Skomer's marine life (Francis Bunker), amongst other attractions.

If demand exists, a field trip will be organised to the good shores of Pembroke on the Sunday afternoon (low tide Milford Haven at 14.58 BST) with the option of a trip to Skomer.

As normal, a dinner will be organised for the Saturday evening.

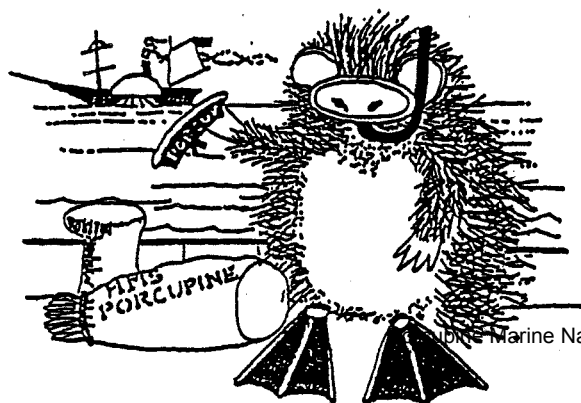
Enquiries, plus indications of numbers for the dinner, to Jon Moore, Oil Pollution Research Unit, Orierton Field Centre, Pembroke, Dyfed, SA71 5EZ (Tel. Castlemartin (064681) 370).

Final details of venue, etc. will be circulated directly

The 1988 Spring meeting and Annual General Meeting will be held at Millport, Cumbrae, on Saturday 6th and Sunday 7th March, 1988, on the theme of the Status of Marine Research in Scotland. Contributions are planned on the St Abbs nature reserve (NNR by then?), the NCC Marine Reserves in Scotland, local diving surveys, the sub-aqua surveys of the Hebrides and St Kilda, and biological suppliers, together with talks on Millport itself by John Allen and on chitons by John Baxter.

Final details of the meeting, including the possibilities of 'overnighting' in Glasgow on the Friday will appear in the next Newsletter, and enquiries should be addressed to Fred Woodward, Glasgow Museum and Art Gallery, Kelvingrove, Glasgow.

Members wishing to organise future meetings, or to offer themes or venues, are encouraged to contact the Hon. Sec. Martin Shearer, Dept. Oceanography, The University, Southampton, Hants.

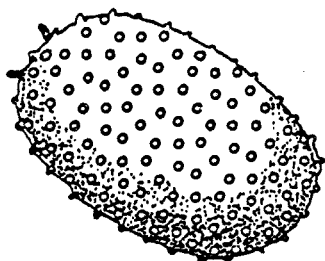


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ONCHIDELLA CELTICA (FORBES & HANLEY, 1852) AND OTHER
MOLLUSCA OCCASIONALLY VISITING WESTERN SCOTTISH SEAS

by Shelagh Smith

Onchidium celticum was first recorded from Scotland by Chumley (1818) who mentioned briefly "taken on the shores of Upper Loch Fyne - a new record for the west coast." This record was until recently treated with considerable doubt. I am not the only person to have searched Upper Loch Fyne in vain and to have concluded that there was an error. However, two specimens turned up in west Scotland in 1985 which have immediately revised opinions.



The basis for Chumley's note has been difficult to track down, and I am grateful for the help of Alan Ansell, SMBA, for information. I quote parts of his letter to me. "We have a small collection of notebooks and logbooks which refer to dredging operations in the Clyde between May 21, 1891 and October 1892. The log books for 'Medusa', written either by Captain Turbyne (Captain of 'Medusa') or Mr Pearcey, give lists of animals found

in the dredge at the various stations, and are presumably the raw material for Chumley's 'Fauna of the Clyde Sea Area'. 'Medusa' worked in Upper Loch Fyne on 1st and 2nd March 1892 and between 21 and 30 April 1892. On 25, 26, 27, 28 and 29 April Pearcey and Turbyne collected on the shore at low water at various places. However, there is no mention of Onchidium celticum being collected at that time". As will be seen, this may be significant. "In a separate notebook there are lists of species from I Loch Goil, II Upper Loch Fyne, III Gareloch, drawn up by Chumley from Turbyne and Pearcey's log books." In this, on p.116, a number of species, including Onchidium celticum, have been added in pencil to the list. I quote from a photocopy of the list:

"Chemnitzia rufescens	12-25fms
Trophon muricatus	12-25fms
hydatis	
Bulla cranchii Turbyne's cabinet list	E. side, 20fms (r.r.);
Centre,	36-70fms (r.)
Acteon tornatilis - "	" "
Cylichna strigilla - "	" "
Philine catenata "	" "
Onchidium celticum "	" "
Philine punctata,	East side, 20fms (r.r); Centre, 36-70fms
(r.r)	
" scabra	W side, 10-15fms (r.r); E, 28fms (r.)
Tornatella fasciata	Minard 11-25fms, (r.r)"

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Ansell continued "In another notebook labelled "Animals of the Clyde Sea Area, with notes on distribution", Onchidium celticum appears on p.206, with "(Mr Robertson) Found in Upper Loch Fyne on shore probably new to west coast. in Cabinet."The note suggests that he was responsible for the identification I suppose it is possible that the original specimen is preserved in the collection at Millport." (being checked).

Thus the matter rested until 1985 when on a chilly 2 March I was with a party of MCS divers at Craobh Haven, south of Jura. They returned to shore with boxes and poly-bags of specimens for me to help them identify.

Floating about in one bag was a sprightly Onchidella celtica. Alas! sprightly no more, it is a Voucher Specimen in the National Museum of Scotland.

Me: "Where did you find that?"

Diver: "I don't know, never saw it, don't know how it got in the bag."

Thus all we know about its habitat is that it clearly was sublittoral.

This started an Onchidella hunt. With Julia Nunn a few weeks later I scoured the shores around Craobh Haven, looking in particular in the barnacle zone because O. celtica normally lives there. No luck. Then there was a report of a sighting in Loch Carron: Strome narrows, by a member of Inverness Subaqua Club who had read a note (illustrated) on the Craobh Haven finding which I had put about in a news sheet. This latest specimen was seen on 21 April 1985, floating about (to describe it as swimming is a bit imaginative) over pebbles. This was under water, although in the intertidal zone. In June that year Fraser Gault and I searched Strome narrows and the adjacent areas. No luck.

And that at present is the end of the Onchidella celtica in Scotland story. Clearly its visits to Scottish shores are accidental and probably rare, but perhaps not so. (It is usually restricted to S.W. England and points south). Who in their right minds would expect to find a pulmonate (air breathing) mollusc to be sublittoral? Does it come up for air like a whale? It is a very difficult animal to see under water, being dark dull blackish green: perhaps divers will be the people to continue the tale.

Kelvin Britton has informed me that the diet of Onchidella celtica is basically herbaceous, with a variety of algae taken - Enteromorpha, Ulva, Chaetomorpha, Rhodomenia, Lithophyllum, Rhizoclonium, Litosiphon, Callithamnion, Furcellaria, Polyides, diatoms - hence it seems to me that the next point of search should start not amongst barnacles but amongst weed low on the shore and in the shallow sublittoral.

It is very difficult to decide, just because there are few records, what species are genuinely rare and occasional visitors, and which have simply not been found. There is also a large group which is not uncommon but probably does not breed so far north, adult populations being constantly maintained from the plankton. From data which I, with David McKay, have obtained in our work on the distribution of marine Mollusca of west Scotland, I list a number of apparently rare species together with my thoughts on

the subject. The list is not exhaustive (if it were it would be exhausting), but is confined to selected species about which there is a point to be made. Comments on and additional records of these species and other uncommon ones are welcome. Those species marked with a * are probably not uncommon, not found rather than rare.

*Hanleya hanleyi (Bean in Thorpe, 1844)

Recorded from the Oban area and off Jura. Lives sublittorally on bedrock. Divers, who might be expected to find this, generally list chitons as "Chiton sp." - frustrating!

Acanthochitona fascicularis (L., 1767) = A. communis

I found one at Craobh Haven in March 1986, on top of a boulder amongst Ascophyllum nodosum. Not a typical specimen, but not A. crinitus so sent it to Piet Kaas for checking. As chitons, if present, are fairly easy to find, I am certain I would have found others if this specimen had not been just a lone wanderer.

*Scissurella crispata Fleming, 1828

Found in grab samples, shell sand, in Loch Carron and West of Barra. Dead shells, which are very fragile, are widespread, and I feel that lack of records indicates inadequacies of sampling. Although records suggest that it lives on pebbles or gravel, it may well prefer a hard substrate.

*Emerginula crassa Sowerby, 1813

Common on rock in Loch Fyne. Probably to be found on rock elsewhere. Divers please note. I have also found it amongst Lophelia pertusa from Rockall Bank.

*Propilidium exiguum (Thompson, 1844)

Also a rock dweller, usually below 100 m, thus evades capture.

Margarites argentatus (Gould, 1841)

Several specimens found in a sample of maerl from Loch Torridon which was obtained in 1975. While this may be genuinely rare, as Margarites are not always easy to identify it may have been overlooked. Also not many people sort samples of maerl.

Littorina neglecta var. scotia Smith, S.M., (in press)

I have previously indicated the presence of this winkle on Rockall (Smith, 1979) and have also found it on the Mull of Oa, Islay. I would expect it to be on the cliffs of St Kilda and perhaps, but by no means certainly, on the Atlantic cliffs of Lewis (NB - I have instigated a hunt on St Kilda).

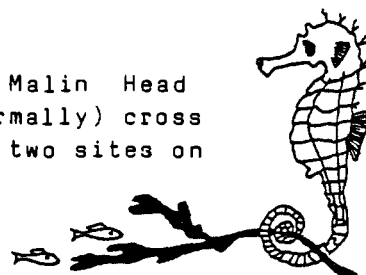
Ammonicera rota (Forbes & Hanley, 1850)

This can easily be overlooked and recorded as Omalogyra atomus.

Having found that both species were not uncommon living amongst the smaller littoral algae in the Sound of Jura area I spent a considerable amount of time going through all the specimens of O. atomus in my own possession and in the collections of the National Museums of Scotland. I found one A. rota, in a sample from Loch Hourne. This story demonstrates a good use to which extensive representative collections can be put.

Coriandria fulgida (J.Adams, 1797)

This species is common in NW Ireland as far east as Malin Head and is one of a number of species which do not (normally) cross the North Channel. I have found it abundant on two sites on



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Islay in 1979, and a single specimen in Loch Sween in 1982. Since much of my work includes investigating the appropriate habitat, smaller algae, I am convinced that the Scottish records depended on being at the right place at the right time. Even so it is at the extreme northern end of its range.

Pyramidellids

It is difficult to make judgements on which of these might or might not be genuinely rare. Many are sublittoral, which means that I may not have come across them very often. In the past there has been the problem of identifying them. Most species are parasitic, and the host organism (polychaetes, especially terebellids and serpulids are favourites) is often easier to find.

Janthina janthina (L., 1758)

Stranded on the west coast of Lewis in 1981. This is very far north for strandings of this pelagic species to occur, and lucky is the person, in this case not me, who finds any.

Eulimids

Remarks as for Pyramidellids: host organisms usually echinoderms.

Calyptraea chinensis (L., 1758)

Fresh dead shells have been found in Loch Sween and living material on the oyster bed in Loch Ryan. It has been described in association with oysters in Ireland by Minchin, McGrath & Duggan (1987) as a case of accidental introduction and the same is likely to be true for Scotland.

*Erato voluta (Montagu, 1803)

Dead shells are sufficiently widespread to consider that it lives elsewhere than St Kilda or Coll. Probably eats colonial ascidians living on bedrock: divers please note.

*Euspira fusca (Blainville, 1825) = Natica or Lunatia fusca

Occasionally dredged from deep water. Sand, muddy sand and muddy gravel preferred.

*Trophonopsis muricatus (Montagu, 1803)

The only ?living Scottish record is that in the Medusa notebooks and East of South Uist (Marshall, 1910). Dead shells are widespread. It lives on sandy gravel and should not be difficult to find.

Turrispho fenestratus (Turton, 1834)

Marshall (1910) dredged up a young specimen from the Minch; recorded from Loch Eil and Arran. This species is usually found below 100 m on pebbly ground and I am dubious of the recent records, but at a loss to suggest with what they could have been confused. Probably somebody will produce specimens and I will have to eat humble pie again.

Troschelia berniciensis (King, 1840)

..has also been recorded from Loch Eil, and is also a deep water (shelf edge and slope) species. The deeper sea lochs may well harbour unexpected species.

Turrids

Many of these are rarely recorded. Most are sublittoral and, apart from being not particularly easy to identify, may also live in habitats difficult to sample. For example *Raphitoma purpurea (Montagu, 1803) (= Philbertia purpurea) is secretive, having been found inside a plastic glove which a diver brought

up for me thinking it might be interesting, under boulders and amongst littoral algae. *Teretia teres (Forbes in Reeve, 1844) has been dredged from rock in the Firth of Lorne, and seen on a vertical cliff in Loch Carron. The distribution of dead shells leads one to think that Comarmondia gracilis (Montagu, 1803) may perhaps be confined to the Clyde.

*Acteon tornatilis (L., 1758)

Dead shells are very widespread but there are surprisingly few records of living animals. Probably common in the Clyde.

Roxania utriculus (Brocchi, 1814)

Found off Bute. The place to look appears to be haddock's stomachs.

Philine catena (Montagu, 1803)

The only recent records are from Loch Etive. This is a species which appears to be less common than it was 100 years ago.

*Philine pruinosa (Clark, 1828)

Occasionally found on muddy sand slopes, associated with Ascidia mentula; again probably common.

Haminoea navicula (da Costa, 1778)

The record from Upper Loch Fyne (above) is probably this species (H. hydatis is not British). H. navicula occurs in Donegal sea loughs. Its occurrence in the same year as Onchidella celtica is probably no coincidence.

*Hermaea bifida (Montagu, 1803)

Recorded occasionally living on Griffithsia corallinoides. Probably has some good years and some bad, and may not breed in west Scotland.

Other Sacoglossans and Nudibranchs

Distribution of the less common and/or more difficult to find or identify depends very much on the distribution of effort by nudibranch buffs. There are, however, a few of note.

Scyllaea pelagica L., 1758.

There is a record of one taken in a tow net off Cumbrae (in about 1900) which was accidentally destroyed before being verified absolutely, but with what could it be confused? This is a pelagic oceanic species and thus could be expected to go off course now and again.

Adalaria loveni (Alder & Hancock, 1862)

The species recorded as this is not uncommon living in the Firth of Lorne and Loch Linnhe, from low water downwards. While it is an Adalaria it is not loveni and is yet to be described.

Thecacera pennigera (Montagu, 1815)

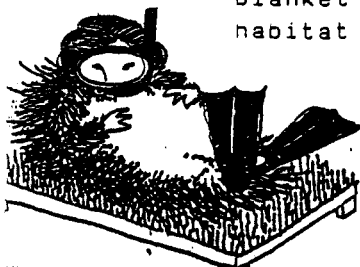
Recorded by Robertson (1868) from Cumbrae and considered to be a gaudily coloured Polycera quadrilineata. However, I. pennigera has recently been discovered to be not uncommon living in the shallow sublittoral all along the north coast of Ireland and thus Robertson's record can no longer be dismissed out of hand.

Hero formosa (Loven, 1841)

Recorded in the Sound of Mull and off Luing in 1983. A few old records from the Clyde. This is probably an occasional species.

*Ovatella myosotis (Draparnaud, 1801)

I have found this at two sites, living in muddy gravel under blanket Ascophyllum nodosum. As this is not my favourite habitat to investigate I am sure I have overlooked it.



Otina ovata (Brown, 1827)

Living in crevices on the exposed west coast of Islay, 1979 and 1982. The habitat is prone to natural destruction. At the northern limit of its range and possibly breeding populations are not established.

*Yoldiella lucida (Loven, 1846)

Living in mud, 110 m in Loch Nevis. Difficult to identify and may be fairly common in the depths of sea lochs.

Codakia decussata (O.G. Costa, 1863) (= Ctena decussata)

Fresh complete shell found at Craobh Haven in 1976. Possibly introduced with cultivated oysters.

Ihyasira spp.

Records of the smaller Ihyasira spp. are problematical. The species may well be common in the depths of the sea lochs but they are very difficult to identify and the published literature doesn't help.

*Tellimya tenella (Loven, 1846)

Common off Cumbrae, also found on the Stanton Banks. Not in the well known literature, and difficult to identify. Probably widespread.

Neolepton sulcatulum (Jeffreys, 1859)

I was given a dead whelk shell found west of Barra. From the sand inside it I found one N.sulcatulum. There are few records from anywhere, but what else can you expect from a round shell 1.5 mm across?

Arcopagia balaustina (L., 1758)

This has been found east of Barra and in the outer Loch Carron. It is a deep water species, but large and pretty enough not to be overlooked, and is likely to be genuinely rare.

Pholadidea loscombiana Goodall in Turton, 1822

Several living in a calcareous concretion trawled from the Passage of Tiree (Smith, 1981). This is a presumed southern species which bores into soft rock. These calcareous concretions are not so rare off west Scotland as was once thought, and many must be tossed overboard without a glance.

*Xylophaga dorsalis Turton, 1822

Few records, but probably common. It lives in waterlogged wood on muddy gravel bottoms and is probably overlooked in the same way as the previous species. If divers can be persuaded to bring up bits of likely-looking wood and any such dredged are carefully kept and not tidied away overboard, records will multiply.

Cuspidaria spp.

Few records and probably genuinely quite rare, living in mud or muddy sand.

*Cephalopods

Records of cephalopods are very frustrating. There are some strandings of small shelled species especially on the Atlantic coasts, probably occurring less than annually. Most species are probably common, but seasonal. The larger species (giant squids apart), particularly those which are commercially fished, are regarded as common but there is little precise data on location, etc. The smaller species are regarded by divers as too pretty to catch and are recorded as "Sepiolid", which is unhelpful. Most sepiolids have proved to be either Rossia

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macrosoma (delle Chiaje MS, Orbigny in Ferussac & Orbigny, 1848) or Sepietta oweniana (Orbigny in Ferussac & Orbigny, 1840), the latter taken, I suspect, because they were thought to be giant Sepiolo atlantica (Orbigny in Ferussac & Orbigny, 1840)! In the light of Stephens' work (Heppel & Smith, 1983) I feel that many of the smaller species must be common.

Several points emerge: apart from those species which occur some years and not others and those which are likely to be genuinely rare, and far from their normal range, such as Onchidella celtica, other rare species fall into one or other of two categories. Either they are difficult to identify because they really are difficult, or, more likely, because the literature which is used is inadequate, not only regarding what the species actually looks like but also in what habitat it may be found. Or the habitat is not investigated. Investigation for infauna and small species requires diligence and time, but in my experience most people are under such pressure to do a certain quota of work that they are unable to do it thoroughly. Perhaps this is one reason why the old boys (and girls) of the last century found such a lot.

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 Smith S.M., 1979. Littorina rudis var scotia and its adaptations to the extreme environment of Rockall (Mollusca: Gastropoda). Porcupine Newsletter, 1; 138-139.
 Smith S.M., 1981. A calcareous concretion from the Passage of Tiree. Porcupine Newsletter, 2; 65-66.

(MORE!)

NOTICES

10. THE INSTITUTE OF OCEANOGRAPHIC SCIENCES Deacon Laboratory is holding Open Days on Thursday 15th and Saturday 17th October 1987 at Wormley, Godalming, Surrey. Displays will be given of technological developments, scientific discoveries, and of instruments used to study the oceans.

The Thursday, from 10 a.m. to 5 p.m., is by invitation, for visitors with a professional interest in oceanography or marine science. Visitors requiring invitations should contact the Open Day Office, Institute of Oceanographic Sciences, Brook Road, Wormley, Godalming, Surrey GU8 5UB.

The Saturday, from 11 a.m. to 5 p.m. is for the public at large.

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Letters to the Editor



From Dennis Seaward:

I have just had the latest Estuaries and Coastal Waters of the British Isles bibliography (No. 11, March 1987) from the M.B.A., and realise that they do not notice PORCUPINE NEWSLETTER, confirmed by checking earlier numbers. They do notice other Newsletters - e.g. Conchological Society. Is this deliberate? I suggest some of the articles are of such high quality and importance (modesty forbids me etc.) that M.B.A. should list them. Anyway, good for the Society and recruitment to get the publicity.

ALL VERY TRUE, and I am looking into this - Hon. Ed.

From Tony Walker
16, Dunstall Rd, Wimbledon, London SW20

'For information for people collating species records'. Since I have been working in the benthos (since 1970) there have been many changes both in my own competence and in marine invertebrate taxonomy, especially the polychaetes. This is not only due to new species descriptions, but also to more up-to-date keys appearing in English.

The earlier Liverpool Bay samples have been largely reworked, though some groups such as nudibranchs remain to be looked at thoroughly. The full card index is with Ivor Rees at Menai Bridge.

The 1971-72 Dublin Bay survey (unfortunately published - Irish Fish. Invest., 22 (1980)) is being reworked. After one summer, my assessment of the earlier work is as follows (major groups):

Hydrozoa: many omissions
Anthozoa: reliable
Polychaeta: unreliable
Malacostraca: some questionable
Mollusca: probably largely reliable
Echinodermata: probably reliable
Chordata: some questionable

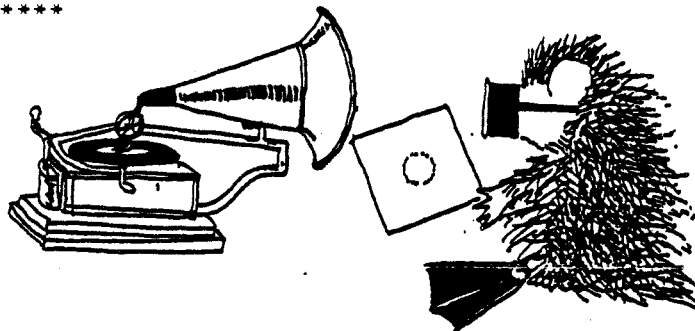
I shall be working on this for two months this summer, and hope to next summer, after which it should be done.

From C.T.Cannon

Can this be serious, what I read in the Sunday Times? (Surely a most reliable source). That a "Campaign for Real Fish" is being instigated by, of all people, F.O.E., to discourage us from buying reasonably priced and thus accessible ranched (NOT farmed!) salmon, but instead we should dig deeper into our ingestion budgets to subsidise the exploitation of wild stocks of salmon (and presumably keep the River owners and the T-net fishermen healthily at each others throats!). Is this campaign to reduce pollution threats? Not if the NCC report is to be believed (e.g. Mar. Pollut. Bull., 18 (6), p.261). Is it in relation to disadvantageous effects on the local benthos? Not judging from the results of J.R. Brown et al. (J.E.M.B.E., 109; 39-51).

No, apparently "The problem with farmed fish is that they get no excercise"!, and thus don't taste like salmon! (surely taste is in the mouth of the beholder). Have I missed the point? It wasn't published on 1st April, so it must be down to an actual aberration.

**new
records**



A NEW ADDITION TO THE BRITISH MARINE MOLLUSC FAUNA,
LIVING IN THE FLEET, DORSET

This is a preliminary note to record the finding of a colony of the prosobranch Caecum armoricum De Folin, 1869, in The Fleet, Dorset, its first recorded occurrence in the British Isles. It is similar to C.glabrum (Montagu), but with a much more protruding and assymetrical septum, and is well described and illustrated by Van Aartsen and Hoenselaar in Basteria, 48; 23-26 (1984). Dr Van Aartsen has kindly confirmed my tentative determination. Previous records are from the Atlantic coast of Portugal, Spain and France, as far north as the St Malo area.

I have so far found the species at two sites in the Fleet in a highly specialised microhabitat, where it seems to be a significant member of the community. A more detailed account will appear in due course.

The animal is very small (adult shell 2.5 mm long x 0.5 mm diameter) and easily overlooked. In view of the recent finding of C.clarki Carpenter at several points along the continental Channel coast, it is worth critically examining any finds of this genus.

Dennis R. Seaward.