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The second Annual General meeting and Spring Seminar held at the Royal Scottish Museum, Edinburgh on 31st March and 1st April 1979 proved a resounding success, due to the considerable enthusiasm and involvement of our hosts to whom we extend our sincere thanks. The theme of the Symposium "Biological Frontiers" proved most stimulating and resulted in lively discussion.

During the course of the Annual General Meeting it was agreed to grant Honorary Memberships in recognition of outstanding service to marine zoology and to Porcupine, with the result that Sir Maurice Yonge was nominated for and duly agreed to become Porcupine's first Honorary Member.

On a sadder note, it is with some regret that I have to inform members of the 'retirement' of my secretary, Mrs. Joyce Wilkinson, who is moving out of the area. She has carried out sterling service on the Society's behalf, not only in the preparation and production of the first eight Newsletters, but also played an important part in the summer meeting held at South Shields during 1977. On behalf of us all I wish to extend to her our sincere thanks and best wishes for the future.

Finally, members are reminded that contributions comprising reviews, notices of forthcoming events, news of personal and joint research projects, requests for information, etc. should be sent to the Hon. Editor of Porcupine, Mr. F.R. Woodward, South Shields Museum and Art Gallery, Ocean Road, South Shields, Tyne and Wear, NE33 2TA, or to the Hon. Secretary of Porcupine, Dr. Shelagh M. Smith, Royal Scottish Museum, Chambers Street, Edinburgh, EH1 1JF.

F.R. WOODWARD
Hon. Editor.

COMMITTEE NEWS

Minutes of the Second Annual General Meeting held at the Royal Scottish Museum, Edinburgh on Sunday 1st April 1979 at 09.45hrs.

Adrian Norris took the chair.

Minutes of the First A.G.M. held at Manchester 25th February 1978 were read and approved.

There were no matters arising.

Items 1, 2 and 3 on the Agenda were read or demonstrated. The Hon. Treasurer's Report was demonstrated with difficulty and he proposed that the accounting year end on 30th November, this was seconded by Frank Evans and put to the meeting being carried unanimously.

1. Hon. Secretary's Report. Acceptance proposed by Tom Gascoigne. Seconded by Tom Pain.

2. Hon. Treasurer's Report. Acceptance proposed by David McKay. Seconded by Fred Woodward.

3. Hon. Editor's Report. Acceptance proposed by John Wilson. Seconded by Eve Southward.

The Hon. Record Convener (David KcKay) also gave a report. Acceptance proposed by Adrian Norris. Seconded by Fred Woodward.

4. Election of office-bearers.

The present office-bearers were re-elected unanimously.

Election of Council Members.

Frank Evans was proposed from the floor by Tom Gascoigne and seconded by Fred Woodward.

He and Roger Brehaut were approved as new Council Members. Council now is:

Roger Brehaut, Bob Earll, Frank Evans, John Gordon, W. Eifion Jones, Adrian Norris, Brendan O'Connor, Eve Southward, Geoff Swinney, John Wilson.

5. Future Meetings.

It was agreed with enthusiasm that the next A.G.M. should be held in Edinburgh, probably February 1980, preferably not the 3rd Saturday of the month. The idea of an Annual Dinner was suggested.

6. The proposal that the Committee should have the power to elect Honorary Members raised considerable heat and fears that such Members would be a burden were expressed. After Fred Woodward put forward the safeguard that the maximum number should be 3 the proposal was accepted. Fred Woodward then proposed that Sir Maurice Yonge be invited to become Porcupine's first Honorary Member, seconded by Tom Thompson and unanimously elected with acclaim.

The A.G.M. closed at 10.45hrs.

Later that morning it was announced that Sir Maurice had intimated his acceptance to become Porcupine's first Honorary Member.

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HON. SECRETARY'S REPORT

Shelagh Smith.

Porcupine has very successfully survived its second year of infancy with a membership of 118. Three more meetings (excluding the present one) have been held, starting with a very successful gathering at Manchester Museum on 24-25 February 1978. The theme was the Species Problem, which attracted an attendance of 44

vociferous people. On 23-25 June 1978 we had a weekend workshop course at the Marine Biology Station, Portaferry, at which the 9 people attending received individual tuition on the field collection, separation and identification of several groups of Meiofauna. On 23-24 September 1978 there was a very lively meeting at Portsmouth Polytechnic on The Ecological Impact of Seaweeds, which delighted the 40 enthusiasts who participated.

We have heard of little progress within the Marine Recording Schemes despite (or perhaps because of) Porcupine's agitation, except in marine Mollusca where the suitability or otherwise of different grids is to be assessed following the hand-plotting by Nature Conservancy Council personnel of records for a selection of common species. As we have been told at this present meeting, data processing across a broad spectrum of marine organisms is proceeding as fast as the information can be stuffed into computers.

The Guide to Fauna/Floral Lists and Systematic Keys has fallen into abeyance partly through lack of support and partly through lack of manpower, especially to evaluate the usefulness of keys. Experts please step forward.

There is a lack of adequate forward planning of meetings due to lack of volunteer hosts, we would also like joint meetings with other groups. The present meeting, in the Royal Scottish Museum, on Biological Frontiers, 31 March-1 April 1979 has been a great success and Edinburgh had been requested as the venue for next years A.G.M. to be held Spring 1980.

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MARINE RECORDER'S REPORT

David W. McKay.

In my report to the 1978 A.G.M. I stated that I had had no records of any kind lodged with me during 1977. I cannot however make this claim for 1978 as I have had some records of Crustacea from the North coast of Spain. I regard this as the start of a data bank that will eventually become very large.

I have recently been mapping the Mollusca of the East of Scotland and have been rather dismayed by the amount of data which has been collected and not published. I would therefore like to take this opportunity to encourage research workers to lodge their raw station data with one of the national recording schemes or with the Porcupine Marine Recorder, where no national scheme is available. I am well aware that most workers are rightly jealous of their data prior to this work being published. However editors are becoming more and more reluctant to publish species lists in detail and I feel that it would be a great pity if these data were to be lost to future workers simply because no vehicle is available for its publication.

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REPORT OF PORCUPINE MEETING

Shelagh Smith.

The meeting at Edinburgh was very successful. Nine people went on the excursion on Friday, 30th March 1979. We went to Redheugh, Berwickshire and, encouraged by unexpectedly pleasant weather found a sufficiency of animals of which nudibranchs were the main interest (list at end of report).

About 40 people attended the indoor part of the meeting on Saturday 31st March and Sunday 1st April and were entertained and informed on a variety of subjects mostly within the framework of the theme Biological Frontiers.

The Annual General Meeting was held on the Sunday morning, business there is reported elsewhere in this number of the Newsletter.

Mollusca from Redheugh.

This is not the complete list - just species of particular interest to those on the excursion.

Littorina arcana Hannaford-Ellis, 1978
Littorina neglecta (Bean, 1844)
Littorina nigrolineata (Gray, 1839)
Littorina rudis (Maton, 1797)
Lamellaria perspicua (L. 1758)
Lamellaria latens (Müller, 1776)
Berthella plumula (Montague, 1803)
Aegires punctilucens (Orbigny, 1837)
Goniodoris nodosa (Montague, 1808)
Limacia clavigera (Müller, 1776)
Onchidoris fusca (Müller, 1776)
Onchidoris muricata (Müller, 1776)
Acanthodoris pilosa (Müller 1789)
Cadlina laevis (L. 1758)
Archidoris pseudoargus (Rapp. 1827)
Lorunna tomentosa (Cuvier, 1804)
Coryphella verrucosa (M. Sars 1829)

Limapontia was searched for but not found, but had been obtained from Dunbar the previous week. L. capitata was common and one specimen of L. senestra (quadrefages) was found (det. T. Gascoigne). This is the first record for the Firth of Forth.

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HONORARY MEMBER

The proposal that Sir Maurice Yonge be elected our first honorary member in recognition of his continued and outstanding service to marine zoology was more than heartily applauded and we are delighted that Sir Maurice has accepted.

Sir Maurice, known throughout the world for his work, particularly on bivalve Mollusca, is very highly respected both as a scientist and naturalist. He has been a friend of Porcupine since its inauguration, showing great interest behind the scenes and encouraging us with his belief in, and commitment to, the aims of Porcupine. In addition during a period extending over fifty years he has not only instructed and inspired graduates and undergraduates with his enthusiasm and example in the marine biological sciences but has, at the same time, instilled inspiration to the amateur by the popularisation of marine biology through his publications. These include 'The Seas', first published in 1928 (in conjunction with F.S. Russell); 'A Year on the Great Barrier Reef', 1930; 'British Marine Life', 1944; 'The Sea Shore', 1949;'Guide to the Sea Shore', 1958 (in conjunction with J. Barrett); and 'Living Marine Molluscs', 1976 (in conjunction with T.E. Thompson).

Here is a great man who has done Porcupine a great honour.

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MACROBENTHOS DISTRIBUTION PATTERNS IN RELATION TO FRONTS IN THE IRISH SEA

E.I.S. Rees
Marine Science Laboratories, Menai Bridge.

Preliminary distribution plots have been made of a number of conspicuous benthic species based on data collected incidentally to other activities. These indicate definable zones in the Irish Sea where series of species have roughly coincident geographical limits. These boundary zones occur in places where oceanographic and satelite thermal imagery observations indicate that "fronts" regularly occur.

South and west of the Isle of Man the deeper water in an area of slack tides stratifies in the summer months. A front occurs between this area and the tidally mixed water of St. George's Channel and the central Irish Sea. Such conspicuous species as Porania pulvillus, Solaster endeca and Balanus hameri are quite common round the south of the Isle of Man but are absent from apparently suitable ground only 30 miles away off the north of Anglesey. Another faunal boundary runs north across the mouth of Liverpool Bay at about 4°W. Species such as Xantho couchii, Emarginual reticulata, Lima loscombi, Colus gracilis, Palmipes membranacea, and Crossaster papossus do not normally extend into Liverpool Bay much beyond the 4°W lines. This boundary seems to represent the offshore equivalent of the intertidal faunistic boundary that has long been recognised between the two sides of Anglesey. The boundary coincides with a frontal region at the mouth of Liverpool Bay and the limit of the summer offshore spread of the boundary between Sagitta setosa and S. elegans water indicated by Khan and Williamson (1970).

Within Liverpool Bay the boundary between offshore and inshore water varies considerably and rapidly in response to meteorological events. Variations from year to year in the relative abundance of offshore and inshore benthic species seem in part to arise from movements of the hydrographic boundary. Hence knowledge of the positions of the boundaries that may be obtained by remote sensing is important for benthos monitoring.

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DEEP-WATER CORALS OF THE NORTH-EAST ATLANTIC

J.B. Wilson
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Some 18 species of scleractinian coral are recorded from British and Irish waters, Rockall Trough, Rockall Bank, the Faeroes, and from Norwegian waters (Zibrowius, 1976). The adaptation to living on soft substrates of two of these - Carophyllia smithii and Lophelia pertusa has been studied.

C. smithii is dependent on the polychaete Ditrupa arietina for support during its post-settlement development on the sand sheets in the weaker tidal current areas on the continental shelf. As the coral grows, this dependence decreases and algal borings weaken and eventually break off portions of the Ditrupa tube until it is finally destroyed leaving no evidence of the initial attachment visible at the base of the coral (Wilson, 1975, 1976).

L. pertusa is widely distributed and occurs on all the offshore banks of the north east Atlantic (Lousy Bank, Rockall Bank, Faeroe Bank, etc.) with some records from the deepest water in the Minches and sea off the Hebrides. It is rare on the edge of the continental shelf to the west of the Outer Hebrides but it occurs on

the shelf edge and north of Shetland and southwards towards the eastern end of the Wyville Thomson Ridge (Wilson, 1979a).

Observations made from a submersible on Rockall Bank have suggested the probable way in which the Lophelia 'patches' develop. The initial colony gives rise to a ring of younger colonies which in turn give rise to other colonies. The transition from stage to stage depends on portions of living colonies weakened by clionid sponge attacks breaking off and falling away from the colony so providing the substrate for the development of later colonies and thus enabling lateral increase in the size of the 'patch' to take place (Wilson, 1979b).

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FACTORS INFLUENCING THE DISTRIBUTION OF Nephrops norvegicus (L.)

F.G. Howard
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Nephrops norvegicus (L.) has a discontinuous boreal distribution. Its geographic range extends from Morocco northwards to Greenland and Iceland. It is found in the Mediterranean as far east as Egypt, but becomes less widespread east of the Adriatic. It is restricted to the continental shelf and is not found west of Ireland. It does not occur in the Baltic Sea.

Nephrops is a burrowing organism, constructing simple and complex burrows in mud. The mejor limiting factor in the animal's distribution is the availability of a substratum of fine, cohesive mud capable of supporting unlined burrows.

In it silt and clay fractions with a particle size of 0.5 - 60 µm account for 50 - 85% by weight of the sediments. The clay mineral, organic and water contents are important in determining the cohesive properties of the mud. The sediments are thixotropic, tending to become more fluid under applied force (Rice and Chapman, 1971).

Belderson (1964) described Nephrops inhabited deposits in the Irish Sea as residual reworked glacid clays from the late Holocene. It is likely that many of the sedimentswhere Nephrops are found are of similar origin.

There is little evidence to suggest that environmental factors such as temperature, salinity or oxygen are limiting factors in Nephrops distribution. In fact confusion can arise because changes in these factors may affect the behaviour and catchability of Nephrops. Maximum and minimum recorded temperatures from areas

inhabited range from 7 to 13°C in the Irish Sea (Farmer, 1972) and from 10 to 15°C in the Adriatic (Karlovac, 1953).

Jensen (1965) suggested that in the Skagerrak and Kattegat Nephrops could not be caught when bottom temperatures fell below 5°C because they remained in their burrows. However this has been questioned by Bagge and Munch-Petersen (1979) who reported a stronge negative correlation between trawl catch in the Kattegat and dissolved oxygen concentrations. The oxygen levels in water close to the sea bed reached a minimum level of 42% saturation when catches were greatest.

Salinity is apparently not an important factor in distribution, although Hoglund (1942) suggested that the absence of Nephrops in the Baltic Sea was due to its inability to tolerate very low salinities.

It is unlikely that Nephrops are affected by sudden environmental changes since they generally inhabit deep water. They occur at depths ranging from 15m to more than 800m, the main populations being found between 15m and 500m. Andersen (1962) suggested that the activity patterns of Nephrops, i.e. their emergence from burrows, is related to light intensity, and this in turn could limit the maximum depth at which they are found. Studies of individual Nephrops by diving and tagging (Chapman and Rice, 1971; Chapman et al, 1975) show that they spend most of their time within their burrows and that they emerge for a comparatively short time during each 24 hour period. The burrows extend 200 - 300mm below the surface, so that animals within are unlikely to be caught by trawling.

Trawl catches show large diurnal and seasonal fluctuations and it has been assumed that these reflect the periodicity of emergence. This assumption has recently been confirmed by comparing trawl catches and television observations on the same grounds (Chapman and Howard, 1979).

In general the biggest catches are obtained around dawn and dusk, but with increasing depth (over 150m) the time of these two peaks shifts towards mid day. Conversely in shallower water (less than 20m) the peaks moved towards midnight. Studies on populations off the west coast of Scotland at two extreme depths (Atkinson and Naylor, 1976) showed that at 184m in the Minch peak trawl catches occurred close to mid-day, and at 10m in Loch Aline, diving revealed peak emergence at night.

Chapman et al (1975) suggested that the emergence of Nephrops from their burrows was confined to a narrow range of light intensities, and by using a light meter in conjunction with television observations showed that the period of peak emergence at different depths corresponded to the same range of light intensity at the sea bed.

The density and spacing of burrows in a Nephrops inhabited area varies considerably, and a complex community of burrow-dwelling species co-exists.

In a community in Loch Torridon at 30m, burrow density ranged from 0.5 to 0.7 per m^2, but only about one third belonged to Nephrops. About 30% of the Nephrops burrows were empty and the densities of Nephrops ranged from 0.13 to 0.18 per m^2. Many of the remaining burrows were occupied by the burrowing goby, Lesueurigobius friesii (Collett). Other burrowing species within the same ecosystem include the crab Goneplax rhomboides (L.) and the thalassinid decapod Calocaris macandreae (Bell).

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DISPERSAL OF JUVENILE FISH ON THE WEST COAST OF SCOTLAND

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The move of the Scottish Marine Biological Association's laboratory from Millport on the Clyde to Dunstaffnage on the west coast stimulated a number of ecological studies of the Firth of Lorne and its associated sea lochs. Between 1969 and 1973 the fish populations of the Firth of Lorne, Loch Linnhe, Loch Etive, Loch Spelve, Loch Sunart and the Upper Sound of Mull were investigated by means of bottom and midwater trawls and a 2m plankton net. The seasonal sampling programme was designed to yield information on the distribution, abundance, age composition and feeding. It soon became apparent that these areas were nursery grounds for young fish and the dominant species were the gadoids (whiting, Norway pout, poor cod and to a lesser extent haddock) and the clupeids (Herring and sprat).

The O-group gadoid fish generally appeared in the area in June or July, reached peak abundance in September or October and thereafter the numbers declined so that in some areas they were completely absent after February. There was however considerable variation between lochs and also between years.

It has been estimated that almost half of the freshwater runoff from the entire west coast (excluding the Clyde) enters the Firth of Lorne. Loch Etive which is about 18 km long and is separated with two basins by shallow sills has the greatest freshwater input of any loch and as a consequence it has a low and extremely variable salinity. O-group whiting enter the loch each year but Norway pout, poor cod and haddock are almost completely absent. The failure of these latter species to colonise

the loch is probably a result of their inability to tolerate low salinity. Once in Loch Etive whiting tended to remain longer than in other lochs although there was evidence of a decline in numbers during the second winter. There are two possible explanations for the prolonged residence in the Loch. The first is the availability of deep-water in the upper basin and indeed the largest whiting are found in this area and the second is that there is undoubtedly a more plentiful supply of zooplankton for food during the winter months.

Loch Spelve was the smallest and shallowest loch studied and it is less subject to extremes of salinity. All four gadoid species migrated into this loch but only remained for about two months. The most likely explanation is that as the fish grow they have a preference for deeper water but the possibility that food might be limiting cannot be excluded.

The Firth of Lorne and Loch Linnhe are closely linked and are more estuarine in their physical characteristics. The major difference between the two sampling stations was the depth, the Firth of Lorne having a mean depth of 47m while Loch Linnhe had a mean depth of 90m. The gadoids entered these areas simultaneously and peak abundance was reached at about the same time. By February the Firth of Lorne was almost devoid of gadoids but in Loch Linnhe they tended to persist in reduced numbers for another year. These differences in distribution are almost certainly related to the depth of the water, since it is well known that gadoids have a preference for deeper water as they increase in size.

The clupeids are more complex in their distribution. The herring can be divided into two races. 0-group autumn spawned herring, which probably originate from the Minch, first appear in April while spring spawned fish from the Clyde do not enter the area until June. Peak abundance occurred in September and by March or April the Firth of Lorne and Loch Linnhe were almost devoid of herring. In common with the gadoids they only remained in Loch Spelve for a short time but tended to overwinter for a second year in Loch Etive.

0-group sprats showed considerable variation in the timing of their arrival into the area and there was some evidence that they tended to remain for longer periods in the smaller lochs. The numbers remained high throughout the winter in Loch Etive. The most noticeable feature of sprats was the presence of older fish at some of the more open areas such as the Firth of Lorne and the Upper Sound of Mull. This was the result of an active inshore migration during the winter months and accounts for the commercial sprat fishery which has become established in the sea lochs to the west of Mull and north of Ardnamurchan. The explanation of the overwintering of non-feeding adult sprats remains obscure.

In summary the dispersal of 0-group gadoids and clupeids in the sea lochs and inshore waters of the Firth of Lorne is probably influenced by three factors. Hydrographic conditions are important as is best illustrated in Loch Etive. Depth is an important factor in determining the residence period as for example in Loch Linnhe and Loch Etive. The availability of food may also be important and food limitation may account for the short residence of most species in Loch Spelve, although the shallow water may also play a part.

During the period 1974 to 1976 an attempt was made to establish the origin of the gadoid fish and to identify more precisely the stage in the life cycle when the inshore migration began. The most abundant species, whiting, Norway pout and poor cod were sampled at three offshore sites, Tiree, Ross of Mull and the Sound of Mull. Unfortunately only the poor cod was observed to spawn in the area. The planktonic stages of the poor cod were only found at the offshore sites and it was concluded that the inshore migration occurred after this stage in July and August. Analysis of catch data suggested that the inshore movement was the result of a spreading of the offshore population at times of peak abundance. Norway pout did not spawn in the offshore areas studied but colonised the offshore areas after

the planktonic stage in March and April. They first appeared in the inshore areas during June and July and as with poor cod the inshore migration was the result of a spreading of the offshore population. Whiting were not observed to spawn offshore in the areas studied but by April and May there were significant numbers of pelagic stages at the offshore sites. Unlike poor cod and Norway pout, whiting do not become established as demersal 0-group to the same extent at the offshore sites but aggregate in the inshore sites.

There are three possible explanations to account for the inshore movement of 0-group gadoids. The first is that it may be an adaptation to abundance because by separating the adult and juvenile feeding grounds more food becomes available. The second explanation may be that estuaries are favoured nursery areas because they have a rich and under-utilised food supply. Another explanation may be that by moving inshore they escape from predators. Whilst food supply must be an important consideration, in the Firth of Lorne area escape from predators seems to be an important factor.

Further reading.

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A NOTE ON Balanus balanoides LARVAE IN THE PLANKTON

Frank Evans
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Over the winter the shore barnacle, Balanus balanoides, retains developing embryos in an egg-mass within the mantle cavity, releasing them as nauplii, it is said,at the onset of the spring flowering of phytoplankton. At Millport Pyefish (1948) found early nauplii in the plankton on 20th February. In 1977 H. Bedford (personal communication) noted the release of nauplii at Whitby around 25th March. In 1978 I found early nauplii (N1 and N2) in the plankton within a mile of Blyth, Northumberland but not further out, on 6th March. In this year numerous plankton hauls were taken in this locality between the months of March and July and up to 11 miles offshore. It was observed that by early May larvae at all stages from N1 to cyprid occurred within 7 miles of the shore, none further out, and that by late May only cyprids survived in the plankton, these being found from the shore 11 miles seaward. By late June all Balanus balanoides larvae had disappeared from the plankton.

On 15th May numerous cyprids and recently metamorphosed pre-adults with four peripheral shell components were observed to have settled intertidally. By 22nd May the lower mid-shore (MTL - LWN) was seen to be occupied largely by pre-adults, while the upper mid-shore (MTL - HWN) bore a predominance of cyprids i.e. the lower mid-shore was colonised first. No settlement took place above the barnacle zone (HWN). Pyefish found settlement beginning in early April at Millport, while in 1977 Bedford recorded settlment at Whitby on 17th May.

It may be supposed that the cyprids found offshore in Northumberland in May and June had been drifted there by tides and currents and that there was little hope of their ever returning to the shore. Apart from the influence of such factors as predation, inadequate food and incorrect water quality the loss of larvae by sheer diffusion offshore must be immense. It may indeed be the prime cause of larval mortality in Balanus balanoides. Nevertheless, diffusion is seen to be effective in generation replacement, its effect being enhanced by the shore itself, which, acting as a barrier to dispersal must cause an aggregation of larvae at the very place where they require to settle.

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Littorina rudis var scotia AND ITS ADAPTATION TO THE EXTREME ENVIRONMENT OF ROCKALL (MOLLUSCA: GASTROPODA)

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The name scotia has at present state of knowledge no taxonomic value. It is, however, a convenient tag for referring to one of the forms of Littorina found on Rockall. scotia has no geographical or nationalistic connotations, it is the name of the research vessel from which landings were made in July 1978.

Specimens of Littorina rudis var scotia were collected from Rockall (lat. 57°36.20'N, long. 13°41.32'W) on 14th July 1978 from a site on the south eastern side of the rock, about 2m above low water spring tide. The rock surface was fairly open, covered patchily by tufts of small green algae, and the Littorina were nestling almost invisibly amongst the irregularities of the granite surface. As 8 specimens were obtained from a very small area, perhaps 50cm^2 , the largest being 3.5mm high, I sympathise with Moores' statements (1977, p192) "None was found amongst weed on the open rock surface .... In mainland terms they were very sparsely distributed", but I cannot agree with him.

In shell shape they differ from others of the Littorina rudis (Maton, 1797) group, to which they belong. Although the young are fairly normal, with only a slightly larger aperture, rounded whorls and a short pointed spire, the larger animals (mature females) were squat and almost without a spire, the juvenile spire have been eroded off and the last whorl is very large and round with an enormous aperture to accommodate the very large foot. The shell is almost smooth or with faint spiral ribs and/or growth corrugations and is tesselated dark and pale grey in colour, with a dark band round the base in the manner of Littorina neglecta (Bean, 1844). The suture is slight, unlike L. neglecta, the outer lip abutting much higher on the previous whorl. The operculum is very thin and flexible. The two largest animals proved to be viviparous females. Two smaller ones were also dissected and found to be immature males.

One of their most obvious characteristics is their tenacity. They were much more difficult to remove from the rock surface than any other Littorina I have observed. I suggest that their size is also significant in terms of physical survival. They approximated in size to that of excrescences on the granite, with none larger. These adaptations would appear essential for staying put in a situation where one's chief, and very formidable, enemy is wave action. Camouflage from predation is probably unnecessary, since the birds roosting on Rockall are fish-eaters. Specimens of Littorina saxatilis s l (sic) were collected from Rockall by Moore (1977) in 1973. I have examined 4 of these and find that three of them are significantly different in shell shape from Littorina rudis var scotia. They are, irrespective of size, spired and their spires are not eroded. The largest one, a

viviparous female (figured 1977) looks like Littorina tenebrosa (Montagu, 1803) and is 7mm high. Note that these specimens were obtained from a small pool, and were sparsely distributed.

One can therefore happily if not confidently suggest that Rockall supports at least two forms (species?) of Littorina, those inhabiting the pools, and those on the open rock. Moore's specimens seem to be adapted for life in crevices and in a pool where wave action is slightly broken, mine are particularly suited for the open rock, and perhaps do not require refuge in crevices. For protection they rely upon muscle strength and streamlining of the shell rather than shell strength, lacking a thick or heavily ribbed shell suitable for being rolled around, since if they fall off and are swept away there is little chance of recovery. The operculum is probably little used, since the environment required no adaptation to extremes of temperature, salinity or dessication.

The most likely method or original colonisation of Rockall by Littorina is on the feet of birds, a simple and fairly obvious process. Continued breeding success on the rock is assured by not having a planktonic larval stage in common with all the other animals on Rockall (Moore, 1977). It has been suggested, however, that a more sophisticated method or original colonisation may have operated, one which allows a greater genetic flexibility than normally available in a non-swimming non-wandering viviparous animal; Littorina littorea (L., 1758) and Littorina neritoides (L., 1758) have planktonic dispersal phases, and although it could be argued that they are not of the L. rudis group, one does have the intimation that this mechanism is not unknown in Littorina. The Rissoacea are suspected of occasionally producing planktonic larvae to promote spread and mixing of the gene pool. Thus could the Littorina of Rockall have arrived by sea rather than by air?, and if so how fortunate that the larvae were able to cling on and survive. Are they of American extraction?

It is to be expected that Littorina rudis var scotia occurs on other very exposed isolated rock surfaces not normally investigated, and material from Sula Skeir, Sula Skerry, North Rona and St. Kilda should be studied. I would be grateful for specimens, even should they turn out to be of different species from less rigorous habitats. Specimens in the Royal Scottish Museum from St. Kilda and North Rona (collected many years ago when research of this nature was not considered, and from islands which probably support several species of Littorina) are not the same and are possibly Littorina arcana Hannaford-Ellis, 1978).

Reference.

Hannaford-Ellis, C.J., 1978. Littorina arcana sp. nov: A new species of winkle (Gastropoda: Prosobranchia: Littorinidae). J. Conch. Lond. 29: 304.

Heller, J., 1975. The taxonomy of some British Littorina species with notes on their reproduction (Mollusca: Prosobranchia). Zool. J. Linn. Soc. 56: 131-151.

Moore, P.G., 1977. Additions to the littoral fauna of Rockall, with a description of Araelaimus penelope sp. nov. (Nematoda: Axonolaimidae). J. mar. biol. Ass. UK. 57; 191-200.

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A PRELIMINARY STUDY OF LOCH OBISARY: A BRACKISH HEBRIDEAN LOCH

Frances Dipper
NCC, Huntingdon.

Loch Obisary is one of the largest brackish water bodies on the island of North Uist in the Outer Hebrides. The configuration of the single, narrow channel which connects this loch to the sea, restricts sea-water flow into the loch to periods of spring tides. The loch is divided into two main basins by a chain of islands running east to west, separated by shallow channels. A distinct halocline and a thermocline were present in the north basin of the loch at about 4m depth, but these

were not found in the south basin. The salinity of the water above the halocline in the north basin and throughout the south basin was 13-14°/oo whilst that below the halocline had a maximum of 28.5°/oo. Temperature decreased by approximately 1°C at the level of the halocline and rose again by approximately 0.5°C near the bottom of the loch. Two distinct communities of plants and animals were found in the loch:

(i) a "freshwater" marginal component consisting of freshwater euryhaline species and brackish water species, found above the halocline in the north basin and throughout the south basin of the loch. The species diversity was low especially when compared with the fully marine situation immediately outside in Loch Eport, and the number of algae present decreased with distance from the seawater entrance. An algal mat consisting of blue green algae and Cladophora glomerate covered the rock surfaces especially in the north basin. Large numbers of small thin-shelled Mytilus edulis were also present on the rocks. The pondweed Potamogeton pectinatus dominated large areas especially the shallow, narrow channels between islands. Animal life was small and inconspicuous and included Gammarus, Jaera and Potamopyrgus species.

(ii) a marine component consisting of marine euryhaline species numerically dominated by the red alga Phllophora pseudoceranoides and the tunicates Ciona intestinalis and Ascidiella aspersa, occurring on large boulders strewn in a very soft muddy bottom. Other common species were the worms Neoamphitrite figulus and Arenicola marina occurring in the sediment; and numbers of the opisthobranch mollusc Akera bullata and the starfish Asterias rubens occurring on the mud surface. The Asterias were all small and unusually soft.

Possibly explanations for the small size and thin shells or soft bodies of the Mytilus and Asterias were discussed.

Brief comparisons with other brackish lochs and water were made and it was concluded that Loch Obisary is an unusual and interesting example of a scarce habitat type. The loch has long been of interest to the Nature Conservancy Council and consideration is now being given to designating it as an SSSI (site of special scientific interest).

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DISTRIBUTION OF POGONOPHORA IN THE NORTH ATLANTIC

Eve C. Southward
The Laboratory, Citadel Hill, Plymouth PL1 2PB.

Pogonophora are of considerable zoological interest because, being free-living animals without any mouth or gut, their feeding and their position in the animal kingdom have set us some intriguing problems. They are worm-like invertebrates which live in chitinous tubes, partly buried in the sea floor. They appear to feed by absorption through the epidermis of dissolved organic compounds, from the water and mud around them. The earlier assignment of the Pogonophora to the echinoderm/chordate group has been disturbed by the discovery of a previously unsuspected segmented posterior region. At present there is argument over whether they are closely related to annelids or whether they form a separate and distinct group, not closely related to any of the main invertebrate groups.

Dispersal is by means of yolky larvae which are retained within the tube of the female until they have developed ciliated bands for swimming and a posterior burrowing organ. When they are released they can swim a little, but within a few hours they settle and crawl on the bottom and then begin to burrow and secrete a tube. Spread of pogonophore species is likely to be slow, and to depend mainly on the larvae being carried by near-bottom currents.

Pogonophores are thought of as deep-sea animals, but in fact they are most common on continental slopes. They extend down into some trenches but are rare

or absent on the great abyssal plains. Their upper limit near the top of the continental slopes is at around 200m depth, but is determined by temperature rather than depth alone. They are not found in water warmer than about 12°C, but in some places where the shallow sea is cold all the year round pogonophores have been found in depths as shallow as 25 metres.

Collections of pogonophores made by various research ships have been used for study of geographical distribution. On both sides of the North Atlantic there is a division into (1) upper slope; (2) lower slope; (3) deep-water species, but the depth limits of these groups vary from place to place. The upper slope species tend to be rather local in their horizontal distribution. The lower slope species (1000-2500m approx.) are the most widespread, occurring on both sides of the Atlantic and in the Caribbean. Abyssal species, occurring in depths of 4000m and more, show a separation into Eastern and Western groups. The distributions found seem to fit what is known of the deep current systems quite well.

For more details see:

Southward, E.C., 1971. Pogonophora of the northwest Atlantic: Nova Scotia to Florida. Smithsonian Contributions to Zoology, 88, 29pp.

Southward, E.C., 1979. Horizontal and vertical distribution of Pogonophora in the Atlantic Ocean. Sarsia (in press).

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UNDERWATER CONSERVATION PROGRAMME/UNDERWATER CONSERVATION SOCIETY

Bob Earll
Manchester University

One year on after the inception of UCP a constitution has been agreed for UCY/UCP's long term successor the Underwater Conservation Society. The formation of this Society was described at the Underwater Association annual symposium and the BS-AC A.G.M. It is envisaged that both publicity and membership of the Society will be built up during the year. The Society's inaugural meeting will be held in Manchester over the weekend of November 3/4th. Further details about membership and the aims and objectives of the Society can be obtained from the acting secretary Dr. Frances Dipper, NCC, Godwin House, George Street, Huntingdon, Cambs.

The organisation of the Society was one of the achievements of UCP and good progress was also made in relation to many of the projects and the level of individual participation in projects was up in comparison with UCY.

The species and habitat records from the Observation Species Recording and Habitat Schemes increased by over 100% in comparison with UCY and a computer based data handling system was designed to handle this information. Major progress was made with the use of colour photographs to aid the identification of sublittoral species, sets being produced for the Species Recording Scheme Species and the nudibranchs. (Although all 100 of these were sold very quickly additional copies have been obtained and sets are still available). In this area important development work on a guide to sponges involving many Association members and co-ordinated by Dr. David Guiterman has made very substantial progress on this important although previously badly neglected group. Many of the projects seek to collect descriptive information of fundamental importance to an understanding of the sublittoral ecology of our coastline. Increasingly this essentially 'reconnaissance' information on common species is being used to provide a background to more detailed studies.

An analysis of project participation levels in UCP/Y has lead to a much clearer idea of how to design and present projects. In general the 'operation' one off style of projects characteristic of amateur divers projects in the late 60's and early 70's does not provide a particularly helpful model either for the development

of divers awareness in the marine environment or participation in natural history related projects. The development of marine record cards has, as experience has shown on land, proved far more effective in both enhancing interest and obtaining useful information.

A full report on UCP's organisation, and progress with projects, education and conservation has been prepared and can be obtained from Bob Earll, price £1.50, c/o Zoology Department, University of Manchester, Oxford Road, Manchester M13 9PL.

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Further thoughts on Porcupine splinters - in the fingers, this time.

What! would you slap the Porcupine?
Unhappy child - desist.
Alas! that any friend of mine
Should turn tuptophilist. *

To strike the meanest and the least
Of creatures is a sin.
How much more bad to beat a beast
With prickles on its skin.

*One that loves to strike. The word is not found in classical Greek, nor does it occur among the writers of the Renaissance - nor anywhere else.

Hilaire Belloc.

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REQUEST FOR INFORMATION

E.I.S. Rees
Marine Science Laboratories, Menai Bridge.

Diogenes pugilator. This small hermit crab seems to be rather selective in the type of moderately exposed beach on which it occurs. I would be grateful for information on beaches where it can be found regularly with a view to comparing the characteristics of the beaches.

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DEEP SEA NEWSLETTER

Members may be interested to know of the commencement of publication of a Deep Sea Newsletter, No. 1, 1978, editor Torben Wolff, Zoological Museum of the University, Universitetsparken 15, DK-2100 Copenhagen Ø, Denmark. It is intended that publication will occur twice yearly and will include articles on current research work, research requests, information regarding obscure publications, etc., and further particulars may be obtained from Dr. Tony Rice, Institute of Oceanographic Sciences, Wormley, Godalming, Surrey.

FORTHCOMING DEEP SEA MEETING

Fourteenth Pacific Science Congress will take place in Khabarovsk, Siberia, U.S.S.R. from 20th August to 5th September 1979. The theme of the congress is 'Natural Resources of the Pacific Ocean for the Benefit of Mankind'. The convener for 'Biology of the Pacific Ocean depth (more than 2000 m)' is Dr. Nina Vinogradova, Institute of Oceanology, Academy of Sciences, 23 Krasikova Street, Moscow 117218.

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CATALOGUE OF MATERIAL COLLECTED BY H.M.S. "CHALLENGER", 1873-1876

Brian J. Brown
Hunterian Museum, University of Glasgow.

DESCRIPTION	LOCATION	STATION No.	DEPTH (fathoms)	DATE	REMARKS	NO. OF SAMPLES	CATALOGUE NOS.
Recent coral coated with Manganese	Lat.25°45'N Long. 20°14'W	3	1525	18.2.73	Dykes Coll. 1918	1	C7627
Red Clay	Lat.23°23'N Long.35°11'W	9	3150	.2.73	Dykes Coll. 1918	3	R11359 R7780 Red.No.364
Pteropod ooze	off Sombrero Is., West Indies	23	450	.3.73	ex-Zoology	1	R7779
Pteropod ooze and washed and sieved material	off St. Thomas and Culebra Is., West Indies Lat.18°38'30"N Long.65°5'30"W	24	390	25.3.73	Dykes Coll. 1918 Don C.D. Ovey 1947	1 1	R7799 --
Pumice	North Atlantic	73	1000	.6.73	ex-Zoology	1/1-15	R11393/1-15
Volcanic Mud	off Canary Is.	--	620	.7.73	ex-Zoology	1	R7791
Red Mud	off Coast of Brazil	120	675	.9.73	ex-Zoology	1	R7790
Recent coral, Solenosmilia variabilis	off Tristan de Cunha Lat.37°1'50"S Long. 12°19'10"W	135	1000	18.10.73	Dykes Coll. 1918 (coral numbered 55)	1	C7627
Greensand - very fine casts in glauconite	off Cape of Good Hope	141	98	17.12.73	Dykes Coll. 1918		R11357
Phosphatic concretion	Agulhas Bank	--	--	.12.73	Don. Sir. J. Murray	1	Tyr3537 (Red No.482)
Diatom ooze	S. Indian Ocean, S.W. of Australia Lat.53°55'S Long.108°35'E	157	1950	3.3.74	Don. Sir J. Murray .5.1906	1	R78(TyR69)
Manganese nodules	Southern Ocean	160	2600	.3.74	ex-Zoology	1/1-12	R11396/1-12
Greensand	off Sydney Australia	--	410	.4.74	ex-Zoology	1	R7782
Coral sand	off Tongatabu	172	18	.7.74	ex-Zoology	1	R7788
Coral sand	off Raine Is., Cape York	--	158	.8.74	ex-Zoology	1	R7787
Coral sand	off Raine Is., Lat.11°35'25"S Long.144°2'0"W	185	155	31.8.74	Dykes Coll. 1918	1	R11354
Washings, Globigerina ooze	Lat.7°45'N Long.144°29'E	224	1850	.3.75	Don. C.D.Ovey 1947	1	--

DESCRIPTION	LOCATION	STATION NO.	DEPTH (fathoms)	DATE	REMARKS	NO. OF SAMPLES	CATALOGUE NOS.
Pumice impregnated by Fe and Mn oxides	North Pacific	241	2300	.6.75	--	1	R11360
Pumice infiltrated by Mn and Fe oxides	North Pacific	246	2050	.6.75	ex-Zoology	1/1-16	R11394/1-16
Mn nodule (treated with HCl)	South Pacific	247	2750	.7.75	ex-Zoology	1	R11398
Mn nodule plus one in section	Central North Pacific	248	2900	5.7.75	--	2	R11362 R11363
Mn nodule plus one in section and one treated with HCl	Central North Pacific	252	2740	.7.75	--	4	R7793a,b R7794 R11395
Radiolarian ooze	Lat.12°42'N Long.152°1'W	265	2900	25.8.75	Dykes Coll. 1918	1	R11353
Radiolarian ooze	Tropical Pacific	269	2550	2.9.75	ex-Zoology	--	R7783
Globigerina ooze and washings (containing many radiolarian)	Lat.0°33'S Long.151°34'W	271	2425	6.9.75	81.27% CaCO3	2	R11355 R11356
Radiolarian ooze	--	272	2600	.9.75	--	4	HMTS8132-8135
Red clay with Mn nodules	Central Pacific	273	2350	.9.75	ex-Zoology	1	R7781
Mn nodule and one in section	Central Pacific	274	2750	11.9.75	--	2	R11362 R11363
Tooth of Carcharodon megalodon	Central	276	2350	.9.75	ex-Zoology	1	V5736
Teeth of Lamna or Isurus and Carcharodon and an Mn/Fe with an old red clay bottom with volcanic ash layer	Central South Pacific	281	2385	6.10.75	ex-Zoology	12	V5734/1-6 V5735/1-6 R7798
Phillipsite crystals	off Paumaton Archipelago 33°S	--	833	.10.75	Don. via Rutley	1	HMTS153217
Mn nodules, tooth of Carcharodon and tooth of Isurus or Lamna	Lat.32°36'S Long.137°34'W	285	2375	.10.75	Dykes Coll. 1918	1/1-19 2	R7797/1-19 V5737 V5738

DESCRIPTION	LOCATION	STATION NO.	DEPTH (fathoms)	DATE	REMARKS	NO. OF SAMPLES	CATALOGUE NOS.
Mn nodules	Central South Pacific	286	2335	16.10.75	ex- Zoology	1/1-13	R11397/1-13
Earbone of whale plus one in section	"	"	"	"	ex-Zoology	1/1-2	V573/1-2
Dense bone of whale	"	"	"	"	--	1/1-2	V5739a,b
Mn nodules	"	"	"	"	Dykes Coll. 1918	1/many	R11358
Scapula of whale	"	"	"	"	(missing)	1	--
Mn nodules from Globigerina ooze	South Pacific	297	1775	.11.75	ex-Zoology	1/1-15	R11399/1-15
Blue mud	off Magellan Straits	--	345	.12.75	ex-Zoology	1	R7789
Bathybius*	South Atlantic	--	--	4.3.76	ex-Zoology prepared by Sir J. Murray	1	--
Globigerina ooze	South Atlantic Lat.21°15'S Long.14°2'W	338	1990	21.3.76	--	1	R11352
					ex-Zoology	1	R7786
					Don. J. Murray	1	TyR70(Red No373)
					--	1	Red No372
Coral	off Ascension Lat.7°54'20"W Long.14°28'20"W	344	420	3.4.76	Dykes Coll. 1918	1/1-6	C7628/1-6
Globigerina ooze	--	--	1850	--	ex-Zoology	1	R7785
Globigerina ooze	--	--	1845	--	ex-Zoology	1	R7784
Pteropod ooze	North Atlantic	--	1500	--	ex-Zoology	1	R7778
Pteropod ooze	North Atlantic	--	600	--	ex-Zoology	1	R7777
Palagonite tuff	--	--	2368	--	--	1	R11361
Ooze	--	--	--	--	Main Coll. 1922	1	R11351
Radiolarian ooze	--	--	2900	.75	Dykes Coll. 1918	1	R11364

* Bathybius - a name termed by Huxley for a viscuous substance found in the deposit samples of the H.M.S. "Cyclops" (1857) voyage which was subsequently shown by the "Challenger" scientists to be a chemical precipitate thrown down by the sea water associated with the deposits by the alcohol used in their preservation.

(see J. Murray and J. Hjort, Depths of the Ocean, 1912, p. 9)

Hunterian Museum, Zoology Section

Challenger material gifted to the museum by Sir John Murray in February 1914. In conversation with Professor J. Graham Kerr he said that the material would be ".... on loan, but you may take it I shall not ask for their return".

The following entries are direct copies of the labels of each item - there is no catalogue.

1. Pteropod ooze, off Sombrero Island, W. Indies. Challenger Station 23, 450 fathoms.
2. Red Mud, off coast of Brazil. Challenger Station 120, 675 fathoms.
3. Red Clay, North Atlantic. 3150 fathoms.
4. Red Clay with Manganese nodules, Central Pacific. Challenger Station 273, 2350 fathoms.
5. Blue Mud, off Straits of Magellan. Challenger Station 306, 345 fathoms.
6. Volcanic Mud, off Canary Islands. Challenger Station 8, 620 fathoms.
7. Radiolarian ooze, Tropical Pacific, 2nd September 1875. 2550 fathoms, Station 269.
8. Radiolarian ooze, Challenger Station 265, 2900 fathoms. Lat. 12°42'N Long. 152°1'W.
9. Three boxes of Globigerina ooze, Tropical South Atlantic. Challenger Station 338, 1990 fathoms.
10. Three boxes of diatom ooze, Southern Ocean, Lat. 53°55? Long 108°35'E. 1950 fathoms, Station 157.
11. Two boxes of Coral Sand, off Raine Island, Cape York. Challenger Station 185, 155 fathoms.
12. Two boxes of Coral Sand, off Tongatubu, Friendly Islands, Challenger Station 172, 18 fathoms.
13. Blue Mud from trawl, HMS Challenger Station 237. Lat. 34°37'N. Long.140°32'E.
14. Globigerina ooze, Pacific, 1850 fathoms.
15. Challenger No. 40. 2675 fms. Shells.
16. Challenger No. 185. 155 fathoms. 31st August 1874. Nat. Ex.
17. Challenger mud from dredge, No. 177. 18th August 1874. New Hebrides. 125 fathoms.
18. Challenger. Lat. 1°45'S. Long. 30°58'W. 2475 fathoms.
19. From dredge No. 47. 7th May, 1873. Lat. 141°15'N. Long. 65°315'? 1340 fathoms.
20. Washings of dredge No. 142. 18th December 1873. Off Cape of Good Hope. 150 fathoms.
21. From dredge No. 185. 31st August 1874. 155 fathoms.
22. From dredge, December 1873. 15 to 20 fathoms. Limon Bay.
23. From Long Beach. 30th March 1876. Island of Ascension.
24. Washings of trawl No. 218. 1st March 18??. Lat. 2°33'S. Long. 144°N
25. Globigerina ooze dredged from a depth of 1845 fathoms. W. Trans. Atlantic Ocean.
26. Four boxes with unreadable labels, but obviously more Protozoa. Handwriting similar.
27. Eighteen small bottles of samples of Protozoa from various stations at various depths.
28. Euplectella aspergillum (Porifera), Venus' flower basket. Challenger Exp. 100 fathoms. Philippines. Cat. No. 1070.

29. Hyalonema sp. (Porifera), off Inosima, Japan. Challenger Exp. 940 fathoms. Murray Coll.

30. Primnoisis antarctica (Coelenterata), Prince Edward Island, 310 fathoms. HMS Challenger, Cat. No. 1070. Murray Coll.

31. Pentacrinus sp. (Crinoida), sea-lily. Station 192, 129 fathoms. HMS Challenger Murray Coll., Cat. No. 1070.

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MARINE INFORMATION AND ADVISORY SERVICE

In response to the growing amount of interest in the marine environment a Marine Information and Advisory Service (MIAS) has been set up in the Natural Environment Research Council's Institute of Oceanographic Sciences (IOS) at Wormley, Surrey. This continues the work of its predecessor, the British Oceanographic Data Service.

The aim is to help industrial or research organisations, government departments, local councils and universities who in the planning, design and management of projects require marine information or data. General marine information and advice in the field of physics, chemistry, geology, geophysics and biology are provided. For customers who have specific requirements MIAS is able to supply numerical data, and these can be analysed and provided in various formats. Other aspects include a referral service to other appropriate organisations if the information sought is not within the scope of MIAS. Geographical coverage is worldwide but MIAS expertise is especially applicable to British - interest waters.

One of the more important aspects of MIAS is that in its situation at IOS it has access to comprehensive library facilities, specialist Tidal and Waves and Currents advisory services, and the expertise of marine scientists and engineers. These aspects are often of importance if a customer requires interpretation of or qualification of specific data. In addition contact is maintained with staff at other marine research organisations in order to keep up to date with recent developments in the marine field and to pass the information to customers.

Acquisition, storage and retrieval

Due to the increasing quantities of marine data becoming available from recording instruments, sophisticated methods are needed for data storage and retrieval. MIAS has set up a new system using a Honeywell 66/20 computer. The accent is on the banking of wind, wave, tide, current and hydrographic data and on the preparation of programmes to make these available to users, including established methods of analysis. Later, other variables will be included in the system.

MIAS staff visit many marine data-gathering organisations in the UK and as MIAS is the UK National Oceanographic Data Centre, it participates in international data exchange. Marine data cannot be more accurate than the instruments themselves, and the value of a record is affected also by the reliability of the instrument and by any errors in subsequent handling. Therefore, incoming data are validated and subject to quality control. Original documentation and information on quality is stored with the data so they can be related to specific enquiries. Inventories are made available so that the customer may be aware of the amount of data available to him. Categories of selection include geographical location, depth, date, cruise number, etc.

Some users may bank their present data holdings in the MIAS system, and as with all MIAS operations, commercial confidence is maintained if necessary.

Customers

Customers, who include industrial and research organisations, are concerned with marine resources, fisheries, marine survey, pollution, civil engineering, ship-building and operating, offshore activities, etc. For example, offshore operators within the oil and gas industry are usually interested in geological, physical and marine meteorological conditions offshore. These types of data may be critical not only in the design and operation of oil rigs and platforms but in the control of pollution due to oil spillage.

Organisations concerned with fisheries may be interested in the distribution of nutrients, biological productivity and such physical parameters as currents, tides, salinity and temperature. These types of information may be needed to investigate the fisheries in local coastal areas or in the open ocean.

Charges

The Departments of Industry and Energy are paying for the establishment and maintenance of the MIAS capability as a national service. However, if significant amounts of staff or computer time are involved in answering an enquiry a charge based on time may be made to the customer.

Publications

In order to keep customers up to date with the facilities available to them, MIAS is actively engaged in the production of informative literature. A News Bulletin is produced twice yearly and is available free of charge to anyone requesting it.

For further details contact the Publications Officer, M.I.A.S., Institute of Oceanographic Sciences, Wormley, Godalming, Surrey.

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A SHORT NOTE ON MARINE MACROFAUNAL INVERTEBRATES NEWLY RECORDED FOR THE MEDWAY ESTUARY

R.N. Bamber
Central Electricity Generating Board, Fawley, Southampton.

A comprehensive list of the Medway Estuary invertebrate fauna has been produced by Wharfe (1977). Current sampling in the neighbourhood of the Kingsnorth and Grain power stations in this estuary has revealed to date the presence of six species not mentioned by Wharfe, and presumably therefore not previously recorded, though their presence is not a matter for great surprise.

Annelida.

Nepthys hombergi Audouin & Milne-Edwards. Not infrequent in coarser sandy-mud substrates in Damhead Creek and at the Isle of Grain, at mean low water mark. No specimens of N. caeca (Müller) have been found to date, though Wharfe records this species from the shore, which may indicate some confusion of identification.

Arthropoda.

Praunus flexuosus (Müller). Common in mid-water net samples from Kingsnorth outfall, though much less abundant than Mesopodopsis; probably throughout Damhead Creek.

Mesopodopsis slabberi (van Beneden). Abundant in mid-water net samples from Kingsnorth outfall, and common throughout Damhead Creek, forming an important constituent of the diet of the fish present (e.g. Bass). This and the previous

species were presumably not collected by Wharfe due to inappropriate techniques for the smaller pelagic invertebrates.

Macropipus pusillus (Leach). Common amongst stones on gravelly mud, upper Damhead Creek; one individual beneath boulder at Grain.

Idotea linearis (L.). Frequent in mid-water net samples from Kingsnorth outfall, presumably derived from an established sublittoral population in the Medway proper.

Cyathura carinata (Kröyer). An isolated population at the top of Damhead Creek, amongst stones on gravelly mud (density up to 500 per square metre). This species, together with Macropipus, would seem to be exploiting the rare coarse substrate environment which has been artificially created at the power station outfalls.

Reference:

Wharfe, J.R. 1977. An ecological survey of the benthic invertebrate macrofauna of the lower Medway Estuary, Kent. J. Anim. Ecol., 46; 93-113.

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UNDERWATER CONSERVATION PROGRAMME: UNDERWATER CONSERVATION SOCIETY MARINE PRINT SETS FOR MARINE LIFE IDENTIFICATION

During 1977 and 1978 amateur and professional divers have been recording sublittoral animals and plants at different sites around Britain as part of the Underwater Conservation Programme. Consistently one of the major problems has been identification of the organisms since often sublittoral species are not illustrated in the current general field guides or the illustrations given bear little resemblance to the living organism.

To help overcome this problem of identification, coloured mini prints measuring 9cm. x 6 cm. have been duplicated from slides of the commoner sublittoral organisms that were mostly taken underwater. Three mini print sets are available for selected projects in the Underwater Conservation Programme.

THE SPECIES RECORDING SCHEME: 71 prints of common sublittoral animals and plants are combined with a text giving details of their key identification features, geographical distribution and the types of habitat and sea bed where they occur. The prints and text cost £8.

THE NUDIBRANCH RECORDING SCHEME: Mini prints have been produced of 50 of the commoner species (and some problematical forms) of sea slugs. These prints were designed for use with the Linnean Society Synopsis 'British Opisthobranch Molluscs' by T.E. Thompson and G.H. Brown but the notes accompanying the prints explain several recent nomenclatural changes and new additions to the British fauna. It is hoped the photographs will also be of particular use to participants in the Conchological Society's marine census. The prints and notes cost £5.

THE SPONGE PROJECT: Sponges are often difficult to identify from preserved specimens but the growth form and the colour of living sponges are often very distinctive. The sponge project aims to develop greater understanding of the nature, distribution and biology of the British sponges. A sponge guide is available and contains 42 mini prints of 26 species of British sponges together with a text on their identification and costs £4.50.

If you could like further details or to order any of the mini print sets then please contact Dr. Bob Earll, Zoology Department, University of Manchester, Oxford Road, Manchester M13 9PL. Tel. 061 273 7121, Ext. 5501.

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