Porcupine Newsletter

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NEWSLETTER. Being the tenth number this is the last part of Volume 2. Volume 3, number 1 will appear in July and contributions for this next issue will be welcomed until 22 June. Have you thought of writing to PN?

INDEXES. An index of authors and genera for Volume 1 will be sent out with the next PN. A more comprehensive index for Volume 2 is planned and will appear in due course. Secretary Shelagh Smith has bravely offered to construct future indices on computer.

PORCUPINE BANK. Was the type locality of Thalassiohystrix scuba, a hundred fathoms deep and 120 miles west of Ireland, an island within historical times? Don't miss the cartographical revelation from the XVII century court of Louis XIII in our next issue.

FUTURE MEETING. The next "Porcupine" meeting will be a field meeting at the Fal estuary. The date of commencement is Friday 21 September and details are given in Notice 4 of this issue.

Frank Evans, Editor,
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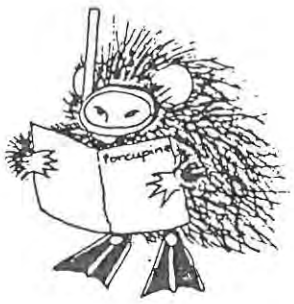

REPORTS OF THE EDINBURGH MEETING, 25 and 26 FEBRUARY 1984.

HISTORY OF BENTHOS SAMPLING

N.A. Holme
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At first sight it might seem that the benthic sampling techniques used today differ little from those employed by 19th century naturalists. The dredges we now use are remarkably like those which have been in use for the last 100-150 years, and very similar sieves are still employed to separate the animals from the rest of the sample. However, we live in a different world from that of the early marine biologists. Not only has there been a revolution in the design and technology of the ships - mechanical propulsion has replaced sail, we use steel warps instead of hemp ropes, and there are mechanical winches, modern navigational and electronic aids for positioning of ship and gear - but there has been a revolution in the intellectual background to the work. In the middle of the last century Darwin's Origin of Species had not appeared, and the modern sciences of genetics, statistics, ecology, oceanography and fisheries biology had yet to come. We now have the accumulated knowledge of these early, and subsequent explorers of the oceans, we have all seen films taken underwater, and many have had first-hand contact with the underwater world through SCUBA diving. Although our sampling methods may be ostensibly the same, the rationale behind our efforts is based on a more complete knowledge of the environment we are attempting to sample.

The earliest sampling methods were derived from traditional fishing techniques, and the naturalists' dredge was developed from the fisherman's oyster dredge. A form of naturalists' dredge was used by the Italians Marsigli and Donati in the mid-18th century, and another version by the Dane, O.F. Müller. Such instruments were intended to skim the surface of the sediment rather than to sample the burrowing fauna, but a bucket dredge designed to dig into the deposit was developed by Robertson in the last century, and this has been used up to the present time at Millport.

The Agassiz or Blake trawl, a double-sided net for use in deep water, was similarly developed from the commercial fisherman's beam trawl.

With the development of fisheries science, need arose for estimating the density of the benthos - an important source of fish food - on the sea bed. Quantitative studies were introduced by Petersen in the Danish fiords, which resulted in the development of the concept of 'communities' of organisms on the sea bed. This led to subsequent studies by other workers, using Peterson's grab, including those of Davis, Hagmeier and Stephen in the North Sea, and Ford in the English Channel.

It became clear that many workers were dissatisfied with the sampling performance of the Petersen grab, particularly under open sea conditions, and this led to attempts to improve its efficiency. One of the most important developments was the van Veen grab, which has a scissor-like arrangement of its arms, which increases the leverage for closing. Other notable advances between the wars were in the development of the Knudson suction sampler, and in the use of a simple diving helmet for shallow water observations by Kitching, at Wembury.

In the 1950s there was a considerable expansion in research effort, and new technologies enabled developments to take place in a number of fields. For conventional grab-sampling a notable development was the Smith-McIntyre grab, which became widely adopted for quantitative sampling under difficult sea conditions. In recent years a simpler version, the Day grab, has been developed, and this is now preferred by some workers. Another development was the anchor-dredge of Forster, which is an invaluable instrument for sampling deep burrowers. Other so-called anchor-dredges have been introduced, but their action is rather different from that of Forster's. A further type of sampler was the box corer, in which a square coring tube is closed by a spade-like arm. The box corer has proved popular with sedimentologists, as the original stratification is not disturbed.

None of the above instruments involve advanced technology - all could have been invented many years earlier - although the great weight of box corers in particular requires a suitably-sized research ship and winch.

Other developments, more dependent on advances in other fields have been in underwater photography, television and diving.

Underwater photography was pioneered by Edgerton in the United States, and came into general use, particularly by geologists and sedimentologists, in the 1950s. Most cameras make use of 35 mm film, and advances have been effected through improvements in optical systems, the development of compact and powerful electronic flash units and in improvements in both black and white and colour film speed and resolution.

Underwater television was developed in this country by Barnes at Millport, and almost simultaneously by the Royal Navy. Early equipment was bulky and unmanageable, but recent developments, including videorecording, have made this technique more generally available and useful.

TV can provide continuity in survey work, is useful for watching operation of gear, and can serve as a 'viewfinder' for photographic cameras or sampling equipment.

SCUBA diving. The system developed by Cousteau has enabled many people to become directly acquainted with the underwater world. For scientific purposes it allows precise positioning of samples in both sedimentary and rocky habitats. In addition it has enabled development of suction-sampling devices manipulated by divers, following the pioneer work of Barnett at Millport.

Submersibles allow exploration of the sea bed at much greater depth than is possible by divers, and have recently been used for exploration around hydrothermal vents. Unfortunately they are generally too expensive to employ except for commercial purposes.

Towed sampling insruments. The low density of the deep-sea benthos, coupled with the long time required to take the small sample obtained by a grab at each lowering, have encouraged the development of sledges for collecting in this environment. These have a sturdy metal frame with runners and a protective mesh around the net, as in Hessler and Sanders' epibenthic sledge. Another deep-sea sledge, with closing mechanism, measuring wheel and photographic camera, has been developed at the Institute of Oceanographic Sciences, Wormley.

The concept of an instrument towed along or just above the bottom for making wide-ranging surveys has much to commend it. The 'troika', a sturdy sledge with photographic camera and flash, has been used in France, and other sledges have been developed carrying a TV camera in addition. There are also towed or self-propelled mid-water vehicles with TV and photographic cameras. For these the technology is more complex than for bottom sledges, and there is also the problem of measuring distance from camera to subject in order to arrive at the size of the object in view.

Observation by photography and TV gives an incomplete picture of the benthos - only that on the surface is seen, although tubes and burrows of those animals below the surface can sometimes be distinguished. It is therefore best to combine these observations with grab, dredge or trawl samples in order to collect the burrowing fauna, and to confirm identifications on actual specimens.

With the increase in complexity of sampling devices the chances of a gear breakdown while at sea increase. It is always advisable to have on board simpler instruments like dredges and trawls which can be deployed when this happens, or where it is too rough to use more sophisticated

gear. That such eventualities do occur even on well-organised expeditions is shown by a report in the New Scientist (December 8th, 1983, pp. 757-8) of a Canadian-US operation involving a submersible in which "An underwater camera had broken down, and so as not to return empty-handed, John Deleney of the University of Washington threw a dredge bucket overboard". Once again, a simple dredge proved its worth!

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CO-ORDINATION OF GEOLOGICAL AND BIOLOGICAL SAMPLING ON THE PORCUPINE BANK

George Bowes, Terry Scoffin and Shelagh Smith
Applied Geology Dept., Strathclyde University, Grant Institute of Geology, Edinburgh University and The Royal Scottish Museum, Edinburgh.

"Challenger" cruise 11/81 to the Porcupine Bank was organised as a geological investigation. The main aim was to investigate the carbonate content of the superficial sediments and to determine its origin. There was also to be a hunt for Lophelia pertusa. Methods to be used included sampling of the superficial deposits by Day grab and making a photographic record (television and still cameras). In addition ship time was to be occupied by remote investigation of the underlying strata by sparker and a determination of the limit of the photic zone by detection of the presence of microalgae.

The track of the investigation zigzagged across the Porcupine Bank, with investigation concentrated on the top. There was then a traverse of the Slyne Trough to the west coast of Ireland where inshore work was carried out, followed by a further traverse down the slope north of Porcupine Bank.

What actually happened was that the Day grabs did not work at all well and in order not to waste time on bosh shots and in repairs an alternative sampling method was used. The gear used for most of the cruise was very simple. A pipe dredge - a steel cylinder about 300 mm wide and 1 m long, closed at the rear end - was rigged by a pair of chains about 2 m behind a rock dredge with an inner bag (mesh size about 11 mm). This system caught considerably more material than a grab would have done and was particularly useful for obtaining data on the fauna present. In addition, unlike most dredging methods, reasonable samples of the finer sediments were obtained. The sediment which was dug with the pipe dredge was probably retained fairly intact with little winnowing. Sometimes two quite different sediments could be distinguished in a single sample, suggesting that little mixing took place after entry into the pipe. On completion of each haul a sample of the sediment in the pipe dredge was set aside for laboratory investigation and the rest was sieved, the smallest mesh being 1 mm. The small animals thus obtained were kept for study. Unfortunately the standard of sieving varied according to the person doing the job. Contents of the rock dredge were separated into their geological and biological components. Some material was kept for further investigation but the rest was merely identified and counted.

These methods gave a considerable amount of data on the geology of the superficial sediments, and the smaller superficial infauna associated with them, and in addition a broad sweep of the larger fauna which cannot be obtained by grabbing. Not only were two types of investigation used at the same place, something which does not happen when different gear is put down separately at the same station, the method was quick, turn-around time being, for a depth of 300-500 m about one and a half hours. While the pipe dredge gave no trouble, there were some snags connected with the use of the rock dredge. It had no cod-end and therefore while stones and rounded animals could be shaken out easily, things with arms, legs or spines got entangled in the inner bag and were tedious to remove. The robustness of a rock dredge means that it can be operated in foul weather (up to Force 9) and also tempts one to put it down on foul ground. Sampling of boulder beds near the west coast of Ireland tested several rock dredges to destruction and inner bags were torn beyond repair.

Scientific provisos dictate that while a fair estimate of the populations could be obtained, data was not truly quantitative (uneven sample size, animals escaping due to being agile or deeply-burrowing and, last but not least, Sod's Law of patchiness, which effects smaller samples more profoundly than larger ones). Geologically speaking, the coarser the sediment the more problems, with boulder beds being very badly sampled.

Photographic equipment comprised television and still cameras together with lights mounted on a simple frame. This method of investigation was not used at all stations for technical reasons. Since it was suspended near the bottom while the ship moved as slowly as possible, control of view was not possible. The gear moved with the ship's motion and tended to bounce on the bottom, which was not good for the equipment or the view, since on soft substrates clouds of small particles would be produced. Coarse control of vertical movement meant that boulders could be jumped over and an emergency climb of a cliff about 20 m high was accomplished without mishap. While the television was running continuously during each haul, still photographs were taken by remote control opportunistically.

The photographic data gave an invaluable view of the nature of the bottom, particularly for the geology. It also indicated which species, some common, were not truly represented in the dredge hauls. Patchy distribution of larger organisms was apparent. Conversely, dredge material helped to identify species seen but fleetingly and the tracks of others.

Methods can only be judged by their results. Community structure and ecology has been worked out. The distribution of individual species and communities is, as expected, based upon grain size and to a lesser extent depth, especially when comparing the inshore fauna with that on the Porcupine Bank. The bottom had a marked effect on the fauna. Some questions to be answered by the present investigation are: what effect did the fauna have on the bottom? How much reworking went on? Did a lot of animals with shells lead immediately to a shelly, or carbonate bottom? The data has now been fully worked up, but it seems that below a certain concentration of shelled animals, above which a shell gravel many be maintained, the bottom sediments may indeed have a carbonate content in inverse proportion to the mass of shelled animals present. Field observation suggested that shell was at a premium, upon the death of its maker it was promptly colonised as a substrate from which carbonate could be extracted by the new arrival or as a home. Pagurids were often one of the commoner species. They lived in gastropod shells until these fell to bits (very few empty gastropod shells were found). Shell fragments disintegrated to a certain size (about 2 mm) then completely collaped. The absence of carbonate from the chemistry of the

finer fraction of sediment where shelled animals were present in number indicates that it was then rapidly recycled into living organisms.

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SAMPLING THE DEEP-SEA DEMERSAL FISH OF THE ROCKALL TROUGH

J.D.M. Gordon, Scottish Marine Biological Assoc., Oban.

In a study of the deep-sea demersal fish of the Rockall Trough samples were obtained with 3 different nets. The largest was a Granton trawl with a foot rope of 20.6 m. It was fished with the 3000 m long paired trawl warps of RRS Challenger at a towing speed of 3.5 to 4 knots. A very common method of sampling deep-sea fish is to use a small otter trawl fished on a single warp. A "box" trawl with a foot rope of 16.4 m was used for such a purpose in this study. It was towed at 2 to 2½ knots. The smallest net was an Agassiz trawl with a 3 m beam.

There were many differences between the catches of the 3 nets some of which were easy to explain in terms of mesh size. For example, the common deep-sea eel Synaphobranchus kaupi was only relatively abundant in the fine mesh Agassiz trawl catches. The other two nets had wider meshes in the wings and belly which would allow the eels to escape before entering the fine mesh cod end. The most striking difference between the catches of the Granton and single warp trawl was that sharks of the family Squalidae, the smoothead Alepocephalus bairdii and the black scabbard fish Aphanopus carbo were relatively abundant in the former and absent or nearly so in the latter. These are all large mobile species which are probably selectively caught by a combination of the herding effect of the bridles and the higher towing speed. It appeared that both trawls are effective at catching the gadiform families Macrouridae and Moridae.

The sharks, Alepocephalus bairdii and Aphanopus carbo have their centres of abundance on the mid to lower slope (750-1500 m) and because of their large size they contribute considerably to the biomass at this depth. Most previous estimates of biomass in the deep-sea have been based on catches from small nets fished on single warps. If the above species or similar are abundant in other areas besides the Rockall Trough, then the biomass will have been underestimated. It seems probable that both nets would give similar estimates of biomass at depths below 1750 m because macrourids dominate the catches.

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CORING FOR MEIOFAUNA

Peter Barnett and Jim Watson, Scottish Marine Biological Association, Oban, Argyll.

Meiofauna is mostly confined to the surface layers of soft sediments, especially muds. Undisturbed quantitative sampling of the flocculent surface layers of muds has always been a problem. Most quantitative meiofaunal surveys have been based on core samples taken with free-fall gravity corers or on larger (0.1 m^2) grab or box corer samples from which small subsamples are taken on the ship after the recovery of a usually disturbed sample. Gravity corers and grabs are convenient to use but are known to waft aside part of the surface sediment and meiofauna immediately before sampling.

An experimental programme was described in which corers were tested on artificial sediments of small plastic beads to determine the extent of quantitative problems associated with coring for meiofauna.

Two new multiple corers were described. The multiple spear corer takes three core samples and is for use in very soft muds where a stabilising framework would sink too deeply into the sediment and would create too much disturbance. The multiple frame corer is designed to take undisturbed core samples from more compact muds and sands of the continental shelf, slope and the deep sea. This corer is equipped with a reversing thermometer, deep sea camera and water current indicator. An array of up to 12 plastic core tubes is lowered slowly into the sediment by a hydraulic damper mounted on a supporting framework. Experience in the north Atlantic has shown the corer to be reliable and capable of taking cores with clear, overlying water with no disturbance of the sediment/water interface. It has been used very successfully in deep sea sediments between the U.K. and Madeira at depths between 150 and 6000 m.

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SAMPLING DEEP-SEA INVERTEBRATES IN THE ROCKALL TROUGH

R. Harvey
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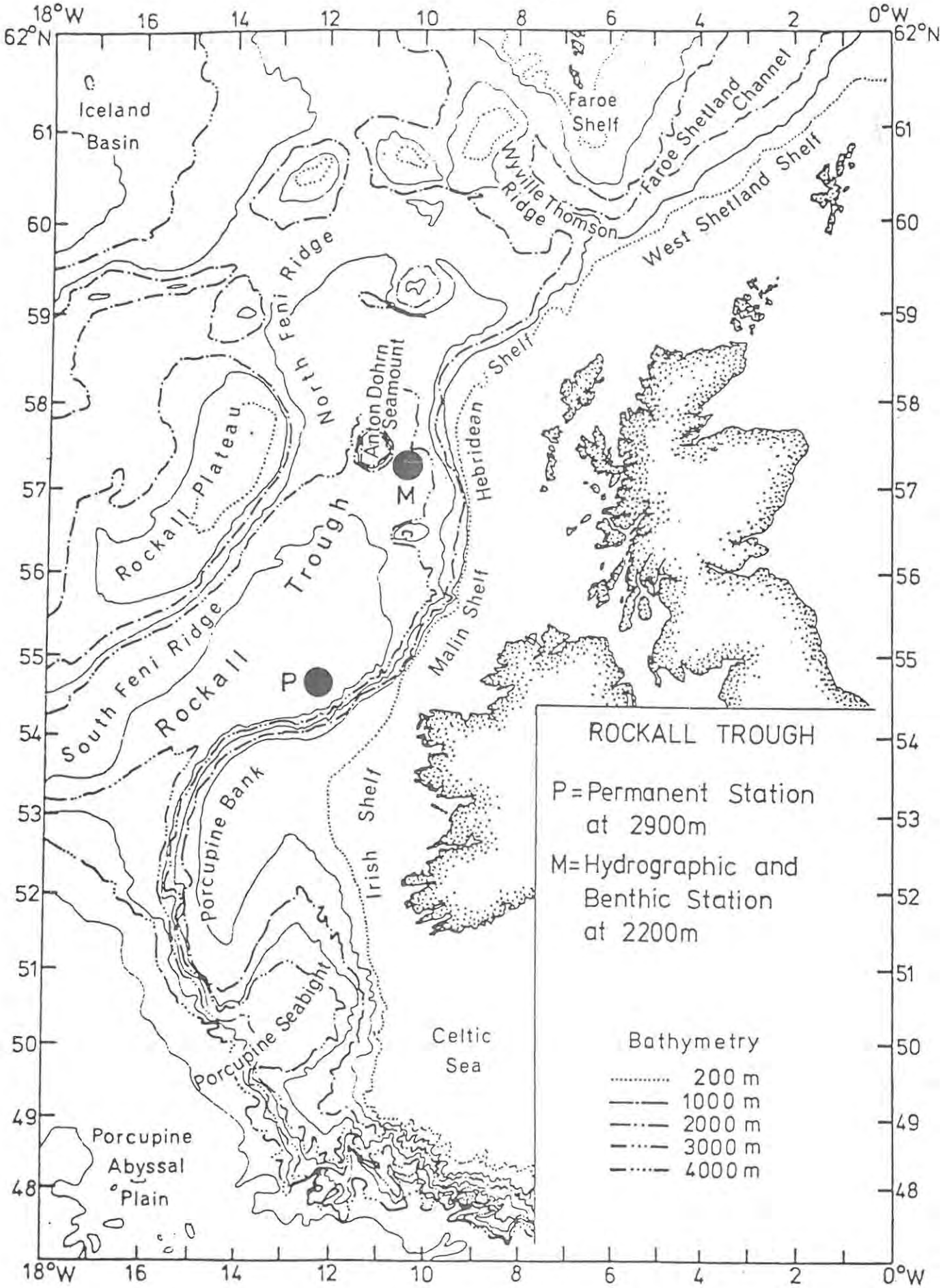
Prior to the early 1970's, benthic studies at SMBA had been restricted to inshore waters, particularly the Clyde basin and a number of west coast sea lochs. One aspect of particular interest to John Gage was community variation, both spatial and temporal. Quantitative sampling using grabs was employed to provide data for the analysis of dispersion and diversity. The availability of sea-going time on R.R.S. Challenger allowed these studies to be extended beyond the

continental shelf. For the first time it was possible to study deep water populations intensively on a regular basis using seasonal samples taken at fixed stations. Thus biological processes operating in the deep North East Atlantic could be investigated.

The Rockall Trough provides a convenient study area with abyssal depths of 3000 m within 24 hrs. steaming from West Coast ports. Two stations shown in the figure have been regularly sampled, with opportunistic sampling elsewhere. Sampling commenced in 1973 using the epibenthic sled developed by Hessler & Sanders (1967). The version used consists of a main net of 1 mm nylon mesh with an 0.5 mm removable extension and end pot. An electronic timing device closes a door at the mouth of the sledge before it is hauled in, reducing wash-out of the sample. Most towed gears employed on the 19th Century cruises to the area had coarse meshes which only captured the megafauna and gave the impression of a low diversity fauna. The epibenthic sled revealed that a diverse macrofauna exists at abyssal depths, and it was possible to obtain the young stages of many organisms including recently settled larvae. A 3 m Agassiz trawl has been used to sample the megafauna particularly at Station M in 2200 m and thus all benthic stages of many organisms can be obtained by the use of these two sampling gears.

Quantitative sampling has been most successful using a modified Spade Box Corer which takes an 0.5 m by 0.5 m sample to a depth of up to 30 cm in the abyssal ooze. The gear is monitored with an acoustic pinger. Relatively undisturbed samples with clear supernatant can be obtained in calm sea conditions, but the weight of the gear (650 kg when empty) presents handling difficulties in sea states above Force 3. The low density of the macrofauna and the time taken to deploy and recover the corer at the deep station (2 hrs.) necessitate the use of such a large sampler, however. The core may be subcored to examine small scale variation in faunal distribution. Replicate cores at 2900 m have shown a fauna which is numerically dominated by Polychaetes (50%), protobranch bivalves and peracarid crustacea which together account for about 80% of the total fauna. The standing crop is typically around 4 grams at this station, an order of magnitude lower than that normally found in shallow water. It is, therefore, essential to use towed gears as well in order to obtain sufficient numbers of organisms for detailed study.

Samples obtained with the epibenthic sled and box corer are gently washed on deck using an elutriation technique and an 0.42 mm sieve in line with methods used at Woods Hole. This appears to cause little damage to delicate organisms such as postlarvae of echinoids. Recently an 0.25 mm sieve has been used nested with the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Iceland Basin
Faroe Shelf
Faroe Shetland Channel
Wyville Thomson Ridge
West Shetland Shelf
North Feni Ridge
Anton Dohrn Seamount
Hebridean Shelf
Rockall Plateau
Rockall Trough
Malin Shelf
South Feni Ridge
Rockall
Porcupine Bank
Irish Shelf
Porcupine Seabight
Celtic Sea
Porcupine Abyssal Plain
M
P
ROCKALL TROUGH
P = Permanent Station at 2900m
M = Hydrographic and Benthic Station at 2200m
Bathymetry
200 m
1000 m
2000 m
3000 m
4000 m

larger mesh sieve, as Tanaids were being lost from the samples. All material is fixed in seawater formalin and later washed and transferred to 90% alcohol at the laboratory. This secondary washing is best carried out by gently agitating the sample on an appropriate sieve in a bath of water. Storage space problems, particularly with the megafauna, have been partly alleviated by sealing specimens in polythene bags within bins.

The 10 year time-series of samples from the permanent deep station at 2900 m is a unique collection of data which is being worked up on a systematic basis. Attention to date has been concentrated on the echinoderms, particularly their reproductive biology. Considerable collaboration with taxonomic experts in other institutes and universities has been a feature of the programme. For the future, it is planned to reduce the intensity of sampling at the permanent station to a long-term monitoring level. Examination of the time-series samples will be focussed on the bivalves, particularly the protobranchs. It is also planned to work further south where sea conditions should be more suitable for box coring. This will provide quantitative data for comparison with the Rockall Trough and allow the testing of hypotheses on seasonality within deep-sea populations in lower latitudes.

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OBSERVING THE BENTHOS ON THE CONTINENTAL SHELF USING TELEVISION AND PHOTOGRAPHY

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Increasing use is now being made of underwater photography and television in investigations into benthic communities and sediments on the continental shelf. In coastal waters and at depths down to 50 meters, SCUBA diving techniques can be used and data collected with hand held, diver operated, photographic and television cameras. On the middle and outer continental shelf and on the upper part of the continental slope, remote methods of operation must be used. Camera systems which are just lowered over the side of the ship are subject to many problems both in terms of handling and in the systematic interpretation of the results. Much better results can be obtained using cameras mounted on sledges and towed astern of the ship.

Sledges incorporating photographic cameras have been described by Laban, Pérès and Picard (1963) and by Wigley and Theroux (1970). Sledges carrying both photographic and television cameras for use in shallow waters have been described by Machan and Fedra (1975) and by Holme and Barrett (1977).

Following several years of successful work with the sledge developed by Holme and Barrett, it was decided to develop a Mark II version of that sledge which could be used at depths down to 200 m. Experience gained during trials of the Mark II sledge suggested a number of modifications in both the sledge itself and in the handling system which have been incorporated in the Mark III version of the sledge.

The Mark III sledge was successfully used on the continental shelf west and north of Scotland in June 1981 (Wilson et al., 1982). During that cruise it was fitted with a Sony black and white television camera and two IOS Mark IV photographic cameras. One deployment was made at a depth of 200 m.

Experience of the value of colour television for benthic investigations has been gained by the MBA with the Mark II sledge since 1981 and useful results have been obtained during investigations into faunas and their relationships to bedforms in the western English Channel (Holme and Wilson in preparation).

Further improvements were made to the Mark III sledge following the 1981 cruise. The success of the colour television system fitted to the Mark II sledge suggested that a colour system should be obtained for the Mark III sledge. This was fitted in the spring of 1982 and the Mark III sledge carrying a colour television camera, two IOS Mark IV 35 mm photographic cameras and an Aanderaa RCM4 recording currentmeter modified to record direction and pressure (equivalent to depth) was successfully deployed to a depth of 365 m on the continental slope west of Orkney in April 1983.

The combined use of television which provides continuous cover along a strip of sea floor and intermittent photographs which provide the fine detail at intervals along the track will prove to be of considerable value in benthic investigations on the continental shelf.

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NEW BOTTOM SAMPLER FOR OFFSHORE BENTHIC MONITORING

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INTRODUCTION

A significant proportion of the expense of offshore benthic monitoring programmes can be attributed to sampling. This is because a relatively large vessel is required for offshore work with its associated high running costs. Survey vessels for such work are usually chartered on a day to day basis so that ship 'down time' due to bad weather conditions can become critically expensive. Because of the great expense involved, it is understandable that offshore investigators will continue operating until sea conditions make it either no longer possible to work on deck, or no longer possible for the sampler to function properly. Experience at Heriot-Watt University has shown that the performance of a grab sampler can be related to sea conditions. Detailed time and motion studies on a large number of offshore survey cruises has shown there to be a direct correlation between grab success rate and wind force (Riddle, unpublished data). Although this may seem like a statement of the obvious, it is important to realise that the time taken for each sample and the relative efficiency of performance (R.E.P.) of a grab varies along a gradient, the success rate and performance deteriorating as weather conditions worsen.

Although it may be just possible to work on deck in a given sea state, the sampler may be incapable of taking a reliable sample and/or may take an unreasonable time to do so. The implications of this are important in offshore monitoring work for it means that there is another probably inconsistent variable to consider when interpreting survey data.

The primary aim here has been to design a sampler that will not only operate at an improved R.E.P. but will also operate at a constant efficiency at all workable states of weather.

BACKGROUND TO DESIGN

In reviewing the design, operation and efficiency of benthic samplers, it becomes clear that one of the most serious drawbacks of the grabs commonly used in offshore monitoring is in the method of closure of the jaws. Closing is usually accomplished by hauling on the warp after the jaws have been released by a bottom activated trigger. There are several reasons why this can create problems:

1. The upward pull of the warp tends to lift the sampler up out of the sediment before the jaws are fully closed.

2. It is necessary for the warp to be hauled vertically or nearly so otherwise there is a high risk of the sampler being pulled over before the jaws are fully closed.

3. In conditions of heavy swell there is a risk that the sampler will be snatched off the bottom before a sample can be properly secured. With worsening weather conditions each of these effects is exacerbated, and largely account for the observed diminishing efficiency of the sampler in deteriorating weather.

In an attempt to overcome these problems, the present sampler has been designed to be self-activating with a delay mechanism incorporated into the trigger release to prevent premature closure. The self-activating facility allows a controlled closure of the grab jaws so that they may be critically profiled to give a high digging efficiency.

THE NEW SAMPLER

The sampler consists of a square frame in which the grab mechanism and jaws are mounted. The jaw buckets are placed just above the base and are pivoted in line with the main struts. The buckets function in a conventional manner closing about two central pivots. They are designed in such a way that the leading edge describes an arc of greater radius than the main body of the bucket. This ensures minimal upward force during closure. The buckets are closed by means of strong springs which are contained in a cylinder placed vertically above. The springs push down on a piston that is connected to the buckets by a system of levers. The springs are compressed by hydrostatic pressure acting on the piston, the opposite

side of which is open to the sea. The diameter of the piston is such that the springs will be fully compressed at water depths of 60 m or greater. Compressing the springs results in the jaws being set open. On reaching the bottom, the slackening of the warp causes a valve to open allowing the external water pressure to act on the opposite side of the piston holding the springs in compression. The rate of inflow can be adjusted to give a delay of about 5 seconds before the jaws begin to close. After the jaws have fully closed the sampler can be hauled up. On the surface the jaws are opened by releasing the piston assembly from the grab frame and lifting by means of an integral lever system.

The grab assembly is supported by a frame which can be weighted according to the type of substratum being sampled. The leading edge of the jaws protrude 5 - 8 cm below the frame and 5 cm deep side guard prevents sideways loss of material as the jaw buckets close.

A typical operating sequence of the sampler in a heavy swell might be:-

1. The sampler is lowered to the bottom with several metres of excess warp to allow for the roll of the ship.

2. Pressure equalizing valve is triggered. A five second delay ensures an internal cylinder pressure reaches that of spring tension.

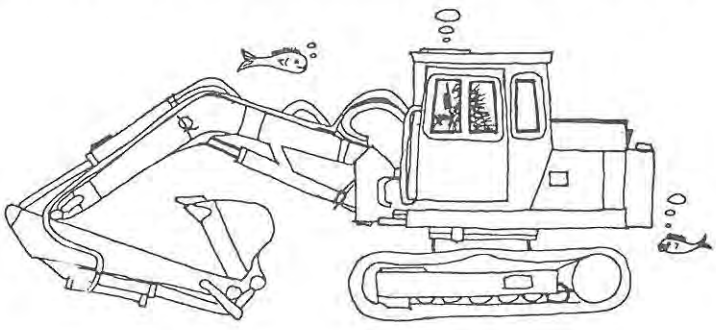
3. Jaws close (max. 5 seconds).

4. Grab hauled in a deposited on supporting frame.

5. Cylinder assembly released from main frame and raised by lever action opening jaws.

6. Sample deposited in deck container.

The prototype model of the sampler was designed specifically for offshore work (central northern North Sea) where ship time is very costly and it is not always possible to run for port in deteriorating weather conditions. Because of the considerable interest in an inshore version of this instrument, a Mark II has been designed and is under construction having an operational depth range from 20 - 200 m giving it both inshore and offshore capability.



RESIN CASTING: A TECHNIQUE FOR INVESTIGATING BURROWS IN SOFT SEDIMENT.

R.J.A. Atkinson
University Marine Biological Station, Millport, Isle of Cumbrae.

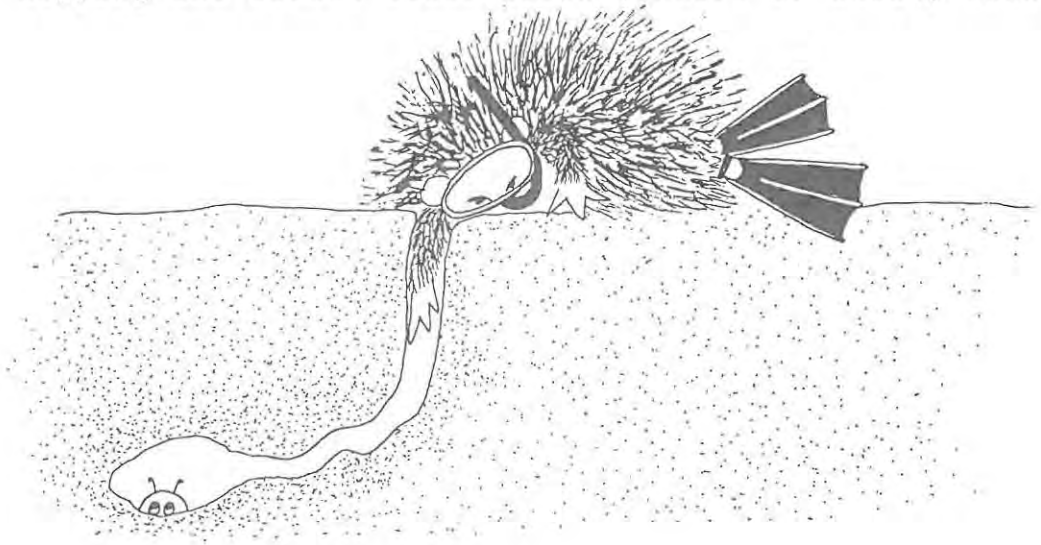
C.J. Chapman
D.A.F.S. Marine Laboratory, Victoria Road, Aberdeen.

Many species excavate permanent or semi-permanent burrows in marine sediments. These burrows may be narrow (mms) and superficial (several cms. depth) as in many polychaetes, or wide (cms.) and deep (sometimes over 1 metre) as in some crustaceans and fish.

Polyester (preferably) or epoxy resins may be used to produce high quality casts of burrows with more than one entrance in tidal or subtidal muds. Small burrows, single entrance burrows and, in sand, unlined burrows, can all present casting problems. Resin casting has proved particularly useful in studying large burrows since their size precludes traditional sampling methods (corers, grabs, manual excavation, etc.) However, burrows as narrow as 1 mm diameter have been successfully cast.

Concentrating on resin casting underwater by SCUBA diving, the preparation of sites for casting, and the application and details of the casting technique were discussed at the Edinburgh meeting. For those interested in following this up, see Farrow, G.E. (1975) techniques for the study of fossil and recent traces. In: The study of trace fossils (R.W. Frey, ed.) pp 537-554. Springer-Verlag, New York; and Atkinson, R.J.A. and Chapman, C.J. (1984). Resin casting: a technique for investigating burrows in sublittoral sediments. Progress in Underwater Science 9, (in press).

The technique has geological and biological applications and provides a powerful tool in studies of burrow identification, burrowing behaviour, benthic ecology, bioturbation, etc., particularly when combined with grid mapping and direct observation (camera or SCUBA) techniques.



ACCOUNTS FOR THE YEAR ENDING 30 NOVEMBER 1983

Income and Expenditure Account

Dr.		£	p	Cr.		£	p
To	Subscriptions for 1981 ...	1	- 10	By	Printing and Stationery ...	427	- 01
	Subscriptions for 1982 ...	4	- 00		Postage and Telephone calls ...	181	- 08
	Subscriptions for 1983 ...	445	- 00		Refund of subscription overpayment	2	- 00
	Sale of Newsletters ...	21	- 10		Gratuities for art-work and typing	11	- 50
	Sale of Christmas cards ...	27	- 60				
	Profit from Menai Bridge Meeting ...	16	- 50				
	Interest from Deposit Account ...	60	- 55				
	Excess of Expenditure over Income transferred to Balance Sheet ...	45	- 74				
		£621	- 59			£621	- 59

Balance Sheet

Dr.		£	p	Cr.		£	p
To	Subscriptions paid in advance ...	30	- 00	By	Cash at bank (Deposit Account) ...	665	- 55
	Balance at 1 December 1982	810	- 89		Cash at bank (Current Account) ...	125	- 78
					Petty Cash in hand	3	- 82
					Transferred from Income and Expenditure Account... ...	45	- 74
		£840	- 89			£840	- 89

Charles Pettitt, Morag MacKinnon,
Hon. Auditors
January 1984.

David Heppell
Hon. Treasurer
22 December 1983.

THE 1983 A.G.M.

Minutes of the Seventh Annual General Meeting of PORCUPINE held at the Royal Scottish Museum, Edinburgh on Sunday, 26th February 1984 at 09.30 hours.

John Wilson was in the chair. 25 members were present. The Minutes of the Sixth Annual General Meeting (published in PORCUPINE Newsletter Vol. 2, No. 7) were approved.

Reports of the Hon. Secretary, Hon. Treasurer and Hon. Editor were given and approved. The Hon. Records Convener was not present (apologies for absence) and had no report.

Incumbent office bearers were re-elected.

Hon Secretary	Shelagh Smith
Hon. Treasurer	David Heppell
Hon. Editor	Frank Evans
Hon. Records Convener	Bob Earll

David McKay retired from Council. Ivor Rees, Menai Bridge, was elected. The Council is now as follows:

Roger Bamber	Norman Holme
Roger Brehaut	Ivor Rees
Peter Davis	Ralph Robson
Bill Farnham	Dennis Seaward
Robin Harvey	John Wilson
	Fred Woodward

The Hon. Auditors were re-elected.

As an outcome of the Hon. Treasurer's Report it was announced that the Annual Subscription would remain at £3, cash flow would be adequate (last year's loss was due to unusual circumstances) especially if a small profit were made on meetings.

The size of the PORCUPINE Newsletter was discussed and the suggestion that it should be reduced to A5 was rejected, loss of clarity of print was too great a price to pay for a small reduction in costs. The Christmas cards were discussed, generally liked but small alterations required.

FUTURE MEETINGS

It was announced that the Summer Field Meeting would be at the Fal Estuary in September 1984, immediately after the European Marine Biology Symposium in Plymouth. For further details see the announcement in the PORCUPINE Newsletter.

A request was made for proposals/volunteers for themes, venues, organisers for meetings. Hosting meetings is a very important contribution to the well-being of PORCUPINE, giving variety not only of venues but also of themes, ideas and speakers.

*****

HON. SECRETARY'S REPORT

Shelagh Smith

During 1983 PORCUPINE held three meetings. The Annual General Meeting and the accompanying meeting was held at Menai Bridge on 26-27 February. There were about 60 participants and the theme was BIOGEOGRAPHICAL BOUNDARIES IN BRITISH SEAS - THE ROLE OF MARINE RECORDING. On 8-9 October the meeting was at Newcastle and Cullercoats. The theme, MARINE VERTEBRATES, a departure, attracted a good audience, including students persuaded to come by Frank Evans. One species of marine vertebrates (Porcupines) had a brief shore excursion on the Sunday morning recorded on Video by Frank Evans.

In addition there was a week-long excursion based on Eyemouth, arranged as a stop-gap, because we were not able to go to the Fal Estuary until this year (1984). The excursion was funded by the Nature Conservancy Council and a report,"The shores in the neighbourhood of St. Abbs (Burnmouth - Redheugh): Marine fauna with emphasis on the Mollusca" was written up by Shelagh Smith and Fraser Gault. The weather was unusually perfect and the tides phenomenally low. Only a select few attended.

PORCUPINE is flourishing and the membership is still rising - at a slightly faster rate than previously. 156 at the end of 1983 so last year's target of 150 was passed.

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PORCUPINE MEETING

Sampling of the Benthos - Methods and Rationale

25 - 26 February 1984

This meeting, in the Royal Scottish Museum, Edinburgh, was one of the busiest yet held. It incorporated the seventh Annual General Meeting (see separate Minutes). The theme attracted a wide audience and variety of talks dealing with most methods of benthic

investigation; trawls, dredges, grabs, corers, both well tried and most modern in design, submersibles, photography, divers; detailed studies of small areas and wider surveys of great tracts of sea. It included work from the abyss to the estuary. On the social side, there was a buffet and disco on the Saturday evening, and the proceedings ended with a picnic lunch (indoors).

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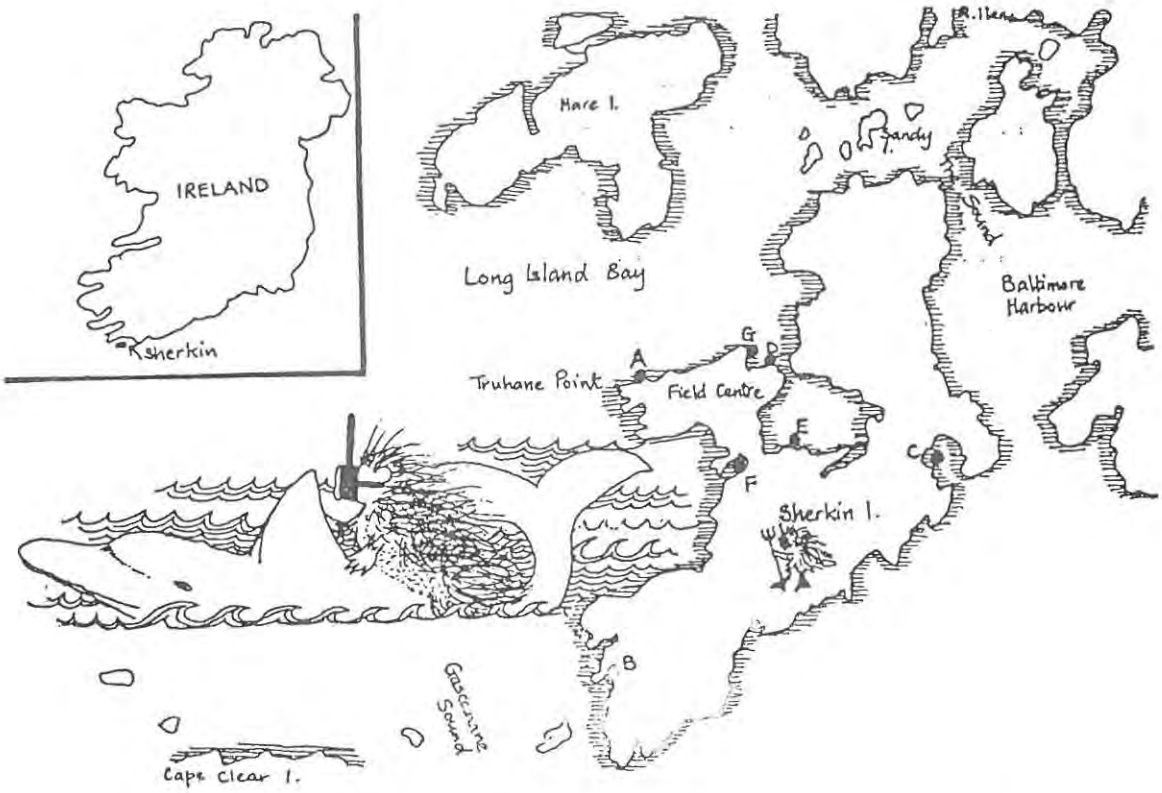
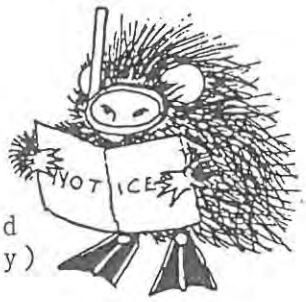
PUBLICATIONS OF SHERKIN ISLAND MARINE STATION

1. Journal of Sherkin Island contains the results of original research work done on and around Sherkin Island. Vol. 1, Nos. 1 and 2 issued so far. Subscriptions: £15 per volume (2 parts) for private individuals, £25 per volume for institutions.

2. Bulletin of Sherkin Island is an occasional series for the publication of contributions on general topics of Irish marine research and fisheries. No. 1, Marine Research in Ireland" by Matt Murphy, was published May 1983, price £1.

For further inormation contact PORCUPINE Member Matt Murphy, Administration Director, Sherkin Island Marine Station, Sherkin Island, Co. Cork, Irish Republic.





NOTICES

NOTICE 1. "PHYCOSPONGOLOGY"

Member Bill Farnham (Portsmouth Polytechnic) and
Shirley Stone (British Museum, Natural History)

We have become interested in the associations between various sponges and algae. The development of the latter in the tissues of their sponge hosts may be so extensive as to produce a bright green discolouration. This relationship has been known for some time but little is known about the species involved (both sponges and algae), any specificity and causal factors (e.g., depth, light intensity?). Perhaps it is not too surprising that some algae should feel at home in such plant-like animals! To initiate this study, we have coined (not too seriously) the term "phycospongology", which may need the explanation that phycology (not algology) is the study of seaweeds.

The purpose of this preamble is to ask for any material of sponges which are discoloured green. This material should be liquid-preserved (4% formalin in seawater or 70% alcohol) as soon after collection as possible. Collection details ideally would include data, locality, depth, sponge I.D., associated species and any other ecological information especially if indicating whether the sponge was in a shaded or well-illuminated habitat. Specimens need not be sent in liquid but removed and posted moist in sealed poly bags, wrapped in brown paper (about $1cm^2$ of sponge would be adequate).

Please send to:-

The Marine Laboratory, Ferry Road, Hayling Island, Hants. PO11 ODG.

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NOTICE 2. SEAWEED WORKSHOP 1984

Another weekend course on benthic marine algae, i.e., seaweeds, is being organised for beginners (both divers and non-divers).

Content — Classification (how to identify); ecology (where they grow); biology (how they breed, etc.); preservation (how to keep them); utilisation (what to do with them). We hope to fit in collecting on the shore too!

Date — 12 - 13 May

Venue — Arundel Wildfowl Centre.

Cost — £7 (approx.) + accommodation and food.

Organisers — Dr. Bill Farnham (Portsmouth Polytechnic) and Sally Rogers (SE-MCS).

Contact — Sally for further information:

10 Lion Lane,
Haslemere,
Surrey, GU27 1JD.

Telephone Haslemere 2735.

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NOTICE 3. From Elizabeth Roberts, Information Officer, The Marine Biological Laboratory, Plymouth.

People wishing to compile the literature relating to their own particular coastline often have difficulty getting started. One useful starting point is Estuaries and coastal waters of the British Isles: an annual bibliography of scientific papers, which is produced by the Library of the Marine Biological Association at Plymouth. Issue No. 8, containing over a thousand entries, is due out at the end of March, price £8.50 (incl. postage and packing). A few copies of the earlier issues are still available, and Numbers 1 - 7 are also available on microfiche. Details of all M.B.A. publications can be obtained on request from The Library, Marine Biological Association of the U.K., The Laboratory, Citadel Hill, Plymouth PL1 2PB.

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NOTICE 4. "Porcupine" Field Meeting in Cornwall. The Roseland Voluntary Marine Nature Conservation Area near Falmouth, Cornwall, starting 21st September 1984.

A meeting has been organised to enable members to view and study certain aspects of the recently declared Voluntary Marine Nature Conservation Area near Falmouth in Cornwall known as "The Roseland Reserve".

The meeting will begin on Friday, 21st September, and cover the week-end period from 22nd-23rd. It will be possible, however, for anyone who wishes to stay on for the whole or part of the following week and an outline of activities will be sent to anyone who is interested.

We shall have the use of very basic laboratory accommodation with benches and electricity but little else. The laboratory is in Falmouth and accommodation can be found near-by in either hotels, guest houses or

self-catering establishments. No accommodation will be booked but a list of suitably situated locations will be sent to interested parties.

The aim of the meeting will be to study the voluntary marine conservation area and to consider the value of and problems raised by this form of conservation measure.

Visits will be made to a number of locations in "The Roseland Reserve" to look at a variety of habitats from rocky to sediment shores and including Zostera beds and the interesting Maerl (Phymatolithon spp) beds which are extensively developed.

In the following week more visits will be arranged to "The Roseland" and there will be diving opportunities and boats for this will be organised. Visits will also be made to adjacent marine areas of conservation importance particularly Helford where the once extensive intertidal Zostera beds seem to be in decline.

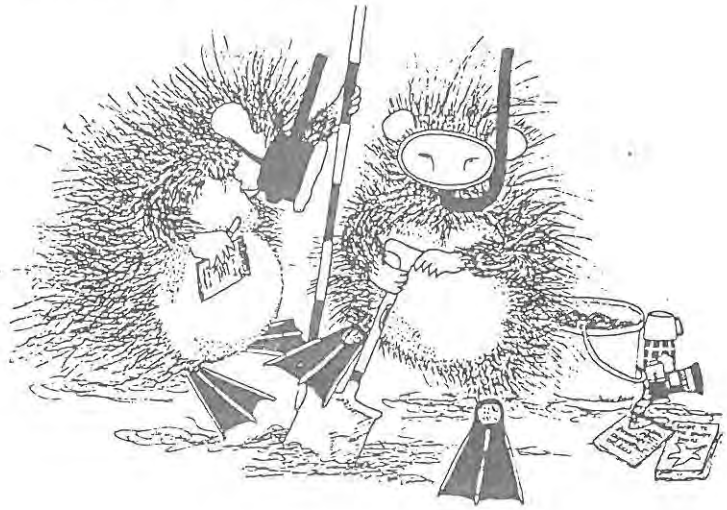
A number of South Western species occur in the Roseland and Helford areas and special reference will be made to these during the meetings.

A daily timetable has been prepaed and in most cases a group leader will be responsible for each day's activities but this will not, of course, prevent those who wish from following their own programme of activity.

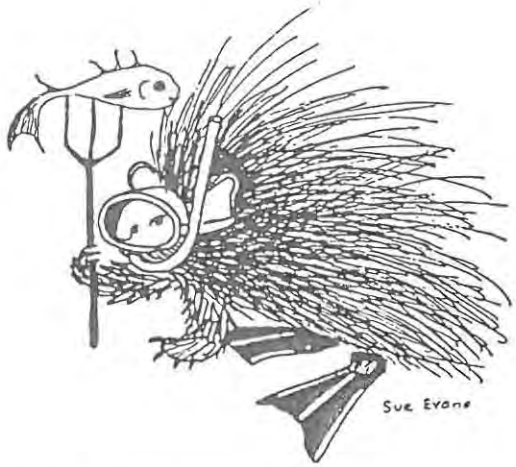
Due to limitations on space in the laboratory and on boat transport the njmbers will have to be limited to around 15 so early application is advised.

Please send a stamped addressed envelope for full details from:

Roger Burrows, Department of EXtra-Mural Stdies, University of Exeter, 5 Walsingham Place, Truro, Cornwall, TR1 2RP.



Porcupine Notes and News



POMPEY PORCUPINES are busy beavering away at various projects. Cliff Thorp, with new research student Simon West (graduated Newcastle 1983) is investigating the distribution and reproductive biology of the introduced serpulids Hydroides ezoensis and Ficopomatus (Mercierella) enigmaticus. Mike Carter plus Alan Larkman and Jeremy Miles continue with their reproductive studies on the anemone Actinia equina and others. Bill Farnham is still chasing after Sargassum muticum (now found in the Med.) and is also splashing about in the Chesil Fleet and on the Falmouth maerl beds (ref. the "Porcupine" field meeting in the Fal this September).

**

THE WATER'S EDGE European campaign. Nowadays conservation is big news. Everything from the natural history of the dragonfly to the effects of dumping waste at sea is aired publicly and in depth. The Water's Edge is the theme of the 1983/4 Council of Europe environmental campaign. Its aim is to heighten awareness of the importance for wildlife and for man of this diminishing and threatened asset. The national centre is: the Council for Environmental Conservation, The Zoo, Regent's Park, London. If there's lots more about aquatic flora and fauna in your daily paper these days, this could be the cause!

**

THE SALT MARSH PLANTS that have flourished along the verges of our trunk roads since the big increase in road salting in the late '60's now extend from Scotland to the south of England. Along the A1 they are mostly northern forms, probably deriving from the small salt marsh sources in Northumberland, where the road passes fairly close to the sea, while more southerly species are extending along the Kentish highroads, being spread by traffic from the continent. It all started when an incredulous botanist found a specimen of Aster tripolium on a roundabout just north of Newcastle. Interestingly, only the east side of the country seems to be affected to any extent; salting in the west is less heavy because of the milder winters.

**

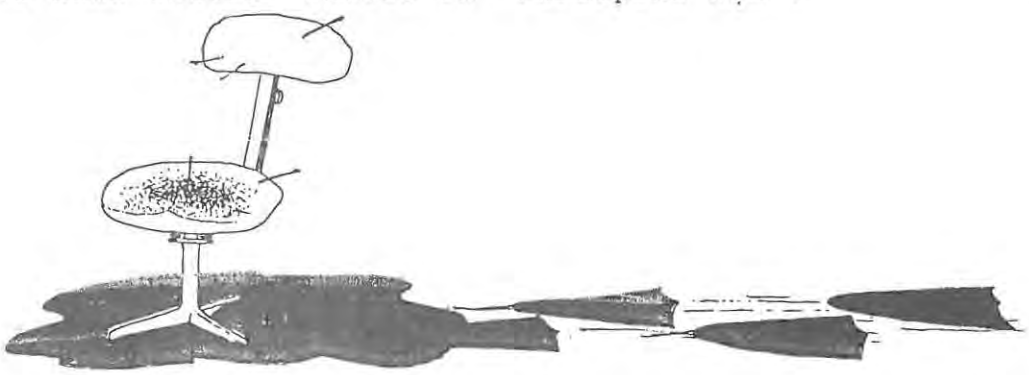
CENTENARY (1). The Plymouth Marine Lab is 100 years old this year. It was on March 31, 1884 that a meeting was held at the Royal Society, chaired by Prof. T.H. Huxley, to establish and maintain a well-equipped laboratory "at a suitable point on the English coast similar to, if not quite so extensive as, Dr. Dohrn's zoological station at Naples".

From a number of possibilities it was decided that the laboratory should be built at Plymouth. It was quickly constructed in Devonian coral limestone, the same material of which Plymouth Hoe is formed, and the building was opened in 1888.

CENTENARY (2). The Hancock Museum, Newcastle on Tyne, also achieves its century in this year. The museum was named for the brothers Albany and John Hancock, leading members of the Natural History Society of Northumberland, Durham and Newcastle upon Tyne (now the N.H. Soc. of Northumbria). John was the Society's ornithologist, taxidermist and public relations man; Albany was the marine biologist, being perhaps best remembered for his magnificent Ray Society publications (1845-1855) with Joshua Alder on the nudibranchs. He was one of the few to have turned down election to the Royal Society, because of a shy and retiring nature, it is said. The museum, in which Newcastle University as well as the Natural History Society now has a stake, is flourishing mightily, with a strong marine interest.

**

PROFESSOR THOMAS HENRY HUXLEY whom we have adumbrated above would never remove the household cat from his favourite chair when he wished to sit down, rather calling one of his daughters to perform the task, in case the animal should take a dislike to him. No such inhibitions deter your Editor when repossessing himself of the editorial chair so frequently occupied by the office Thalassiohystrix. Prickles or not, the brute has to shift. However the wet spot left on the seat cushion causes the beast considerable amusement which we find intensely irritating. We are considering placing a "good home wanted" notice in "Porcupine Ads".



Porcupine Review

A history of Naturalists in North East England, 1983. 112 pp. & 16 portrait photographs. Edited by A.G. Lunn. ISBN 0-9508982-0-1. Published by Department of Adult Education, University of Newcastle upon Tyne. Price £2.00, soft covers.

Reviewer: J.B. Buchanan, Dove Marine Laboratory, Cullercoats.

This delightful little volume contains a multi-author treatment of the biographies and achievements of the North East naturalists, with the word 'naturalist' taken in the broad sense to include geographers and geologists as well as the ornithologists, botanists and marine biologists.

It originates largely from a series of appropriately revised lectures which were delivered in 1979 on the occasion of the 150th anniversary of the founding of the Natural History Society of Northumberland, Durham, and Newcastle upon Tyne (now the Natural History Society of Northumbria).

From the point of view of members of the Porcupine Society, the treatment of the marine based naturalists is clearly of greatest interest. Unfortunately these were not included in the original series of lectures, in spite of their very important contribution to national and international marine science. This unfortunate situation has however been soundly rectified by the inclusion of a chapter on marine biologists compiled by Mr. Peter Davis, the Deputy Curator of the Hancock Museum in Newcastle.

Anyone who has occasion to be involved with marine biology on the east coast will very soon become aware of the heritage of systematic faunal work, dating largely from the astonishingly rapid thrust in the Victorian 19th century. This effort was directed almost exclusively to systematics and taxonomy and the orderly listing of fauna and algae from various habitats. By the turn of the century this knowledge had reached such a comprehensive level that it provided a sound foundation for the more ecological and physiological work of the professionals which were to follow.

Mr. Davis treats the naturalists in more or less chronological order, giving "potted" biographies and accounts of their main achievements and interests. At the same time he has cleverly woven into his narrative an account of the parallel phenomenon of the rise of the local Natural History Societies and Field Clubs with which these

amateur scientists were associated. The introduction to the volume as a whole gives a useful list of the journals and publications of these societies, the dates of their founding, and importantly, an account of the complex name changes in both journals and societies which have taken place throughout the years.

Although some of the naturalists cited may be regarded as being of purely local interest, some of the names are of national and international importance. Among these we have Dr. Johnston of Berwick, of 'Zoophyte' fame; Joshua Alder and Albany Hancock, whose work was to culminate in the monograph "British Nudibranchiate Mollusca"; A.M. Norman, a broadly based taxonomist remembered largely for his work on the smaller crustacea; H. Brady, the foraminifera specialist; G.S. Brady, the elder brother and taxonomist of copepoda and ostracoda. To designate these people as amateurs is clearly somewhat misleading except in the sense of pecuniary advantage. In terms of dedication and time spent in pursuing their hobby there can be little to distinguish them from the present day professional and one cannot help wondering how the patients of physicians fared or indeed the standard of pastoral care afforded by the clergyman. The general feeling of the time suggests both comparative affluence and very considerable leisure on the part of the participants.

It must not be thought that the naturalists were bound to the intertidal shores and beaches. Mr. Davis recounts the exploits of the early offshore dredging operations in the 1860's making use of the newly available technology of steam driven vessels.

The early dredgings lead to more adventurous deep sea expeditions including the H.M.S. Porcupine voyages in 1869 and 1870 to which A.M. Norman made his substantial contribution in terms of taxonomy and Commander E.K. Calver, a northeasterner by adoption, in dredging expertise.

If one is going to criticise this book, it would be because its small size and format, and rather perfunctory biographical details, tend to whet the appetite but not assuage it. One would dearly like to know more of the personal life and activities of these extraordinary people and perhaps learn more of the historical, social and cultural background which lead to this blossoming of scientific interest in Victorian England. There is no doubt however that Mr. Davis has packed a great deal of information, in a concise and readable way, into a comparatively short space. He may be persuaded to expand and elaborate it some day to provide a deeper insight into the motivations and backgrounds of that band of dedicated amateurs to which we are so indebted.

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Letters to the Editor

From Member M.A. Kendall, N.E.R.C. Unit, Dove Marine Laboratory, Cullercoats.

Dear Editor,

Brittany must have more marine laboratories than any similar sized area in Europe and thus when the 17th European Marine Biological Symposium was held at Brest during September 1982 many foreign visitors had a chance to look at them and sample their generous hospitality.

As part of the symposium programme there were full afternoon visits to the two largest laboratories in the area, the Station Biologique de Roscoff and the Centre Oceanologique de Bretagne but the size of both institutions meant that we only had a limited insight on the full scope of their activities. A full account of the Roscoff Laboratory has already been given in P.N.2,4, and so little more need be said about this multidisciplinary laboratory functioning under the joint control of the University of Paris and the Centre National de Recherche Scientifique except to stress its advantages as a base for shorework and collection. More centrally situated than the other Breton laboratories, a short drive takes one to a wide range of both rocky and sedimentary shores, often having species which are seldom encountered to the north of the Channel.

In contrast with the Roscoff Laboratory, whose current layout has evolved over more than a hundred years, is the Centre Oceanologique de Bretagne of the Centre National pour l'Exploitation des Oceans (CNEXO). This complex of modern laboratories occupies a large landscaped site, overlooking the Rade, to the west of Brest. The limited time available (and in my own case a limited command of the French language) made difficult a full appreciation of the many aspects of marine science which are studied here. Realizing this, our hosts split up the visitors into small groups so that we could concentrate our interests on the subjects which we found most relevant. Most of the intertidal and benthic ecologists visited the Department of Coastal Environment and Management where we were informed of the wide range of activities which this group undertakes as part of its responsibility for the biological and chemical monitoring of French coastal and estuarine waters. Other CNEXO activities on this site range from physical oceanography to aquaculture while areas of interest are from the deep ocean trenches to the intertidal zone - all supported by extensive computing and equipment testing facilities.

In the city of Brest itself is the Institut d'Etudes Marines of the Universite de Bretagne Occidentale but as most of its staff were heavily involved in the running of the symposium it was visited by very few of the participants.

Nevertheless contributions to the meeting itself provided us with information on its current research programme in marine ecology which includes the study of subtidal communities both in sediment and on rock. In 1978 the tanker Amoco Cadiz was wrecked at the Roches de Portsall and as they are no more than 25 km from Brest the incident stimulated considerable interest in the effects of oil pollution and in monitoring techniques.

Furtherest from Brest is the Laboratoire Maritime de Dinard, an institute of the Museum National d'Histoire Naturelle. Although it is smaller in size and in the number of staff than the other Breton laboratories, Dinard has a long standing reputation among shoreworkers. In the 1930s and 40s it was the scene of pioneering work on the ecology of rocky seashores but with time the zoological emphasis has swung towards the biology of polychaetes and the communities which they dominate.

Since the construction of the Rance Tidal Barrage, the world's first electricity generating facility to make use of sea power, Dinard has found itself ideally situated for monitoring the ecological consequences of this. An interesting upshot is that shore ecologists sampling in the area now require two sets of tide tables, depending on which side of the Barrage they are working!

**

From Porcupine Secretary S.M. Smith, The Royal Scottish Museum, Edinburgh.

Dear Editor, Has anybody seen a Caloplocamus ramosus (Cantraine, 1835)? If you have you will know. This nudibranch is unmistakable, succinctly described to me as "a Tritonia with gills on its back". One specimen surfaced not so long ago from the Marine Laboratory, Aberdeen, where it had evaded several mass throw-outs of unwanted specimens. It was taken by a small trawl in 270 m west of Shetland, 60°26'N 04°02'W on 28 August 1906 and although carefully preserved, remained unidentified along with other nudibranchs for nearly 80 years.

It is about 12 mm long, stout, with 8 cerata shaped like stumpy arms with numerous fingers, 5 tripinnate gills on the back between the 3rd and 4th cerata and a large anus on the right side under the 3rd ceras.

Caloplocamus ramosus seems to be a rare and mysterious beast. What little information I have come across suggests that it is a) Mediterranean, shallow water; b) Northwest Atlantic, 100-130 m; and c) does not look at all like a related species Issena abildgaardi Pruvot-Fol, 1934 (? = pacifica), which is northern. There are records of related species Issa lacera Bergh, 1894 (? = pacifica) from Alaska and Euplocamus pacificus Bergh, 1884 from Kermadec and New Zealand.

I would like to know of more of these odd creatures; apart from anything else, is what I have got really Caloplocamus ramosus? Is Issena abildgaardi, or lacera or pacifica, the same or different?

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Porcupine Ads.

(Advertisements are published free to members. Replies should be addressed to the advertisers or to PORCUPINE Newsletter at the Dove Marine Laboratory, Cullercoats, North Shields, NE30 4PZ, England.)

SUMMER WARDER FOR THE WEMBURY VOLUNTARY CONSERVATION AREA. A person is required to act as summer-time warden for the Wembury Conservation Area in Devon. The warden would be a temporary member of the staff of Fort Bovisand Underwater Centre for a period from June to September 1984. The job would entail preparing interpretative materials on the area (leaflets, etc.) and providing advice for visiting divers. For 50% of the time the person would work on the Bovisand training programme and the applicant would also be expected to be a qualified diving instructor. It might be possible to provide training. Salary would be £80 a week. Applicants should apply to the Secretary, Fort Bovisand, Plymouth, Devon, PL9 0AB.

SEAWEEDS OF THE BRITISH ISLES. There is a series of books being published by the British Museum (Natural History) under this title covering all the British and the majority of northern Atlantic seaweeds.

> Volume 1. Rhodophyta. Part 1: Introduction, Nemaliales, Gigartinales by P.S. Dixon & L.M. Irvine. 1977. 252 pp., 90 illus., paper, £13.
>
> Volume 1. Rhodophyta. Part 2A: Cryptonemiales (sensu stricto), Palmariales, Rhodymeniales by L.M. Irvine. 1983. 120 pp., illus., paper, £13.
>
> In preparation: Part 2B (Corallinales, Hildenbrandiales), Part 3A (Ceramiales), Part 3B (Bangiophyceae, Key, Glossary).

IBP HANDBOOK NUMBER 16. Methods for the Study of Marine Benthos, edited by N.A. Holme and A.D. McIntyre and published by Blackwell. A second, revised edition of this most useful volume is to be published in May-June of this year.

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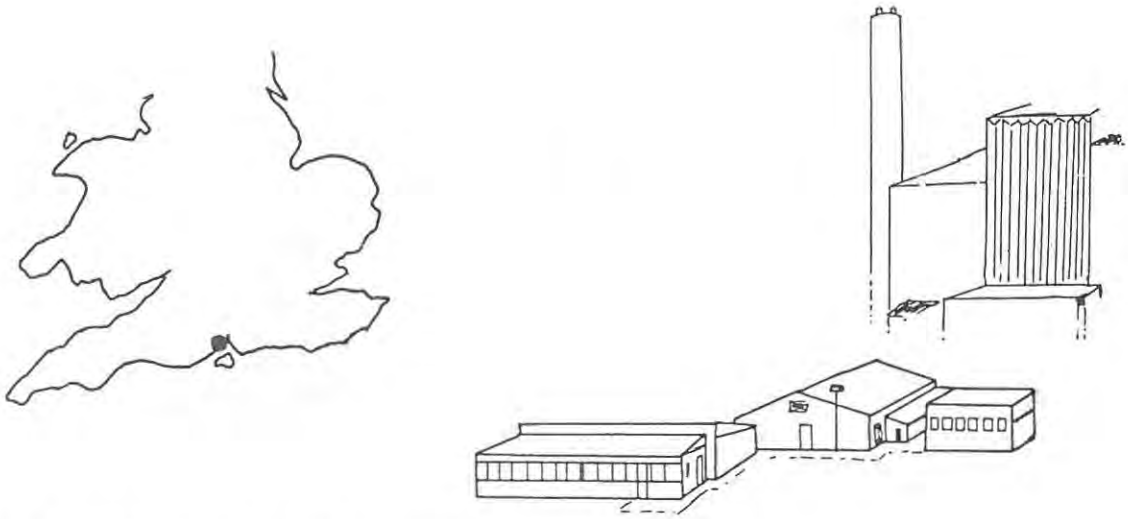

Around the Marine Laboratories.

Number 9.

The CERL Marine Biological Laboratory, Fawley

The main research facility of the Central Electricity Generating Board is based at Leatherhead, where CERL (Central Electricity Research Laboratories) includes, in its wisdom, a biology section, whose concerns are the interactions between all aspects of electricity generation and the environment. For the period 1959 to 1968 the section's marine biology group was based at Bradwell, where they were concerned with biological studies in the R. Blackwater estuary in relation to the operation of Bradwell nuclear power station, effectively Britain's first commercial nuclear station. Additional ecological studies developed at other sites, for example the Severn Estuary and the Channel, leading to a dispersal of staff. Accordingly, with the completion of the main intensive studies at Bradwell, it was decided to bring the various teams together, and the Marine Biological Laboratory was established at Fawley, on the site of the 2000 MW oil-fired power station then being completed. The laboratory was set up as a centre for the coordination of the CEGB's marine biological research, which covers all sites in England and Wales. It was officially opened by Sir Frederick Russell on 3rd October 1969.

The principal single storey buildings incorporate a suite of laboratory rooms supplied with sea water, and a larger experimental rig of 2000 sq. ft. The sea water supply is pumped from the intake channel of the power station which connects to the southern end of Southampton Water. In addition there is a direct supply of heated sea water from the power station's cooling water system, the outflow pipes of which pass the laboratory on their way to the discharge headworks in the Solent. Local inshore fish and plankton studies are served by the laboratory's "fleet" of small boats. With the rapid

evolution of marine biological science over the last 15 years, and the changing emphases brought about by the addition of new staff, the evolution of power station systems, and the understanding of potential problems, resulting from earlier studies, the laboratory has 'grown' additional facilities, including a sea water flume building for larger scale fish studies, and purpose-designed computing and library facilities.

The researches are primarily concerned with the sea water cooling systems of coastal power stations, including the abstraction of organisms at the intakes and its effects on local animal populations and on power station operation, the entrainment of organisms through the cooling water system and associated fouling problems, and the effects of the heated discharge on its return to the sea and its potential use in the culture of commercial species. While experimental work is based at Fawley, recent field studies have been undertaken at Bradwell, the Severn Estuary, Sizewell, Morecambe Bay and the Medway Estuary.

NEW RECORDS FOR LAGOONAL SPECIES IN BRITAIN

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British brackish-water coastal lagoons, with a few notable exceptions, have received little study, with the consequence that scant data is available as to the species characteristic of particular lagoonal types, and the functioning of lagoonal ecosystems is likewise poorly understood. Over the last few centuries, and especially over recent decades, many lagoons have been affected by human activity, including reclamation, conversion to freshwater lakes, input of pollutants and by change in the relative freshwater/seawater inputs. Some lagoons have also been formed by man's acctivities, for example, during the reclamation of coastal marshes. In general, lagoons can therefore be considered as environments which are generally under threat from human activity, and about which we have relatively little information.

In England, coastal lagoons occur mainly in East Anglia and on the south coast. Present research within the Department of Oceanography, University of Southampton, involves studies of the Dorset Fleet, England's largest lagoon (Ph.D. study by C. Pickering), Fort Gilkicker Moat at Gosport (Hampshire), Widewater near Shoreham (W. Sussex) and a coastal lagoon system between Keyhaven and Lymington (Hampshire). Each of these studies has involved detailed surveys of the macrofauna and flora in relation to physical and chemical parameters. In the case of the Fleet and Fort Gilkicker Moat, data on seasonal changes and productivity have been obtained.

Those lagoons so far studied on the south coast, especially those which have been 'naturally' formed, contain species typical of sheltered estuarine conditions, together with a few species which tend to be found only within brackish lagoons. Some of these species are rare, being recorded at very few sites in Britain. New distribution records for four of these species are given below.

(1) Nematostella vectensis Stephenson

Nematostella, the Startlet sea anemone, was entered in the IUCN Invertebrate Red Data Book in 1983 (Williams, 1983). It is a small species of burrowing anemone (usually less than 2 cm long), occasionally also found on weed. It is recorded from England and North America. English populations are currently known from East Anglia (Shingle Street, Suffolk) and on the south coast (Pagham, Sussex; Langton Herring on the Dorset Fleet).

In the present south-coast studies the species was found to be common along most of the length of the Dorset Fleet (December, 1981 and June, 1983 - C. Pickering), at Fort Gilkicker Moat, Gosport (October, 1980 - October, 1983) and abundant in coastal lagoonal systems between Keyhaven and Lymington (June, 1983 and November, 1983). At each of these new sites there is direct seawater input to the lagoon. At Widewater, Sussex, where seawater percolates through a broad shingle bank, Nematostella is absent.

(2) Edwardsia ivelli Manuel

This is a species of small burrowing anemone, known only from the deep soft mud of Widewater lagoon. Recent collections from this locality failed to reveal further specimens (Manuel, 1981).

An intensive survey was carried out during the summer of 1983, when conditions of oxygen stress and high temperature were apparent throughout the lagoon; no Edwardsia were found. However, samples taken in December, 1983 reavealed a single specimen of Edwardsia ivelli. Further careful monitoring of this site will be necessary to reveal distributional and seasonal patterns of abundance within the lagoon.

(3) Gammarus insensibilis Stock

This is a species of amphipod crustacean which is locally common in the Mediterranean, where it tolerates fully marine conditions, and is recorded from the Black Sea, and Atlantic coasts of Europe to the English Channel. In the British Isles it is recorded in the Dorset Fleet, and in New England Creek, Essex (Lincoln, 1979).

In the present south-coast studies the species was found to occur in the Fleet (December, 1981 - C. Pickering), and to be abundant in Fort Gilkicker Moat (October, 1980-October 1983), and in the lagoon system between Keyhaven and Lymington (June and November, 1983).

(4) Lamprothamnium papulosum Groves.

L. papulosum is a brackish-water Charophyte occurring in suitable brackish areas from Norway southwards to N.W. Africa (Algiers), with records from S. Africa and Australia.

In Britain it was formerly known from three brackish localities - Newtown on the Isle of Wight, disused claypits at Hamworthy Junction, and the Dorset Fleet. Of these sites Lamprothamnium is now only present in the Fleet. In addition the species has

recently been recorded in the brackish Eight Acre Pool, Lymington (Hampshire) (Farnham, cited by Daniel, 1975).

In the present studies Lamprothamnium is recorded from a new site in Fort Gilkicker Moat, where changes in a healthy, though small population, have been followed since October, 1980. The alga was absent from other sites examined.

It is hoped to continue and to expand the present study to produce comparative data for all south-coast lagoonal sites.

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TWO SCOTTISH SIGHTINGS OF DERMOCHELYS CORIACEA IN OCTOBER 1983.

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In October 1983, the Royal Scottish Museum received two reports of Dermochelys coriacea, the Leatherback turtle or Luth, in Scottish waters.

The first was on Thursday, 13th October 1983, when the coastguard at Stornoway reported that a Luth had been caught by a trawler, which was fishing off the coast of Berneray, Sound of Harris, Outer Hebrides. The turtle had become entangled in the boat's net and was in very poor condition when it reached Stornoway harbour. Unsuccessful attempts were made to land the turtle and it was eventually towed back to sea, by which time it was dead or clearly dying.

The second specimen was sighted almost a week later, when Dunstaffnage Marine Laboratory reported that a Luth had been seen in Loch Craignish, about 15 miles south of Oban. Two local residents spotted it on Wednesday, 19th October 1983, and then later found it stranded on rocks

and badly cut. The turtle appeared to be very weak, but they managed to get the specimen (which was approximately 7 feet in length, back into the water. It was then seen on a few occasions until Saturday, 22nd October, 1983.

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THE OCCURRENCE OF DWARF MALES IN THE BRITISH ECHIURAN THALASSEMA THALASSEMUM

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The discovery of dwarf males within the nephridia of adult female specimens of the British echiuran worm Thalassema thalassemum Pallas (Hawkins, 1981), invalidates one of the cardinal characteristics used in the classification of the Echiuroinea, which is a major order of the phylum Echiura (Stephens & Edmonds, 1972). The taxonomy of this order relies upon the presence or absence of sexual dimorphism when differentiating between the two constituent families, the Bonelliidae and the Echiurdae. The former is characterised by the occurrence of dwarf male forms whereas species of the latter family are supposed to lack any discernably dimorphic features. At present T. thalasemum is considered to be a member of the Echiuridae.

The dwarf males of the Bonelliidae are typically neotenic larvae (Baltzer, 1925) that are obligate parasites found in female nephridia. Their body form is highly reduced in size (1-3 mm length (Spengel, 1879) and structure, when compared to the much larger females (up to 1 metre length, including proboscis) (Beltzer, 1931). The males observed in T. thalassemum are the same size as those of the Bonelliidae but their external features resemble those of the adult female. These males are also capable of an independent existence after removal from the female host. The less simplified form of the male and other anatomical features of the female of T. thalassemum preclude it from being re-classified as a bonellid.

The above observations when combined with the citation of other examples of sexual dimorphism in the Echiuridae (Gould - Somero, 1975) would suggest that the taxonomy of this group of animals requires revision. The need for such a revision is reinforced by the continuing discovery of new echiurans from the deep sea, where they are important components of the bottom fauna of certain areas (Belyaev, 1972; Wolff, 1979).

A detailed description of the reproductive biology of T. thalassemum is in preparation.

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A LETTER FROM GEORGE JOHNSTON OF BERWICK

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The Art Gallery and Museum, Kelvingrove, Glasgow

During the recent Annual General Meeting at Menai Bridge the Honorary Treasurer drew members' attention to the need to increase income and suggested that we should encourage our friends and colleagues to join "PORCUPINE" to swell membership and thus our finances and activities. It may be of comfort to the council to note the following undated letter from Dr. George Johnston (1797-1855) of Berwick on Tweed to the Reverend David Landsborough (1779-1854) at Saltcoats, Ayrshire, concerning that other primarily marine organism, "The Ray Society":

'My Dear Sir: A few days ago I had my microscope out to examine your Lepralia, sent long ago, but alas! by some carelessness my little dear microscope, my companion for more than twenty years, was broken, and I have not again found leisure to..... How the sentence was to have been completed I do not know, for there was a sudden and a long interruption, but all the leisure I could command has been devoted to the establishment of the Ray Club. When first it was started I did not contemplate any opposition; many I know would not join, having no taste for such matters, but I believed we would be permitted to go on undisturbed by any actual resistance. In this I was unexpectedly disappointed, and hence I have been led into an extent of correspondence, which if seen at first would have frayed me. Now I think this opposition

is giving way; although our success cannot be boasted of, yet I do not despair of making up a society that will do some good. I believe that it has become necessary, both for naturalists and natural history, but I am too weary to enter into the details. We are now engaged in making the rules, in getting a council, and in preparing a list of works, as samples of those we have in view to print, and when this is printed you will get a copy. I will write to you so soon as my microscope is mended,and I get a look at all your specimens. The Sponge is, I think, Spongia limbata. The number who have hitherto joined the Ray Society is one hundred and sixty-five. Your friend, Major Martin, should join us and every amateur of natural history, male and female. We must have five hundred to do any good.

Yours very truly, GEORGE JOHNSTON.

Rev. David Landsborough.

The origin and formation of the Ray Society is outlined by David Elleston Allen in his 'The Naturalist in Britain' published in 1976 on pages 117 to 118 as follows:

The Palaeontographical Society was itself partly modelled on another, rather similar body established three years earlier: the Ray Society. This materialized from the need widely sensed about this time for some means of bringing out learned works on natural history - particularly monographs on the more abstruse groups - that were unlikely to find a commercial publisher or otherwise had to be issued at a price that placed them beyond the average naturalist's means. At least three people thought up schemes along these lines independently and almost simultaneously. One of them, the ornithologist (and geologist) H.E. Strickland, first tried to interest the British Association in sponsoring such a venture. When this proved abortive he decided on the founding of a special club, analogous to those already in existence for the printing by private subscription of books of interest to antiquaries, clergymen and doctors. His original idea was to call this the 'Montagu Society' (after the famous ornithologist) and to confine it to zoology. But meanwhile the ever-energetic George Johnston, mainstay of the Berwickshire Naturalists' Club and dominant in marine natural history, had started to canvass support for a scheme which was organizationally almost identical but aimed at a much wider spread of subjects. Sensibly, the two joined forces and it was agreed to name the body after a less specialized naturalist - of whom John Ray was far and away the most appropriate. Five hundred members, it was calculated, would be needed for success. A prospectus was duly printed and batches sent to groups of leading naturalists throughout the British Isles, asking them to recruit locally and among their friends. Partly because of this rather makeshift mode of circularization, perhaps, and partly because of downright opposition from a few influential people who

as usual saw danger in this for the established national societies, the scheme made slow headway and Johnston all but despaired of success. But after a further month, with enrolments doubled and a total of 157 already 'in the bag', the risk of formal establishment seemed worth taking and Johnston was voted into office as the secretary. Now, at last, he exulted,

> I shall see new life and vigour infused into practical out-of-door naturalists, working zealously and well, seeing that their labour shall no longer be in vain; and I shall see the poor country apothecary and the priest with cheap and good Manuals in their hands, and I shall see popular bookseller compilations at a discount, and I shall see the neglected corners of our Fauna and our Flora searched out, and all their hidden treasure desribed as well as are the lilies and the birds, and the gaudy shells of drawing room amateurs... The meat and medicine have been too long dispensed only to the rich.

Still very much alive today, the enterprise has turned out one of natural history's lesser-known but most far-reachingly constructive success stories.

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