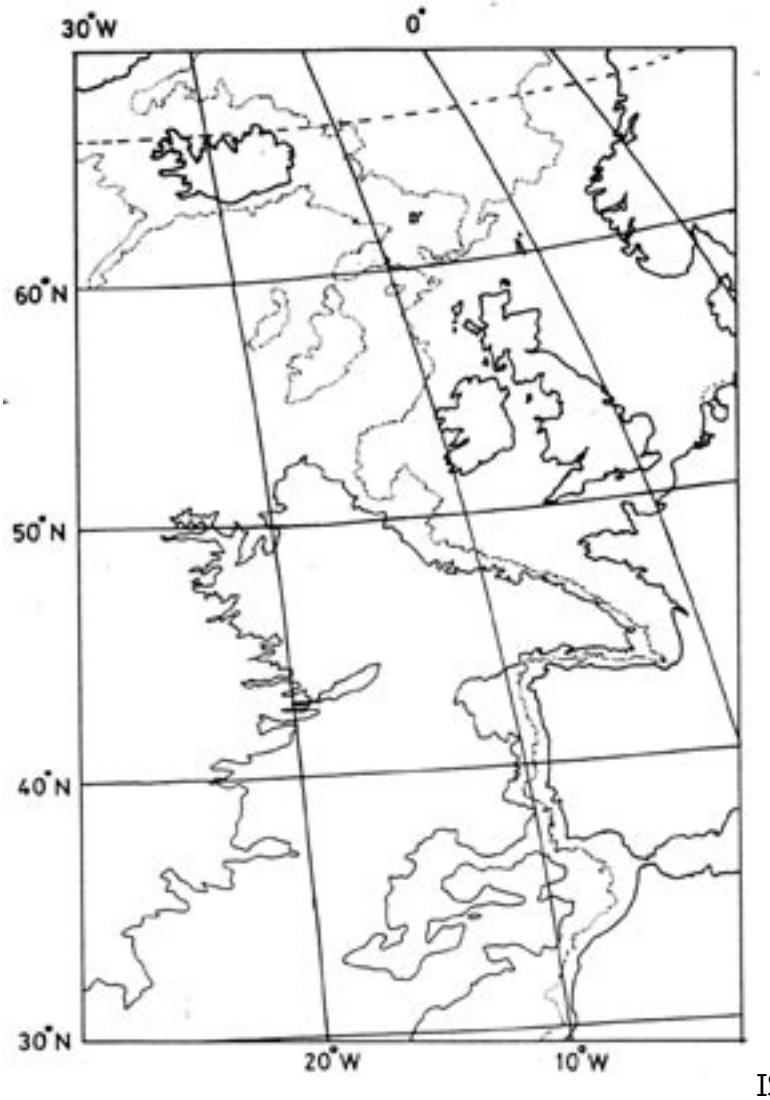
PORCUPINE MARINE NATURAL HISTORY SOCIETY

NEWSLETTER

November 2005 Number 18



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Porcupine Marine Natural History Society

Newsletter

No. 18 Nov 2005

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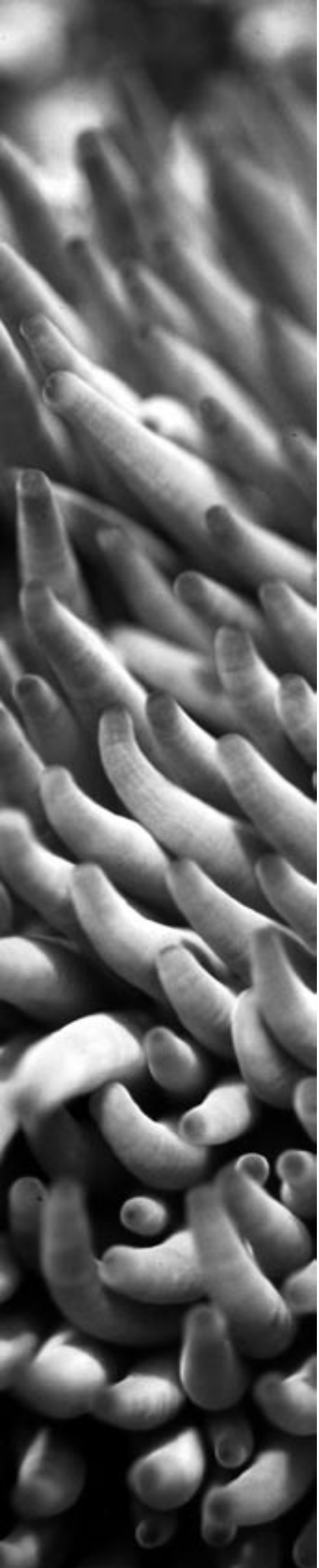
Porcupine MNHS welcomes new members- scientists, students, divers, naturalists and lay people. We are an informal society interested in marine natural history and recording particularly in the North Atlantic and 'Porcupine Bight'. Members receive 3 newsletters a year which include proceedings from scientific meetings.

Individual £10 Student £5

www.pmnhs.co.uk



EDITORIAL

Since the last issue, a band of intrepid Porcupiners have ventured forth into and around the Wash on our annual Field Trip held in July this year. This was very successful and great fun- you will find a report of the trip in this newsletter. Species lists and scientific data from the trip will be reported in the February issue.

Our next important event is our Annual Scientific meeting and AGM, this year to be held on the Isle of Man in the Port Erin Marine Laboratory. The dates are March 24th to 26th – see the Meetings section for details. As I mentioned in the last issue, Port Erin Laboratory will close on 30th September 2006 so this may be your last chance to visit this pioneering laboratory. Visit www.peml.net for details of their closure 'party' in July 2006.

Also in this issue another two 'confessions' from your Council. This time it is the turn of your Chairman Julia Nunn and your Web editor Anne Bunker to tell us how they came to become Marine Biologists.

Those of you with an eagle eye will have noticed that the last issue (No. 17) began at Page 3! This meant that the pages given in the Contents did not quite match reality. Our apologies for this, which was due to a software problem.

COUNCIL EXTRA

Congratulations to Council member Tammy Horton and her husband Dave who produced a mini Porcupine on 27th August. Zoë Kathryn Cox weighed in at a respectable 7lb 12.5 oz.

INSTRUCTIONS TO AUTHORS

If you are submitting copy for the newsletter, please refer to the 'Instructions for Authors' on the Inside Back Cover. Please note that you should NOT insert images into word documents as this makes it difficult for us. Please supply images as separate files.

COPY DEADLINES

December 15th for February Issue; April 15th for June issue.

MEETINGS

PORCUPINE 2006. MARINE NATURAL HISTORY: PAST, PRESENT AND FUTURE

24th-26th March 2006, Port Erin Marine Laboratory, Isle of Man

PMNHS will be holding its annual conference and AGM at Port Erin Marine Laboratory, Port Erin, Isle of Man. There will be two days of talks (Friday and Saturday) followed by a field trip on the Sunday. Laboratory space will be available and it may be possible to arrange diving for any truly hardy people! The Isle of Man has extensive and varied rocky shores and sandy coves and also has superb scenery, walks and many other tourist attractions. So you may wish to extend your visit by a few days. Unfortunately the Laboratory will be closing permanently in 2006 so this may be your last opportunity to visit.

Costs:

The conference fee, which includes tea and coffee is £30 (£20 for students and unwaged). Non-Porcupine members may join the Society during the conference (by standing order only) for £5, a 50% reduction.

Porcupine dinner:

A conference dinner has been arranged. The cost will be reasonable (around £20) and payable on the night.

Call for papers:

We would be delighted to hear from anyone who would like to present a paper at the conference. Speakers will not be charged the conference fee but will be asked to make a small contribution for refreshments.

Details including location map, accommodation list, provisional programme & membership form (where appropriate) will be sent on completion of the attached booking form.

Contact: Frances Dipper, 18 High Street, Landbeach, Cambridge CB4 8DT: fdipper@sustenergy.co.uk or 01223 861836

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PORCUPINE 2006 BOOKING FORM

NAME: .....

ADDRESS AND E-MAIL: .....

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I enclose a cheque for the sum of £30 / £20 (please delete as appropriate) made out to Porcupine Marine Natural History Society.

I would / would not like to attend the Porcupine dinner (please delete as appropriate).

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OTHER MEETINGS

25th –26th January 2006. Coastal Futures 2006 Review and Future Trends

1st –2nd February 2006 CIWEM World Wetlands day

9-12 May 2006 ECSA 40. Sustainable co-development of enclosed coastal seas:our shared responsibility. Caen, France.

Contact: Dr Jean-Paul Durcrotoy *j-pduc@wanadoo.fr*

Report from the PMNHS Norfolk Field Trip 7-10th July 2005

Frances Dipper (photos by Séamus Whyte)

Thursday 7th July dawned cold and blustery as I broke the Landrover of its habitual early morning sulk and set off for Sutton Bridge on the River Nene at the southern end of the Wash. The original destination had been Wells on the North Norfolk coast but a strong northerly wind put paid to that. At Sutton, 5 keen Porcupines boarded 'Three Counties', the modern research vessel of the Eastern Sea Fisheries Committee. Séamus Whyte had arranged with ESFC that, in return for them taking us out, we would provide expert analysis of trawl and grab samples.

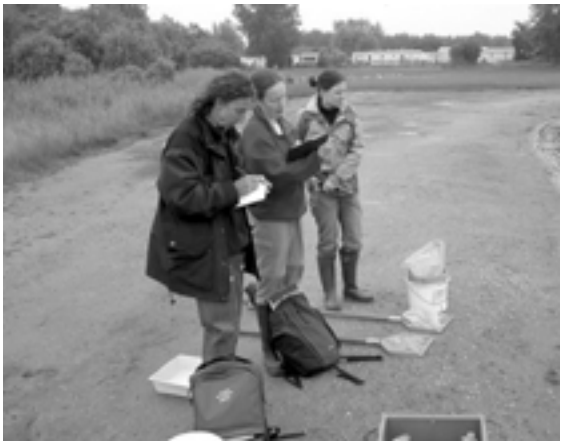
On board the boat, the crew made us welcome with cups of tea and demonstrated the safety equipment as we steamed out along the brown and muddy River Nene. Soon we emerged into the Wash and discovered just how glad we were not to be out on the exposed North Norfolk coast. Even here the horizon seemed like something from a game of Quidditch in Harry Potter. Still, the sun came out and it was just great to be on the water and for a change, not under it! After a muscle-tensing hours ride, we made the Gat Channel, which looks to the uninitiated, just like any other bit of the Wash but is in fact between two extensive sand banks and so sheltered. Here the crew leapt into action and we were able to take Day grabs and beam trawls to our hearts content. After each haul we were allowed out on deck to sieve, sort, exclaim over and photograph the catch.

Later we moved to Old Lynn Road to repeat the exercise. Each of us also preserved any material that we wanted to work on further. My personal favourites were the hauls that brought up a beautiful weeverfish and later in the weedier grounds, foot-long beautiful snake pipefish.

We ended the day tired, windblown, satisfied and very grateful to the crew who were endlessly cheerful and patient. The only down point was the appalling news about the London bombings.

The next day the exercise was repeated with Séamus herding another group of 5 Porcupines on board…Meanwhile I drove up to Wells and a nearby camp site where the struggle I had to put my tent up was more than made up for by a fabulous early morning walk through the adjacent saltmarsh. Friday

dawned still windy but beautifully sunny. The morning was spent sorting and identifying samples in a community hall in Wells where Thursday's boat participants were joined by others from the Alternative Cambridge University (Anglia Polytechnic University). Meanwhile the tide was busy going out so that by lunchtime we could get out onto the shore at Wells/Holkham. The sands here extend out to nearly 2 kilometres and are backed by sand dunes and an area of pioneer saltmarsh. We spent a healthy time digging up worms, *Scrobicularia* and cockles plus innumerable new and fossil shells.



The Saturday saw yet more Porcupiners and hangers on meet in the car park at Wells Beach complete with salinometer, GPS, waders, notebooks and specimen jars for a survey of two saline lagoons Abraham's Bosom and Salt's Hole by kind permission of English Nature and the Holkham Estate.

This was a fascinating day as most of us had little experience of 'pond dipping' in a marine environment! Both sites are land locked but with percolation through from the sea and salinities in the region of 20-25 ppt (see scientific report in next issue). These sites have a long survey history with the last survey run by Roger Bamber around ten years ago and support an interesting flora and fauna with a number of rare species, some of them the subject of BAPs (Biological Action Plans). Shelagh Smith got excited about an interesting snail, Frances found a bryozoan and an anemone not on previous lists, and Séamus got very smelly and muddy – again see scientific report in the next issue. A final very quick visit was made by myself and one other intrepid to another tiny lagoon near Cley called Half Moon Pond where we confirmed that the starlet anemone *Nematostella vectensis* is still flourishing or perhaps flourishing again.

This was a fascinating field trip attended by at least 12 Porcupiners. Even with the complicated logistics, we managed two visits to local hostelries and wet within and out, slept soundly knowing we had done some useful recording in an area somewhat neglected by marine biologists.

Our considerable thanks must go to Eastern Sea Fisheries for their generous support. Species lists and data will be published in the next issue of Porcupine…..

Further characterisation of chaetae
Their structure and the use of computer neural networks

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Identification keys for polychaete species are descriptive. They depend upon diagrams that characterise the general shape of chaetae, and the presence and numbers of processes. The approach is largely subjective. An objective one would be entirely quantitative and this would have advantages. Hopefully it would retain many of the subtleties of descriptive keys.

Previous attempts to characterise chaetae

Statistical and mathematical procedures have been used to characterise structure. For example, Vogt & Kudenov (1994) used statistical variation in the bifurcation of notosetae to separate two species of *Euphrosine*. Also several mathematical procedures were applied to the chaetae of four species of polychaete by Gibson, Robson & Armitage (1999). A problem with both these procedures is that numerous measurements had to be made and these were time consuming. However, automation of these measurements might solve the problem.

What was apparent from the methods used by Gibson *et al.* was that the procedures could be simplified if one can recognise common structural features. In divergent evolution in general the vast arrays of structure seen in different groups evolved from simpler forms found in common ancestors. That is, chaetae have evolved from basic types. If the original forms of chaetae no longer exist they can be deduced, and evolutionary trees have been published. Also, the array of types of chaetae might be simplified through D'Arsy Thompson transformations (Gibson, 2002a) which demonstrate how body shape, and therefore chaetae, change through evolution. For example, how crotchets might have evolved into uncini by differential growth.

Structure and development

Structure and development might help characterise chaetae. Since all structure has a function, measurements for characterising chaetae might be expected to have biological significance. The probable function of falcigers and spinigers and how they may be related through evolution has been looked at by Gibson (2002b). The distal region, the head, is the most significant since it has evolved a variety of functions such as crawling, digging and swimming. The rest of the chaeta, the shaft, is normally uniform in shape. The internal structure seen by phase contrast or dark field microscopy is paracrystalline and striated (Bouligand, 1967). The striations are approximately parallel to one another and to the perimeter of the chaeta, and their numbers appear to be related to the thickness of the chaeta.

Bouligand (1967) and O'Claire & Cloney (1974) studied the development of chaetae, and suggested that they evolved from patches of cuticularised epidermal microvilli. Microvilli, slender extensions of cells, are commonly found on the epidermis of invertebrates. However, chaetae are formed below the surface of the body in chaetoblasts and therefore during the course of the evolution the microvilli must have invaginated to form follicles. The walls of the follicles are lined with lateral cells and these, or the microvilli, must secrete the matrix of a chaeta that accumulates around the microvilli (Fig. 1a). As the chaetae grow in length by production of matrix, the extracellular space of the follicle occupied by the microvilli remains above them as canals (Bouligand, 1967) (Fig. 1b), which extend the length of the chaetae and presumably form the striations. In cross section of the chaetae the canals are seen as holes.

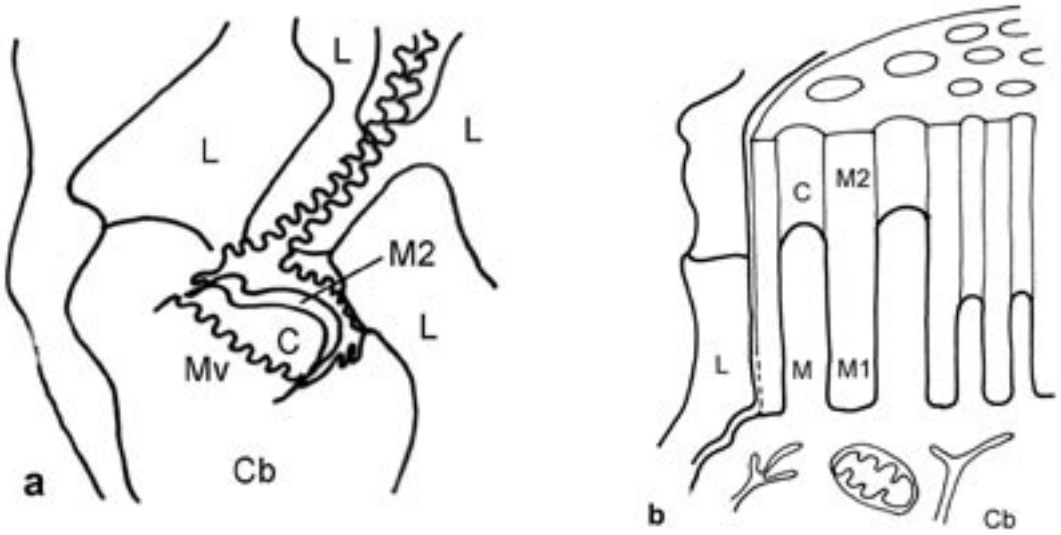

Fig. 1. Diagram of a) the early development of a chaeta (based on Fig. 9 of Hausen & Bartolomaeus, 1998), b) a possible arrangement of villi within a developing crotchet. C: canal, Cb: chaetoblast, L: lateral cell, M1: newly secreted matrix, M2: polymerised matrix, Mv: microvillus.

Control of chaetal shape

The microvilli clustered at the base of developing chaetae appear to act as a template and modulate development (Bouligand, 1967; Welsch & Storch, 1976; Hausen & Bartolomaeus, 1998). The lateral cells may produce matrix precursor, and the microvilli a polymerising enzyme (or the reverse could be the case). We suggest that the amount of matrix produced depends on the length of the microvilli (Fig. 1b). Where the microvilli are the same length the chaeta produced would be simple (i.e. spindle shaped). The formation of a hook, however, would require longer microvilli and therefore more precursor on the convex side of the developing chaeta. More complex chaetae would require still greater modulation. For example, during development microvilli of comb chaeta (Fig. 2) would first produce the lateral teeth at the two sides. These would then be pushed apart by the microvilli that form the teeth of the comb. Most of the microvilli would disappear during development as the chaeta narrowed leaving those that form the shaft. That is, modulation requires the appearance and disappearance of microvilli of different lengths in a timed sequence.

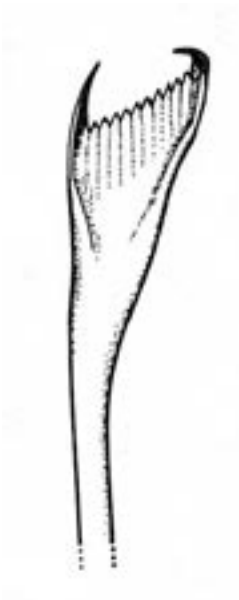

Fig. 2. A typical polychaete comb chaeta (Mikkelsen & Virnstein, 1982).

Modulation is likely to be controlled by the microtubules that form the cytoskeleton, the cell support, of the chaetoblast and microvilli. Microtubules can assemble and disassemble very rapidly in vitro. The developmental process can only explain the shape of the chaetae and, obviously, does not offer an ultimate controlling mechanism (that is, the way in which the cytoskeleton is formed). It does, however, bring the problem of chaetal formation into line with general cell biology.

Neural networks

The internal structure and the method of formation of chaetae do not suggest a practical computer procedure for their characterisation. The periphery, the outer boundary, of the chaeta would appear to be the only useful feature. An approach that has not been applied, so far as we are aware, is the use of computer neural networks. Their attraction is they are *quasi* organic in nature: they involve a computer learning procedure and appear to operate in a manner similar to our own ability to recognise shapes. The method does not depend on making finite measurements. For example, when we normally identify chaetae

Table 1. Identification of crotchets of five species of polychaete using the neural network programme of Jens Langner

Species	Family	Correct score	Identified
Dodecaceria opulens	*Cirratulid*	*31.0%*	*No*
D. fimbriata	*Cirratulid*	*78.8%*	*Yes*
D. concharum	*Cirratulid*	*20.0%*	*No*
Capitella capitata	*Capitellid*	*99.8%*	*Yes*
Aonides paucibranchiata	*Spionid*	*94.4%*	*Yes*

we instantaneously compare them with a variety of types in our memory. If we are still uncertain about the identification we refer to published examples.

The Jens Langner neural networks computer program (Langner, 2001) was used in this study. The program was designed, unlike many other such programs, to look at perimeters. We used it to identify examples of the crotchets of five species: three cirratulids, one spionid and one capitellid. The program recognises specific types of structures by referring to a library of structures which, in this case, were chaetae. Since types of chaetae differ along the body, within parapodia and at the various stages of developmental (Caullery & Mesnil, 1898, Tables α, β, γ) the library should ideally be for a range of types. However, the percentage of some types will be small and can therefore be ignored. Only the head of the crotchet was used in this study since it has a more variable shape than the shaft. The chaetae had previously been isolated using either a solution of potassium hydroxide (Gibson *et al.*, 1999) or they had been removed physically (Gibson, 1975). Some extracted chaetae were contaminated with debris and were not used although this can be removed from the image. The study should ideally have been carried out using different chaetae for each species. However, as a preliminary study, to increase the numbers of images in the library those for each species were slightly distorted using a standard computer manipulation. Five examples were used for each species.

The crotchets used were taken from *Dodecaceria fimbriata*, D. concharum** (Fig. 3a), *Capitella capitata, D. opulens* (Fig. 3b) and *Aonides paucibranchiata*, and of these three were identified correctly using the neural networks (Table 1). The reason for the failure to recognise the others is not clear. Preparations could be made for whole samples using potassium hydroxide digestion. Only chaetae free from contact with other chaetae (i.e. not lying across one another) could be recognised without further computer manipulation. Although this study has its limitations the general conclusion is that the procedure could be capable of making positive identifications of chaetae for any species for which there was a representative library.

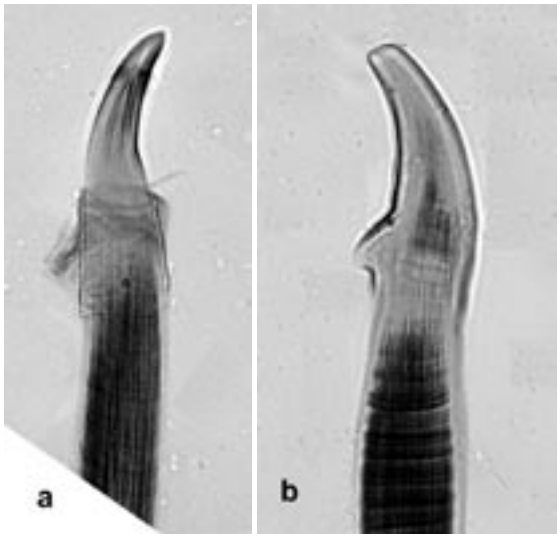

Fig. 3. Photographs of heads of chaetae from a) Dodecaceria concharum and b) D. opulens, used in the neural network study.

*These two species of *Dodecaceria* are partly defined by their methods of reproduction: *D. concharum* is parthenogenetic (Gibson, 1981), *D. fimbriata* reproduces asexually (Gibson & Clark, 1976) and both reproduce sexually (Gibson, 1981). A systematic point that is often missed by taxonomists is that species should ultimately be characterised by their methods of reproduction and not their morphology (Gibson, 1975).

Acknowledgements

We wish to thank Dr Derek Cosens of the University of Edinburgh and Dr Alistair Armitage of Napier University for their helpful criticism.

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Osilinus lineatus in Lough Hyne, Co. Cork

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Introduction

Lough Hyne, County Cork is a small sheltered, deepwater sea basin connected to a long narrow shallow inlet, which opens out to the Atlantic Ocean to the south. It is one of the most intensively studied areas (for marine life) in the island of Ireland. Reviews of work there are summarised in the proceedings of conference held in 1990 (Myers *et al.* 1991). Lough Hyne was declared a Marine Reserve in June 1981, and is still the only statutory Marine Reserve in the Republic of Ireland.

Biological studies in Lough Hyne began in 1886 with a visit by the Rev. William Spottswood Green (great grandfather of PMNHS Council member Lin Baldock!). He entered the Lough in a small rowing boat on the morning of 7th July from off the *Lord Bandon* which was then on a deep water cruise around the south-west of Ireland (Minchin 1991). Since that time, the Lough has been visited by many groups, principally those led by Renouf (in the 1930's) and Kitching (1940s to 1980s). Marine laboratories have been established there for many years, which are now run by University College Cork.

Recording of Mollusca has been part of much of the work that has taken place, particularly nudibranchs (summarised in Wilson & Picton 1983). Nonetheless, most of the information is scattered throughout the literature, and has not been comprehensive for taxa or geographically. A project was initiated in 1990 by the author to map the marine Mollusca of Lough Hyne, with visits being made in 1990, 1992, 1993, 1997 and 2005, with publication of results expected in 2006. As part of this work, the distribution of *Osilinus lineatus* was ascertained, and is the subject of this article.

Observations and Discussion

Osilinus lineatus is a largely southern and western species in the British Isles (Seaward 1990). In Ireland, *Osilinus lineatus* has a discontinuous distribution, being mainly absent from Malin Head down the east coast to Carnsore Point, apart from a stretch of coast from approximately St. John's Point, Co. Down to south of Dublin. This distribution was first published by Southward & Crisp (1954), and a similar distribution (unpublished) has been compiled by the author.

Although molluscs have been recorded from Lough Hyne since 1886, there have been no published records of *Osilinus lineatus* in the Lough. Such a conspicuous species, if present, would almost certainly have been noted, especially with the intensity of research during the middle part of the 20th century. The species is present outside the Lough on the main coast (personal collection). The only record prior to 2000, was from Castle Island, Lough Hyne with a few, (less than 10) seen by Dan Minchin sometime during the period 1976-1984 (pers. comm.) (Figure 1). None were seen by the author, despite extensive walks around most of the shores of the Lough, from 1990 to 1997.

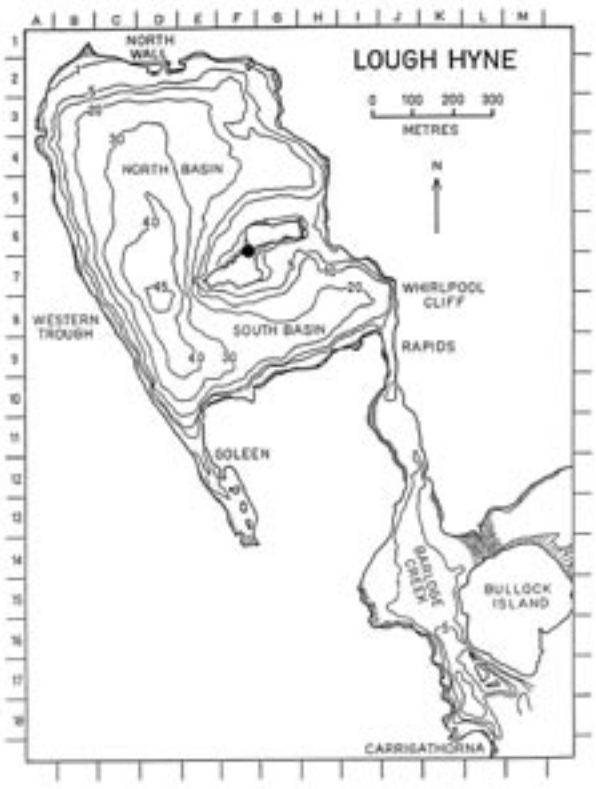

Figure 1 Distribution of Osilinus lineatus *pre 2000*

Figure 2 Osilinus lineatus, *Lough Hyne*

In 2003, the author was contacted by Christina Simkanin, a member of the MarClim team repeating the work by Southward & Crisp (1954), and also a student carrying out a Ph.D. on *Osilinus lineatus*. She reported that she had seen *O. lineatus* from west of Renouf Bay (the south shore of the Lough) on 10th May 2003.

In July 2005, the author returned to Lough Hyne to complete the mapping of the marine Mollusca prior to publication, primarily by diving. A number of shore sites were also visited on a casual basis. At one of these, in the northeast of the Lough, two specimens of *O. lineatus* were found on 10th July 2005 (Figure 2). In view of the apparent extension of this species in other parts of Ireland e.g. Strangford Lough (Nunn 2004), the author decided that the entire shoreline (where practicable) of the Lough should be walked to ascertain the current status of the species. From 12th to 15th July, the shores of Lough Hyne, including the inlet, creeks and one site on the nearby main coast (Tragumna) were examined.

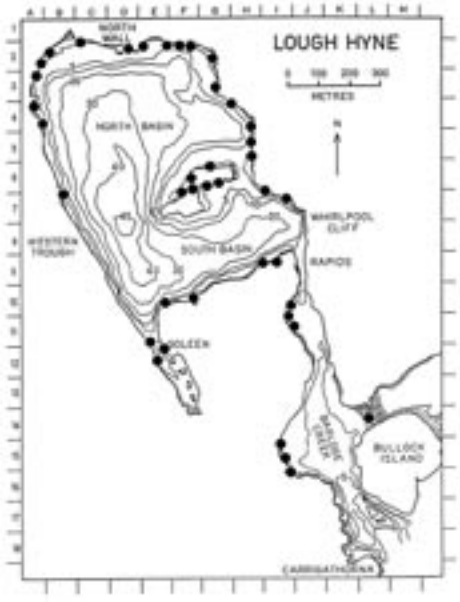

Figure 3 Distribution of Osilinus lineatus *to date*

Small populations were found in every area where the habitat was suitable (e.g. primarily small boulders, stones and sheltered bedrock - not exposed bedrock or sheltered mud/gravel) (Figure 3). Densities were low (<1/m^2), although more than 20 individuals were observed on Castle Island (NW) at a density of 3/m^2, and 19 individuals over a wider area on the eastern shore of the Lough. The settlement dates ranged from about 1997 to 2001, ascertained from growth checks on the shell. A very few small (probably 1-2 years old) individuals were found under stones in the Goleen (south-west Lough) by Jon Bass on 16th July. *O. lineatus* was also found in the inlet to the Lough at both Southern's Bay and Barloge Creek – densities in Southern's Bay also reached 3/m^2 – but only 2 specimens were seen on the outside main coast at Tragumna. In total, more than 100 specimens were seen in the Marine Reserve.

There has been an unprecedented extension of range of *Osilinus lineatus* into Lough Hyne. This is consistent with the current general picture for this species in Great Britain and Ireland – that is that not only is *O. lineatus* extending its range, but is also expanding the size of its populations, particularly at its previous range limits. It is unclear why this species has been largely absent from Lough Hyne until the late 1990s. Perhaps this range extension and expansion is part of a response to global warming?

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Acknowledgments

I acknowledge with grateful thanks permission by Dan Minchin and Christina Simkanin to publish their records of *Osilinus lineatus* from Lough Hyne. I also thank Lin Baldock, Jon Bass and Graham Day for their considerable help with recording *Osilinus* around Lough Hyne in 2005, especially with rowing the boat to access the shores!

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Pseudomystides spinachia (Polychaeta: Phyllodocidae), an under recorded species in Scottish coastal waters.

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Introduction

Pseudomystides spinachia Petersen and Pleijel, 1993 was found to be widespread and very common in muddy sediments of sea lochs and inshore waters on the west coast of Scotland but does not seem to appear in species lists for the area and is either being misidentified or overlooked.

Methods

The benthic fauna of the sea lochs and inshore waters of the west of Scotland is being monitored intensively. Much of this monitoring is being carried out in the vicinity of salmon farms as a requirement of the Scottish Environment Protection Agency which specifies the methods to be used (SEPA, 1998). Usually the sea bed samples are taken with a grab of $0.1m^2$, $0.05m^2$ or $0.025m^2$ and washed through a sieve of mesh size 0.1mm before preservation. The samples are usually sent to biological consultants for faunal identification. At the author's laboratory the samples are then washed on a 0.5mm sieve, rather than the 1.0mm mesh recommended by SEPA, so that small or fragmented animals are less likely to be washed through and lost.

During surveys between 2000 and 2003 numerous specimens of a small phyllodocid polychaete were collected and on close examination these appeared to belong to *Pseudomystides spinachia*. Species lists provided by several consultants and by SEPA were checked and this species did not appear, although *Pseudomystides limbata* (Saint-Joseph, 1888) was occasionally reported. Therefore specimens from several locations which appeared to be *P. spinachia* were sent to Dr Frederik Pleijel, (Tjarno Marine Biology Laboratory, University of Goteborg), who confirmed that they all belonged to this species.

During 2003 seabed samples from every location studied by Hunter Biological from Lochinver (Sutherland) in the north to Loch Spelve (Isle of Mull) in the south contained specimens of *P. spinachia* and many of these are listed in Table 1. Most of these locations were in sea lochs but some were in sheltered bays. Also included in Table 1 are some recent records for the west coast from Myles O'Reilly and Sue Hamilton which are more southerly (M O'R and S H) and more northerly (S H) than our own.

Results

In samples examined by us from approximately 30 locations in bays and sea lochs of the Scottish west coast in 2002 and 2003, nearly all contained *P. spinachia*. Although common the abundance was usually fairly low - typically less than 50 m^{-2} . The

only east coast location surveyed by us is Burghead where *P. limbata* was found but not *P. spinachia*. The only record (known to me) of *P. spinachia* available from the east coast of Scotland is from the Inner Firth of Forth at 25m depth in black mud.

Despite the number of benthic samples being taken from this area and much biological effort by various organisations, this species does not seem to have been recorded previously from the west coast of Scotland. There could be several reasons for this:

- *P. spinachia* is a very small species and if samples are processed by sieving the sediment through a 1 mm sieve (which is the most commonly used mesh size) some would be lost.
- *P. spinachia* is not included in the Linnean Society Synopsis (Pleijel and Dales, 1991) which is widely used for identification of this group.
- Some of the generic characteristics might be missed unless examined carefully. Although tentacular cirri occur on two segments, only two of the cirri on each side are longer than normal segmental cirri and therefore it could be mistaken for an immature *Eteone* species. The median antenna of *Pseudomystides* is minute and difficult to see and therefore specimens have a superficial resemblance to *Eulia mustela* Pleijel 1987, which also has a minute median antenna. On closer examination the number of tentacular cirri are different in the two genera.

The description of *P. spinachia* in Pleijel (1993) is detailed and permits separation of the two species and the accompanying illustrations are good. However to help in identifying the two species the anterior segments of both are illustrated below. The specimen of *P spinachia* is from Oban Bay and was confirmed by F. Pleijel.

The feature used to separate the species in the key provided by Pleijel, 1993, is the ventral tentacular cirri of segment 2. In *P. limbata* these are more than twice as long as the segmental ventral cirri and broadly tapered.

Table 1 Locations where P. spinachia and P. limbata *have been recorded.*
+ = present; - = absent

LOCATION		year	spin	limb
West coast				
Loch Kanaird, Rhubha Mheallain Bhuidhe	-----	2002	+	-
Loch Kishorn, Camasdoun	57° 22.843 N 05° 38.493 W	2002	+	-
Outer Loch Kishorn	57° 21.424 N 05° 43.161 W	2002	+	-
Loch Broom, Isle Martin	57° 56.402 N 05° 12.186 W	2002	+	-
Loch Nevis	57° 00.770 N 05° 43.225 W	2002	+	-
Loch Nevis, Stoul	57° 59.612 N 05° 42.495 W	2002	+	-
Loch Nevis, Ardintigh	56° 58.788 N 05° 40.279 W	2002	+	-
Sound of Mull, Fishnish,	56° 31.100 N 05° 50.720 W	2002	+	-
Isle of Ulva, Tuath	56° 29.721 N 06° 12.063 W	2002	+	-
Loch Aline	-----	2003	+	-
Oban Bay, Kerrera	56° 24.653 N 05° 29.925 W	2003	+	-
Loch Linnhe, Shuna,	56° 35.27 N 05° 22.94 W	2003	+	-
Loch Linnhe, Port Na Moralachd	56° 32.553 N 05° 29.085 W	2003	+	+
Loch Linnhe, Dunstaffnage Bay,	56° 27.343 N 05° 26.896 W	2003	+	-
Lochinver, Priest Island	58° 9.065 N 5° 17.159 W	2003	+	-
Loch Broom, Corry	57° 51.468 N 5° 06.378 W	2003	+	-
Loch Broom, Tanera More	58° 0.624 N 05° 23.282 W	2003	+	-
Loch Broom, Ardmair Bay,	57° 56.271 N 5° 11.529 W	2003	+	+

They are somewhat shorter than the dorsal tentacular cirri of segment 2. In *P. spinachia* they are rounded and only slightly larger than segmental ventral cirri, (Figure 1).

Another feature not mentioned in Pleijel 1993 is that the prostomial protruberance between the frontal antennae is rounded in preserved specimens of *P. spinachia* but in some *P. limbata* it is indented or slightly incised (Figure 1).

Specimens of *P. spinachia* from Loch Linnhe have been deposited in the collection of the National Museums of Scotland, Edinburgh.

Distribution in relation to sediment type

In an extensive study of the fauna of the Irish Sea (Mackie et al, 1995) both *P. spinachia* and *P. limbata* were recorded. *P. spinachia* was an exclusive species to an assemblage of stations with soft sediments in the Celtic Deep whereas *P. limbata* was an exclusive to gravely sediments. "A noticeable feature of the polychaete distributions was the tendency for congeneric species to have distinct distributions, often being found in quite different sediments and/or different depths. Thus *Pseudomystides limbata* and *Gyptis propinqua* were found in gravels, while *P. spinachia* and *G. rosea* were present in the deep soft sediments" (Mackie et al, 1995).

Most of the locations in Table 1 were in sea lochs or sheltered bays and so sediments were mainly mud or muddy sands with some shell debris and stones. Therefore it is not surprising that *P. spinachia* was much the commonest species. The only locations where both species of *Pseudomystides* were recorded by us were Port Na Moralachd (Loch Linnhe), Meanervagh (Benbecula) and Ardmair Bay (Loch Broom). At these places the two species were found at different stations and not in the same sample. Both species were found at Campbeltown Loch, Argyll, (Myles O'Reilly, SEPA, pers. comm.), but again they were found at different stations.

At Port Na Moralachd *P. limbata* was recorded at the station with the highest proportion of gravel, although the relationship between the two species and sediment type was not completely straightforward and the numbers of individuals were quite low.

At Ardmair Bay, Loch Broom in 2003 *P.limbata* was found at the two stations where sediments contained the highest proportion of gravel and *P.spinachia* at the one station with least gravel.

At Meanervagh *P. limbata* was found in coarse compacted shelly sand with other species typical of this type of sediment such as *Polygordius appendiculatus* Fraipont, 1887, *Hesionura elongata* (Southern, 1914) and *Glycera lapidum* Quatrefages, 1866.

Therefore on a larger scale in the Irish Sea *P. spinachia* occurred exclusively in muddy sediments while *P. limbata* was found in gravely sediments. In the small number of locations in Scottish sea lochs where both species occurred the latter species was found in stonier samples and they never occurred in the same grab sample.

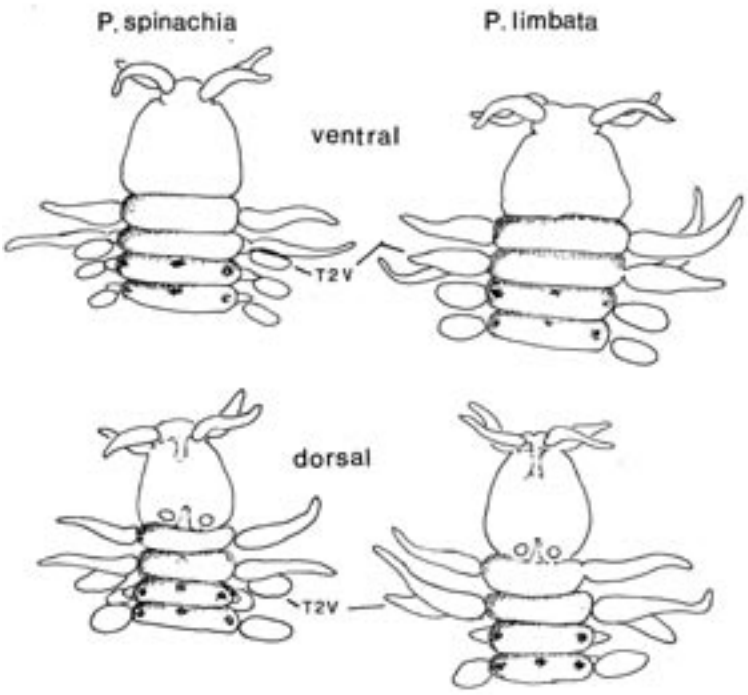

Figure 1 P. spinachia and P. limbata *: ventral and dorsal views of anterior segments. (T2V = second ventral tentacular cirrus)*

Table 2 Pseudomystides *species at Port Na Moralachd, Loch Linnhe, in relation to sediment type (No. of specimens in 0.15 m2)*

STATION	No. of *spinachia*	No. of *limbata*	% of gravel
Reference 1	15	0	19
Reference 2	13	0	15
South west 150m	27	0	0
South west 50m	9	0	3
South west 25m	6	0	4
North east 25m	0	2	25
North east 50m	0	0	4

Conclusion

P. spinachia is one of the most common polychaete species in soft sediments of Scottish sea lochs and sheltered waters but it does not seem to appear on species lists for the area. This may be due to the small size of the species and the difficulty of discerning the generic and specific characters. Also it is not included in one of the keys most commonly used to identify this family.

In the Irish Sea the two species occurred in separate species assemblages with *P. spinachia* in muddy sediments and *P. limbata* in gravely sediments. In the few locations on the Scottish west coast where both species were recorded *P. limbata* occurred at the stations with the higher gravel content.

Acknowledgements

I am grateful to Sally Davies of Scottish Sea Farms for permission to use their data and to Sue Hamilton, Myles O' Reilly (SEPA), and the Fish Vet Group for permission to use their records.

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The Dove Marine Laboratory: A Position Paper

Frank Evans

Please note that the views expressed in this paper are those of the Author and are not necessarily endorsed by Porcupine Marine Natural History Society

This paper was prepared for consideration at the Dove Marine Laboratory but may have wider relevance. It is a review of the highs and lows of a marine science laboratory and a plea for general recognition of the importance of long-term recording and associated ecological research.

The Dove was founded in 1908 at a time of high confidence in marine science and was one of a number of marine laboratories begun around this time. There was a belief in the power of fisheries science to overcome dwindling fish stocks, for instance by the release of laboratory-bred fish larvae, by the onset of tagging and through a true realisation of the effects of increased fishing effort as well as through academic research in general.

Like other laboratories the Dove thus concerned itself with academic research in marine biology while at the same time keeping an eye on the landings at the North Shields Fish Quay, principally, at that time, of herring. It was intimately involved with the inshore fishery through the Northumberland Sea Fisheries Committee. In 1911 the lab procured its own first boat, the "Evadne" which was operated along the north east coast until the mid thirties.

In that time considerable scientific progress was made. Dove Marine Laboratory workers were nationally known. Professor Alexander Meek, the founder of the lab, produced much research of note and in 1916 published a successful book: "The Migrations of Fish" There was a journal, the Reports of the Dove Marine Laboratory, which contained many seminal papers and which acquired an international reputation. The Dove library holdings were listed for borrowing in the major libraries and the journal was exchanged for other journals. In this way a fine periodicals collection was built up, together with an extensive reprint collection.

The lab has been perennially short of cash, so that purchase of books as opposed to exchange of journals, was limited. A little money was won through the public aquarium, opened at the very beginning of the lab, and through specimen sales to other institutions, principally for teaching. Here we may mention that for some years the displays in the aquarium open to the public were presented through the largest side viewing tanks in the country, all faced with inch thick plate glass.

However, following the retirement of Meek there was a particularly difficult period in the nineteen thirties. The lab lost direction and funds were so reduced that the "Evadne" had to be sold. The lab journal became irregular and eventually ceased publication.

During the nineteen thirties there was, nevertheless, one person, H.O. Bull, who followed Meek and his co-workers in producing work of a particularly high standard. He joined from the Plymouth lab in 1933. He was a fine naturalist and collector but his major work lay in fish physiology. He was proud to have visited Pavlov in Moscow in the early thirties and applied the great Russian's concepts to fish. Using Pavlov's conditioned reflex theories he was able to discover the minimum change in sea temperature that fish could perceive. We know that for this work he was considered for election to the Royal Society but unfortunately did not eventually achieve this honour.

The 1939-45 war interrupted the lab programme, leaving only one aging scientist to hold the fort until 1946. A few years later a replacement boat, the "Pandalus", a forty foot fishing vessel, was acquired and the lab began to pull itself out of a sad decline. After only a year or two, in 1955 a replacement vessel, the "Alexander Meek", named after the lab's founder, was purchased and converted for research work. She was a fifty foot wooden vessel, formerly the seine netter "Village Belle"

and proved herself successful for many years. New members joined the lab and the quality and quantity of research and publication rose markedly.

During this early post-war time some part of the teaching of marine biology students from the main Newcastle campus was carried on at the Dove. Later, Dove members undertook additional teaching duties in the main zoology department. Numbers of students specialising in marine biology, at first as part of a zoology degree and subsequently as a subject in its own right, increased from a small handful each year to the considerable numbers of today.

For about five years until1966 the Dove lacked a director, with H. O. Bull filling the position of Deputy Director. When in 1966 a new professor of zoology was appointed he automatically became director of the lab. Later this position was held by successive heads of the zoology department. Unfortunately, ever since the founding of the lab its head has had callings on his time in Newcastle and this has been endlessly deleterious to the lab's interests.

In about 1967 the public aquarium, which was now thought to be a drain on the lab's resources, was closed and the specimen trade discontinued. Following this the workers' aquarium was partly, and subsequently completely, covered by a new mezzanine floor and transformed into a library. The public aquarium became the lab's research aquarium.

For many post-war years the lab was held in high regard among its peers, both in the UK and overseas. For a time its collected reprints substituted in exchanges for the defunct journal. In 1973 a purpose-built steel hulled vessel, the "Bernicia", replaced the "Alexander Meek". This boat now appears to have long outlived its expected life, being built, thanks to the aegis of the Naval Architecture Department, of superior steel. Funds for Ph.D. and M.Sc. students which are now sought for individually were in earlier years supplied in a gentlemanly way by the Development Commission directly to the lab and subsequently internally distributed among academic staff, a method that worked as well as any.

Recently support for the lab has once again dwindled and for want of funds research effort has been insufficiently encouraged. But at the same time the number of undergraduate marine biology students has increased until the lab has finally burst at the seams and the undergraduates have been forced to relocate to the main campus in Newcastle. The library has been dispersed and is largely valueless. The lab has been downgraded to a field station and apart from the boat's crew its technical staff reduced from a secretary, a librarian and five technicians to a single caretaker technician. The lab is now a skeleton of its former self.

This is the present position. What of the future?

While past research has been widely spread there is one thread among many which should be drawn forward. Since long before the lab's foundation scientific workers have devoted their attention to the Northumbrian coast and collections from both the shore and offshore have been recorded from the mid nineteenth century and even earlier. A very large amount of data generated from the lab itself has been collected from its beginning and recently this has been brought together in a combined fauna and flora list occupying two large volumes. This comprehensive list is probably unequalled in the world for the animal and plant records of a small area.

Inevitably, the comprehensive listing of records for a couple of centuries results in a time-series, albeit a highly interrupted one. However two purposeful series of regular collections have been made. These are the work on the benthos by J. B. Buchanan at a single station from 1972 to 1992 and on the monthly plankton collected by me at a single station from 1969 to 1989 and continued by other workers to this day. It has been stated that the need for long time-series data on marine communities in order to ascertain the extent of both natural and anthropogenic changes to the ecosystem has only recently been recognised. Both the surveys noted above were continued at a time when such studies were regarded as mundane and unfashionable. However, their uses are now clearer. For example Buchanan's work was at first concerned to monitor changes in the sea bed due to fly-ash dumping from the now-defunct Blyth power station. It then became important in relation to sewage

dumping east of the Tyne. It revealed the relocation of the economically important Nephrops beds. Buchanan showed over a long period a predictive relationship between phytoplankton production and the density of benthic invertebrates a year later. My plankton work also showed this agreement and both Buchanan and I have shown marked faunal changes between the 1970s and 1980s. It is becoming clear that these events are related to long-term climate change.

The impact of this type of work cannot be predicted. For general plankton studies in the North Atlantic and North Sea we are indebted to the creation of the Continuous Plankton Recorder by Sir Alistair Hardy back in the 1930s. This programme, for supposed lack of value, has been within a whisker of closure on a couple of occasions, yet how glad we are that it now exists for it offers a fundamental measure of climate change in the sea. The Dove net plankton records, by the way, are the only available long-term checks on this programme.

This is the thread that should be grasped. Long-term monitoring should be fostered. All research at the Dove, and it can be wide-ranging, should spring from this, whether it be into fish and fisheries, Atlantic cycles, reproductive patterns, zoogeographic changes or whatever and should not be on distantly related topics such as self-contained physiology, neurology or molecular biology programmes, however eminent. Equally, staff appointments should be made with this theme rigidly in mind, as has not always happened earlier. The lab should be staffed entirely with ecologists whose interests lie in temperate waters.

The lab cannot flourish without a critical mass of people passing through its doors each day. With the loss of undergraduate students a good opportunity presents itself to redesignate the Tropical Coastal Management course as simply Coastal Management and transfer its location to the Dove. Here postgraduate students will feel that they are in real contact with their subject. Coastal management will be at hand as it is not in Newcastle. And more than undergraduates, M.Sc students are able to make a contribution to the research work of the lab.

So, with a dedicated staff, sufficient postgraduate input and proper funding, the future of the lab becomes promising, with its research output increased and its direction redefined. The coastal management course should expand and the lab be prepared to extend, under contract, the geographical limits of its research within the North Sea, always with faunal changes in mind.

Future essential requirements include the continuing provision of a research vessel, establishment of a postgraduate teaching course, an increase in staff, both academic staff and technical support staff, and proper recognition within the university of the lab's historic and future value.

The classical marine laboratories around the country, founded so confidently in the nineteenth and early twentieth century, are dwindling in number. It would be easy but mistaken to follow them into oblivion. And it can pay to be different. For within a dedicated programme of long-term recording and all that flows from it a vital role can be found.

COUNCIL CONFESSIONS

How PMNHS council members became marine biologists

Anne Bunker

Frantic seaweed pressing before work (they won't last another day), identifying sponges after midnight, collecting seawater in the dark, sandwiches for the whole survey team, patching another hole in the boat, a Fairy liquid session for dry suit repairs an hour before we should have gone on holiday. Oh no: the best spring tide of the year coincides with that important party. What do you mean? – You've got a diving survey at the same time as my only field work for the year? You'll have to take the kids then! There are two marine biologists in our house. We can't even get the milk out of our fridge without first removing several sandwich boxes of rotting specimens. How did it come to this?

I think the path was always set, although it took years to recognise. Early childhood beach holidays and days out at Charmouth, Lyme Regis and in Cornwall laid the foundations. Our family always walked to the remotest spot for exploring and rockpooling. The Collins Guide to the Seashore and binoculars were dad's only contributions to the packing.

Our junior school headmaster gave me an interest in watery things, finding us amoeba and paramecium to look at under a microscope. Otherwise, school drifted by without direction. "Have you thought of being a nurse?" was the full extent of my careers guidance. Sixth form college was great and I became well educated in table football, cards and homework excuses. A field trip to Kilve in Dorset stopped me giving up on dull and badly taught "A" level biology. My first sight of glistening iridescent blue-rayed limpets and the chance to study collected treasures in the laboratory had me hooked.

A friend of mum's suggested a degree in marine biology (I had no idea that existed) and in spite of the teachers' apathy (Oh, we've never had anyone do that before) - I applied. Westfield College, London University, gave me an unconditional offer and off I went to the big city and adventure.

Completely inspired by the first pictures of high temperature deep sea vents with giant, bright red, tube dwelling worms feeding on sulphur bacteria in my first year, by field courses to Millport and Anglesey and by lecturers involved in fascinating research, I loved every minute. It therefore came as a shock that there were no jobs to apply for at the end. A little detour emerged, via small particle analysis then archaeology (Human Environment Department technician), taking years to rejoin the main road. A job at Orielton Field Centre, teaching marine ecology, only guaranteed for six months and with a big drop in pay, seemed a silly gamble to some, but it was the best move I ever made and I've been in west Wales ever since.

To stay in the beautiful county of Pembrokeshire with its wonderful coast while raising children and paying the mortgage needs a bit of flexibility. Being a field centre tutor isn't compatible with family life so I've been self employed, contributed to CCW's Phase 1 survey of the intertidal of Wales, worked for a large consultancy and now again work for CCW as a Marine Conservation officer for West Region and as part of the Phase 1 intertidal team. With the Welsh Assembly cutting CCW's budget, I don't know how long it will last.

So have I arrived? Am I really a marine biologist now or just a paper pusher? Getting there I think! The road goes on but I'm sure the best is yet to come, when one day I will have time to spend exploring on the shore and sit with an identification book and a microscope. And one day perhaps some part of the sea around Wales will have protection from human influence. I hope I'm still around to see it.

Marine biologist?

Julia Nunn

Sometimes I wonder if that is what I am – or at least whether I can describe myself as a professional marine biologist.... My story is somewhat longer than many, as I did not arrive at marine biology at an early age. Not for me inspiration by Cousteau or Hass. Although, with that wonderful thing, 20/20 hindsight, I can detect the signs in my early life - as a child I loved rockpooling. I can also remember as a teenager feeling rather envious of the lucky person who won a 'fix-it' type TV programme to spend a month on board the Calypso. No – I was to become a biochemist, albeit with the emphasis on the biological rather than the chemical side. Enzymology was my passion, and my first degree at Cambridge and Ph.D. at University College London were indeed in Biochemistry and Enzymology respectively. Spookily however, my first year fieldtrip for the course 'Biology of Organisms' was to Exeter where my field project was on the behaviour/feeding of Littorina species on various different algae.

My life was to change (although I didn't know it at the time) in 1978, when I acquired a boyfriend who was a shell collector. I knew nothing about shells, just that it was very pleasant to walk on beaches and collect them. We had a happy arrangement – as he had a shell collection (and I didn't), anything I collected I gave to him! In 1979 I joined the Conchological Society of GB & Ireland, and by the time the boyfriend moved on to pastures new, it was too late - I was hooked on shells! Like magic, it just seemed to fit – an opportunity/excuse to visit beautiful parts of the coast; the 'treasure trove' syndrome - the excitement of finding something new or rare; my tick-list mentality; and the scientific appeal of finding out more about the behaviour and ecology of the Mollusca.

In 1980, I went on my first long organised field trip – a joint meeting between Porcupine and the Conch. Soc. to the Channel Islands. There I met Shelagh Smith and David Heppell (founders of PMNHS) for the first time. Through them over the years I have learnt an huge amount regarding identification of molluscs, taxonomy and literature. I also had my first experience of working in a Museum when David arranged for 2 weeks with the collections in Edinburgh in 1982 when I was unemployed. I owe an enormous debt to both of them. My recording of molluscs became more systematic and professional, and I was slowly beginning to broaden my knowledge. In 1982 I also became secretary of the Conch. Soc.

My professional life as a biochemist/ immunologist had by this time become just a job to pay the bills, although insecure due to the contract nature of the post-doctoral research life. In 1986, personal circumstances seemed to offer an opportunity to escape this, to become a 'marine biologist', and I moved to Belfast. Although the personal reasons

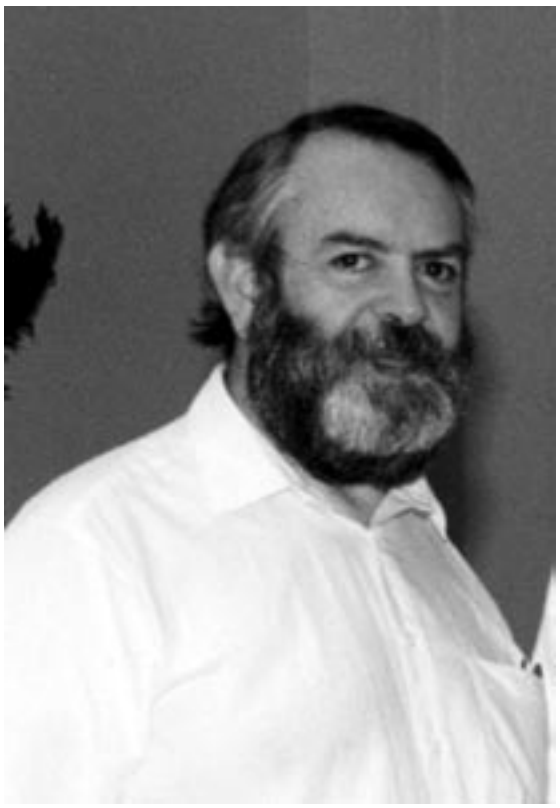
for moving to Northern Ireland failed, I was captivated by the island of Ireland and its people and decided to stay. By this time I had found a job at Queen's University, returning to enzymology, but I had already decided that I wanted to be in marine biology! So I used the job to fund a part-time M.Sc. by thesis (on the molluscs of Strangford Lough) in marine biology so that I had some kind of qualification. I had begun to learn to dive, and from a nervous start (I am a little claustrophobic, and not a natural!), I fell in love with the underwater world and racked up more than 100 amateur dives a year. Ultimately I became a BSAC first class diver and advanced instructor. My aim throughout this was to become a professional diving marine biological surveyor. Sadly this was not to be, as in 1989 after nearly 300 dives I experienced a severe Type II bend (paralysed legs are not a joke), which was almost certainly due to my subsequently diagnosed PFO. This put paid to those aspirations. I still dive, but with a depth limitation.

After completing my M.Sc., I was lucky enough to have a short (18 months) time as a professional academic marine biologist (mainly working on plankton), but grants were hard to find, and it seemed to be the end..... In desperation, I then trained as a school teacher. Fortunately, throughout my time in Belfast, I had been closely associated with the Ulster Museum, and when the Curator of Mollusca went on sabbatical, I obtained her post to cover for her absence, and remained in the Museum on short contracts when she returned. This meant I was in position to obtain a post at the new Local Records Centre at the Museum, which I did in 1995. My first permanent job, and where I still work today. Most of the work has had nothing marine about it, and the topic was neglected for years, despite my efforts. Now, however, marine records are being taken seriously, and I am now permitted to spend most of my time on marine recording related projects.

Molluscs are still my 'obsession', but in recent years I have tried to expand my knowledge to encompass most of the other phyla (common species mainly, and I still don't like worms!), and I teach on the Seasearch project in Northern Ireland. Does this make me a marine biologist? I sometimes feel a fraud when compared with academic professionals (as I have no first degree, nor published in a top flight journal), or experienced full time diving surveyors. However, my 'hobby' of 27 years has given me enormous pleasure. If I can utilise those skills I have learnt and pass on my own enthusiasm to others, then I will have gone some way to repay my debt to those who freely gave their time and expertise to me over the years.

OBITUARY: DAVID HEPPELL (1937-2004)

In the Editorial of Issue 15 of Porcupine newsletter, we reported that David Heppell had died peacefully in April 2004. As David was one of our founding members, we felt it appropriate to reproduce(with permission) the Obituary written by his friend and colleague Peter Dance and published in J. Conchology 38 No.4, 2004.



Extract from the History of Porcupine at www.pmnhs.co.uk

The society was inaugurated in 1977, at first under the simple name Porcupine. Its founders were the conchologists Shelagh Smith and David Heppell, both members of the Conchological Society. Being based in Edinburgh they were often disappointed that so many meetings of that society were held in London or at other localities in the south of England; rarely did the Conch. Soc. venture far from the metropolis. So they resolved to form a new, more geographically extensive society.

Not unnaturally the first meeting of the fledgling organisation was in the Royal Scottish Museum (as it then was) in Edinburgh. This took place in February 1977, although a newsletter under the editorship of Fred Woodward had been issued in November 1976 at which a steering committee had been announced.

The interests of the society were accepted at the February 1977 meeting to embrace not just molluscs but the ecology and distribution of the generality of marine fauna and flora in the NE Atlantic. This accords naturally with the Society's attachment to HMS "Porcupine". Biological recording was to form an important feature of the Society's objects and the extensive lists in the Society's journal demonstrate the success of this aim.

Obituary by S. Peter Dance

David Heppell, a member of the Conchological Society since 1959, has died, in his 67th year. Born at Gosport in Hampshire on 21st November 1937, he was the eldest of three children, his two sisters, Carole and Janet, surviving him. As a child David was blessed with an inquiring mind and a determination to get to the bottom of things, collecting and studying postage stamps, books, fossils, insects, shells, and anything puzzling or odd. Indeed, he delighted in all things strange or unexplained. Words fascinated him and he came to attach great importance to their meanings and correct usage. He developed a skill at card games, such as Bridge and Whist, and became a good chess player. Such interests and skills may have distanced him from his schoolfellows. Even as an adult he seems to have regarded himself as an outsider. He once told his friend and colleague of many years standing, Geoff Swinney, 'that he always felt something of a loner and that he had few friends'.

After leaving school he studied dentistry at University College, London, from 1956 to 1961. Having qualified as a dentist, he joined the School Dental Service. Realising that examining other persons' teeth was not to his liking, he resigned after about six months. On the other hand, malacology was to his liking. Having investigated the presence on the Hampshire coast of *Mercenaria mercenaria* (L. 1758), he published his first

article on molluscs in his school magazine (Heppell, 1957). He followed this up four years later with a more comprehensive article on this introduced species in our journal (Heppell, 1961b). By then David had made my acquaintance, occasionally visiting me at the Natural History Museum where I had been working since 1957. We became friends and met frequently, the skating rink at nearby Bayswater being a favourite venue. Although there was never any doubt that his preferred forms of exercise were cerebral, he donned his skates regularly and attempted, doggedly and usually unsuccessfully, to stay upright on them. His watchword, from the beginning to the very end, was determination.

David's chance to become professionally involved with molluscs and their shells came about in an unlikely way in 1962. I had been approached by the Linnean Society of London to overhaul and write a report upon the Linnaean shell collection, then in a sorry state. Having accepted that it would take a year to achieve this objective satisfactorily, the Linnean Society agreed to award a grant to David for that length of time. The grant was to pay him for doing my job in the Natural History Museum, the museum continuing to pay me my normal salary. He filled my shoes efficiently, but his list of publications suggests that he may have spent a certain amount of his time investigating things that were not part of his remit.

In 1963, after filling my shoes for a year, he had the opportunity to do three years postgraduate research at the University of Glasgow, under the watchful eye of the distinguished marine biologist Professor C. M. Yonge. His research topic was 'A comparative anatomical and ecological study of European Cardiacea'. The research involved was not to his liking, however, and he never submitted his thesis. In any case, having already acquired first-hand experience of museum work, he had joined the Royal Scottish Museum in Edinburgh as a Senior Research Fellow in October 1966, ostensibly 'to study taxonomy of the Mollusca with particular reference to the Amphineura, and also to continue his revision of the list of British Marine Mollusca and to prepare a report on the Mollusca of the Celtic Sea.' (I. Finlay, Report on the Royal Scottish Museum for the year 1966). How well he fulfilled these objectives is not for me to say, but another glance at his list of publications suggests that he may have been distracted by the study of zoological nomenclature. For the rest of his working life, indeed, he was involved with the labyrinthine ramifications of this study, not just as an academic exercise, but as a professional occupation. For some years he was a Commissioner on the board of the International Commission of Zoological Nomenclature, his expertise being acknowledged by all who benefited from it. Undoubtedly, that expertise was founded on his intense love of words.

Circumstances beyond his control may have prevented him from becoming a model curator, but organising molluscan shells would not have given him the same satisfaction as organising words anyway. Nevertheless, that he made a valiant effort to succeed in a difficult job is clear from a CV he prepared for himself. 'I have had to design and set up a Mollusca Section from scratch,' it reads, 'devise storage and documentation systems, work out a policy for acquisitions, field work and display, and train staff.' More a closet naturalist than a field worker, he made relatively few excursions into the great outdoors in search of molluscs. Those he made were probably more rewarding socially than productive materially. Delving into the mysteries of molluscan anatomy was not his forte, either, so he may have surprised everyone when he attempted, with some success, to dissect a large squid in his office. Never happier than when poring over books, his preferred environment was a library, a well-filled one being always available to him at home. There were occasions, however, when a particular research project demanded his presence elsewhere. He travelled to the Indian sub-continent in 1982 and 1984, each time accompanied by his third wife, Frances, with the object of investigating the present state of the chank industry. Working under sometimes difficult conditions, he observed the many different aspects of an activity few westerners have bothered to investigate. A tangible result of his studies was the excellent exhibit about the chank (*Turbinella pyrum*) he prepared for his museum. Unfortunately, he never published an account of his work on

this influential gastropod.

David was prepared to go to extraordinary lengths in his research before deciding he could go no further, tenaciously following up obscure references, never afraid to contact living authorities for their personal views. Nowhere is this more apparent than in his lengthy article dealing with the early history of malacology (Heppell, 1995g). The notes and bibliography at the end of this excellent piece of work, occupying as much space as the main text, are not meant to be passed over unread! When I was engaged to write a series of six books on Classic Natural History Prints it was to David I turned for help with the volume dealing with molluscs and their shells. The volume we co-authored (Dance & Heppell, 1991) is easily the best of the series. Billed by the book trade as 'a modern rarity', it has also become virtually unobtainable, a tribute to David's logical approach to the subject.

He was very interested in the nature of error and how errors are perpetuated, collecting information about animals or disconnected parts of animals that have been misidentified as molluscs or vice versa. The subject of pseudoconchology had long interested me, too, and having collected many examples, we had intended to publish our conclusions about them in a small book. Latterly, David became deeply involved with cryptozoology. Having previously helped me with my book Animal Fakes & Frauds (1976), he continued to share information with me on curious creatures, real and imagined. We had hoped to co-author a book about horned hares and he had hoped to write something substantial about mermaids. Death intervened before any of these projects could be realised.

The International Commission on Zoological Nomenclature was not the only organisation to benefit from David's abilities. As Editor he produced seven numbers of The Journal of Conchology from December 1965 to October 1968. He also helped to launch the Porcupine Society, an organisation formed for the purpose of studying marine molluscs and other life forms in the northern parts of the United Kingdom. In 1986 he took on the organisation of the Ninth International Malacological Congress, almost single-handedly. Held in Edinburgh from 31 August to 6 September 1986, the Congress achieved an unqualified success, an achievement the more remarkable as Frances had timed the arrival of their son, Sam, to coincide with the event! A few years later, under less pressing circumstances, she produced a girl, Sophie. The two children, acquired relatively late, brought David great happiness and he delighted in following their progress through life. Having retired from his museum job, he agreed to a proposal by Frances, a Canadian citizen, that the four of them move to British Columbia, where she had spent her childhood. The move was realised in 1998, when the family moved into the property at Gibson's Landing, Vancouver, vacated for them by Frances' parents.

Having settled in to his Canadian home, David resumed his interests, especially philately. Both he and Sam had entered competitions as members of the Edinburgh Philatelic Society, David becoming a member of the India Study Circle in 1995. Now, what had been a part-time hobby became an obsession. David joined the South Asia Philatelic Study Group of the Pacific Northwest and was soon making original contributions to the study of the postal history of the Indian sub-continent, including 'A Key to the "Conch Shell" Issues of Travancore'. Regrettably, his health began to be undermined by a blood disorder and he declined rapidly. He died on Saturday, 24 April 2004, mentally alert and cheerful to the end. A commemoration of his life and achievements was held near his Canadian home on Sunday, 6 June 2004, attended by a large assembly of friends and relatives. I was privileged to take part in this moving event which proved that David was quite wrong to think he had few friends. He had many, including those who asked for his professional advice, those who benefited from his expertise, and those who, like me, marvelled at the way he gave freely and generously of his time, asking for no reward - the rarest gift of true friendship. A loner, perhaps: friendless, certainly not.

PORCUPINE 2005.
COLLECTIONS, COLLECTORS, COLLECTING

PMNHS meeting held at the Natural History Museum 18-20 March 2005

The following abstracts were received from speakers at the meeting who do not intend to publish a full paper. Further full papers will be published in the next issue (No. 19).

An All Taxon Biodiversity Inventory (ATBI) for the Isles of Scilly: Progress Report

Richard Warwick
Plymouth Marine Laboratory and University of Plymouth

As part of the European Concerted Action BIOMARE, the Isles of Scilly have been selected from among a large number of candidates as one of only six European sites where the production of an All Taxon Biodiversity Inventory (ATBI) might be feasible. The selection of BIOMARE reference sites was based on strict criteria: they must be as free as possible from anthropogenic and natural stressors that are atypical of the region (e.g. reduced salinity or high turbidity); they must comprise a mosaic of representative habitats in a well-defined area; a substantial body of background information on the biota must already be available; they must be protected by legislation, with a high conservation status; they must have an appropriate infrastructure and facilities for marine biodiversity research and there must be a strong national commitment to research. The ATBI sites have been selected as small islands which are protected against direct human impact and are located in a set of full salinity marine environments approaching pristine conditions, the others being Hornsund (Spitsbergen), the Ushant-Molene archipelago (Brittany), the Faial-Pico Channel (Azores), Cabrera (Mediterranean) and Port-Cros Islands (also Mediterranean). The research objectives for these sites include the establishment of baseline phylogenetic patterns of biodiversity and whether these vary along latitudinal and environmental gradients, and the development and calibration of rapid assessment techniques of biodiversity assessment.

Our strategy has been to encourage experts in the taxonomy of each group of organisms to produce these inventories based on historical records and on new collections, and to publish them in the Journal of Natural History series "The marine flora and fauna of the Isles of Scilly". To date 19 taxa have been covered in this series, but many important ones are missing. Defra are generously funding the costs of these experts to visit Scilly for the purposes of collecting and observing the flora and fauna, and we would encourage anybody interested to take up this opportunity. PML's own work has partly been to host and facilitate the visits of these experts, and partly to collect our own species records as a spin-off from targeted research programmes. Examples of three such programmes will be presented: studies of the fractal nature of algal and sand faunas, and monitoring of the sand biotopes of St Martin's flats SAC for English Nature.

Richard Elmhirst, J.P., F.L.S. (1884-1948): the 'other' Cumbrae naturalist

P. G. Moore
University Marine Biological Station Millport

The Cumbrae naturalist was David Robertson, the founder of the Marine Station at Millport. Richard Elmhirst was appointed as Assistant Naturalist to the then Director of the Marine Station, Stephan Pace, in 1906. After the fall-out between Pace and the Marine Biological Association of the West of Scotland, Elmhirst took over as Superintendent, becoming Director in 1933. He devoted 42 years of his life to Millport and witnessed the transition from the era of natural history to that of modern marine science. Although he was not a great scientist, he was an inspiring teacher and communicator and he proselytised to all and sundry the opportunities for research at Millport. He wrote some 74 papers and his book The naturalist at the sea-shore (1913) was a timely addition to the popular literature. Events from his life will used to be highlight his contribution to the development of marine biology in Britain and justify his being considered as "the 'other' Cumbrae naturalist".

Collections of Discovery

Philip S Rainbow
Department of Zoology, The Natural History Museum, Cromwell Road, London SW7 5BD

The Natural History Museum in London houses 450,000 glass jars containing 22 million animal specimens in alcohol or formalin, including 70,000 jars with more than 5 million specimens of marine animals that constitute the Discovery Collections. The Discovery Collections are the collected specimens from the 20th century expeditions of the Discovery (in her different guises) and her British oceanographic sister ships. The series began in 1904 with the return of the SY Discovery from the Antarctic and surrounding Southern Ocean, and the long series of Discovery Collections still continues today, an irreplaceable asset in the history of biological oceanography. The collections span a time of changes – change in the perceived use of such collections and dramatic environmental change on a world scale. Collections of animals have graduated from being objects of wonder to satisfy the curiosity of 17th century philosophers to be essential reference collections for the taxonomy and nomenclature of the world's diversity, underpinning our attempts to decipher patterns of marine biodiversity and evolutionary relationships. The Discovery Collections also offer us a record of oceanic life as it was, before the demise of the great whales, before the ozone hole and before global warming. The foresight of the collectors of this unique archive can only be rewarded by their use as an active research tool, using modern molecular and analytical techniques, and others yet to be imagined.

An introduction to MarBEF [a Network of Excellence in Marine Biodiversity and Ecosystem Functioning] and its facilities for managing data on the distribution of marine organisms.

Geoff Boxshall
Department of Zoology, The Natural History Museum, Cromwell Road, London SW7 5BD

MarBEF aims to integrate marine biodiversity research across Europe by forming a robust and long-lasting collaboration between marine scientists and institutes, with a long-term research programme and dedicated links with industry and the public. The scientific objectives of the MarBEF programme are:

- To understand how marine biodiversity varies across spatial and temporal scales, and between levels of biological

organisation, in order to develop methods to detect significant change.

- To generate theory, models and tests of the relationship between marine biodiversity and ecosystem functioning through the integration of theoretical and modeling exercises, comparative analyses and carefully-designed experimental tests.
- To understand the economic, social and cultural value of marine biodiversity.

To achieve this MarBEF needs to generate new data and to make available existing data on marine organisms and their distributions. These data will be made available via the MarBEF website - which will become the European node of OBIS (the Ocean Biogeographic Information System).

Marine Algal (Seaweed) Collections at the Natural History Museum (BM)

Ian Tittley
Department of Botany, The Natural History Museum

The specimen collections at BM constitute an important reference centre for macro marine algae (Chlorophyceae, Phaeophyceae, Rhodophyceae). The first collections of algae were made in the sixteenth and seventeenth centuries, are among the earliest in the Museum from Britain and abroad, and are housed in bound volumes known as the 'Sloane Herbarium'. The library collections hold both recent and old publications with algal records; Johnson & Gerard's (1633) 'Herball…' contains clear descriptions, geographical and ecological information, and illustrations of algae such as *Fucus vesiculosus* and *Laminaria saccharina*.

Many collectors have contributed to the development and growth of the seaweed collection, and its taxonomic and geographical range is broad. The algal collection comprises 350,000 specimens, mostly of pressed material but also, microscope slides, liquid-preserved and boxed specimens. Of the total, 85,000 specimens are from Great Britain and Ireland. Figure 1 shows the 10km grid squares around the coasts of Britain and Ireland for which there are specimens in the BM collection.

The next two Figures (2, 3) show the abundances of species along a small section of the south coast of England. Figure 2 is based on the collections at BM and species abundances are given on a scale of 1-9 (maximum) while Figure 3 presents comparable data taken from the British Phycological Society's (BPS) 'Atlas of Seaweed distribution of Britain and Ireland'.

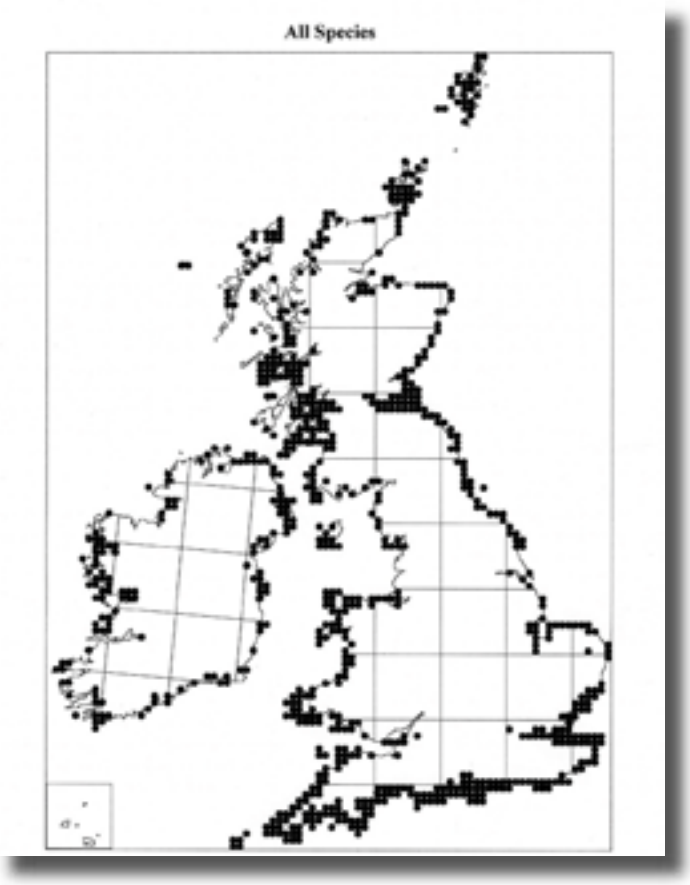


Figure 1.

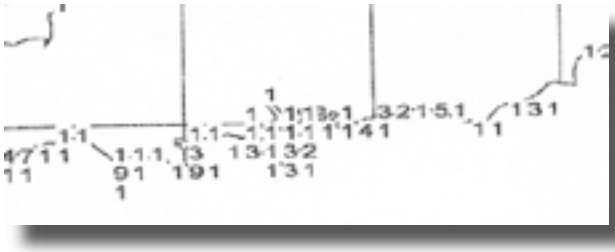


Figure 2

Figure 3

A significant amount of information is associated with specimens but access to this is not always straightforward. A start has been made to improve this through specimen databases and image collections. Thus far 40,000 specimens records have been accessioned electronically. A priority is to accession all type specimens, and secondly to capture information on UK specimens. A collection review has improved the availability of geographical information. All holdings from Great Britain and Ireland have been mapped using DMAP and species distribution maps are now available for consultation. Similarly, species distribution maps are available are available on a world basis for part of the collection. Inventories of species holdings by country and vice versa are also available. For the future, it is planned to hold representative specimens of all species that occur in Great Britain and Northern Ireland by filling three main gaps in the algal collection, taxonomic, geographical and temporal. Table 1 lists species from Britain and Ireland not in BM.

The seaweed collections at BM provide an important historical record of species occurrence in space and time. Collections of Padina pavonica from eastern England made in the 18th and 19th centuries indicate a change in distributional range that may be due to change in sea temperature. Global warming may alter the distributional ranges of species in Britain. 19th century collections of *Odonthalia dentata* show the species to have occurred at locations in the Firth of Forth where it is no longer present probably due to changes (deterioration) in water quality. Early (18th century) collections of *Bostrychia scorpioides* show the species to have occurred in the Thames estuary and in Lincolnshire where it is no longer present due to habitat change (drainage of saline wetland).

The wider use of the collection for contemporary environmental, conservation and biodiversity issues will be encouraged, as will the acquisition of important voucher specimens.

Table 1

Rhodophyceae

Acrochaetium battersianum
Acrochaetium efflorecens
Acrochaetiumnemalii
Acrochaetium rosulatum
Acrochaetium sanctae-mariae
Colaconema asparagopsis
Gelidium maggsiae
Pterothamnion polycanthum
Rhodella maculata
Rhodochorton concrescens
Sahlingia subintegra

Phaeophyceae

Compsonema minutum
Microspongium immersum
Pseudolithoderma roscoffense
Scytosiphon dotyi
Sorapion kjellmanii
Sphacelaria arctica
Nemastoma canariense

Chlorophyceae

Acrochaete heteroclada
Acrochaete operculata
Chlorochytrim facciolae
Cladophora pygmaea
Cladophora retroflexa
Eugomontia sacculata
Halochlorococcum moorei
Microspora ficulinae
Monostroma bullosum
Prasiola furfuracea
Umbraulva olivascens

Instructions to Authors

Although we can deal with most methods and styles of presentation, it would make our editorial lives easier if those wishing to contribute to the Newsletter could follow these guidelines. Please submit all material in electronic format if at all possible either by e-mail or disc/CD. Hard copy can also be accepted provided it is not too long!

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Do not leave a space between paragraphs.
Do not add page numbers or anything else as headers or footers.

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Photographic images should be supplied as greyscale (black and white) images JPGs with a resolution of 300 pixels per inch and width of 7cm. Save at high quality. Image size should be 7cm wide.
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References

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Brown, M. T. and Lamare, M. D. 1994. The distribution of *Undaria pinnatifida* (Harvey) Suringar within Timaru Harbour, New Zealand. *Japanese Journal of Phycology* **42**: 63-70.
Dipper, F. A. 2001. *Extraordinary Fish*. BBC Worldwide Ltd. 96pp.

If all this is thoroughly off-putting, just send whatever you have got and we will do our best with it!!

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