

Porcupine Newsletter

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STOP PRESS: Members are reminded that their 1990 Membership Fee is due on January 1st, except for those helpful and obliging Members using a Banker's Order. Membership is still £5.00.

PORCUPINE

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EDITORIAL

One of the prime interests of PORCUPINE at and since its inception has been the subject of marine recording. Our first full meeting in Edinburgh in February 1977 was on this topic, as was our 12th meeting in Glasgow in March 1982. Next year's spring meeting returns to this theme (again at an AGM in Scotland!) and we shall see what progress has been made both in the "state-of-the-science" and in recording and its uses over the last 8 or 13 years (vide PN's 1 [2] and 2 [4]).

On the subject of PORCUPINE history, a list of the meetings to date and their biogeography are published herein (p.159). Hopefully Members will spot relevant topics we have yet to cover or to which we should return, and venues/regions to which we should drag the PORCUPINE "Roadshow"; please contact the Hon. Sec. with all ideas and offers of help for future meetings.

Further to marine recording, the present issue, by coincidence, takes on the appearance of some 'Cullercoats Marine Fauna List', since it contains two extensive species lists from the Northumberland area. The first represents the results of the PORCUPINE summer field trip to the Trink; Jon Moore has painstakingly collated the list of 235-odd species, while the expedition log and chart are down to Frank Evans. Together with another 230-odd-species list for Druridge Bay (on the coast directly inshore from the Trink!), this represents rather a lot of future work for the poor compiler of the Newsletter index (sympathy gratefully received)!

The other major article shows just how prompt some speakers can be in supplying papers from their talks at PORCUPINE meetings - thank you Shelagh. We hope to have the other articles from the Guildford meeting in the next issue, along with the odd bit outstanding from Lancaster. Plus, of course, all the articles, short notes, letters to the Ed., requests, announcements, etc., that you are all about to submit. So don't delay.

And it's still not too late to write to your MP on the future of the N.C.C.

Apropos Guildford, participants were privileged to witness the rare appearance of *Scubahystrix boadani*, it having recovered from a bout of skin disease and partial dismemberment. We await with baited hook - er, sorry - bated breath the possibility of its presence in Dundee in March, which would certainly constitute a northernmost record.

Hoping you all solved the mis-stapling of pages 133 and 134 in the last issue, have a merry Christmas (we are already well oiled at Fawley!),

Roger Bamber, Hon. Ed.

Porcupine Newsletter, 4 (7), 1989

Report of the Summer Field Meeting
PORCUPINE AT SEA

by Frank Evans

The summer field meeting of PORCUPINE took place at the Dove Marine Laboratory, Cullercoats, Northumberland on Thursday 20 and Friday 21 July 1989. Thirteen Members took part, of whom twelve braved the briny aboard the Newcastle University research vessel "Bernicia" to visit the object of the meeting, the Trink, a patch of gravel off the port of Blyth.

On the morning of Thursday a piratical-looking, welly-clad crowd of Porcupines assembled at the Dove before setting off by car for Blyth and the "Bernicia", eight miles to the north. Brandishing collecting jars and thermoses they poured aboard the trawler before setting course northeast for the Trink, past the notorious Sow and Pigs rocks, the brooding presence of Blyth Power Station, the yet more brooding presence of the Alcan smelter power station, and other brooding presences along the coast. As the ship bravely breasted the waves the only sounds to be heard were the pulsing of the engine and the heaving of a pirate whose sea legs had unfortunately been left behind.

On station, the Agassiz trawl was shot and hauled, shot and hauled, to the cries of the crew and the menacing click of cameras. As the net came in oaths flew and disputes flared among the buccaneers about the division of the spoils but eventually the treasure was stowed safely away and the rum cask was broached, or anyway a few tubes of Foster's began to appear. Then, with the black flag flying proudly at the peak, wherever that is, the boat turned for home. The only sounds to be heard were the pulsing of the engine, the sough-soughing of the ring-pulls and the heaving.....

Alongside, the sea's jewels were borne triumphantly to the Dove lab for appraisal and valuation. There followed a sumptuous meal in the old Indian quarter of the town of Whitley Bay (thank you, fellow Porcupines, for your generosity to Rosie and me) where tales were told, or mostly retold, and fresh ventures planned.

On the following day, Friday, all hands were called but only a jury crew turned out to man the "Bernicia", the remainder preferring to continue in the lab, gloating over the previous day's captures. The "Bernicia" steamed south to new grounds off St Mary's Lighthouse and there, in shallow water and over a hard bottom, proceeded to hazard her gear in search of a big catch. She got both, a bumper haul and a torn net, but it was all worth it as the list of species which follows shows.

• *

THE TRINK is a shallow ridge of partly sediment-covered limestone lying 030°, 10 miles from Blyth Lighthouse in a depth of about 55 m. The sediment is gravelly with some cobbles and boulders, although our sampling with an Agassiz trawl secured only gravel. Samples were of 10-minute duration at a speed of approximately 1½ knots.

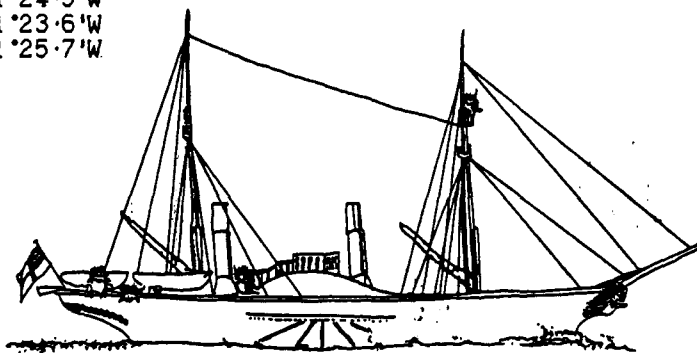
In preparation for the PORCUPINE meeting, three samples had been taken at the Trink on Wednesday 19th July in 55°16.4'N 1°20.5'W.

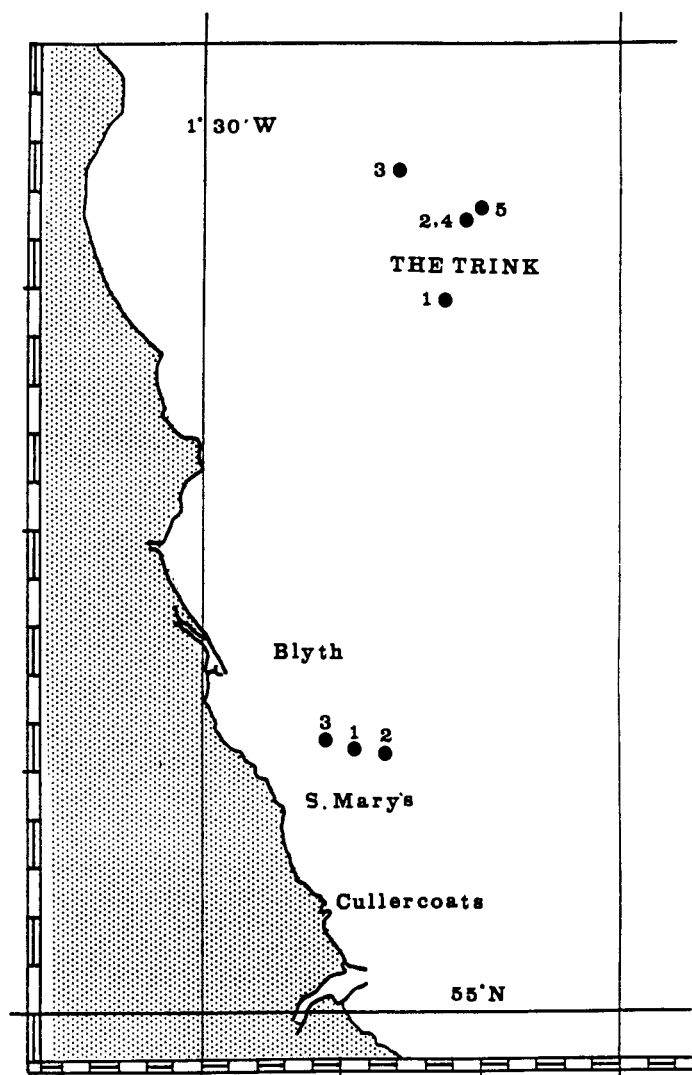
Thursday 20 July 1989. At the Trink

Station 1	55°14.8'N 1°21.3'W	50 m	11.27 hrs BST
Stations 2 & 4	55°16.4'N 1°20.5'W	55 m	11.56 & 13.09
Station 3	55°17.4'N 1°23.0'W	56 m	12.38 hrs
Station 5	55°16.8'N 1°20.0'W	56 m	13.37 hrs

Friday 21 July 1989. Off St Mary's Lighthouse. Depth 36 m.

Station 1	55°05.5'N 1°24.5'W
Station 2	55°05.4'N 1°23.6'W
Station 3	55°05.7'N 1°25.7'W





The cast list for the Trink trip was (alphabetically) Roger Bamber, Sue Chambers, Frank Evans, Bob and Judy Foster-Smith, David Heppell, Jan Light, Jon Moore, Ted Phorson, Paul Scarnell, Martin Sheader, Shelagh Smith, Tom Thompson and Fred Woodward.

All contributed to the collecting, sorting and identification. Specific determinations are attributable as follows: Foraminifera - B.F.-S.; Porifera - J.M.; Hydrozoa - J.M. & B.F.-S.; Anthozoa - J.M. *et al.*; Nemertea - P.G.; Sipuncula - S.S.; Polychaeta - P.G. & S.C.; Pycnogonida - R.B.; Acari - R.B.; Cirripedia - P.S., S.S. *et al.*; Amphipoda - M.S.; Isopoda - M.S.; Decapoda - R.B. & J.M.; Molluscs - S.S., J.L., D.H., T.T. & T.P.; Bryozoa - J.M. & B.F.-S.; Echinoderms - J.M. *et al.*; Ascidiars - J.M. *et al.*; Pisces - R.B. *et al.*. To these may be added field observations of guillemots, skuas, gannets, kittiwakes, fulmars, puffins, black-backed gulls and a goose on a raft (!).

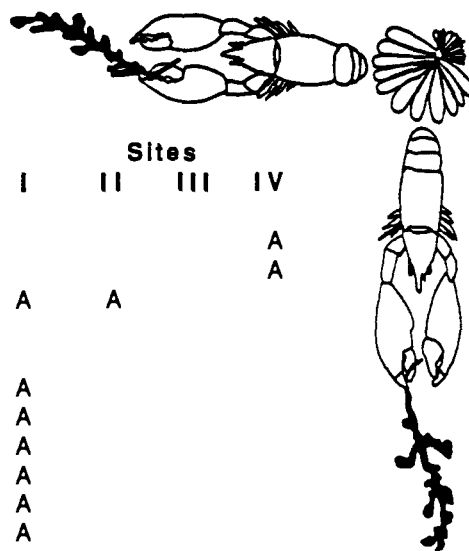
The collation of the data and the preparation of the following list were undertaken by Jon Moore.

**Complete species list from the Porcupine Field Meeting on 20 - 21 July
1989 to the 'Trink' and other sites on the Northumberland coast.**

I = Trink, II = Off St. Mary's Island, III = St. Mary's Island shore, IV = Cullercoats shore
 A = live specimen(s), B = (recently) dead specimens, C = (long) dead specimens
 (B and C refer mainly to mollusc shells)
 All species codes and nomenclature is according to Howson (1987).

Code	Species	Sites			
		I	II	III	IV
Foraminifera					
A 1	<i>Rosalina anomala</i>				
Porifera					
C 70	<i>Grantia compressa</i>			A	
C 221	<i>Suberites domuncula</i>	A			
C 484	<i>Halichondria panicea</i>			A	
Hydrozoa					
D 144	<i>Tubularia indivisa</i>	A			
D 306	<i>Bougainvillia ramosa</i>	A			
D 516	<i>Lafoea dumosa</i>	A			
D 525	<i>Halecium beanii</i>	A			
D 585	<i>Kirchenpaueria pinnata</i>	A			
D 597	<i>Nemertesia antennina</i>	A			
D 599	<i>Nemertesia ramosa</i>	A			
D 605	<i>Plumularia setacea</i>	A			
D 626	<i>Abietinaria abietina</i>	A			
D 640	<i>Diphasia fallax</i>	A			
D 653	<i>Hydrallmania falcata</i>	A			
D 660	<i>Thuiaria thuja</i>	A			
D 671	<i>Sertularella tenella</i>	A			
D 676	<i>Sertularia argentea</i>	A			
D 677	<i>Sertularia cupressina</i>	A			
D 689	<i>Tamarisca tamarisca</i>	A			
D 697	<i>Campanularia volubilis</i>	A			
D 723	<i>Laomedea flexuosa</i>	A			
D 730	<i>Obelia dichotoma</i>	A			
Anthozoa					
D 1024	<i>Alcyonium digitatum</i>	A			
D 1025	? <i>Alcyonium glomeratum</i>		?A		
D 1168	<i>Urticina felina</i>	A			
Nemertea					
G 127	<i>Nipponnemertes pulcher</i>	A			
G 148	<i>Oerstedia dorsalis</i>	A		A	
Sipuncula					
N 28	<i>Phascolion strombi</i>	A			
Polychaeta					
P 106	<i>Harmothoe imbricata</i>			A	
P 107	<i>Harmothoe impar</i>			A	
P 133	<i>Lepidonotus squamatus</i>	A			
P 312	<i>Phyllodoce lamelligera</i>			A	
P 471	<i>Glycera</i> sp.	A			

Code	Species	Sites			
		I	II	III	IV
Polychaeta cont.					
P 686	<i>Eusyllis blomstrandii</i>	A			
P 745	<i>Exogone naidina</i>	A			
P 771	<i>Autolytus prolifera</i>	A			
P 825	<i>Neanthes fucata</i>	A			
P 837	<i>Nereis zonata</i>	A			
P 1484	<i>Flabelligera affinis</i>	A			
P 1876	<i>Sabellaria spinulosa</i>	A			
P 2261	<i>Sabella pavonina</i>	A			
P 2288	<i>Hydroides norvegicus</i>	A			
P 2304	<i>Pomatoceros triqueter</i>	A			
P 2326	<i>Filograna implexa</i>	A			
Pycnogonida					
Q 4	<i>Nymphon brevirostre</i>	A			
Q 7	<i>Nymphon grossipes</i>	A			
Q 8	<i>Nymphon hirtum</i>	A			
Q 55	<i>Pseudopallene circularis</i>	A			
Acarl					
Q 154	<i>Copidognathus reticulatus</i>	A			
Q 155	<i>Copidognathus rhodostigma</i>	A			
Cirripedia					
R 31	<i>Scalpellum scalpellum</i>	A			
R 64	<i>Verruca stroemia</i>	A			
R 108	<i>Semibalanus balanoides</i>			A	
R 109	<i>Balanus balanus</i>	A			
R 175	<i>Peltogaster paguri</i>	A			
Amphipoda					
S 181	<i>Calliopu laeviusculus</i>				A
S 193	<i>Eusirus longipes</i>	A			
S 199	<i>Epimeria cornigera</i>	A			
S 201	<i>Epimeria tuberculata</i>	A			
S 245	<i>Westwoodilla caecula</i>	A			
S 264	<i>Stenopleustes latipes</i>	A			
S 494	<i>Hippomedon denticulatus</i>	A			
S 628	<i>Iphimedia obesa</i>	A	A		
S 684	<i>Atylus vedlomensis</i>	A			
S 708	<i>Ampelisca aequicornis</i>	A			
S 711	<i>Ampelisca diadema</i>	A			
S 722	<i>Ampelisca typica</i>	A			
S 761	<i>Echinogammarus marinus</i>				A
S 762	<i>Echinogammarus obtusatus</i>				A
S 764	<i>Echinogammarus stoerensis</i>				A
S 772	<i>Gammarus finmarchicus</i>				A
S 853	<i>Maera othonis</i>	A			
S 945	<i>Erichthonius rubricornis</i>	A			
S 955	<i>Jassa falcata</i>	A			
S 1024	<i>Corophium insidiosum</i>				A
Isopoda					
S 1474	<i>Jaera albifrons</i>			A	
S 1484	<i>Janira maculosa</i>		A		
S 1563	<i>Idotea granulosa</i>			A	A



Code	Species	Sites			
		I	II	III	IV
Isopoda cont.					
S 1566	<i>Idotea neglecta</i>				A
S 1567	<i>Idotea pelagica</i>				A
S 1592	<i>Astacilla longicornis</i>	A	A		
Decapoda					
S 2250	<i>Caridion gordonii</i>	A			
S 2261	<i>Eualus gaimardii</i>	A			
S 2271	<i>Hippolyte varians</i>	A			
S 2322	<i>Pandalus montagui</i>	A			
S 2341	<i>Pontophilus bispinosus</i>	A			
S 2346	<i>Pontophilus spinosus</i>	A			
S 2465	<i>Pagurus bernhardus</i>	A		A	
S 2490	<i>Galathea strigosa</i>	A			
S 2502	<i>Pisidia longicornis</i>	A	A		
S 2559	<i>Hyas araneus</i>	A			
S 2560	<i>Hyas coarctatus</i>	A	A		
S 2586	<i>Macropodia tenuirostris</i>		A		
S 2646	<i>Cancer pagurus</i>			A	
S 2690	<i>Carcinus maenas</i>			A	
Polyplocophora					
W 55	<i>Leptochiton asellus</i>	A	A		
W 74	<i>Lepidochitona cinereus</i>			A	
W 79	<i>Tonicella rubra</i>			A	
Gastropoda (except Opisthobranchia)					
W 111	<i>Emarginula fissura</i>	A	A		
W 115	<i>Puncturella noachina</i>	C			
W 126	<i>Tectura virginea</i>			A	C
W 133	<i>Patella ulyssiponensis</i>			A	
W 134	<i>Patella vulgata</i>			A	A
W 139	<i>Helcion pellucidum</i>			A	C
W 191	<i>Gibbula tumida</i>	B	B		
W 193	<i>Gibbula cineraria</i>			A	A
W 200	<i>Calliostoma zizyphinum</i>	A	A		
W 200	<i>Calliostoma zizyphinum var lyonsii</i>	A			
W 239	<i>Lacuna pallidula</i>			A	A
W 244	<i>Lacuna vincta</i>			A	A
W 250	<i>Littorina littorea</i>			A	A
W 254	<i>Littorina mariae</i>			A	A
W 258	<i>Littorina neglecta</i>			A	A
W 260	<i>Littorina saxatilis</i>			A	
W 284	<i>Rissoa interrupta</i>			A	A
W 313	<i>Alvania punctura</i>				C
W 318	<i>Alvania semistricta</i>				B
W 340	<i>Onoba semicostata</i>			A	A
W 400	<i>Skeneopsis planorbis</i>			A	A
W 442	<i>Turritella communis</i>	A	B		
W 517	<i>Chrysallida spiralis</i>				C
W 557	<i>Brachystomia rissoides</i>			A	A
W 620	<i>Epitonium trevelyanum</i>	B	B		
W 700	<i>Aporrhais pespelecani</i>	A	A		
W 701	<i>Aporrhais serresianus (juv.)</i>	B			
W 713	<i>Trichotropis borealis</i>	C			
W 754	<i>Velutina velutina</i>	C			

Code	Species	Sites			
		I	II	III	IV
Gastropoda cont.					
W 775	<i>Lunatia montagui</i>	A			
W 777	<i>Lunatia poliana</i>	B	B		
W 813	<i>Boreotrophon truncatus</i>	A			
W 817	<i>Nucella lapillus</i>			A	
W 844	<i>Buccinum undatum</i>	A	B		
W 860	<i>Neptunea antiqua</i>	A	C		
W 874	<i>Colus gracilis</i>	B			
W 876	<i>Colus jeffreysianus</i>	C	B		
W 887	<i>Hinia incrassata</i>	A	A		C
W 889	<i>Hinia reticulata</i>	B			
W 919	<i>Mangelia brachystoma</i>	B			
W 930	<i>Oenopota trevelliiana</i>	B			
W 931	<i>Oenopota turricula</i>	B	C		
W 939	<i>Teretia teres</i>	B			
W 945	<i>Raphitoma linearis</i>	A			
Opisthobranchia					
W 958	<i>Acteon tornatilis</i>	B	B		
W 969	<i>Cylichna cylindracea</i>	B			
W 973	<i>Roxania utriculus</i>	C			
W 986	<i>Philine scabra</i>	C			
W 1017	<i>Retusa truncatula</i>				B
W 1083	<i>Limapontia senestra</i> (juv.)			A	
W 1113	<i>Berthella plumula</i>			A	
W 1242	<i>Tritonia hombergii</i>	A			
W 1319	<i>Acanthodoris pilosa</i>	A			
W 1382	<i>Cadlina laevis</i>			A	
W 1425	<i>Armina loveni</i>	A			
W 1448	<i>Coryphella</i> sp.	A			
W 1515	<i>Eubranchus tricolor</i>		A		
W 1524	<i>Facelina</i> sp. (probably <i>coronata</i>)	A			
Scaphopoda					
W 1591	<i>Antalis entalis</i>	A	C		
Pelecypoda					
W 1618	<i>Nucula nitidosa</i>		C		
W 1619	<i>Nucula nucleus</i>	A			C
W 1631	<i>Nuculana minuta</i>	A	B		
W 1650	<i>Mytilus edulis</i>			A	A
W 1664	<i>Musculus discors</i>	B			
W 1669	<i>Modiolarca tumida</i>	A			
W 1675	<i>Modiolus modiolus</i>	A	A		
W 1778	<i>Palliolum tigrinum</i>	C	C		
W 1782	<i>Similipecten similis</i>	A			
W 1796	<i>Chlamys distorta</i>	A	C		
W 1805	<i>Aequipecten opercularis</i>	A			
W 1809	<i>Pecten maximus</i>	A			
W 1820	<i>Pododesmus patelliformis</i>	C	A		
W 1822	<i>Pododesmus squamula</i>	A	A	A	A
W 1842	<i>Lucinoma borealis</i>	C			
W 1852	<i>Thyasira flexuosa</i>	B			
W 1885	<i>Kellia suborbicularis</i>	A	A		
W 1905	<i>Mysella bidentata</i>			C	
W 1911	<i>Tellimya ferruginosa</i>		C		

Code	Species	Sites			
		I	II	III	IV
Pelecypoda cont.					
W 1945	<i>Astarte sulcata</i>	C			
W 1959	<i>Tridonta elliptica</i>	C			
W 1961	<i>Tridonta montagui</i>	C	C		
W 1976	<i>Parvicardium minimum</i>	A			
W 1977	<i>Parvicardium ovale</i>	A	A		C
W 1978	<i>Parvicardium scabrum</i>	A			
W 2003	<i>Spisula elliptica</i>	C			
W 2022	<i>Ensis</i> sp.	C			
W 2032	<i>Phaxus pellucidus</i>	B			
W 2051	<i>Arcopagia crassa</i>	C			
W 2087	<i>Gari fervensis</i>	B	C		
W 2105	<i>Abra prismatica</i>	B			
W 2125	<i>Arctica islandica</i>	B	C		
W 2164	<i>Dosinia lupinus</i>	B			
W 2185	<i>Venerupis senegalensis</i> (juv.)				A
W 2189	<i>Chamelea gallina</i>	C			C
W 2218	<i>Turtonia minuta</i>			A	A
W 2227	<i>Mya truncata</i>	C			
W 2239	<i>Corbula gibba</i>	C	A		
W 2251	<i>Hiatella arctica</i>	A	A	A	A
W 2353	<i>Thracia villosiuscula</i>	C			
W 2361	<i>Cochlodesma praetenu</i>	C			
Cephalopoda					
W 2408	<i>Sepiolo atlantica</i>	A			
Bryozoa					
Y 28	<i>Crisia eburnea</i>	A			
Y 49	<i>Tubulipora lilacea</i>	A			
Y 139	<i>Alcyonidium hirsutum</i>	A			
Y 142	<i>Alcyonidium parasiticum</i>	A			
Y 307	<i>Umbonula littoralis</i>			A	
Y 622	<i>Turbicellepora avicularis</i>	A			
Y 658	<i>Eucratea loricata</i>	A			
Y 664	<i>Membranipora membranacea</i>			A	
Y 678	<i>Electra pilosa</i>			A	
Y 694	<i>Flustra foliacea</i>	A			
Y 710	<i>Securiflustra securifrons</i>	A			
Y 724	<i>Callopora dumerilii</i>	A			
Y 814	<i>Cellaria sinuosa</i>	A			
Y 840	<i>Scrupocellaria scrupea</i>	A			
Y 841	<i>Scrupocellaria scruposa</i>	A			
Y 872	<i>Bugula flabellata</i>	A			
Y 875	<i>Bugula plumosa</i>	A			
Echinodermata					
ZB 164	<i>Henricia</i> sp.	A			
ZB 190	<i>Asterias rubens</i>	A	A		
ZB 235	<i>Ophiothrix fragilis</i>	A	A		
ZB 278	<i>Ophiopholis aculeata</i>	A			
ZB 300	<i>Amphipolis squamata</i>			A	
ZB 313	<i>Ophiura albida</i>	A	A		
ZB 355	<i>Psammechinus miliaris</i>	A			
ZB 362	<i>Echinus esculentus</i>	A	A		
ZB 388	<i>Echinocyamus pusillus</i>	A			

Code	Species	Sites			
		I	II	III	IV
Echinodermata cont.					
ZB 484	<i>Ocnus lactea</i>	A			
Asciacea					
ZD 141	<i>Asciella aspersa</i>	A			
ZD 194	<i>Dendrodoa grossularia</i>	A		A	
Pisces					
ZG 49	<i>Clupea harengus</i>	A			
ZG 438	<i>Taurulus bubalis</i>	A			
ZG 680	<i>Pholis gunnellus</i>		A		
ZG 707	<i>Aphia minuta</i>	A			
ZG 724	<i>Gobius paganellus</i>	A			
ZG 877	Pleuronectidae indet. (juv.)	A			

Notes on species of interest:

D1025 *Alcyonium glomeratum* - this is likely to have been a misidentification of *A. digitatum*, since all previous records (except for another doubtful record from the Cullercoats area) are confined to west and southwest coasts of UK (Manuel, 1988).

Q7 *Nymphon grossipes* - The only records of this species in the last 60 years are from the Trink, where it is common (Bamber, pers.comm.).

Q55 *Pseudopallene circularis* - Apart from one record from off Teesmouth, the only records of this species in the last 60 years are from the Trink (Bamber, pers.comm.).

Q154 *Copidognathus reticulatus* - This is a new record for the area (Bamber, pers. comm.).

S201 *Epimeria tuberculata* - Lincoln (1979) cites a single British record in the Clyde, but Martin Sheader has recorded it previously in the Cullercoats area (Sheader pers.comm.).

S708 *Ampelisca aequicornis* - has not been recorded in the area since 1895 (Sheader, pers.comm.).

S722 *Ampelisca typica* - Lincoln (1979) does not cite any records for the east coast, but it was recorded in 1900 (Sheader pers.comm.).

S2261 *Eualus gaimardii* - This is a new record for the area (Bamber, pers.comm.).

W620 *Epitonium trevelyanum* - No records since 1905 (Foster-Smith, pers.comm.). 1 very fresh dead specimen and a few worn specimens collected.

W701 *Aporrhais serresianus* - No previous records in the Cullercoats area (Foster-Smith, pers.comm.).

W713 *Trichotropis borealis* - Only one record this century, and none since 1905 (Foster-Smith, pers.comm.). 1 dead adult collected.

W876 *Colus jeffreysianus* - No records since 1905 (Foster-Smith, pers.comm.).

W919 *Mangelia brachystoma* - No records since 1905 (Foster-Smith, pers.comm.).

W939 *Teretia teres* - No records since 1864 (Foster-Smith, pers.comm.). 1 specimen of a very freshly dead adult collected.

W973 *Roxania utriculus* - No records since 1888 (Foster-Smith, pers.comm.). 1 dead specimen collected.

W1619 *Nucula nucleus* - No records since 1938 (Foster-Smith, pers.comm.). Live and dead specimens collected.

W1959 *Tridonta elliptica* - No previous records (Foster-Smith, pers.comm.).

W1976 *Parvicardium minimum* - Only one specimen recorded (1973) since 1851 (Foster-Smith, pers.comm.). 1 live specimen collected.

W2051 *Arcopagia crassa* - Only one specimen recorded (1964) since 1899 (Foster-Smith, pers.comm.).

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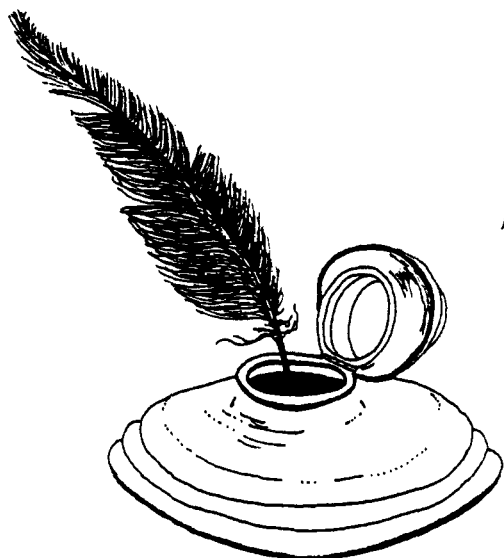
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Acknowledgements

Many thanks to all the participants of the meeting, and particularly to Peter Garwood, Judy and Bob Foster-Smith, Shelagh Smith, Jan Light, Roger Bamber, Tom Thompson and Martin Sheader for sending me records and helping me to compile the list of species of interest.





Letters to the Editor

from Mark J. Costello
Environmental Sciences Unit
Trinity College, Dublin 2, Ireland

Dear Readers,

I have observed two interesting aspects of fish behaviour in the sea. Firstly, a group of at least 7 dogfish (*Scyliorhinus canicula*) huddled in large holes under rocks and boulders on two occasions. What they are doing (or waiting to do) in there I do not know, but maybe someone else knows, or if I can collate further observations perhaps a pattern will emerge.

Secondly, I have observed wrasse cleaning other fish in Irish waters and several of the common fish guides note that this behaviour occurs. Indeed, the Norwegians are using some species to remove parasitic lice of salmon in fish cages. However, there do not appear to be any published observations of such behaviour in the wild with details of locality, date and species involved. This is probably because diving scientists only witness such behaviour occasionally and do not feel it merits "writing up".

If you have any records of groups of dogfish in holes or of cleaning fish in north European waters I would be very grateful if you could let me know.

Hon.Ed.; I presume that I don't have to respond to letters addressed "Dear Readers", so over to you; but don't forget that we also like to publish replies to correspondence.

NOTICES



THE MARINE BIOLOGICAL ASSOCIATION will be holding a meeting entitled **ENVIRONMENTAL CHANGE ~ BIOLOGICAL RESPONSE** at the Polytechnic Southwest, Plymouth, on 2 - 4 April 1990.

The meeting will consider the adaptive responses of biological systems in the sea to stress (induced for example by contaminants, anoxia, climatic change, osmotic stress). Sessions will be arranged to express the way in which biological systems respond and adapt at different levels of organisation. Each of these will be introduced by a keynote speaker. You are invited to submit short papers (20 minutes) and posters on the following topics. Time will be allowed in the programme for a poster session.

1. *Cellular/subcellular*. To include detoxification pathways, sequestration, repair mechanisms.

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2. *Whole organisms.* Reproduction and breeding behaviour, accumulation and excretion of contaminants, acquisition of tolerance.
3. *Community.* Structure of communities, diversity, species succession, trophic levels.
4. *Long-term changes.* Interaction between biological communities and climatic changes with special emphasis on the use of long-term biological data sets.

The Meeting will be the occasion of the second **Leslie Cooper Memorial Lecture**. For further details, or to offer a contribution, contact either Dr M.B. Jones, Dept. of Biological Sciences, Polytechnic South West, Drake Circus, Plymouth PL4 8AA or Dr Linda Maddock, Marine Biological Association, The Laboratory, Citadel Hill, Plymouth PL1 2PB

THE MARINE CONSERVATION SOCIETY, WEST OF SCOTLAND BRANCH announces a "great programme of events" for 1989-90. Regular indoor meetings will be on the second Wednesday of each month at the Art Gallery in Kelvingrove, Glasgow, at 19.30hrs. The next will be Wed December 13th - Video and slides from the University's summer trip to Tobago, followed by mince pies and wine. Dominic Counsell will be on hand at the Wednesday meetings to tell a little about marine biology.

Events coming up in 1990 include:
 Lawson Wood will be visiting us again with a spectacular show;
 Easter Holiday booked at Loch Duich;
 Diving trips planned for May with Bruce Howard;
 Photographic competition.

As last year, there is a small membership fee for the West of Scotland Branch of MCS, to cover costs of mailing and of running the meetings. The subscription is £5.00 per head or £8.00 for family membership. Membership entitles you to attend all the monthly meetings (which include refreshments) and you will get a syllabus for 1989-90 with all the dates of events.

Applications for membership (cheques/PO payable to "Marine Conservation Society (Scottish Region)"), queries, ideas or suggestions to Mary Child, 32 Springfield Park Road, Burnside, Glasgow G73 3RQ (Tel. 041 643 1650) or contact Morag MacKinnon (041 638 2622).

ROYAL IRISH ACADEMY PRAEGER COMMITTEE FOR FIELD NATURAL HISTORY Grant Information. Grants, not normally exceeding IR£300 in any one year, are available for field work relevant to the natural history of Ireland. Grantees need not be based in Ireland. Applications are particularly welcomed from amateur natural historians but awards cannot be made in support of undergraduate or postgraduate student projects. Preference will be given to projects which concern sites of special scientific interest and/or endangered species.

It is preferred that publication of results should be in the Irish Naturalists Journal, Irish Birds or, if appropriate, the Academy's Proceedings.

A representative set of any material collected must be deposited in the National Museum, Dublin; the National Herbarium, Dublin; or the Ulster Museum, Belfast; or any other recognised institution in Ireland.

Application forms - which must be returned by 15th February - are now available from:

PRAEGER COMMITTEE SECRETARY,
 ROYAL IRISH ACADEMY
 19 DAWSON STREET
 DUBLIN 2

SHORE ECOLOGY OF LEWIS AND HARRIS

by Shelagh Smith

Lewis forms the northern part of the largest, most northerly island of the Outer Hebrides (off northwest Scotland), while Harris is its southern end. The boundary between Lewis and Harris has no particular topographic feature, but Harris is divided into North Harris and South Harris at the isthmus at Tarbert (Fig.1). There is a wide range of environments, from some of the most exposed in Britain to some of the most sheltered.

Much of the rock is Precambrian Lewisian gneiss and granite, which is hard and smooth with few crevices. As will be shown, however, the distinctive topography of the gneiss contributes greatly to the environment. It has been eroded into hummocks and hollows, the latter being water-filled, fresh, brackish or fully saline, forming interesting lagoons (Smith, 1984; 1987). Around Stornoway on the east coast there is a hard Permo-Triassic conglomerate which is not too hospitable, and in South Harris there is a belt of calcareous metamorphic rocks which make little positive contribution to the shore environment.

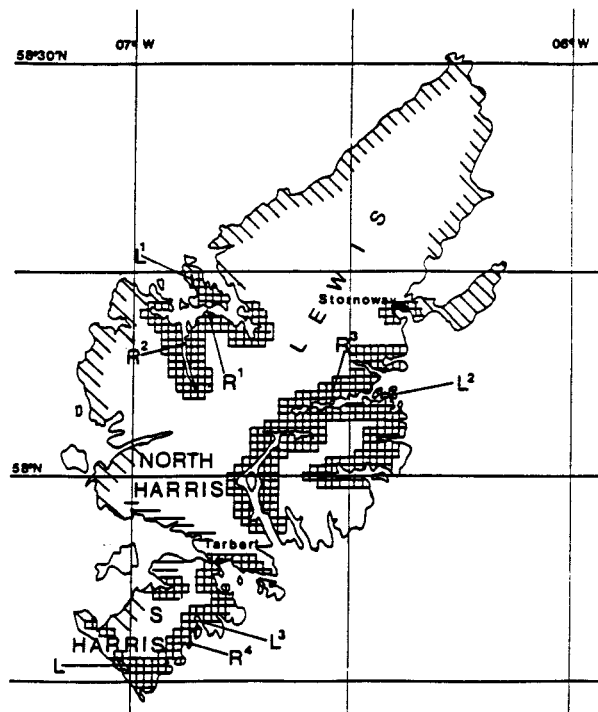


FIG.1. Map of Lewis and Harris, showing exposed coasts (diagonal lines) and sheltered coasts (squared). R - tidal rapids; L - lagoons.

Field work was done in 1977 and (mostly) 1982 under contract to the Nature Conservancy Council (Smith, 1979; 1982; 1983). The scope of the present paper is restricted to work carried out by myself. The sediment shores, especially the sandy ones, have been described by Angus (1979). Conditions described pertain to the situation as it was at least 7 years ago, and it is possible that in some of the more sheltered areas changes will have taken place owing to development. Many fish and shellfish farms are now present. However, the descriptions and conclusions set out here have their interest in that they refer to a more or less natural environment, although the demise of natural major oyster and mussel beds in Harris had taken place many years ago: some locals attribute this to over-fishing while others blame the advent of sewage being piped into the sea (Macdonald, 1985).

Exposed Shores

The west coast is largely exposed to the Atlantic and, with deeper offshore water, is more storm-lashed than apparently similar shores further south in the Outer Hebrides. The east coast of Lewis as far south as the Eye peninsula is exposed to the north or south and has a similar nature. A considerable proportion of the coast is cliff up to 50 m high, upon which little can survive, but the top is distinguished by saltmarsh which is visited by waves at not infrequent intervals. At the bases of the cliffs there were patchy *Balanus-Mytilus* communities, with *Alaria esculenta* (L.) Grev. at low water, and in the more sheltered parts various fucoids and *Laminaria digitata* (Hudson) Lamouroux. Some rocky areas had exposed rock pools with a distinctive flora, chiefly corallines, including encrustations of *Lithothamnion glaciale* Kjellman, which harboured a variety of species depending on a crevice and/or a calcareous habitat. These include sipunculids and nemerteans and the molluscs *Acanthochitona crinitus* (Pennant), *Kellia suborbicularis* (Montagu) and *Epilepton clarkiae* (Clark). These pools could be the richest sites on the exposed rocky shores.

In addition to cliffs, particularly in the north of Lewis, there are considerable stretches of boulder beach with storm beach above, interspersed with low rock platforms. The boulders are smooth, indicating that they are rolled, and they have a sparse flora and fauna. The rock platforms, where the grain is parallel to the shore, contain patches of abundant life, dominated by fucoids and *Littorina* spp. supporting a winkle-gathering industry. While algae, particularly Rhodophyta, were abundant and diverse, the fauna, apart from the species mentioned, was generally patchy and sparse and of low diversity.

The coast of north-west Lewis is distinguished by several small lochs or lagoons cut off from the sea by boulder beaches. They are only a few metres deep, with sand or boulder floors, and with an impoverished fauna because, while they are normally fresh or at very low salinity, occasional storms sweep in saline water, killing of the inhabitants.

Sheltered Shores

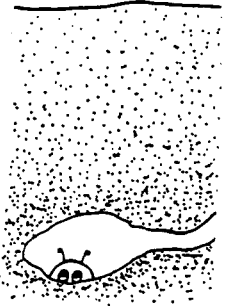
The sea lochs on the east coast together with Loch Roag on the west coast are all to a greater or lesser extent sheltered, and exhibit a range of environments from cliffs to various rocky and stable bouldery shores blanketed with fucoids, and a small amount of sediment, usually gravel or muddy sand with an infauna of polychaetes and large bivalve molluscs including *Modiolus modiolus* (L.), *Ensis arcuatus* (Jeffreys) and venerids. *Tapes decussatus* (L.) had a tenuous hold at Crossbost, its most northerly recorded site, living not in gravel but under boulders where it was perhaps a little safer from the active predation of the local human population. At the heads of some of the sea lochs, for example Loch Erisort, there are considerable areas of soft mud with *Scrobicularia plana* (da Costa). There was a much larger biomass of both plant and animal life than on the exposed coasts, and while the fauna was also much more diverse than on the exposed west coast, the algae, so far as I can identify them, had a similar number of species.

Exceptionally, the sheltered east coast of South Harris had a noticeably naturally impoverished fauna, the reason for which was not apparent.

There are estuarine conditions at the heads of some sea lochs, such as in Loch Roag where there are large rivers including the Grimersta and Abhainn Dhubh. Here, in the constant water flow, the sediment is gravel or muddy gravel, with some bedrock or boulders capped by *Ascophyllum nodosum* (L.) and *Mytilus edulis* L. The calmer gravel areas support *Fucus vesiculosus* L., *F. spiralis* L. and *F. ceranoides* L. together with *Ascophyllum nodosum mackaili*. Where there is a strong freshwater flow overlying more saline water, the algae are stunted and have been levelled off as if cropped by a lawn mower.

Tidal Rapids

Narrows in the lochs produce tidal rapids which are the richest and most diverse habitats. The more important ones which I investigated include those at Bernera Bridge in Loch Roag and at the entrance to Little Loch Roag, and on the east coast the Loch Erisort narrows at Balallan and the mouth of Ob Manish. Bernera Bridge (Fig.1, R¹) crosses a channel about 100 m wide which joins Loch Roag and East Loch Roag. Much of the floor of the channel is a gravel flat with large boulders, permanently submerged and at a depth of several metres in the middle. The maximum current speed is about 2 knots. There were a number of species not usually found above low water, including algae and a swarm of *Antedon* sp. Pycnogonids were common. Over 50 species of mollusc were found, including *Ocenebra erinacea* (L.) which at the time of reporting (1983) was the most northerly site in Britain.



The entrance to Little Loch Roag (Fig.1, R²) is by a narrow gut some 2 km long and only 60 m wide at its narrowest, where the sides are almost vertical rock walls with narrow ledges and loose blocks. In wider areas there are patches of gravel and boulders. The tidal current is up to 8 knots. Polychaetes, bryozoans and ascideans were notable diverse, but sponges were few. Again there were over 50 species of mollusc. (By contrast, divers reported that the subtidal part of the channel was comparatively impoverished, probably because of boulders rolling along in the current.)

The tidal narrows at Balallan (Fig.1, R³) on the east side of Lewis has very sheltered, steep boulder shores which were blanketed by fucoids. At low water rocks emerge and the channel is reduced to 50 m over some 0.5 km. Although much of Loch Erisort is muddy, the current keeps this area clean. The bivalve fauna of the gravel included *Lutraria angustior* Philippi, *Clausinella fasciata* (da Costa) and *Mya truncata* L., suggesting that the sediment was mobile; under fucoid-covered boulders there was a semi-mud *Eupolymnia nebulosa* - *Pododesmus patelliformis* community. (At this site was found a certain *Eledone* famous for attacking me [Anon, 1982]).

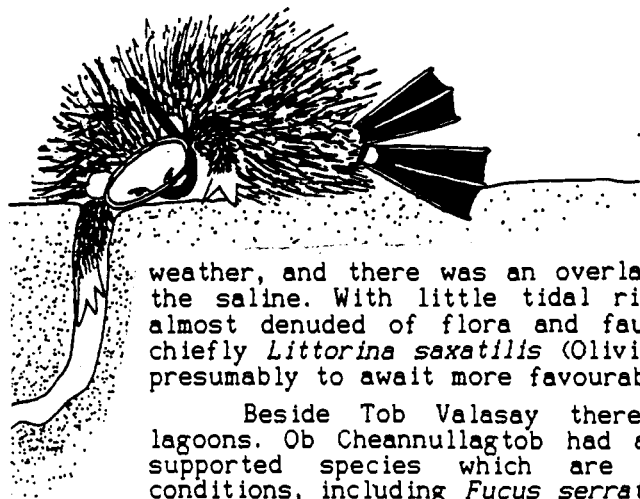
The navigable tidal rapids at Manish in South Harris (Fig.1, R⁴) differ again in being mostly rocky. They are only 40 m wide and 100 m long but have a greater drop than the others, of about 1.5 m. The fauna was noticeably sparse for a rapids, and comprised mostly sponges and *Sagartia elegans* (Dalyell).

Saline Lagoons

These are a typical feature of Lewisian gneiss topography and many have been listed (Smith, 1984; 1987). They have various and varying salinities from more or less fully saline to completely fresh water at their upper ends or on the surface. My testing of the salinity of these lagoons was by taste only. Having visited those in the Uists studied by Nichol (1936) and Dipper & Mitchell (1980), I am of the opinion that one-off measurements of salinity are of limited use, particularly when given without indications of ambient or recent weather patterns. The weather in the Outer Hebrides can have long periods (up to 12 weeks) of drought, when the salinity rises considerably, then there can be a sudden change to flood and an influx of fresh water. In calm conditions there may be a surface layer of fresh water (i.e. water not tasting salty) overlying fully saline water, but if rain coincides with gales there will be surface mixing. Apart from this there may be complex haloclines at a lower level.

As a rule of thumb, I have graded the lagoons according to the amount of marine flora and fauna present: the following are examples chosen from amongst many.

On the west coast, in Loch Roag the lagoon system at Tob Valasay (Fig.1, L¹) comprises the main lagoon, some 2 km long and 0.7 km wide, which has been dammed at its seaward end by a tidal weir. However, much of the lagoon was still more or less fully saline with vigorous stands of *Codium fragile* (Suhr) Hariot which supported a marine mollusc community. When visited there had been a prolonged period of wet



weather, and there was an overlay of some 10 cm of fresh water above the saline. With little tidal rise and fall, the shore was therefore almost denuded of flora and fauna apart from *Gammarus* spp. Winkles, chiefly *Littorina saxatilis* (Olivi) had retreated above high water mark, presumably to await more favourable conditions.

Beside Tob Valasay there is a staircase system of smaller lagoons. Ob Cheannullagtoob had at its mouth a 2 m high cliff, which supported species which are tolerant of the variable brackish conditions, including *Fucus serratus* (lagoon form), *Mytilus edulis*, *Onoba semicostata* (Montagu) and *Skeneopsis planorbis* (Fabricius). The whole of this lochan has access to the sea, but as it is fed by Loch Bharabhat (barely higher and about 2 km long) the fresh water influence was paramount and there was no surface indication of marine conditions.

On the east coast, Loch nam Bodach, in Lewis (Fig.1, L²), is about 500 m long and 250 m wide, the upper half cut off by a shallow narrows and assumed to be much less saline than the rest. The tide enters at a waterfall 1 to 10 m wide, 40 m long and with a drop of about 2.5 m; the tidal range in the lagoon is about 0.5 m. While marine species were present, there was an excellent fauna typical of brackish lochs, including *Alderia modesta* (Loven) and the submerged winkles *Littorina tenebrosa* (Montagu) and the lagoon form of *L. mariae* Sacchi & Rastelli.

By contrast, at Bayhead of Ardvey in South Harris (Fig.1, L³) is a fully saline inlet, passing up through a steep boulder bed into a pool 100 m long which is fed by a river and contained *Fucus ceranoides*. To one side there is a more or less vertical cliff supporting *F. vesiculosus* and *F. serratus*, which live above the *F. ceranoides* in the pool below; they are protected from the inflow of freshwater by being at a higher level, and thus only covered by salt water. The waterfall here leads from an upper lagoon, Loch na Sweyn, 200 m square. In 1977, while the shore environment appeared totally fresh, there was a natural marine litter of shells including *Mytilus edulis*, indicating that saline conditions had been present, perhaps beneath the surface; in 1982 there was no sign of marine life at all.

Diversity and Abundance of Species

While there are obvious differences in the species complement between exposed and sheltered shores, and while the exposed shores tend to have a lower biomass than the sheltered, there are also conspicuous differences in the diversity. Fig.2 shows the average and range of numbers of species for each major habitat.

The estuarine habitats had fewest species (although one estuarine site was rich in polychaetes): the lagoons, being on the whole more saline, had more species. The figures for molluscs are the most accurate, with about 6 species in the estuaries and 26 in the lagoons. The most diverse habitat was the tidal rapids with about 50-65 mollusc species, and almost as many of other groups (it should be understood that these numbers refer to species recognized by me; the true figures would be higher).

Apart from these unusual habitats, the rest show a decrease in mollusc species numbers from 35 in the very sheltered to 15 in the very exposed habitats (the "sheltered" habitat had more species [47] than the "very sheltered" owing to better water quality). This decrease in diversity of molluscs is paralleled by that of other animals (37 in the very sheltered to 13 in the exposed). There is no significant change in the numbers of algae, about 30 in each case, with Rhodophyta on the exposed coasts being replaced by Phaeophyta on the more sheltered.

Molluscs Associated with Algae

Samples of *Fucus serratus* and of small algae were taken from most sites investigated, and consistent methodology used for collection and extraction of molluscs (Smith, 1979). The full data showed differences between samples both at different habitats and at different seasons of the year. These differences are summarized more simply here. There are very wide variations between samples from a single type of

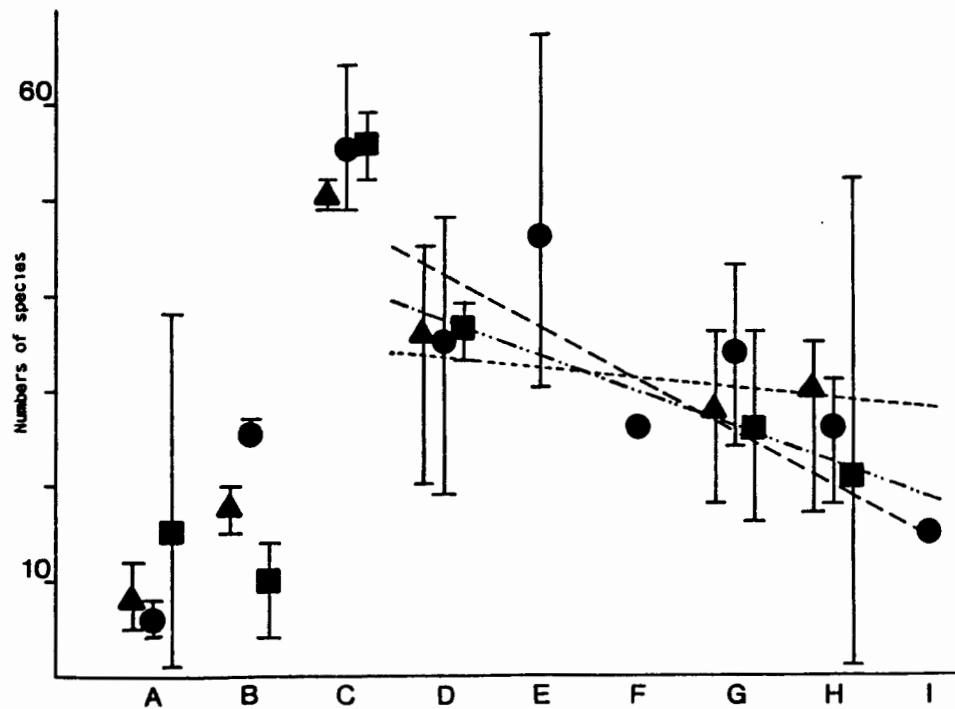


FIGURE 2. Numbers of species at different habitats: circles = molluscs; squares = other animals; triangles = algae. A = estuary; B = lagoon; C = tidal rapids; D = very sheltered; E = sheltered; F = moderately sheltered; G = moderately exposed; H = exposed; I = very exposed.

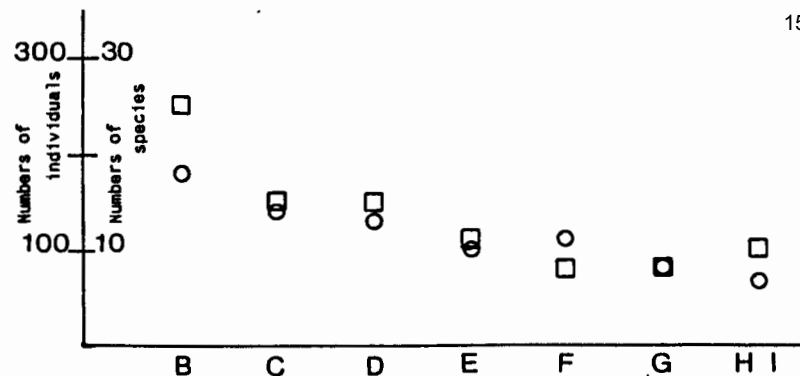


FIGURE 3A. Molluscs associated with *Fucus serratus*. Numbers of species (10s) shown by open circles, numbers of individuals (100s) by open squares. Habitats as in Fig 2.

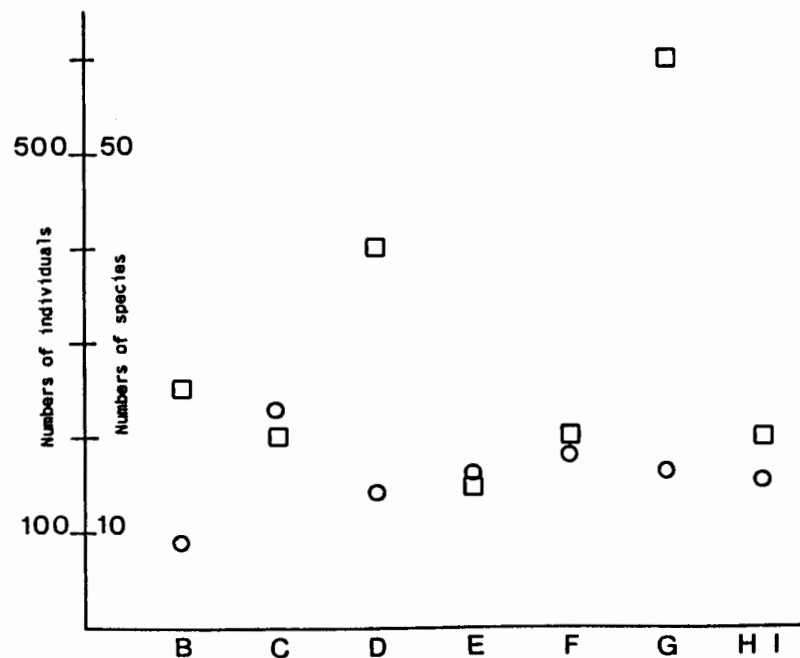


FIGURE 3B. Molluscs associated with small algae. Numbers of species (10s) shown by open circles, numbers of individuals (100s) by open squares. Habitats as in Fig 2.

habitat, caused by the season, the variation attendant upon what can only be a random sampling of subtly varying materials, and also by sudden swarms of certain species, usually having the effect of depressing the diversity but increasing the numbers and biomass. Fig. 3 gives the average values.

For *Fucus serratus* (Fig.3A) there are most species (18) and most individuals (250+) in lagoons: the weed there is sheltered and always submerged. The value for tidal rapids is not outstanding, and there is a small fall off from an average of 13 species and 150+ individuals in very sheltered habitats to 7.5 species and 100+ individuals in exposed habitats.

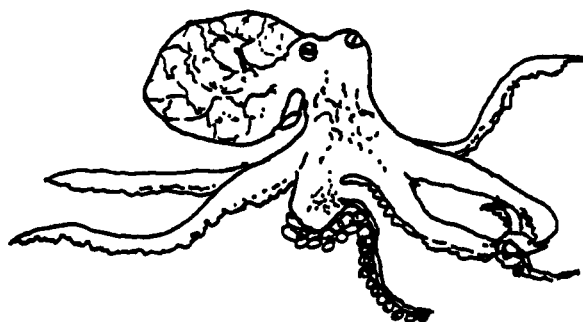
The results for small algae (Fig.3B) are much more haphazard, probably for a number of reasons. Although I concentrated on obtaining a moderately consistent quantity of algae from a variety of levels and microhabitats on the site, there were differences in molluscan preferences for certain algae. Also sampling could be beset by swarms of certain species. Average numbers of species ranged between 9 and 23 (mostly 14 to 18); variation in numbers of individuals (150+ to 600+) was probably not significant.

Conclusions

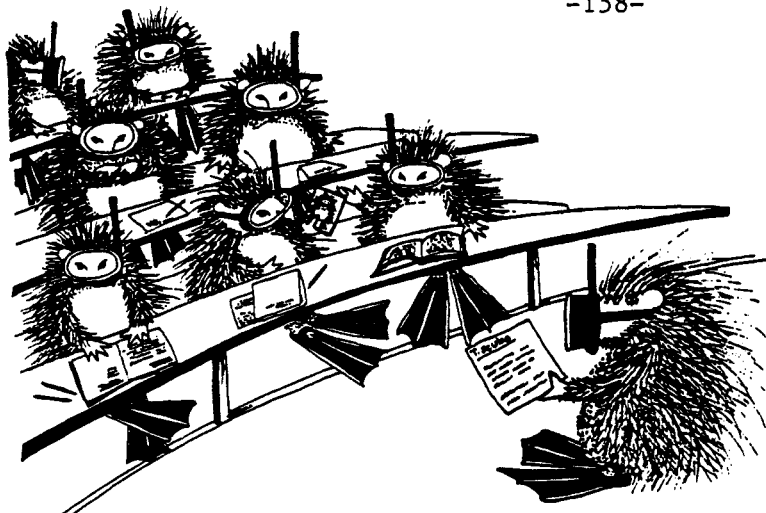
A wide variety of habitats has been found in Lewis and Harris. Those investigated were chiefly rocky. The effects of exposure and of salinity has been demonstrated. While for most groups low salinity results in low diversity, there is a decline in numbers of species, but not always numbers of individuals, with increase in exposure. The exceptionally high diversity of all groups found in tidal rapids has not been matched by those molluscs associated with algae, which showed similar figures to those from other habitats.

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FUTURE MEETINGS

The PORCUPINE Spring Meeting and A.G.M. will be held on the weekend of 3rd - 4th March 1990 at the University of Dundee, on the topic of **Marine Recording**. Members will appreciate that this topic has been a *raison d'être* of PORCUPINE since its inception, and was indeed the theme of our first meeting in Edinburgh in 1977; we return for the third time to this theme (and again in Scotland). Talks will cover:

- New Recording Techniques
- Biology (aspects/implications)
- Progress
- Results of Schemes
- Mapping,
- etc., etc.

amongst other things.

There will of course be the Conference Dinner. Those wishing to attend or contribute and/or requiring further information, details of booking, accommodation, etc., should contact the Hon. Records Coordinator Jon Moore, FSCRC, Fort Popton, Angle, Pembroke, Dyfed, SA71 5AD, or alternatively the Hon. Secretary.

The full programme and details of arrangements will be circulated nearer the date.

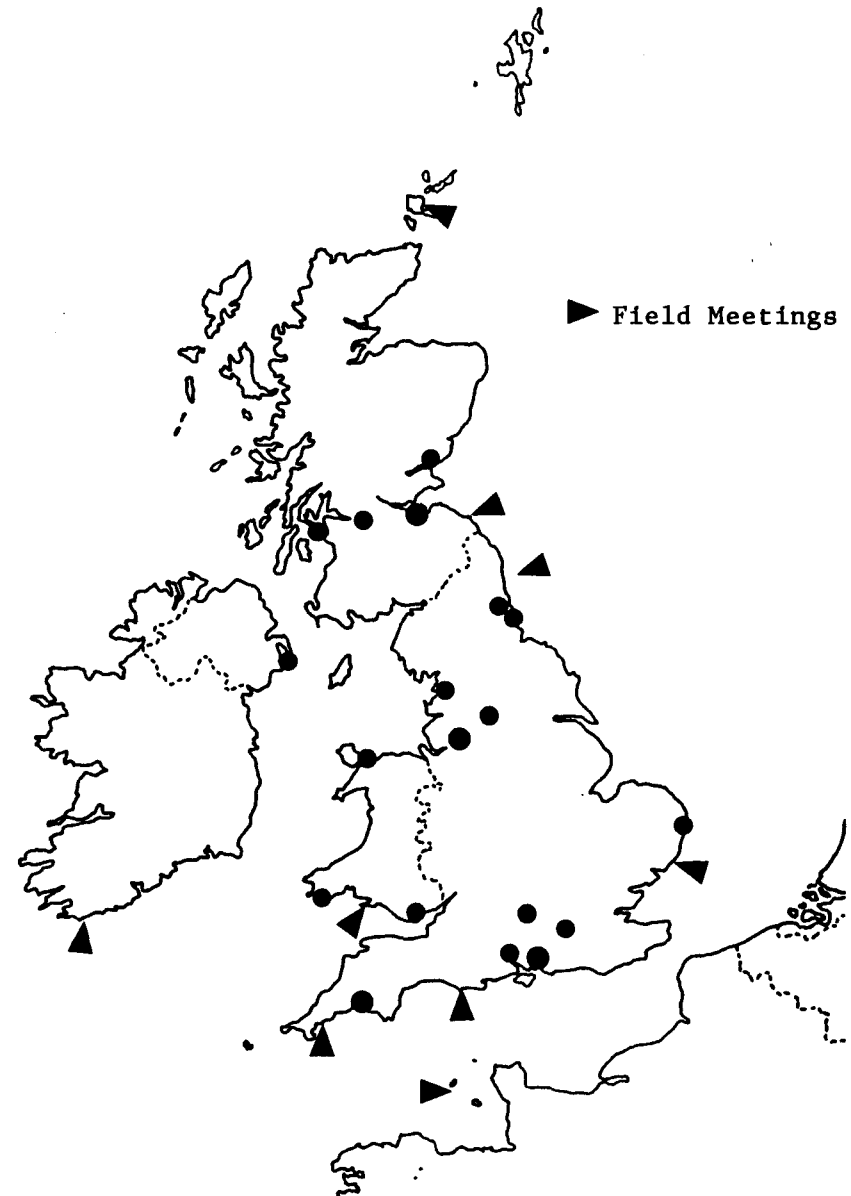
AS ANNOUNCED AT THE LAST MEETING, moves are afoot to produce some **PORCUPINE** sweatshirts, depending on expressed demand. It is hoped that an example of the product will be available at the AGM.

A FULL LISTING of **PORCUPINE** Meetings to date was prepared for a recent Council Meeting; as it was considered of interest to the Membership as a whole, it is reproduced on the following page. This is your chance to offer a gap-filling venue and/or missed topic for a meeting - just contact the Hon. Sec.

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DATE	LOCATION	TOPIC
Feb 1977	Edinburgh (RSM)	Marine Recording
Jun 1977	South Shields	Preservation & Photographic Techniques
Aug 1977	Orkneys	Field Trip with BRISC
Oct 1977	Cardiff	Parasites, Commensals & Symbionts
Feb 1978	Manchester	The Species Problem
Jun 1978	Portaferry, N.I.	Marine Meiofauna
Sep 1978	Portsmouth	Seaweeds
Apr 1979	Edinburgh	Biological Frontiers
Oct 1979	Leeds	Developmental Stages of Marine Organisms
Mar 1980	Edinburgh	Predation & Survival
Sep 1980	Channel Islands	Field Meeting
Feb 1981	Plymouth	Ecology from Underwater Photography
Sep 1981	Rhossili (Gower)	Field Meeting with Conch Soc.
Sep 1981	Portsmouth	Biology of Coelenterates (with The Coelenterate Group)
Mar 1982	Glasgow	Biological Recording
Aug 1982	Sherkin Island	Field Meeting
Dec 1982	Reading	Identification of Sessile Groups
Feb 1983	Menai Bridge	Biogeographic Boundaries
Aug 1983	Eyemouth	Field Meeting
Oct 1983	Newcastle-on-Tyne	Marine Vertebrates
Feb 1984	Edinburgh	Sampling of the Benthos
Sep 1984	Falmouth	Field Meeting
Feb 1985	Manchester	Predators & Feeding Strategies
Apr 1986	Southampton	Coastal Lagoons
Sep 1986	The Fleet, Weymouth	Field Meeting
Apr 1987	Lowestoft	Criteria for Sites of Special Status
Sep 1987	Pembroke (OPRU)	Alien Species
Mar 1988	Millport	Marine Biology in W. Scotland
Oct 1988	Suffolk (Ipswich)	Field Meeting (Shingle Street)
Apr 1989	Lancaster	The Irish Sea
Jul 1989	The Trink (D.M.L.)	Field Meeting
Oct 1989	Guildford	Islands
Mar 1990	Dundee	Marine Recording

HISTORY AND BIOGEOGRAPHY OF PORCUPINE MEETINGS



NOTICE OF ANNUAL GENERAL MEETING

The 13th Annual General Meeting of PORCUPINE will be held at Dundee University on Sunday 4th March 1990 at 09.30 a.m.

The Agenda will include:

1. Minutes of the 12th Annual General Meeting
(Published in PORCUPINE NEWSLETTER, Vol.4 No.5)
2. Hon. Secretary's Report
3. Hon. Treasurer's Report
4. Hon. Editor's Report
5. Hon. Records Coordinator's Report
6. Election of Office Bearers and Council

In connection with Item 6, attention is drawn to the relevant Rules of Procedure:

- (2) The maximum and minimum numbers of Members on the Council shall be left open.
- (4) The office bearers retire annually and are normally available for immediate re-election.
- (5) Council members shall at present serve for three years, at least two retiring each year, who are not normally available for immediate re-election.
- (6) Voting shall take place at the AGM and shall be restricted to Members present.
- (7) Names of persons seeking election to the Council (as chosen by the Council) will appear in a notice prior to the AGM together with an intimation that proposals from ordinary Members of additional candidates are welcome. Candidates must give their assent in person or in writing before voting takes place.

The Office Bearers available for re-election are as follows:

Hon. Secretary	Martin Sheader
Hon. Treasurer	Antony Jensen
Hon. Editor	Roger Bamber
Hon. Records Coordinator	Jonathan Moore

The present Council Members are:

Iain Dixon	Ivor Rees
Frank Evans	Ralph Robson
Bill Farnham	Dennis Seaward
Robin Harvey	Shelagh Smith
David Heppell	Brenda Thompson
David Lampard	John Wilson
Jan Light	Fred Woodward

Proposals from the floor are welcome.

7. Election of Auditors.

The present Auditors are Nick Light and Ralph Robson.

8. Future Meetings

9. Any Other Business.

If Members have a point which they wish to have discussed, particularly if they are unable to attend the AGM, please will they contact the Hon. Sec., Martin Sheader.

* * * * *

THE MARINE BIOTA OF DRURIDGE BAY, NORTHUMBERLAND

by Roger Bamber

Fawley Marine Biology Unit, CEGB, Fawley, Southampton SO4 1TW

Between 1985 and 1987 the CEGB's Marine Biology Unit at Fawley undertook surveys of the plant and animal communities of Druridge Bay, Northumberland, commissioned by Central Electricity Generating Board. Vertebrates were not covered in any detail in these surveys, being the subject of other studies (though fish recorded incidentally are noted herein).

The surveys covered the Bay from the rock platform at Hadston Carrs in the north (55°18.6'N 1°32.7'W) to that of Cresswell Scars in the south (55°14.0'N 1°13.3'W); between these lies more than 8 km of coarse sandy beach, backed by sand dunes. The wave-cut rock platforms are sandstones and shales of the Coal Measures: they extend sublittorally into the Bay as spurs curving inwards, with soft sediments covering some 50% of the seabed in the Bay (Walker, 1984). The sublittoral seabed was sampled by grabbing from the Dove Marine Laboratory's vessel 'Bernicia'; the sublittoral extension of Cresswell Scars (Cresswell Skeres) was the subject of a diving survey by Morpeth Dolphins BS-AC under the direction of Dr R. Foster-Smith.

Details of the surveys and the habitats are described in Bamber & Coughlan (1989). The present paper serves to list the fauna and flora recorded, with notes on commonness and habitat. A small number of animal species are previously in litt. for the Bay (vide the Marine Fauna of the Cullercoats District series); however, those records for algae were sufficiently comprehensive that only the common or conspicuous species were recorded in the present survey.

Notable new records for the area (or for the world) were cited earlier (PN 4 [6]; 138), viz. *Baldia johnstoni*, *Axinella infundibuliformis*, *Bispira volutacornis* and *Caryophyllia smithii*. Additionally worthy of mention are the amphipods *Megaluropus agilis* and *Pontocrates altamarinus*, both of which have only occasionally been recorded from Northumberland (the former at the turn of the century and four specimens in 1950); similarly, these records of the tanaid *Tanaissus lilljeborgi* are the first for Northumberland since 1904.

A selection of the collected material will be lodged at the Hancock Museum, Newcastle-upon-Tyne, as a voucher collection.

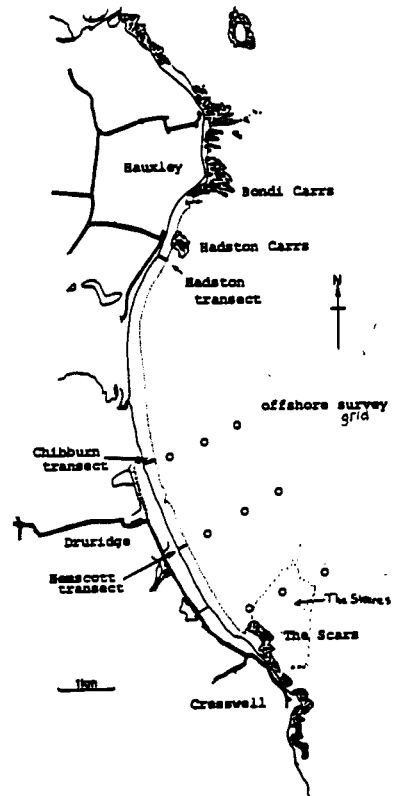
Acknowledgements: I remain indebted to all the acknowledgees mentioned in Bamber & Coughlan (1989). This paper is published by permission of the National Power Co., a division of the CEGB.

References

Bamber R.N. & Coughlan J., 1989. The marine flora and fauna of Druridge Bay. Central Electricity Generating Board Research Report RD/L/3470/R89

Howson C.M., 1987. Species Directory of the British Marine Fauna and Flora. Marine Conservation Society, Ross-on-Wye; 471pp.

Walker P., 1984. Fish recorded in Druridge Bay, Northumberland, 1975-80. Porcup. Newsl. 3; 47-50.



The marine fauna and flora of Druridge Bay. Species recorded during the surveys in 1985-1987, with notes on their abundance and occurrence. Nomenclature and authorities as in Howson (1987) except species marked *. Species marked † are not previously recorded for the area (e.g. in the Marine Fauna of the Cullercoats District series).

PORIFERA

- Halichondria panicea* Common, littorally and sublittorally beneath rocks, in *Laminaria* holdfasts, etc..
Myxilla/Haliclona indet. Small growths sublittorally on vertical surfaces, Cresswell Skeres.
Scypha ciliata Frequent sublittorally, particularly on larger hydroids.
Grantia compressa Frequent sublittorally, Cresswell Skeres.
Axinella infundibuliformis † 1 specimen photographed on sublittoral rock, Cresswell Skeres.

CNIDARIA (COELENTERATA)

- Hydrozoa
Dynamena pumila Occasional, on *Halichondria*, in holdfasts.
Sertularia cupressina Occasional in Cresswell Skeres epifauna.
Halecium halecinum Common on sublittoral rock edges, Cresswell.
Thuiaria thuja Isolated clumps frequent below 8 m, Cresswell Skeres.
Nemertesia antennina Frequent stands on sublittoral vertical rock face, Cresswell.
Abietinaria abietina Occasional sublittorally with *Thuiaria*.
Tubularia indivisa Frequent on shallower and larger sublittoral vertical rock faces, Cresswell.
Anthozoa
Sagartia elegans Frequent on sublittoral rock, Cresswell.
Urticina felina Occasional littorally, Hadston.
Urticina eques Frequent on ledges on the sublittoral vertical cliff of Cresswell Skeres.
Alcyonium digitatum Abundant sublittorally on Cresswell Skeres, mainly on vertical faces.
Caryophyllia smithii Occasional on sublittoral rock otherwise bare of encrusting fauna, Cresswell Skeres, ca 10 m.
Scyphozoa
Cyanea lamarckii One specimen photographed from Cresswell Skeres.

PLATYHELMINTHES

- Stylochoplana maculata* Occasional in *Corallina* and *Laminaria* holdfasts, littoral.
(Quatrefages)*

NEMERTEA

- Lineus longissimus* Occasional, Hadston Carrs, beneath rocks.
Oerstedtia sp. indet. Occasional in sand, algal holdfasts, *Rhodocorton*-bedded mud.
• Indet species A One no. in *Laminaria* holdfast, Cresswell.
Indet species B One specimen in offshore sand.

KINORHYNCHA

- Pycnophyes zelinkae* Southern* Rare, sublittoral sand meiofauna.

SIPUNCULA

- Golfingia minuta* Occasional, *Laminaria* holdfasts and common in *Rhodocorton*-bedded mud, littoral.

ANNELIDA

- Oligochaeta
Tubificoides pseudogaster Common in *Rhodocorton*-bedded mud, Cresswell.
*Tubificoides benedii** Common in *Rhodocorton*-bedded mud, and in littoral sand at Hadston.

<i>Clitellio arenarius</i> cf. <i>Enchytraeus</i> sp.	Common in <i>Rhodocorton</i> -bedded mud, Cresswell. One specimen, HWM, Hemscott beach.
<i>Polychaeta</i>	
<i>Scoloplos armiger</i>	Common in the offshore sand.
<i>Paraonis fulgens</i>	Occasional, Hadston littoral beach sand and sublittoral sand.
<i>Poecilochaetus serpens</i>	One specimen, offshore sand.
<i>Spiophanes bombyx</i>	Common, offshore sand and Hadston littoral beach sand.
<i>Aonides oxycephala</i>	Occasional, Hadston beach sand.
<i>Scolelepis squamata</i>	Common to abundant in sheltered littoral beach sand, mainly near low water mark.
<i>Scolelepis foliosa</i>	One specimen, sublittoral sand.
<i>Spio martinensis</i>	Common near low water mark, Hadston littoral beach sand, occasional in offshore sand.
<i>Polydora</i> sp. indet.	Abundant in dense patches on rock below 8 m, Cresswell Skeres.
<i>Magelona mirabilis</i>	Occasional, Hadston littoral beach sand; abundant in offshore sand.
<i>Chaetozone setosa</i>	Abundant in sublittoral sand.
<i>Ophelia limacina</i>	Occasional, littoral sandy beach at Hemscott and Chibburn, mid to low water mark.
<i>Capitella capitata</i>	Occasional, Hadston beach sand, common in finer sands north of the Carrs.
<i>Baldia johnstoni</i>	Garwood & Bamber *†. Occasional, Hadston beach finer sand, LWM.
<i>Arenicola marina</i>	Common in sheltered beach, Hadston.
<i>Owenia fusiformis</i>	Rare, sublittoral sand.
<i>Lanice conchilega</i>	Frequent in littoral sandy sediment amongst stones, Cresswell.
<i>Nicolea zostericola</i>	One specimen in sublittoral epifauna from Cresswell Skeres.
<i>Sabellaria spinulosa</i>	Occasional on rocks at LWM, and frequent sublittorally, Cresswell.
<i>Fabricia sabella</i>	Abundant in <i>Rhodocorton</i> -bedded muddy-sand.
<i>Pomatoceros lamarcki</i>	Common on the rocky shores at Hadston and Cresswell; common sublittorally on rock and <i>Laminaria</i> holdfasts, especially abundant on some vertical faces of Cresswell Skeres.
<i>Hydroides norvegica</i>	Common littorally, Cresswell rocks, occasional on <i>Laminaria</i> holdfasts.
<i>Bispira volutacornist</i>	One specimen seen in small vertical rock face, sublittoral, Cresswell Skeres.
<i>Harmothoe extenuata</i>	Occasional, <i>Laminaria</i> holdfasts.
<i>Harmothoe imbricata</i>	Common littorally under stones, and amongst sublittoral epifauna, notably on <i>Flustra</i> and amongst <i>Thuiaria</i> .
<i>Harmothoe impar</i>	Rare, in <i>Laminaria</i> holdfasts.
<i>Alentia gelatinosa</i>	Occasional under littoral rocks, Cresswell.
<i>Sthenelais limicola</i>	Occasional, sublittoral sand.
<i>Eteone longa</i>	Frequent, Hadston littoral beach sand, <i>Laminaria</i> holdfasts, sublittoral sand.
<i>Anaitides maculata</i>	Occasional in <i>Laminaria</i> holdfasts, beach sand, sublittoral sand.
<i>Eumida sanguinea</i>	Frequent in sublittoral <i>Laminaria</i> holdfasts.
<i>Typosyllis armillaris</i>	One specimen, littoral, on <i>Halichondria</i> .
<i>Nephtys cirrosa</i>	Occasional, sandy beaches.
<i>Nephtys caeca</i>	Occasional, sublittoral sand.
<i>Nephtys hombergii</i>	Occasional, sublittoral sand.
<i>Nereis pelagica</i>	Common littorally in <i>Corallina</i> , <i>Laminaria</i> holdfasts and under stones; frequent sublittorally in <i>Laminaria</i> holdfasts.
<i>Nereis diversicolor</i> *	Common under bedded stones, Hadston Carrs.
<i>Glycera</i> sp. indet.	One juvenile, sublittoral sand.
<i>Goniada maculata</i>	Occasional in offshore sand.
<i>Lumbrineris latreilli</i>	One specimen in offshore sand.

MOLLUSCA

<i>Lamellibranchia</i>	
<i>Nucula nitidosa</i>	Common in sublittoral sand.
<i>Pododesmus squamula</i>	Occasional littorally on <i>Laminaria</i> holdfasts, on <i>Patina</i> (!), under rocks; common sublittorally, frequent on <i>Laminaria</i> holdfasts, and two specimens on <i>Thuiaria</i> .
<i>Pododesmus patelliformis</i>	Common on all sublittoral rock surfaces, Cresswell Skeres, one specimen on <i>Abietinaria</i> .
<i>Mytilus edulis</i>	Abundant on rocks, boulders, <i>Corallina</i> , <i>Laminaria</i> holdfasts, and <i>Dynamena</i> , spat in <i>Rhodocorton</i> -bedded muddy-sand, occasional on sublittoral rock, and one in offshore sand.
<i>Musculus discors</i>	Frequent sublittorally amongst larger hydroids (<i>Nemertesia</i> , <i>Thuiaria</i> , <i>Abietinaria</i>) and occasionally on <i>Flustra</i> , Cresswell Skeres.
<i>Modiolus modiolus</i>	Abundant sublittorally on Cresswell Skeres, though mostly empty shells.
<i>Thyasira flexuosa</i>	One specimen, sublittoral sand.
<i>Tellimya ferruginosa</i>	Rare, sublittoral sand.
<i>Arctica islandica</i>	One juvenile, offshore sand.
<i>Dosinia lupinus</i>	Occasional, sublittoral sand.
<i>Chamelea gallina</i>	One specimen, offshore sand.
(?= <i>Venus striatula</i>)	
<i>Venerupis saxatilis</i> *	Rare, littoral, Hadston; mainly dead shells.
<i>Spisula subtruncata</i>	Occasional, offshore sand.
<i>Angulus tenuis</i>	Rare, Hadston beach and sublittoral sand.
<i>Fabulina fabula</i>	Common, sublittoral sand.
<i>Abra alba</i>	One specimen, offshore sand.
<i>Abra prismatica</i>	Common, sublittoral sand.
<i>Ensis siliqua</i>	Probably common in beach, LWM.
<i>Ensis arcuatus</i>	Occasional, offshore sand.
<i>Hiatella arctica</i>	Occasional in <i>Corallina</i> and sublittoral larger hydroids, common in <i>Laminaria</i> holdfasts, one specimen on <i>Flustra</i> .
<i>Thracia villosiuscula</i>	Occasional, offshore sand.
Gastropoda	
<i>Helcion pellucidum</i>	Common on <i>Laminaria</i> fronds and holdfasts, beneath littoral stones.
<i>Patella vulgata</i>	Abundant on littoral rocks.
<i>Gibbula cineraria</i>	Common under stones, in rock pools, frequent sublittorally.
<i>Lacuna vincta</i>	Common in <i>Corallina</i> , <i>Laminaria</i> holdfasts, one specimen in sublittoral <i>Thuiaria</i> (!).
<i>Littorina littorea</i>	Common in <i>Corallina</i> , abundant amongst littoral rocks.
<i>Littorina saxatilis</i> agg.	Common on littoral rocks.
<i>Rissoa parva</i>	Abundant amongst <i>Corallina</i> , <i>Laminaria</i> holdfasts and other algae (smooth-shelled variety); frequent on sublittoral larger hydroids, occasional on <i>Flustra</i> .
<i>Onoba semicostata</i>	Occasional amongst littoral algae; frequent in sublittoral <i>Laminaria</i> holdfasts, occasional in <i>Flustra</i> .
<i>Lunatia poliana</i>	Occasional in offshore sand.
<i>Nucella lapillus</i>	Common in <i>Laminaria</i> holdfasts, <i>Corallina</i> , Hadston rocks; abundant on Cresswell Scars.
<i>Buccinum undatum</i>	Occasional, littorally on Cresswell rocks, frequent sublittorally on the Skeres.
<i>Doto coronata</i>	Occasional on littoral <i>Dynamena</i> , with eggs.
<i>Doto fragilis</i>	One specimen on <i>Nemertesia antennina</i> , Cresswell Skeres.
<i>Onchidoris bilamellata</i>	Common littorally beneath stones.
<i>Onchidoris muricata</i>	One specimen in sublittoral epifauna, Cresswell.
<i>Goniodoris nodosa</i>	Frequent sublittorally on Cresswell Skeres.
<i>Polycera quadrilineata</i>	Common sublittorally on kelp (Cresswell).

Berthella plumula One specimen photographed sublittorally on Cresswell Skeres.

Amphineura
Tonicella rubra Occasional littorally under stones, Cresswell and Hadston.
Callochiton septemvalvis One specimen in Cresswell Skeres sublittoral epifauna.
Lepidochitona cinereus One specimen in Cresswell Skeres sublittoral epifauna.
Acanthochitona crinitus One specimen in Cresswell Skeres sublittoral epifauna.

ARTHROPODA

Insecta
Clunio marinus Larvae common in *Rhodocorton*-bedded muddy sand and amongst mussel spat; adults frequent on rock pools.

Acari
Thalassarachna basteri Common on *Electra pilosa*

Pycnogonida
Nymphon brevirostre One specimen on sublittoral *Desmarestia*, Cresswell Skeres.
Phoxichilidium femoratum One specimen amongst littoral *Dynamena* on *Halichondria*.
Pycnogonum littorale One specimen on sublittoral *Nemertesia*, Cresswell Skeres.

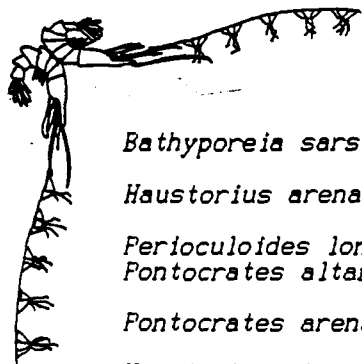
Crustacea
Ostracoda
Lindisfarnia laevata (Norman) One specimen in sublittoral meiofauna, offshore sand.
Heterocythereis albomaculata Baird. Occasional in *Rhodocorton*-bedded muddy-sand, Cresswell.
Semicytherura sella (Sars) Occasional in *Rhodocorton*-bedded muddy-sand, Cresswell.

Cirripedia
Verruca stroemia Frequent, low water rocks and on hermit crab shells; occasional in sublittoral *Laminaria* holdfasts.
Balanus balanoides Abundant on the littoral rocks and boulders.
Balanus balanus Common sublittorally on Cresswell Skeres.
Balanus crenatus Common sublittorally on Cresswell Skeres.

Isopoda
Eurydice pulchra Common in the littoral sandy beaches.
Idotea baltica Common littorally in *Corallina*.
Idotea granulosa Abundant littorally in *Corallina*, *Laminaria* holdfasts and *Cladophora*.
Idotea pelagica Occasional in *Halidrys* and amongst mussel spat.
Zenobiana prismatica Common in *Corallina* at Hadston.

Tanaidacea
Tanais dulongii Common littorally in *Rhodocorton*-bedded muddy-sand.
Tanaissus lilljeborgi Common sublittorally in offshore sand.

Amphipoda
Megaluropus agilis One specimen in sublittoral sand.
Ampelisca brevicornis Occasional, offshore sand.
Stenothoe monoculoides Occasional amongst algae at Cresswell.
Talitrus saltator Rare, upper shore beach, Hemscott.
Hyale pontica Occasional in *Corallina* at Cresswell and *Rhodocorton*-bedded muddy-sand at Hadston.
Bathyporeia pilosa Common in offshore sand.
Bathyporeia pelagica Common in sand littorally and sublittorally.



<i>Bathyporeia sarsi</i>	Common in littoral beach sand, leaving surface tracks at LWM.
<i>Haustorius arenarius</i>	Common in littoral sandy beach, favouring the upper shore.
<i>Perioculoides longimanus</i>	Common in sublittoral sand.
<i>Pontocrates altamarinus</i>	Common near LWM in beach sand at Hadston; rare in the offshore sand.
<i>Pontocrates arenarius</i>	Frequent in the littoral sandy beach and the offshore sand.
<i>Harpinnia antennaria</i>	Rare, sublittoral sand.
<i>Apherusa jurinei</i>	Frequent in littoral algae at Hadston.
<i>Atylus swammerdami</i>	Rare in Hadston beach (DB2 site).
<i>Calliopius laeviusculus</i>	Common amongst littoral algae at Cresswell, rare in the sublittoral epifauna.
<i>Gammarellus homari</i>	One specimen on <i>Flustra</i> , sublittoral, Cresswell Skeres.
<i>Dexamine spinosa</i>	Occasional in littoral algae, Cresswell.
<i>Dyopedos porrectus</i>	Observed ("whips") amongst sublittoral epifauna, Cresswell Skeres.
<i>Amphithoe rubricata</i>	Common in <i>Corallina</i> , littoral rock pools.
<i>Siphonoecetes kroyeranus</i>	Common in the sublittoral sand.
<i>Jassa falcata</i>	Frequent littorally on the rocky shore.
<i>Jassa pusilla</i>	Occasional in the sublittoral epifauna, particularly amongst <i>Thuiaria/Abietinaria</i> , Cresswell Skeres.
<i>Pariambus typicus</i>	One specimen, offshore sand.
<i>Caprella linearis</i>	Occasional in Cresswell Skeres epifauna.
<i>Caprella septentrionalis</i>	† Common to abundant in Cresswell Skeres sublittoral epifauna, in hydroids, <i>Laminaria</i> holdfasts, <i>Desmarestia</i> and <i>Flustra</i> .
<u>Cumacea</u>	
<i>Cumopsis goodsiri</i>	Frequent, littoral beach sand, Hadston.
<i>Pseudocuma gilsoni</i>	Abundant, offshore sand (including " <i>P. longicornis</i> " males).
<i>Iphinoe trispinosa</i>	Rare, Hadston beach and sublittoral sands.
<i>Diastylis</i> sp. indet.	Juveniles frequent in the offshore sand.
<u>Decapoda</u>	
<i>Eualus pusiolus</i>	Occasional, net sweepings through rock pools and in <i>Halidrys</i> , Cresswell.
<i>Crangon crangon</i>	Occasional in beach sand at Hadston (where artisanal shrimping is undertaken) and in rock pools.
<i>Galathea strigosa</i>	Frequent in horizontal crevices, sublittoral, Cresswell Skeres.
<i>Galathea intermedia</i>	Rare, under stones, sublittoral, Cresswell Skeres.
<i>Galathea nexa</i>	One specimen under littoral stones, Cresswell.
<i>Pagurus bernhardus</i>	Abundant in rock pools; young amongst <i>Corallina</i> .
<i>Pisidia longicornis</i>	Littorally frequent in <i>Laminaria</i> holdfasts, common under stones; sublittorally abundant in turf and under stones (Cresswell Skeres), and common in the epifauna amongst hydroids and <i>Flustra</i> .
<i>Carcinus maenas</i>	Common littorally amongst rocks, young in <i>Corallina</i> and <i>Laminaria</i> holdfasts.
<i>Cancer pagurus</i>	Common littorally at Cresswell rocks and Hadston Carrs, juveniles in <i>Corallina</i> and <i>Laminaria</i> holdfasts.
<i>Hyas araneus</i>	Rare under stones, littoral, Cresswell.
<i>Hyas coarctatus</i>	One specimen in the sublittoral sand; occasional in Cresswell Skeres sublittoral epifauna, in <i>Desmarestia</i> and <i>Thuiaria</i> .
<i>Homarus gammarus</i>	Occasional small specimens sublittorally at Cresswell Skeres.

ECTOPROCTA

- Electra pilosa* Abundantly epiphytic on algae at LWM; sublittorally occasional on larger hydroids, common on *Laminaria* holdfasts and other brown algae.
- Flustra foliacea* Abundant sublittorally on shallow rock of Cresswell Skeres, occasionally in dense patches. Common in beach drift.
- Escharioides coccinea* Frequent patches on sublittoral rock faces, Cresswell.
- Escharioides mamillata* † Rare on sublittoral rock, Cresswell.
- Scrupocellaria scruposa* Common sublittorally at Cresswell, forming a turf on vertical rock faces.
- Alcyonidium diaphanum* † Occasional specimens on sublittoral rock, Cresswell.
- Alcyonidium parasiticum* Frequent clumps on sublittoral rock, Cresswell.
- Bugula flabellata* Common sublittorally on *Flustra*, larger hydroids and *Desmarestia*.
- Bugula cf plumosa* Occasional sublittorally at Cresswell on *Flustra* and *Nemertesia*.
- Membranipora membranacea* One colony on *Abietinaria*.

PHORONIDA

- Phoronis muelleri* Common in offshore sand.

ECHINODERMATA

- Ophiuroidea
- Ophiothrix fragilis* Common littorally on Cresswell rocks under stones and in *Corallina*; occasional on sublittoral hydroids and *Flustra*, common amongst stones and in crevices, Cresswell Skeres.
- Ophiopholis aculeata* Frequent sublittorally in crevices and under stones, Cresswell Skeres.
- Ophiactis balli* Occasional in crevices, Cresswell Skeres.
- Ophiura affinis* Occasional, offshore sand.
- Asteroidea
- Asterias rubens* Young littorally frequent under stones, adults washed onto rocks in stormy weather. Abundant on rocks sublittorally, mostly young, occasional on *Flustra*, *Desmarestia* and in *Laminaria* holdfasts.
- Henricia sanguinolenta* Common sublittorally on Cresswell Skeres.
- Solaster endeca* Frequent sublittorally on Cresswell Skeres.
- Crossaster papposus* Common "everywhere" sublittorally on Cresswell Skeres.
- Echinoidea
- Echinus esculentus* Common "everywhere" sublittorally on Cresswell Skeres.
- Psammechinus miliaris* Common littorally on Cresswell rocks, mainly small; sublittorally in bryozoan/hydroid turf, occasional on *Nemertesia*.
- Echinocardium cordatum* Occasional, offshore sand.

TUNICATA

- Clavelina lepadiformis* Frequent on sublittoral rocks, Cresswell.
- Botrylloides leachi* Occasional (a few colonies) sublittorally on Cresswell Skeres.

CHORDATA

- Pisces
- Zoarces viviparus* Occasional, littoral rock pools.
- Ammodytes tobianus* Frequent in the beach at Hadston; numerous eggs, probably of this species, in upper beach sand at Hemscott.

<i>Cyclopterus lumpus</i>	Occasional in littoral rock pools, one male guarding eggs in pool at Hadston Carrs.
<i>Labrus bergylta</i>	Common off Cresswell.
<i>Gadus morhua</i>	Common off Cresswell.
<i>Ciliata mustela</i>	Occasional, littoral rock pools.
<i>Taurulus bubalis</i>	One specimen photographed on Cresswell Skeres.
<i>Zeugopterus punctatus</i>	Occasional off Cresswell.
<i>Platichthys flesus</i>	Occasional off Cresswell.

FLORA

All plants were recorded from rock substrates. With the comprehensive listing for Cresswell recorded in Hardy (1985 & 1987: Marine Fauna of the Cullercoats District, No's 17 & 22), plants were not intensively surveyed; this list represents the commoner species.

ALGAE

<i>Laminaria digitata</i>	frequent, circalittoral
<i>Laminaria hyperborea</i>	common, circalittoral
<i>Alaria esculanta</i>	occasional, circalittoral
<i>Fucus serratus</i>	abundant, littoral
<i>Fucus vesiculosus</i>	common, littoral
<i>Halidrys siliquosa</i>	occasional, sublittoral, littoral pools
<i>Dictyota dichotoma</i>	common, sublittoral
<i>Dictyosiphon foeniculaceus</i>	common, sublittoral
<i>Ralfsia verrucosa</i>	abundant, sublittoral
<i>Desmarestia cf viridis</i>	common, sublittoral
<i>Cladophora rupestris</i>	occasional, littoral pools
<i>Enteromorpha intestinalis</i>	common, littoral
<i>Ulva lactuca</i>	abundant, littoral
<i>Palmaria palmata</i>	common, littoral
<i>Audouiniella floridula</i>	(="Rhodocorton") common, forming mats of embedded muddy sand on littoral rock
<i>Corallina officinalis</i>	common, littoral pools, circalittoral
encrusting Corallinaceae	abundant, littoral and sublittoral
<i>Ceramium rubrum</i>	frequent, littoral
<i>Chondrus crispus</i>	frequent, littoral
<i>Gigartina stellata</i>	common, littoral
<i>Plocamium cartilagineum</i>	occasional, sublittoral
<i>Ptilota plumosa</i>	occasional, littoral
<i>Lithothamnion</i> sp. indet.	common, littoral

LICHENS

<i>Verrucaria maura</i>	common, littoral.
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AND MERRY
CHRISTMAS !!!