

# Porcupine Newsletter

Volume 2 Number 1

ISSN 0309-3085

MARCH 1981

-1-

NEWSLETTER. This Newsletter marks the beginning of a second volume and the first from the 'prentice hand of a new editor. Our sincere thanks to Fred Woodward for producing the ten parts of Volume 1. Mr. Woodward relinquished the editorial chair as a result of his transfer from South Shields to Glasgow, a town where production facilities for the Newsletter were found not to be favourable; as a result there has been a hiatus in the Newsletter's appearance. We hope it will now resume its wonted periodicity. Intervals between Newsletters will normally be about four months.

COPY. The editor hopes that the Newsletter will continue to be serious without being solemn and is anxious to receive contributions in the form of scientific communications, news of Porcupine members, appropriate oceanographic and natural history notes, news of activities of other bodies and any trifles concerning the doings of Hystrix spp. (Mam.). Please note that we can now publish illustrations.

MEMBERSHIP. Our welcoming attitude to new members, together with our outstandingly low annual subscription, makes Porcupine an attractive proposition to interested young people. You can help Porcupine by publicising this fact.

MARINE RESERVES LEGISLATION (see within). A copy of the consultation paper is enclosed with this Newsletter. We have heard that the Bill has now picked up a huge number of amendments in the Lords which may well slow its progress; so there is certainly time for your views to become known.

CONTRIBUTIONS TO THE FEBRUARY 1981 MEETING IN PLYMOUTH. Late contributions have been held over to the next issue of the Newsletter. Would contributors with reports outstanding please send them in now.

FUTURE MEETINGS. 1. The next meeting will be a joint field meeting with the Conchological Society on Sat. 19 September and Sun. 20 September 1981 at Rhossili, Gower, Wales. Leader, Dr. P. Graham Oliver. Meet Rhossili car park at 10.00 Sat. 19. Accommodation is available at the Worms Head Hotel, Rhossili (Tel. 044 120 512). Members must make their own arrangements for this. Contact address: Mr. Tom Pain, 47 Reynolds House, Millbank, London, SW1P 4HP (01 821 7674).

2. A joint meeting is planned with the Coelenterate Group for this autumn, probably in London. Details in next Newsletter.

Frank Evans, Hon. Editor.

Dove Marine Laboratory, Cullercoats, North Shields NE30 4PZ, England.

## ACCOUNTS FOR THE YEAR ENDING 30 NOVEMBER 1980

Income and Expenditure Account

Dr.	£	p	By	£	p	Cr.			
To Entrance Fees	...	16	-	00	By Printing and Stationery	...	72	-	83
Subscription for 1979	...	2	-	00	Postage	...	55	-	98
Subscriptions for 1980	...	214	-	00	Meetings	...	275	-	27
Subscriptions for 1981	...	2	-	00	Bank Charges	...	0	-	62
Receipts from Meetings	...	93	-	86					
Sale of Newsletters	...	4	-	90					
Interest from Deposit Account	...	17	-	50					
Excess of Expenditure over									
Income carried to Balance Sheet	...	54	-	44					

£ 404 - 70  
=====

£ 404 - 70  
=====

Dr.	£	p	By	£	p	Cr.			
To Subscriptions paid in Advance		6	-	90	By Cash at Bank (deposit a/c)	...	692	-	50
Balance at 1 December 1979	828	-	25		Cash at Bank (current a/c)	...	84	-	17
					Petty Cash in Hand	...	4	-	04
					Transferred from Income and				
					Expenditure Account	...	54	-	44

£ 835 - 15  
=====

£ 835 - 15  
=====

Charles Pettitt, Norman A. Holme  
Hon. Auditors  
February 1981

David Heppell  
Hon. Treasurer  
29 December 1980

THE 1981 A.G.M.

Minutes of the Fourth Annual General Meeting held at the Marine Biological Association's Laboratory, Plymouth, on Sunday, 22nd February 1981 at 09.45 hrs.

Bob Earll took the chair. Thirty members were present.  
The Minutes of the 1980 A.G.M. were approved.

Hon. Secretary's Report. Acceptance proposed by Frank Evans.  
Seconded by David Heppell. Approved.

Hon. Treasurer's Report. Acceptance proposed by Shelagh Smith.  
Seconded by Roger Bamber. Approved.

Hon. Editor's Report. Acceptance proposed by Bob Earll.  
Seconded by Roger Bamber. Approved.

Hon. Record Convener's Report. Acceptance proposed by Frank Evans.  
Seconded by David Heppell. Approved.

Matters Arising from Reports.

There was discussion on the raising of the subscription. Pat Fry asked why it should not be raised. David Heppell replied that more money could be raised by getting more members, having meetings charges for attendance by non-members. The estimated income was set against estimated costs for the Newsletter and postage and this, with reserves, was considered more than adequate. Ralph Robson proposed that the subscription should be raised to £3.00 per annum, seconded by Fred Woodward. Frank Evans spoke against this motion saying that keeping the subscription down was attractive and as we did not need the money members should get the benefit. On a vote 3 were in favour of putting up the subscription and 15 against.

Item 5 of the A.G.M. Preliminary Notice (Motion to temporarily suspend Clause 7 of the Rules of Procedure should a Newsletter not appear prior to the A.G.M.) was accepted with the promise that this was for this meeting only.

Election of office-bearers.

It was unanimously agreed that the present Honorary Secretary, Honorary Treasurer and Honorary Records Convener remain in office. Election of Frank Evans as Honorary Editor was proposed by Fred Woodward and seconded by Tom Gascoigne. Frank Evans was duly elected.

Fred Woodward suggested that Porcupine should reaffirm its faith in its Auditors and proposed that they should be re-elected. This was seconded by Roger Bamber and approved.

There was no election of Council members. Fred Woodward automatically became one on his retirement as Honorary Editor. Council members are now:

Roger Bamber	Celia Pain
Roger Brehaut	Eve Southward
John Gordon	Geoff Swinney
David McKay	John Wilson
Adrian Norris	Fred Woodward

Future meetings were intimated.

Any Other Business.

Bob Earll proposed that members should empower the Honorary Secretary to write to D.O.E. concerning possible legislation on Marine Nature Reserves as suggested by the Committee. This was seconded by Ralph Robson and agreed by members.

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

\*\*\*\*\*

#### HON. SECRETARY'S REPORT

Shelagh Smith

It is with sadness that I start my report by announcing the deaths during the last year of two of our members, Dr. Bill Fry, Luton, a new member who would have spoken at this Plymouth meeting, and Mr. Michael Long, Co. Kerry, a founder member. Obituaries will be found on p. 5.

Despite some evidence that Porcupine had lost some of its initial momentum, in retrospect 1980 was a not unsuccessful year. Support, as shown by the number of members at 31st December 1980 (119) is as strong as ever. This is an average figure, the turnover of members leaving and new members joining being steady at about 15%. This is quite high but not unexpected in a small society.

There was only one indoor meeting, at Edinburgh on 1st - 2nd March 1980. The theme, Predation and Survival, attracted 38 participants.

Porcupine, despite a carefully nurtured image that meetings should be informal and that contributions can, and do, reflect work in progress as well as completed research, maintains a standard of communication at meetings which in content and presentation is higher than at many much more prestigious meetings.

It is intended that the Newsletter will become a stronger publication and thus attract more members, but, as is also stressed by the Hon. Editor, this cannot happen unless members, and others, send in articles over and above summaries of talks. News too, of other meetings and coming events, is required, and especially snippets of information which would benefit from an airing. The future of Porcupine and the Newsletter is in the hands of members, not just the Committee, and that means YOU.

This brings me to an important matter. Fred Woodward has now retired as Hon. Editor. He has given good service for four years, and has had considerable responsibility for making Porcupine known through the Newsletter. We all thank him very much.

Porcupine also held a field meeting, in September in Guernsey, organised very nicely by Roger Brehaut. Unfortunately attendance was low. For further details see the report of this meeting.

I am looking forward to the year. I shall have more time to devote to Porcupine. There are a number of plans in the pipeline for future meetings.

\*\*\*\*\*

HON. TREASURER'S REPORT

David Heppell

The Accounts for the year ending 30th November 1980 were presented (see p. 2) and comparisons made with the previous year. Some members of Committee had proposed that the annual subscription be increased but after discussion it was decided that this would not be done unless members at the A.G.M. so directed. A motion to increase the subscriptions to £3.00 was proposed at the A.G.M. but defeated after the Treasurer forecast that the Society's funds were sufficient to meet the expenditure estimated for the forthcoming year. The annual subscription will therefore continue to be £2 until further notice.

\*\*\*\*\*

OBITUARIES

It is with great regret that we have to record the death of two members of Porcupine, Michael Long and Bill Fry.

Michael Long of Dingle, Co. Kerry, was a member of the Society from its inception until his death in March 1980. His contribution to the knowledge of the flora and marine zoology of the Dingle area was honoured in 1978 by his election to Honorary Life Membership of the Institute of Biology in Ireland. Tributes to him were published by three of his colleagues in the Irish Naturalists' Journal (vol. 19, pp. 177-179) and we are grateful to the Editor of that journal for permission to quote from those appreciations.

Michael Long himself published little of his knowledge but for about thirty years he corresponded regularly with the National Museum of Ireland and allowed his records and specimens to be freely used in the taxonomic and biogeographical papers of others. Arthur Went estimated that Michael had been responsible for bringing to notice 82% of the scarce or rare fishes handled in the Department of Fisheries of Ireland including numerous additions to the Irish fauna. The local fishermen were encouraged to bring him any species of fish with which they were not thoroughly familiar.

With the co-operation of the Dingle trawlermen he was the discoverer of twelve invertebrate species previously unknown from Irish coastal waters and many rare species besides. His interest in Mollusca was aroused in 1966 when the gastropod Galeodea rugosa was found to be included among a selection of local shells he had presented to the National Museum. This species had been recorded from Ireland only once before. Subsequently he added to the Irish list two further tonnacian gastropods, Charonia lampas and Ranella olearia, both of which reach their northern limits in the waters of SW Ireland. The debt owed by the professional biologist to the work of the good local amateur naturalist is exemplified by the valuable contribution of Michael Long to the natural history of Ireland.

Bill Fry had been a member of Porcupine for only a few months but had immediately taken an active interest in the Society. He was the prime mover of the meeting on "Ecological results from underwater photography" held at Plymouth in February, 1981, and had looked forward to attending the meeting and talking about his headline camera survey of the North Sea benthos. We offer our sympathy to his widow, Patricia Fry, to whom we are grateful for providing the following information.

William Gronow Fry was a marine biologist and taxonomist who confessed to an abiding interest in all "salty wet animals", although he was best known for his work on sea spiders and sponges. His research into the sea spiders began while he was still at school, and after completing the Natural Sciences Tripos at Cambridge he went to California to work on sea spiders as a research student under Joel Hedgpeth. Following this he worked at the British Museum (Natural History), where he was Curator of Sponges. Later he added teaching to his research interests, and numerous students enjoyed the stimulus of his great enjoyment of marine biology and his insight into the complexities of this diverse subject.

In his short life he organized two international Symposia, the first in 1968 on the Biology of the Porifera, and the second in 1976 on Sea Spiders (Pycnogonida), in honour of Joel W. Hedgpeth. In 1978 he was awarded a substantial grant by the Natural Environment Research Council in support of his research into the benthos of the North Sea and Eastern Arctic, a project upon which he was working with characteristic enthusiasm and thoroughness until his death in August 1980.

\*\*\*\*\*

#### PORCUPINE MEETING IN THE CHANNEL ISLES

Shelagh Smith

A field meeting, the tenth Porcupine meeting, was held in Guernsey on 22nd - 29th September 1980. Only eight people managed to attend (4 members of Porcupine, and one of the others has since joined). The party included Albert Stiva from Amsterdam and Jim McLean from Los Angeles. On two days we were joined by members of the local natural history society. Porcupine's wide interests were not well represented as everyone specialised in Mollusca, but this did mean that this group were searched for thoroughly.

Roger Brehaut hosted the meeting and made excellent arrangements. Five shore stations were investigated on Guernsey and two each on Herm and Sark. An afternoon was spent dredging. The causeway at Lihou, historically and recently regarded as an extremely rich site, was somewhat disappointing with an unexpectedly low diversity not only of Mollusca but also other animals and algae, but Belle Greve Bay was very rich in many phyla with an abundance of animals. The long beaches of Herm required more time than was available. The visit to Sark was timed to coincide with the lowest Spring tide in order to visit the Gouliot caves which had a splendid display of anemones but most of the hydroids and Polyzoa were dead. The dredging was particularly useful and produced many species from fine shell gravel of which about a litre was sorted unsieved to produce such minute species as Arculus sykesi (Chaster, 1895), the first British record this century, which are concluded not to be as rare as they have been thought to be, but rather overlooked or lost by usual sorting methods.

Full details of findings will be written up separately. Suffice it to mention here that of over 140 species found alive, 11 were new to Guernsey (eight new to the Channel Isles) and another 35 had not been found alive since 1950. A number previously considered rare were found in attendance. Amongst about 70 species only found as dead shells, a number are new to the Channel Isles and many have not been found this century. All such statistics show is that, while the Channel Isles have traditionally been regarded as rich in Mollusca, little serious work is undertaken now, and by modern standards little is known and less published.

Editor's note: For lack of space the list of molluscan records resulting from the meeting is held over until the next issue.

\*\*\*\*\*

Notice to Members: Marine Reserves Legislation

The Department of the Environment have provided Porcupine with copies of the Consultation Paper on the establishment of marine reserves. Bob Earll has written an article which gives the background. Porcupine members are invited to express their opinions on the proposed legislation and to write to DOE at the address given on p. 3 of the consultation paper. These opinions are a vital part of the democratic process and a method by which individuals can influence government. It is suggested that letter to DOE might include comments on the principle of marine nature reserves, suggestions as to possible sites, comments or criticisms of the consultation paper.

In addition to any private individual response, Shelagh Smith as Hon. Secretary of Porcupine has been empowered by the members who were at the Porcupine meeting in Plymouth, to write a letter in favour of the enactment of legislation which would enable marine reserves to be established, and to criticise the consultation paper especially regarding the clauses suggesting limits of size of reserves and the inadequate sanctions against abuse. It was also considered desirable that legislative processes should be speeded up. The importance of the marine environment and its availability for research and education was stressed.

\*\*\*\*\*

Marine Reserves Legislation: A comment by Bob Earll.

A great deal is happening on this issue at present, and the background to this is described below. The Department of the Environment (DoE) have released their consultation document and various initiatives have been taken in relation to getting provisions made in the Wildlife and Countryside Bill (W & CB). I must apologise for not keeping you better informed; however the situation changes daily and really the only way to get an up to date picture of what is going on is to telephone me (053 185 415) or Roger Mitchell.

The background. As most of you will know there was no provision made for marine nature reserves in the Wildlife and Countryside Bill. The W & CB is a Lords Bill and it seeks to update a good deal of our current conservation legislation to bring it into line with a variety of conventions, etc. At the second reading of the bill the government were asked why no provision had been made for marine reserves - the reply was that the issue was complex and that they would release a consultation document on this problem 'shortly'.

A variety of voluntary groups decided that it would be a very good idea to table an amendment for the next stage (the committee stage) of the bill following this response. These voluntary bodies included Marine Action Centre (Joanna Gordon Clarke), UCS, Peter Hunnam, myself and Roger Mitchell, WWF (Chris Tydeman) SPNC (Tim Sands) and representatives from RSPB, FoE and BANC. A meeting was held at WWF and David Pedley,

a solicitor with considerable experience of wildlife legislation, prepared a final version of an amendment which was put down by Lord Mowbray. General and Legal briefs were prepared for this amendment which cited Lundy and Bardsey as potential reserve areas. The Head of NCC's legislative department thought the amendment went too far; however the amendment (which was faultless with regard to its drafting) took a strong position so that there would be a logical fall back position.

A report of the debate is given in the 12th February edition of New Scientist (page 388); broadly speaking the government, faced by an all party amendment proposed by a conservative peer (Lord Mowbray) for which there were no views expressed against, were forced to concede "that they would look into the possibility of enabling powers"; that is, they would look at introducing an enabling amendment into the next (report) stage of the bill.

CoEnCo Wildlife Link met soon after this and the consultation paper was discussed. It was decided that a list of statements on the consultation paper should be prepared to help member organisations respond rapidly (i.e., in time for the report stage). The release of the paper coincidentally near to the committee stage of the bill was termed "a blatant try on" by Lord Melchett, and Lord Mowbray said that he thought it was the press release when he first saw it, minutes before the debate.

In February Lord Craigton's amendment to part 2 of the Bill (still the committee stage) came up, the government once again had not anticipated the response from peers to the issue, and the amendment (which seeks to extend NCC's existing legislation by simply adding "to our 3 mile limit") was won by 98 votes to 54. This leaves the government with a problem, for they can either let Lord Craigton's amendment stand (and it is rather too vague to allow that) or they have to introduce some legislation of their own. This is likely to take the form of enabling powers for the Secretary of State. In any case the voluntary bodies are drawing up an enabling amendment of their own just in case something unforeseen happens at the report stage. Unfortunately we are not able to comment on the results of the report stage before going to press. MAFF are one of the main blocking groups but even they are supposed to have agreed in principle at Inter-Departmental Working Group meetings to the proposals. UCS are currently drawing up a brief to be directed at approaches to MAFF (DAFS). (Please contact R.E. if you will). The voluntary groups met NCC on 4th March; again too late for a report to be included here.

\*\*\*\*\*

PORCUPINE MEETING IN PLYMOUTH, 21-22 FEBRUARY 1981

Shelagh Smith

The 11th Porcupine meeting was held in the Marine Biological Association's Laboratory, with the theme "Ecological Results from Underwater Photography". Over 70 people attended. Talks were divided into sections according to the gross methods of achieving desired information, in diving depth, shallow seas and deep water. There were profuse illustrations, a factor which should be remembered when the articles are read in the Porcupine Newsletter.

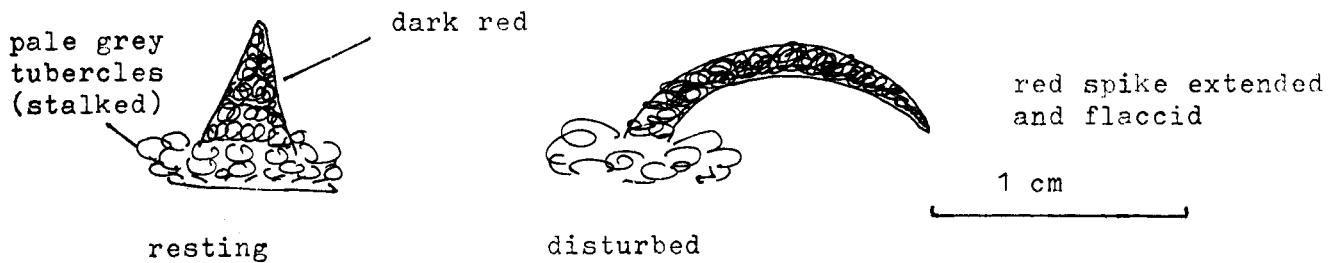
Roger Mitchell, NCC, led discussion on the proposed initiation of legislation on marine nature reserves, saying that those who considered that marine reserves were a good thing should act, now, as individuals,



and express their opinions (see separate articles). The consultation paper setting out proposals to date is not without its short-comings and these were immediately picked on by those present.

A buffet supper was held on the Saturday evening in the Laboratory. The weather, and particularly the sea temperature, were comfortably pleasant for short excursions to the shore at Wembury (Sunday afternoon) and Mount Edgcumbe (Monday afternoon).

At Wembury strange beasts were found firmly affixed to the underside of a boulder near LWM. What are they?



Although additions to the mollusc list for the Plymouth area were not expected, a juvenile Sphenia binghami Turton, 1822, was found in red algae at Mount Edgcumbe and at both localities there were living in a similar habitat several juvenile Acmeidae < 1mm shell length not distinguishable from the smallest of a growth series of Acmaea (Collisella) tessellata Müller, 1976), a species not normally regarded as such a southerly one.

\*\*\*\*\*

REPORTS OF THE MEETING AT PLYMOUTH

SEDIMENTOLOGICAL AND ECOLOGICAL OBSERVATIONS FROM MANNED SUBMERSIBLES

J.B. Wilson

Institute of Oceanographic Sciences, Wormley, Godalming, Surrey.

Submersibles have been used for sedimentological and ecological research in several parts of the world over the past fifteen years. Some of these are described in a recent book on the use of submersibles (Geyer 1977). In U.K. waters investigations were carried out using the submersibles PISCES II and PISCES III in 1970, 1971 and 1973 (Wilson 1978).

Observations made in the western English Channel on populations of the brittle star Ophiocomina nigra (Abildgaard) showed that it was present in large patches up to 300 m across. Within the patches, the individual Ophiocomina tend to separate from one another. The spacing between individuals was much more dispersed than a random distribution. This was confirmed by laboratory experiments and results from the towed sledge (Wilson, Holme & Barrett 1977).

On the west side of Rockall Bank, observations on the occurrence of the deep-water coral Lophelia pertusa (L.) showed it to be present in patches which are generally 10 - 50 m across. The patch develops from a single colony. Portions of the colony are broken off by the activities of boring sponges and the resulting debris is used as a substrate for growth of new colonies round the original one. This process of lateral growth continues and the patch increases in size (Wilson 1979).

#### REFERENCES

- Geyer, R.A., 1977. (Editor) "Submersibles and their use in Oceanography and Ocean Engineering." Elsevier, Amsterdam. 383 pp.
- Wilson, J.B., 1978. Ecology and sedimentology from manned submersibles. Progress in Underwater Science, 3, pp. 275-279.
- Wilson, J.B., 1979. 'Patch' development of the deep-water coral Lophelia pertusa (L.) on Rockall Bank. Journal of the Marine Biological Association of the United Kingdom, 59, pp. 165-177.
- Wilson, J.B., Holme, N.A. & Barrett, R.L., 1977. Population dispersal in the brittle star Ophiocomina nigra (Abildgaard) (Echinodermata: Ophiuroidea). Journal of the Marine Biological Association of the United Kingdom, 57, pp. 405-439.

\*\*\*\*\*

#### PHOTOGRAPHY IN DESCRIPTIVE SUBLITTORAL ECOLOGY

Frances Dipper

Nature Conservancy Council, P.O. Box 6, Huntingdon

In developing a strategy for the nature conservation of Britain's shallow seas, the Nature Conservancy Council considers that the safeguarding of habitats is the best approach. The selection of sites which might eventually become marine nature reserves depends on a knowledge of the species, habitats and communities present, and descriptive ecology therefore plays an important part in marine conservation.

Adequate sources of information that can be tapped by the NCC are already available from the sublittoral of some areas especially those in the vicinity of marine laboratories, or universities. A particularly useful source of records lies in collections of underwater photographs, often those of amateur divers.

However, where adequate information is not available, new survey is necessary, and over the past few years NCC has initiated descriptive sub-littoral surveys mainly in the south-west of Britain and in the Hebrides. Photography plays a very important part in these surveys, providing an accurate record of species, habitats and communities present and NCC now holds a sublittoral slide collection of approximately

4500 slides.

Resources of both time and money for sub-littoral survey are limited and it will be many years before adequate coverage around the coasts of Great Britain is achieved. However, considerable help is now being received from amateur divers through the Underwater Conservation Society. The UCS has developed a 'photographic project' with the aims of providing participants with an identification service and of promoting the use of underwater photography in marine biology. Participants send in their underwater photographs for identification along with relevant details of site, depth, scale, etc. Each slide is then analysed in detail and returned to the owner. The information collected from these photos falls into several categories: (i) distribution records of species, (ii) habitat and site information, (iii) behavioural observations, (iv) unusual happenings, e.g., pollution incidents. This is, of course, exactly the type of information required for the assessment of the marine conservation interest of a site.

The UCS is also providing useful information through the expedition surveys it runs each year in areas where adequate information is not available. The photographic record from these surveys is of particular value.

The recognition of species in situ is a prerequisite for descriptive studies and in many cases adequate identification guides are not available. The UCS has developed photographic guides covering several groups. The guides consist of a 'mini-print' of each species with a page of text and have been collated by experts in the relevant groups. Photographs of the species in situ are provided by UCS members. Guides have been produced covering British nudibranchs, anthozoa, common marine life and sponges. The sponge guide is not a straightforward guide but aims to increase our knowledge of British sponges by determining which ones, if any, can be identified from external features alone. Guides to British tunicates and hydroids are now in preparation.

\*\*\*\*\*

#### QUANTIFICATION OF THE DEEP SEA BENTHOS: A NEW APPROACH TO AN OLD PROBLEM

R.S. Lampitt

Institute of Oceanographic Sciences, Wormley, Godalming, Surrey

The use of photography for estimating abundance of benthic fauna has the drawback that a the area examined is small, b only the epifauna are sampled and c identification can be difficult particularly in the deep sea.

The main problems with towed nets are a the net may not be on the sea bed for all of the trawling period, b the net pore may clog and c the net may be selectively inefficient for different animal types, these being those which are too small, too motile, too deeply buried, too well anchored or too fragile.

The IOS epibenthic sledge is described. This takes photographs of the sea bed just in front of a row of three nets (2 coarse and 1 fine). A net monitoring system gives information about the sledge via an acoustic beacon including its depth, the ambient temperature, whether the net is open or closed and its rate of movement over the sea bed.

This is used to adjust the ship speed and length of warp to give the best possible performance of the gear.

The system overcomes some of the problems of towed nets.  
1. We know the area of sea bed actually fished. 2. We can estimate the degree of clogging by comparing abundance of epibenthic animals as estimated from photographs (the photo-density) with estimates based on the catch (the catch density). 3. Selective inefficiency for fragile or well anchored animals may be assessed from the photographs.

From the 9 hauls in which all the gear worked perfectly, the photo-density was plotted against catch density for all those animals found at a density of over 5 per 1000m<sup>2</sup> and retained by all three nets. The line is very close to the 1:1 ratio. Catch density for those animals retained by the fine net is in even closer agreement with photo density.

A number of species were excluded from the regression. These were the asteroid Hymenaster membranaceus which appears to be infaunal for some of the time, particularly the smaller specimens.

The second species excluded was the pennatulid Kopholobolemnium stelliferum. At one station 1553 specimens were expected in the catch from the photo density but only 9 were recovered. Similarly for the anthozoan Ceriatulus multiplicatus. These species may either be too firmly anchored in the sediment or may retract into it and their abundance should be estimated from the photographs alone.

The fragile but large protozoans, the Xenophyophores, may also be excluded as they break up on capture, but again photographs are used for abundance estimates.

The combined use of photography and net capture gives very important information about the performance of the net and about the biology of some of the benthic fauna. We know that for a considerable and recognised proportion of the benthos the IOS epibenthic sledge gives a very accurate estimate of abundance.

\*\*\*\*\*

#### RESULTS FROM NORTH SEA BENTHOS SURVEYS

M.F. Dyer, W.G. Fry and P.D. Fry  
Marine Benthos Laboratory, Luton College of Higher Education,  
Putteridge Bury, Luton, Bedfordshire.

Our work began in 1978, when Dr. W.G. Fry received a grant from N.E.R.C. to study the ecological role of pycnogonids and associated benthos on the North Sea and Eastern Arctic demersal fishing grounds. As part of this study we wanted to know the distribution and abundance of as many macro-epibenthic species as possible. Consequently, during the past three summers, we have participated in research cruises of the Eastern Arctic (between the North Cape and North Spitsbergen: 70-80°N) and the North Sea (between 52-62°N). We have sampled the benthos from 499 North Sea stations and 229 Arctic stations. Granton trawls and, in a few cases, semi-pelagic trawls, were used throughout these cruises. These are not ideal for sampling the benthos, but

without them yearly benthos surveys in these large areas would not be possible.

During the North Sea surveys (MAFF Lowestoft), a remote head-line camera was used successfully at 115 stations. The camera was adjusted to take photographs of the sea bed at intervals of one minute throughout the 60 minutes of a trawl. In all, some 5000 useable photographs were obtained.

Of the 150 species recorded from North Sea trawls, some 30 species are identifiable on the underwater photographs and their abundance throughout the North Sea has been estimated. Of these, the distribution and abundance of 7 species were shown:-

1. Cidaris cidaris. This echinoid is known to be distributed from the Mediterranean to the deeper water west of Europe as far as Norway. In the North Sea it was found only to the west of Orkney/Shetland, where Cidaris seems to be on the edge of its range. Estimates of abundance based on underwater photography varied from 9-22/100m<sup>2</sup>.
2. Pennatula phosphorea. This pennatulid was rare in the trawls, but underwater photographs showed it to be very common throughout the northern North Sea. Particularly large densities were found off the west coast of Norway (182/100m<sup>2</sup>) and in the Farne deeps (66/100m<sup>2</sup>). The ability of pennatulids to contract quickly when disturbed presumably contributed to the low catching efficiency for this species.
3. Hyalinoecia tubicola. This polychaete was found throughout the northern North Sea. It was most common to the west of Shetland, where a density of 142/100m<sup>2</sup> was found.
4. Echinus acutus. Common throughout the northern North Sea, the juvenile form is sometimes trawled in vast numbers. The highest density of juveniles (512/100m<sup>2</sup>) was found in the central northern North Sea. Other high densities of 173 and 247/100m<sup>2</sup> were found to the west of Norway.
5. Alcyonium digitatum. This soft coral was common throughout the southern North Sea and along the east coast of Scotland. It was found to be most abundant off the Forth and Tay, where estimates of abundance varied from 37-48 colonies/100m<sup>2</sup>.
6. Asterias rubens. This asteroid was found throughout the North Sea, but it was found in much higher numbers in the southern North Sea - particularly off the west coast of Denmark and between East Anglia and Holland. In these regions it was found at densities of 30/100m<sup>2</sup>. Further north, Asterias was found in lower numbers, and north of Orkney the underwater photographic survey showed the abundance to be below 2/100m<sup>2</sup>.
7. Stichopus tremulus. This holothurian was found in the northern North Sea at depths below 150 metres. Only 1 specimen was found on the underwater photographs, but this is not surprising as the area trawled is some 1500 times the area photographed. However, the distribution of Stichopus was presented because the underwater photographic survey showed many cylindrical objects (6 - 8 cm long) covering the sea bed in areas where Stichopus was trawled. We first

felt that these objects were the faeces of Stichopus, but it now seems more likely that they are the polychaete Onuphis conchylega. They were found on the underwater photographs in vast numbers - up to 50/m<sup>2</sup>, though they were never caught in the trawl.

The use of a conical dredge on future cruises in these areas might enable us to confirm the identification of Onuphis.

\*\*\*\*\*

#### DEEP-SEA HOLOTHURIAN SWARMS

D.S.M. Billett

Institute of Oceanographic Sciences, Wormley, Godalming, Surrey.

The spatial distribution of the elasipod holothurian Kolga hyalina was described in order to demonstrate the use of photographs in studying dispersion patterns. Generally the density of deep-sea megafauna is too low to permit the analysis of spatial patterns using a towed time-lapse camera system, but occasionally animals do occur in high densities, notably ophiuroids, and in this case a sea-cucumber. The study of spatial distributions not only provides information on the behaviour of an animal but may also contribute invaluable data on the environment, such as the distribution of food resources.

K. hyalina has been sampled between 2755 and 4080 m at the mouth of the Porcupine Seabight off the south-west coast of Ireland using the I.O.S. epibenthic sledge. 12 samples have been taken on 5 cruises over a period of 2½ years. An area of 1 m<sup>2</sup> in the foreground of each photograph was analysed and treating each photograph as a trapezoid-shaped quadrat the degree of aggregation at each station was examined using Lloyd's index of patchiness. Although there are some spatial differences in dispersion pattern, demonstrated by samples taken on the same cruise, temporal changes are more important. For instance two stations sampled at 2800 m and 4000 m in July 1979 showed a near random distribution of K. hyalina, but the same areas sampled two months later produced aggregated patterns.

Aggregation may occur to increase the chances of fertilization during spawning. The appearance of thousands of small K. hyalina (3.7 mm mean length) over a wide area of the Porcupine Seabight indicates a highly synchronous reproductive event but data on the gametogenic cycle is equivocal. The spermatogenic cycle suggests that spawning may occur in August-September, a time when aggregations were formed, but an oogenic cycle is far from certain and clumping was also noted in April 1978. Aggregations may therefore be formed in response to food concentrations, possibly in areas where a dead animal has left a legacy of organic matter. However, the temporal changes in spatial pattern indicate that other processes may be important, such as the flocculent patches which were only present in July 1979 at most stations sampled between 1955 and 4000 m and which tended to collect around mounds and within hollows, areas where K. hyalina seemed to reach its greatest density. The nature of the flocculent material is not known, however, and it must also be stressed that the majority of sedimentary structures were devoid of K. hyalina.

USE OF PHOTOGRAPHY FOR MONITORING SUBTIDAL COMMUNITIES  
ON HARD SUBSTRATA

Keith Hiscock and Dale Cartlidge  
Field Studies Council Oil Pollution Research Unit, Orierton Field  
Centre, Pembroke, Dyfed, Wales.

Almost all of the studies on the ecology of sublittoral hard substrata in British waters have been of a descriptive nature. However, a knowledge of the dynamic aspects of sublittoral communities is useful for interpreting the distribution of species and communities in relation to environmental conditions, for understanding the process of colonisation and succession of bare surfaces, and for distinguishing between natural population fluctuations and pollution-induced changes.

Recently, attempts have been made to monitor changes using photographic methods. Almost all of the work in this field has been carried out in Scandinavia using stereophotographic systems. Stereophotography enables easier identification of species than with single photographs, and also size measurements of organisms can be made. A foolproof system for use in British waters still has to be developed and there are several problems to overcome, particularly high suspended sediment levels and locating and marking suitably large areas of unbroken silt-free rock surface. However, photography does provide a repeatable, rapid and non-destructive technique for monitoring, and with suitable equipment the standard of accuracy obtainable is superior to that for in situ surveys.

During 1980, staff from the Oil Pollution Research Unit were commissioned to carry out a photographic survey on jetty pile communities present on one of the piers in Milford Haven. The work was concerned with monitoring populations adjacent to the site of effluent discharge, describing any gradients of change close to the discharge point and providing a basis for monitoring any population changes which occur in the future. The system used was a Nikonos III underwater camera with a 28 mm lens, flash unit and close-up lens with focussing frame, which gave a picture area of 0.03 m<sup>2</sup>. The pier piles were marked at pre-determined levels and twelve slides were taken in sequence around each marker. These were later projected on to a screen and percentage cover estimated by identifying the species present at each point on a grid system. Tests were carried out to establish the number of points required and to compare random and systematic placement of points. Some difficulties were encountered during interpretation of the slides due to factors such as poor resolution, uneven illumination from the flash, silt cover, algae obscuring the understorey organisms, or over-growth of one species by another. However, the final results provided a measure of the percentage cover of the main species present and proved particularly easy to apply for brightly-coloured conspicuous species such as Antedon bifida.

Obviously, some types of community are better-suited to photographic analysis than others. A comparison between photography and suction sampling at a site on Lundy Island revealed that 80% of the species found in samples could not be detected in photographs. However, it is felt that, used under the correct circumstances, photography is an excellent tool which could be more generally applied in studies aimed at describing and monitoring sublittoral communities of conspicuous species on hard substrata.

END OF REPORTS OF MEETING

## OBSERVATIONS ON THE BENTHIC FAUNA OF THE RIVER BLACKWATER ESTUARY, SPRING, 1979.

R.N. Bamber

Marine Biological Laboratory, C.E.G.B., Fawley, Southampton.

### 1. INTRODUCTION

During investigation of the herring spawning grounds in the River Blackwater Estuary in Spring, 1979, benthic samples were taken to obtain information on the associated macrofauna, and to determine the presence of animals which may affect the herring eggs. The only spawning site discovered was the Eagle Bank, off the mouth of the estuary (Figure 1). This report discusses the benthic fauna of the Eagle Bank. It is appropriate to include information from contemporaneous dredge and plankton samples in the estuary, since all the sampling has afforded data on the continuing presence of certain species (cf. Davis, 1967; Bamber and Henderson, 1981), and on species previously unrecorded from the estuary.

### 2. METHODS

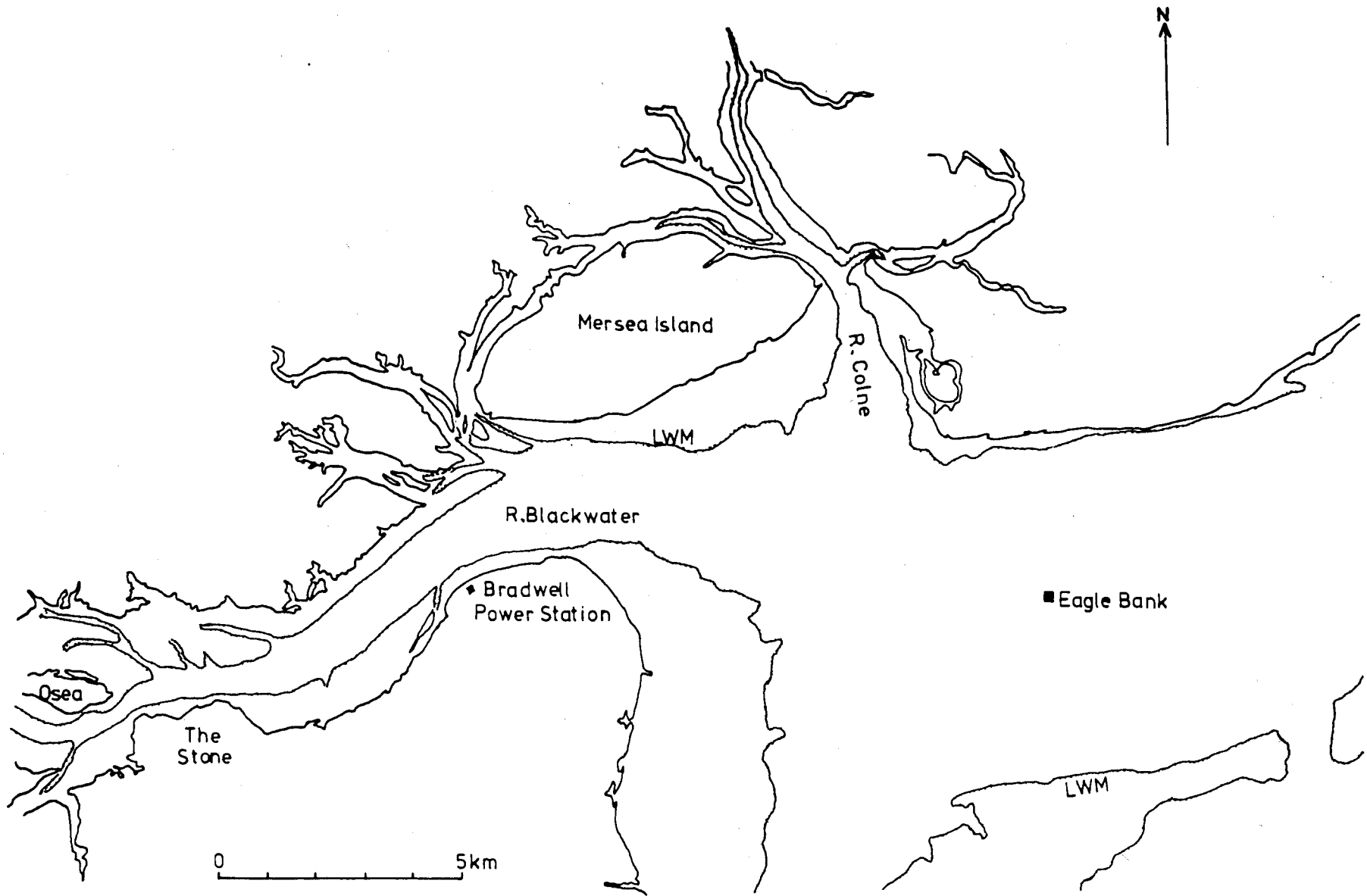
Quantitative samples from each sediment type on the Eagle Bank were collected with an 0.1 m<sup>2</sup> Day grab. The samples were washed through a 1 mm mesh sieve, and fixed in 4% formaline and 1% propylene phenoxitol in 50% seawater. The sieve mesh was selected in consideration of the main objective of the sampling, viz - the herring eggs, and was maintained in other samples for consistency. The fixative had been previously tested in the laboratory on large Nereis and 2 to 3 cm. Carcinus and found to be satisfactory. Most samples were subsequently stained with Rose Bengal for ease of sorting. Qualitative samples of bottom fauna were taken with an oyster dredge, but virtually none of this material was kept after examination in the field. Plankton samples were collected by Gulf III samplers employing 60 mesh per inch netting, and fixed in 4% formalin. All specimens of newly recorded species have been retained.

### 3. EAGLE BANK FAUNA

The topography and the distribution of sediments on the Eagle Bank are shown in Figure 2; three sediment types were present (Table I). A general heterogeneous sediment of coarse pebbles, shell breccia and gravel in a muddy sand matrix, reminiscent in appearance of fresh concrete, covered the majority of the Bank. Peripheral sandy mud sediments were present in patches below 4 metres depth measured from chart datum and a coarse shell-pebble substrate covered the seaward slope of the Bank, representing the general heterogeneous sediment with the sand-mud fraction eroded from the surface 2 to 3 cm. The shell inclusions were predominately from Ostrea and Crepidula. These three sediment types supported different benthic communities; their total species structure is summarised in Appendix 1 and community structure in Table 2 and Figure 3.

The general heterogeneous sediment supported a typically diverse community of 38 species, of which 22 were infaunal. The latter were dominated by polychaetes, principally Pholoe minuta Fabricius, a species not previously recorded from the Blackwater. The other





-17-

Figure 1: River Blackwater Estuary.

dominant species were Scoloplos armiger (O.F. Muller), Scalibregma inflatum Rathke, Lumbrineris gracilis Ehlers, and a phyllocid (indet.). The amphipod Harpinia antennaria Meinert, again a new record for the area, was the commonest infaunal arthropod. These species are characteristic of the finer fraction of this heterogeneous substrate, and predominantly detritivores, Pholoe and a second aphroditid, Lagisca extenuata (Grube), being carnivores. The epifaunal complement of this community, exploiting the pebbles and shell breccia, was numerically dominated by the sponge Sycon ciliatum (Fabricius); unquantified hydroids were also frequent. These sessile species supported the other epifaunal dominants, the pycnogonids Achelia echinata Hodge, Anoplodactylus petiolatus (Krøyer) and A. pygmaeus (Hodge); the latter two are new records for the area. The markedly bimodal particle structure of this sediment may be expected to reduce the ammensalism between these two trophic groups, and the presence of both live and decaying sessile epifauna may improve the stability of the finer fraction of the sediment, to the benefit of the infauna.

The fauna of the homogeneous fine sandy mud sediments was numerically poor, and only five species were recorded. Nephtys caeca Fabricius was dominant, and the oligochaete Peloscolex benedeni (Udekem) frequent. All the species present were infaunal. Only Diastylis rathkei (Krøyer) was found exclusively in this sediment, though N. caeca was commonest here.

The benthic community on the homogeneous coarse shell-pebble substrate was also at a very low density, and dominated by Peloscolex and the amphipod Gammarellus homeri (Fabricius). While most of the commoner species were epifaunal (e.g., Spirorbis, Metridium, hydrozoa), the high permeability of the overlying coarse sediment allowed species such as Peloscolex and some infaunal polychaetes to exploit the underlying muddy sand. Grab samples from this sediment were the only ones to contain errant decapod crustaceans, though they occurred in dredge samples over the whole Bank.

#### 4. DREDGE AND PLANKTON SAMPLES

The dredge samples gave qualitative information on the presence of large macrofaunal species. No previously unrecorded species were taken, but the continuing presence of 26 species was confirmed (see Appendix 2).

Some migratory benthic invertebrate species were taken in the plankton samples, Idotea linearis (L.) being particularly common. Four previously unrecorded cumaceans were regularly taken, and frequently contributed to the diet of Pleurobrachia. Pseudocuma gilsoni Bacescu was the commonest of these, and P. longicornis (Bate) very rare. The more benthic Cumella pygmaea Sars and Diastylis lucifera (Krøyer) are known to demonstrate a nocturnal migration out of the sediment (e.g., Jones, 1976), and were only found in night-time plankton samples; the Pseudocuma spp. showed no such diurnal rhythm.

#### 5. NEWLY RECORDED SPECIES

Fifteen species previously unrecorded for the River Blackwater were represented in the samples (Appendix 3). Of these, Pholoe minuta was the dominant species of the Eagle Bank community, and may be expected to occur along much of the estuary. This species, together with the four cumaceans (see Section 4) and two amphipods, were probably unsampled in previous surveys because the sieve meshes employed were too coarse. The three new pycnogonid species are all small and tenacious, and easily overlooked amongst hydroid material in particular. Nine specimens

0 500m

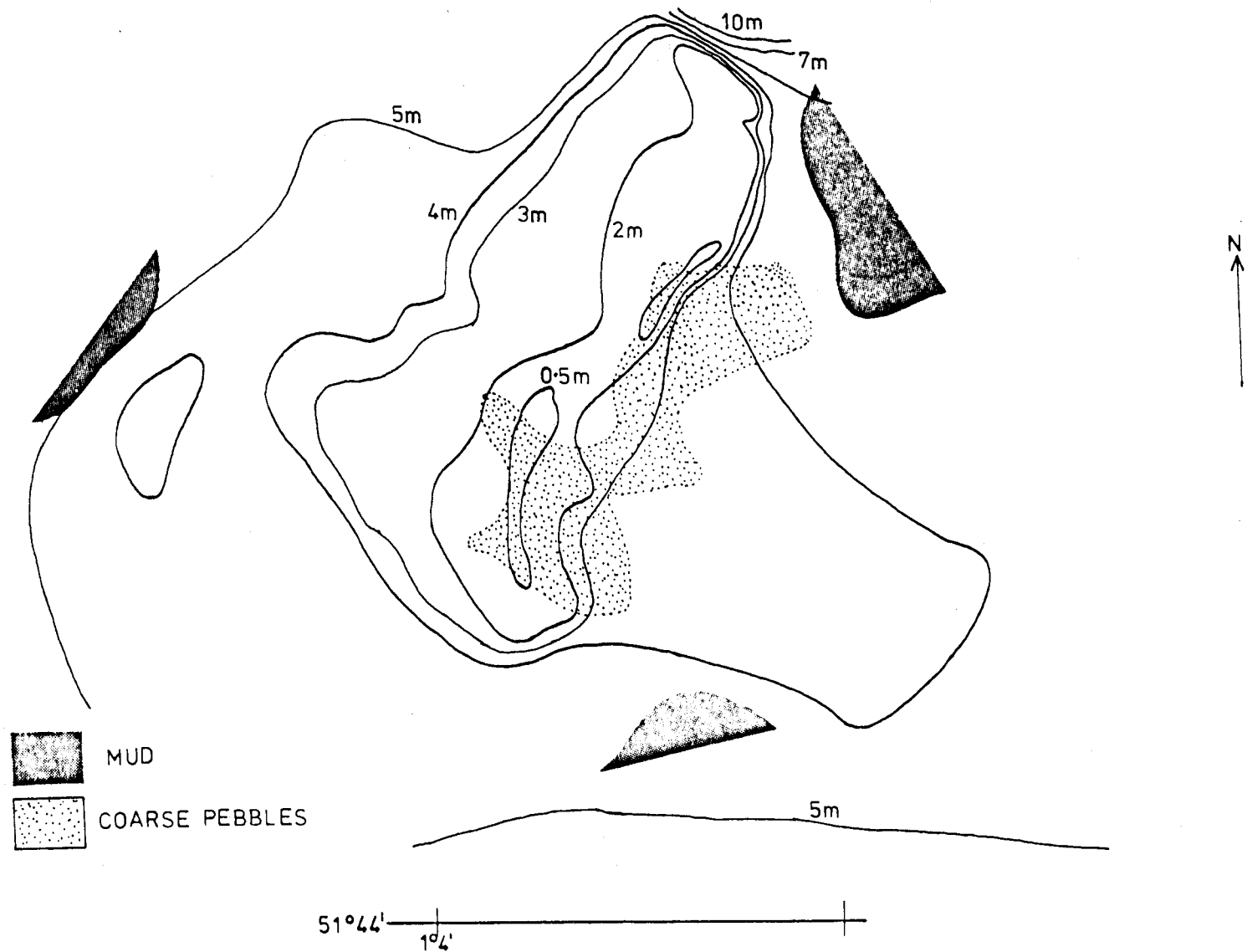
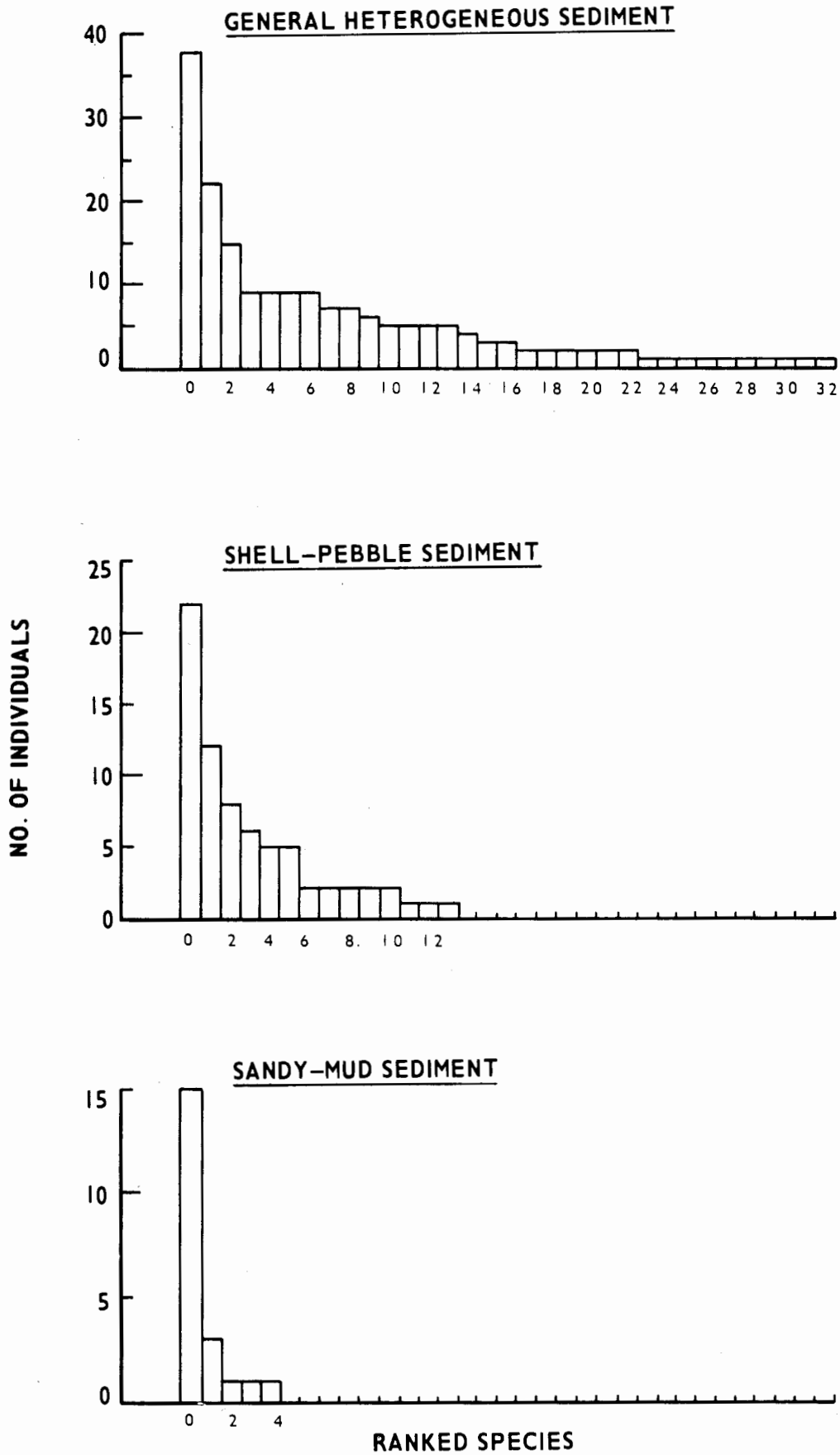


Figure 2. Depth contours (m below Newlyn Chart Datum) and sediment distribution over the Eagle Bank. Unshaded area is the general heterogeneous sediment.



**FIG. 3 RANKED SPECIES STRUCTURE OF EAGLE BANK BENTHIC COMMUNITIES**

of a syllid polychaete (? Exogoninae) could not be identified further, but surprisingly represent the first record from the Blackwater for this family, other than the planktonic Autolytus. The single specimen of Cauleriella was a juvenile, and though similar to C. zetlandica (McIntosh) could not be attributed to a species.

## 6. DISCUSSION

The samples analysed from the Blackwater estuary in Spring 1979 have demonstrated the presence of three communities on the Eagle Bank, whose structure is dependent upon the associated sediment. Their analysis confirms the accepted theory that heterogeneous sediments support a more diverse fauna (e.g., Gray, 1974). It is not possible to compare these faunas with data from the previous Blackwater benthic surveys, since the Eagle Bank was not sampled during those surveys. It is valuable in maintaining the theme of the previous surveys to be able to record the continuing presence of many benthic species and, with the possibility of future work in this area, to establish the presence of a further fifteen species in the estuary. It is likely that many of these species would be found to be widespread in the estuary if finer sieving of relevant samples were undertaken.

## 7. CONCLUSIONS

- i) The Eagle Bank supports three benthic communities related to substrate. The heterogeneous sediment supports a more diverse community, which may exhibit low trophic group ammensalism.
- ii) The continuing presence of 71 benthic species has been confirmed.
- iii) Fifteen species previously unrecorded in the estuary were collected.

## 8. ACKNOWLEDGEMENTS

The author wishes to express his thanks to Dr. C.H. Dempsey, Dr. P.A. Henderson, and G. Cartwright for making plankton and dredge material available. This work was carried out at the Central Electricity Research Laboratories, and the paper is published by permission of the Central Electricity Generating Board.

## REFERENCES

- Bamber, R.N. & Henderson, P.A., 1981. Bradwell Biological Investigations: analysis of the benthic surveys of the River Blackwater up to 1975. C.E.R.L. Report, in press.
- Davis, D.S., 1967. The marine fauna of the Blackwater Estuary and adjacent waters, Essex. Essex Nat., 32, 2-61.
- Gray, J.S., 1974. Animal-sediment relationships. Oceanogr. Mar. Biol. Ann. Rev., 12, 233-261.
- Jones, N.S., 1976. British Cumaceans. Linnean Society of London, Synopses of the British Fauna (N.S.) No. 7, 66 pp.

## APPENDIX 1: BENTHIC SPECIES FROM THE EAGLE BANK SEDIMENTS

		* = Present	** = Dominant	
	Species	General Sediment	Coarse Shell- gravel	Fine Sandy Mud
PORIFERA	<i>Sycon ciliatum</i>	**		
CNIDARIA	Hydrozoa			
	<i>Tubularia indivisa</i>	*		
	<i>Hydrallmania falcata</i>	*	*	?
	<i>Sertularia operculata</i>	*	*	
	Anthozoa			
	<i>Metridium senile</i>	*	*	
	<i>Cereus pedunculatus</i>			
ANNELIDA	Oligochaeta			
	<i>Pelosclex benedeni</i>		**	*
	Polychaeta			
	<i>Pholoe minuta</i>	**		
	<i>Lagisca extenuata</i>	*		
	<i>Cauleriella</i> sp.	*		
	<i>Tharyx multibranchiis</i>	*		
	<i>Nephtys caeca</i>	*	*	**
	<i>Scalibregma inflatum</i>	*		
	<i>Glycera lapidum</i>	*		
	<i>Scoloplos armiger</i>	*	*	
	<i>Lumbrineris latreilli</i>	*		
	<i>Notomastus latericeus</i>		*	
	<i>Phyllodoce</i> sp.	*	*	
	<i>Eteone longa</i>	*		
	<i>Arenicola marina</i>	*		
	<i>Stylarioides plumosa</i>	*		
	<i>Melinna palmata</i>	*	*	
	<i>Sabellaria spinulosa</i>	*		
	<i>Spirorbis</i> cf. <i>borealis</i>		*	
	Syllidae sp.	*	*	
ARTHROPODA	Crustacea			
	<i>Diastylis rathkei</i>			*
	<i>Gamarellus homari</i>		**	
	<i>Dulichia monacantha</i>	*		*
	<i>Harpinia antennaria</i>	*		
	<i>Melita obtusata</i>	*		
	<i>Macropipus pusillus</i>		*	
	<i>M. arcuatus</i>		*	
	Pycnogonida			
	<i>Nymphon brevirostre</i>	*		
	<i>Achelia echinata</i>	**		
	<i>Anoplodactylus petiolatus</i>	*		
	<i>A. pygmaeus</i>	*		
	<i>Pycnogonum littorale</i>	*		
	<i>Callipallene brevirostris</i>	*		
MOLLUSCA	Gastropoda			
	<i>Ischnochiton albus</i>		*	
	<i>Crepidula fornicata</i>	*		

	Species	General Sediment	Coarse Shell- gravel	Fine Sandy Mud
	Lamellibranchia			
	<i>Nucula turgida</i>	*		*
	<i>Abra alba</i>	*		
	<i>Mya truncata</i>	*		
ECTOPROCTA	<i>Membranipora membranacea</i>	*	*	
	<i>Electra pilosa</i>	*		
ECHINODERMATA	<i>Ophiura albida</i>	*		
HEMICHORDATA	<i>Saccoglossus</i> sp.	*		

APPENDIX 2: SPECIES RECORDED FROM DREDGE SAMPLES

PORIFERA	<i>Grantia compressa</i>
CNIDARIA	<i>Tubularia larynx</i> <i>Setularella polyzonias</i> <i>Sertularia operculata</i> <i>Alcyonium digitatum</i> <i>Taelia felina</i>
ANNELIDA	<i>Lagisca extenuata</i>
ARTHROPODA	<i>Sacculina carcini</i> <i>Eupagurus bernhardus</i> <i>Cancer pagurus</i> <i>Macropipus puber</i> <i>Carcinus maenas</i> <i>Hyas araneus</i> <i>Macropodia rostrata</i> <i>Nymphon brevirostre</i>
MOLLUSCA	<i>Crepidula fornicata</i> <i>Gibbula cinerea</i> <i>Littorina littorea</i> <i>Buccinum undatum</i> <i>Ostrea edulis</i>
ECTOPROCTA	<i>Flustra foliacea</i>
ECHINODERMATA	<i>Asterias rubens</i> <i>Solaster papposus</i> <i>Psammechinus miliaris</i>
CHORDATA	<i>Asciidiella aspersa</i> <i>Dendrodoa grossularia</i>

APPENDIX 3: NEWLY RECORDED SPECIES FOR THE BLACKWATER

Phylum Annelida

Class Polychaeta

*Pholoe minuta* Fabricius

*Lumbrineris gracilis* Ehlers

*Cauleriella* sp. indet (cf. *C. zetlandica* (McIntosh))

*Tharyx multibranchiis* (Grube)

Syllidae sp. indet

Phylum Arthropoda

Class Crustacea

*Dulichia monacantha* Metzger

*Harpinia antennaria* Meinert

*Pseudocuma gilsoni* Bacescu

*P. longicornis* (Bate)

*Cumella pygmaea* Sars

*Diastylis lucifera* (Kroyer)

Class Pycnogonida

*Callipallene brevirostris* (Johnston)

*Anoplodactylus petiolatus* (Kroyer)

*A. pygmaeus* (Hodge)

Phylum Hemichordata

Class Enteropneusta

*Saccoglossus* sp. indet

TABLE 1

Eagle Bank Sediments

Sediment	Median particle diameter		Depth Range (m. below C.D.)
	MdØ	µm	
General Heterogeneous	-1.7	3200	0.5 --> >10
Shell-Gravel (Coarse Homogeneous)	-3.2	8400	0 --> 4.5
Sandy-Mud (Fine Homogeneous)	+3.85	70	4.5 --> >10

TABLE 2

Eagle Bank Benthic Communities

Sediment	No. Species	No. Individuals	Diversity		Dominant Species
			'H'	'D'	
General Heterogeneous	38	184	4.23	7.10	<u>Pholoe minuta</u> , <u>Sycon ciliatum</u> , <u>Achelia echinata</u> .
Coarse Homogeneous	7.4*	13.2*	2.98	2.91	<u>Gammarellus homari</u> , <u>Peloxcolex benedeni</u> , <u>Spirorbis</u> cf. <u>borealis</u> .
Fine Homogeneous	5	21	1.38	1.31	<u>Nephtys caeca</u> , <u>Peloscolex benedeni</u> .

\* Mean value for 0.1 m<sup>2</sup>