

Porcupine Newsletter

Volume 2 Number 2

ISSN 0309-3085

JULY 1981

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NEWSLETTER. Two new features appear in this PN. "Around the Marine Laboratories" (p.33) devotes its first number to the oldest British laboratory, Dunstaffnage, formerly at Millport. We hope in time to portray other laboratories, both large and small, including, if our French colleagues will so favour us, some from the French Atlantic coast. A "Notes and News" section begins on p. 29. We ask you, the Members, to send in short pieces to keep this section sailing. Remember that what is common knowledge to you may be news to others.

MEMBERSHIP. Are you in touch with any young scientists? Membership of Porcupine will permit them to attend our meetings, a valuable contribution to the education of any larval marine biologist. Entrance is but £1 and the annual subscription only £2, which includes, normally, receipt of three PNs. Porcupine Treasurer is Mr. D. Heppell, Royal Scottish Museum, Edinburgh EH1 1JF.

THOSE STRANGE BEASTS at Wembury, Plymouth (PN Vol. 2, p. 9) were, as several Members cleverly pointed out, the curious hydroid Myriothele cocksii (Vigurs).

FUTURE MEETINGS. 1. The next meeting will be a joint field meeting with the Conchological Society on Sat. and Sun. 19 and 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 (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 with the Coelenterate Group on "The Biology of Coelenterates in European Waters" will take place on Sat. and Sun. 26 and 27 September 1981 at the Department of Biological Sciences, The Polytechnic, Portsmouth. A leaflet about the meeting is included with this PN. Contact address: Dr. M.A. Carter, Dept. of Biological Sciences, The Polytechnic, Portsmouth (0705 27681).

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

REPORTS OF THE MEETING AT PLYMOUTH (continued from Vol. 2, No. 1)

SPATIAL AND TEMPORAL CHANGES IN A SUBLITTORAL, EPIBENTHIC ASSEMBLAGE

J.A. Rubin

Underwater Centre, The Polytechnic, Drake Circus, Plymouth

Marked-out areas on a rock face 8 metres below chart datum were photographed continuously from June 1979 to June 1980 and percent cover of the epibenthos determined by means of projecting 35 mm transparencies on to a grid of points.

Values of the anthozoan Corynactis viridis and the arborescent bryozoans Chartella papyracea and Scrupocellaria scruposa were examined by means of a complete two-way analysis of variance which enabled both spatial differences and temporal changes to be determined.

S. scruposa exhibited cover values up to 60% in June 1979, dying back during the winter and returning to these figures a year later. C. papyracea exhibited maximum values in October, while it was more difficult to determine a clear, annual cycle for C. viridis which showed greater spatial than temporal variations.

PHOTOGRAPHIC AND TV SURVEYS OF BENTHOS IN THE ENGLISH CHANNEL

N.A. Holme

The Marine Biological Laboratory, Citadel Hill, Plymouth.

A towed sledge carrying television and photographic cameras is being used for surveys of the sea bed and its fauna in the English Channel. The TV camera is inclined forward at 35° to the horizontal, scanning a width of 68 cm of sea bed. TV observations are made quantitative by an odometer wheel at the back of the sledge which transmits a signal each revolution, which is fed into the audio-track of the videorecorder. Photographs are taken by a motorised 35 mm Nikon camera with wide-angle lens and having a magazine back to accommodate 250 exposures. This camera points vertically down to cover 0.2 m² of sea floor. Photographs are normally taken on colour reversal film, which is later projected for analysis. The camera can be triggered manually from the ship, or at fixed time intervals, but recently firing of the camera has been linked to rotation of the odometer wheel, so that photographs are a constant distance apart.

By means of this equipment it is possible to survey wide areas of sea bed, the main limitation being the time needed for subsequent analysis of film and videotape. The gear has proved useful for estimating stocks of Queens (Chlamys opercularis) and Scallops (Pecten maximus) for which there is an important fishery in the region in some years. Other members of the fauna which can be estimated quantitatively include starfish, brittle-stars, sea urchins, larger crustaceans, also colonies of Alcyonium, hydroids,

and bryozoans. Off Plymouth conspicuous tracks made on the bottom by towed fishing gear are often visible.

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- Holme, N.A. & Barrett, R.L., 1977. A sledge with television and photographic cameras for quantitative investigation of the epifauna on the continental shelf. *Journal of the Marine Biological Association of the United Kingdom*, 47, 391-403.
- Franklin, A. Pickett, G.D., Holme, N.A. & Barrett, R.L., 1980. Surveying tocks of Scallops (*Pecten maximus*) and Queens (*Chlamys opercularis*) with Underwater Television. *Journal of the Marine Biological Association of the United Kingdom*, 60, 181-191.

SUBTIDAL ROCKY COMMUNITIES IN THE CONCARNEAU-GLENAN AREA

A. Castric-Fey

Laboratoire de Biologie Marine, 29110 Concarneau, France.

An investigation of sublittoral communities by diving was carried out some years ago, at the Glenan's Isles in South Brittany, a site 9 miles offshore of Concarneau Harbour, far from coastal influences. The characteristic features of these communities of pure water, in exposed sites (0 to 60m), have been illustrated at the Plymouth meeting by some slides.

In the sublittoral fringe (0 - 6m), in the undergrowth of *Laminaria digitata*, few species are able to live (splash zone) but each species covers an important area. Characteristic: *Umbonula littoralis*, *Trididemnum cereum*, *Esperiopsis fucorum*, *Halichondria topsenti*, *Diadumene cincta*, *Aglaophenia octodonta*.

The kelp forest extends until 26 m (infralittoral zone). In the upper part (6 - 18m) laminarians (*L. hyperborea*, *Saccorhiza bulbosa*) are dense, the undergrowth shows the greatest diversity, in the same way as the communities lying on rockwalls. In the lower part (18 - 26m) laminarians (*L. hyperborea*) become more spaced, the algal undergrowth becomes monotonous, with 2 dominant species (*Dictyopteris membranacea*, *Bonnemaisonia asparagoides*). Scarcity of the fauna and very close epibiosis are features of this zone, which appears as a transitional zone with the following one.

There are no more laminarians in the circalittoral zone, whose characteristic species are: Axinellids, tall Hydroids and Brachiopods *Terebratulina caput-serpentis* and *Megerleia truncata*. Algae are still present (such as *Carpomitra costata*) in the upper part of the circalittoral (Circalittoral cotier de CABIOC'H), but in the *Dendrophyllia* zone, beginning at about 50 m, no more erect

macroalgae are seen because of the darkness. The relative stillness permits the life of tall rigid forms such as Porella compressa, Dendrophyllia cornigera (Circolittoral du large de CABIOC'H).

In the sheltered areas of the Glenan's Isles, the communities are somewhat different: Sponges are inconspicuous, the rock is covered with Lithothamnion. Tunicates are more numerous, in the same way as bugulids and valkeriids. Algae are heavily charged with various epiphytes. We can also find at 10 m species which, in exposed sites, do not appear before 30 m.

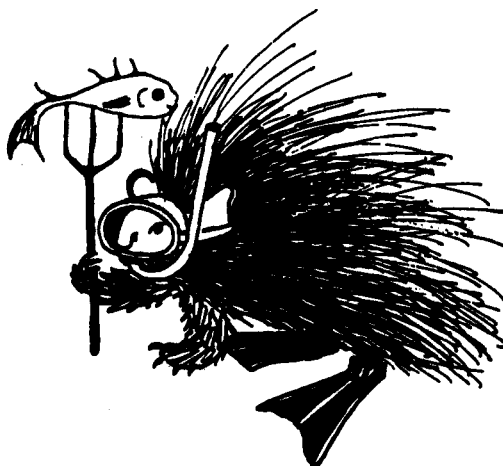
In order to see the changes of the communities in the vicinity of the Bay of Concarneau receiving untreated harbour sewages, a preliminary survey was conducted last summer. Three groups of sites can be distinguished, on the basis of the laminarian distribution (lower limit 10 m for L. hyperborea, 14 m for S. bulbosa) and distribution of the most conspicuous animals.

- a) Sites near the harbour. The endofauna of these sites has been showed by GLEMAREC 1980 as a polluted one. The epifauna is reduced to a few species but present in great number, such as sponges, Ophiothrix fragilis, Plumularia setacea. The presence of the harbour species Bugula neritina and the lack of Echinus esculentus, Alcyonium digitatum, Corynactis and Eunicella are characteristic features.
- b) Sites near the shore, outside the last harbour beacon, where L. hyperborea, L. ochroleuca and S. bulbosa are present. Animal communities become progressively poor, the epibiosis becoming very thin by reduction of sponges, erect bryozoans and polyclinids. There, we note the presence of Echinus esculentus, Alcyonium digitatum, Corynactis, Eunicella and various actinians.
- c) Sites offshore, in the proximity of the muddy zone occurring in the middle of the Bay, where Saccorhiza is prevailing or even the alone Laminarian. Other species such as Metridium senile f. dianthus, Nemertesia ramosa, Halecium halecinum, Alcyonium glomeratum take place, but the epibiosis' aspect remains somewhat close-cropped and monotonous, with Corynactis strongly dominant.

At this point of the preliminary survey, we may say:

1. The communities along the shore seem to become poorer when going out the Bay.
2. The proximity of a muddy sand bottom brings to the sites offshore a good deal of species.
3. There is a certain similarity between the sites offshore and the sheltered sites of the Glenan's Isles (presence in both sites of Alcyonium glomeratum and Epizoanthus marioni, sites bordered by similar sedimentary bottom of "maerl").
4. At least, the epibiosis are in the Bay less rich than in the Glenan's Isles.

Notes & News



We wait attentively for reports of the success of a little book by Member Tom Gascoigne entitled "Fine Dissection of Ascoglossans". Gascoigne's long interest in these small opisthobranch molluscs has led him to set down the methods by which he probed their anatomy using home-made instruments and a pair of very steady hands. Not of very general interest, you may think, but you would be wrong, for Gascoigne's techniques - well described and illustrated in the book - are applicable to the anatomical investigation of many other small, soft-bodied invertebrates. Copies of his publication are obtainable from the author at 16A York Grove, London, SE15 2NY, price £1, post free.

**

Due no doubt to the long recession, the famous Wellcome Marine Laboratory in Robin Hood's Bay, Yorkshire, is to close in December 1982. The two academics there, J. Grahame and especially J.R. Lewis, together with a NERC team currently of three scientists, have made the laboratory renowned as a centre of inshore ecology. It is sad that a programme of collaboration with marine laboratories of mainland Europe to look at population fluctuations of selected inshore species over a wide area must now be lost. What's the opposite of congratulations? We offer them to the owners of the laboratory, Leeds University.

**

For years and years and years mercant seamen have been writing up their observations on sea surface life in the back pages of their meteorological log books and sending them in to the Met. Office HQ in Bracknell, Berks. And for years and years and years marine biologists didn't know these accounts existed. Recently T. Wyatt and J. Last of Lowestoft have copied a small fraction of the reports with a view to researching them. Many descriptions are of easily identifiable animals (e.g., Physalia, Pyrosoma) and many more are accompanied by drawings or photographs. Your Editor, by the way, has been recruited to comment on the more interesting current sightings, in a quarterly journal of meteorology entitled "The Marine Observer", published by the Met. Office.

**

Still on the subject of merchant ships, an old-established charity, the Marine Society, founded originally to kit out poor waifs for a sea career, has more lately directed its funds to the provision of ships' libraries and educational facilities for British seafarers. Now the Porcupine Marine Natural History Society (www.pmnhs.co.uk) newsletter archive

Society has appointed a seagoing tutor in marine biology, P.V. Horsman, to promote the subject amongst interested seamen, of whom there are many. He has made several successful voyages, to the Gulf, to the States and most recently to China and Australia.

**

After 28 years the "Sarsia" is to be exchanged for a new ship. The Plymouth laboratory is hoping to take delivery of their new vessel in the summer and we were pleased to learn that the name of the replacement is to be "Frederick Russell" after a former director of the laboratory. Sir Freddy, more than almost anyone in marine biology, deserves our admiration and thanks for his lifetime's contribution to our science.

**

A technical report by the highly respected consultants, Gaffney, Cline & Associates, declares that Ireland could at last have a commercial oilfield, in the so-called Porcupine Basin, 100 miles west of Galway. The size of the field is comparable to a medium-sized North Sea field but it is in 360 metres of water, twice as deep as any in the North Sea. Ireland needs only one such field to become self-sufficient in oil.

PORCUPINE MEETING IN THE CHANNEL ISLES, SEPTEMBER 1980

List of Molluscan Records

Shelagh Smith

New or updated records of live Mollusca. These are compared with Seaward (1979) for the Channel Isles as a whole, e.g., (a17) and with Brehaut (1975) for Guernsey itself, e.g., (aG). Equivalent names as used in Turk (1973) are given where necessary.

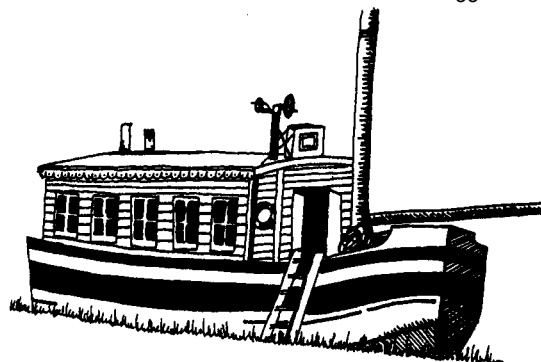
Jujubinus montagui (Cantharidus montagui)	(B17)	(BG)	(1, dredgings)
Lacuna vincta	(b17)	new to Guernsey	(scarce, algae, LWM)
Lacuna parva	(b17)	(aG)	(Common, algae, LWM)
Littorina mariaae			new segregate record (widespread, common, <u>Fucus</u>)
Littorina neglecta	"	"	" (widespread, common, crevices)
Littorina nigrolineata	"	"	" (widespread, common, crevices)

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<i>Littorina arcana</i>			new segregate record (widespread, common, upper shore)
<i>Onoba aculeus</i>	"	"	" (scarce, algae, LWM)
<i>Manzonina crassa</i>	(<u>B17</u>)	(<u>BG</u>)	(1, crevice, upper shore)
<i>Pusillina parva interrupta</i> (<i>Rissoa parva interrupta</i>)			new segregate record, species or subspecies (common, algae)
<i>Rissoella diaphana</i>	(<u>B17</u>)	(<u>BG</u>)	(common, algae)
<i>Cerithiopsis tubercularis</i>	(b17)	(AG)	(1, under boulder, LWM)
<i>Chauvetia brunnea</i>	(<u>B17</u>)	(<u>BG</u>)	(1, on <u>Laminaria hyperborea</u>)
<i>Philbertia linearis</i>	(B17)	(aG)	(several, dredgings)
<i>Menestho divisa</i>	(b17)	(aG)	(several, algae, LWM)
<i>Odostomia acuta</i>	(b17)	(aG)	(rare, algae, LWM)
<i>Odostomia rissoides</i> (<i>Odostomia scalaris</i>)	(B17)	(<u>BG</u>)	(rare, algae, LWM)
<i>Odostomia turrita</i>	(B17)	(aG)	(rare, algae, LWM)
<i>Odostomia unidentata</i>	(b17)	(aG)	(1, under boulder, LWM)
<i>Runcina coronata</i>	(a17)	(aG)	(rare, algae)
<i>Ancula gibbosa</i> (<i>ancula cristata</i>)	(<u>A17</u>)		new for Guernsey (1, algae, LWM)
<i>Goniodoris castanea</i>	(A17)		new for Guernsey (1, algae, LWM)
<i>Crenella prideauxi</i>	(C17)	(aG)	(several, probably common, on <u>L. hyperborea</u> stipe)
<i>Musculus costulatus</i>	(A17)	(aG)	(1, under boulder, LWM)
<i>Musculus discors</i>	(<u>A17</u>)	(aG)	(common, algae, LWM)
<i>Modiolus modiolus</i>	(<u>B17</u>)	(<u>BG</u>)	(1, crevice, upper shore, and juveniles on <u>L. hyperboarea</u> stipe)
<i>Palliolum tigrinum</i> (<i>Chlamys tigrina</i>)	(A17)	(<u>BG</u>)	(1, dredgings)
<i>Loripes lucinalis</i>	(<u>A17</u>)	(<u>BG</u>)	(common, sand, MTL)

<i>Lucinoma borealis</i>	(<u>B</u> 17)	(<u>B</u> G)	(1, sand, MTL)
<i>Mysella bidentata</i>	(<u>B</u> 17)	(AG)	(common, dredgings, etc)
<i>Tridonta montagui</i> (<i>Astarte montagui</i>)		new record	(1, dredgings) (specimen in Los Angeles)
<i>Parvicardium ovale</i> (<i>Cardium ovale</i>)	(b17)	(<u>B</u> G)	(several, dredgings, probably common)
<i>Parvicardium scabrum</i> (<i>Cardium scabrum</i>)	(<u>B</u> 17)	(<u>B</u> G)	(several, dredgings and in sand, MTL, probably common)
<i>Tellina pygmaea</i>	(B17)	(AG)	(several, shell gravel, LWM)
<i>Gari tellinella</i>	(<u>B</u> 17)	(<u>B</u> G)	(1, sand, LWM)
<i>Abra alba</i>	(B17)	(aG)	(common, dredgings and in sand, LWM)
<i>Abra nitida</i>	(<u>B</u> 17)	(<u>B</u> G)	(1, sand, LWM)
<i>Abra prismatica</i>	(<u>B</u> 17)	(<u>B</u> G)	(1, sand, LWM)
<i>Gouldia minima</i> (<i>Gafrarium minimum</i>)	(<u>B</u> 17)	(BG)	(1, dredgings)
<i>Gastrochaena dubia</i>	(b17)	(AG)	(1, calcareous algae, pool, MTL)
<i>Thracia villosiuscula</i>	(b17)	(aG)	(1, sand, LWM)
<i>Hemisepiola aurantiaca</i> (? <i>Sepiola pfefferi</i>)		new record	(stranded in pool, LWM)

Dead shells are of less importance, but the following are perhaps of some interest, unless otherwise stated are the first this century: *Margarites helycinus* (new for Channel Isles, so far from other occurrences that further confirmation will be sought), *Skenea cutleriana*, *Lacuna crassior*, *Turbona beanii* (*Alvania beanii*), *Tornus subcarinatus*, *Caecum glabrum*, *Cerithiopsis jeffreysi*, *Triphora adversa* and *Triphora pallescens* (new segregate records for the Channel Isles), *Eulima trifasciata*, *Vitreolina dautzenbergi* and *Vitreolina incurva* and *Vitreolina philippi* (new records for the Channel Isles, following Waren; pers. comm.), *Chrysallida decussata*, *Chrysallida excavata*, *Chrysallida obtusa*, *Odostomia eulimoides*, *Odostomia lukisii*, *Odostomia nivosa*, *Eulimella gracilis*, *Philine punctata*, *Modiolula phaseolina* (*Modiolus phaseolinus*), *Limatula subauriculata* (*Lima subauriculata*), *Tellimya ferruginosa* (*Montacuta ferruginosa*), *Galeomma turtoni*, *Arculus sykesi* (*Neolepton sykesi*) (FIRST BRITISH RECORD THIS CENTURY), *Epilepton clarkiae*, *Goodallia triangularis* (*Astarte triangularis*), *Mya arenaria*, *Thracia distorta*.



The Ark.

Around the Marine Laboratories.

Number 1.

Dunstaffnage Marine Research Laboratory

The first permanent marine laboratory in Britain was a canal barge called the "Ark". During 1884 the "Ark" was moored at Granton on the Firth of Forth but in the following year she was towed through the Forth-Clyde canal and beached on the island of Millport in the Clyde. For a number of years the "Ark" served there as a marine laboratory until the Millport shore buildings were put up.

In 1970 the laboratory moved from Millport to a new establishment at Dunstaffnage (Oban).

The Dunstaffnage laboratory is currently the home of the Scottish Marine Biological Association, a body which, through the "Ark", traces its origins back to the "Challenger" Expedition. At the laboratory, research is pursued in most aspects of marine science. A wide range of disciplines is represented in a staff of about 100, who undertake both basic and applied research. The support for the basic research comes from the Natural Environment Research Council, while contracts from government departments and from industry are the main source of funding of the applied work.

The laboratory has extensive facilities. A direct computer link to the Rutherford Laboratory permits on-line data processing. Electronic and engineering facilities are available, and two inshore research vessels, the "Calanus" and the "Seol Mara" are operated. Recompression facilities are available for the diving team. The library has acquisitions spanning the last 100 years.

Deep-sea work is undertaken west of the British Isles and the inshore activities cover the area from Shetland to Cornwall.

Up to 12 postgraduate students are normally in residence, generally registered at the Universities of Glasgow, Stirling, Heriot-Watt or Dundee, with which the laboratory has formal links. There are also courses in aquaculture for M.Sc. students from Stirling and practical training courses for fish farmers.

The Scottish Marine Biological Association holds scientific meetings twice yearly on subjects of topical interest in marine science, alternately at the laboratory and in various locations around Scotland.

BENTHIC OFFSHORE INVERTEBRATES FROM SIZEWELL, SUFFOLK, JUNE 1976.

R.N. Bamber

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

A survey of the marine benthos in the vicinity of Sizewell Power Station, Suffolk, was undertaken by the C.E.G.B. from 14th to 25th June, 1976. A grid of sampling stations was established by means of the Decca navigation lanes, resulting in 68 stations, at approximately 0.5 km intervals (Fig. 1). Quantitative samples were taken using an 0.1m² Day Grab, three grabs per station being collected for analysis. Supplementary dredge samples were taken to identify macrofaunal species which were highly mobile or had large ambits. The grab samples were washed through a series of sieves (3 mm, 2 mm and 1 mm) and the residue retained in a Rose Bengal/formalin solution. Dredge samples were sorted and recorded in the field, few specimens being retained.

A total of 93 species was identified from the grabbing survey, and a further 7 species were only taken in the dredge hauls. Analysis of the community structures and associated sediments is discussed by Bamber and Coughlan (1980). The sediments ranged from offshore sandy-muddy substrates to coarser shelly-sand and stony substrates at the northern and southern inshore stations. Animals were predominantly infaunal. The dominant species of the benthic community are marked in the following list by an asterisk:-

PHYLUM: CNIDARIA
HYDROZOA

Dynamena pumila (L.)
*Sertularia spp.
*Hydrallmania falcata (L.)
Gonothyrea loveni (Allman)
Obelia spp.
Antennularia sp.
Plumularia sp.
Tubularia indivisa L.

ANTHOZOA

Metridium senile (L.)
Cereus pendunculatus (Pennant)
Alcyonium digitatum (L.)

PHYLUM: RHYNCOCOELA

Nemertine indet.

PHYLUM: ECTOPROCTA

Bugula cf. fulva Ryland
Electra pilosa (L.)

PHYLUM: PHORONIDA

*Phoronis cf. muelleri de Selys-Longchamps

PHYLUM: MOLLUSCA

LAMELLIBRANCHIA

**Nucula turgida* Leckenby and Marshall
 **Mysella bidentata* (Montagu)
Montacuta ferruginosa (Montagu)
Mytilus edulis L.
Modiolus cf. *modiolus* (L.)
Abra alba (Wood)
 **A. nitida* (Müller)
Tellina fabula Gmelin
 **Macoma balthica* (L.)
Mactra corallina (L.)
Cultellus pellucidus (Pennant)

GASTROPODA

Hydrobia ulvae (Pennant)
Natica alderi Forbes
Buccinum undatum L.
Opisthobranch indet.

PHYLUM: ANNELIDA

Lepidonotus squamatus (L.)
Pholoe minuta Fabricius
Sthenelais cf. *limicola* Ehlers
Polynoid sp. indet.
Eteone longa (Fabricius)
Eteone sp. indet.
Eunereis longissima (Johnston)
 **Nephtys hombergi* Lamarck
N. cirrosa Ehlers
N. caeca (O.F. Müller)
Glycera lapidum Quatrefages
Lumbrineris fragilis (O.F. Müller)
Scoloplos armiger (O.F. Müller)
 **Spiophanes bombyx* (Claparede)
 **Nerinides cantabra* Rioja
Scoelelepis ciliata (Keferstein)
 **Magelona papillicornis* O.F. Müller
Cirratulus c.f. *cirratus* (O.F. Müller)
Audouinia tentaculata (Montagu)
Diplocirrus glaucus Haase
 **Scalibregma inflatum* Rathke
Ophelia limacina (Rathke)
Notomastus latericeus M. Sars
Arenicola marina L.
Owenia fusiformis Delle Chiaje
Sabellaria spinulosa Leuckart
Pectinaria koreni Malmgren
Pectinaria belgica (Pallas)
Lanice conchylega (Pallas)
 **Polymnia nebulosa* (Montagu)

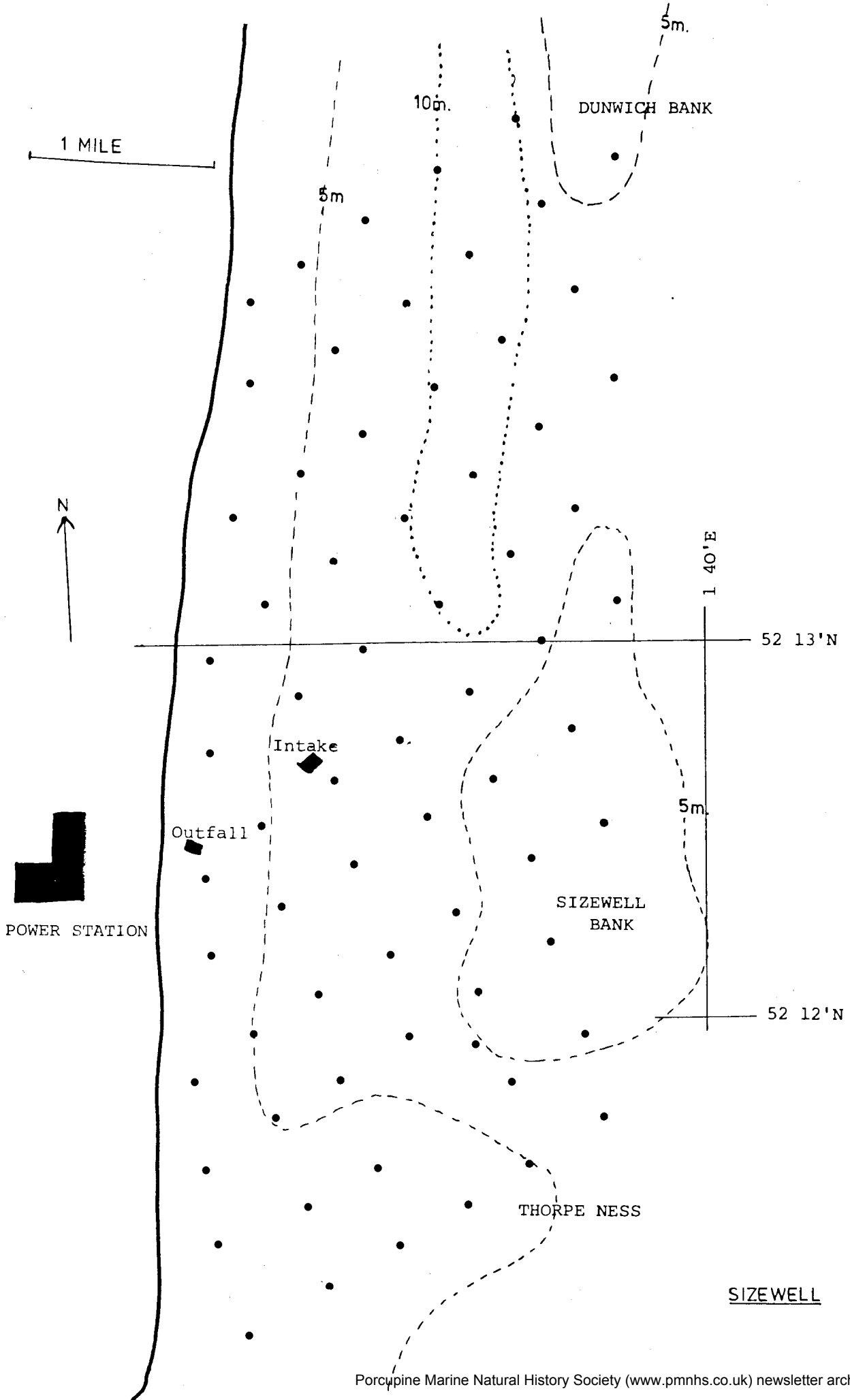


FIGURE 1. SIZEWELL BENTHIC SURVEY SAMPLING GRID.

PHYLUM: ARTHROPODA
CRUSTACEA

Diastylis rathkei (Kroyer)
Diastylis lucifera (Kroyer)
Eurydice pulchra Leach
*Dulichia monacantha Metzger
Synchelidium intermedium G.O. Sars
*Perioculoides longimanus (Spence Bate)
Stenothoe brevicornis G.O. Sars
*Urothoe elegans Spence Bate
*Bathyporeia pelagica Spence Bate
Gammarus duebeni Lilljeborg
Nototropis falcatus (Metzger)
Nototropis vedlomensis (Spence Bate)
Nototropis swammerdami (Milne-Edwards)
Caprella linearis (L.)
Balanus balanoides (L.)
Hyas araneus (L.)
Eupagurus bernhardus (L.)
Crangon crangon (L.)
Corystes cassivelaunus (Pennant)
Portumnus latipes (Pennant)

PYCNOGONIDA

*Nymphon brevirostre Hodge
Achelia echinata Hodge
Phoxichilidium femoratum (Rathke)
*Anoplodactylus petiolatus (Kroyer)
Pycnogonum littorale (Ström)

PHYLUM: ECHINODERMATA

Ophiura albida Forbes
Ophiura offinis Lutken
Ophiura sarsi Lutken
Ophiura texturata Lamarck
Amphiura chiajei Forbes
Asterias rubens L.
Echinocardium cordatum (Pennant)
Psammechinus miliaris (Gmelin)

PHYLUM: CHORDATA

Molgula c.f. citrina Alder and Hancock

Additional species recorded from dredge hauls only:

PHYLUM: MOLLUSCA

Spisula elliptica (Brown)
Ensis sp.

PHYLUM: ARTHROPODA

Elminius modestus Darwin
 Idotea linearis (Pennant)
 Carcinus maenas (L.)
 Cancer pagurus L.
 Macropipus rostratus (L.)

ACKNOWLEDGEMENTS

This work was carried out at the Central Electricity Research Laboratories, and the paper is published by permission of the Central Electricity Generating Board.

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WINTER SURVEY OF SHORE FISH AT CULLERCOATS, NORTHUMBERLAND

Frank Evans
 Dove Marine Laboratory, Cullercoats, North Shields

1. INTRODUCTION

Between 1971 and 1980 research projects involving a general survey of rocky shore fish at Cullercoats (55°02'N, 1°26'W) on the English North Sea coast were separately undertaken by five final year students of Zoology, under my supervision, at Newcastle University. The popularity of the topic as a student project has resulted in the amassing of information which, although confined to the winter months, approximately November to March, is sufficiently weighty to warrant summarising.

Cullercoats Bay is 600 yards wide, lying between sandstone headlands (Fig. 1). Deep within the bay are two stone piers enclosing an inner arc of sand; otherwise the bay is rocky. Offshore, the whole sea floor frontage is rocky for a full mile seaward.

The rocks of the bay are, on the north side, massive sandstones of the Coal Measures and, on the south side, Permian sandstone and dolomite. The area of intertidal rock on the north of the bay is about 4.7 ha. and on the south side about half as much.

The mean tidal rise above chart datum is 5 m. at springs and 3.9 m. at neaps.

Rock pools and shore fish are quite common. From the collections some 10 species of fish were identified. Other species, many known from warmer months, occur but were not recorded during these surveys (Table 1).

2. PROCEDURES

Each project extended over two University terms. All students made some measurements of fish sizes and most made subjective estimates of species densities. One student in the course of his investigation employed a simple capture-recapture method to estimate fish numbers. Where population volumes are given in the text they are derived from this study. Another student examined gut contents to discover the fishes' diets. The nature of habitats was frequently reported.

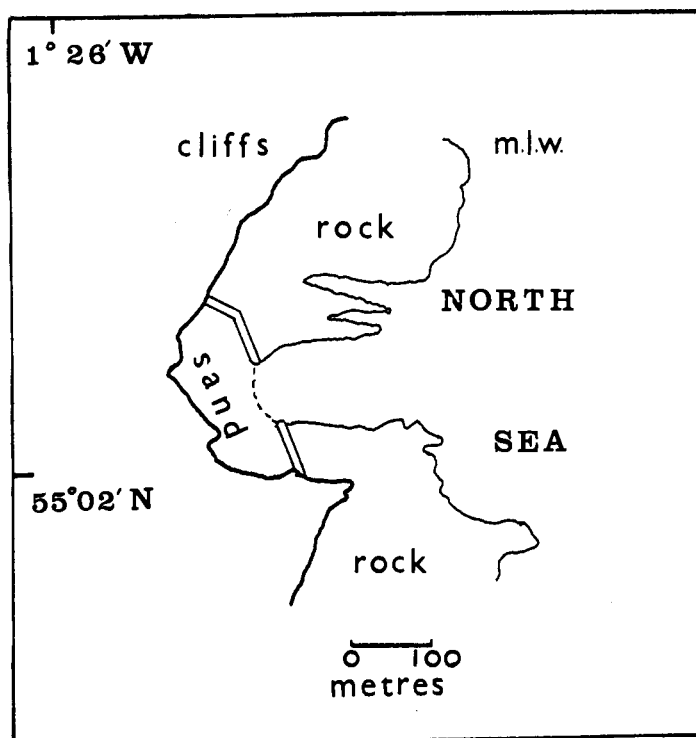


Figure 1. Cullercoats Bay.

3. SPECIES LIST (in order of abundance).

Species names are from Wheeler (1978).

- a) Viviparous blenny, Zoarces viviparus. Recorded by all five observers. Distributed commonly and fairly evenly over the whole of the rocky shore both north and south up to 3.4 m above chart datum. Found in pools containing also bull-routs and sea scorpions. Especially common on the middle shore in pools dominated by Corallina sp. but found also in low pools with much sediment and in high pools with rock or gravel bottoms. Found in still and running water but never out of water. Sometimes two fish occur under the same stone. Individuals move about the beach and are not often caught at the same place twice. Exceptionally, two small fish were caught in a high pool in early October and retaken from the same pool in mid November.

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The estimated population on the north shore was 315 fish. In one study sizes ranged between 7.5 cm. and 25 cm. until April, when many 5 cm. fish first appeared. In another study 5 cm. fish became abundant in early February. In a further study a winter sample of 75 fish ranged between 7.5 cm. and 22 cm.; the mean size was 12.8 cm. with 61 of the fish lying between 10 cm. and 16 cm.

The stomach contents of 11 fish were analysed. Four stomachs were empty. Otherwise the contents were generally a mixture of organic debris apparently from the sediment, together with small crustaceans, in particular Idotea sp. and copepods; molluscs, including Skeneopsis planorbis and Rissoa parva; and polychaetes. A large female of 25 cm. had also been feeding on Carcinus maenas.

- b) Sea scorpion, Taurulus bubalis. Recorded by all five observers. Common and easily taken all over the rocky shore up to 3.4 m. above chart datum but principally found on the middle shore; in pools with rock or gravel bottom and varying amounts of vegetation. The fish retreat under cover by day, their density being highest in pools with overhanging shelves, but at night they often lie exposed on the open rock of the pool floor.

Sea scorpions remain in the same rock pool for many tides. An investigation into the movement of 9 specimens showed firstly that the same fish could be recaptured again and again in the same pool, and secondly, that if removed to an adjacent pool less than about 5 m. away, they would return to the original pool at a subsequent tide. If moved more than about 5 m, they tended to remain in the new pool.

Estimation of population size using a capture-recapture method must consequently be of doubtful accuracy. Direct counting on the north side of the bay gave a total of 33 individuals there.

One estimate of size gave a range of between 3.5 cm. and 15.5 cm. with most fish lying between 4 cm. and 8 cm. The number of fish measured was not stated. Another example of 33 fish (above), gave a range of 4 cm. to 10 cm. with a mean length of 6 cm.

Six stomachs were examined, of which one was empty. The remaining fish had been feeding on Carcinus maenas, which formed the sole content of three of the stomachs. The crabs had been swallowed whole in all cases. The stomach of the smallest fish, 5.5 cm. long, contained two crabs about 3 mm. across the carapace together with traces of the setae and jaws of a polychaete, Harmothoe sp. The gut of the last fish contained, besides crabs, a little sand.

- c) Five-bearded rockling, Ciliata mustela. Recorded by all five observers. Found at all levels on the shore up to 3.4 m. above chart datum, but commonest on the upper part of the middle shore, often in pools dominated by barnacles and Corallina sp.; it was characteristically absent from lower shore pools inhabited by

bull-routs. In small, gravelly pools high on the shore, small specimens of this species may often be the only fish present. The estimated population on the north shore of the bay was 121 fish.

In one survey of 38 fish, sizes ranged from 5 cm. to 13 cm., with a mean of 7.9 cm. and in another, of 54 fish, the sizes ranged from 4 cm. to 9 cm. In a third survey a specimen of 18 cm. was taken, none of the remainder in this survey exceeding 10 cm.

The stomach contents of the one specimen examined consisted largely of organic debris of the type found on pool bottoms but also some isopod and mollusc fragments.

- d) Butterfish, Pholis gunnellus. Recorded by four observers. Found on the middle and especially on the lower shore, sometimes among gravel and sand, sometimes in pools of bare rock and sometimes out of water under wet weed. It was not found higher than 2.1 m. above chart datum. Although taken by all but one of the investigators it was found only in small numbers and no estimation of population size was made. Sizes of one sample of 6 fish ranged from 11 cm. to 15.5 cm., with a mean of 12.5 cm.

The stomachs of two specimens, respectively 16.7 cm. and 9 cm. long, were examined. The larger contained only the remains of Idotea sp., the smaller in addition the remains of harpacticoid copepods, molluscs (Lacuna sp.) and a small Garcinus maenas.

- e) Shanny, Lipophrys pholis. Recorded by three observers. Found principally on the upper middle shore between 2.1 m and 3.4 m above chart datum. Some individuals may be found under the same stones again and again (on 7 of 10 occasions between mid-October and mid-January in one instance). No estimate was made of population numbers but observers agree that the species is not very common. In size, one observer found specimens mostly of only 2 cm. in length and never more than 3 - 4 cm.; another, with a sample of 26 fish, found a size range of 3.5 cm. - 8.5 cm.; the third found sizes of 2.5 cm. to 5 cm. with the appearance of much bigger fish, 15 - 23 cm. in April. The first two observers may not have collected in this month.
- f) Two-spotted goby, Gobiusculus flavescens. Recorded by two observers. One observer took four specimens in pools on the middle shore on the south side of the bay. Another observer made 40 sightings of the species, some being repeat sightings of the same individual since the fish tend to remain in the same pool, but at least 18 separate fish were seen by him; these were also on the south side of the bay. All the fish were inhabiting pools between 1.7 m and 2.3 m above chart datum and were absent from pools higher on the shore.
- g) Bull-rout, Myxocephalus scorpius. Recorded by two observers. Always found in pools with sediment (sand or mud), never with bare rock bottoms. Vegetation (Pelvetia canaliculata, Ulva

lactuca and Rhodocorton spp.) was sometimes present, while some inhabited pools were without vegetation. The fish occurred generally on the lower shore and always under stones. The estimated population size on the north side of the bay was 44 fish; the general impression was that they were not common.

The size range of a sample of 14 fish was 4.5 cm. to 13 cm. with a mean of 9.2 cm.

- h) Worm pipefish, Nerophis lumbriciformis. Recorded by two observers. One record was of 2 specimens, the other of 3. All the fish were taken on the lower shore in pools with heavy growths of furoid algae. The sizes of all the specimens lay between 17 cm. and 20 cm.
- i) Fifteen-spined stickleback, Spinachia spinachia. Recorded by two observers and only in the month of October. Found "in the higher pools".
- j) Common goby, Pomatoschistus microps. Recorded by one observer, a single specimen 6.5 cm. long. It was taken not in a rock pool but in open water over gravel.

ACKNOWLEDGEMENTS

Credit is in large measure due to R. Blackshaw, M. Crooks, P.T. Davison, R.L. Oswald and I.G. Roddam, all graduates of Newcastle University, for the information contained in this account. I am indebted to P.S. Davis for the right-hand column of Table I.

REFERENCE

Wheeler, A., 1978. Key to the Fishes of Northern Europe. Warne, London.

TABLE 1.

Species taken in the present studies.

- Ciliata mustela
- Gobiusculus flavescens
- Lipophrys pholis
- Myoxocephalus scorpius
- Nerophis lumbriciformis
- Pholis gunnellus
- Pomatoschistus microps
- Spinachia spinachia
- Taurulus bubalis
- Zoarces viviparus

Species known from the rocky shore at Cullercoats but not recorded in the present studies.

- Anguilla anguilla
- Chirolophis ascani
- Crenilabrus melops
- Cyclopterus lumpus
- Entelurus aequoreus
- Gasterosteus aculeatus
- Labrus bergylta
- Liparis liparis
- Liparis montagui
- Sygnathus acus
