Porcupine Newsletter

Volume 3 Number 6

JUNE 1986

ISSN 0309 - 3085

CONTENTS

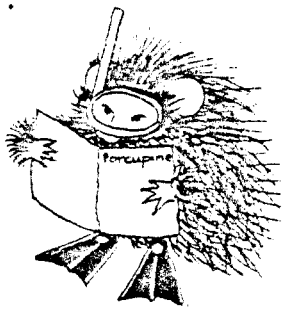
* * * *

Apologies for the comparative late arrival of this issue of PN, oue mainly to the AGM falling somewhat later this year. It was nonetheless a most successful and well-attended meeting, and reports therefrom appear in this and the next issues. The theme of coastal lagoons was largely a spin off from the ongoing NCC survey of lagoons around Britain, and we are grateful to the collaboration of Roger Mitchell and his many 'field operatives'.

It is with deep sadness that we heard of the death on 17 March of our first Honorary Life Member, Sir Maurice Yonge CBE, FRS, FRSE, at the age of 86. We are all grateful for his quiet and significant behind the scenes support during the birth of PORCUPINE. In the words of Member Fred Woodward "...always a humble and obliging colleague, willing to assist others without wishing credit for himself, but readily crediting others; an inspiration to us all."

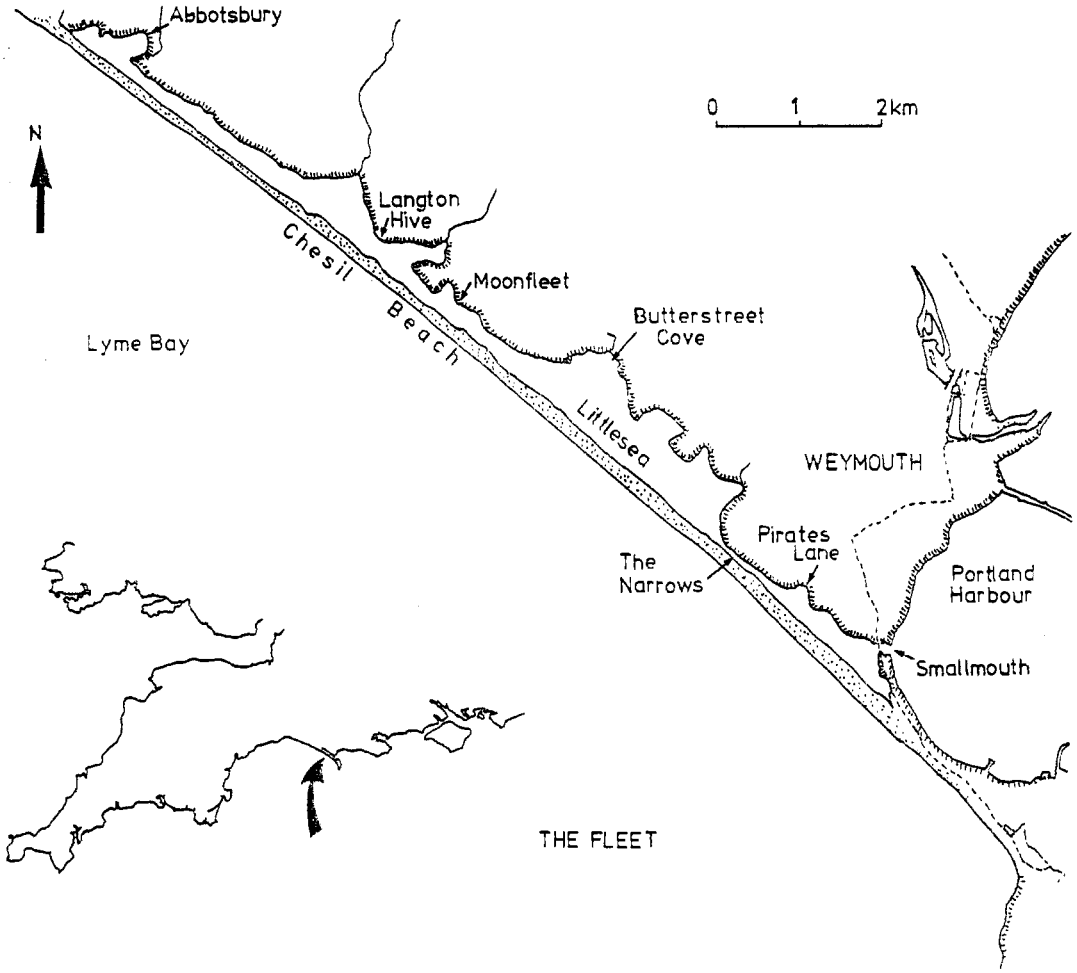
Future meetings- The Autumn meeting is planned for Peterborough at the beginning of October, on the theme of Aliens and immigrants (how far has Eiminius got?), and it is hoped to organise a field meeting at The Fleet (see inside) towards the end of September, under the auspices of the Fleet Study Group; full details of both next issue (sooner than you think!).

Roger Bamber, Hon. Editor,
Marine Biology Unit, C.E.G.B., Fawley,
Southampton SO4 1TW.



REPORTS OF THE SOUTHAMPTON MEETING, 19 AND 20 APRIL 1986
PORCUPINE LAGOON SYMPOSIUM

Participants in the successful Lagoons Symposium will doubtless recall a certain dominance of the Fleet, Dorset, as a study site; I have attempted to publish the majority of Fleet-based articles from the meetings in this issue of PN, and, for the convenience of Members, below is a map of the Fleet, particularly for the (few?) readers who do not know the place. Hopefully it will clarify the place names/ habitat zones mentioned in the articles. Members wishing to know more of the Fleet Study Group are referred to Members Dennis Seaward or Bill Farnham, and are reminded of its status as a Nature Reserve.



THE DISTRIBUTION OF OSTRACODS IN THE FLEET, DORSET

by J.E. Whittaker
British Museum (Natural History), Cromwell Road, London SW7 5BD.

Until the survey of the Mollusca (Seaward, 1980), my study of the Ostracoda (Whittaker, 1972;1981a) had been the only one undertaken on any group of invertebrates in the Fleet. The collecting, from a final maximum of over 80 stations in the 13 km long lagoon, was carried out on a seasonal basis between 1967 and 1969; this was before the invasion of Sargassum.

Three assemblages of ostracods were recognised, corresponding almost exactly to the divisions of the Fleet suggested on the basis of the salinity regime (Whittaker, 1980; 1981b). Unlike a normal estuary, the Fleet is long and narrow, with a relatively small input from rivers, a large volume of "estuarine" water at low tide, and a tidal flow greatly retarded by the small size of the marine inlet. Thus a salinity gradient is well developed from Smallmouth to Abbotsbury, though the degree of dilution and hence steepness of the gradient varies seasonally. In terms of salinity, therefore, the Fleet can be divided into 3 parts:

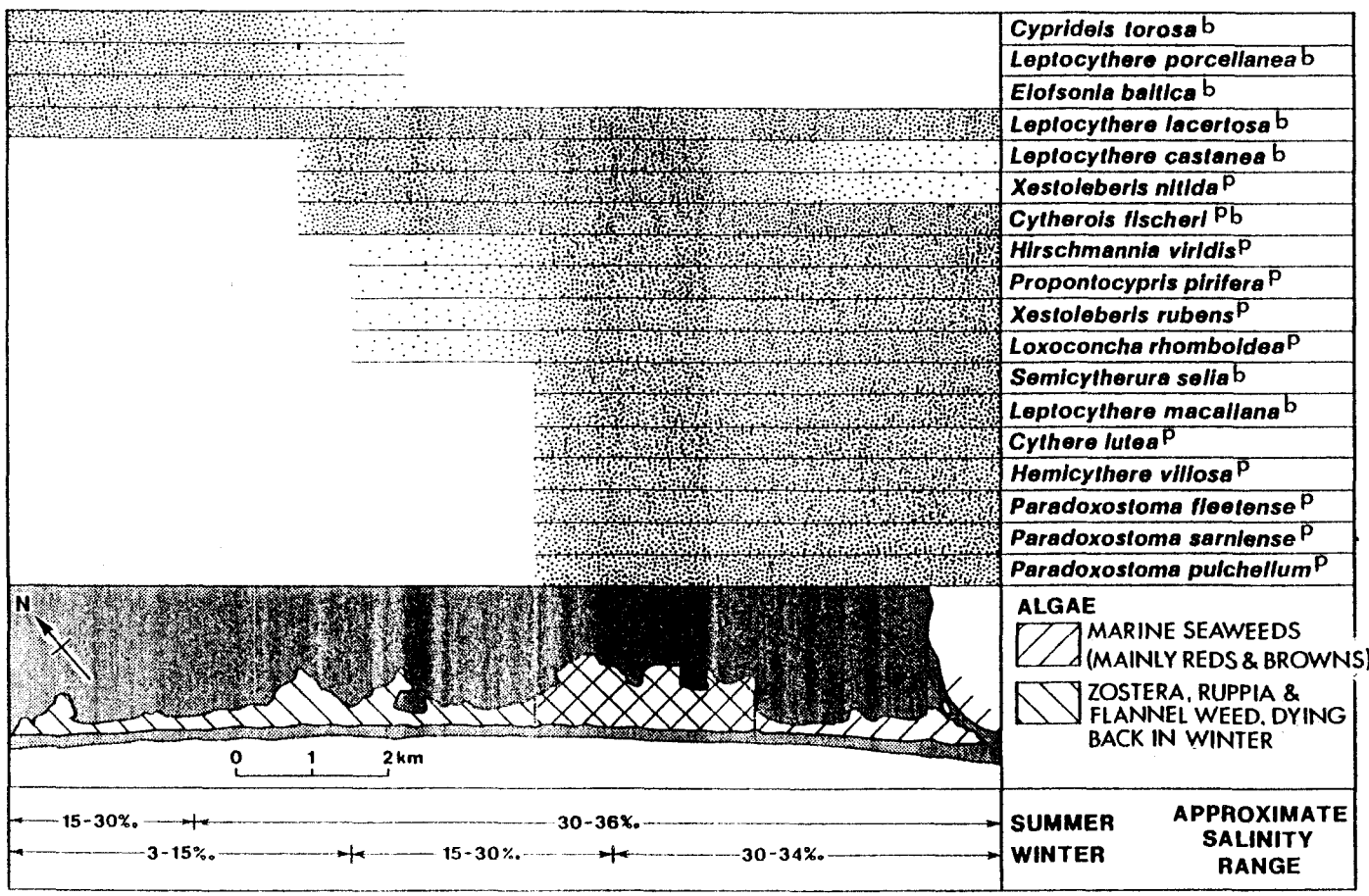
1. A marine to near-marine part, extending from Smallmouth to Butterstreet Cove (the effective limit of tidal flow), only extending further northwest during high tides in summer months and long periods of fine weather.
2. A high salinity brackish part, covering most of West Fleet, with values between 15 and 30%. in winter and spring, generally a little higher in the summer.
3. a low salinity brackish part found in the Abbotsbury Embayment, with values frequently below 10%. rising to 20%. or more in periods of low stream discharge.

The chief factor influencing the salinity of the Fleet, as with water levels, is the tical effect; this is despite the low tidal range (Robinson, 1981) and the restricted marine inlet. This is then modified in the West Fleet by a small amount of percolation through the Chesil Bank and freshwater runoff.

Salinity is not the sole factor governing ostracod distribution, but it does appear to control the distribution of the algae and sea-grasses on which a great many invertebrates, including the ostracods, depend. The shallow waters of the Fleet behave like a gigantic rock pool, with, in the spring and summer, pH values (.9), mean dissolved oxygen content (ca 150%) and mean water temperature (.18.C) all very high compared to the open sea. It is also sheltered, under most conditions by the Chesil Beach. The only detrimental ecological parameter, for sediment dwelling ostracods, is the unsuitability of much of the substrate which, for most of the Fleet above the Narrows, is composed of soft, toxic, organic silt. Only on the landward shore, and in the vicinity of Abbotsbury Swannery and Smallmouth, are there tracts of suitable, well-oxygenated substrate which can support a benthic ostracod population. Many of these ostracods appear to be tolerant of a wide range of salinities, and are governed more by the substrate type (e.g. Leptocythere lacertosa (Hirschmann)),

Fig. 1 Distribution of some ostracod species in the Fleet (simplified).

b - benthic species; p - phytal species.



but others (e.g. L. porcellanea (Brady)) are still restricted to lower salinities (Fig.1).

ASSEMBLAGE 1 - THE EAST FLEET "RESTRICTED MARINE" FAUNA

This assemblage is characterised by large numbers of marine phytal species which die out slowly westwards with distance from the sea, lowering of salinity and disappearance of most marine seaweeds (Fig.1). No difference in fauna was found between the deeper water channels of Littlesea and the Narrows, characterised by luxuriant algae, and the shallow areas of Littlesea, characterised by Zostera and Ruppia, although ostracod populations in the former tended to be more plentiful. This assemblage is termed "restricted marine" because there is a lower species diversity in comparison to Weymouth Bay. Nevertheless, the number of individuals in this sheltered environment is very large indeed. In total, 20 phytal species were found living on the fronds of the algae and sea-grasses and associated epiphytes. Some of the more important ones are listed in Figure 1 (e.g. Paradoxostoma spp., including P.fleetense Horne & Whittaker, Xestoleberis rubens Whittaker and Hirschmannia viridis (Muller)). The commonest species of this assemblage is X.rubens (Fig.2), first described by Whittaker in 1978, and a remarkable local phenomenon; it has yet to be found elsewhere in Britain, although it has recently been found in W. and N.W. France. It is totally replaced in Weymouth Bay by another xestoleberid, X.aurantia (Baird). The characteristic ostracod of the lower salinity assemblage 2, X.nitida (Lilljeborg), is found only on the Zostera/Ruppia beds in Littlesea, coexisting with X.rubens but gradually replacing it northwestwards (Fig.1). In addition 12 benthic species live either in the non-toxic sediment along the landward shore, in the sediment trapped by algal holdfasts, or in the extensive rootmass of Zostera.

ASSEMBLAGE 2 - THE WEST FLEET FAUNA

This assemblage, found in the area from beyond Butterstreet Cove to Shipmoor Point, is characterised by a smaller number of species, both phytal and benthic, and by few individuals except in summer months. It is the realm of Zostera and Ruppia with their associated mat of "flannel weed" (trailing masses of filamentous, mainly green algae, see Burrows, 1981). When these sea-grasses die back in late autumn, very little microfauna can survive except in a few areas of stable, oxygenated sediment and green algae, mainly on the landward side. In winter the main population of Xestoleberis nitida appears to migrate into Littlesea. Only 2 indigenous phytal species live in West Fleet; however, in summer months when salinities are higher a further 4 phytal species migrate into West Fleet, though never in large numbers (Fig.1). A further 5 benthic species make up assemblage 2.

ASSEMBLAGE 3 - THE ABBOTSBURY BRACKISH FAUNA

The Abbotsbury Embayment and adjacent Fleet has the lowest salinities of the lagoon, large expanses of wel-oxygenated mud, Phragmites reedbeds and perennial freshwater dilution - it is the

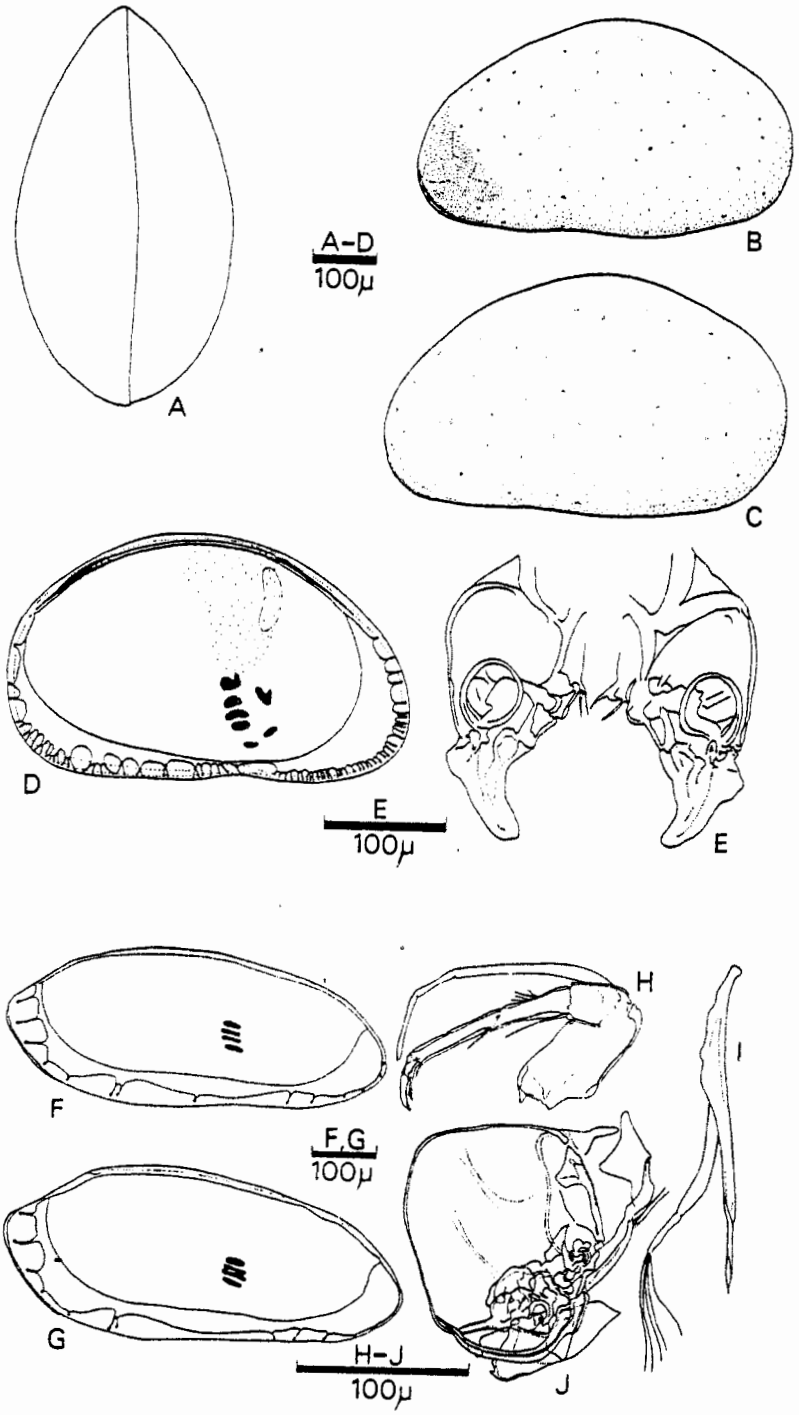


Fig. 2 Two species of ostracods, first discovered from the Fleet. 2A–E, Xestoleberis rubens Whittaker, 1978, a remarkable local phenomenon and so far only known in Britain from the Fleet. A, ♀ car.dors.; B, ♂ LV; C, ♀LV; D, ♀ LV, int.; E, ♂ cop.app. 2F–J, Paradoxostoma fleetense Horne & Whittaker, 1985. F, ♂ RV; G, ♀ RV; H, ♂ antenna; I, ♂ mandible; J, ♂ cop. app. (Drawings by Dr D.J. Horne).

most typically estuarine of the Fleet environments. It is therefore not surprising that the ostracod fauna is marked by the appearance, for the first time in large numbers, of the truly brackish estuarine species Cyprideis torosa (Jones) and Leptocythere porcellanea (Brady) (Fig.1); in all, 7 species are found alive.

In such an environment, the puzzling absence of Loxoconcha elliptica Brady, virtually ubiquitous throughout European estuaries (Whittaker, 1981c) is hard to explain. This is particularly so since thousands of its calcareous shells and disarticulated valves have been found in the sediment of the Abbotsbury Embayment and the shore stations of West Fleet. Live specimens have not been found despite a close search for its possible habitat. A clue to its disappearance may lie in a similar more widespread presence of dead shells of C.torosa in comparison to its live distribution. Perhaps at some time in the past the Fleet (at least in West Fleet) presented a much more widespread brackish environment than today. Whether this can be placed as recently as before the building of Portland Harbour and the first Smallmouth bridge (pre-1840/1850), when the tidal inlet there may have been more susceptible to silting, is debatable. Under such conditions, the Fleet could have been cut off for long periods from the sea, becoming brackish and even hypersaline.

REFERENCES

Burrows E.M., 1981. The algae of the Fleet. In: Ladle M. (Ed.): The Fleet and Chesil Beach. Structure and biology of a unique coastal feature. Dorset County Council, Dorchester. pp.39-43.

Robinson J.S., 1981. Tides and water levels in the Fleet. Ibid, pp.23-31.

Seaward D.R., 1980. The marine molluscs of the Fleet, Dorset. Proc. Dorset Nat. Hist. Archaeol. Soc., 100 (for 1978); 100-108.

Whittaker J.E., 1972. The taxonomy, ecology and distribution of recent brackish and marine Ostracoda from localities along the coast of Hampshire and Dorset (Christchurch Harbour, the Fleet and Weymouth Bay). Unpublished Ph.D. Thesis, University of Wales. 2 Vols, 643pp.

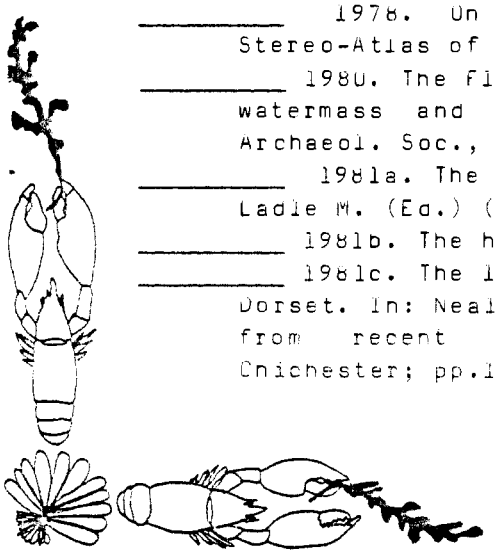
_____ 1978. On Xestoleberis rubens Whittaker sp.nov.. Stereo-Atlas of Ostracod Shells, 5; 35-44.

_____ 1980. The Fleet, Dorset - A seasonal study of the watermass and its vegetation. Proc. Dorset Nat. Hist. Archaeol. Soc., 100 (for 1978); 73-99.

_____ 1981a. The distribution of Ostracoda in the Fleet. In: Ladle M. (Ed.) (see above); pp.61-64.

_____ 1981b. The hydrology of the Fleet. Ibid, pp.15-22.

_____ 1981c. The living Ostracoda of Christchurch Harbour, Dorset. In: Neale J.W. & Brasier M.D. (Ed's): Microfossils from recent and fossil shelf seas. Ellis Horwood, Chichester; pp.193-303.



THE FLEET, DORSET - A SALINE LAGOON WITH SPECIAL REFERENCE TO ITS MOLLUSCS

by Dennis R. Seaward

The Fleet is a narrow lagoon, lying between the shingle ridge of Chesil Beach and the mainland shore, extending some 13 km northwest from its narrow marine connection with Portland Harbour at Smallmouth, to its other extremity at Abbotsbury. It is the subject of an extensive body of literature, especially following the stimulus provided by the formation, eleven years ago, of the Fleet Study Group, and more recently the commisioning of specific reports by NCC. The molluscs are of particular interest, and there are references from the middle of the last century.

Physical aspects of the Fleet are described elsewhere (e.g. Whittaker, 1978 and this Newsletter, p.135). For the purposes of this article, it may be considered in three sections:

LOWER FLEET: fine sand floors the first 2 km from Smallmouth. For the next 1 km the Fleet constricts, to its least width of less than 0.1 km in the Narrows, which is scoured by the strong tidal flow and floored by shingle, clay, Corallian outcrops and boulders. At each end of the Narrows, shallows produce rapids at certain stages of the tide. Salinity, flora and fauna are typically marine.

MIDDLE FLEET: 9 km long, this largest section is characterised by very shallow water, intersected by a few deeper, winding channels, the whole substrate being soft, largely organic silt, dominated by extensive meadows of Zostera and Ruppia. The first 3 kms 'dries out' at low tide, forming mud flats; the next 6 kms experiences little tidal effect. Salinity is 'high brackish', and species diversity falls rapidly up the Fleet.

UPPER FLEET: The Abbotsbury embayment, about 1 km long, completes the Fleet. The landward side is fringed with Phragmites marsh and the famous Swannery. Freshwater influence is greatest, and salinity is generally 'low brackish'.

In molluscan terms, the Fleet is notable for its abundant lagoonal community, for its tidal rapids zone, for a gradient from low diversity/high density to relatively high diversity/low density, for the presence of sibling species pairs, for the presence of rare or local species, and for an unusual interstitial habitat and community. These aspects are described below and a full mollusc species list for the Fleet is given as Appendix 1.

Lagoonal Community

Six mollusc species dominate the Upper and most of the Middle Fleet, their shells forming a strand line in places. Few other species occur until the Lower Fleet is approached. These six species are:

GASTROPODS:

Littorina saxatilis in its permanently submerged lagoon

form, the specific status of which is uncertain (see e.g. Smith, 1982).

Hydrobia ventrosa s.s.. The closely similar H.neglecta Muus has been looked for but not found.

Rissoa membranacea. This is the distinctive large, thin-shelled form membranacea J.Adams.

Akera bullata. The Fleet population is being studied by Dr T.E.Thompson, who considers that it belongs to the subspecies nana Jeffreys.

BIVALVES:

Cerastoderma glaucum

Abra tenuis. The reproduction and population cycle of the Fleet population is the subject of work by Gibbs (1984).

The Littorina and Rissoa are occasionally colonised by the bryozoan Alcyonidium, which in some cases completely covers the shell and partially obscures the aperture. A significant predator of small molluscs in the Middle Fleet is the polyclad turbellarian Leptoplana.

Tidal Rapids Zone

This area, known as the Narrows, provides the greatest range of habitats and species diversity within the Fleet, and the molluscs require more detailed study; substrate and general ecology are described by Dyrynda (1984).

Species Diversity Gradient

Of the 85 species of mollusc recorded living within the Fleet (see Appendix), 75 occur in the Lower Fleet, 23 in the Middle Fleet and only 7 in the Upper Fleet.

Sibling Species Pairs

The two hydrobiids H.ulvae and H.ventrosa overlap slightly at the lower end of the Middle Fleet. (The paper by Yankson, 1986, published just after the Lagoon Symposium, describing the very different byssus threads of the spat of these two species, is of interest in regard to the discussion over their conspecification).

Rare or Local Species

The angiosperms Zostera and Ruppia in the Middle Fleet provide a substrate for many animals such as the bryozoan Bowerbankia, the tunicate Botryllus, the tubicolous amphipod Erichthonius, and, in some years, abundant hydroids, mainly Obelia dichotoma (L.). The latter provides food for two sea slugs- Eubranchus farrani in an unusual colour form, and the euryhaline Tenellia adspersa, only now known in Britain from one other site.

The small southern gastropod Truncatella subcylindrica is at the northern limit of its distribution, and only one other British site is known. It is restricted to a narrow strip at HWM, living several centimetres down in the stable shingle on the sheltered side of Chesil Beach, among rotting detritus derived from Zostera etc.. At maturity, it breaks off the apical part of the shell spire, which presumably facilitates its interstitial

mode of life. Also present are many fresh shells of the tiny gastropod Paludinella littorina which I consider must be living here, although I have not yet found it alive. There are no recent British live records.

A slit limpet Emarginula conica occurs here, also interstitially in the shingle, in the mid- to lower-shore; elsewhere it is sublittoral.

Interstitial Habitat and Community

In contrast to the exposed Lyme Bay side of Chesil shingle beach, the Chesil shore on the Fleet side is extremely sheltered and tranquil, and the shingle is undisturbed. The tidal range is rather less than 2 m at springs, and as the tide ebbs in the Lower Fleet, from about mid-level downwards in many places, water issues from the shingle as 'springs' and runs down over the pebbles, which acquire a thin cover of small seasonal algae. If one digs at such a place, the water is rising strongly, and the pebbles are clean in contrast to areas between, where the stones are more or less embedded in muddy detritus. 'Spring' water is of similar salinity to that in the Lower Fleet and Portland Harbour. It is not known whether these 'springs' are the release of water stored in the shingle at high tide, or percolation through Chesil Beach from the sea.

Superficially, no animals are visible on the shingle, and the fauna only becomes apparent after the top few centimetres are cleared. Besides the lower 'springs' community, there is also a characteristic upper shore grouping. A diagrammatic representation of the typical members of the community is shown as Figure 1; all these will often be present along a transect through a 'spring' area. Some other species occasionally found in association are listed. The upper shore group are intermittently present along several kms of the Chesil Fleet shore.

The most noteworthy constituents of the 'springs' association are Emarginula conica, and, to a lesser extent, the chiton Leptochiton asellus; the latter is usually sublittoral, while the former does not appear to be recorded elsewhere intertidally. Presumably, within the 'springs' area the continuous flow of water provides a 'sub-littoral' environment.

REFERENCES

Dyrynda P., 1984. Investigation of the subtidal ecology of the Fleet, Dorset. Report to NCC.

Gibbs P.E., 1984. The population cycle of the bivalve Abra tenuis and its mode of reproduction. J. mar. biol. Ass. U.K., 64; 791-800.

Seaward D.R., 1978. The marine molluscs of the Fleet, Dorset. Proc. Dorset Nat. Hist. Archaeol. Soc., 100; 100-108.

--------- (Ed.), 1982. Sea Area Atlas of the Marine Molluscs of Britain and Ireland. Conchological Society/ ncc.

--------- 1983. The distribution of marine molluscs in the Fleet, Dorset. Report to NCC.

Smith S.M., 1982. A review of the genus Littorina in British and Atlantic waters. Malacologia, 22 (1-2); 535-539.

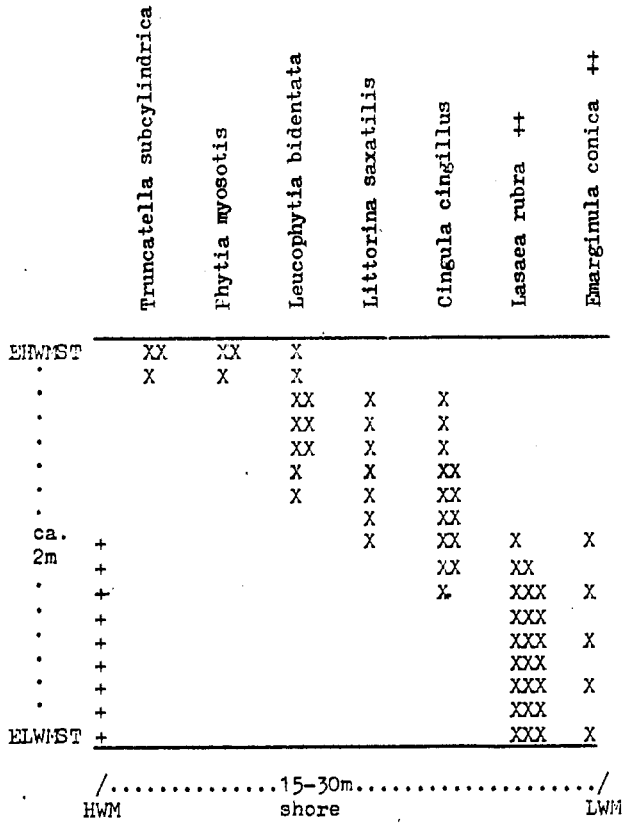
Thompson T.E. & Brown G.H., 1984. Biology of Opisthobranch Molluscs, Vol.II. Ray Society.

Whittaker J.E., 1978. The Fleet, Dorset - a seasonal study of its watermass and its vegetation. Proc. Dorset Nat. Hist. Archaeol. Soc., 100; 73-99.

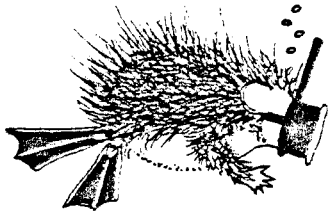
Wilson K. & Picton B.E., 1983. A list of the Opisthobranchia: Mollusca of Lough Ine Nature Reserve, Co. Cork, with notes on distribution and nomenclature. Ir. Nat. J., 21 (2); 69-72.

Yankson K., 1986. Observations on byssus systems in the spat of Cerastoderma glaucum and C.edule. J. mar. biol. Ass. U.K., 66; 277-292.

FIGURE 1:
Diagrammatic Transect
through Fleet Shore of Chesil Beach in Lower Fleet
including 'Spring' Area and showing Typical Species



'Springs' may appear at any level from mid-shore downwards (+++). Associated species are marked ++.



Several other mollusc species also occur occasionally in 'spring' areas, including the following:

CHITONS: Leptochiton asellus

GASTROPODS: Onoba semicostata
Bittium reticulatum
Turbonilla elegantissima

BIVALVES: Mytilus edulis
Kellia suborbicularis
Mysella bidentata) This species presumably in association with the sipunculan Golfingia elongata (Keferstein) which is also present.
Notirus irus

APPENDIX I

MOLLUSC SPECIES LIST FOR THE FLEET, DORSET

		Lower Fleet	Middle Fleet	Upper Fleet
	POLYPLACOPHORA			
*	Leptochiton asellus (Gmelin)	x	-	-
	Lepidochitona cinereus (L.)	xx	x	-
	Callochiton achatina (Brown)	x	-	-
	Acanthochitona crinitus (Pennant)	x	-	-
	GASTROPODA:PROSOBRANCHIA			
*	Emarginula conica Lamarck	xx	-	-
	Patella vulgata L.	xx	x	-
	Acmaea virginea (Muller)	xx	-	-
	Gibbula magus (L.)	x	-	-
	G.cineraria (L.)	xx	-	-
	G.umbilicalis (da Costa)	xx	-	-
	Tricolia pullus (L.)	x	-	-
	Littorina littorea (L.)	xx	x	-
*	L.saxatilis (Olivi)	xx	xx	-
*	L.saxatilis (lagoon form-?tenebrosa?)	-	xxx	x
	L.obtusata (L.)	xx	x	-
*	Hydrobia ulvae (Pennant)	xx	x	-
*	H.ventrosa s.s.(Montagu)	-	xxx	xxx
*	Truncatella subcylindrica (L.)	xxx	xx	-
	Cingula cingillus (Montagu)	xxx	-	-
	C.semistriata (Montagu)	x	-	-
	Onoba semicostata (Montagu)	xx	x	-
	Alvania crassa (Kanmacher)	x	-	-
	Rissoa parva (da Costa)	xx	-	-
	R.guerinii Recluz	x	-	-
*	R.membranacea (J.Adams)	-	xxx	xxx
(1)*	(Paludinella littorina (Chiaje))	(xx)	-	-
	Rissoella diaphana (Alder)	xx	-	-
	Omalogyra atomus (Philippi)	x	-	-
	Bittium reticulatum (da Costa)	xx	-	-
	Cerithiopsis tubercularis (Montagu)	xx	-	-
	Calyptraea chinensis (L.)	xx	-	-
	Crepidula fornicata (L.)	xx	-	-
	Lamellaria perspicua (L.)	xx	-	-
	Ocenebra erinacea (L.)	x	-	-
	Nassarius reticulatus (L.)	xx	-	-
	N. incrassatus (Strom)	xx	-	-
	Mangelia brachystoma (Philippi)	x	-	-

APPENDIX I (cont)

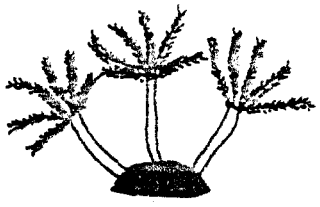
		Lower Fleet	Middle Fleet	Upper Fleet
	GASTROPODA:OPISTHOBRANCHIA			
	Retusa obtusa (Montagu)	-	xx	-
	R.umbilicata (Montagu)	x	-	-
(2)	Haminea sp. (juvs. indet)	x	x	-
*	Akera bullata Muller	-	xxx	xxx
	Runcina coronata (Quatrefages)	xx	xx	-
	Odostomia plicata (Montagu)	x	-	-
	O.unidentata (Montagu)	x	-	-
	Turbonilla elegantissima (Montagu)	xx	-	-
	Berthella plumula (Montagu)	x	-	-
	Elysia viridis (Montagu)	xx	-	-
	Limapontia senestra (Quatrefages)	-	xx	-
	Alderia modesta (Loven)	x	-	-
	Dendronotus frondosus (Ascanius)	x	-	-
	Doto coronata (Gmelin)	x	-	-
	D.millbayana Lemche	x	-	-
	Acanthodoris pilosa (Muller)	xx	-	-
	Palio nothus (Johnston)	xx	-	-
	Aeolidia papillosa (L.)	x	-	-
	Aeolidiella alderi (Cocks)	xx	-	-
*	Eubranchus farrani (Alder & Hancock)	xx	xx	-
(3)	E.doriae (Trinchese)	xx	-	-
(4)	E.sp.(vittatus/cingulatus?)	x	-	-
	Cuthona foliata (Forbes & Goodsir)	x	-	-
*	Tenellia adspersa (Nordmann)	-	xx	-
	GASTROPODA:PULMONATA			
	Leucophytia bidentata (Montagu)	xx	x	x
	Phytia myosotis (Draparnaud)	xx	x	-
	BIVALVIA			
	Nucula turgida Leckenby & Marshall	x	-	-
	Anomiid sp. (juvs. indet.)	x	-	-
	Mytilus edulis L.	xx	-	-
(5)	Modiolus barbatus (L.)	x	-	-
	Musculus marmoratus (Forbes)	x	-	-
	Ostrea edulis L.	x	-	-
	Loripes lucinalis (Lamarck)	xx	-	-
	Kellia suborbicularis (Montagu)	x	-	-
	Lasaea rubra (Montagu)	xxx	-	-
	Mysella bidentata (Montagu)	x	-	-
	Parvicardium exiguum (Gmelin)	xx	-	-
*	Cerastoderma edule (L.)	xx	-	-
*	C.glaucum (Bruguiere)	-	xxx	xxx

APPENDIX I (cont.)

		Lower Fleet	Middle Fleet	Upper Fleet
	Venus verrucosa L.	x	-	-
(6)	Mercenaria mercenaria (L.)	-	x	-
	Venerupis aurea (Gmelin)	xx	-	-
	V.decussata (L.)	xx	-	-
	Notirus irus (L.)	xx	-	-
*	Abra tenuis (Montagu)	-	xxx	xx
	Solen marginatus Montagu	x	-	-
	Spuenia binghami Turton	x	-	-
(5)	Barnea parva (Pennant)	x	-	-

The following have not been found living in the Fleet, although their shells are present:
Venus casina L., Tellina squalida Montagu, Macoma balthica (L.), Scrobicularia plana (da Costa), Corbula gibba (Olivi), Barnea candida (L.) (5), and Sepia officinalis L.

Records are from Seaward (1978, 1983) or from my subsequent observations, except where otherwise stated.
Comments in the text upon distribution and status in Britain are based upon Seaward, 1982. Indication of status in list shown thus: x : single or few records; xx : occasional to frequent; xxx : common to abundant where it occurs, but may be local.
* indicates that the species is mentioned in the text.
Notes:
(1) See comment in text querying the live presence of this animal.
(2) Sexually mature individuals have not yet been found in the Fleet and differentiation between immatures of the two species is not at present possible (Dr T E Thompson, pers. comm.). The record in my 1978 survey should now be regarded as Haminea sp. indet.
(3) and (4) There has been considerable confusion over these species requiring revision of ideas about their identity and status, (see Wilson & Picton, 1983 and Thompson & Brown, 1984). The 'E.cingulatus' recorded in my 1978 survey should now be called E.doriae, while the 'E.vittatus' is probably E.cingulatus. Exactly what 'E.vittatus (Alder & Hancock)' is does not seem to be clear (B E Picton, pers. comm.).
(5) Dyrynda, 1984.
(6) An introduction; probably none now living in the Fleet.



FISHES OF THE FLEET

by Jon Bass
Freshwater Biological Association, River Laboratory, East Stoke
Wareham, Dorset.

Prior to 1983, no documented fish survey had been undertaken on the Fleet. Dorset County Council commissioned an investigation on the biology of the bass (Dicentrarchus labrax (L.)) within the Fleet, following local concern over possible changes to the lagoon caused by replacement of the road bridge over the narrow sea entrance.

Data on fish species captured and those recorded prior to this work are presented in three groupings: species associated with weed and rocks, generally restricted to the seaward end of the Fleet (Table 1); species recorded as pelagic larvae, suspected chance invaders (Table 2); species that appear to be present in large numbers throughout the length of the Fleet and may be regarded as characteristic of the fish fauna (Table 3).

Two types of seine net were used, a variable mesh bag seine (5mm - 40mm knot to knot) and a 5 m micro-mesh seine (2mm apertures, knitted mesh). Both were hand-hauled along the north (mainland) shore at three locations, Pirates Lane, Moonfleet and Langton Hive. Plankton nets sampled fish eggs, larvae and post-larvae on the flood and ebb tides at fortnightly intervals from May to August. In the plankton nets most species were recorded with greater frequency on the flood tide, while ebb tide samples provided comparatively large numbers of three-spined sticklebacks, deep-snouted pipefish and sand smelt, all three known to spawn within the Fleet. No bass or grey mullet species were present in the plankton samples, but both were recorded during seine netting. Two age groups (0+ and 1+) of bass were sampled, with immigration by young-of-the-year occurring in August. This was later than previously recorded inshore movements (May to July) and can be attributed to below average sea temperatures in March and April 1983, resulting in delayed spawning (D.Kelley, pers. comm.). Three species of grey mullet were recorded, with golden mullet the most frequent; this contrasts with local observations of coastal and estuarine shoals which are generally dominated by thick-lipped mullet. The thin-lipped mullet, recorded least frequently in the Fleet, appears to prefer the upper tidal reaches of estuaries and therefore may be more strongly represented in less saline lagoons (with at least intermittent access to the sea).

To summarize, the fish fauna of the Fleet includes a wide range of species, many of which can be regarded as chance occurrences. A small group, the common goby, deep-snouted pipefish, sand smelt and golden mullet are particularly characteristic of the situation. While a large lagoon such as the Fleet may have a great influence on local populations, on a national scale the role of lagoons as nursery areas for commercially important marine fish is probably insignificant, and this partially explains the absence of research in the past. Other factors devolve from a lack of established fish-sampling

techniques suitable for shallow, weedy and muddy situations. There clearly remains considerable scope for increasing our knowledge and understanding of the impact of fish populations in the diverse situations loosely categorised as lagoons.

Table 1. Fish associated with weed and rocks in the outer Fleet.

Ballan Wrasse	Labrus bergylta Ascanius
Corkwing Wrasse	Crenilabrus melops (L.)
Goldsinny Wrasse	Ctenolabrus rupestris (L.)
Greater Pipefish	Syngnathus acus L.
Butterfish	Pholis gunnellus (L.)
Rocklings	Gadidae
Blenny/Shanny	Blennius pholis L.
Sea Scorpion	Taurulus bubalis (Euphrasen)
Two Spot Goby	Chaparrudo flavescens (Fab.)
Pollack	Pollachius pollachius (L.)
Conger Eel	Conger conger (L.)

Table 2. Fish entering the Fleet as pelagic larvae and post-larvae, chance invaders.

Pouting	Trisopterus luscus (L.)
Sandeel	Ammodytes spp.
Sprat	Sprattus sprattus (L.)
Herring	Clupea harengus L.
Smelt	Osmerus eperlanus (L.)
Black Bream	Spondyliosoma cantharus (L.)
Gilthaad Bream	Sparus aurata L.
Dragonet	Callionymus lyra L.
Thin-lipped Mullet	Liza ramada (Risso)

Table 3. Fish that occur throughout the Fleet.

Freshwater Eel	Anguilla anguilla L.
Bass	Dicentrarchus labrax (L.)
Flounder	Platichthys flesus (L.)
Deep-snouted Pipefish	Syngnathus typhle L.
Thick-lipped Mullet	Crenimugil labrosus (Risso)
Golden Mullet	Liza auratus (Risso)
Sandsmelt	Atherina boyeri Risso
Common Goby	Potamoschistus (Iljinia) microps (Krøyer)
Three-spined Stickleback	Gasterosteus aculeatus L.

SAND SMELT IN THE FLEET

by Peter Henderson & Roger Bamber

As much as the Fleet, as a protected, sheltered, productive environment, is important to fish, so are fish important to the Fleet, being the major top predators in the ecosystem, and essential prey for the local tern colony. As has been mentioned elsewhere in this issue by Jon Bass (p....), the Fleet supports a local breeding population of the sand smelt, Atherina boyeri Risso. This small, inshore species, normally attaining a maximum length of 150mm and age of 3+, is found in Europe in marine, estuarine and even freshwater situations, and is commonly associated with coastal lagoons.

It lays its eggs in May and June, amongst filamentous algae (and seagrasses?), where they passively entangle by means of filamentous surface threads. The postlarvae hatch out after 2 to 3 weeks, and for their first few weeks of active life they remain close inshore, often in association with structures such as jetties or (in the Fleet) fences, and using shallow water weeds as shelter. 1 to 2 day-old postlarvae have been found along the full length of the Fleet from Smallmouth to Abbotsbury Swannery. As they grow and become better swimmers, they move out to deeper, more open water; eventually they overwinter in the Fleet, and breed the following spring. Subsequently adults tend to move offshore, and certainly after their second breeding year they only return to the Fleet for spawning. Less than 1 in 40000 reach a 4th spawning period (as 4-yr-old fish). The population age-class structure is evident at breeding times (Fig.1).

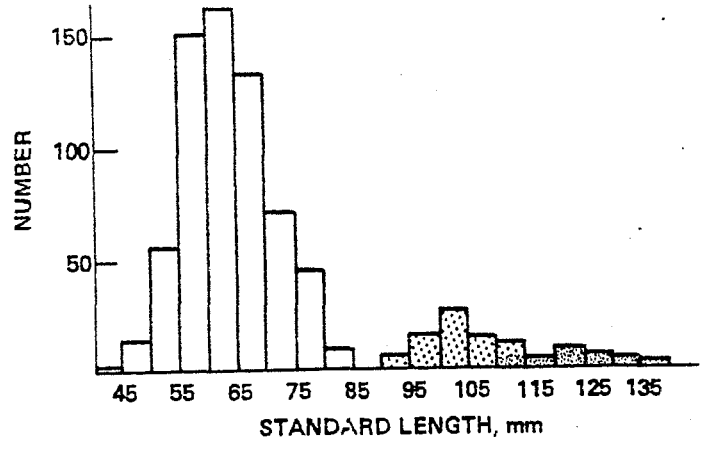


FIG. 1 LENGTH FREQUENCY HISTOGRAM OF ADULT SAND SMELT FROM THE FLEET, 17 MAY 1983, WITH DIFFERENTIAL SHADING OF 0+ (WHITE), 1+ (LIGHT STIPPLING) AND 2+ (HEAVY STIPPLING) AGE CLASSES

A.boyeri therefore uses the Fleet as a spawning and nursery ground and for the first year or two of adult life. From the year-to-year mortality prior to the offshore ('off-Fleet')

migratory age, and data from other localities, it is probable that mixing with other localised populations is minimal.

Ecology in The Fleet.

The diet of sand smelt at all stages of life consists of animals moving in the water column which are small enough to enter the mouth. The postlarvae and juveniles are typically meioplanktivores, feeding predominantly on nauplii, copepodites and molluscan veligers; at the water margins they also feed on insects (e.g. chironomids), and one shoal of postlarvae from the Fleet had 30 or more thrips in each gut. As the fish grow, their increased mouth size allows them to supplement their basically planktonic diet with larger animals, such as amphipods and isopods (mainly Idotea), and presumably mysids, though none were found from Fleet sand smelt gut analyses.

As prey, this species must be significant to the Chesil Bank little tern colony, these birds commonly being observed feeding in the Fleet; the sand smelt is second in commonness only to the common goby, but the demersal habit of the latter is inappropriate to the tern's feeding strategy. The sand smelt is probably also preyed upon by other fish, e.g. bass, and the enormous numbers (millions) of postlarvae and juveniles in the summer must undoubtedly be exploited as a food resource, but as yet we have no data on or observations of such predation.

The Fleet population harbours three known (to date) parasites. Stomach analyses have found the parasitic flatworm Bacciger bacciger, and an as yet unidentified acanthocephalan, which may be a new species at least for the U.K.. This Atherina population also shows a very heavy infection of diplostomiasis (black spot), a condition caused by the metacercaria of a trematode (cf. Neodiplostomum) encysting on the skin of the fish, and appearing as a scatter of black spots owing to the fish secreting melanin around each cyst. The first host in the trematode life cycle will be a mollusc, and circumstantial evidence suggests Hydrobia ventrosa as the prime candidate; the adult worms are endoparasites of piscivorous birds - in the case of the Fleet almost certainly the little tern.

With the very high densities of both adults and postlarvae, the sand smelt is clearly an important species in the Fleet ecosystem: its interrelationships are summarised in Figure 2. Further work on this relatively undisturbed/ unexploited population is planned, particularly to find out more about the egg and postlarval mortality. Any information from Fleet workers which can shed light on our hypotheses about the sand smelt's predators would be gratefully received, but please do not shoot the terns!

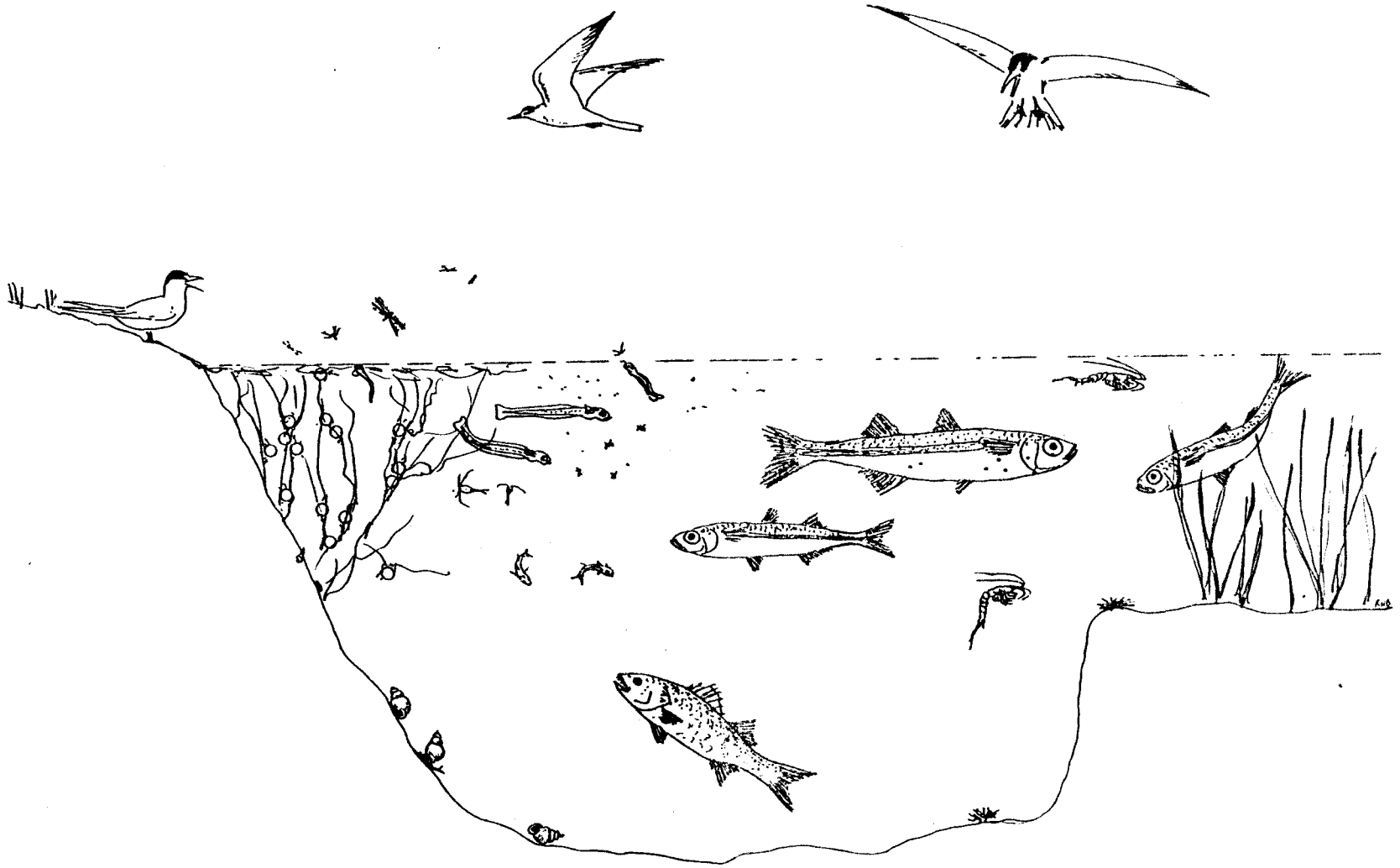


Figure 2. The sand smelt in the Fleet ecosystem, representing interactions with spawning weeds, prey (insects, plankton, crustaceans), predators (bass, tern) and parasites (via terns, Hydrobia) (not to scale).

LAGOONS IN THE CONTEXT OF ENCLOSED MARINE INLETS

by Sue Gubbay
Marine Conservation Society, 4 Gloucester Road, Ross-on-Wye,
Herefordshire HR9 5BU

Brackish lagoons are only one of a variety of types of enclosed marine inlet, and to put their characteristics into some context it is useful to examine the special features of other types of marine inlet.

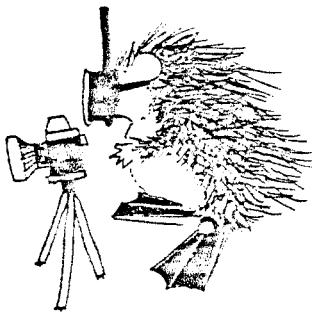
The main characteristics which influence the habitat and communities to be found within the variety of marine inlets are: shelter from wave action, changes in salinity, depth, and any constrictions to water movement such as an area of narrows or a pass. Three types of inlet were described, fjords, fjards and rias, and the special features of each highlighted.

Fjords in their classic form are glaciated features, deep water inlets U-shaped in cross section with a shallow sill at the entrance. One of the most important features of fjord systems, which has particular bearing on the communities they contain, is shelter from wave action. There is a gradual transition from a wave exposed to wave sheltered situation within the inlet and, related to this, a gradation of sediment types. The result is a sequence of communities related to the degree of shelter, although the form can be more complex with a series of deep basins separated by moraines which form narrow passes. At the passes there are often rapid changes in both substrate and communities because of the changes in current, and these are usually the most interesting parts of the system.

Fjards are also the result of glaciation, but form in areas of lowland glaciation. They have a more complex structure than fjords, being more open with a very irregular coastline and no main channel. They are also relatively shallow areas with numerous islands providing localized shelter as well as current-swept narrows. Owing to their complexity they contain a great variety of habitats and communities and, unlike fjords, there is no simple gradation from shelter to exposure.

Rias have some features in common with fjords, but they are not formed by glacial action. They are drowned river valleys, usually deep and narrow with a well defined channel and often fully marine for much of their length. They are predominantly rocky features, although there can be small bays and inlets along their length and muddy creeks at the head. The sheltered, relatively deep water with a firm substrate provides a habitat for species that may be more common in deep offshore waters.

The large, narrow inlets around our coastline are probably the most threatened type of marine habitat as they have been a focus for settlement and industry for many years, with the associated problems. Perhaps the most significant of these are the discharge of pollutants, dredging and reclamation.



COASTAL ENGINEERING AND ITS ECOLOGICAL CONSEQUENCES IN THE SOUTH WEST NETHERLANDS

by A.T.Critchley* & P.H.Nienhuis'

*University of Natal, Dept. of Botany, Pietermaritzburg 3201, Natal, R.S.A.

'Delta Institute for Hydrobiological Research, Yerseke, The Netherlands.

The area of the south-west Netherlands known as the Dutch Delta comprises the convergence of three major Europen rivers, viz. Meuse, Scheldt and Rhine. Over historical time the area has been subject to considerable flooding from the sea and as a consequence many reinforcements have been built, necessitating changes to the coastal configuration.

Controversial decisions were taken by the Dutch Government to undertake extensive coastal and hydraulic engineering, in order to compartmentalize the estuaries, thereby improving local communications and safety for inhabitants from flooding. The ecological consequences for such manipulation of coastal morphology, estuarine configuration and prevailing salinity were presented, with particular reference to the complete closure of a former estuary (sea arm) to create a stagnant brackish lake, namely Lake Grevelingen.

The extent of Zostera marina populations within Lake Grevelingen has been monitored, and found to increase in area immediately following closure, but subsequently decline. A management policy was formulated, and the lake opened to the North Sea via a sluice gate in 1978. Following this reconnection and the return to full salinity, the Zostera beds began to increase in area. Coincidentally, the invasive brown alga Sargassum muticum also gained access to Lake Grevelingen whilst the sluice gates were open. The alga has spread very rapidly in subsequent years.

A recent decision by the Dutch Government to keep the Eastern Scheldt Estuary open to the North Sea (intended for closure), but protected by a technologically advanced storm surge barrier, was discussed, together with tentative predictions of its effect on the marine organisms.

NOTICES

1. IRISH SEA INTERESTS. An Irish Sea Study Group has been formed, whose objectives are:

   a. to receive and discuss information relevant to the Irish Sea,

   b. to assess trends,

   c. to receive research plans and programmes and syntnesize them,

d. identify gaps arising from b and c and suggest ways of filling them,

e. disseminate information.

The Group's immediate task is to compile a comprehensive list of all organisations, and individuals not covered by an organisation, which have an interest in some aspects of the Irish Sea, with the intention of inviting them to participate in future activities of the Group.

For further information and an initial questionnaire, contact D.F.Shaw, Director, Centre for Marine and Coastal Studies, University of Liverpool.

*****

2. URCHIN '86 is a nationwide, predominantly diver-oriented MCS project which aims, in one year, to collect information on the status of urchin populations from all around the coast of the British Isles: it needs diving clubs and groups to help achieve that goal.

Individual divers can take part by filling in a preprinted postcard after a dive. This will give a broad picture of where and how many sea urchins are found round the coasts. Groups and clubs can take part in more detailed studies of urchins at particular sites: this part of the project needs groups of divers to make counts on the sea bed, as well as measurement to age the population.

For details contact the Marine Conservation Society,
4 Gloucester Road, Ross-on-Wye, Herefordshire HR9 5BU
(Tel. Ross-on-Wye (0989) 66017).

*****

3. FFLASK. For Porcupines who may have been wondering how the Fauna and Flora Lists And Systematic Keys project is getting on, I am delighted to report that it is. Member Judy Foster-Smith has agreed to take on the development of the project, and, as agreed at the AGM, funds have been duly allocated to her. Members wishing to contribute constructively are encouraged to get in touch.

*****

PYCNOGONID FEEDING SUPPLEMENTARY:

Discerning readers will recall the article in PN 3 (3), p.67 et seq., on the odd dietary preference of Pycnogonum for anemones commensal on hermit crab shells, and thus inaccessible as a food source. In response to the request for further suggestions to account for this, I am delighted to have received that from Jack Coughlan, suggesting that the anemones took to a mobile substrate because they were attractive to pycnogonids! Fine lateral thinking.

Minutes of the NINTH Annual General Meeting of PORCUPINE, held at Southampton University on Sunday 25th April 1986

Bill Farnham was in the Chair; 19 members were present. The minutes of the Eighth Annual General Meeting (published in Porcupine Newsletter Vol.3 no.3) were approved.

Matters arising concerned the proposal that PORCUPINE consider application for membership of The Biological Council. It was agreed to discuss this further at the next Committee meeting.

Reports of the Hon. Treasurer and Hon. Editor were given and approved. The Hon. Secretary was not present (apologising for her absence) but gave her report by letter (see p.157) together with notice of her wish to relinquish office.

Office bearers were elected as follows:

Hon. Secretary	Martin Sheader
Hon. Treasurer	John Wilson
Hon. Editor	Roger Bamber
Hon. Records Coordinator	Jonathan Moore

The retiring office bearers, Shelagh Smith, David Heppell, Frank Evans and Fred Woodward, agreed to continue as council members, and were thanked for their efforts and contributions to PORCUPINE over the years since its inception. Roger Brehaut, who retired from Council, was also thanked for his services.

The Council is now as follows:

Peter Davis	Norman Holme
Frank Evans	Ivor Rees
Bill Farnham	Ralph Robson
Robin Harvey	Dennis Seaward
David Heppell	Shelagh Smith
	Fred Woodward

The Hon. Auditors were re-elected.

Following the poorly attended (one Member) 1985 field meeting in Skye, the desirability of further field meetings was discussed. Several members showed interest in continuing, with suggestions put forward for future visits.

At the 1984 AGM it was suggested that a poster be produced to attract new Members and to advertise the aims of PORCUPINE. Shelagh Smith produced a preliminary sheet, and Frank Evans agreed to redesign and complete the poster.

It was decided that a grant obtained from the World Wildlife Fund should be used to fund a feasibility study of producing a synopsis of Fauna and Flora Lists and Systematic Keys (FFLASK) for British marine biota, with a view to proceeding further should applications for additional funding be successful. It is hoped that the preliminary study be completed during 1986.

ACCOUNTS FOR THE YEAR ENDING 30 NOVEMBER 1985

Income and Expenditure Account

Dr.	£ p		Cr. £ p
To Donations	7 - 00	By Printing and Stationery	302 - 78
Subscriptions for 1983	1 - 00	Postage	127 - 92
Subscriptions for 1984	34 - 00	AGM expenses	182 - 45
Subscriptions for 1985	459 - 00	Field meeting expenses	200 - 00
Sale of Newsletters	32 - 00		
Sale of Christmas cards (1984) ...	14 - 42		
AGM Booking Fees ...	202 - 00		
Interest from Deposit Account ...	50 - 41		
Excess of Expenditure over Income transferred to Balance Sheet	13 - 32		
	£813 - 15		£813 - 15

Balance Sheet

Dr.	£ p		Cr. £ p
To Subscriptions paid in advance ...	29 - 50	By Cash at Bank (Deposit Account) ...	800 - 00
Uncleared cheques	200 - 00	Cash at Bank (Current Account) ...	311 - 45
Balance at 1 December 1984 ...	899 - 26	Petty Cash in hand	3 - 99
		Transferred from Income and Expenditure Account	13 - 32
	£1128 - 76		£1128 - 76

M C MacKinnon C W Pettitt
Hon. Auditors

David Heppell
Hon. Treasurer
28 March 1986

Hon. Secretary's Report 1985-1986

There was only one meeting in the last year, the Annual General Meeting held at Manchester on 23-24 February 1985 (briefly mentioned in last year's report) with the theme Predators, Prey and Feeding Strategies, memorable for its chilliness. The planned field meeting in Skye was a fiasco due to lack of support. No meeting took place in the Autumn because due to various complications I did not hear that the person whom I had approached to organise it could not do so until it was too late to make alternative arrangements.

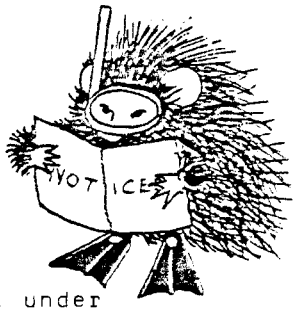
Behind the scenes, PORCUPINE expressed an interest in the Wildlife and Countryside Act. The Hon. Sec. wrote appropriate letters with little response, the reply from her local Member of Parliament being slow and lukewarm. Perhaps other Porcupines had more success. PORCUPINE also gave written evidence to the House of Lords Select Committee on Science and Technology Subcommitte II - Marine. Initial reaction was a phone call asking "What's Porcupine?". In the published report we are listed with those who gave written evidence. Recommendations put forward are much as we would wish. Copies of the Summary of Conclusions and Recommendations are available.

We mourn Sir Maurice Yonge, our first Honorary Life Member, who died on March 17 1986. He will be missed by many of us as a Grand Old Man and father figure in marine biology.

Membership is still rising steadily and is now 190.

This year sees a complete change in Office Bearers. I originally hoped to suppo rt the new Hon. Treasurer and Hon. Editor until they were established, but as I have moved house and communications with other Porcupines and indeed the marine biological world in general are less easy I felt that the time has come for me also to relinquish office

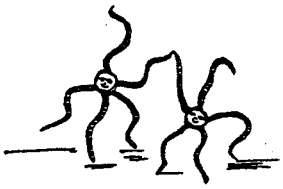
Shelagh Smith.



NOTICES

4. The Tenth International Symposium on Ostracoda, under the auspices of the British Micropalaeontological Society, will be held at the University College of Wales, Aberystwyth between 25 and 29th or 30th July 1988, and there will be a series of pre- and post-symposium field excursions, including a 'Recent Marine Ostracod' trip to Millport. The major theme of the comference is Ostracoda and Global Events, and the symposium will consist of both invited and contributed papers, poster and discussion sessions, workshops, demonstrations of scientific equipment, etc.. Papers are requested on relevant topics, and further details can be obtained from:

Dr.R.C.Whatley, 10th Ostracod Symposium, Department of Geology, University College of Wales, Llandinam Building, Penglais, Aberystwyth, Dyfed, SY23 3DB, Wales, U.K.



ASTEROID MAKES TRANSATLANTIC HOP

by R.Harvey
Scottish Marine Biological Association, P.O.Box 3, Oban, Argyll.

Despite the title, this item has nothing to do with the appearance of Halley's Comet, nor was the writer influenced by that appearance. It is instead a tale of experience confirming hope, i.e. if you look long enough at an environment that few others are priveleged to study, you are bound to find something new. Since 1973, the SMBA has been fortunate in having access to an average of two benthic cruises per year on RRS Challenger. An introduction to the methodology may be found in an earlier number of the Newsletter (Harvey, 1984). Our energies, and those of colleagues at the British Museum, Zoological Museum Copenhagen, Swansea University and I.O.S. have been directed mainly towards defining the echinoderm populations of the Rockall Trough and examining their reproductive strategies, recruitment and growth from a time series of samples. Two monographic papers have already been published on the records of Crinoidea, Asteroidea and Ophiuroidea, and the Echinoidea and Holothuroidea from this area of the Northeast Atlantic prior to 1983 (Gage et al., 1983; 1985).

Subsequently, benthic invertebrate samples have been obtained from trawlings on the Hebridean Slope in 500-2000 m, undertaken as part of a programme examining the biology of the demersal fish of this area (see Gordon, 1984; Gordon & Duncan, 1985). This depth range has been somewhat neglected in the past in our invertebrate sampling, and some interesting records have turned up. Over 80 specimens of the asteroid Mediaster bairdii have been recovered in three hauls in different years from depths of 1383-1587 m. Another species, this time a benthopectinid Cheiraster sepitus, previously known from the Azores, has been recovered in smaller numbers from a similar depth. Other finds of note are rthe large pterasterid cushion star Diplopteraster multipes and a vivid red cushion star Chondraster grandis, both of which appear to be rare in the Rockall Trough, only three specimens of each having been taken by us. Three specimens of Crossaster squamatus were also recovered from the Hebridean Slope, the only records of this species from south of the cold water area of the Faroe Channel.

Work is proceeding on a paper which includes these new records and updates those of species included in previous papers. It is hoped that two cruises to Rockall and Madeira planned for 1986 will be as fruitful as those from previous years.

REFERENCES

Gage J.D., Pearson M., Clark A.M., Paterson G.L.J. & Tyler P.A., 1983. Echinoderms of the Rockall Trough and adjacent areas I. Crinoidea, Asteroidea and Ophiuroidea. Bull. Br. Mus. nat. Hist. (Zool.), 45 (5); 263-308.

Gage J.D., Billet D.S.M., Jensen M. & Tyler P.A., 1985. Echinoderms of the Rockall Trough and adjacent areas II.

Echinoidea and Holothuroidea. Bull. Br. Mus. nat. Hist. (Zool.), 48 (4); 173-213.

Gordon J.D.M., 1984. Sampling the deep-sea demersal fish of the Rockall Trough. Porcupine Newsletter, 2 (10); 270.

Gordon J.D.M. & Duncan J.A.R., 1985. The ecology of deep-sea benthic and benthopelagic fish on the slopes of the Rockall Trough, northeastern Atlantic. Prog. Oceanogr., 15; 37-69.

Harvey R., 1984. Sampling deep-sea invertebrates in the Rockall Trough. Porcupine Newsletter, 2 (10); 271-274.

Letters to the Editor

FROM Mike Kendall
Dove Marine Laboratory

Casual observation of the strand line at Boulmer, Northumberland on 28 February 1986 revealed the presence of unusually high numbers of relatively undamaged cuttle-bones. Similar observations were made at Bamborough, Northumberland on the same day and at Cullercoats, Northumberland ten days later. During this period, further reports have come from Newton-by-the-Sea, Northumberland (Bob Foster-Smith), St. Mary's Island, Northumberland (Susan Clark) and Filey Bay, North Yorkshire (Rosemary Bowman). Stranded, badly decomposed carcasses of Sepia sp. mixed with those of small squid were seen around the same time at Tynemouth, Northumberland (J.B.Buchanan).

Is heavy winter mortality of Sepia unusual, or is it just that we haven't noticed it in the past? Earlier local records are few (1898, 1954) and these are again not of living animals (Judy Foster-Smith, in press).

Reference:

Foster-Smith, J.L. (1986, in press). The Marine Fauna of the Cullercoats District 18. Mollusca excluding Bivalvia. Rep. Dove Mar. Biol. Lab.

FROM Member Dennis Seaward

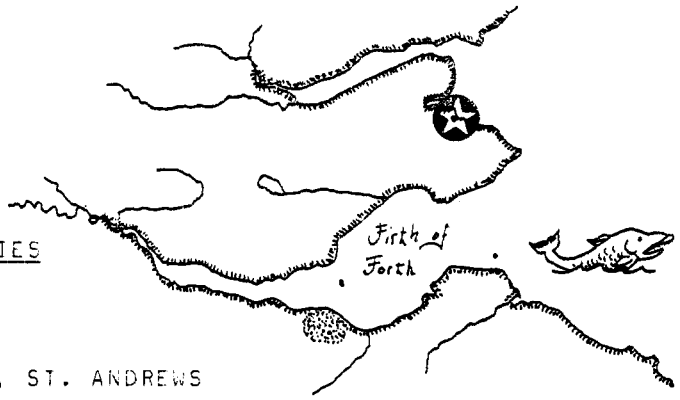
Portland Harbour and the Double Low Tide

The tidal phenomenon in the English Channel, affecting low tide in Weymouth Bay and high tide from Swanage to the Solent, is well known. Shores from Portland to Swanage are thereby subjected to a double low tide or a long low water stand. Low water springs here occur about midday, and the extended 'low' lasts about four hours. Exposure of the shore to climatic extremes is thus intense, and may perhaps be expected to result in a restricted marine fauna: on the contrary.

On the west side of Portland Harbour there are extensive sand flats which are exposed or at 'wadeable' depth on a low spring tide. These carry large populations of polychaetes, anemones and molluscs; the molluscs are of particular interest in that several normally sublittoral species occur, although at low density, including the scaphopod Antalis vulgaris and the neogastropods Mangelia nebula and M.brachystoma.

I believe that the circumstances described are rare, so that Weymouth Bay beaches are potentially of considerable biological interest. Within the Bay, soft sediment shores only occur at Weymouth Sands (already under pressure as a holiday beach), in the mouth of the Fleet, and in Portland Harbour as mentioned above, where they are threatened by growing amenity use and possible development as a marina, etc..

This note is both a request and a plea. Do you know of similar circumstances elsewhere? If so, I should be interested to swap notes. If not, then the unique nature of these sand flats should be recognised before it is too late.



AROUND THE MARINE LABORATORIES

Number 14

THE GATTY MARINE LABORATORY, ST. ANDREWS

The origins of the Getty Marine Laboratory in St. Andrews are essentially attributable to William Carmichael McIntosh, who obtained the Chair of Natural History at the University in 1882. He came to St.Andrews from an appointment as superintendant of a mental asylum at Murthly, Perthshire. After 20 years there he had been elected a Fellow of the Royal Society and had become a world authority on polychaete annelids. His Ray Society monographs on nemertines and annelids remain the lone taxonomic texts for these groups.

Under McIntosh's guidance, the St. Andrews Fisheries Laboratory, supported by the Fisheries Board for Scotland, was conceived and opened in 1884 - the same year that 'The Ark' at

Granton (thence Millport, and subsequently the Scottish Marine Biological Association, now at Oban) commenced work. The Fisheries Board for Scotland established and opened its own laboratory in Aberdeen in 1899. Up until that time McIntosh, in St. Andrews, had provided the research impetus for the Board, studying especially the biology and life-histories of British food-fishes. The St Andrews laboratory, which was originally a fever hospital built on the shore-front south of the harbour, was of wood construction and water was pumped by means of a gas engine. The original laboratory did, in fact, burn down (in mysterious circumstances!) but only after McIntosh had transferred his operations to the stone built Gatty Marine Laboratory located a little further along the shore-line. This latter building was provided by a specified endowment of £2000 from Charles Henry Gatty, plus a further £500 for laboratory fittings. The building was officially opened in 1896 - the same year that Millport commenced operations. This stone building presently remains the basis of the site occupied today.

After McIntosh's death in 1931 the laboratory did, in fact, close - owing to lack of funds - although it was reopened in 1947. Since then the laboratory staff had specialised in physiological studies of marine organisms. Certainly, during the 1960's under the direction of Adrian Horridge FRS, the laboratory gained an international reputation for invertebrate neurobiology. Recognising the importance of such academic pursuits to broader medical research, the Wellcome Foundation provided funds for the extension of the Laboratory both in 1959 and 1965.

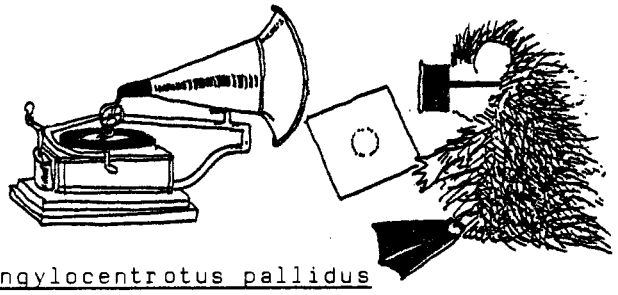
In total there are some 1400 m. of laboratory space, with exceptionally stable floors (essential for neurophysiology), constant temperature facilities, mechanical and electrical workshops, an electron microscopy suite and teaching laboratories. The aquarium room is supplied by high quality non-recirculated pumped seawater, which is also available throughout the main laboratory building and in the additional teaching block.

In recent years there has been a shift away from neurobiology, although this remains one of the two major research groups, to include environmental biology and ecology. This latter group are concerned with environmental adaptations of marine organisms and aspects of benthic invertebrate ecology. A major new facility provided for the environmental group is a large exterior constant temperature cold-room utilized for maintaining Antarctic fish and invertebrates.

In addition to providing service teaching for botany, zoology, ecology and physiology classes, staff at the Gatty teach a one-year honours degree course in marine biology, plus all Faculty teaching of transmission and scanning electron microscopy.

With the recent commitment of the University to maintain and extend facilities, staff and capital equipment, the Laboratory can now offer well-formed facilities for a wide variety of physiological, ecological and ultrastructural research interests. The organisms used by particular workers are similarly diverse in nature, ranging from insects to crustaceans,

echinoderms, cephalopods, gastropods, fish and reptiles. Although, by contrast to the west coast, the east is notoriously impoverished in its fauna, what we have is available in abundance. We have proximate access to estuarine and marine habitats ranging from mud through sand to bare rock. The long-term maintenance of laboratory animals is not problematic and visitors are welcomed (sic). As part of the ongoing development plan, space, facilities and equipment are being specifically provided for both short- and long-term visitors.



new records

From responses to the note of Strongylocentrotus pallidus in the last issue (p.132), I must apologise to Ronnie Gallagher (who also phoned) for being one of the few Porcupines who didn't know him. Many thanks to Ailsa Clark of the BM(NH) for further information, viz. S.pallidus is considered distinct from S.droebachiensis as in the recent review of the genus by Margit Jensen (Sarsia, 57:113-148, 1974). Dr Jensen cites the distribution of S.pallidus as mainly arctic and matching that of S.droebachiensis but extending south, in the Pacific to Nagasaki and the vicinity of Vancouver Island and in the north Atlantic to Massachusetts Bay, Iceland, the Faroes, Oslofjord and the Orkney and Shetland Islands! So it is not a new record, but one that has been overlooked by almost everyone. R.G. is still finding the animal, and we hope for a Newsletter contribution giving more detail in the near future.

*****

Members will recall the Fawley fish list of PN vol.1, p.120 et seq; nine further species have been recorded from the power station screens since then, and may be considered rare in this (Southampton Water) "fauna", though the lack of previous solenette records may be due to misidentification. The nine are:

Tope	Galeorhinus galeus (L.)
Northern rockling	Ciliata septentrionalis (Collet)
Cod	Gadus morhua L.
3-bearded rockling	Gaidropsarus vulgaris (Cloquet)
Rock goby	Gobius paganellus L.
Common goby	Pomatoschistus microps (Kroyer)
Turbot	Scophthalmus maximus (L.)
Topknot	Zeugopterus punctatus (Bloch)
Solenette	Buglossidium luteum (Risso)