Porcupine Newsletter

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PORCUPINE CHRISTMAS CARDS are on sale now. Details in Porcupine Ads., p.207. An order form is enclosed with this PN.

NEWSLETTER. Have you thought of contributing? Observe that, as well as the more formal papers, Notices, Notes and News, Letters, Ads, Reviews are all supplied by Members.

MEMBERSHIP. We constantly need new Members. This is a sure way of spreading interest in our subject and at the same time of keeping our subscription at its present remarkably low level of £3. Help "Porcupine" by recruiting friends with either a marine interest or a curiosity for sea life.

THALASSIOHYSTRIX SCUBA. A signal advance in our understanding of the systematics of this amazing animal appears on p.208.

FUTURE MEETINGS. 1. There will be a field meeting at Eyemouth, Berwickshire from Sunday 7 August to Saturday 13 August 1983. See Notices, p.203.

2. There will be a "Porcupine" meeting at Newcastle-on-Tyne on Saturday 8 and Sunday 9 October 1983. Further details will be found on p.203. An enquiry form is enclosed with this PN.

3. The A.G.M. in the spring of 1984 will be held at the Royal Scottish Museum, Edinburgh. More in the November issue.

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

REPORTS OF THE MEETING IN MENAI BRIDGE, 26 AND 27 FEBRUARY 1983
(continued from Vol. 2, No. 7)

HYDROGRAPHIC DISCONTINUITIES ON THE CONTINENTAL SHELF

J. Simpson
Marine Science Laboratories, Menai Bridge, Gwynedd.

Tidal stirring plays a central role in maintaining the most pronounced type I discontinuities in shelf sea structure. Competition between seasonal heating and stirring results in the partitioning of the shelf seas into "mixed" and stratified regimes separated by well defined frontal zones. The associated surface temperature gradients are frequently visible on satellite I-R images which provide convincing evidence for the consistency of frontal positions. The current field associated with the fronts are not simple 2-D geostrophically-balanced flows parallel to the fronts, probably because of the frequent occurrence of large scale instabilities on a scale of 25 km. There is also indirect evidence for a cross frontal circulation with a pronounced surface convergence in the region of largest horizontal temperature gradient.

A second class of discontinuity (type II) arises from fresh-water inputs. Within estuaries we observe a variety of frontal structures with relatively short lifetimes usually less than one tidal cycle. The scale of these features is generally small enough for them to be unaffected by the earth's rotation. When, however, the low salinity outflow from an estuary (or a series of estuaries) enters the shelf seas its spreading in response to the buoyancy force is modified by the Coriolis forces and the flow turns to the right (in the NH) and then moves parallel to the coast. Sharp discontinuities are frequently observed at the outer edges of such coastal currents examples of which occur along the coasts of Norway and the west of Scotland.

A further type III discontinuity may be distinguished at the shelf break when there is a transition from the deep ocean regime to tidally dominated shelf system. It has been suggested that mixing forced by internal waves may be responsible for a surface cool water anomaly observed at the break.

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THE DISTRIBUTION OF INTERTIDAL ANIMALS AND PLANTS AROUND THE COAST OF IRELAND

D.J. Crisp
Marine Science Laboratories, Menai Bridge, Gwynedd.

Data on the abundance of intertidal animals and plants comprising about 100 species from 80 localities collected over the period 1952-1970 were ordinated by reciprocal averaging. The first ordination, from which ubiquitous species were excluded, revealed a major axis (eigenvalue 0.329) corresponding to exposed western coasts with lusitanean species in contrast to north eastern coasts and sheltered estuaries, with predominantly northern and celtic species. There was a second axis (eigenvalue 0.103) which

corresponded at one end to sandy, semi-exposed shores, with Sabellaria, anemones and trochids and clear water rocky shore species (Himanthalia lorea, Alaria esculenta and the Ceramium-Mytilus community) at the other extreme. However, this ordination was interspersed with apparently anomalously placed rare species.

When the sheltered sites were separately analysed, the axis corresponded well with a salinity gradient with high values for Balanus improvisus, Fucus ceranoides and Carcinus maenas and low values for Gibbula sp., Littorina neritoides and Chthamalus montagui. The ordination of the remaining open coast sites differed little from the original ordination, but the two trends were clearer and without obvious anomalies.

Detailed species maps indicate four factors underlying distribution. First the climatic amelioration since the ice age, which has resulted in lusitanean species extending northwards. Some, however, such as Balanus perforatus and Patella intermedia Jeffries (= P. depressa Pennant), have failed to cross St. George's Channel and so have not reached the more equitable shores of western Ireland.

Secondly present sea and air temperature regimes reinforce the western predominance of many lusitanean elements. Thirdly, there are headland effects which stabilise distribution patterns. Cold susceptible species survive in the milder local climate of the headland during severe winters but extend back during warmer periods into surrounding embayments. Furthermore, headlands are often associated with offshore currents which disperse pelagic larvae and so reduce the probability of extension beyond the refuge afforded by the headland.

The fourth factor is the existence of permanent tidal fronts related to coastal topography, separating the existence of stratified water during the summer. Their importance has only recently been appreciated. Southern and western forms appear to be favoured by stratified water. The most obvious relationship is shown by the pocket of higher abundance of Chthamalus, of the top shells Gibbula umbilicalis and Monodonta linneata and of the polychaete Sabbelaria alveolata between Strangford Loch and Dundalk which coincides with an area of stratified water within the western Irish Sea front. Similar boundaries to many lusitanean forms coincide with fronts off Malin Head in the north, Waterford in the south east, and the Cork promontories in the south west.

It might be expected that a predominance of northern forms should be seen in the offshore benthos in the areas of stratified water, since the bottom water should remain cooler in the summer than water in well mixed areas.

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BIOGEOGRAPHY OF MARINE FOULING ORGANISMS: RACES OF MYTILUS ON NORTH SEA RIGS

A.H. Burfitt
Marine Science Laboratories, Menai Bridge, Gwynedd.

Over the past 20 years an extension has occurred in the range of the mussel Mytilus edulis such that it is now a major component of the fouling community on offshore N. Sea oil installations.

Such fouling, as well as being a nuisance, is a potential hazard as, where heavy it may conceal dangers, such as hairline cracks, from inspection. For this reason vast sums are expended annually on cleaning.

Presumably the mussels reach the rigs by the same route as other fouling species with planktonic dispersal phases and it is of interest to examine the routes by which such species arrive.

Possibilities are that:

a) Their occurrence represents merely an extension of the range of the adult/nonplanktonic phase, which have survived in the new area because the offshore rig provided a suitable settlement site whereas before the larvae would die.

b) The animals are continually introduced by ships in transit from coast to platform, e.g., supply vessels.

c) That the structures collected the fouling organisms when they were built, or fitted out, in the water, before being towed to the final station.

This extension in the range of Mytilus provided an ideal opportunity for examining the racial structure of Mytilus and routes by which fouling occurs. This was carried out using analysis of morphological characters and starch gel electrophoresis to study genetic variation.

Gross morphological characters proved of little value:- mantle colour was not consistently variable and different observers could not agree on precise colours. % of "beaked" shells in the sample - a marker for the more southerly Mytilus galloprovincialis was not easily applied since the shells were distorted by the very rapid growth found in offshore samples.

Enzyme polymorphisms provide much safer ground. Seven loci were studied. Two of these (6PGD and MPI-F) showed little polymorphism over the whole ranges from Mediterranean to the North Cape of Norway.

Three loci (ODH, MPI-S and Est D) differentiated animals into 3 distinct regions:

Firstly the Mediterranean, where at each locus one specific group of isozymes was found at frequencies 95%.

Secondly a region including the Atlantic coasts of Spain and France, western Cornwall, western Ireland and Scotland to the Shetlands, and the Northern oil rigs sampled (Brent, Forties, Montrose and Auk), where the Mediterranean alleles were only present at approximately 50%.

The remaining 50% comprised those isozymes which were present at approximately 95% in the third area. This ranged from the Irish Sea and English Channel, UK east and northern coast, southern North Sea rigs (Sole and Leman), Dutch and Danish coasts to Norwegian and Baltic waters.

The other two loci studied reinforced the differentiation of these 3 populations, but also suggested that further differences were present both within Scandinavian populations and between them and North Sea populations.

One buoy from the Auk field which first entered the water in southern Norway showed approximately 10% of animals characteristic of that region whereas the remainder were of the western Atlantic seaboard type found also in northern offshore populations. The same was true in the case of "Dundee Kingsnorth", a mobile rig which had been in Norway for some months before being moved to the open North Sea, whereas the mobile "Staydrill" which had only been in the Brent field showed 100% animals characteristic of that region.

Thus it can be concluded that, while primarily fouling is due to natural survival of larvae which would normally have failed to metamorphose, there is an input of animals from settlement at the time of platform fabrication when conditions allow.

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CHANNEL STARS

N.A. Holme
The Marine Biological Laboratory, Plymouth.

The western end of theEnglish Channel is well known as an important zoogeographical boundary, particularly for warm-water species nearing their northern limits. Certainly there are many species which live in the western part of the Channel which do not penetrate into the North Sea, but the boundaries vary for different species, and are not necessarily related to temperature. Moreover some of the species showing a limited distribution are not at or near the limits of their geographic range.

The environment of the English Channel is dominated by the strong tidal streams in its central regions, exceeding 4 knots off the Cotentin Peninsula. These result in considerable turbidity in the eastern Channel and the Gulf of St. Malo, where vertical mixing occurs throughout the year. In contrast the western Channel is occupied by stratified water in summer, the warm surface water overlying cool bottom water. As a result the annual range of bottom temperature in the western Channel is only 3^{o} - 4^{o} whereas in the eastern Channel it may exceed 8^{o}. In the shallow coastal waters

highest summer temperatures are attained in the central parts of the channel (Gulf of St. Malo; Bay of the Seine; Portland to Isle of Wight), and these same areas tend to be the coldest in winter.

The most important distributional boundary, which is more-or-less fixed in position, is between the western and eastern basins, corresponding to the transition from summer-stratified to fully mixed waters. This is illustrated by the range of the bivalve Venus fasciata, which is restricted to the western Channel, scarcely occurring even as empty valves in the eastern Channel and Gulf of St. Malo. Venus striatula apparently shows feeder on this brittle-star. In the early 1970's the distribution of this Luidia corresponded roughly to the grounds formerly occupied by Ophiothrix off Plymouth, but it was not found in areas where Ophiothrix beds still occurred off the French coast. It is concluded that predation by Luidia ciliaris may have been at least partially responsible for the disappearance of Ophiothrix beds off Plymouth. In Allen's surveys in the 1890's no specimens of Luidia ciliaris were recorded in the Plymouth area.

Much of the information given in this paper may be found in the following publications:

Holme, N.A., 1966. The bottom fauna of the English Channel. Part II. Journal of the Marine Biological Association of the United Kingdom, 46, 401-493.

Holme, N.A. (in press). Fluctuations in the benthos of the western English Channel. Proceedings of the 17th European Marine Biology Symposium, Brest, 27 September - 1 October 1982, to be published in Oceanologica Acta.

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LITTORAL BIOGEOGRAPHY

J.R. Lewis
The University of Leeds

The littoral fauna and flora of the British Isles are characterised by many lusitanean species which reach their northern limits of geographical distribution variously on S.W. and W. coasts. The broadly W. - E. gradient of winter temperatures and the extensive adult mortalities during the severe 62/63 winter suggest that these northern limits are set by inability to withstand winter conditions further to the north and/or east.

In some gastropods and barnacles frequent recruitment failures have been recorded over wide distances, and the age structures of populations become increasingly biased towards long-lived individuals towards their northern limits. Adults transplanted beyond these limits (e.g., to North Sea coasts) have survived and grown well, and produced ripe gonads or nauplii, suggesting that absence and geographical limits are set primarily by repopulation failure rather than adult intolerance. But in seasonally reproducing species at their northern limits summer is the breeding season, and distributional limits should, therefore, show more correlation with summer than winter isotherms.

This apparent paradox may perhaps be resolved by more detailed investigation of the relative temperature sensitivity of the different phases in the overall repopulating process in individual species. "Reproduction" (i.e., gonad ripening and spawning) may indeed be centred on the warmer season but the subsequent larval and juvenile establishment phases on the shore may variously extend into autumn and winter. Future research may show that it is the conditions affecting these later phases which are the most critical.

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FAUNAS OF THE TIDE-SWEPT SEA FLOOR IN THE CENTRAL ENGLISH CHANNEL

J.B. Wilson and N.A. Holme
I.O.S., Wormley, Godalming, and The Marine Biological Laboratory, Plymouth.

The central part of the English Channel between the Isle of Wight and the Cotentin Peninsula is swept by strong tidal currents. Values of the peak near-surface spring tidal currents exceed 150 cm/sec. The bottom sediments in this region consist of pebble gravels with some sand and shell debris forming a thin veneer on the rock pavement, which outcrops locally. The gravels are cut by a series of longitudinal furrows up to 10 m wide which are in general parallel to the direction of tidal streams. Sand is in short supply and is mostly concentrated into sand ribbons which are of variable width but only a few cm thick. The sand forming the ribbon may be discontinuous and formed into isolated ripples separated by the gravel floor.

The area studied in detail is some 15 - 20 miles south of St. Alban's Head, in a depth of ca 55 m. This lies just to the west of the English Channel Bed Parting zone, so that net sediment transport on the sea bed is in a westerly direction. During a cruise on RRS Frederick Russell in May 1982 two tows were made over this ground with the MBA television sledge. In addition to a TV camera this has a motorised 35 mm photographic camera which takes vertical photographs of the sea bed from a distance of 60 cm at regular intervals. The video and photographs revealed two main types of habitat, depending on the presence or absence of sand scour. The gravel or rock floor between the furrows and sand ribbons is stable and supports a rich fauna of attached and encrusting organisms, including sponges, ascidians, bryozoans and hydroids. In contrast, in the adjacent and topographically lower zones the bottom is subject to sand scour and may be periodically covered by sand ribbons. The fauna is restricted and includes species such as barnacles which can rapidly colonise exposed rock surfaces, and others which can tolerate occasional submergence by sand - notably the Dahlia Anemone, Tealia felina.

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THE USE OF A MICROCOMPUTER FOR SPECIES AND HABITAT RECORDING

D. Erwin and P. Gilleece
Ulster Museum, Belfast.

In recent years staff in the Ulster Museum have been utilising a microcomputer for the handling and analysis of small packages of species and habitat information.

In 1981 the Museum was awarded a contract by Conservation Branch of the Department of the Environment (N.I.), to carry out a diving survey of the sublittoral benthos around the Northern Ireland coast. Contract staff and facilities supplemented by personnel under the Manpower Service's A.C.E. scheme provided the resources, the opportunity and the catalyst to examine the problem of data handling in the field from first principles.

A system has been developed in an attempt to solve as many as possible of the regularly recurring problems of this type of work and is now operational. Survey data collected on the contract has been entered and existing data from previous work and the literature is in the course of entry. By the end of the contract period it is hoped that a full integrated data base of the Northern Ireland benthos will be available for interrogation in a multiplicity of ways.

The computer being utilised is a Modata DSC4/102 with a 23 Mb hard disc, an Epsom MX100 printer and a Lyme 5010 V.D.U. The software has been written in Microsoft Basic under the CP/M operating system.

THE SYSTEM:

The following represent the principal components of the system:

(i) Thesauri

Thesauri of working species lists of the major marine groups have been drawn up as an essential prerequisite for other software, producing a thesaurus file of approximately 1 Mb which can be added to or altered as necessary. Code numbers have been allocated to species which enable efficient recording, storage and retrieval (Fig. 1).

(ii) Site information entry and retrieval

This software is written in interactive form, and field data are entered and stored using coding system to enhance efficiency. Realistically however, it is inevitable that not all relevant data are available at the same time. The programmes are therefore set up to deal with incomplete data which can be added to at a later date. Printouts of the entered data can be obtained incorporating calculations where appropriate (Fig. 2).

(iii) Single species/specimen entry and retrieval

These programmes enable the handling of data concerning a single species/specimen record irrespective of the source of the data since the record may be a museum specimen, a

field record, a literature record or a photograph. Where a museum specimen is catalogued this will be related to the appropriate dive record and cross referenced to the site file (ii). Thus all voucher specimens can be directly related to site information.

(iv) Search 1: Site information search and output

This complex series of programmes allow interrogation of the site data file in any number of the available fields. Every variable entered, including species, can be searched for either on its own or in combination with others against any other single variable or group of variables. Output can either be displayed on the screen or can be obtained as a printout. It is hoped that mapping facilities will also be incorporated.

Below are examples of possible questions with which the programme could deal:

1. What species have been recorded from depth of 20 - 30 m within specified substratum characteristics where Pachymatisma johnstonia is present?

2. What Echinoderms have been recorded with a given set of latitude and longitude parameters?

3. What physical parameters, such as substratum or salinity, are associated with every recorded occurrence of a species or group of species (Fig. 3)?

(v) Search 2: Species/specimen search and output

Programmes are designed as for Search 1, with the exception that interrogation will be of the species/specimen data files.

All of the above programmes are entered through a menu system to enhance ease of use and negate an operators understanding of how the system works. The system outlined was designed to solve the particular needs of the Ulster Museum in which it has largely succeeded. We do not claim it to represent a panacea for all ills but rather to be an indicator of what is possible. However, it must at all times be remembered that any data handling system is only as valuable as the information entered into it. Thus the principle target for people working in the field of Marine recording is, and will always remain, that of obtaining reliable data.

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Fig 1 Examples of Species codeing

CODE NUMBERS	SPECIES NAMES	AUTHORITY AND DATE
D 254	Nemertesia antennina	(Linnaeus 1758)
D 514	Virgularia mirabilis	(O.F.Muller 1776)
P 698	Lanice conchilega	(Pallas 1766)
S 1172	Pagurus bernhardus	(Linnaeus)
S 1175	Pagurus prideauxii	(Leach)
Y 346	Flustra foliacea	(Linnaeus 1758)
ZB 21	Astropecten irregularis	(Pennant 1777)
ZB 83	Asterias rubens	Linnaeus 1758
ZB 144	Ophiura texturata	Lamarck 1816
ZB 146	Ophiura albida	Forbes 1839
ZG 527	Callionymus lyra	Linnaeus 1758

Fig 2 Example of a site record

ULSTER MUSEUM DIVESITE RECORD 2

DIVE NUMBER	820730/01
DIVESITE NUMBER	NI 154/5
BOTTOM TEMPERATURE	15 degrees C
PHOTOGRAPH NUMBERS	445-473
COUNTRY	IRELAND
COUNTY	ANTRIM
SEA AREA/VICE CO. NO.	S29a
PLACE NAME	NORTH OF THE GIANTS CAUSEWAY
GRID REFERENCE	NOT DETERMINED
LAT LONG	55 14.83'N 006 30.92'W
SALINITY	EUHALINE

ACTUAL SALINITY	34.3	
DEPTH ZONE	LOWER CIRCALITTORAL	
DEPTH BAND (M)	>30	
DEPTH FROM C.D. (M)	-31	
WAVE EXPOSURE	EXPOSED	
MAXIMUM RATE OF TIDE	3 KNOTS	
SITUATION	COASTAL OPEN COAST	
INCLINATION	HORIZONTAL	
BOTTOM TYPE/S	UNCLASSIFIED	
BOTTOM FEATURES	SCOURED MOBILE COBBLES SOFT	
DOMINANT SPECIES CNIDARIA	ANTHOMEDUSAE Tubularia indivisa	
VISUAL ESTIMATE	BEDROCK	0.00%
	BOULDER	2.00%
	COBBLE	5.00%
	PEBBLE	0.00%
	GRAVEL / COARSE SAND	0.00%
	SAND	93.00%
	MUD	0.00%
	OTHER	0.00%
SOFT SEDIMENT ANALYSIS	PEBBLE	0.32%
	GRANULE	0.81%
	VERY COARSE SAND	1.69%
	COARSE SAND	7.52%
	MEDIUM SAND	82.72%
	FINE SAND	5.52%
	VERY FINE SAND	0.16%
	MUD / SILT / CLAY	1.26%
MEAN	1.45147 PHI ie the size class of MEDIUM SAND	
STANDARD DEVIATION	.726208 PHI ie MODERATELY SORTED	
SKEWNESS	-.739258 ie NEGATIVELY SKEWED	
KURTOSIS	21.1545 ie LEPTOKURTIC	

MODE/S	MEDIUM SAND
PROMINENT GROUPS	NONE
NOTES	STABLE BOULDERS & MOBILE COBBLES. MUCH SAND SCOUR. EAN SAND IN 0.5M HIGH DUNES
SPECIES RECORDED	
PORIFERA	HADROMERIDA
	Polymastia mammilaris
	POECILOSCLERIDA
	Iophonopsis nigricans
CNIDARIA	ANTHOMEDUSAE
	Tubularia indivisa
	Tubularia larynx
	LEPTOMEDUSAE (=THECATA)
	Campanularia verticillata
	Hydrallmania falcata
	Sertularia cupressina
	ALCYONACEA
	Alcyonium digitatum
	ACTINIARIA
	Metridium senile
ANNELIDA	SABELLIDA
	Pomatoceros triquestra
CRUSTACEA	(BALANOMORPHA)
	Balanus crenatus
	(REPTANTIA)
	Pagurus bernhardus
	Hyas coarctatus
	Macropodia sp.
MOLLUSCA	ARCHAEOGASTROPODA
	Calliostoma zizyphinum
	NEOGASTROPODA
	Ocenebra erinacea
	NUDIBRANCHIA
	Eubranchus tricolor
BRYOZOA	(STOLONIFERA)
	Vesicularia spinosa
	(ANASCA)
	Flustra foliacea
ECHINODERMATA	FORCIPULATA
	Asterias rubens
	OPHIURIDAE
	Ophiothrix fragilis
	Ophiopholis aculeata
TUNICATA	(PHLEBOBRANCHIATA)
	Ascidiella scabra
	PLEUROGONA (SIC) TOBRANCHIATA)
	Dendrodoa grossularia
	Botryllus schlosseri
OSTEICHTHYES	Pleuronectidae
	Pleuronectes platessa

Fig 3 Example of site file search

SEARCH HEADINGS :-

DEPTH BELOW C.D. -30 - -20
SPECIES RECORDED AND Pagurus cuanensis

ULSTER MUSEUM DIVESITE RECORD 43

PLACE NAME MAGILLIGAN STRAND

LAT LONG 55 15.70'N 006 50.45'W

DEPTH FROM C.D. (M) -28

ULSTER MUSEUM DIVESITE RECORD 53

PLACE NAME N.W.OF LITTLE SKERRY. PORTRUSH

LAT LONG 55 13.38'N 006 38.74'W

DEPTH FROM C.D. (M) -26.2

ULSTER MUSEUM DIVESITE RECORD 76

PLACE NAME E.OF BLACK ROCK SKERRIES. PORTRUSH

LAT LONG 55 13.30'N 006 36.44'W

DEPTH FROM C.D. (M) -20.1

ULSTER MUSEUM DIVESITE RECORD 82

PLACE NAME LEE STONE POINT. KILKEEL

LAT LONG 54 01.81'N 005 52.80'W

DEPTH FROM C.D. (M) -23.5

REPORTS ON COLLECTING FOLLOWING THE MENAI BRIDGE MEETING

EPIFAUNAL ARTHROPODS FROM THE TIDE POOLS AT RHOSNEIGR

R.N. Bamber and P.A. Henderson
Marine Biological Unit, C.E.G.B., Fawley, Southampton.

The recent PORCUPINE meeting at Menai Bridge included a visit on the Sunday (27 March 1983) to Rhosneigr, where material was collected from the splendid tide pools. The samples analysed here were sorted separately from (1) understone bryozoan/sponge turf scrapings, (2) Corallina officinalis, and (3) other algae (filamentous reds and Cladophora). The amphipods and isopods are being treated separately, and the molluscs were sent to the Hon. Secretary. The following reports on the data for the less abundant (? obscure) arthropod groups, the Pycnogonida, Halacarid mites, Ostracoda and the single tanaid, records of which are sadly infrequent in litt..

	Corallina	Other weeds	Bryozoan/sponge turf
Pycnogonida			
Achelia longipes (Hodge)	2	1	
A. echinata Hodge	10		7
Anoplodactylus angulatus (Dohrn)	2		
Acari			
Halacarus actenos Trouessart	3		
Copidognathus gracilipes (Tr.)			1
C. oculatus (Lohmann)			2
Rhombognathides seahami (Hodge)	2	20	
R. pascens (Lohmann)	13	7	
Ostracoda			
Cythere albomaculata Baird	*	*	*
C. lutea O.F. Muller	*		
Hemicythere emarginata Sars	*	*	*
Loxoconcha impressa Baird		*	*
Paradoxostoma variabile (Baird)	*	*	
P. bradyi Sars	*		
Paradoxostoma sp. indet.		*	
Tanaidacea			
Paratanais batei Sars			1

As is commonly the case, the Corallina supported the most diverse weeds having a similar though poorer fauna. The mites demonstrate the clearest split between substrates: predatory Copidognathus spp. occurred only on the bryozoan/sponge turf, while Rhombognathides are known to be algivorous, and occurred only on the weeds; R. pascens and R. seahami, which commonly occur together, demonstrate an interesting reversal in relative abundance between Corallina and the other weeds. Pycnogonids are usually commoner on Corallina (when available) than on other weeds, and Achelia echinata is known to feed on both red weed and bryozoans. The predominantly detritivorous ostracods showed the least differences between substrates, and only their presence is recorded above.

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RHOSNEIGR AND BARNS NESS: A COMPARISON OF WINTER SHORES

Shelagh Smith and Fraser Gault
Royal Scottish Museum, Edinburgh

There was a short field trip to Rhosneigr, Anglesey (53°13.5'N 04°31.5'W) on 27 February 1983, following the Porcupine meeting to Menai Bridge. Investigations concentrated on Mollusca and Polychaeta and because the former were much less numerous than expected, a consequent visit was made to the most similar readily reached shore near Edinburgh on 2 March 1983. This shore was at Barns Ness (55°59.2'N 02°26.7'W) (near Eyemouth!).

Rhosneigr is a rocky point in the middle of a wide sandy bay. It is exposed to the southwest but wave action is diminished by offshore shallows. The rocky area comprises irregular rocks (Precambrian metamorphic rocks) interspersed with sandy channels and pebbly lagoons near low water. There are a few high level rock pools. Barnsness is exposed to the east and north, and the rock area is much larger, forming an irregular rock platform up to 150 m wide and about 1 km long. The rocks are Carboniferous sandstones and limestones. There are rock pools at all levels, and a shallow pebbly lagoon near the top of the shore. There is considerable sand offshore and sand to the northwest and southeast of Barnsness. Barnsness was muddier than Rhosneigr, especially under boulders and overhangs near low water.

Table 1 gives a subjective assessment of the relative diversity and abundance of groups of flora and fauna and show that Barnsness was by far the richer shore, except for Rhodophycea, Polychaeta and Crustacea. Mollusca were assessed more objectively (Table 2). There were 30 species at Rhosneigr of which few were abundant, while 40 species were found at Barnsness and several were abundant.

Samples of Fucus serratus and small algae were collected at each site and analysed for their molluscan content. Tables 3 and 4 show that Rhosneigr was extremely impoverished and only comparable with an even more impoverished sample obtained from Stackpole Quay, Pembroke (51°37.4'N 04°54.0'W) a month later. The Molluscan populations of the algae can be compared with data from previous years obtained from Skateraw, a similar site about 1 km southeast of Barnsness. The sample of Fucus serratus from Skateraw was a little richer than at Barnsness but well within the normal variation found between samples from east Scotland early in the year. The sample of small algae from Barnsness were a little richer but again within the normal variation.

Table 1. Subjective estimate of flora and fauna

	BARNS NESS	RHOSNEIGR
CHLOROPHYCEAE	mostly Enteromorpha and Cladophora, equally common at both sites	
PHAEOPHYCEAE	equally common at both sites	
RHODOPHYCEAE	Corallina vigorous	Much more abundant and diverse Rich turfs in the lagoons
PORIFERA	more diverse and more abundant	
POLYCHAETA	common	common, but more abundant and more diverse
CRUSTACEA	common, especially Cancer pagurus & Porcellana spp	common, more diverse, many Porcellana spp & Pilumnus hirtellus
MOLLUSCA	much more diverse and abundant	poor, notably few specimens from algal samples
ECHINODERMATA	more diverse and abundant especially starfish	sparse
ASCIDIACEA	much more abundant especially Dendrodoa grossularia	sparse

Table 2. Species of Polychaeta, Crustacea and Mollusca

	BARNS NESS	RHOSNEIGR
POLYCHAETA	Lepidonotus squamatus Harmothoe extenuata H. imbricata H. impar Nereis pelagica Stylaroides plumulosa Cirratulus tentaculata Maldanid Eupolymnia nebulosa Pomatoceros triqueter Spirorbis spp	Lepidonotus squamatus L. clava Harmothoe extenuata H. imbricata Alentia gelatinosa Nereis pelagica Nereis sp Phyllodoce sp Nepthys sp Thelepis cincinnatus Lanice conchilega Spirorbis spp
CRUSTACEA	Galathea strigosa Porcellana platycheles Cancer pagurus Carcinus maenas Hyas araneus	Galathea strigosa Porcellana longicornis P. platycheles Cancer pagurus Carcinus maenas Pilumnus hirtellus Hyas araneus Macropodia rostrata

Table 2. (continued)

MOLLUSCA * species found only on 12 March 1977	BARNS NESS	RHOSNEIGR
	*Lepidochitona cinereus	Diodora apertura
	*Tonicella rubra	Acmaea virginea
	Acmaea virginea	Patella aspera
	Patella aspera	P. vulgata
	P. vulgata	Helcion pellucidum
	Helcion pellucidum	Gibbula cineraria
	Gibbula cineraria	G. umbilicalis
	Lacuna pallidula	Lacuna pallidula
	L. parva	L. parva
	L. vincta	L. vincta
	Littorina littorea	Littorina littorea
	L. mariae	L. mariae
	L. obtusata	L. obtusata
	L. neglecta	L. saxatilis
	L. nigrolineata	L. neritoides
	L. saxatilis	Rissoa rufilabrum
	Rissoa interrupta	R. interrupta
	R. parva	R. parva
	Onoba semicostata	Onoba semicostata
	Skeneopsis planorbis	Trivia arctica
	Omalogyra atomus	T. monacha
	Lamellaria latens	Nucella lapillus
	*L. perspicua	Buccinum undatum
	Trivia arctica	Hinia incrassata
	T. monacha	Elysia viridis
	Nucella lapillus	Limapontia capitata
	Buccinum undatum	Acanthodoris pilosa
	*Hinia incrassata	Aeolidia papillosa
	Odostomia rissoides	Mytilus edulis
	Diaphana minuta	Musculus discors
	*Berthella plumula	Lasaea rubra
	*Aegires punctilucens	
	Goniodoris nodosa	
	*Ancula gibbosa	
	*Onchidoris bilamellata	
	O. muricata	
	*Cadlina laevis	
	Archidoris pseudoargus	
	Jorunna tomentosa	
	Facelina coronata	
	Mytilus edulis	
	Musculus discors	
	Modiolus modiolus	
	Pododesmus patelliformis	
	P. squamula	
	Lasaea rubra	
	Kellia suborbicularis	
	Turtonia minuta	
	*Abra alba	
	Hiatella arctica	

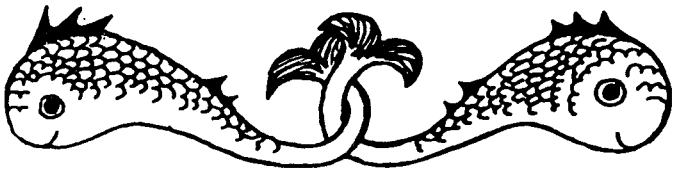
Table 3. Numbers of Mollusca on Fucus serratus

Sk1 = Skateraw, March 1975; Sk2 = Skateraw, March 1976; Sk3 = Skateraw, March 1977; B = Barns Ness, March 1983; R = Rhosneigr, February 1983.

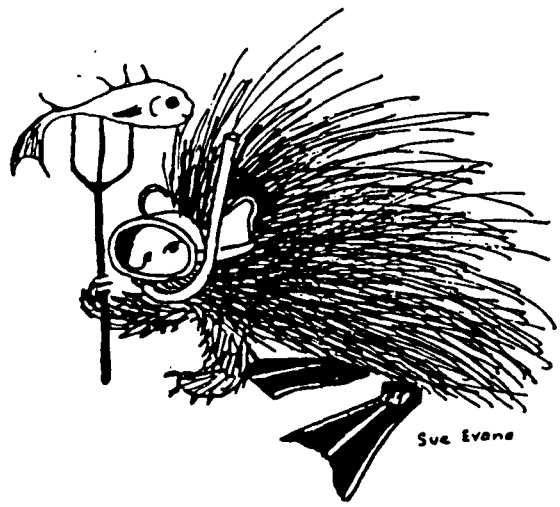
Species present	Sk1	Sk2	Sk3	B	R
Helcion pellucidum				1	
Gibbula cineraria				4	
Lacuna pallidula	1	10	10+	20	2
Lacuna vincta		30+	4	3	
Littorina littorea	6	1		4	
Littorina mariae	30+	30+	5	6	7
Littorina obtusata	10+			1	
Littorina neglecta				2	
Littorina saxatilis	2				
Rissoa interrupta		20+	50+	1	
Nucella lapillus (juv)	1		1		
Mytilus edulis (juv)			20+		
Turtonia minuta			10+		

Table 4. Numbers of Mollusca on small algae

Species present	Sk1	Sk2	Sk3	B	R
Helcion pellucidum				1	
Lacuna pallidula	1			1	
Lacuna parva				1	1
Lacuna vincta		100+	2	4	2
Littorina littorea		4	10+	10+	
Littorina mariae	20+	1	5	6	
Littorina neglecta				2	
Littorina nigrolineata				1	
Littorina saxatilis			2		
Rissoa interrupta	100+	500+	10	40+	7
Rissoa parva				2	6
Onoba semicostata	10+	1	3	30+	
Skeneopsis planorbis	20+			10+	
Omalogyra atomus				10+	
Nucella lapillus (juv)	2			1	
Buccinum undatum (juv)	1			5	
Odostomia rissoides				1	
Diaphana minuta				1	
Mytilus edulis (juv)	3	20+	10+	10+	
Musculus discors	2		1	5	
Modiolus modiolus (juv)	9	20+			
Turtonia minuta				30	
Hiatella arctica	1				



Porcupine Notes and News



STANDING ON THEIR OWN TUBE-FEET. Member Michel Glémaric's report of a starfish explosion in Brittany is parallelled by the following account in the "Western Gazette", 14 April 1983: "The worrying news revealed last week about the plague of starfish from Lyme Bay along Chesil has been confirmed by commercial fishermen who are worried about their livelihoods.

"Some boats at West Bay and Weymouth fish for shellfish, but the skippers fear that the starfish will devastate the scallop beds. The tiny trawls that they use have been dragging up great numbers of starfish. The reason for their sudden appearance in such numbers is a mystery."

**

NORTON TRIUMPHS ON THE ISLE OF MAN. T.A. Norton, presently a professor of botany at Glasgow University, has been appointed the professor of marine biology at the University of Liverpool. From October his address will be: The Department of Marine Biology, Port Erin, Isle of Man. Congratulations and best wishes from fellow-Porcupines, Trevor!

**

DON'T FORGET THE DIVER! The Underwater Association finds there is still considerable confusion about the new Health and Safety Executive diving regulations as applied to scientific divers. The regulations call for additional long and expensive training courses and are likely to result in a shortage of divers qualified under the regulations. Biologists who dive in the course of their work may like to contact Dr. Richard Pagett, Flat 5, Chapel Lane, Leeds LS6 3PP for further information.

**

SQUID QUIZ. Secretary Shelagh Smith enquires: "Idle curiosity: has any work been done on the diet of Loligo forbesii Steenstrup, 1856? I found an 'owl pellet' composed of fish bones in a sac in the gut of one I bought for my dinner."

**

COLD WINTERS AGAIN. We asked Dr. Jack Lewis of Robin Hood's Bay if he would like to comment on earlier correspondence on this subject in PN but he courteously declined. We suspect he's preparing something rather weighty on the same theme to appear between harder covers elsewhere.

***

SOLWAY SPECIALIST. Dr. Eric Perkins, who has watched over the health of the Solway ("the last unpolluted large estuary in England") for nearly thirty years, has finally left the Department of Bioscience and Biotechnology of Strathclyde University to start a marine biological consultancy at Maryport, Cumbria. We doubt not that fees will be waived to Porcupines enquiring about the flora and fauna of that estuary. And none better qualified to provide answers than Dr. Perkins. The practice is at Grove Cottage, Birkby, Maryport CA15 ORG.

***

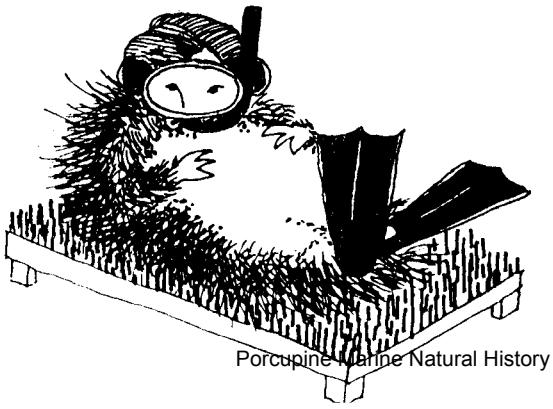
POLYCHAETE SOCIETY ERRANT. A new society catering for polychaete enthusiasts has been formed in Britain whose objects (identification, recording, mapping, publication) resemble in their own sphere those of "Porcupine". If your thing is wriggly worms contact Porcupine Member Chris Mettam, Zoology Department, University College, Cardiff CF1 1XL. (For ourselves, we classify the animal kingdom into polychaetes and interesting animals but we are prepared to concede that others may be quite earnest in their misguided beliefs!)

***

TO MAKE AMENDS for the above... A recent undergraduate script contained reference to 'polychaete chaetey' (sic), which almost reconciled us to the group. We shall treasure it together with memories of dogfish 'dental dermicles', also recently encountered.

***

A COLONY OF WILD PORCUPINES (Hystrix sp.) originating from eastern India has been discovered living in a Devonshire wood. Perhaps our own Thalassiohystrix scuba in turn has a wider distribution than its currently known range in "Porcupine" seas. Would overseas Members in particular please be alert to the possibility.



NOTICES

NOTICE 1. PORCUPINE SUMMER FIELD MEETING (7 - 13 August 1983)

As detailed in the last PN there will be a field meeting centred on EYEMOUTH, Berwickshire, run in conjunction with the Underwater Conservation Society.

It will be based at Barefoots Caravan Site, Eyemouth, and early booking is desirable. (Please make own arrangements for accomodation). Standard 6-berth caravans are £65 a week; full service vans, 8-berth, loo, electricity, hot water etc., are £110 a week; both £10 deposit. For further details contact Secretary Shelagh Smith at the Royal Scottish Museum, Chambers Street, Edinburgh EH1 1JF, tel. 031 225 7534.

Last year's meeting at Sherkin was greatly enjoyed. Why not try this one. Families welcome.

***

NOTICE 2. THE 1984 EUROPEAN MARINE BIOLOGY SYMPOSIUM

This will be held in Plymouth in mid-September 1984 at the joint invitation of the Marine Biological Association, the Institute of Marine Environmental Research and Plymouth Polytechnic. More details will be available soon. Contact address: Member Eve Southward, The Laboratory, Citadel Hill, Plymouth PL1 2PB.

***

NOTICE 3. THE STRUCTURE AND FUNCTION OF BRACKISH WATER AND INSHORE COMMUNITIES

The Estuarine and Brackish Water Sciences Assocation, together with Heriot-Watt University, is holding a symposium on the above topic in Edinburgh on 21 and 22 September 1983. Contact address: Dr. M. Wilkinson, Dept. of Brewing, Heriot-Watt University, Chambers Street, Edinburgh EH1 1HX, tel. 031 225 8432 x 347.

***

NOTICE 4. PORCUPINE MEETING IN NEWCASTLE IN THE AUTUMN. MARINE VERTEBRATES. 8 & 9 October 1983.

Fish and other vertebrates will be the topic of this meeting, to be held at the Hancock Museum in Newcastle-on-Tyne. Formal papers will be taken on the Saturday and it is planned to visit the coast on the Sunday, during which the Dove Marine Laboratory will be opened to "Porcupine" Members. The Hancock Museum itself, home of the Natural History Society of Northumbria with its connections with the Hancock brothers, Alder and Brady, is one of our great provincial natural history museums. Members who may be further interested are asked to write to Peter Davis, the Hancock Museum, Claremont Road, Newcastle-on-Tyne NE2 4PT, when they will be sent details of the meeting and of accommodation. A request form is enclosed with this PN.

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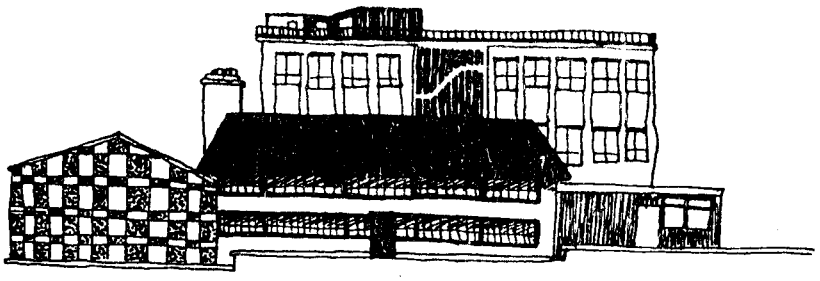

Around the Marine Laboratories

Number 7.

The Marine Laboratory, Aberdeen

The Marine Laboratory in Aberdeen is a government funded establishment, which is now part of the Department of Agriculture and Fisheries for Scotland. Government involvement in marine research in Scotland dates from 1836 when they sponsored an investigation in the Firth of Forth to determine whether the small nets being used there to catch sprat were detrimental to the herring fisheries. With the formation of the Fisheries Board for Scotland in 1882 the government took a much bigger interest in fisheries research, and a Marine Research Station was established in St. Andrews in 1884. After a brief sojourn in Dunbar the Fisheries Board's Laboratory moved to a site at the Bay of Nigg, Aberdeen. The Laboratory moved to its present site in Torry, Aberdeen in 1923. From small beginnings in a one storey H-shaped building, part of which is still in use, the Laboratory has grown to cover a site of some three-and-a-half acres between Victoria Road and the River Dee. In addition the Laboratory maintains outstation at Loch Ewe, Loch Torridon, and Loch Duich, and has the full time services of four research vessels ranging in size from 50 to 230 feet.

Being based in Aberdeen the Laboratory is ideally situated to meet its main research aims. As would be expected from a government research station the Laboratory's work has a high applied content. It divides naturally into three components.

1) Studies aimed at giving management advice on the commercially exploited stocks of fish and shellfish in the North Sea and to the west of Scotland.

2) Studies of the marine environment and its relationship with the fish stocks in the area. In recent years with the development of the offshore oil industry base line studies and pollution monitoring have become more prominant in the Laboratory's work.

3) Studies of fishing gears: This was originally aimed at the development of improved fishing gear but the emphasis has now moved towards understanding the selection processes involved in the working of different types of gear.

To meet these research aims the Laboratory supports a staff, including support personnel and research vessel crews, of some 290 people.

As well as publishing its work in the scientific press the Laboratory has a number of publications it its own:-

Scottish Fisheries Bulletin: This is a regular journal giving information on the Laboratory's work to the fishing industry.

Scottish Fisheries Research Reports: These are occasional publications giving information of a more detailed nature on particular research projects.

Scottish Fisheries Information Pamphlets: These are occasional publications giving background information on subjects of particular interest to the fishing industry.

Details of these publications can be obtained frcm the Laboratory's Librarian.

The Laboratory welcomes visitors, both professional and amateur. For the amateur the best time to visit the Laboratory is on Wednesday afternoons, when there are standing arrangements to show visitors around. For the professional some study space is available, but as this is restricted visits are best arranged in advance. (DAFS, Marine Laboratory, P.O. Box 101, Victoria Road, Torry, Aberdeen AB9 8DB.)

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Porcupine Review

Peter Davis, 1983. Fishes. The Marine Fauna of the Cullercoats District. No. 11. Report of the Dove Marine Laboratory, 3rd Series, No. 24. Dove Marine Laboratory, University of Newcastle upon Tyne, Cullercoats, North Shields. pp. 231 + 7 (index), Price £13.50.

Reviewer: A. Wheeler, British Museum (Natural History).

The distribution of marine fishes on the British coast presents several paradoxes. Firstly, the occurrence of the common species is well known but often poorly documented - for example, the cod is common in the North Sea, but how abundant is it and at what seasons does it occur off Whitstable,

Clacton, Gorleston, Grimsby or Cullercoats? Secondly, the non-commercial species such as Yarrell's blenny are poorly recorded, and they might therefore seem to be rare, but investigation in the right places by the right methods shows that they are at least locally common. Thirdly, the literature reveals numerous records of unusual species such as Ray's bream, deal-fish, opah, and sunfish - which are accidental immigrants to coastal waters and are certainly more rare than many poorly recorded native species. The only corrective to these imbalances in the recording of the fauna is the compilation of the local fauna list by a critical worker who is in a position to review earlier reports and publish new records.

Peter Davis has produced a most competent account of the fishes of the Northumberland coast. The earlier literature on fishes in the area is extensive (beginning with William Turner's notes in 1557 - the first made on British fishes), and is carefully reviewed. In addition, the existence of the Dove Marine Laboratory, with its several distinguished naturalists, produced a body of information on fishes which survived as manuscript lists, notes, and indexes from which Peter Davis has extracted much valuable information. The Hancock Museum has also served as a resource for notes on the occurrence of rarities especially, and its collections and those of the Sunderland Museum have provided data on the occurrence of interesting fishes. Davis's own extensive collecting along the north-east coast has yielded up-to-date information on the occurrence of both common and little-recorded fishes.

The fishes are arranged in systematic order and the information is preserved in a more or less chronological sequence, the earliest references or records being cited first. The literary records are presented as straight extracts but without quotation marks. This sometimes leads to possibility of confusion when "I" occurs in mid sentence and one needs a swift check to see that the reference is to an earlier author and not the compiler. It results, however, in a valuable reference to the earlier literature with dates, localities, size of specimen all recorded; an immensely useful massing of data against which recent records can be, and in the future occurrences will be, compared.

This is a most valuable publication which for any naturalist concerned with the distribution of marine fishes will prove to be an important working tool. (I have had cause to use my copy for reference for two quite distinct projects within a month of receiving it.)

Produced from double spaced typescript at A4 size with card covers (protected by clear plastic), and spiral bound, it is an unwieldy volume although it gives ample space for annotation. But the economics of formal publication have forced such formats upon low-budget organisations. While one regrets that we could not have the "Fishes of the Cullercoats District" in conventional printed form, we must nevertheless be grateful for any format which makes so much information available. Peter Davis is to be congratulated on his painstaking studies and analysis of the literature, and the Dove Marine Laboratory on making available such a valuable faunistic work.

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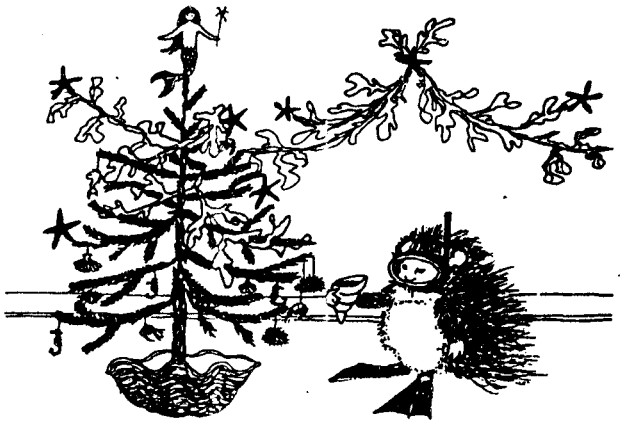
Porcupine Ads.

(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.)

PORCUPINE CHRISTMAS CARDS. Yuletide doings of a well-known marine animal. Attractively printed in green ink. Price £1.20 for 10 including p. & p.

Use the enclosed Christmas card order form or write directly to the Editor. Cheques should be made payable to Porcupine.



(caption) The Season's Greetings from "Porcupine".

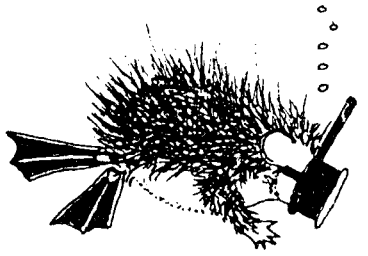
"Porcupine". 1869. A naval ship engaged in oceanographic research. 1976. An oceanographic society devoted to marine biological recording.

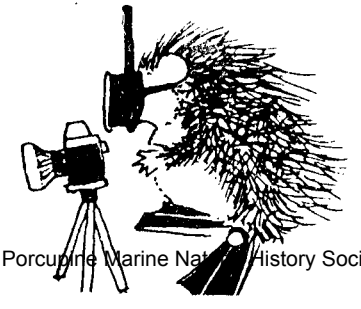
SHORT-TERM RESEARCH VACANCY. An assistant is required for three months during the period September - December 1983 for a Nature Conservancy Council funded project on the ecology of disused dock basins. The position will involve a month's field work in Liverpool and London plus analysis of existing data and writing a short report. There is a possibility of attracting further funding for an extra year at a substantially higher salary. Initial salary, £105 per week for 12 weeks, plus a field-work subsistence allowance.

For further details see J. Applied Ecology, 20, 43-58. Send a c.v. to: Dr. S.J. Hawkins, Dept. of Zoology, The University, Manchester M13 9PL, tel. 061 273 7121, ext. 5518.

RECENT CEPHALOPODA in the collections of the Royal Scottish Museum, Edinburgh. *Information Series: Natural History*, 10, vi + 81 pp., March 1983. An important compilation by "Porcupine" officers David Heppell and Shelagh Smith. Sent gratis to interested persons.

DEEP-SEA RESEARCH AND OCEANOGRAPHICAL LITERATURE REVIEW. Published by Pergamon Press. Vol. 1 (1953) to Vol. 28 (1981). Price, £850, is believed to be less than a quarter of the publisher's price for back numbers. Box 10.





Letters to the Editor

From Treasurer David Heppell, The Royal Scottish Museum, Edinburgh.

Dear Editor,

Although the taxonomy of the scubarhine Anatipodia is still in its infancy I should like to "make a few points" concerning the best-known species, Thalassiohystrix scuba.

Confusion has arisen since the original specimen of Scubahystrix boadeni (see PN1: 93) was exhibited by our Secretary at the recent AGM at Menai Bridge. As no other example of that remarkable creature has yet been found its systematic position remains conjectural. While its lack of the posterior flipperpods so characteristic of T. scuba may be due to an accident of preservation, the shorter dorsal spines and the scubal organ in the form of paired dorsal bottellae do rather suggest an animal which has adapted the primitive acanthotrophic feeding behaviour (noted by Pliny in fructivorous echini) to an infaunal habitat and a specialized diet of epizoic meiofauna.

T. scuba on the other hand seems to be very much a generalist, and has been observed using a variety of tools (see for example PN2: 134, 148, 182). The variation in size and configuration of these is not thought to be a useful taxonomic character, however, unlike in certain marine gastropods. I would also like to "point out" a variation in the handedness and coloration of the scubiform apparatus, which in T. scuba is cephalic (compare figures at PN2: 70 and 111). Again this is probably not significant; sinistrality/dextrality is known in a number of marine organisms and the loss of pigmentation can be attributed to a diet of whiting, reported for the holotype specimen (PN2: 86).

Some members have enquired about the original description of T. scuba, while others may perhaps have wondered whether, in the words of Prince Charles, "her talents are so unique and unusual that comment would be utterly superfluous" (describing not Diana, apparently, but Dame Edna). In fact the first published description appears on p. 70 of PN2, cleverly incorporated into the accompanying illustration. As students of the ICZN Code will know, so long as the name itself is Latin or latinized the description may be in any language whatever. Here, appropriately, it is written in the Porpentine tongue (and aquillic paint) and is roughly equivalent to "Thalassiohystrix nosce Te ipsum", recalling Linnaeus's succinct description of H. sapiens in the Systema Naturae.

Other matters of "acute" interest are whether the accessory trident organ (ATO) so well adapted for spearing whiting may have a secondary function for defence, and the nature of the symbiont shown on PC2: 175. The latter is neither a catfish nor a sea-lion cub, but a porpuss. As to the ATO I make a "sharp" distinction between taxonomy and toxophily and prefer to leave experience of venomous attacks to our Secretary (PN2: 135). For all I know Thalassiohystrix may be able to shoot every quill in its body if sufficiently provoked.

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From Member R.N. Bamber, C.E.G.B., Fawley, Southampton.

Dear Editor,

With reference to Member Shelagh Smith's letter (PN2, No. 6), I am able to confirm the sudden spate of aggressive attacks on gentle and well-meaning scientists by delinquent cephalopods. I was recently examining some specimens of Sepiola atlantica, prior to installing them in the idyllic, nirvanaesque cephalopod environment of a comfortable display tank, when, provoked by nothing more than extraction from sea-water, delicate handling (what else?), and impersonal examination of its mantle edge (not a thing to get embarrassed about, I would have thought), one specimen had an apparent ganglion-storm and viciously attacked, biting my index finger right through to the stratum-germinativum, almost painfully. Fortunately I was able to subvert any vampiric intent in time, and lived to point again with minimal disability. However, I have now learnt to handle Sepiola with greater care.

**

From "Pelagos".

Dear Editor,

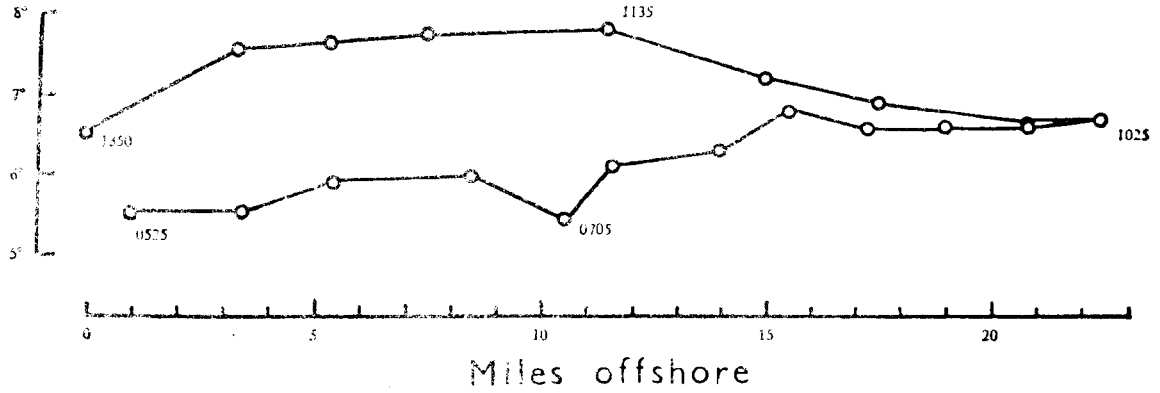
More on cold winters. We all know what a cold winter is in marine terms; it is when the sea temperature is well below the long-term average (and for intertidal animals, when the air temperature is, too). Yet this simple statement contains difficulties. What in fact is the sea temperature? Close inshore it may be something we have measured ourselves. The problem then is that while we may have enough readings to convince us that the sea is unusually cold we may not have enough to give a long-term average, ideally derived from observations over at least ten years.

Further offshore, sea surface temperatures are obtained from four principal sources: (a) merchant ships and warships (b) research vessels (c) lightships and coastal stations, e.g., lighthouses (d) satellite pictures. I understand the last of these has no great precision. Results from the first three sources in the waters around the British Isles have been published by the International Council for the Exploration of the Sea (ICES). A single volume covers 1905 to 1954 (Anon, 1962); thereafter, annual atlases extend from 1955 to, currently, 1974 (Service Hydrographique 1966-1982).

These offshore temperatures, while acceptable for long-term averaging, may be less acceptable for single-month values. It is known, for instance, that research ship observations, source (b), can differ from merchant ship observations, source (a), by an average of 0.5^{o}. Moreover, most merchant ships take sea temperatures from the very surface, using a protected sea thermometer and sampling bucket, but some use distant-reading equipment attached to the hull well below the water line, or thermometers at the engine room intake, also well below the surface. Inconsistencies must arise from this.

The Service Hydrographique of ICES divides its reporting area into 2^{o} by 1^{o} squares. In many instances the number of observations in a month in adjacent squares can differ by two orders of magnitude. Can the two average temperatures then be fairly compared?

When the number of observations in a month in any square falls to as low as single figures the time of the month when the observations were made becomes important, but it is not published. Equally important may be the time of day of individual observations but they, too, are not published. Attached is an example from my own records showing how sea surface temperature can change with the time of day.



Temperatures were taken at the surface using a protected sea thermometer and sampling bucket. My ship sailed from Blyth on 6 April at 0515 GMT, proceeded directly offshore for 22½ miles and returned to port at 1350. The day was partly cloudy and the wind light. Air temperature was a little below sea temperature until 1100, then a little above it.

Observe that in some places the sea surface temperature rose by as much as 2° during the morning.

In general, records away from the surface are more dependable but are not to be had in the long term from many places.

The most practical solution to the anomaly problem appears to be as follows: We select the nearest station(s) where recording has been undertaken regularly for many years; say a lighthouse, light-ship or busy ICES square. These records will be internally compatible. Having calculated an anomaly, only then may we tentatively transfer the statement 'This was/was not an unusually cold winter' to our own site and to any local temperature observations we may have.

References

Anon, 1962. Mean monthly temperature and salinity of the surface layer of the North Sea and adjacent waters from 1905 to 1954. Cons. Internat. Explor. Mer, Copenhagen.

Service Hydrographique, 1966-1982. Monthly means of surface temperature and salinity for areas of the North Sea and the NE North Atlantic 1955-1974. Cons. Internat. Explor. Mer, Copenhagen.

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WALRUS, ODOBENUS ROSMARUS (L.) IN SCOTLAND

Richard Sutcliffe
The Art Gallery and Museum, Kelvingrove, Glasgow.

The walrus, Odobenus rosmarus, is today a very rare visitor to British waters, although this was not the case in early historical times. By the year 1600, walrus-hunting was a regular trade. As a consequence of this hunting the walrus's geographical range has been considerably restricted in modern times.

There have been very few sightings of walruses during the nineteenth and twentieth centuries around the British Isles. Ritchie (1921) gives all 24 records known to him from 1815-1921, the majority of which (19) were from Shetland and Orkney. It is interesting to note that the sighting of a walrus in Ettrick Bay, Isle of Bute in 1884 was not mentioned and was not in fact reported until 1946 (Kerr, 1946).

Only three walruses appear to have been recorded since Ritchie's paper in 1921. One in Shetland in October 1926, one at Gairloch in May 1928 and one seen and photographed at Collieston, Aberdeenshire, on 24 February 1954 (Forman, 1954).

In July 1981 another walrus was sighted in Shetland by Mr. R. Tulloch who states, "I first found the animal on 26 July 1981 at Gutcher (Yell), it was reported seen at Cullivoe (a few miles north) the following day, and in Mid Yell voe on 28. I re-located it on 29 ashore on the little island of Kay Holm where it stayed until last seen at 5 p.m. on 5 August.

As I could watch it at Kay Holm from my bedroom window I took the opportunity of watching and timing its sequences of feeding dives. Several batches of ten dives were timed in shallow water and these averaged out at between 02.10 mins. and 02.81 mins., spending about 45 secs. on the surface between each dive." (Tulloch 1983).

Mr. Tulloch took several excellent photographs of the animal, which was reckoned to be an immature male, with tusks about six inches long.

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19TH CENTURY PRESERVATION TECHNIQUES

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During recent years considerable interest has been stimulated in regard to the historical aspects of Natural Sciences in the British Isles. On reading through "The Philosophy of Zoology or a general view of the structure, functions, and classification of animals" by Professor John Fleming (1785-1857) published by Archibald Constable and Company, Edinburgh in 1822, I came across the following description for the preservation of fish on page 397 of volume 2.

"Various methods have been practised in the preservation of fishes for a museum. The simplest method consists in dividing the fish vertically and longitudinally, taking care to preserve, attached to one side, the anal, dorsal, and caudal fins. From this side the flesh is then to be scraped off, the bones of the head reduced in size, the base of the fins made thinner, and the specimen stretched out on pasteboard and dried. By this process a lateral view of the fish is preserved; and if the fins and gill-flap are cautiously spread out, the specimen will furnish sufficient marks for recognising the species. A collection of such fishes may be kept in a portfolio, similar to an herbarium.

Many species may be well preserved, by extracting the contents of the body at the mouth, or skinning the fish, with the skin entire from the mouth towards the tail, in the same way as eels are prepared for cooking. Let the skin be restored to its former position, fill the whole with fine sand, and having spread out the fins, let it be dried with care. Almost all wide-mouthed, cylindrical or tapering fishes may be preserved in this manner. Some recommend filling the skin with plaster of Paris, while others employ cotton. Preserved fishes are usually covered with a coat of varnish, to restore in part the original lustre. But by no means of this sort can we retain many of the brilliant colours which the animals of this class possess when alive; and even the form of some of the soft parts cannot be preserved. Hence fishes are in general preserved in bottles of spirits of wine. In this way, it is true, they take up much room, but they can be subjected to examination at pleasure, and all their characters satisfactorily exhibited, except those depending on colour."

The method for dry mounting fish in a way similar to herbarium specimens is novel. However, in the portion of Professor Flemings Natural History Collections, registration number NH-1981-83, now in Glasgow Museum, his sponges are dry mounted on herbarium sheets. If anyone has or knows of any fish preserved in this manner the author would be grateful for information.

In regard to invertebrates Fleming deseribes the techniques for preparing molluses on page 518 thus:- "The preparation of molluscous animals for exhibition in a museum is attended with peculiar difficulty. The shells, indeed, need only to be cleaned with a soft brush, and the marine kinds to be steeped in fresh water, to extract all the saline ingredients, and dried, when they are fit for the cabinet. The soft

parts, however, can seldom be distended by any substance, and dried. They are usually, therefore, preserved in spirits of wine, where but too frequently they appear a shapeless mass. The animal should be permitted to die slowly, that the different parts may become relaxed, otherwise the examination of the form of the body, at a future period, becomes impracticable. A quantity of spirits should be injected into the stomach, or other cavities of the body, immediately after death, to prevent putrefaction, as it frequently happens when the body is immersed in spirits, without such precaution, that the viscera become unfit for examination while the integuments have been preserved in a sound state."

Finally on pages 587-589 he describes the methods for preserving insects and crustacea as follows:- "The capture of the articulated annulosa is accomplished with the hand, with forceps or gauze-nets, according to the nature of the species. Care ought to be taken to preserve as entire as possible all the limbs, antennae, and down upon the body. They should then be placed in separate boxes, or transfixed with a pin, through the thorax or side, according to circumstances, and fixed in a box, with the bottom lined with cork. Butterflies, when fixed in this state, by the motion of their wings greatly injur their beauty by rubbing off the fine coloured scales with which they are covered. It is convenient, therefore, to kill them by compressing their sides, or fixing them with the pin through the thorax laterally. Some, after killing them by compression, carry them home in the leaves of a book. In many cases the killing of the animal is a more difficult task than its capture. Some suffer them to writhe on the pin until they die from pain or hunger. Others shorten their sufferings by suffocating them with the fumes of burning brimstone, or by passing a red hot needle, or one dipped in aquafortis, through their bodies, while a few attempt to kill them by putting oil of turpentine or tobacco in their mouths. Fumigation, however, is the most expeditious method. When this is inconvenient, they may be put into a small tin box, which must be immersed half its depth in boiling water: the heat communicated to the box will speedily kill them.

When the animal is dead, it is then to be set in a natural position, in reference to its wings, legs and antennae, these organs being kept in their proper place by pins stuck in the cork below, or by slips of card fixed down with pins. When dry it is fit to be added to the collection.

The marine crustacea must be steeped in water before being dried. The larger kinds must be embowelled, and a little preserving powder introduced.

In order to exhibit the history of an insect, it is necessary to preserve it in the egg, larva, and pupa state, as well as the imago. The eggs and pupa are easily preserved by drying, but many of the fleshy larvae require, previous to being dried, to be embowelled, and the cavity distended with air, cotton, or sand. When perfect insects are obtained in a dry state, without having been set, their different members may be readily relaxed for that purpose, by placing them on a piece of cork, floating on water in a basin, the mouth of which is covered lightly with a damp cloth. In a few hours the joints will become sufficiently supple.

The entomological collection is kept in drawers of hard wood, with moveable glass covers. The bottom of each drawer is covered with cork, or wax, for the reception of the pins supporting the animal. It is washed over with arsenic, or corrosive sublimate, and covered with white paper glued to it. The insects are distributed in rows, with their names marked on the paper below, or with a number referring to a catalogue. The collection must be frequently inspected, to see if any insect depredators have got admission. These must be carefully removed, and their eggs destroyed, by baking the specimens to which they have been attached, in the sun, or before the fire. If they need washing, it may be done with a hair pencil, dipped in rectified spirit of wine."