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- 237 -

CONTENTS

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EDITORIAL

At the close of the year may I wish you all Season's Greetings and good hunting for 1995. There is little to comment upon at the moment, save the Editor's permanent lament: THERE ISN'T ENOUGH COPY! This issue smacks very much of being a "family" affair, and is heavily weighted towards molluscs and the recording of same. If you find molluscs just a big yawn, you know what to do, send in an article about something entirely different.

For the next meeting we are going to return to one of our old haunts - MILLPORT. Remember what an excellent meeting we had last time in 1987 despite the ferry strike, getting ourselves on TV taking supplies in a cockleshell of a boat through a raging storm to sucour the beleagered islanders (making sure our booze got there!). See the FIRST CIRCULAR [loose sheet] with details for 1995. A meeting not to be missed.

Rumours that the Hon. Ed. has gone mad are entirely true. But the married state does not change her name or address. (The new half isn't a marine biologist, but already is a contributor to PN, see maps on pp 247 & 248). Please note that BT has changed her telephone number, like nearly everyone else's, see front page, and threatens to do so again at some nebulous time within the next two years, which is extremely vexing.

Jon Moore is as usual awaiting your subscriptions, they haven't gone up this year [£8 for full members, £5 for students]. Remember, no sub = no Newsletter.

DIVING SURVEY OF AN UNUSUAL ROCKY HABITAT OFF THORPENESS POINT, SIZEWELL, SUFFOLK

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INTRODUCTION

Thorpeness is a small headland some 2 km to the south of Sizewell Power Station. The village of Thorpeness is effectively an Edwardian folly, with a small tourist industry. The geological Thorpeness extends offshore in an ENE direction as a sublittoral hard substrate outcrop, and it is this sublittoral feature which is referred to hereinafter as Thorpeness.

The bedrock of Thorpeness is Pliocene Coralline Crag (e.g. Chatwin, 1961). Surveys of this area were undertaken in the late 1970s by the Institute of Oceanographic Sciences (e.g. Lees, 1980; 1983, and intervening reports quoted therein). They discovered evidence of the Coralline Crag extending seawards as subsurface rock as far as 3.4 km offshore; however, the surface extrusion of Thorpeness is within 2 km of the headland (Fig.1).

The Crag material is an agglomerate of iron-stained (golden) medium sand with molluscan shell inclusions, including macrofossils of the *Aequipecten opercularis* group, *Epitonium*, bryozoans and barnacle valves. Debris derived from the Coralline Crag accumulates to the north side of Thorpeness. The upper Thorpeness surface is variously covered with sands or muds, particularly towards the inshore edge, while the seaward edge is bounded by medium sand.

There is controversy over the history of the particulate sediment material (see Lees, 1983), but the commonly accepted theory is of a mass offshore removal of material to the Sizewell Sandbank during stormy weather. While the bedload transport is southerly, there is a greater movement of suspended material, generally in a northerly direction.

An offshore benthic grab survey of the Sizewell area undertaken in 1976 (Bamber & Coughlan, 1980) collected some samples from Thorpeness, where particulate sediment was present. The fauna was dominated by a tubicolous phoronid (identified then as *Phoronis* cf *muelleri*), with hydroids common and supporting other epifaunal species, notably bryozoans, the amphipod *Dulichia monacantha* and five species of pycnogonid.

The second survey in 1989 (Bamber & Batten, 1989) was unable to retain any grab samples from Thorpeness, although fragments of *Alcyonium digitatum* ("dead-man's fingers") and the hydroid *Tubularia indivisa* were taken. The depths recorded at the time suggested erosion had occurred since the 1976 survey, presumably including the loss of much of the sand sampled at that time; other evidence in 1989 also concluded a general phase of erosion along this Suffolk shoreline, including an attempt by the local Council to import sand to the beach to reinstate its potential for holiday-makers.

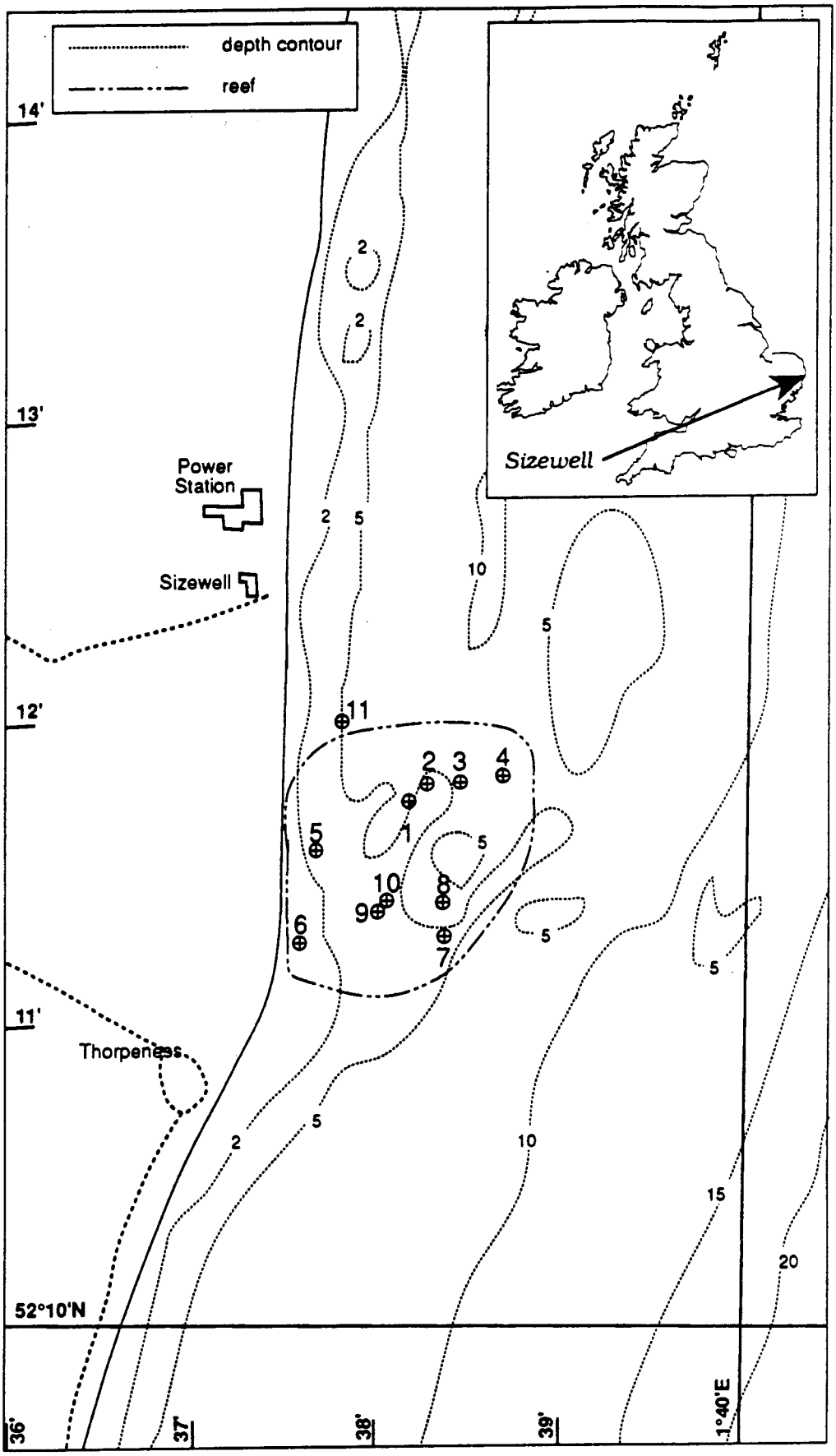

Fig. 1. The coast near Sizewell showing locations of survey stations, depth contours and approximate limits of the reef (taken from Admiralty Chart No. 1543).

The reef is extensively fished by local fishermen for crabs and lobsters and is known to be a reliably rich potting ground.

A diving survey of a shallow subtidal reef off Thorpeness Point, south of Sizewell Power Station was carried out by FSCRC and FARL in June 1993 on behalf of Nuclear Electric. The reef is situated in the path of the cooling water discharge plume from Sizewell Power Station and it was necessary to acquire more information about the marine habitats and communities of Thorpeness.

SURVEY STRATEGY AND METHODOLOGY

Fieldwork was carried out on the 12th and 13th June 1993 from the fishing boat 'Joleen' (skippered by Paul Horsnell) and an inflatable. The four man diving team consisted of Jon Moore, Francis Bunker, John Woolford and Bruce Jones. Survey methods were based on techniques developed for use on Marine Nature Conservation Review (MNCR) surveys (Hiscock, 1990). Recording forms, as used by the MNCR, were used throughout. These forms incorporate the species codings of Howson (1987).

The survey sites were chosen to include a range of depths and to cover as large an area as possible of the rocky reef off Thorpeness Point. Site positions were fixed with the aid of GPS and Decca navigators and echo-sounder. The sites are listed in Table 1 and mapped in Fig. 1.

Where visibility allowed, the divers recorded the habitat features, depths, conspicuous species present and their abundance (semi-quantitative abundance scales were as used by the MNCR) on a writing slate. Specimens of substrata and conspicuous species were collected in plastic bags for later analysis and preservation. When visibility was too low to enable *in situ* recording (on most dives) the divers attempted to collect a representative selection of substrata from the site by feel.

Samples and specimens that were collected and preserved (or identified, labelled and preserved) were analysed further by Roger Bamber at Fawley Aquatic Research Laboratories Ltd.

Underwater photography was attempted on a few dives where visibility gave some hope of results. A Nikonos underwater camera and flash, with automatic exposure, was used. Results were disappointing owing to the poor visibility. On a few slides it is just possible to make out details of the habitat and community.

DESCRIPTION OF HABITATS AND COMMUNITIES

Thorpeness had a low habitat diversity, with only one major habitat type of interest. The reef consists of a flat-topped bedrock platform in 4 to 8 m below chart datum (bcd), considerably sand scoured with large areas completely smothered with sand. Erosion of the top surface has created many hollows, up to a metre deep and a few metres wide, with sand and pebbles/cobbles in the bottom and cut back under the (presumably) harder top surface. These horizontal fissures were typically 15-30 cm high and were more than a metre deep in places.

The rock was colonised by a lower circalittoral community of mainly sessile species typically found in areas of tide-exposed and sand scoured hard substrata. A complete list of species recorded from the site is given in Table 2. The upper surfaces were dominated by a dense bed of the ascidian *Molgula manhattensis* in most areas, except at the shallowest station. In some areas other space-covering species dominated, particularly *Phoronis hippocrepia*. A hydroid/ bryozoan turf was dominant near the edges of many hollows. This turf included the hydroids *Tubularia indivisa*, *Halecium halecinum*, *Sertularella gayi* and *Sertularia argentea*, and the bryozoans *Bugula plumosa*, *Bicellariella ciliata* and *Anguinella palmata*. Other species of

interest included *Alcyonium digitatum*, the anemone *Sagartia troglodytes*, juveniles of the anemone ? *Metridium senile*, the bryozoan *Flustra foliacea*, the starfish *Asterias rubens* and sea whips made by the amphipod *Dyopedos monacanthus*. The latter were very abundant in places. The sides and fissures in the hollows were also colonised by bryozoans and hydroids with occasional *Alcyonium digitatum* and anemones. The fissures were also inhabited by frequent edible crabs (*Cancer pagurus)* and lobsters (*Homarus gammarus*), with occasional velvet crabs (*Necora puber*). In patches of relatively stable sand, particularly at the shallowest site, there were high densities of sand-mason worms (*Lanice conchilega*).

Although the species recorded are all typical of the habitat, the domination by *Molgula manhattensis* and *Phoronis hippocrepia* had never been seen before by the team. Given that hard substrata, particularly natural bedrock, is a rare feature of this coast, it is suggested that the community is of scientific interest.

No algae were recorded from any site, which, considering the poor visibility and the sand scour, was not surprising. However, if there are hard substrata in the very shallow water, which was not accessible to the diving team, some algae are likely to be present.

The rock was fairly soft and brittle, and the divers were able to break or saw bits off it in places. It was clearly being slowly eroded by sand scour in places where it was not covered by marine fauna.

DISCUSSION

The sublittoral extension of Thorpeness comprises a creviced hard substrate. On a local scale, there is little or no similar hard sea-bed in this area of the coast, where the inshore and offshore substrates are what the Admiralty define as "fine-sand, small stones and broken shell". Comparable substrates may be offered by wrecks and unburied structures of that part of the old Dunwich Village which have long since fallen into the sea.

The associated fauna is of three components, the intimately-associated epifauna of the bedrock, the errant decapod crustaceans (lobster and crab), and the infauna of the softer sediments.

The sedimentary infauna is only established where the sand is protected by the rock and thus dynamically stable; the dominant species are of small size, consistent with stress (presumably from erosion-deposition or predation) and high annual mortality, but may be exploited as a food resource by both crustaceans and fish in the vicinity of Thorpeness; densities of such prey species in the surrounding gravelly sands are low.

The lobster and crab fishery is significant not only in terms of the numbers landed (Aldeburgh lobster landings exceed those for Grimsby or Felixstowe, for example), but also in the unique fishery potential of this site for the local area. Factors which may be currently influencing the status of this fishery, such as overexploitation by more efficient gear and loss of habitat through infilling from fine sedimentary material, appear to be unrelated to the existence of Sizewell Power Stations.

The diverse epifauna (61 recorded species) comprises (inevitably) sublittoral species, which themselves would contribute little as a feeding resource for either the decapod crustaceans or local commercial fish. The local rarity of the site results in the local rarity of these species. This habitat ranks of conservation importance on most of the criteria established by the Marine Nature Conservation Review of the JNCC (see Bamber & Irving, 1993, for example). In particular, the domination of unusually dense patches of *Mogula manhattensis* and of *Phoronis hippocrepia* have not (to the knowledge of the authors or of the diving team) been found elsewhere.

The most stable establishment of this community is offshore, although certainly present at dive site 5. Other nearshore areas are constrained by the influence of mobile sand and mud.

ACKNOWLEDGEMENTS

This study was undertaken under contract to Nuclear Electric plc. We are grateful to the members of the diving team and the crew of the MV '*Joleen*'. Specimens have been checked by Peter Hayward and Shelagh Smith.

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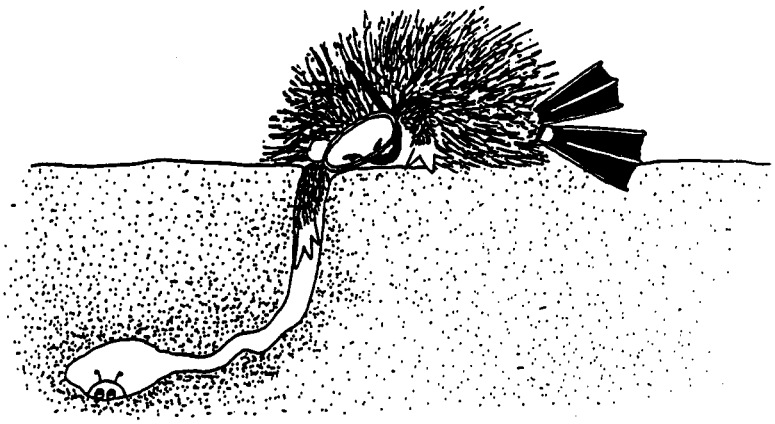
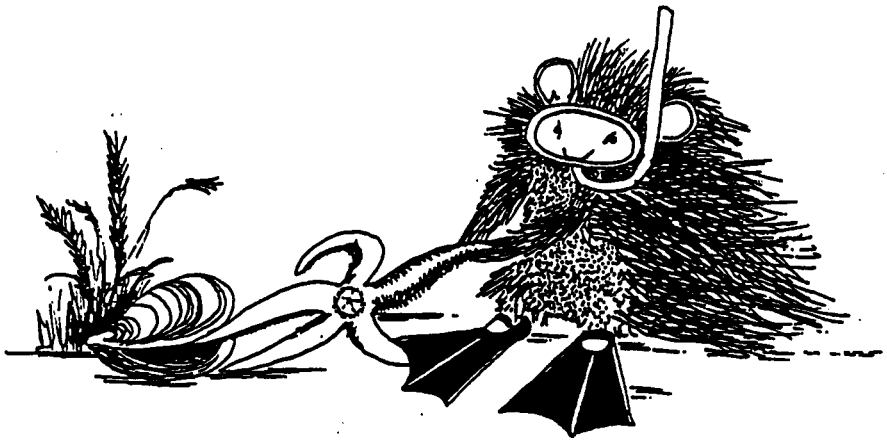


Table 1. Diving Survey Sites

No.	Date	Divers	GPS Lat-Long	DEPTH	Notes
1	12/6/93	JM, BJ	52°11.75'N 1°38.14'E	5.5	zero viz., samples taken
2		FB, JW	52°11.80'N 1°38.24'E	5.2	zero viz., samples taken
3		JM, BJ	52°11.81'N 1°38.43'E	6.4	some viz., samples taken
4		FB, JW	52°11.83'N 1°38.68'E	7.3	some viz.
5		JM, BJ	52°11.59'N 1°37.64'E	3.7	some viz.
6		FB, JW	52°11.28'N 1°37.56'E	2.7	current too strong, no records
7	13/6/93	FB, JW	52°11.30'N 1°38.37'E	6.1	strong current, 'good' viz
8		JM, BJ	52°11.42'N 1°38.36'E	8.5	sand, no records
9		JM, BJ	52°11.39'N 1°38.00'E	6.1	photography attempted
10		FB, JW	52°11.42'N 1°38.04'E	7.0	slack water, zero viz., poor records
11		JM, BJ	52°12.01'N 1°37.78'E	4.9	sand, no records



Legend to Table 2:

R - rare; O - occasional; F - frequent; C - common; A - abundant
Numerals are actual numbers in (non-quantitative) samples analysed at the laboratory.
P - present (colonial species) or single specimens.
D - divers' records (*vide* Moore, 1993)
[1] - elytra missing; fragmented
[2] - erect form, on *Bugula plumosa*
[3] - confirmed by dissection; totally sand-covered tests.
[4] - small specimens; may account for some of the "*Polymnia*" of the 1976 survey!
[5] - smashed specimen, not retained
[6] - severely damaged specimen, not retained
[7] - anastomosing tube masses in places
[8] - perhaps juvenile *Metridium senile*
[9] - ex *Liocarcinus*
sites 4, 7, 9 and 10 - diver records only

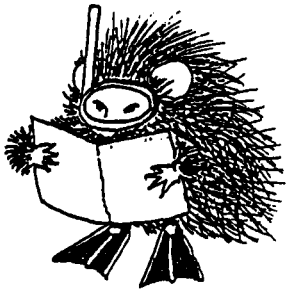


Table 2: Species recorded from dive sites, with indications of abundance

Site:	1	2	3	4	5	7	9	10
Alcyonium digitatum		FD	OD		OD	OD	OD	CD
Haliclona oculata			P(OD)			OD	RD	
Halecium halecinum	P(CD)	FD	FD		P(CD)		OD	
Nemertesia antennina					PD			
?Diphasia rosacea	PD	OD	PD			OD		
Sertularella gayi	P(FD)		P		P			
Sertularia argentea				FD	P(OD)			
Tubularia indivisa	P(AD)	P(CD)	P(AD)	CD	P(FD)	CD	FD	CD
Tubularia larynx						OD		
Actiniacean indet.	CD[8]	1		CD	PD	FD	CD	
Sagartia troglodytes	6(CD)	1	3(FD)		4(FD)		OD	FD
Nemertea indet.	4	3	2					
Oerstedia dorsalis		1						
Pholoe inornata	18	C	C		C			
Sthenelais boa		1	1					
Lepidonotus squamatus	1				2			
Harmothoe sp.[1]	1		1		1			
Scoloplos armiger		1	1					
Scalibregma inflatum			1		2			
Pherusa flabellata	1							
Lanice conchilega[4]		A	C		C(FD)	CD	FD	CD
Eupolymnia nebulosa			1[6]					
Sabellaria spinulosa	P							
Pomatoceros triqueter		OD		OD				
Syllidae indet.	F		1		2			
Phyllodoce mucosa					1			
Streblospio shrubsolii					1			
Polydora flava	2		1		1			
Tritonia hombergii		1D						
Doto fragilis							1	
Janolus cristatus			PD					
Balanus crenatus			P		P			
Dyopedos monacanthus	A	A	C	CD	F(CD)	CD	FD	FD
Stenothoe marina	2	1	1					
Apherusa cirrus	1		1					
Caprella linearis	6		7					
Homarus gammarus	PD		PD					
Cancer pagurus	PD				1[5](PD)		PD	
Necora puber[9]			PD					
Pisidia longicornis			PD					
Porcellana platycheles	1							
Hyas araneus					PD			
Nymphon brevirostre	1	1	2		2			
Achelia echinata	1		5		2			
Achelia longipes	1							
Callipallene brevirostris	7		1					
Anoplodactylus pygmaeus	2							
Anoplodactylus petiolatus		2	6		2			
Phoronis hippocrepia	A[7]	P	P		P		AD	AD
?Anguinella palmata		P(FD)	FD	CD		CD	OD	FD
Bugula plumosa	A(CD)	P(FD)	CD		P(FD)	FD	OD	
Bugula avicularia	P							
Schizoporella unicornis	P(PD)	P			P			
Electra pilosa	P		P		P[2]			
Flustra foliacea							FD	
Conopeum reticulatum		C(PD)			P			
Bicellariella ciliata	P(FD)	FD			P(FD)	OD	OD	
Asterias rubens		FD	CD		OD	OD	OD	
Amphipholis squamata	2	1						
Ophiothrix fragilis	1							
Molgula manhattensis[3]	A	A	AD		OD	AD	AD	FD

THE BURREN REVISITED

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and
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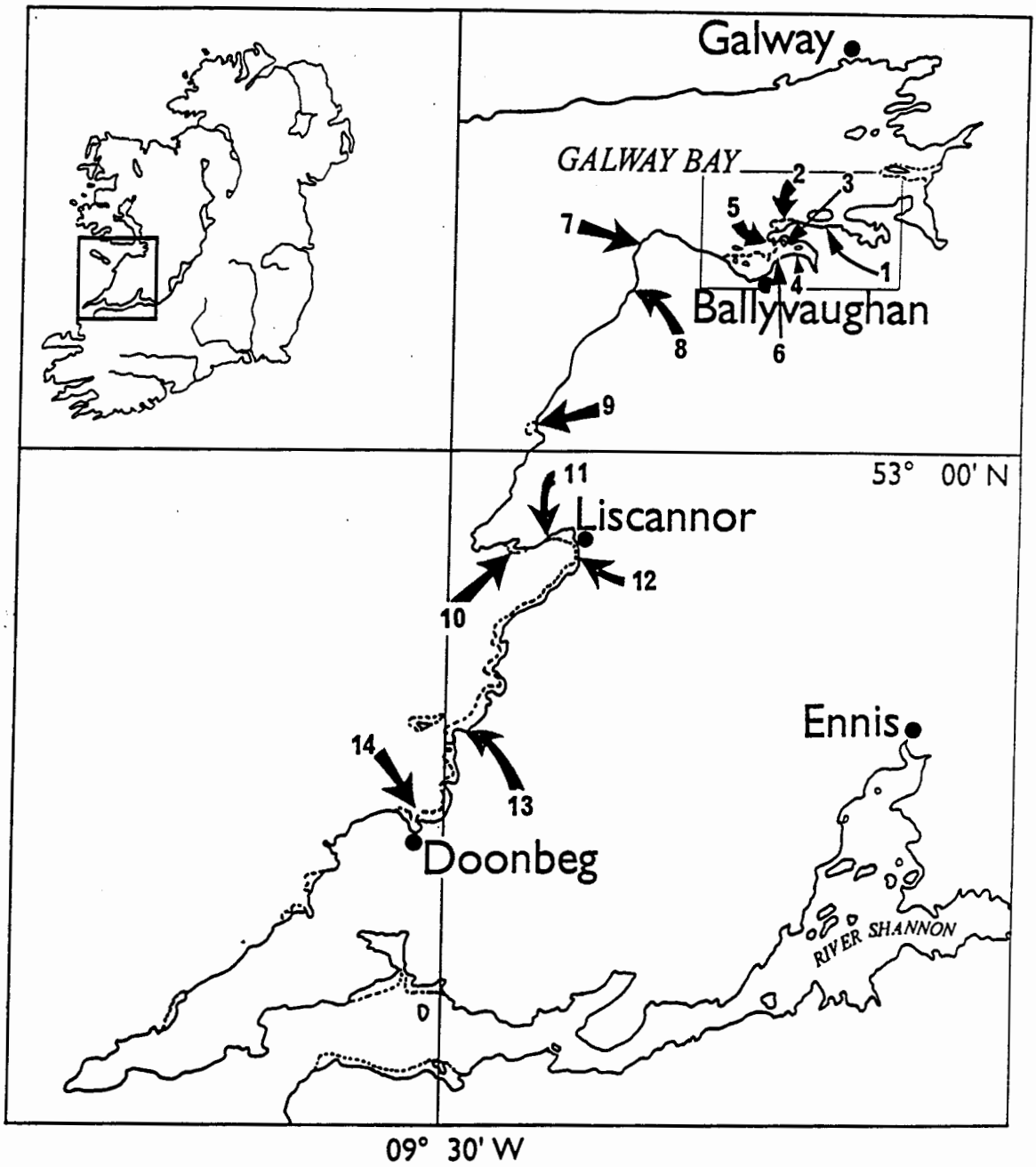
The Burren is a region on the west coast of Ireland south of Galway Bay renowned for its magnificent limestone scenery, flora and antiquities. The shores attract a smaller, not to say elite, following, and this report, building upon that of Killeen & Light (1989), gives some flavour of the marine biological environment and fauna, particularly the Mollusca, to be found here.

We were fortunate to be able to stay at the University College Galway Marine Station right beside the shore at Finavarra while we visited the Burren and the surrounding areas on 6 - 13 August 1994, recording and collecting Mollusca. We covered sites (Map 1) between New Quay [1] on the south side of Galway Bay and Macgrath's Point, Doonbeg [14]. Those in Ballyvaughan Bay (Map 2) - Carrickadda reef, Finavarra [2] and the Muckinish area [4,5] in particular - were investigated in most detail. Smith previously visited Carrickadda and Seafield [13] in 1976 and several sites including Murroogh [7] and Fanore [8] were reported on by Killeen & Light (1989). Habitats included tidal rapids, sheltered to exposed rocky shores, muddy gravel lagoons, maerl, shell gravel, gravel, pebble beds and *Zostera marina*. Our species lists are long and therefore only the more interesting Mollusca are mentioned here. Those being recorded as totally new records or not found post 1950 (Seaward, 1990) in the Sea Areas 36 (including the Burren) or 35 (Connemara) are prefixed * for dead shells, live records are marked **.

Of the three rapids seen, that at New Quay [1], visited on the advice of Michael Guiry, was the most prolific of life and species. Here, on the south side of the channel out of Aughinish Bay, the site is composed of flat indurated till ledges with some sand and gravel on them, together with limestone boulders. The overhangs at low water were festooned with *Metridium senile* and clumps of enormous *Suberites* sp. Over 60 species of mollusc were found and, as at other sites, an interesting-looking holey stone was taken home, demolished and the remains washed. Such species as *Epilepton clarkiae*, *Irus irus*, and *Gastrochaena dubia* were extracted. *Anomia ephippium* was particularly common, attached to small stones. A large plate of **Tonicella marmorea* was found. By contrast, Srucorrafaan [5] at the exit from Muckinish Bay is a fearsome channel only about 100m wide with the ebb flowing over a drop of at least 1.5m and a current of 10-15 knots. It is largely a boulder shore. Although there was plenty of sessile animal life clinging under boulders there were not many molluscs except under more sheltered boulders and in holes. Thus the site, athough protected from storm wave action, could be regarded as an exposed one! In addition to the species found in holes at New Quay, this site produced many distorted *Venerupis senegalensis* of the variety *saxatilis*. A further rapids, which looked equally promising, at Bishop's Quarter Beach [6], had plenty of non-molluscan life, particularly sponges and ascidians, but only three specimens of Mollusca including a large *Berthella plumula* were found in the field (a few more were in the weed washings) in the low water current area. According to the guide books, Bishop's Quarter Beach is a good shell beach, but the shell sand also was disappointing.

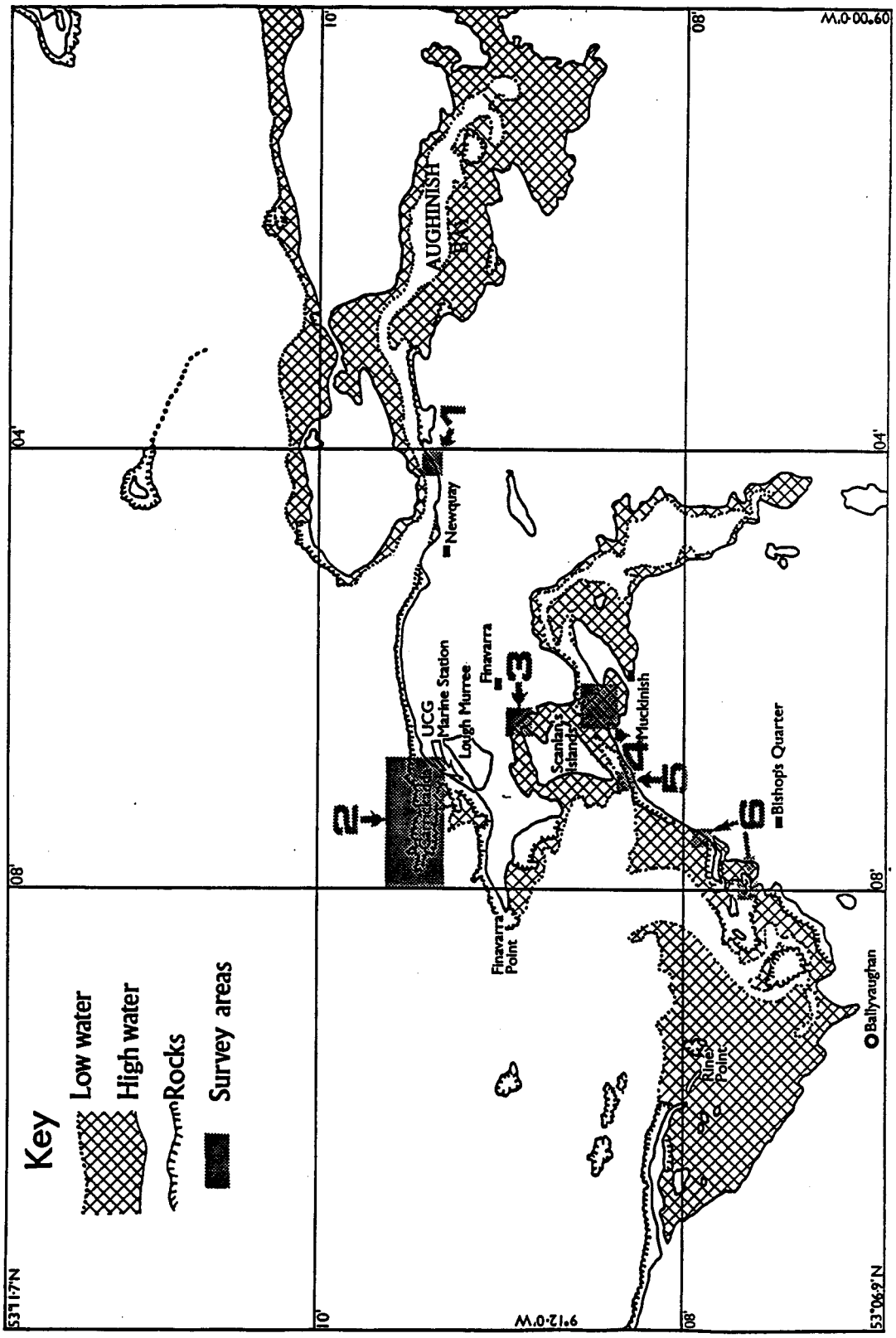
Carrickadda reef, submerged at high tide, is a spit about 1km long running due west parallel to and north of Finavarra point. At the shore end there is a storm beach, then boulders on sand and gravel, patches of sand and *Zostera marina* to the south. The reef is composed of limestone, careously weathered and covered with fucoids, which makes progress extremely slow. On the north more exposed side there are channels with shell gravel. Initial comparison with 1976 was one of frustration and disappointment. There was much more weed and far fewer boulders which could be overturned. There thus seemed to be fewer microhabitats. Species seemed to be missing. Results from weed washings were uninspiring. However, right out at the point there

MAP 1. Sites in the Burren area and to the south



was a bed of small *Mytilus edulis*, washings from which produced many *Brachystomia eulimoides* (not *B. scalaris* as expected). The holey stones contained *Irus irus* and *Gastrochaena dubia*, amongst others. The beds of *Zostera marina* contained mostly *Bittium reticulatum* and *Lacuna vincta*, but other live species included *Mangelia coarctata*, and *Goodallia triangularis*. A bucket of the shell gravel, which became very heavy although there was only a short distance to carry it, has produced many species after an exhausting and exhaustive search. Juvenile *Modiolus adriaticus* were byssally attached to shell fragments. *Irus irus* was living free, *Caecum imperforatum* was common and there were several live specimens of *Goodallia triangularis*. Thus the site redeemed itself with over 80 species live and another 35 dead including a fresh *Diplodonta rotundata*.

MAP2. Sites in the Burren area



The next area from which shell gravel was taken in quantity was Muckinish [4]. This site was also recommended to us as being one where living maerl was accessible at low tide. It is very sheltered within the lagoon above Srucorrafaan, although there is a brisk current draining across the maerl. Typical lagoon conditions apply: the tide is about hour to an hour and a half later than outside and there is a long period of useful low water. The inner bay is composed of muddy firm sand with pebbles on the upper shore and at low water neaps there is gravel and clumps of fucoids. Lower on the shore humps of living maerl and maerl gravel emerge and on a good tide nearly half the channel is accessible by wading. There are many large bivalves - the locals appear to collect *Cerastoderma edule* and *Tapes decussatus*. A careful search of the maerl and gravel samples yielded about 65 live species from the maerl, some being the same as in the Carrickadda gravels, but others different. *Dikoleps nitens* and *Skenea serpuloides* were particularly noticeable, as was *Caecum glabrum* (no *C. imperforatum*). ***Rissoa lilacina* and *Manzonia crassa* were living, as was a single specimen of ***Graphis albida*, and. Amongst dead shells there were *Alvania carinata* and *A. cancellata*, *Tornus subcarinatus*, *Cerithiopsis pulchella*, *Cima minima*, *Mangelia attenuata*, *Folinella excavata*, *Megastomia conoidea*, *Ondina divisa*, *O. obliqua* and *O. warreni*. Again the total species count was over 80 living and 41 dead. We feel that there is more to come.

A very sheltered muddy man-made lagoon on the north side of the Muckinish channel contained *Cerastoderma* which at first glance appeared to be *C. glaucum*, but later consideration indicated otherwise, merely gerontic *C. edule*. *C. glaucum* has been recorded from Finavarra, in Lough Murree, which at one time was brackish with access to the sea. When the road was repaired the channel was closed and the lough became totally fresh, there now being not even the dead shells which were found in 1976. A colony of *C. glaucum* must still live within Aughinish Bay, since a juvenile specimen was found in weed washings from New Quay.

The southern part of the area, south of Black Head, is directly exposed to the Atlantic. Shores investigated are largely rocky and with little shelter and few habitats. No site had as many as 40 live species of mollusc. Killeen & Light (1989) reported on Murroogh [7], suggesting that *Patella depressa* was to be found here. Careful search this time showed that specimens with dark grey feet were mostly *P. vulgata* var. *picta*, but could also be *P. ulyssiponensis*. There was no sign of genuine *P. depressa*. Lookalikes have been found in similar exposed situations in Donegal, all being *P. vulgata*. (On very exposed shores on Islay, Scotland, *P. vulgata* and *P. ulyssiponensis* are almost indistinguishable). Washings from small *Mytilus edulis* in clumps on the middle shore contained specimens of *Otina ovata*, but washings from similar habitats elsewhere did not.

Killeen & Light (1989) also reported on findings in shellsand taken at Fanore [8]. It being the holiday season, Smith visited the shore early in the day before it was trampled and dug over, There was not a great deal of interesting-looking shell debris. Nunn collected more from other parts of the beach later in the day. First impressions from sorting were promising, so Smith revisited the beach for more 3 days later, after an easterly gale as it happened, to discover the beach as clean as a whistle and no shells whatsoever! However, more species, again all dead shells, were found (117) than by Killeen & Light (1989). Many of the rarities were the same, but also there were **Cerithiopsis barleei*, *Melanella alba*, *Raphitoma echinata*, **Chrysallida decussata* and **Neolepton sulcatulum*. Some species, such as *Epitonium clathrus* and *E. clathratulum*, occur as dead shells in most shellsand we collected.

Most other sites held little interest. Liscannor [11] looked decidedly unappetising, with a large sewage pipe running down the east side next to the harbour, but there were many interesting species of mollusc, including a specimen of ***Calma glaucoides* under a boulder next to fish eggs. Lehinch [12] was somewhat unsafe, Smith having just moved out from under the cliffs when a refrigerator was dropped from on high.

We also spent a week in Connemara, to the north, which has been rather less extensively worked. Although the tides were neaps, particularly interesting shores were found in Ballynakill Bay where there were lagoons with *Cerastoderma glaucum*, tidal rapids and lower shore gravels. Also a tidal rapids on the north side of Galway Bay at Bealadangan Bridge was worked in error for Lettermore Bridge and found just as good, and another error of navigation due to an inadequate map led to the island of Inishbofin. Nunn also carried out a number of dives around Clare Island, islands off NW Connemara, Killary Harbour and in the mouth of Galway Bay. One of these, in Killary Harbour, was a particularly rich mixed habitat of rock, gravel, maerl mud and isolated *Serpula* colonies. There were 47 mollusc species (34 live) of which 4 were New Records for Sea Area 35, which is an excellent score for a dive site.

Species of particular note as having not been previously recorded from Sea Area 35 are ***Littorina nigrolineata*, ***Rissoa lilacina*, ***Onoba aculeus*, ***Pusillina sarsi*, ***Caecum imperforatum*, ***C. glabrum*, **Cerithiopsis barleei*, *C. *pulchella*, **Epitonium clathrus*, **Vitreolina philippi*, **Mangelia powisiana*, ***Brachystomia angusta* (Sea Area 36), ***Ondina warreni*, ***Tritonia hombergii*, ***Tritonia plebeia*, ***Tergipes tergipes*, ***Eubranchus doriae*,***Limatula subauriculata*, **Semierycina nitida*, **Montacuta substriata*, ***Epilepton clarkiae*, ***Lutraria angustior*, ***Pholas dactylus* living in peat in a mid tide pool and ***Thracia distorta*.

There are a number of *Crassostrea gigas* farms, many in an apparent state of neglect, both in the Connemara and Burren areas. Live specimens of *Tapes philippinarum* were found at many of these and this species was also living some distance from farms. All live specimens seen were carefully removed from these locations (and eaten).

Voucher specimens are to be placed in the Ulster Museum.

ACKNOWLEDGEMENTS

We are very grateful to Michael Guiry, University College, Galway, for allowing us to use the Finavarra Marine Station and for his friendship and advice.

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A 'NEW' WARM-WATER BARNACLE OFF PLYMOUTH

BY A J SOUTHWARD
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This article (from MBA NEWS, November 1994) has been brought to the attention of Hon. Editor, and since it is a request for information it is republished here.

The Plymouth Marine Fauna tends to be though of as a definitive work, and only a handful of species have been added since the last edition in 1957. I was therefore surprised to find an unrecorded barnacle living off Plymouth this spring. We had been asked to obtain a rare barnacle, *Balanus spongicola*, for Dr John Moyse of Swansea. This entailed examining hundreds of live queen scallops, *Aequipecten opercularis*, trawled from depths of 45 to 60m off Plymouth. The wanted barnacle was scarce - only one per 500 queen scallops - but we found another barnacle was present, and much commoner on the scallops, occurring at the rate of 1 per 15 scallops, with up to 15 specimens on one scallop. This 'new' barnacle represents a genus not recorded before from Britain, *Solidobalanus*, which is distinguished from the common species of *Balanus* by having no pores inside the shell plates and base. It is regarded as a 'primitive' group, surviving from a period before the evolution of the true balanids.

The new barnacle, *Solidobalanus fallax*, was described in 1927 (as *Balanus fallax*) from the Atlantic coast of Morocco by Hjalmar Broch, and was later found on the Algerian Mediterranean coast and down as far as Angola, a rather tropical distribution. Superficially it looks rather like *Balanus crenatus*, which is also comon on queen scallops. If encrusting growths and silt are brushed off and the barnacle is placed in sea water and allowed to put out its cirri, the differences are quite obvious. Uusually there is some pink colour in the shell plates, most often the carinal and lateral plates, with the rostral plate mostly white. The soft flaps of tissue round the mantle cavity, that show up when the barnacle puts out its cirri, are brightly coloured yellow, crossed with four bands of chocolate-brown. The thorax that carries the cirri is also coloured yellow and brown. In contrast, *Balanus crenatus* has a pure white shell and the flaps of tissue round the opening are thinner and coloured yellow to white without any brown bands.

There is a strong chance that this 'new' species occurs on other parts of the western coasts of Europe and in the Mediterranean, and possibly elsewhere, so it would be helpful if interested members and their colleagues could keep a look out for it. In the past it may have been confused with *Balanus crenatus*. the latter is an arctic-boreal species that is close to its southern limit in the English channel, so reported occurrences father to the south need re-examining for the possibility that they refer to *Solidobalanus fallax*.

1993 AUTUMN MEETING TO THE ISLE OF MAN

- MOLLUSCA RECORDED ON THE DREDGING TRIP -

By IAN KILLEEN
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As part of the Autumn 1993 meeting based at the Port Erin Marine Laboratory, PORCUPINES were able to take the opportunity of a day's sampling from the Laboratory's new vessel *R. V. Roagan*.

In spite of a rough sea and a threat of seasickness from one of those present (who won't be named), a total of seven stations southwest of the island were sampled (see Figure 1). The co-ordinates, details of gear, substrate, etc., are shown in Table 1. Examples of all phyla were collected, particularly for the collections of the National Museums of Scotland. However, this article covers only the Mollusca and is esentially based on analysis of shell gravel and associated debris by the author and Shelagh Smith.

Table 2 summarizes the results. In addition to those species found living, records of unusual or rare species found only as shells have been included. Abundancies were recorded but have not been included in these combined lists.

The samples broadly represented two substrate types: dead shell gravel which had a rich molluscan fauna; and fine broken shell/silt which was impoverished. As might be expected the fauna in the shell gravels are essentially similar and the results differ according to gear used and the quantity of large bivalve molluscs (mostly *Modiolus modiolus* (L., 1758)) or epifauna (hydroids and bryozoans) or epiphyta present.

Shell gravel is usually one of the richest marine habitats for Mollusca irrespective of geography. by any standards these are long lists and in particular Haul 7, with 76 live species, is spectacular. Surprisingly, most have been recorded before. The most recent and complete lists are those in the *Marine Fauna of the Isle of Man* (Bruce, Colman & Jones, 1963), although much of this data must be regarded as historical. To some extent the current investigations have updated the molluscan section of this work. Of greatest interest is the discovery of live speciens of the pyramidellid gastropod *Jordaniella truncatula* (Jeffreys, 1850). This is a rare species in the northeast Atlantic with the only recent live records from off the Brittany coast. Records from British waters are virtually all based on dead shells (see Seaward, 1990: *Distribution of the marine molluscs of north west Europe*). The two specimens found in Haul 7 have been assigned to *J. truncatula* rather than the common *J. nivosa* (Montagu, 1803) on the basis of their larger size and more pronounced spiral sculpture. Nothing is known about the animal, its biology or host.

Much has been written and spoken about the deterioration of the Irish Sea and its marine fauna. However, on the basis of these data it would appear that not only is the molluscan fauna still rich and diverse, it has not changed significantly in the last 40-50 years.

We are grateful to Professor Trevor Norton, Director of the Port Erin Marine Laboratory, for making *Roagan* available to us, and to the skipper and crew of the vessel for their patience and enthusiasm.

TABLE 1. Co-ordinates and details of dredging stations southwest of the Isle of Man, 8 October 1993.

1.	53°59.7'N 04°50.8'W	50-55m	scallop dredge	Shell gravel & *Modiolus modiolus*
2.	53°58.9'N 04°50.13'W	65m	scallop dredge	Shell gravel
3.	53°58.5'N 04°51.7'W	65m	anchor dredge	Muddy shell gravel
4.	54°03.4'N 04°49.5'W	77m	anchor dredge	Muddy shell gravel
5.	54°04.2'N 04°55.1'W	50m	anchor dredge	Shell gravel
6.	54°04.17'N 04°51.15'W	36m	anchor dredge	Shell gravel with epifauna and epiphyta
7.	54°04.36'N 04°49.9'W	35m	scallop dredge	Shell gravel with epifauna and epiphyta

FIGURE 1. Map of the Isle of Man, showing positions of dredging stations.

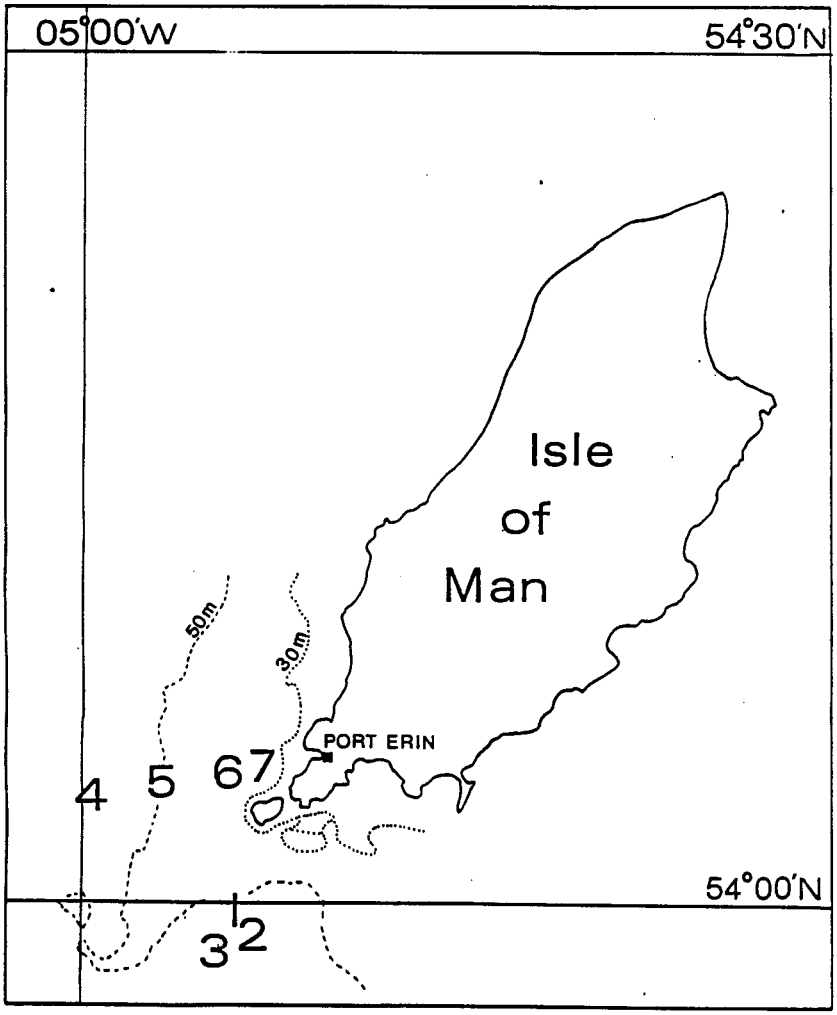
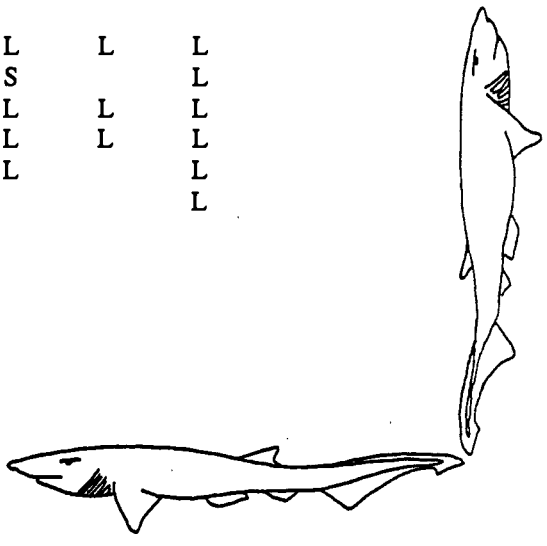


TABLE 2. List of Mollusca recorded by station.

Species	1	2	3	4	5	6	7
Rhopalomenia aglaopheniae							L
Leptochiton asellus	L	L	S		L	L	S
Ischnochiton albus					L		
Emarginula fissura	L	L	S		S	L	L
Diodora graeca	L				S		
Tectura virginea					S		L
Propilidium exiguum			S		S		
Jujubinus miliaris	S	L	S		S		L
Jujubinus montagui	L						L
Gibbula tumida	L				L	L	L
Calliostoma zizyphinum	L				L	L	L
Dikoleps nitens	L	S			S	L	L
Skenea serpuloides	L				S	L	L
Skeneopsis planorbis	L						
Alvania beanii			S		S	L	L
Alvania punctura	L	L			L	L	L
Obtusella alderi	S				S	S	L
Onoba semicostata	L	L			S	L	L
Pusillina inconspicua			S		L	S	L
Capulus ungaricus	L				S	L	L
Trivia arctica	L					L	L
Trivia monacha							L
Velutina velutina	L				L	S	L
Polinices montagui					S	L	
Polinices polianus	L				L	L	L
Aclis gulsonae						S	S
Cima minima						S	S
Graphis albida							S
Eulima bilineata	L		S		S	S	L
Melanella alba		L					L
Melanella frielei						S	
Boreotrophon truncatus						S	L
Trophonopsis barvicensis						S	L
Trophonopsis muricatus	S	L	S		L	S	L
Buccinum undatum	L				S		L
Colus gracilis	L						S
Neptunea antiqua		L	L				L
Hinia incrassata	L	S			S	L	L
Raphitoma linearis	L				S	L	L
Raphitoma purpurea	L						L
Teretia anceps					S		
Odostomia plicata							L
Odostomia turrita		S	L	S		S	L
Odostomia unidentata		L			S	S	L
Brachystomia eulimoides	L	L			S	L	L
Chrysallida indistincta			S		S		
Chrysallida obtusa					L		L
Jordaniella truncatula							L
Ondina diaphana							L
Ondina divisa						S	S
Partulida spiralis	S	L	S		S		L
Turbonilla rufescens					S		S
Tritonia plebeia						L	
Cuthona caerulea						L	
Nucula hanleyi				S			L
Nucula nucleus	L	L		L	L	L	L

TABLE 2. List of Mollusca recorded by station (continued).

Species	1	2	3	4	5	6	7
Glycymeris glycymeris			S		L	L	L
Modiolus modiolus	L					L	L
Modiolarca tumida	L	L			L	L	L
Musculus discors							L
Limaria loscombi					L	S	S
Limatula subauriculata			S	S	S	S	S
Chlamys distorta	L	L	L	S	L	S	L
Chlamys varia	L				L	L	L
Pecten maximus	L	L				L	L
Aequipecten opercularis		L	S		L	L	L
Palliolum striatum	L		S		L		L
Palliolum tigerinum	L		S		S	L	L
Similipecten similis			S				S
Heteranomia squamula	L	L	S	S	S	S	L
Pododesmus patelliformis	L	L					L
Kellia suborbicularis							L
Semierycina nitida	L		L		L		L
Mysella bidentata	L			S	L	L	L
Astarte sulcata	L	L		S	L	L	L
Goodallia triangularis					L	L	L
Parvicardium ovale	L				S	L	L
Parvicardium scabrum				S	S	L	L
Laevicardium crassum		S					L
Spisula elliptica	L		S		S	L	L
Ensis arcuatus						L	L
Arcopagia crassa							L
Arcopella balaustina					S		
Gari tellinella					L	L	L
Abra alba					S		L
Abra nitida				L	L		
Solecurtus scopula		S			S		
Circomphalus casina	L	S			L	L	L
Gouldia minima							1
Clausinella fasciata	L		S		L	L	L
Timoclea ovata	L		L	S	L	L	L
Tapes rhomboides			L		L	L	L
Venerupis senegalensis							L
Dosinia lupinus					L		
Dosinia exoleta		L					
Mya truncata	L	L			L	L	L
Corbula gibba			S	S	S		L
Hiatella arctica	L	L	S		L	L	L
Thracia villosiuscula					L	L	L
Pandora pinna					L		L
Lyonsia norwegica							L



PORCUPINE SUMMER MEETING

CHANNEL ISLANDS

6 September - 10 September 1994

By IAN KILLEEN
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Twelve PORCUPINES and members of the Conchological Society (or both) joined up for a few days of fieldwork and recording of the superb shores of Guernsey and its neighbouring islands. The faunal lists from the shore sites are still being compiled, apart from that submitted by Roger Bamber and should appear in the next issue of PN. This article is intended to give a synopsis of the meeting and to make more of you wish you had come along!

The meeting kicked off on the Monday evening with a gathering at the Smith/Nunn/Heppell cottage to finalize the itinerary for the week. Those of us who did not arrive until the Tuesday morning were thus presented with a *fait accompli.* Early-arriving PORCUPINES had already visited the shore at Pezeries Point on the southwest coast of Guernsey, finding the exposed rocks and rock pools one of the best places seen all week.

Day 1 was spent on the east coast of Herm, particularly around Shell Bay and La Pointe du Gentilhomme. It is curious that most visitors merely look at the strandlines, whereas on spring tides there are a variety of rich habitats. These include boulders in rapids, sheltered lagoons with *Zostera* and expanses of shell gravel. Perhaps the most exciting find was a mid-shore colony of the flatworm *Convoluta roscoffensis* Graff, 1891 and its bluey-green symbiotic algae, still present but not as noticeable as when demonstrated to PORCUPINES in 1980. The central sand and shell gravel part of the bay was considerable less rich in molluscs, both alive and dead, than when first visited.

On Day 2 the party split into two with one group going to the stunning Gouliot Caves on Sark while the hard-line malacologists returned to Herm to work the west side of the island around the harbour and Fisherman's Bay. This area comprises boulder and gravel areas, much weed and sandy stretches.

On Day 3 the summery conditions which we had enjoyed on Herm gave way to wild squally weather for a trip to Lihou Island on the exposed western end of Guernsey. There are extensive rocky shores on either side of the (tidal) causeway which join Lihou to the main island. On both sides these comprise a series of terraces and shallow lagoons with rocks covered in luxuriant growths of many species of algae. It was here that we were able to see many live ormers (*Haliotis tuberculata* L., 1758) and appreciate their colours and speed of movement. The introduction of farm-bred stock seems to have been a success, as when PORCUPINES visited Guernsey in 1980 it was a triumph to find any at all.

A brackish lagoon and a mixed rocky and sandy shore at Grand Havre on Guernsey's north coast offered different habitats for Day 4. Although less rich (to some workers!) than some of the shores examined on previous days, of particular interest were the upper shore crevices and the sediments.

Day 5 had been scheduled for boat work and the Force 6 wind was sufficient to deter the less strong-stomached. However, 7 of us mastered the conditions and were able to dredge at several stations to the south of St Peter Port on the east, more sheltered, side of the island. The substrata

comprised silts and algae in about 15m and shell gravel to 50m. Although they samples are still being analysed the initial results indicate that species diversity is rather low especially when compared to the shores.

As with all PORCUPINE events, this was very much a social occasion as well as a biological meeting, and the evening get-togethers in local restaurants were an excellent way to end each day. Not to mention the paella of local sea food (unfortunately not all collected by ourselves!).

All this would not have been possible without Guernsey PORCUPINE Roger Brehaut who superbly organised the meeting. His local knowledge was invaluable and the kindness and hospitality we received from Roger and his wife Dorothy was greatly appreciated and will long be remembered by all of us.

CALLIOSTOMA GRANULATUM IN SCOTTISH WATERS

By DAVID W McKAY
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Calliostoma granulatum (Born, 1778) [Mollusca: Gastropoda} is the largest of the British trochids. It is a southern species with up until now no authenticated live records north of that from the Mull of Galloway, which dates from 1841. All records of dead shells form the west of Scotland and north of Ireland are over 100 years old. Recent live records are from the Irish Sea and further south.

On16 February 1993 while monitoring discards rates on the scallop dredger MFV "*Virgo*", a single specimen was recovered from off Loch Carnan, South Uist [57°22'N 07°13'W; 19-38m]. On a survey of scallop stocks on the west of Scotland a further three specimens were recovered from two sites around Skye [Sound of Sleat: 28 June 1993: 57°04'N 05°52'W: 35m] and Vaternish Point: 1 July 1993: 57°36'N 06°38'W: 25m]. All were alive in aparently good condition; all were adults ranging in height from 26 to 32mm. Because they were taken from scallop dredges it is difficult to be precise about the substrates from which these specimens were recovered. Those from Vaternish Point appeared to come from an area of small stones whereas those from Loch Carnan and the Sound of Sleat came from much softer substrates.

In August 1994 during a survey of scallop stocks in the North Sea a further living specimen of *Calliostoma granulatum* was recovered east of Orkney [58°34'N 02°18'W: 72m]. This was 29mm high. It was collected from a substrate of broken shell and sand.

The occurrence of five living specimens at four such separated sites would indicate a widespread settlement of this species around the North of Scotland. As all the specimens were fairly large it may be assumed that this settlement took place some time in the late 1980's or early 1990's. Further information is sought on occurrences of *Calliostoma granulatum* in Scottish waters.

PORCUPINE FIELD TRIP TO GUERNSEY, SEPTEMBER 1994
SPECIES LIST FROM RNB

Groups ignored: barnacles (except for Gouliot), bryozoans, molluscs (except for Gouliot, where they were intensively sought!), birds (even the cattle egrets at Lihou), mammals. Spirorbids were only collected at Lihou. Algae summarized at the end.

GUERNSEY

Pulias lagoon: (31‰ @ 20 cm depth)
Palaemonetes varians abundant, large annual recruitment, brooding females
Chaetogammarus stoerensis frequent
Monodonta lineata frequent on rocks
Hydrobia neglecta many old shells, some recent shells, 1 live (destroyed)

Lihou
Anemonia sulcata common
Sagartia troglodytes Common

Lineus ruber frequent

Golfingia minuta 1, rock crevice

Achelia echinata occasional
Parasinelobus chevreuxi common in crevices, upper shore nr causeway
Dynamene bidentata common in crevices, upper shore nr causeway
Idotea granulosa common in algae
I. balthica less common in algae
Podocerus variegatus in algae
Gammarus locusta in algae
Maera grossimana
Hyale nilssoni
Calliopius laeviusculus
Hyppolyte varians common
Eualus pusiolus in rock pool
Crangon crangon
Galathea squamifera frequent
Porcellana platycheles abundant
Pisidia longicornis common
Cancer pagurus common
Carcinus maenas common

Geophilus maritimus common in crevices (is it *Scolioplanes* now?)

Nereis pelagica
Platynereis dumerilii
Nicolea venustula
Janua pagenstecheri abundant on Sargassum, also stones, Halidrys
Spirorbis spirorbis abundant on Fucus
S. corallinae abundant on Corallina

Circeis armoricana occasional on Laminaria & Sargassum
Halosydna gelatinosa 1 beneath stone
Filograna implexa common under stones

Amphipholis squamata common
Ophiothrix fragilis common
Asterina gibbosa common
Psammechinus miliaris few

Ascidiella aspersa frequent

Lepadogaster lepadogaster 1
Pomatoschistus minutus common
Pholis gunnellus common
Petta maximus 1 juvenile
Pleuronectes platessa juveniles
Liza ramada juveniles
Syngnathus rostellatus 1

Pezeries Point
Endeis spinosa 1 ♀ (coll. D Heppell)

Grand Havre
Anemonia sulcata common

Gastrosaccus normani 1♀
Praunus flexuosus shoals in shore pools
Bathyporeia pilosa common
Ampelisca brevicornis common
Chaetogammarus stoerensis frequent
Gammarus locusta in Saccorhiza holdfasts
Cymodoce truncata in Saccorhiza holdfasts
Idotea balthica in Saccorhiza holdfasts
I. granulosa in algae
I. pelagica in barnacles
Palaemon serratus frequent in shore pools
Galathea squamifera frequent
Porcellana platycheles common
Pisidia longicornis occasional
Necora puber frequent
Cancer pagurus common
Carcinus maenas Common

Notomastus latericeus common
Lanice conchilega common
Nereis pelagica in Saccorhiza holdfasts
Filograna implexa frequent

Amphipholis squamata common
Asterina gibbosa occasional

Ascidiella aspersa frequent

Gaidropsarus vulgaris common
Pholis gunnellus common
Pleuronectes platessa juveniles
Pomatoschistus minutus common
Liza ramada juveniles
Atherina boyeri juveniles

HERM

Shell Beach
Anemonia sulcata common
Actinia equina frequent
Dynamene pumila frequent

Convoluta roscoffiensis common below strand line

Cerebratulus sp indet. 1 (*?fuscus*)

Nebalia sp. indet (damaged individual)
Talitrus saltator abundant at strand line
Ampelisca brevicornis common
Hyppolyte varians common
Galathea strigosa 1
Cancer pagurus common
Carcinus maenas common

Spio martinensis frequent in sand
Pygospio elegans ditto
Boccardia cf polybranchia occasional in sand
Lanice conchilega common

Amphipholis squamata common
Asterina gibbosa common

Lepadogaster sp. 1
Pholis gunnellus occasional

Harbour Bay
Anemonia sulcata common

Scoloplos armiger
Notomastus latericeus
Lanice conchylega

Anoplodactylus angulatus 1♀

Pomatoschistus minutus common
Atherina boyeri shoals of young
Syngnathus rostellatus 2
Juvenile pleuronectids, indet.

SARK

Gouliot Caves
Pachymatisma johnstonia occasional
Cliona celata occasional
Ophlitaspongia seriata occasional
Halichondria panicea occasional, notably the green form at the cave entrance.

Alcyonium digitatum frequent
Metridium senile abundant
Caryophyllia smithi rare
Corynactis viridis common (pink, orange, white)
Anemonia sulcata common
Actinia equina abundant
Tubularia larynx abundant
Kirchenpaeria pinnata occasional

Filograna implexa abundant
Typosyllis armillaris common
T. variegata rare
Autolytus edwardsi rare
Nereis pelagica occasional

Balanus perforatus frequent Identified in the field; although Koehler mentions massive *balanoides*, these were larger than adjacent adult *Actinia*, and photographs tend to confirm the field identity.

Callipallene brevirostris occasional, incl. ♀g
Jaeropsis brevicornis occasional
Caprella tuberculata abundant
C. acanthifera rare
Parajassa pelagica rare
Podocerus variegatus common
Stenothoe valida occasional
S. monoculoides occasional

Hiatella arctica 1
Tricolea pullus rare
[*Patella vulgata* outside caves only]

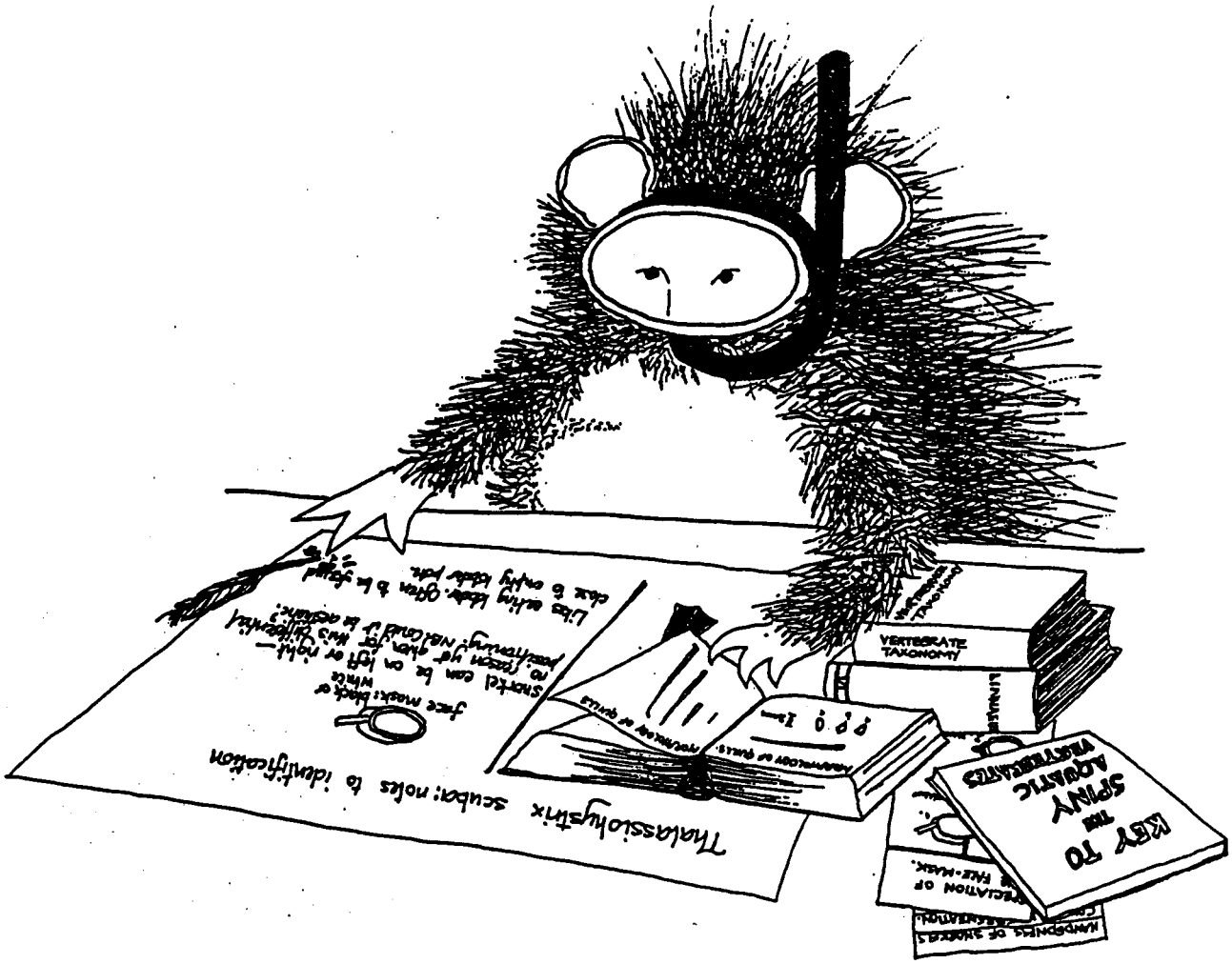
Amphipholis squamata occasional

Didemnum maculosum occasional

ALGAE

Abundant (except in Gouliot Caves!) and not looked at closely. Kelps and Wracks and *Himanthalia* everywhere, notably *Saccorhiza* (good for holdfast fauna), *Sargassum* common in Harbour Bay, Herm and around Lihou Causeway in particular. *Polysiphonia lanosa* on *Ascophyllym*. *Cladophora*, *Ulva*, *Dilsea*, *Callithamnion* sp, *Ectocarpus*, *Corallina* of course, *Lithophyllum encrustans*, *Mesophyllum lichenoides* (Lihou), *Phymatolithon calcareum* in Gouliot! "*Rhodocorton*" beds (*Audouiniella*) on rocks at Shell Beach, Herm.

Zostera marina beds present in Harbour Bay, Herm and around Lihou Island Causeway, notably in lower shore rock pools; little or no epifauna.



Torin Morgan

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Natural History Museum;
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Given Title:
"A multidisciplinary study of the formation and dynamics of *Pygospio elegans* tube-beds"

This project was conceived during work in The Baie de Somme (N.W. France) in which *P.elegans* populations were occasionally found to attain densities ($>10^5$ m^{-2}) sufficient for the formation of "tube-beds" (a.k.a. "lawns", "mats" and "tables") in which the close-packing of individual tubes (approximately 1mm in diameter), increases overall sediment stability and compaction (over areas of 100's m^2) leading to lowered erosion; flow effects at tube tips and the filtering activity of the worms lead to increased deposition. Consequently, beds may be raised up to 20cm above the level of adjacent sediment. Drainage is increased by the presence of the tubes, which may penetrate to a depth of 10cm, and the beds may become quite dry.

Ecological implications of such beds include **1.** inhibitory effects on recruitment (*P.elegans* feeding, space and sediment material pre-emption; chemical inhibition {?}; flow effects on sinking larvae); **2.** facilitatory effects on recruitment (preference for stable substrate; presence in beds of increased nutrient availability) and **3.** increased bacterial / meiofaunal population due to a beneficial tube environment geochemistry (tubes increase sediment water interface for O_2/ nutrient/ waste exchange).

Pygospio elegans may attain such dense populations through direct development involving demersally brooded larvae, or, even more efficiently, by an asexual growth / reproduction process in which a worm fragments into 2-10 setiger lengths and subsequently rapidly regenerates a head and tail end. Such behaviour has been found to be stimulated by high levels of organic matter (e.g. at sites of effluent output): a typically opportunistic response (Anger,K., 1976; Anger,V., 1984; Wilson, 1985; Gudmundsson, 1985; Noyer, 1993).

Such reproduction, not involving a propagative, planktonic larval phase, may bring about a degree of isolation with the consequent potential for allopatric subspeciation. Closely situated yet separate populations have been reported exhibiting significantly different reproductive cycles and modes (Rasmussen, 1973; Gudmundsson, 1985; Anger, 1984).

I would be very interested to hear of *P. elegans* populations, of densities sufficient to cause a perceptable stabilisation / raising of the sediment, in The British Isles or abroad; apart from representing interesting and important distribution data, a southern British site would be of great use to me as a comparator, and one which could be considerably more accessible to me than that in N.W. France. Also, specimens of the worm, from any area, would be most greatfully recieved: the possibility of allopatric sub-speciation in this species could thus be more thoroughly investigated.

References

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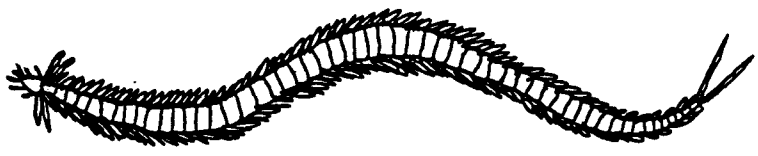
Wilson, W.H.Jr.	1985	Food limitation of asexual reproduction in a spionid polychaete. **International Journal of Invertebrate Reproduction and Development, 8,** 61-65.



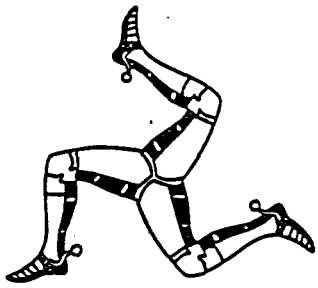
FSC OVERSEAS COURSES 1995

The Field Studies Council Overseas organises a wide range of natural history and environmental study courses throughout the world, including specific sourses designed to study marine biology. A copy of the full programme and further detials on the the Manx and Shetland courses may be obtained from Anne Stephens or Fiona Gillett, FSC Overseas, Montford Bridge, Shrewsbury, SY4 1HW, UK. [tel: 01743-850164 fax 01743-850178].

The price for the two courses detailed below includes all accommodation and internal transport, also return passenger ferry from Heysham or Aberdeen and entrance fees that are part of the programme. There are the usual extras.

Any enquiries into the daily activities of the courses should be directed to: **Dr Mark Ward**, 22 Shears Brook Close, Bransgore, Christchurch, Dorset BH23 8HF [tel: 01425-673918 or (day) 01590-623565]. **Jon Moore**, FSC Research Centre, Fort Popton, Angle, Pembroke SA71 5AD [tel: 01646-641404] or **Annette Little**, 28 School Lane, Swavesey, Cambridge CB4 5RL [tel: 01954-230654].

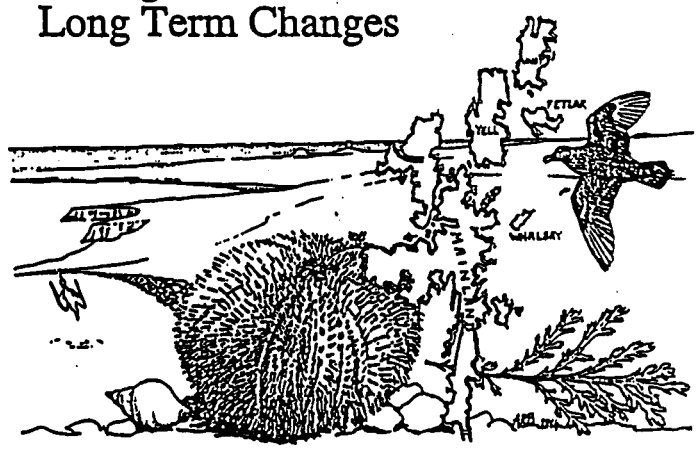
Manx Magic:
Marine Biology and Natural History on the Isle of Man



Led by
Mark Ward and Lisa Brunwin

29 Jul - 05 Aug 1995 Price: £635

The Rocky Shores of Shetland: Ecological Studies and Long Term Changes



Led by
Jon Moore and Annette Little

03 - 10 August 1995 Price: £699

MARINE ENVIRONMENTAL MANAGEMENT
REVIEW of EVENTS in 1994 and FUTURE TRENDS
January 17-18th 1995, London.

19 conference speakers will cover topics including Coastal Zone Management, Pollution - including Waste Minisation, Fisheries, Nature Conservation including the Habitats Directive, Environmental Impact Assessment, offshore Oil and Gas, and aggregate extraction.For details contact Bob Earll, Candle Cottage, Kempley, Glos. GL18 2BU: 0531 890415: Price £65.

BOOK REVIEW

BIOGEOGRAPHY OF IRELAND; PAST, PRESENT, AND FUTURE. Eds: Mark J Costello & Katherine S Kelly. Occasional Publication of the Irish biographical Society. Number 2, 1993.

The eleven papers comprising this publication were given at the December 1992 conference hosted by the Environmental Sciences Unit of Trinity College, Dublin and held under the auspices of the Irish biogeographical Society, the Irish Marine Sciences Association and PORCUPINE. The papers cover many aspects of Irish biogeography, both on land and at sea. and are grouped Past, Present, Future. The Introduction gives the theme of the conference. The insular nature of Ireland has resulted in its fauna and flora being a unique subset of species present elsewhere in Europe. Knowledge of both the presence and absence of species. and their sometimes differeing ecology in Ireland and elsewhere in Europe assists the understanding of the roles of climate, man's activities, and the environmental limitations and colonizing abilities of species in making the world what it is today. Perhaps of greater importance is that this knowledge aids prediction of the impacts of environmental change (be it induced by man or not) on ecosystems, and the biological resources and proceses within them on which our lives depend. Those papers referring to marine matters include Raine, R, McMahon, T & Roden. C, *A review of the summer phytoplankton distribution in Irish coastal waters: a biogeography related to physical oceanography.*; Minchin, D, *Possible influence of increases in mean sea temperature on Irish marine fauna and fisheries.*; Quigley, D T, Flannery, K & O'Shea, J, *Trigger fish species in Irish waters: a biogeographical review.*; Wilson, J G, *Climate change and the future for the cockle Cerastoderma edule in Dublin Bay - an exercise in prediction modelling.*

The book may be ordered from Mark Costello, Environmental Sciences Unit, Trinity college, Dublin 2, Ireland, at a cost of IR£12 for one copy or IR£10 for multiple copies [IR£15 or IR£15 for orders to non-EC countries]. Price includes postage and packing.