



# BULLETIN of the PORCUPINE MARINE NATURAL HISTORY SOCIETY

Spring 2017 — Number 7



# Bulletin of the

## Porcupine Marine Natural History Society

No. 7 Spring 2017

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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 2 Bulletins per year which include proceedings from scientific meetings, plus regular news bulletins.

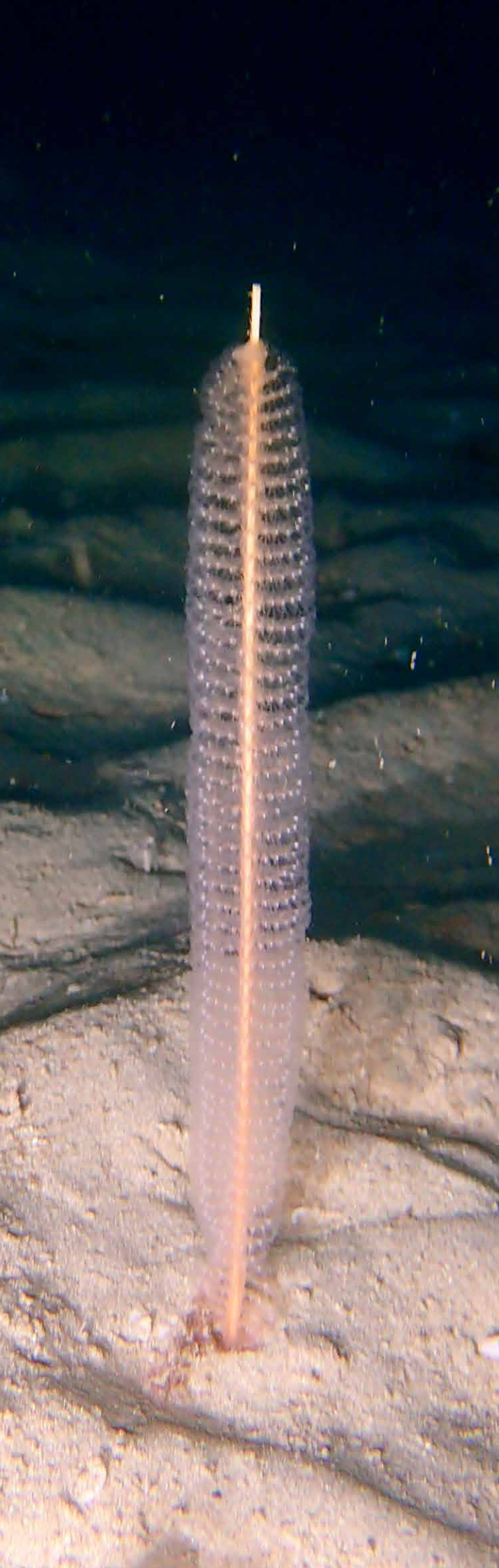
Membership fees: Individual £18    Student £10

 [www.pmnhs.co.uk](http://www.pmnhs.co.uk)

 <http://www.facebook.com/groups/190053525989>

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## Editorial

### 40 years of Porcupine

40 years of Porcupine;  
To celebrate we'll wine and dine.  
Our conference brings us all together,  
The field trips fun in any weather.  
From dabbling on a rocky shore,  
To mud grabbed from the ocean floor,  
To diving through gold shafts of light  
We try to get our ID right.  
Mega, macro, micro fauna,  
Red, brown, green and meio flora;  
We aim to record all we see  
Using guides, books or a taxonomic key.  
We publish our Bulletin twice each year  
The content pleasing to most, we hear.  
A diverse array we try to feature -  
field reports to single creature.  
Come read the Bulletin for a fix  
Of our very own *Scubahystrix*.  
As Porcupines we are drawn to the sea  
A passionate group of marine folk are we.  
A click of the button and you are a member  
The fun times with friends you will remember.  
And now turn the page to see what's in store  
There's articles on fish and so much more.....

Vicki Howe  
Hon. Editor



## Porcupine Annual Field Trip 2017

Dove Marine Lab, Cullercoats  
September 6th–10th 2017

The next Porcupine Marine Natural History field trip will take place on shores in NE England. It will be based at the Dove Marine Laboratory, which is part of the University of Newcastle-upon-Tyne. There will be field trips to rocky and sediment shores on the Durham Heritage Coast, Coquet to St Mary's Marine Conservation Zone and Berwickshire and North Northumberland Coast SAC. There will also be a chance to do some seabed sampling courtesy of the Northumberland IFCA. A dive boat has been booked for Sunday 10th to carry out Seasearch dives on local wrecks and reefs. It might be possible to organise additional dives locally or at the Farne Islands, subject to interest and availability. Everyone is welcome for any or all of the days but participants should ensure they are members of Porcupine before the event.

A full programme and information will be sent to members via Mailchimp and will be posted on the website (possibly even before you read this)!

We are also planning to run a Seasearch Fish Identification Course probably on the Saturday or Sunday just prior to the field trip.

Paula Lightfoot [p.lightfoot@btinternet.com](mailto:p.lightfoot@btinternet.com)

Frances Dipper [frances.dipper@sustenergy.co.uk](mailto:frances.dipper@sustenergy.co.uk)

**KEEP THE DATE!**

## Collecting & Identifying Seaweeds

British Phycological Society  
Marine Biological Association, Plymouth  
25–27 April 2017

Numbers will be limited to enable the tutors to cater for individual needs of interested amateurs, professional biologists, students, artists, and those working with the Water Framework Directive. Will include identification of Water Framework Directive species.

Application forms are available from [archerthomson@btinternet.com](mailto:archerthomson@btinternet.com)

## 14th MBA Postgraduate Conference

University of Exeter,  
Penryn Campus  
24th–28th May 2017



The *Marine Biological Association Postgraduate Conference* is an annual scientific gathering of postgraduate students undertaking research in marine biology and related fields. The event serves as an invaluable opportunity for early career scientists to present their research to fellow students and marine biologists in a friendly, yet rigorous, environment.

For information on the conference visit <http://biosciences.exeter.ac.uk/mba2017/>

## 7th Unknown Wales 2017 A day to celebrate Welsh wildlife

Amgueddfa Cymru-National Museum Wales,  
Cardiff, Saturday 28th October



Cynhadledd  
Cymru Anhybys  
Unknown Wales  
Conference



This one day meeting celebrates Welsh wildlife, highlighting the icons as well as the less well known flora and fauna, showcasing new discoveries and new thinking on nature in Wales, whether on land or in the sea, through a series of short talks.

Details of the conference will be uploaded as they are available: <http://www.welshwildlife.org>

**Marine Sponge Identification Course  
Dale Fort Field Centre  
Pembrokeshire**

**28th March – 1st April 2017  
Tutor: Jen Jones**

A 3-day, shore-based course consisting of fieldwork, sample collection and laboratory work.

Visits to 3 different shores in Pembrokeshire

Suitable for divers and non-divers.

Residential course includes accommodation, all meals and transport to and from sites.



**For further information and booking:**

<http://www.field-studies-council.org/individuals-and-families/courses/2017/df/marine-sponge-identification-66358.aspx>

E-mail: [enquiries.pb@field-studies-council.org](mailto:enquiries.pb@field-studies-council.org) 01646 623920



Field Studies Council:  
Bringing Environmental Understanding to All

**OBITUARY**  
**Christine Howson**  
**- Diving Marine Biologist**  
**15th January 1955 – 21st September 2016**



Christine was known to many people in the marine community through her survey work and the Marine Species Directory, which was considered innovative before electronic technology was so ubiquitous. It never seemed too much effort for Christine to zig zag across the country for a survey or dive or to see family as she had so much energy. Included here is a chronological summary of her life which may give hope to others that a straight path to success is not the only path. This is followed by some personal reflections of friends and colleagues.

**Career**

- Durham University to read French and Italian then swapped to Biology (and marine biology) after first year; 2.1 (Hons) awarded 1978.
- Teacher (maths) in Jamaica during her university gap year.
- Following degree from Durham in 1978, went to Glasgow to study for a PhD in intertidal marine ecology with Trevor Norton – broke a leg and dropped out; went to Belfast to join the Northern Ireland sublittoral survey early 1980s.
- 1985 left for Cyprus to become an instructor at a diving school (Cydive) for 6 months. Returned to UK to join Marine Conservation

Society for a project developing the first UK Marine Species Directory – published 1987 – a major piece of work, much used by UK marine biologists for many years. Joined OPRU 1987 and married Iain Dixon.

- 1988 moved to the University Marine Biological Station, Millport, Isle of Cumbrae in the Clyde – Iain to do a PhD, and Christine to a salaried post running the *Scottish Sea Lochs* survey project for three years;

- Both were invited to join a diving survey of Rockall, the remote rock approximately 200 miles west of Scotland, and Christine was trained to operate the diving recompression chamber fitted to the ship. This turned out to be a rare honour achieved by few, and a diving and career highlight. The weather was kind enough to let us land on the rock, but the diving was tremendously exciting, involving close encounters with sharks.

- 1992 – moved to Ormiston, East Lothian where Christine started a self-employed career as a marine biologist in a co-operative group with Tom Mercer, Francis Bunker and Jon Moore.

**Family life**

Chris, born 5 October 1992. Tim, born 11 October 1994;

- Christine joined the school board at Ormiston primary.
- Highly active in local campaigns to stop open-cast mining activities proposed at various times in the close vicinity of Ormiston.
- Ross High School Tranent – took up the blogging pen name Guineapigum – essentially, Chris's year were guinea pigs for a trial in which Standard Grade exams were started a year earlier than normal. The blog extended beyond school through to cancer, to life in general and was maintained to 2016.
- Trod the touchline along with other parents at many junior football matches for Tim and Chris – took to running to avoid standing around.
- Encouraged Chris and Tim to learn to swim well and competitively, at Tranent Amateur Swimming Club.

- University for Chris (Sports and Exercise Science), and for Tim (Geology);

- Tim died in Vancouver, Canada whilst on Erasmus student exchange for his third year. A huge setback, especially for Christine, since they didn't find out until much later the cause of his death so far from home - from undiagnosed diabetes.

### Interests

- Diving – learnt in Jamaica; third and second class certificates; however, nearly drowned on first experience of real diving in cold UK waters whilst at Durham.

- In early 1980s in Glasgow and then in Northern Ireland, she ramped up her diving activities massively and achieved First Class and National Instructor standards with BSAC, and became extremely active in the training of divers and diving instructors at national events, and organising regional conferences.

- Career involved diving and marine biology throughout her life, but diving and visiting remote places was a passion in her spare time – she was the lynchpin in starting up our diving club in Edinburgh – Lothian Divers, with a successful grant application that enabled the club to buy a fully equipped dive boat and sets of diving gear.

- Many trips to lovely and varied places particularly locally in Scotland and UK with the club and friends – St Kilda on several occasions, plus North Rona, Sula Sgeir, Sule Skerry, North Shoal, Rockall, Orkney, Shetland, Inner and Outer Hebrides, the Corryvreckan whirlpool, Scilly Isles etc. Also around the world – Philippines, Indonesia, Great Barrier Reef, Fiji, Maldives, France, Spain, Norway;

- Also took up swimming– at local triathlon club and then at local Masters Groups, and became heavily involved in coaching and helping to run the Tranent Amateur Swimming Club. Also took up triathlons and open water swimming (including swimming across the Corryvreckan whirlpool), as well as doing 5k and 10k runs for charities.

- Christine was diagnosed with ovarian cancer in 2008; following surgery plus chemo she was clear for several years; the cancer later

returned unexpectedly, and a succession of chemo sessions once again followed.

- In 2013, Christine set out with her friends Saartje and Guy on an adventure to swim across Scotland – this was achieved over two long weekends in the summer, starting at Loch Laxford on the northwest coast, through a string of freshwater lochs and rivers including the Shin, and finishing at Bonar Bridge in the Beaully Firth on the east coast. This was great fun – involved lots of friends and contacts (family plus Caroline, Ian, Pete, the Lairg Angling Club and other local help) to help plan and then to do it; involved canoeists, small boats, an argocat, several vehicles, and mobile cafe facilities. Several thousand pounds were raised for Maggie's and Water Aid.

- In 2014, in recognition of her sporting achievements and work in the community, Christine was given the honour of being one of the baton-bearers for the 2014 Commonwealth Games;

- Tranent and District Community Sports Awards 2015 – Christine honoured with a Lifetime Achievement Award;

- Most recently, Christine developed an interest in making jewellery for friends (using beach glass) inspired by her sister Pat, who was making a living from craft work whilst living in Ireland, and other friends in East Lothian. Through increasingly frequent bouts of illness at home and in hospital, she would be crocheting and rag-rugging and receiving advice and encouragement from a stream of lovely friends.

*Susan Chambers*

## Personal Reflections of Christine

I first came across the name Christine Howson via her work with the pioneering Ulster Museum dive team in Northern Ireland. I remember our first meeting well. It was at a Marine Conservation Society event. I introduced myself to this diminutive blonde with some cheeky patter, only to be met with a steely rebuff. She was having none of it and it was from this difficult beginning that a relationship was forged. Sometimes full of fun but at other times she decided that I should go back in my box. Christine was not one to hold back when she thought you had stepped out of line. I first got to know Christine personally when she moved to Pembrokeshire to work for the Field Studies Council (FSC) in its OPRU dive team. She joined in with the local diving club and would often come out and help with trainees and marine biology orientated dives. I remember being in trouble with Chris after my echo sounder packed up when trying to put her on a shallow underwater pinnacle off Skomer, only for her to end up at 40 m in pitch darkness. Then I persuaded her to help cook Christmas dinner for all the staff at Orierton. I gave her (and Iain) the task of preparing stuffed cabbages for 30 people. They were up until after midnight preparing food and this didn't endear me to her. I did of course emphasise how delicious and well worth the effort it all was. It was just like Christine to always be prepared to muck in and never to shirk from difficult tasks.

Christine helped get me recognised as a freelance diving marine biologist. In 1990 she invited me on a Marine Nature Conservation Review diving survey of the Outer Hebrides. It was a fantastic way to explore some little-known areas of the British Isles and my learning curve was steep. I was in awe of Christine's grasp of logistics, organising a boat full of marine biologists to complete a job in places where seabed conditions and tides were unknown and liaison with the skipper was difficult. By the late 1990's Christine's job with Millport and JNCC had come to an end and she became a freelancer. We kept meeting each other on different jobs where we were employed for our expertise. One of them was to map the shores of Papa Stour off Shetland. Here the cliffs were steep and the shores inaccessible so we ended up circumnavigating the island by Zodiac and visiting sea caves and remote rocks in what seemed like a never-ending swell. On one occasion I persuaded Christine to land me on a rock to look for the rare seaweed *Fucus distichus* Linnaeus, 1767. Landing was hazardous enough but in picking me up the boat propeller became fouled in seaweed and there were heart-stopping moments while I pulled us free as the swell threatened to beach the boat high up on jagged rocks. However, we did succeed in finding the rare seaweed. Nothing ventured, nothing gained. Chris was always up for doing things like this and her real passion was always marine conservation. In 1999, together with Tom Mercer we decided to combine our expertise and form a company –called Aquatic Survey and Monitoring Ltd. Jon Moore joined us a couple of years later. I was still frequently in trouble with Christine but the balance was always tipped more towards fun and laughs rather than fights. Christine would never say 'the right thing' and would often challenge me to think about problems in a different way. More than anything she was a loyal friend. We not only shared a working life but also, with our respective families, a personal life. I never got a chance to say thank you, but then maybe it didn't need saying.

*Francis Bunker*

I have shared surveys, a week at a time with Christine since the mid 1990's, through the MNCR and subsequently marine monitoring in Wales. Nothing could keep Christine from getting in the water and doing a proper job of everything she touched. Her attention to detail could put others to shame if they weren't up to scratch!

*Paul Brazier*

I first met Christine in 1977 when she helped with my diving training at Durham University; she in the last year of her degree and me in my first. As has already been mentioned, she quickly developed considerable skills in marine species identification and marine biological surveys; and, in the mid-1980s, I would meet her regularly at the Marine Conservation Society and Underwater Association conferences. She, in part, inspired me onto a similar path, and I started to pick up similar skills, though never to the same level.

Our first survey together was in 1986, when she joined an OPRU-led diving survey to the Shetland Islands. My friend and OPRU colleague Iain Dixon was also on that trip and I think he and Christine met there. That trip was a high point in my life and I have been lucky enough to go there many times since, most often with Christine.

She loved fieldwork. Particularly diving surveys of course, but shore surveys as well. I think the enjoyment of report writing had started to pale over the last few years – funny that! – but she must have done at least 6 weeks of field work just last year. Two weeks of that was on rocky shore monitoring with me in Shetland; an annual survey that we had been doing together since 2006.

Shetland is beautiful and I know that was part of the attraction for her, as it is for me, but the rocky shore surveys are not exactly easy. The timing of the low spring tides and the long daylight hours meant that we would have at least 4 consecutive days doing 2 tides a day – i.e. 4am starts and 9pm finishes – with a bit of rest in the middle of the day. Christine never complained about that, as she never complained about anything, even when it was raining and the midges were bad and the waterproofs supplied by the Sullom Voe terminal were 3 sizes too big. Can you picture that?

The upside of getting up at 4am is the Shetland scenery and wildlife as the sun rises on a lovely sunny summer day on a wild natural landscape, and I know she loved that. It was an unwritten rule that we stopped work to watch an otter – of course! – but we would also stop occasionally to enjoy terns, tystie, skuas, seals etc., or just the view! Christine enjoyed photography and if she finished her survey work before me, which was usually the way, because she was more efficient, she would sit and wait for me at the top of the shore, with her camera and a smile of contentment. That is how I will remember her.

*Jon Moore*

Christine came to work with us at MCS for year in 1988 on the Species Directory. It was a modest project based on an idea of David Erwin's and was funded by WWF (Chris Tydeman) and BP (John Hartley). The aim was to bring together all the species lists for the UK using up-to-date names. It was based on work I had finished on the Shetland fauna and work in the Ulster Museum that David Erwin, Bernard Picton and Christine had compiled on the Northern Ireland species lists. Christine compiled these lists and then liaised with specialists who edited and revised them. I remember it as being a great time and she got her head down and completed it with the characteristic smile and really positive approach in less than the allotted year when she was offered the sea lochs job in Scotland. This was a remarkable achievement in such a short time and is indicative of her clarity of thinking, determination of spirit and ability to work with many co-workers. It was great to meet her again at Millport at the Porcupine meeting (in March 2016) and I will always have great memories of working with her.

*Bob Earll*



I first met Christine at a Porcupine meeting in Oban (1992) where she gave a presentation about her work on the west coast of Scotland Sea Lochs. I asked about the fate of this unique collection and as there were no other bidders I agreed to acquire it for the museum in Edinburgh. Soon after Christine moved to East Lothian and we met frequently and worked together on several projects including re-describing one species and describing a new species of sponge. It took 5 years to complete as Christine had her 2 boys which slowed down things a bit, but not much. I remember sitting on an East Lothian shore in a snow storm and drinking coffee when we reached the conclusion we were not going to find any “orange sponge” today! Field work with Christine was fun even in the cold and snow. I knew nothing about sponges but with Christine learnt a huge amount and we were very pleased with our *Ophlitaspongia* paper. With Iain, Christine also set up the new Lothian divers club and persuaded me to join and I learnt to dive at 45 years old. The relationship continued over the years with various surveys and culminated in 2012 when we managed a survey in the Uists to look at Saline Lagoons. It was complicated logistics but we achieved our aim and prepared a report with a plan to produce some papers. Later, in 2015 I was also persuaded to take part in an open water swim in the Oxfordshire part of the Thames for several kilometres with Christine as part of the team. I was new to open water swimming and had virtually no training and had to buy a wet suit to take part. Of course Christine sped off in the distance and I was left at the back struggling but it was a fantastic weekend and I promised myself to learn to swim properly on my return. When I retired I joined Christine’s swimming club where she was still coaching for the last few weeks of her life. Thanks Christine for inspiring so many, including me.

*Susan Chambers*

Christine was an amazing lady. I have known her for many years, although - compared to others - worked with her comparatively little. Apart from my collaboration with the UK Marine Species Directory, Christine worked with my team at the National Museum Wales on our HabMap project (published as BIOMÔR 5), identifying the ‘Others’ (i.e., pretty much everything except polychaetes, molluscs and crustaceans). She was, as usual, most thorough, conscientious, and a joy to work with. Even then, recovering from her latest treatment and wearing her headscarf as though it was part of her style (rather than any sort of cover), Christine exuded enthusiasm and joy. On a personal level, one particular incident resonates. Christine was in hospital once more, but this time making great progress from the debilitating Guillain-Barré syndrome, when I visited her with my son Sean. Christine was typically in an upbeat mood, having just regained movement in her toes! We talked of many things, but I am certain that Sean would have gained much fortitude from that day when, shortly after, he faced his own cancer challenge. Christine was a great marine biologist, diver, swimmer - a truly wonderful person and inspiration to so many in a wide range of professions and situations. I am proud to have known her as a friend and colleague.

*Andy Mackie*



*Rockall MNCR team*

Christine was an enormous strength to any of the survey teams that I was associated with. She did particularly great work as a member of the Scottish Sealochs surveys team (part of the Marine Nature Conservation Review of GB) based at Millport which, over four years, described, catalogued and classified seabed habitats and associated communities that had, in the subtidal at least, been greatly ignored by researchers. A particular survey highlight for Christine must have been as a team member diving Rockall (yes, those reefs 306 km WEST of St Kilda) - and, alright, perhaps it was Christine (and not me) that took the picture of the Porbeagle while it made up its mind what to do.

*Keith Hiscock*



*Porbeagle photographed during dive at Rockall*

## Porcupine annual meeting at Millport: Diving report

Paul Brazier

The Porcupine annual conference at Millport provided an excellent opportunity for shore diving, local to the site at the FSC field centre. Some 13 divers took part in a total of 10 dives over 2 days. Some divers used Seasearch methods (forms) to record species, and others used the old MNCR (Marine Nature Conservation Review) forms as a prompt sheet to record species. Below is a commentary of those dives that I completed, with additional references from others.

On 13th March, 10 divers took to the sea at Port Loy, a small inlet to the west side of Farland Point, Millport. A scramble across boulders towards the rising tide and a short snorkel across a boulder field, presented a slightly silty sparse kelp forest on boulders amongst a gravelly sand matrix. On descent, and keeping left (south), the boulders were replaced by silty gravelly sand with very dense



Fig. 1: *Ophiura albida* (Photo: Nick Owen)

brittlestars *Ophiura albida* across the surface. The most obvious fauna living in the sediment were the gaper clam *Mya truncata*, revealed by the mucus coated oval siphons and the lesser cylinder anemone *Cerianthus lloydii*. Surface animals included *Luidia ciliaris*, predator to the brittlestars, swimming crabs *Liocarcinus* spp., large hermit crabs *Pagurus* spp. and the occasional scallop *Pecten maximus*. The sediment slope graded into muddier sediment as it continued beyond 14 m below chart datum (bcd). In stark contrast, heading upwards to 6 m bcd quickly revealed bright pink steep bedrock, where there were abundant edible



Fig. 2: Devonshire cup corals surviving in areas grazed by sea urchins (Photo: Nick Owen)

urchins *Echinus esculentus*. Other plants and animals clung on where grazing pressure was less, such as in crevices, corners and pinnacle edges. Dead man's fingers *Alcyonium digitatum*, Devonshire cup coral *Caryophyllia smithii* and solitary ascidians covered less than 5% of the bedrock in the deeper areas of bedrock. Sparse red algae, included sea beech *Delesseria sanguinea* and the non-native *Dasysiphonia japonica*, with a denser kelp *Laminaria hyperborea* forest above, equally heavily urchin grazed to the surface.

Later that day, near to the high tide saw Paul Naylor and I heading onto mixed sand and gravel with small bedrock mounds on the east coast, a few hundred metres from the marine station. Again, the infauna was dominated by gaper clam *Mya* sp. with a good range of starfish *Asterias rubens*, *Astropecten irregularis* and *Marthasterias glacialis*. The maximum depth of this dive of 5 m bcd meant that any stable rock was colonised by sugar kelp *Saccharina latissima*, furbelows *Saccorhiza polyschides*, the northern toothed weed *Odonthalia dentata*, sandy leaf bearer *Phyllophora crispa*, sea oak *Phycodrys rubens*, siphon weed *Polysiphonia nigra*, banded weed *Ceramium* sp. and coralline crusts.

On 14th March, another accessible site on the east side of the Isle of Cumbrae, Clashfarland Point was dived by 6 divers. Access was a clumsy walk down the coastal slope and across slippery wracks on the seashore. The top 7 m bcd consisted of steep pink coralline crust coated bedrock, with a fairly steep slope of sand and gravel with occasional boulders below



Fig. 3: Rugose squat lobster *Munida rugosa* under rock with crinoids (Photo: Nick Owen)

this. We headed rapidly to 21 m bcd, where the infauna was dense with gaper clam *M. truncata*, lesser cylinder anemone *Cerianthus lloydii* and venerid clams *Venerupis corrugata*. The small rocky patches had dense dead man's fingers *A. digitatum* and plumose anemones *Metridium dianthus*, with occasional butterflyfish *P. gunnellus*, rugose squat lobster *Munida rugosa* and prawns *Pandalus montagui* hiding round the base of the rock. Lesser amounts of solitary ascidians *Ascidiella scabra* and feather stars *Antedon bifida* were also recorded on the rocks, as was a single sea slug *Doto fragilis* on a piece of *Halecium* sp. The clear coralline surface of the shallower rock was heavily grazed by edible sea urchin *E. esculentus* with



Fig. 4: Nudibranch *Doto fragilis* on *Halecium* (Photo: Nick Owen)

very sparse sea oak *P. rubens* and the kelps *S. polyschides* and *S. latissima*. Nick Owen spotted an area of dense fish eggs, thought to be those of a lump sucker *Cyclopterus lumpus* attached at the base of the bedrock.

The fishes spotted were limited to benthic species - butterflyfish *Pholis gunnellus*, the



Fig. 5: Fish eggs around the top of a *Chaetopterus* tube (Photo: Nick Owen)

attractive pogge *Agonus cataphractus* and gobies. No wrasse or gadoids were observed during the dives, although Maya Plass observed a large ballan wrasse *Labrus bergylta* being consumed by an otter. A number of divers noted the level of inert waste (ceramic, glass, bicycle and fishing tackle), some of which came back in divers' bags!

The conditions, whilst not perfect, were considerably better than many of us experience in March in England and Wales and certainly sufficient for some excellent macro photographs of the many creatures observed. The biological records summarized in Table 1 will be entered onto the National Biodiversity Network (NBN) database by the Porcupine honorary records convener. The records presented here are from a collation of 7 divers' records.

I must thank all of the divers for providing records, photographs and video to complete this article: Rohan Holt, Jon Moore, Anne Bunker, Ruth Sharrat, Nick Owen, Paul Naylor, Liz Morris, Fiona Crouch, Franki Perry, Maya Plass, Leigh Morris.

Rohan Holt (CloudBase Productions) has compiled a video based on drone and underwater video material, which can be viewed here: <https://vimeo.com/163872893>.

## Reference

Connor, D. & Hiscock, K. 1996. Data collection methods. In: K. Hiscock (Ed.) *Marine Nature Conservation Review: Rationale and Methods*. Peterborough, Joint Nature Conservation Committee. pp. 51–56 & Appendices 5–10, pp. 126–158.



Ruth Sharratt



Nick Owen



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Ruth Sharratt

Taxon Name	Authority	Farland Pt	E of Farland Pt	Clashfarland Pt	Photo	Specimen / checked
<b>PORIFERA</b>						
Porifera sp. (encrusting)	Grant, 1836	R		R		
<i>Halichondria</i> ( <i>Halichondria</i> ) <i>panicea</i>	(Pallas, 1766)	R				
<i>Myxilla</i> ( <i>Myxilla</i> ) <i>incrustans</i>	(Johnston, 1842)	O				
<b>CNIDARIA</b>						
<i>Aurelia aurita</i> (scyphistomae)	(Linnaeus, 1758)	F			RS/RH	
<i>Coryne pusilla</i>	Gaertner, 1774	O			RS	
<i>Hydractinia echinata</i>	(Fleming, 1828)	O		R	NO	
<i>Halecium halecinum</i>	(Linnaeus, 1758)			P	NO	JJM
<i>Nemertesia antennina</i>	(Linnaeus, 1758)	R				
<i>Nemertesia ramosa</i>	(Lamarck, 1816)			R		
<i>Plumularia setacea</i>	(Linnaeus, 1758)			R		JJM
<i>Abietinaria abietina</i>	(Linnaeus, 1758)	R				
<i>Hydrallmania falcata</i>	(Linnaeus, 1758)	R				
<i>Sertularella gayi</i>	(Lamouroux, 1821)			R		JJM
<i>Sertularia argentea</i>	Linnaeus, 1758	R		R		JJM
<i>Sertularia cupressina</i>	Linnaeus, 1758	R				
<i>Campanulariidae</i>	Johnston, 1836	R				
<i>Obelia dichotoma</i>	(Linnaeus, 1758)	O			RS	
<i>Obelia geniculata</i>	(Linnaeus, 1758)	O		O		JJM
<i>Obelia longissima</i>	(Pallas, 1766)	R			RS	
<i>Alcyonium digitatum</i>	Linnaeus, 1758	F	R	F	RS/NO	
<i>Cerianthus lloydii</i>	Gosse, 1859	O		F	RS/NO	
<i>Actinia equina</i>	(Linnaeus, 1758)	P	O		RS	
<i>Urticina felina</i>	(Linnaeus, 1761)	R	F	F	NO	
<i>Metridium dianthus</i>	(Ellis, 1768)	O	R	O	RS	
<i>Sagartia elegans</i>	(Dalyell, 1848)		O	R	NO	
<i>Caryophyllia</i> ( <i>Caryophyllia</i> ) <i>smithii</i>	Stokes & Broderip, 1828	C		R	RS/NO	
<b>NEMERTEA</b>						
<i>Tubulanus annulatus</i>	(Montagu, 1804)	R			NO	
<b>ANNELIDA</b>						
<i>Spirobranchus</i> sp.	Blainville, 1818	C	F	F	RS/NO	
<i>Chaetopterus variopedatus</i>	(Renier, 1804)	F		C	RS	
<i>Terebellidae</i> sp.	Johnston, 1846	R	O	R		
<i>Lanice conchilega</i>	(Pallas, 1766)	O	O		RS/NO	
<i>Spirorbinae</i> sp.	Chamberlin, 1919	F			RS	
<b>ARTHROPODA</b>						
<i>Balanus balanus</i>	(Linnaeus, 1758)	F	C	F	RS/NO	
<i>Mysidae</i> sp.	Haworth, 1825		O			
<i>Amphipoda</i> sp.	Latreille, 1816		O			
<i>Caridea</i> sp. (prawns/shrimps)	Dana, 1852	O				
<i>Palaemon serratus</i>	(Pennant, 1777)			R		
<i>Pandalus montagui</i>	Leach, 1814 [in Leach, 1813-1814]			F	NO	
<i>Homarus gammarus</i>	(Linnaeus, 1758)	R		R		
<i>Paguridae</i> sp.	Latreille, 1802		C		NO	

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<i>Pagurus bernhardus</i>	(Linnaeus, 1758)	C		F	RS	
<i>Galathea strigosa</i>	(Linnaeus, 1761)			R		
<i>Munida rugosa</i>	(Fabricius, 1775)	O		F	RS/NO	
<i>Porcellana platycheles</i>	(Pennant, 1777)			F		
<i>Hyas araneus</i>	(Linnaeus, 1758)	F		F	NO	
<i>Inachus phalangium</i>	(Fabricius, 1775)			R		
<i>Macropodia (tenuirostris?)</i>	Leach, 1814	R		R		
<i>Cancer pagurus</i>	Linnaeus, 1758	O	O	O		
<i>Liocarcinus depurator</i> ?	(Linnaeus, 1758)	P	F		RS	
<i>Necora puber</i>	(Linnaeus, 1767)	C	O	F	RS/NO	
<i>Carcinus maenas</i>	(Linnaeus, 1758)			R		
<b>MOLLUSCA</b>						
Polyplacophora	Gray, 1821		R			
<i>Gibbula cineraria</i>	(Linnaeus, 1758)	O	O	F		
<i>Calliostoma zizyphinum</i>	(Linnaeus, 1758)	O		O	RS	
<i>Lacuna vineta</i>	(Montagu, 1803)		O	O		
<i>Littorina littorea</i>	(Linnaeus, 1758)			C		
<i>Trivia monacha</i>	(da Costa, 1778)	O		O		
<i>Nucella lapillus</i>	(Linnaeus, 1758)			O		
<i>Buccinum undatum</i>	Linnaeus, 1758	O				
<i>Tritonia hombergii</i>	Cuvier, 1803	R				
<i>Doto fragilis</i>	(Forbes, 1838)			R	NO	
<i>Cuthona caerulea</i>	(Montagu, 1804)			P		
<i>Eubranchius farrani</i>	(Alder & Hancock, 1844)			P		
<i>Pecten maximus</i>	(Linnaeus, 1758)	O		R	RS/NO	
<i>Ensis</i> sp.	Schumacher, 1817	R	O			
Veneridae	Rafinesque, 1815		O			
<i>Venerupis corrugata</i>	(Gmelin, 1791)			O		
<i>Mya truncata</i>	Linnaeus, 1758	C	C	C	RS/NO	JJM
<b>BRYOZOA</b>						
Bryozoa (encrusting)		R	R	R		
Crisiidae	Johnston, 1838	R		R		
<i>Alcyonidioides mytili</i>	(Dalyell, 1848)			R		
<i>Alcyonidium diaphanum</i>	(Hudson) Lamouroux	O	R	O		
<i>Membranipora membranacea</i>	(Linnaeus, 1767)	F		F		
<b>ECHINODERMATA</b>						
<i>Antedon bifida</i>	(Pennant, 1777)	F		F	NO	
<i>Astropecten irregularis</i>	(Pennant, 1777)	R	O	R	NO	
<i>Luidia ciliaris</i>	(Philippi, 1837)	F	R		RS	
<i>Crossaster papposus</i>	(Linnaeus, 1767)	R	R	O		
<i>Henricia</i> sp.	Gray, 1840	O		O		
<i>Asterias rubens</i>	Linnaeus, 1758	F	C	F	RS/NO	
<i>Marthasterias glacialis</i>	(Linnaeus, 1758)	O	R	O	NO	
<i>Ophiothrix fragilis</i>	(Abildgaard in O.F. Müller, 1789)	R		R	NO	

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<i>Amphipholis squamata</i>	(Delle Chiaje, 1828)	F				
<i>Ophiura albida</i>	Forbes, 1839	A		F	RS/NO	
<i>Echinus esculentus</i>	Linnaeus, 1758	C	F	F	RS/NO	
<b>TUNICATA</b>						
<i>Clavelina lepadiformis</i>	(Müller, 1776)	R			RS/NO	
Didemnidae	Giard, 1872			R		
<i>Diplosoma listerianum</i>	(Milne Edwards, 1841)	P			RS	
<i>Ciona intestinalis</i>	(Linnaeus, 1767)	O		R	RS	
<i>Corella eumyota</i>	Traustedt, 1882		O			
<i>Corella parallelogramma</i>	(Müller, 1776)	R		R	NO	
<i>Asciidiella aspersa</i>	(Müller, 1776)	F		O		
<i>Asciidiella scabra</i>	(Müller, 1776)	O		F	NO	
<i>Ascidia mentula</i>	Müller, 1776	F		O		
<i>Ascidia virginea</i>	Müller, 1776	R				
<i>Styela clava</i>	Herdman, 1881	R				
<i>Dendrodoa grossularia</i>	(Van Beneden, 1846)	R		R		
<i>Botryllus schlosseri</i>	(Pallas, 1766)	R				
<b>PISCES</b>						
<i>Taurulus bubalis</i>	(Euphrasen, 1786)			R	NO	
<i>Agonus cataphractus</i>	(Linnaeus, 1758)			R		
<i>Pholis gunnellus</i>	(Linnaeus, 1758)		O	O		
<i>Gobius paganellus</i>	Linnaeus, 1758			R		
<i>Pomatoschistus</i> sp.	Gill, 1863			O	NO	
<i>Pomatoschistus pictus</i>	(Malm, 1865)	O			RS	
<i>Limanda limanda</i> ?	(Linnaeus, 1758)	R				
<b>RHODOPHYTA</b>						
Rhodophyta (encrusting)	Wettstein, 1901	O		O		
<i>Palmaria palmata</i>	(Linnaeus) Weber & Mohr, 1805		R			
<i>Callophyllis laciniata</i>	(Hudson) Kützting, 1843			P		
<i>Kallymenia reniformis</i>	(Turner) J.Agardh, 1842		O			
<i>Meredithia microphylla</i>	(J.Agardh) J.Agardh, 1892	R		R	NO	
Corallinaceae (encrusting)	Lamouroux, 1812	A	C	A	NO	
<i>Gracilariopsis longissima</i>	(S.G.Gmelin) M.Steentoft, L.M.Irvine & W.F.Farnham, 1995			O		
<i>Phyllophora pseudoceranoides</i>	(S.G.Gmelin) Newroth & A.R.A.Taylor, 1971	O	O			
<i>Polyides rotunda</i>	(Hudson) Gaillon, 1828		O			DPB
<i>Cystoclonium purpureum</i>	(Hudson) Batters, 1902			O		
<i>Rhodymenia holmesii</i> ?	Ardissone, 1893		R			
<i>Lomentaria clavellosa</i>	(Lightfoot ex Turner) Gaillon, 1828		O			DPB
<i>Ceramium nodulosum</i>	Ducluzeau, 1850		O	O	NO	DPB
<i>Cryptopleura ramosa</i>	(Hudson) L.Newton, 1931	O	O	F		
<i>Delesseria sanguinea</i>	(Hudson) J.V.Lamouroux, 1813	F	O	F	RS/NO	

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<i>Hypoglossum hypoglossoides</i>	(Stackhouse) F.S.Collins & Hervey, 1917	R		R	NO	
<i>Membranoptera alata</i>	(Hudson) Stackhouse, 1809			R		
<i>Phycodrys rubens</i>	(Linnaeus) Batters, 1902	O	F	A		
<i>Dasysiphonia japonica</i>	(Yendo) H.-S.Kim, 2012	O	O	C		DPB
<i>Heterosiphonia plumosa</i>	(J.Ellis) Batters, 1902	F			RS	
<i>Brongniartella byssoides</i>	(Goodenough & Woodward) F.Schmitz, 1893			O		
<i>Odonthalia dentata</i>	(Linnaeus) Lyngbye, 1819	O	F	O		DPB
<i>Polysiphonia (stricta?)</i>	Greville, 1823			F		JJM
<i>Polysiphonia nigra</i>	(Hudson) Batters, 1902	O	F	F		DPB/JJM
<i>Rhodomela confervoides</i>	(Hudson) P.C.Silva, 1952	R		R		
<b>OCHROPHYTA</b>						
<i>Cutleria multifida (Aglaozonia)</i>	(Turner) Greville, 1830	O				
<i>Sphacelaria</i> sp.	Lyngbye, 1818		O	P		
<i>Desmarestia aculeata</i>	(Linnaeus) J.V.Lamouroux, 1813		O			
<i>Laminaria (sporeling)</i>	J.V. Lamouroux, 1813	O	O			
<i>Laminaria hyperborea</i>	(Gunnerus) Foslie, 1884	C		F		
<i>Saccharina latissima</i>	(Linnaeus) C.E.Lane, C.Mayes, Druehl & G.W.Saunders, 2006		O	O	C	
<i>Saccorhiza polyschides</i>	(Lightfoot) Batters, 1902	F	O	O		
<i>Sargassum muticum</i>	(Yendo) Fensholt, 1955	R	R			DPB
<i>Halidrys siliquosa</i>	(Linnaeus) Lyngbye, 1819			O		
<b>CHLOROPHYTA</b>						
<i>Ulva</i> sp.	Linnaeus, 1753	O		O		
<i>Ulva lactuca</i>	Linnaeus, 1753		O			DPB

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Sand goby (Photo: Ruth Sharratt)

## Porcupine visits the Staffa Archipelago

### Inch Kenneth and Diving

*Becky Hitchin & Fiona Crouch*

September 2016 saw several boat loads of Porcupine members rounded up and led by Rayner Piper, heading to the small islands of Inch Kenneth and Little Colonsay, in the Staffa Archipelago, west coast of Scotland. It was a trip of superlatives, from the marathon journey over to the islands - travel to Oban from starting points as far flung as Truro, Plymouth, Cambridge and Inverness, ferry to Mull, travel across Mull's winding roads and sheep-on-roads hazards to Ulva Ferry, rigid hulled inflatable boat (RHIB) from Ulva Ferry across to the islands - to the landscapes and seascapes we found ourselves surrounded by. No other survey trip I've been on has included private islands, castles and lutes. Normally it is midge-infested tents and the occasional guitar. So we enjoyed it while we could.

This is very much an account of the trip from a diver's point of view, and thus the story of life on Inch Kenneth. The shore party were staying on Little Colonsay and most of us only got to wave at them across beaches from various boats - and to compare notes on a couple of evenings over a glass (or two) of wine.

Inch Kenneth is a small island that has more history than a 0.21 square mile island has any right to have. The ruins of a 13th century church are said to include Kings of Scotland that were buried there, when storms prevented passage to Iona. Grave slabs include images of salmon - and ostriches. In the 1930s, the island was owned by Sir Harold Boulton, the writer of the words to the Skye Boat Song. He created the current house. In the mid 20th century, the island was owned by the famous and infamous Mitford Girls. Unity Mitford, famously a Nazi sympathiser, spent her last years on the island before dying of meningitis associated with a failed suicide attempt, and Jessica Mitford later teasingly suggested in one of her novels, that the island might have become a Soviet submarine base. The island was sold by Jessica in the late 1960s to the family of the current owners - Claire Barlow and Jim Woodhouse. Interestingly, it seems that Claire's ancestors include Charles Darwin.

I would say that this is just all past history, but Inch Kenneth is history. The house flagstones in the hallways are worn smooth, a huge Scottish flag is draped over the first floor balcony, the sun sets over twisted trees and outbuildings and the silence is absolute. It is history, but living history, and hopefully our week there will become a very small part of that.

There were 10 of us living at Inch Kenneth, including Claire and Jim who set themselves



Fig. 1: Inch Kenneth. (Photo: Becky Hitchin)

out to help us in every way possible, from providing food at every opportunity, to ferrying kit around in their dinghy. We took over a large part of the house. The ground floor snug and living room were quickly turned into labs, with a curved table by bay windows, home to Ali's and Nick's microscopes and another table home to Rosemary's gastropod sieving. As the week went on, the room became increasingly covered in Seasearch forms, laptops, cameras, log books and trays of algae, hydroids and bryozoans. Any space over the two Agas became full of drying thermals. Books and forms migrated to the first floor drawing room. Buckets full of specimens lurked in the porch. Claire and Jim took it all in their stride and kept on being the most gracious and interested hosts we could ever wish for.

Outside, the dive shed that started off so neatly, soon got sandy, and kit started flowing out onto the grass. Boats came and went, depending on tides. One of the more challenging parts of the logistics on Inch Kenneth was dealing with the tides. At high tide, the bay in the front of the house was covered and the RHIBs could be safely moored in several metres' water depth, or pulled up to a jetty. At low tide, especially in the week that we were there, an enormous expanse of beach and shore was exposed. Boats couldn't get near the island. This did lead to a few awkward moments where divers found themselves having to walk back over several hundred metres of slippery seaweeds and squishy sand, when there really had been water there only an hour before. Kit ended up being put on a distant jetty that could be used until mid tide, then being rescued by dinghy as the tide flooded in.

We had been invited to the archipelago to record the marine life, in an area where there has been little or no previous surveying, either through Scottish Natural Heritage or through citizen science (a full Porcupine report of our results is in the pipeline). The owners of the islands are keenly interested in the marine life that surrounds them and wanted to collate baseline data on its biodiversity, status and importance. Such information is vital in assessing potential impacts of any proposed developments in the area, such as further fish farms.

Plans, of course, were changed on a day to day basis depending on the weather and boat availability, but we did get to a wide range of sites and habitats. On the first day, we headed out to the relatively inaccessible Treshnish Isles, a long and bumpy RHIB ride from Inch Kenneth. The shore party from Little Colonsay was landed on Lunga on a rather bleak-looking boulder shore, and then the divers visited two sites along the island, with one eye on the weather and one eye on the tides, which we thought were likely to be rushing through the channels between the islands at a good rate of knots. The diving was a little sparse (noting that these are my own memories), with the seabed dominated by clean sands that would have sparkled had the sun been shining, and large swathes of seagrass. Kelps clung to smooth cobbles and boulders that rocked back and forwards in the growing swell, scouring out hollows in the seabed.

All other dive days were spent closer to home, diving mainly around Ulva and Inch Kenneth. Inch Kenneth proved a delight to dive, with the only difficult bit of the dives trying to get to any depth deeper than 4 m. Even at high tide the strait between the island and Mull is shallow; at low tide, many of the seagrass beds are exposed and travelling into the island requires a masterpiece of careful boat skippering. We dived several times out in the bay at Inch Kenneth, and found the most luxuriant maerl bed I have ever seen in Scotland. In places, the pinks and purples covered the whole sea bed, mostly large knobbly twiglets, but also thinner twiglets plus *Corallina*, giving the surface a variety of textures. In places, the maerl beds graded into seagrass beds, notable for the abundance of stalked jellyfish, which were being wafted around in the water column, attached to the seagrass blades.

Ulva proved equally interesting. On the southern side of the island, across from Little Colonsay, there is an area called the Ulva Islets which dries out in many places on the lowest tides. There are maerl beaches and shallow kelp beds full of nudibranchs and stalked jellyfish. The shore party spent many happy hours exploring the area, while the divers explored both the shallow maerl beds and the drop-off just beyond the Islets. The dive group was lucky enough

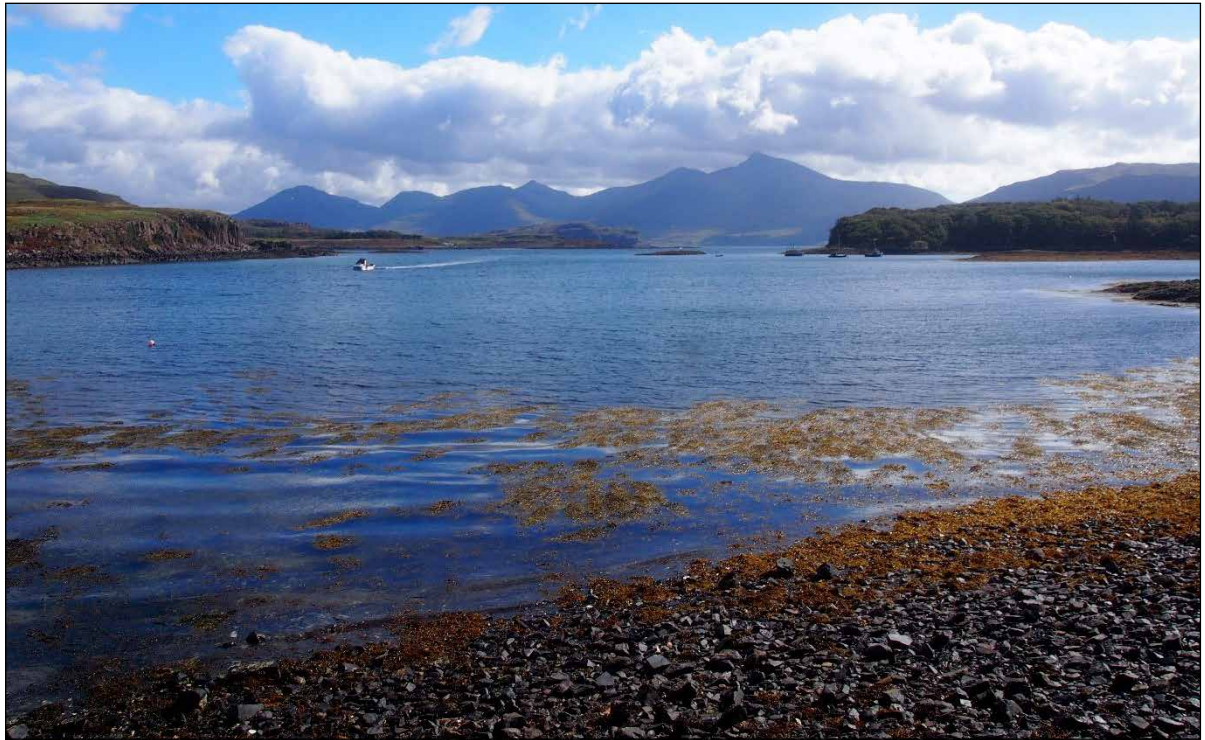


Fig. 2: *Ulva* shore (Photo: Becky Hitchin)

to dive the drop-off, the shallows, and get an hour or two to explore the kelp fauna and flora. The drop-off looked wonderfully sheer on the charts, contours squeezing together a few tens of metres past the shallow basin. In reality it was a stepped series of walls, covered in squirts, featherstars and red seaweeds, wafting numerous stalked jellyfish in the water column. What was really amazing was the shallow dive at the edges of the Ulva Islets basin, sadly the shortest dive we did. Nick Owen and Becky descended to a seabed of perfect waves of maerl and tangled brown seaweed. We're still not sure what type of seaweed it was, but undoubtedly Juliet Brodie will be able to tell us from the samples we brought back for her. Neither of us had seen anything quite like it. It's definitely an area to return to.

One site we all wanted to see was Fingal's Cave on Staffa, but the sea state consistently prevented us from travelling the 6 nautical miles offshore. However, late in the afternoon of our third day exploring the archipelago, we heard the shore party were 'going for it' and of course the divers didn't want to miss out. Two RHIBs headed straight out to the island just visible in the distance. An Atlantic swell was rolling in but nothing that the RHIBs couldn't

handle and the sun was shining bright. When we arrived, the swell seemed even bigger crashing into the cave. There was absolutely no chance of landing on Staffa, but the cave and the island with the huge basalt columns was an impressive site.

Four divers were yet to do a second dive that day so we managed to find some shelter on the east side of the island for a quick 40 minute dive as daylight was fading. The visibility wasn't great but the kelp-covered bedrock and boulder slope was well worth a visit. A variety of hydroids and bryozoans kept Ali busy collecting whilst Fiona attempted to take photographs to record the habitat and conspicuous species. It was such a shame we didn't have more time – as was so often bemoaned after the dives – but as we surfaced, the sun was setting, and so it was time to return home with a Minke whale surfacing behind the boat, an exciting finale to a great day.

On the last day, some of us joined the shore contingent and we went to the shore next to the wonderful Ulva café. Cakes were, of course, the first priority, consumed with gusto while the tide was falling. Accessing the beach proved a little difficult, with the redoubtable



Fig. 3: The snug! (Photo: Fiona Crouch)

Frances Dipper eventually bushwhacking a route down through woodland to the series of rocks fringing the shore. That afternoon reminded me of the differences between intertidal and subtidal discovery. Subtidal is all underwater ok's, sample bags, and rushing to check things down a microscope (after drying off, showers and tea). Lots of crowding round to take turns to look at something exciting and trying not to wobble the table as you slide into a newly vacated seat and start twiddling the focus. Intertidal is noticing something, waving madly to all around, everyone crowded round a tiny rockpool or in a big rockpool, discussions over identification, learning from the expert. Both are amazing, and both have a lot to learn from the other.

Rayner found an amazing piece of shore, half in and half out of the still lowering tide. The underneath of every boulder was full of large, translucent red squirts, white sea cucumbers, cowries, Devonshire cup corals and a wide range of sponges and crustaceans. It was an impressive piece of shore and one worthy (in my opinion) of preserving in all its diversity.

The trip ended as they always do. Packing kit away in lots of cars, still wet, still messy. Leaving with waves and promises to see each other soon. And hopefully that will be the case. We experienced a truly unique week, maerl and seagrass, pinnacles, being lulled to sleep by the sound of lutes. And more than anything else we experienced a week of great hospitality, and we cannot thank Jim and Clare enough for being gracious, interested and ever helpful. They made our week, and I hope we made theirs.

## Little Colonsay and shore recording

*Frances Dipper*

Staffa, Little Colonsay, Ulva, Gometra, Inch Kenneth: exotic tropical islands? No, just a wonderful archipelago tucked away to the west of the Isle of Mull, in the Inner Hebrides. In September 2016 a large group of Porcupines descended on this haven of tranquillity to do what Porcupines do best - record marine wildlife. This field trip, postponed from 2015, was instigated by Rayner Piper and was at the invitation of several of the islands' owners. This was certainly one of the most ambitious of Porcupine fieldtrips, involving a remote location, difficult logistics and both diving and shore work. This is a brief account of the varied activities of the shore team, based on Little Colonsay. This small island, of 0.34 square miles, is ungrazed (except by visiting red deer who are strong swimmers), has no paths, stunning views - even without scrambling to its 64 m summit, and extensive rocky shores, small bays and inlets. It also has one house, owned by Michael Hare who built it many years ago with the help of a lifelong friend, Ronnie. Ronnie was our expert boatman for the trip and a much better driver than Michael or Rayner! Michael was hospitality itself and made us all feel immediately welcome, with shelves and cupboards stacked with more food and wine than the six of us plus Michael and Ronnie could ever have got through (two of our shore team were on Inch Kenneth).

All our evening meals were eaten by candlelight, not for atmosphere, but because the island has no electricity supply. So no late night computer work, no internet, no emails but lots of conversation, discussion and torchlight reading. Juliet and Jo made a seaweed sanctuary in a small snug off the sitting room, where numerous specimens were identified, and/or pressed for later analysis and will be added to the London Natural History Museum herbarium. Where I saw ten seaweeds on a shore they found twenty. It will be an impressive list when completed.

As we disembarked from the Oban to Craignure ferry we were greeted by a full-blown rainbow, no rain and no midges! Things got even better after piling people and mountains of gear into



*Fig. 4: Bottlenose dolphins show us the way to Little Colonsay*

the RHIBs and heading out of Ulva Sound into Loch na Keal. As we approached Little Colonsay, a small school of bottlenose dolphins escorted us in, bow-riding, dipping, turning and leaping. Perhaps they were curious about these strange Porcupines. With only four days and four useable low tides, the number of shores we could survey was limited, but nevertheless we scrambled, slid, and waded our way around sites on Lunga in the Treshnish Isles, Ulva and Little Colonsay, with extra sites covered by the two shore team members based

on Inch Kenneth. Our first shore was at the northern end of Lunga where we explored an extensive boulder field on the east side which had a dense cover of fucoid seaweeds (whose main aim in life seems to be to tip over earnest marine naturalists) and scrambled over tall, steep-sided rock platforms and through rock-strewn surge gullies to a rocky drop-off on the exposed west side.

Sunday dawned wet, wild and windy – well this is west coast Scotland – so it seemed a good time to explore our ‘home’ shores. Extensive, low, dissected rocky ridges make up the shores on the relatively sheltered NE



*Fig. 5: Little Colonsay house*



Fig.6: A Gem Anemone in a shallow pool on Lunga (Treshnish Isles).

side of Little Colonsay. Shallow gullies with loose rocks and stones, covered by a thick mat of furoid seaweeds, provided a good habitat for crustaceans and small shore fishes. This is where a good kneeling pad is essential as such shores need patient seaweed scrabbling and rock turning. Broad-clawed porcelain crabs *Porcellana platycheles* appeared under almost every rock, and Risso's crab *Xantho pilipes* skulked menacingly in dark corners. The undersides of loose-lying rocks were a colourful menagerie of encrusting sponges



Fig.8: Oyster plant (*Mertensia maritima*), a northern maritime specialist, on Little Colonsay.

and bryozoans, small sea squirts, white tube worms, chitons and green sea urchins *Psammechinus miliaris*. Extensive, shallow, middle and upper shore pools were lined with pink paint weed Corallinaceae crusts which even covered limpets with a gaudy cloak.

We awoke on Monday to calm waters and clear skies and set off for the short ride across the sound between Little Colonsay and the many small islands and islets that adorn the SW coast of Ulva. This was the Hebrides at its very best,



Fig.7: Exploring Ulva Inlets

magically still and with a low tide that allowed us to wade out amongst seagrass, maerl and shell sand. Phil immediately disappeared into his dry suit, mask and snorkel and only 'landed' again hours later for lunch and relief. Tidal currents provide plenty of water movement through this fascinating site, resulting in luxurious growths of seagrass, rich sediments with roaming sand stars *Astropecten irregularis*, bivalves (evidenced by their siphon tops), swimming crabs *Liocarcinus depurator* and *L. corrugatus*, brown shrimp *Crangon crangon* and various 'prawns'. There was even a shark corralled in a seagrass-filled pool; only a small spotted catshark *Scyliorhinus canicula* but an unusual intertidal find nevertheless. The maerl was mostly dead but the divers found spectacular, live sublittoral maerl beds nearby. This area is certainly of great interest biologically speaking, and for me it was a perfect Porcupine day.

Our final shore site on the Tuesday was en route for home. Having piled all the gear and bags back into various vehicles on the Mull side of the Ulva ferry, there was time to follow the tide down along the opposite Ulva shore. We had to leave to catch the ferry before the tide was fully out, but as the water receded, a rather dull mixed bedrock, boulder and

sediment upper and middle shore, was followed by the promise of much richer pickings on a steep boulder slope. We caught tantalising glimpses of sea squirts especially large, red *Ascidia mentula* and sponges including what was probably the golf ball sponge *Tethya citrina*. It would be well worth a dive or three in this area, as the fast tidal flow through this narrow sound must provide an abundant food supply for filter-feeders. In my experience, many narrows and sounds at the entrances to Scottish sea lochs and between islands within, are rich in sea squirts, hydroids, sponges, bryozoans and others dependent on a steady supply of plankton.

This was a wonderful and re-invigorating field trip, thanks in no small part to our unflappable and generous host Michael, and to Ronnie for his impeccable boat handling (for some reason Rayner's niece Mia – our official photographer – preferred to be in the boat driven by Ronnie and not Rayner.....)! I hope we will return to this fascinating area one day.

Note: A full account of the Staffa archipelago field trip, including species lists and habitat records, is in the pipeline and will be published either in a subsequent Bulletin or as a separate special edition.



The Shore team with Michael and Ronnie. (Photo: Mia)

## Aberystwyth autumn field trip

Paul Brazier

A notable gap in the distribution of Porcupine records is from the mid-Wales area, so I set about changing that by organising an intertidal trip in October for those brave enough to face the equinoctial weather. As it turned out, the weather was very kind and there were no wet waterproofs to hang out. This also meant additional enthusiasm for a thorough inspection of each of the shores. Table 1 shows the sites that were visited.

College Rocks were recognised as a good example of a honeycomb reef shore, whilst south rocks at Borth have a wide variety of sub-habitats. The marina and Ystwyth provided two low salinity and sheltered sites.

### College Rocks, Aberystwyth

These rocks lie directly beneath the pier in Aberystwyth. The shore is backed by a high coastal defence wall that protects the old town area. The rocky area consists of shale strata lying at a 30° angle, providing repeating gullies and pinnacles of rock. The vast majority of the rocky platform sits at low shore level, with a canopy of serrated wrack *Fucus serratus* around the edges, gradually replaced by knotted wrack *Ascophyllum nodosum* in the interior of the platform with acorn barnacles *Semibalanus balanoides*. Throughout the

platform, common limpets *Patella vulgata* keep areas of the soft rock clear of all algae and barnacles. A number of higher knolls reach the mid-upper shore, where the acorn barnacles *Chthamalus montagui* and *Chthamalus stellatus* dominate. Small rockpools in the gullies between strata and a number of large rockpools influenced by sediment and boulders increase the number of species found. Two typical groups of organisms for these pools are anemones (including strawberry anemone *Actinia fragacea*) and crabs (flat-clawed porcelain crab *Porcellana platycheles*, edible crab *Cancer pagurus*, velvet swimming crab *Necora puber*, shore crab *Carcinus maenas* and hairy crab *Pilumnus hirtellus*). Honeycomb reef worm *Sabellaria alveolata* fills many of the shallow gullies on the lower shore, much of it covered in sea lettuce *Ulva lactuca*, although the *S. alveolata* is only present on the south and west facing outer rocks. Far out on the lower shore, a narrow gully separates a steeper area of shales that slope in a direction perpendicular to the rest of the platform. These rocks have a much greater density of barnacles *S. balanoides* around their tops and they appear to be a harder rock, with shallow pools. False carrageen *Mastocarpus stellatus* and coral weeds *Corallina* spp. dominate the pools and areas where there appear to be fewer *P. vulgata*. The very narrow kelp zone with *Laminaria digitata* drops sharply subtidally to boulders, cobbles and sediment.

Site	Date	Upper	Mid	Lower	Surveyors	LW Time	LW Height	Easting Northing
College rocks, Aberystwyth	14/10/2016	x		x	PB, FD, AB, MP, PL, GR, JB	14:13	0.9m	25790 28190
South rocks, Borth	15/10/2016	x	x	x	PB, FD, AB, MP, PL, GR, PL	15:15	0.6m	26030 28880
Aberystwyth Marina	16/10/2016	x			PB, AB, MP, PL, GR, PL, PM	15:47	0.3m	25813 28118
Ystwyth estuary, Aberystwyth	16/10/2016		x		PB, PL, PL, PM	15:47	0.3m	25802 28048

Table 1: Sites visited during field trip [PB -Paul Brazier; FD - Frances Dipper; AB - Anne Bunker; MP - Maya Plass; PL - Paula Lightfoot; JB - John Buckley; GR - Grant Rowe; PL - Pippa Lewis; PM - Pippa Moore]

At the extreme low shore here, and at Borth, the brittle fern weed *Osmundea oederi* was collected by Anne Bunker and confirmed by Francis Bunker.

The legs and structures under the pier are of rusting metal, but interestingly enough, these have sparse *A. modestus* as well as small patches of creeping chain weed *Catenella caespitosa*.

### Borth South Rocks



Fig. 1: South rocks at Borth. (Photo: Paul Brazier)

The wide bedrock platform and boulders south of Borth extends non-stop to Clarach, 3 miles (5 km) away, backed by a shingle ridge and steep cliffs, except where Sarn Cynfelyn, a shingle causeway running perpendicular to the coast, intersects the shoreline two-thirds of the way to Clarach. Just south of Borth, the back of the shore and the highest pinnacles further down, are topped with acorn barnacles *Chthamalus montagui*, rough winkles *Littorina saxatilis* and laver *Porphyra umbilicalis*. Below this, there is a gradual increase in cover of algae, mainly channel wrack *Pelvetia canaliculata* and also the occasional additional barnacle species—*Chthamalus stellatus* (Figure 2). All of the barnacles here are clearly 'porous' with the boring lichen *Collembosidium* sp. (formerly described as *Pyrenocollema halodytes*) mining into the tests. Small triangular rockpools nestle in the strata, with the blue green alga (Cyanobacteria) *Rivularia* (probably *R. bullata*) and gutweed *Ulva intestinalis*. The small periwinkle *Melarhaphe neritoides* fills many crevices in the barnacle tests. Pools amongst the fucoid canopy are painted with pink coralline crusts and tufts of coral



Fig. 2: Top of a pinnacle at Borth with channel wrack *Pelvetia canaliculata*. (Photo: Paul Brazier)

weed *Corallina officinalis*, small dark-footed common limpets *Patella vulgata* keep the pools grazed. The spiral wrack *Fucus spiralis* replaces the *P. canaliculata* 2 m down the 45° shale with dense barnacles *C. montagui* and *C. stellatus*. The *F. spiralis* and *P. canaliculata* have mature receptacles throughout. The damper understory allows for 30% cover of very fine gutweed *Ulva compressa*, forming a verdant skin over the barnacles and the common limpets. The pinnacles mostly level off to a gently sloping, undulating bedrock platform in the mid-shore, where barnacles *Semibalanus balanoides* and *C. montagui* dominate. The many gullies provide wet areas for fucoid (serrated wrack *Fucus serratus*) and other algal cover (especially sea lettuce *Ulva lactuca*). Numerous large rockpools add to the diversity and density of algae and usually have a crust coating of honeycomb reef worm *Sabellaria alveolata*. The *S. alveolata* crusts are well coated with *U. lactuca* as well as bladder wrack *Fucus vesiculosus* and fucoid sporelings. The crust has few crevices, but areas of steeper rock are broken by fissures and holes. The *P. vulgata* (30/m<sup>2</sup>) on the platform are coated in the brown crust *Ralfsia verrucosa* as are some of the purple topshell *Gibbula umbilicalis* (20/m<sup>2</sup>), but the frequent edible winkles *Littorina littorea* always remain clear of the crust. The dead remains of honeycomb reef leave silty-sand concretions, which are covered in a fuzz of colonial naviculoid diatoms. Some full sized black-footed limpets *Patella depressa* are found standing proud on the tops of barnacle-covered bedrock (Figure 3), whilst long ungrazed growths of *C. officinalis* and *U. lactuca* fill the rockpools. With the steady gradient across the 80 m wide shore, the *F. vesiculosus* is



Fig. 3: Black footed limpet *Patella depressa* from mid-shore, Borth. (Photo: Paul Brazier)

replaced by 10% *F. serratus* on smooth, eroded undulating shale (Figure 1). Wet gullies range from shallow, long pools covered with *U. lactuca*, *C. officinalis* and *S. alveolata*, to very deep and partly undercut channels with a greater diversity of red algae, including stalked leaf bearer *Phyllophora pseudoceranoides*, comb weed *Plocamium cartilagineum* (Figure 4) and branched hidden ribs *Cryptopleura ramosa*. Furoid sporelings grow on *S. alveolata* crust with adjacent large fertile *F. serratus* and *S. balanoides* patches with large (5+ cm) *P.*



Fig. 4: Comb weed *Plocamium cartilagineum* from the low shore. (Photo: Paul Brazier)

*vulgata* (5/m<sup>2</sup>). Small *G. umbilicalis* nestle in the *S. alveolata* reef with tufts of hairy sand weed *Cladostephus spongiosus*, filamentous band weed *Ceramium virgatum* and black siphon weed *Polysiphonia fucoidea*. Deep thin rockpools have dahlia anemone *Urticina felina* and snakelocks anemone *Anemonia sulcata* in the sediment at the bottom, with a varied algal flora including black scour weed *Ahnfeltia plicata*, *C. ramosa* and spirorbid polychaete worms on *C. officinalis*. Here, the finer points of differentiating two prawn species, common

prawn *Palaemon serratus* and rockpool shrimp *Palaemon elegans* were discussed. Occasional sprat *Sprattus sprattus* were stranded in rockpools close to the sediment areas, reflecting the recent occurrence of strands of prey fish along the length of mid Wales (Figure 5). The orange sponge *Hymeniacidon perleve* is mixed in with the sandy concretions



Fig. 5: Sprat *Sprattus sprattus* washed up onto the shore. (Photo: Paul Brazier)

of dead and live *S. alveolata* reef. Under the low shore furoid canopy is a dense turf of pepper dulse *Osmundea pinnatifida* with epiphytic *C. virgatum*. Along the sandy border to the north of the bedrock platform, the habitat is dominated by sand binder weed *Rhodothamniella floridula* with slender wart weed *Gracilaria gracilis*, net weed *Dictyota dichotoma*, false carrageen *Mastocarpus stellatus*, Norwegian fan weed *Gymnogongrus crenulatus*, *U. lactuca*, *C. spongiosus* and *Ceramium* sp. The *D. dichotoma* here is the twisted or spiraled form, often confused with spiraled net weed *D. spiralis* (now known to be a southern species rarely recorded in Britain and Ireland). The green filamentous seaweed here, *Cladophora hutchinsiae*, was the same as that found in similar sandy habitats at Aberystwyth. Here, a collection of amphipods



Fig. 6: *Pariambus typicus*, 2 mm across, from sand influenced seaweeds at Borth. (Photo: Grant Rowe)

was identified as the rockpool amphipod *Apherusa jurinei* (Figure 6), a species that is typically found amongst marine algae.

### Aberystwyth marina

The marina at Aberystwyth has been dredged out of the lower mesotidal estuary of the Afon Rheidol, where the salinity typically remains low, due to the dominance of the freshwater flowing into the estuary. The salinity was measured as 12 salinity units at the seaward end of the marina. The growth on the pontoons and stanchions reflected this highly variable salinity, which probably drops close to zero at low water. All pontoons were covered, below the waterline, by an assortment of very fine filamentous green, brown and red algae. Of these, gutweed *Ulva intestinalis* was identifiable, and very dense purple brown filaments turned out to be non-branching red filaments c. 15 µm wide. A number of stanchions had sparse Australian barnacles *Austrominius modestus* and close to the bottom, spiral wrack *Fucus spiralis* was noted. Overhanging ropes were colonised by numerous individuals of the amphipod *Gammarus zaddachi*, a species known to live in low salinity brackish environments. The next nearest record of *G. zaddachi* (from the NBN Gateway) is from the Dyfi upper estuary west of Machynlleth from 1940 – this species appears under-recorded. Interestingly, the freshwater large amber snail *Succinea putris* was spotted by Grant Rowe amongst weeds in the marina. This air breathing snail is usually found in marshy areas and likely to have been washed downstream. There are a number of records from the mid 1980's in the NBN from Llanbadarn Fawr, some 3 miles upstream and the lower river Ystwyth. The rock armour surrounding the marina was colonised by *F. spiralis* and hornwrack *Fucus ceranoides*, although the lower shore remained submerged.

### Ystwyth estuary

The Ystwyth estuary, to the south of the town and the Rheidol estuary, drains quite early in the tidal cycle, so by midday, 2 hours before low water, just the river flow remained in the inlet, rippling over cobble 'rapids' for the lower 700 m, before entering the lower harbour at Aberystwyth (Figure 7). The river was diverted



Fig. 7: Looking south along the Ystwyth estuary. (Photo: Paul Brazier)

to meet the Rheidol at the seaward end of the harbor in the eighteenth century. Dense green gutweed *Ulva intestinalis* covered the cobbles for 500 m from the estuary mouth, with dense hornwrack *Fucus ceranoides* in the lower 240 m, thinning towards the upper limit. Nearest the estuary mouth, spiral wrack *Fucus spiralis* was possibly distinguishable, but with sporophytes absent, could not be confirmed. Here sparse Australian barnacles *Austrominius modestus* and gammarid amphipods were also present. A caddis fly larva attached to the underside of a cobble at approximately 500 m from the mouth suggests that there is little marine influence at this point. A sample of the green algae was identified as *U. intestinalis*, but a more thorough search may have revealed other green algal species inter-mixed. A search for bryozoans and other species under the cobbles turned up no further species. During the winter storms of early 2015, the storm beach was rolled back, increasing the likelihood of a breach of the beach here. Cobbles and boulders were re-instated in places, but erosion of the Ystwyth river bank, reducing the width of the beach, is ongoing to the north of the existing concrete defences, which have moved the erosion point downstream by 50–100 m.

Further images can be found on the PMNHS Facebook page (<https://www.facebook.com/groups/190053525989/>).

Species Name	Authority	Aberystwyth, College	Rocks upper	Aberystwyth, College rocks	Aberystwyth, College rocks (lower)	Borth, South rocks (upper)	Borth, South rocks (mid)	Borth, South rocks (low)	Borth, South rocks sand	adj rocks	Borth, South rocks sand	Aberystwyth marina	Ystwyth estuary	Specimen or Photo available
<b>PORIFERA</b>														
<i>Sycon ciliatum</i>	(Fabricius, 1780)							R						
<i>Grantia compressa</i>	(Fabricius, 1780)							R						
<i>Halichondria (Halichondria) panicea</i>	(Pallas, 1766)			R				O						
<i>Hymeniacidon perlevis</i>	(Montagu, 1814)			O			R	F						
<i>Ophilitaspongia papilla</i>	Bowerbank, 1866			R				O						
<i>Clathria (Microciona)</i>	Bowerbank, 1862							R						
<i>Halisarca dujardinii</i>	Johnston, 1842							R						
<b>CNIDARIA</b>														
<i>Dynamena pumila</i>	(Linnaeus, 1758)	O		O			F							P
<i>Obelia geniculata</i>	(Linnaeus, 1758)			R										
<i>Actinia equina</i>	(Linnaeus, 1758)	F	R	R	O		O	O						P
<i>Actinia fragacea</i>	Tugwell, 1856		R					O						P
<i>Anemonia sulcata</i>	(Pennant, 1777)		O				O	F						
<i>Urticina felina</i>	(Linnaeus, 1761)							O						
<i>Metridium dianthus</i>	(Ellis, 1768)						R							
<b>PLATYHELMINTHES</b>													C	
<b>NEMERTEA</b>				P										
<b>ANNELIDA</b>														
<i>Eulalia viridis</i>	(Linnaeus, 1767)	O		O	O									
<i>Glycera tridactyla</i>	Schmarda, 1861			P										
<i>Sabellaria alveolata</i>	(Linnaeus, 1767)		R	C			C	A	O					P
<i>Lanice conchilega</i>	(Pallas, 1766)			R										
<i>Spirobranchus</i>	Blainville, 1818		F	F	F		F	O						
<i>Spirorbinae</i>	Chamberlin, 1919		F	O				F						
<b>ARTHROPODA</b>														
<i>Verruca stroemia</i>	(O.F. Müller, 1776)		R					R						
<i>Cithamalus montagui</i>	Southward, 1976	A		O		F	F							P
<i>Cithamalus stellatus</i>	(Poli, 1791)	O				R	O							

Table 2: Species list from all sites visited during the Aberystwyth field trip

Species Name	Authority	Aberystwyth, College	Rocks upper	Aberystwyth, College rocks	College rocks pool	Aberystwyth, College rocks (lower)	Borth, South rocks (upper)	Borth, south rocks (mid)	Borth, south rocks (low)	Borth, south rocks sand adj rocks	Borth, south rocks sand	Aberystwyth marina	Ystwyth estuary	Specimen or Photo available
<i>Semibalanus balanoides</i>	(Linnaeus, 1767)	0	0	C		C		C	A					
<i>Austrominius modestus</i>	(Darwin, 1854)	R				F		R				0	N	
<i>Apherusa jurinei</i>	(Milne Edwards, 1830)								P					
<i>Calliopiopsis laeviusculus</i>	(Krøyer, 1838)			P										
Gammaidae	Leach, 1814												0	
<i>Gammarus zaddachi</i>	Sexton, 1912											0		
<i>Melita hergensis</i>	Reid, 1939			P										
<i>Pariambus typicus</i>	(Krøyer, 1884)								P					
<i>Idotea granulosa</i>	Rathke, 1843			R				R						P
<i>Palaemon elegans</i>	Rathke, 1837	0	F	0				0	F					P
<i>Palaemon serratus</i>	(Pennant, 1777)								R		R			
<i>Hippolyte varians</i>	Leach, 1814 [in Leach, 1813-1814]			P										
<i>Crangon crangon</i>	(Linnaeus, 1758)										R			
<i>Pagurus bernhardus</i>	(Linnaeus, 1758)		0											P
<i>Pisidia longicornis</i>	(Linnaeus, 1767)								R					
<i>Porcellana platycheles</i>	(Pennant, 1777)		0	F										P
<i>Cancer pagurus</i>	Linnaeus, 1758			0					0					
<i>Necora puber</i>	(Linnaeus, 1767)		0	R										
<i>Carcinus maenas</i>	(Linnaeus, 1758)		R	0				0	R					P
<i>Pilumnus hirtellus</i>	(Linnaeus, 1761)			R				R						P
<b>MOLLUSCA</b>														
<i>Lepidochitona cinerea</i>	(Linnaeus, 1767)		0	0				0						P
<i>Acanthochitona crinita</i>	(Pennant, 1777)			0					R					P
<i>Testudinalia testudinalis</i>	(O. F. Müller, 1776)			R										
<i>Patella depressa</i>	Pennant, 1777			0				R						P
<i>Patella ulyssiponensis</i>	Gmelin, 1791		F	F				R	F					
<i>Patella vulgata</i>	Linnaeus, 1758	0	0	A		R		C	C					P
<i>Patella pellucida</i>	Linnaeus, 1758			0					R					P
<i>Phorcus lineatus</i>	(da Costa, 1778)	F				F								
<i>Gibbula cineraria</i>	(Linnaeus, 1758)		0	0					R					

Table 2 (cont.): Species list from all sites visited during the Aberystwyth field trip

Species Name	Authority	Aberystwyth, College upper	Aberystwyth, College rocks	Aberystwyth, College pool	Aberystwyth, (lower)	Borth, South rocks (upper)	Borth, south rocks (mid)	Borth, south rocks (low)	Borth, south rocks sand	Borth, south adj rocks	Borth, south rocks sand	Aberystwyth marina	Ystwyth estuary	Specimen or Photo available
<i>Gibbula umbilicalis</i>	(da Costa, 1778)			0	C	R	F	0						
<i>Littorina littorea</i>	(Linnaeus, 1758)	0	C		0	R	A	0						
<i>Melanthapha neritoides</i>	(Linnaeus, 1758)					F								
<i>Littorina obtusata</i>	(Linnaeus, 1758)				0			0						
<i>Littorina saxatilis</i>	(Olivier, 1792)	F				C								
<i>Rissoa parva</i>	(da Costa, 1778)				R									
<i>Succinea putris</i>	(Linnaeus 1758)								P					
<i>Nucella lapillus</i>	(Linnaeus, 1758)				F		0	F						
<i>Buccinum undatum</i>	Linnaeus, 1758										R			
<i>Tritia incrassata</i>	(Strøm, 1768)		0											
<i>Mytilus edulis</i>	Linnaeus, 1758	0	R		R			R						
Anomiidae	Rafinesque, 1815						0							
<b>BRYOZOA</b>														
Bryozoa (enc)			0		0			0						
<i>Alcyonidium</i> (on rock)	J.V.F.Lamouroux, 1813							R						
<i>Flustrellidra hispida</i>	(O. Fabricius, 1780)				0			0						
<i>Amathia lendigera</i>	(Linnaeus, 1758)						R							
<i>Membranipora membranacea</i>	(Linnaeus, 1767)							R						
<i>Electra pilosa</i>	(Linnaeus, 1767)				0		R	F						
<b>ECHINODERMATA</b>														
<i>Asterina gibbosa</i>	(Pennant, 1777)		0	R										P
<i>Asterias rubens</i>	Linnaeus, 1758							0						
<i>Amphipholis squamata</i>	(Delle Chiaje, 1828)				R									
<b>PISCES</b>														
<i>Ciliata mustela</i>	(Linnaeus, 1758)						R							
<i>Atherina presbyter</i>	Cuvier, 1829						F							P
<i>Lipophrys pholis</i>	(Linnaeus, 1758)		0				R							P
<i>Pholis gunnellus</i>	(Linnaeus, 1758)		R											
<i>Crystalllogobius linearis</i>	(Düben, 1845)		0											
<i>Gobiusculus flavescens</i>	(Fabricius, 1779)		R											P

Table 2 (cont.): Species list from all sites visited during the Aberystwyth field trip

Species Name	Authority	Aberystwyth, College upper	Aberystwyth, College rocks	Aberystwyth, College rocks (lower)	Borth, South rocks (upper)	Borth, South rocks (mid)	Borth, South rocks (low)	Borth, South rocks sand	Borth, South rocks sand	Aberystwyth marina	Ystwyth estuary	Specimen or Photo available
<b>RHODOPHYTA</b>												
<i>Rhodophyta</i> (fil)	Wettstein, 1901									C		
<i>Porphyra purpurea</i>	(Roth) C. Agardh, 1824							F				
<i>Porphyra umbilicalis</i>	Kützinger, 1843			O	O							
<i>Rhodothamniella floridula</i>	(Dillwyn) Feldmann, 1978					O			O			
<i>Palmaria palmata</i>	(Linnaeus) Weber & Mohr, 1805			F			O					
<i>Dilsea cariosa</i>	(Schmidel) Kuntze, 1898			R								
Corallinaceae (enc)	Lamouroux, 1812		O	A	R	F	F					
<i>Corallina caespitosa</i>	R.H. Walker, J. Brodie & L.M. Irvine, 2009	O	O	C		F	F					
<i>Corallina officinalis</i>	Linnaeus, 1758		F	F		F	C					
<i>Gracilaria gracilis</i>	(Stackhouse) M. Steentoft, L.M. Irvine & W.F. Farnham, 1995			R		O		F				S
<i>Ahnfeltia plicata</i>	(Hudson) E.M. Fries, 1836		R			O						
<i>Gymnogongrus crenulatus</i>	(Turner) J. Agardh, 1851						O			R		P
<i>Phyllophora pseudoceranoides</i>	(S.G. Gmelin) Newroth & A.R.A. Taylor, 1971			O			O					S
<i>Mastocarpus stellatus</i>	(Stackhouse) Guiry, 1984			A				F				
<i>Chondrus crispus</i>	Stackhouse, 1797		F	O			F					
<i>Polyides rotunda</i>	(Hudson) Gaillon, 1828					R						
<i>Plocamium cartilagineum</i>	(Linnaeus) P.S. Dixon, 1967			O			R					S
<i>Furcellaria lumbricalis</i>	(Hudson) J.V. Lamouroux, 1813					R						
<i>Catenella caespitosa</i>	(Withering) L.M. Irvine, 1976	R										
<i>Cystoclonium purpureum</i>	(Hudson) Batters, 1902			R								
<i>Lomentaria articulata</i>	(Hudson) Lyngbye, 1819			F			O					
<i>Callithamnion granulatatum</i>	(Ducluzeau) C. Agardh, 1828						R					P
<i>Ceramium virgatum</i>	Roth, 1797		O	F	O	F	F	F				S
<i>Cryptopleura ramosa</i>	(Hudson) L. Newton, 1931			O			O					
<i>Delesseria sanguinea</i>	(Hudson) J.V. Lamouroux, 1813						R					
<i>Membranoptera alata</i>	(Hudson) Stackhouse, 1809			O								
<i>Osmundea oederi</i>	(Gunnerus) G. Furnari, 2008			F			F					S

Table 2 (cont.): Species list from all sites visited during the Aberystwyth field trip

Species Name	Authority	Aberystwyth, College	Rocks upper	Aberystwyth, College rocks	Aberystwyth, College rocks (lower)	Borth, South rocks (upper)	Borth, South rocks (mid)	Borth, South rocks (low)	Borth, South rocks sand	adj rocks	Borth, South rocks sand	Aberystwyth marina	Ystwyth estuary	Specimen or Photo available
<i>Osmundea pinnatifida</i>	(Hudson) Stackhouse, 1809				F		0	0						
<i>Vertebrata lanosa</i>	(Linnaeus) T.A.Christensen, 1967	F			C									
<i>Polysiphonia fucoidea</i>	(Hudson) Greville, 1824			0			0	F	F					
<b>OCHROPHYTA</b>														
<i>Ralfsia verrucosa</i>	(Areschoug) Areschoug, 1845	0			C		F	F						
<i>Elachista</i>	Duby, 1830				0									
<i>Cladostephus spongiosus</i>	(Hudson) C.Agardh, 1817				0		0	0	C					
<i>Dictyota dichotoma</i>	(Hudson) J.V.Lamouroux, 1809				0			R		R				
<i>Laminaria digitata</i>	(Hudson) J.V.Lamouroux, 1813				0			0						
<i>Ascophyllum nodosum</i>	(Linnaeus) Le Jolis, 1863	F			A		0		0					
<i>Fucus ceranoides</i>	Linnaeus, 1753											F	A	S
<i>Fucus serratus</i>	Linnaeus, 1753				A			F						P
<i>Fucus spiralis</i>	Linnaeus, 1753	0				F						0	0	P
<i>Fucus vesiculosus</i>	Linnaeus, 1753				F		F							
<i>Pelvetia canaliculata</i>	(Linnaeus) Decaisne & Thuret, 1845					0								P
<b>CHLOROPHYTA</b>														
<i>Ulva compressa</i>	Linnaeus, 1753			0			0							
<i>Ulva intestinalis</i>	Linnaeus, 1753							F				C	S	
<i>Ulva lactuca</i>	Linnaeus, 1753	0		F	C	0	C	C	C					P
<i>Ulva pseudocurvata</i>	Koeman & Hoek, 1981				0									
<i>Chaetomorpha ligustica</i>	(Kützinger) Kützinger, 1849				F									
<i>Chaetomorpha melagonium</i>	(F.Weber & Mohr) Kützinger, 1845							R						P
<i>Cladophora hutchinsiae</i>	(Dillwyn) Kützinger, 1845			0			R		C					S
<i>Cladophora rupestris</i>	(Linnaeus) Kützinger, 1843	F		R	0		0	F						
<i>Codium fragile subsp. fragile</i>	(Suringar) Hariot, 1889			R										
<i>Verrucaria mucosa</i>	Wahlenberg, 1803				F			0						
<i>Lichina pygmaea</i>	(O.F.Müller) C.Agardh, 1820	R												
<i>Pyrenocollema halodytes</i>	(Nyl.) R.C. Harris, 1987					C								
<i>Anurida maritima</i>	(Guérin-Méneville, 1836)						0							

Table 2 (cont.): Species list from all sites visited during the Aberystwyth field trip

## 'Rose coral' *Pentapora foliacea* (Ellis & Solander, 1786) in Irish & UK waters

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### Abstract

The first known records of the 'rose coral' *Pentapora foliacea* were recently reported from the east coast of Ireland (Irish Sea). The specimens represented the deepest known records (123 m) for the species throughout its range. Although the apparent rarity of *P. foliacea* on the east coast of Ireland may be due to a lack of recording effort, and/or suitable habitats, and/or habitat damage, elsewhere the species appears to be widely distributed around the Irish coast, albeit in relatively shallow subtidal waters (depths <40 m).

### Introduction

During November 2013, a dead fragment of

'rose coral' *Pentapora foliacea* (Ellis & Solander, 1786) was retrieved by a demersal trawler from a depth of 108 m in the Irish Sea c. 40 km E of Howth (53° 10.131' N 05° 20.600' W), Co. Dublin. Three live specimens of the long-clawed porcelain crab *Pisidia longicornis* (Linnaeus, 1767) were found within the three dimensional 'honeycomb' framework of the heavily-calcified bryozoan colony. The specimen represents the first known record of *P. foliacea* from the east coast of Ireland (Quigley & MacGabhann 2016).

On 1 July 2016, the MFV *Atlantic Freedom* (S78) (Skipper: Mr Peter Lynch & Crewman: Mr James Brereton, Howth, Co. Dublin) retrieved another dead fragment of *P. foliacea* from a depth of 123 m while potting for whelk *Buccinum undatum* Linnaeus, 1758 in the Irish Sea E of Howth (53° 18.784' N 05° 22.043' W), Co. Dublin. The maximum width and height of the specimen was 78 mm and 95 mm respectively (Figure 1). The specimen represents the second record of *P. foliacea* from the east coast of Ireland and the deepest known record for the species throughout its range.



Fig. 1: Rose Coral *Pentapora foliacea* retrieved by the MFV *Atlantic Freedom*

## Taxonomy

There is continuing disagreement about whether *P. foliacea* and *Pentapora fascialis* (Pallas, 1766) are separate species, with the majority of the more recent work, up until Lombardi *et al.* (2010), tending to regard *P. foliacea* as a junior synonym of *P. fascialis* (*Pentapora fascialis* var. *foliacea* (Ellis & Solander, 1786)). However, Lombardi *et al.* (2010) again split the two species pending the results of molecular analysis, which is currently being undertaken. Preliminary genetic results suggest that the current species split should be retained (Spencer Jones pers. comm.). According to Hayward & Ryland (1979), *P. fascialis* is not found in British waters. However, for the purpose of the current review, all Irish and UK records referring to *P. foliacea*, *P. fascialis*, *P. fascialis* var. *foliacea*, *Eschara foliacea* Linnaeus, 1758, *Eschara fascialis* Pallas, 1766 and *Lepralia foliacea* (Ellis & Solander, 1786) were regarded as synonymous.

## Distribution

According to Lombardi *et al.* (2010), *P. foliacea* is distributed in the north-eastern Atlantic southwards from St. Kilda (NW Scotland) and the English Channel as far east as Hastings to the coast of Morocco. However, the species appears to be rare in the North Sea. Referring to one 19th century record from deep water off Embleton Bay (Alder 1856), Foster-Smith (2000) remarked that *P. foliacea* is rare in the Cullercoats District, North Shields, UK (E North Sea) and noted that there were no recent records. There are two undated records (as *L. foliacea*) on the GBIF database from the eastern North Sea off Belgium (54.16° N 02.70° E) [<http://www.gbif.org/occurrence/22221091>] and Holland (54.00° N 04.00° E) [<http://www.gbif.org/occurrence/22221092>]. Although *P. foliacea* is widely distributed on the UK side of the Irish Sea (Lomas 1886; Hayward & Ryland 1979; Pätzold *et al.* 1987; Bunker & Mercier 1988), including the Isle of Man (Bruce *et al.* 1963; Hanley *et al.* 2012), and in the English Channel (Powell 2014), it is unclear whether or not the apparent rarity of the species on the east coast of Ireland, and its relative

frequency on other parts of the Irish coast, is due to a lack of recording effort, suitable habitats, and/or habitat destruction (Quigley & MacGabhann 2016).

Hayward & Ryland (1979) suggested that reports of *P. foliacea* from outside the NE Atlantic were doubtful. Mediterranean occurrences, which are seldom adequately described in the literature, require re-assessment in view of the close similarities between *P. foliacea* and *P. fascialis*. Hincks (1880) noted that a variety of *E. foliacea* (var. a) had been reported from the southern hemisphere, including the Cape of Good Hope (South Africa) and the Indian Ocean and Robertson (1900) reported *L. foliacea* from Juneau (Alaska) during 1899. It is interesting to note that *P. foliacea* was recently reported from Alaska: on 12 August 1982, three specimens were retrieved from a depth of 31 m, NE of Cape Leontovich (55.96667° N 161.8° E). The specimens are in the collections of the California Academy of Sciences (CAS Invertebrate Zoology; Cat. No. IZ 27529; Field No. B-34 (T8-30)) [<http://www.gbif.org/occurrence/609395439>] but their identity may be erroneous (Piotrowski pers. comm.). A fossil specimen [<http://www.gbif.org/occurrence/418879208>] (as *E. fascialis*) from Newfoundland (Françoise Bigey pers. comm.) is in the collections of the Muséum national d'Histoire naturelle, Paris (MNHN: A15258). Lombardi *et al.* (2014) noted that live specimens of *P. fascialis* matching those found in the Mediterranean had reputedly been reported from South Australia and suggested that if the provenance was correct, the records would represent a distant geographical outlier, likely to have resulted from an anthropogenic introduction of the species.

## Habitat and Depth

According to Hayward & Ryland (1979), *P. foliacea* is essentially a sublittoral species, found below the edge of the kelp forest, although small colonies may be collected from *Laminaria* holdfasts. Off Lundy (Bristol Channel, UK) it is most common below 18 m, and is abundant between 25–34 m. On rocky, current swept bottoms it is often a conspicuously predominant part of the benthos, growing attached to stones and

boulders or on vertical rock faces: a frequency of one colony per m<sup>2</sup> over large areas is quite usual. Although the vast majority of specimens recorded from Irish waters were observed by SCUBA divers at a mean depth of 20 m (range 0.8–43.9 m), very little is known about the current distribution and abundance of *P. foliacea* in deeper water (Quigley & MacGabhann 2016).

Although Couch (1844) referred to an exceptionally large specimen (as *E. foliacea*) with a circumference exceeding 200 cm and a depth of 30 cm which was hooked up by a fisherman off the Eddystone (Cornwall) during the autumn of 1843, Hayward & Ryland (1979) remarked that the fragile colonies of *P. foliacea* are usually broken when dredged, so it is likely that fragments retrieved by demersal trawls and other types of commercial fishing gear from depths beyond the sublittoral may go unnoticed. Nevertheless, the species has been recorded, albeit occasionally, at depths beyond the normal maximum range of SCUBA diving. For example, the current specimens from the Irish Sea were taken at a maximum depth of 123 m. During 1869, Andrews (1870) obtained a specimen in a dredge at a depth of 70–80 m off Barrack Rock, outer Dingle Bay, Co. Kerry. During July 2010, Scally *et al.* (2010) observed the species using a drop down video at a depth of 58.5–68.0 m off Annagh Head, Co. Mayo (F625350). On 25 August 1983, a specimen was reported from a depth of 96 m in the SE Irish Sea (52.165° N 05.501° W) between Tuskar Rock (Co. Wexford) and Wooltack Point (Skomer, Wales) [<http://www.gbif.org/occurrence/24626183>]. Alder (1856) reported the species from deep water off Embleton Bay (North Shields, UK) in the North Sea. Lombardi *et al.* (2014) examined specimens that had been retrieved from a depth of 60 m off Eddystone Lighthouse (Cornwall, UK) and growing on a cable, at a depth of 120–140 m, 96 km W of Brest (France).

#### Associated fauna and flora

Wood *et al.* (2012) and Lombardi *et al.* (2014) noted that large bryozoans provide complex habitats for diverse associated assemblages, particularly for other bryozoans, molluscs,

annelids, arthropods, cnidarians, sponges, echinoderms and macroalgae. Andrews (1878) previously discovered young stages of *P. longicornis* (as *Porcellana longicornis* Linnaeus, 1767) in the cavities of *E. foliacea* in Dingle Bay, Co. Kerry. Wood (1988) noted that many small hydroids grow attached to *P. foliacea* and that other animals are likely to be living in the shelter of the interlocking leaves.

According to Hayward & Ryland (1979), *P. foliacea* is an important component of the benthos, modifying the environment in exposed areas and offering attachment and shelter to a great variety of motile and sedentary animals. Large colonies may shelter thousands of other animals. Certain encrusting bryozoans, such as *Amphiblestrum flemingii* (Busk, 1854), *Callopora dumerilii* (Audouin, 1826), *Membraniporella nitida* (Johnston, 1838) and *Smittoidea reticulata* (MacGillivray, 1842) are characteristically associated with *P. foliacea*. Ackers *et al.* (2007) recently reported the sponge *Hymeniacion kitchingi* (Burton, 1935) growing on *Pentapora* in Irish waters. Sharp *et al.* (2008) noted differential patterns of microbial fouling on the surface of *P. fascialis* in Welsh waters and suggested that this may be due to the production of novel antimicrobial compounds by the bryozoan which may yet prove to be useful agents for preventing microbial fouling on abiotic surfaces in the marine environment.

#### Potential threats

Due to their fragile nature, habitat-forming bryozoans such as *P. foliacea* face a wide variety of threats, both naturally occurring and anthropogenic (Wood *et al.* 2012). They are vulnerable to damage caused by shifting sands, storms and low salinity caused by submarine freshwater springs and are particularly susceptible to pollution, demersal fishing activities (MacDonald *et al.* 1996; Kaiser *et al.* 1996; Eno *et al.* 2001; Sewell *et al.* 2007; Wood *et al.* 2012) and, in some cases, SCUBA diving (Sala *et al.* 1996).

The coastal waters surrounding Britain and Ireland became warmer during the 20th century and, according to the UK Climate Impact Programme 2002 scenarios of change and other sources, average annual seawater

temperatures may rise a further 2° C or more by the 2050s. Consequently, several southern benthic species, including *P. fascialis*, which currently occur at or near the northern limits of their distribution in Irish and UK waters are likely to increase in abundance as a result of warming seas (Hiscock *et al.* 2004, Boelens *et al.* 2005).

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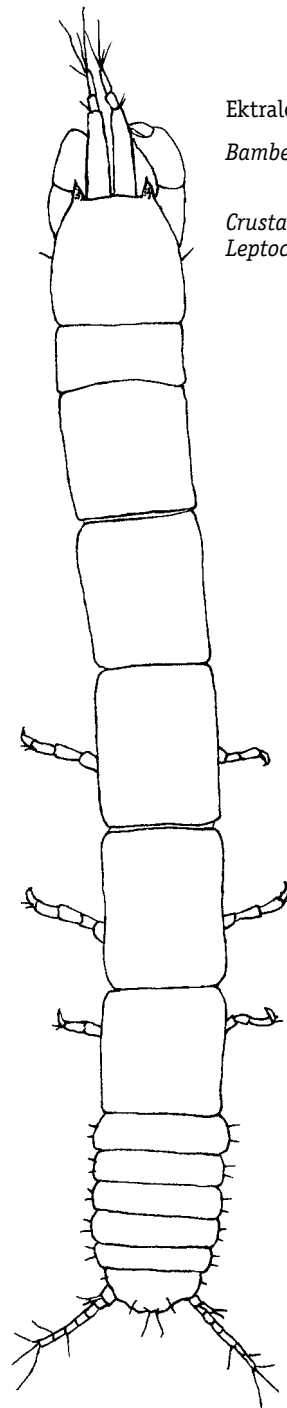
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*Ektraleptochelia phoxops*  
Bamber & Marshall, 2015

Crustacea: Tanaidacea:  
Leptocheliidae

Roger Bamber

One of four new species of Leptocheliidae described by Roger Bamber, former Porcupine Editor, from sublittoral sandy substrata in the South China Sea, off the coast of Brunei; the species also represented a new genus. The generic name was derived from the Greek ektrapelos meaning strange, combined with Leptochelia and the specific from the Greek phoxos – pointed, and ops – eye.

## “Ocean sprawl” and the World Harbour Project’s response

Katie O’Shaughnessy



Many of us live along the coast or visit the seaside regularly but few of us take note of the proliferation of man-made sea defence structures such as seawalls, breakwaters, and groynes protecting us from the sea – a condition recently termed ‘ocean sprawl’ (Duarte *et al.*, 2013; Firth *et al.*, 2016). While these structures do provide a clear service to humans, there are negative consequences for the natural environment. We often forget that before humans began to alter their surroundings, natural habitats, such as rocky shores and sandy beaches, were abundant, and supported a biodiverse assemblage of flora and fauna. However, due to rising sea level coupled with intense urbanisation of our coastlines, humans have been faced with the reality that coastal infrastructure may disappear within decades if not actively protected from the sea. The resulting action has been the drastic and prolific ‘armouring’ (construction of man-made sea defence structures such as seawalls and breakwaters) of coastlines and subsequent deterioration of natural habitats. Such habitat loss is generally considered negative, as man-made structures function differently and do not support equivalent biological communities compared to natural substrata. There is a way, however, to enhance these man-made structures to achieve ecologically-beneficial outcomes and mitigate the negative impacts of artificial structures in the marine environment – ecological engineering.

Ecological engineering (or eco-engineering) encompasses a wide range of options for design and management of artificial structures to support biodiverse communities and provide desirable ecosystem services such as improved water quality and provision of habitat and food to enhance fisheries. Designs have included drilling pits in breakwaters to mimic natural rock pools; attaching large flower pots that

retain water to flat seawalls to support species such as opisthobranchs and urchins; and transplanting natural habitat-forming species such as bivalves and macroalgae onto artificial structures to increase native biodiversity.

In response to ‘ocean sprawl’, the World Harbour Project (WHP; [www.worldharbourproject.org](http://www.worldharbourproject.org)) was created with an overall aim to develop ecologically resilient urban harbours through a collaboration of international researchers. Plymouth University was invited to be part of the WHP’s ‘green engineering’ team whose aim is to investigate effective materials and designs for the eco-engineering of severely urbanised harbours. The ‘green engineering’ experiments are conducted with similar materials and methods in 15 cities across the globe so that results can be compared.

In August 2016, Dr Louise Firth and I led a team of researchers, technicians and volunteers in setting up the WHP tile experiment at two locations in Plymouth Sound. Methods included use of ‘eco-friendly’ tiles (sand cement + glass fibres; 25 x 25 cm) of different levels of complexity (flat, 2.5 cm high, 5.0 cm high) seeded with the native blue mussel, *Mytilus edulis* Linnaeus, 1758 (Figure 1). All experimental tiles (n = 30) were affixed to vertical and featureless seawalls (n = 2), and adjacent plots along the seawall were cleared for controls (Figure 2). The experiment will run for 12 months during which we will collect monthly recruitment data. The objectives are to determine whether eco-engineering techniques can enhance native biodiversity and reduce non-native species on artificial structures in Plymouth Sound.

Our goal is to make Plymouth a major player in eco-engineering research and produce results that will ultimately contribute to management decisions and changes in policy. Although many more trials with consistent results tested over a range of habitats are needed to drive major changes in the engineering of coastal defence structures, by implementing the WHP tile experiment, we have already made huge strides in introducing ecological engineering concepts to the Plymouth community.



*Fig. 1: Seeded and unseeded tiles of varying complexity*

*Fig. 2: Tiles deployed on a seawall in Plymouth Sound*



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## Seasearch seaweed ID course July 2016

Richie West

I must admit that I have been one of those SCUBA divers who has found it hard to love seaweed. My Seasearch surveyor forms have been bursting with the names of animal species, with the algae section populated by only a handful of familiar favourites. The empty seaweed spaces have mostly served as overflow for records from the more photogenic animal kingdom. Given that my British survey dives have been resplendent with swaying kelp forests and shelves of red fluffy stuff, it was definitely beyond time to brush up on my seaweed ID skills. When a seaweed ID course was first touted by Kate Lock, our fabulous Seasearch Co-ordinator in SW Wales, mine was one of the early names on the list.

On a typically Welsh chilly and wet July morning, I poked my head around the door of Marloes Village Hall in Pembrokeshire to meet a sea of eager faces. Some were familiar from dive weekends and others were new, having travelled from as far as Lowestoft and Scotland. Most were nursing their second or third intakes of caffeine. Anne Bunker and Kate, our weekend guides through the algae

fields, were very appropriately dressed for the subject matter if not the weather conditions. Kate was wearing a green jumper with red jeans and Anne was sporting what I can only assume were a custom-made pair of fantastic but flimsy looking seaweed print shorts, a red top and a fetching and much needed red cardigan. Both were looking eager to get started, so it was time for me to find a seat and join the class.

First up were a series of presentations. We discovered that kelp have a microscopic sex life and that one of my familiar favourites, *Laminaria hyperborea*, has growth rings like a tree. Another old friend *Laminaria digitata* stores sodium glutamate and could therefore provide a tasty snack on a long safety stop. We also learned that the Dalai *Laminaria ochroleuca* not only has a golden aura but also provides a happy home for an abundance of hungry vegetarians. What I thought was all either *Ulva lactuca* or *intestinalis* could in fact be many different species and at a push, several of the red seaweed species could give my hair some added shine and bounce if I ever found myself stranded on a deserted Hebridean island.

Armed with enough facts for an expedition with Bear Grylls or Ray Mears, we were ready to tackle the buckets of seaweed samples which Anne and Kate had collected for us to examine. A small library of algae field guides



Fig. 1: Hard at work in Marloes Village Hall



Fig. 2: First identification attempts

was illuminated and explained, together with some more very useful information on seaweed features and identification tips. Before long we were all rummaging through the samples and gently teasing individual plants out onto cartridge paper, poring over the ID guides attempting to work out what was what (Figure 1). Kate and Anne passed around the group, nudging us gently in the right direction to identify the algae (Figure 2) and pointing out their key identification features.

Kate returned after lunch not, as it initially appeared, with a pack of wet wipes for us all to wipe away the residue of our sandwiches but with a packet of nappy liners. Carrying on the Victorian tradition of creating an herbarium (when I'm sure that more rudimentary protective layers had to suffice), we were provided with a demonstration on how to display, press and preserve our seaweed samples with a protective cover to keep the samples in good condition, between a few sheets of newspaper to soak up the moisture (Figure 3). We set to work on presenting a decent range of different algae species, marking each with

dates and locations collected and Latin names along with our own. The herbarium pages were passed forward to be sandwiched between nappy liners and newspapers and appropriately squeezed for at least 24 hours beneath the



Fig. 3: Pressing seaweeds with nappy liners

We spent the afternoon pressing the samples we had collected earlier that day, adding their

Many thanks to Kate Lock and Anne Bunker for giving up their time to provide us with such a fun and informative weekend and for giving us a new toolbox of ID skills to make my diving even more meaningful in future. For anyone unfamiliar with the amazing and worthy world of Seasearch survey diving, more information can be found online at [www.seasearch.org.uk](http://www.seasearch.org.uk).

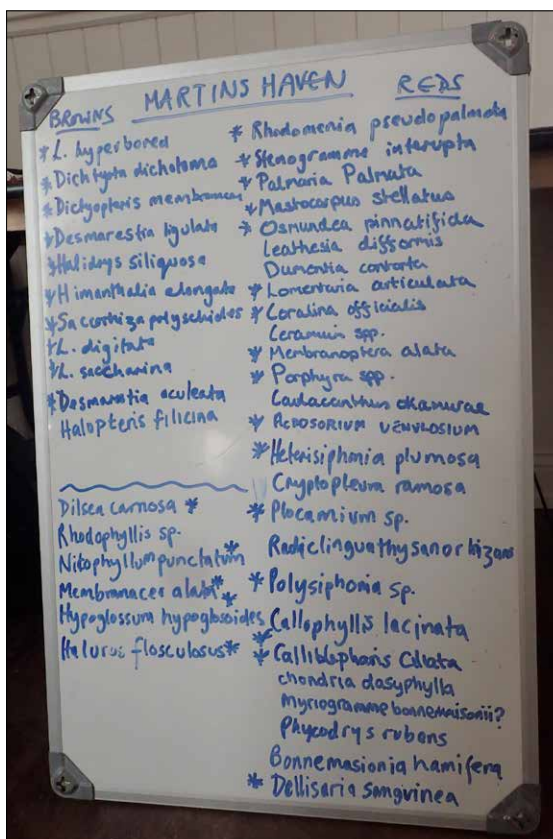


Fig. 4: Final species list

## Diving the exposed cliffs of Orkney

Penny Martin

After a frustrating summer with two RIBS out of action and few opportunities for diving, we were blessed with a period of calm settled weather during September and October.

I was keen to see jewel anemones (right) so we headed out along the craggy shoreline of the west coast washed by the heavy breakers of the Atlantic Ocean.

Our destination was the exposed Noup Head on Westray, one of the northernmost Orkney islands. The sea was glassy smooth for the 45 minute boat trip and we were guided by many of the gannets who nest on the cliffs.

We entered the water in the skerries just below Noup Head Lighthouse to the wreck of a fishing boat named *Tomalina*, which ran aground in the late 1980's. The boat lies flattened by the force of the seas against the walls of a narrow gully that plunges to 30 m.

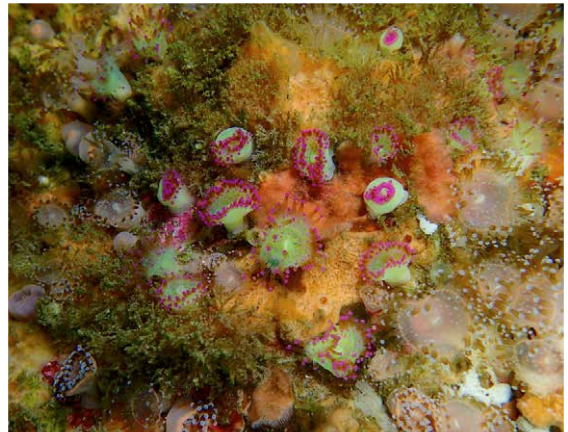
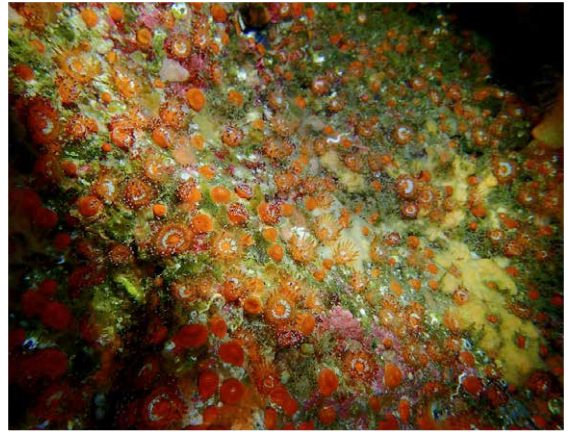
The whole wreck and surrounding rocks are covered with a thick turf of sponges, squirts, hydroids, bryozoans, feather stars, brittle stars, dead man's fingers and cup corals. All are studded profusely with white and yellow *Actinothoe sphyrrodeta* anemones, the pinks, greens and oranges of *Corynactis viridis* and stripy *Urticina felina* and *Sagartia* sp.

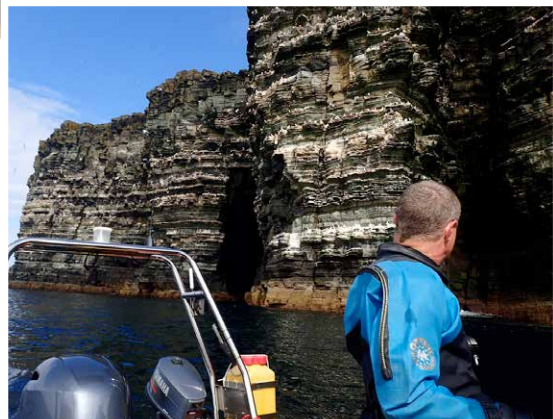
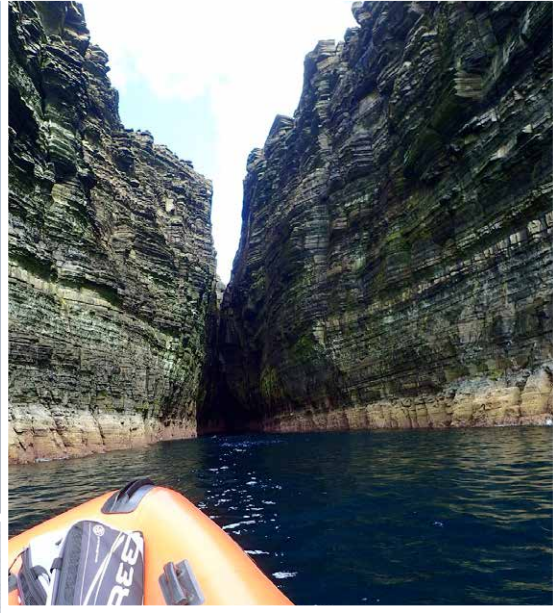
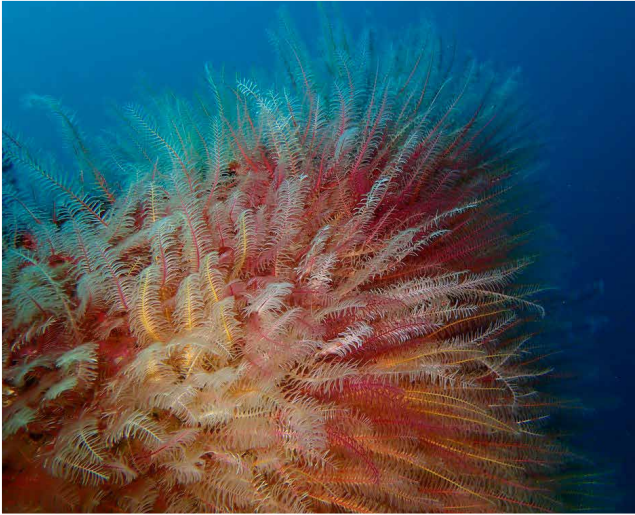
Visibility was more than 25m and lots of fish, crabs, several lobsters, squat lobsters and a few curious seals were encountered during the dive.

Our second dive was at the foot of the cliffs which are topped by the lighthouse. The sheer rock wall continued down to approximately 40 m in depth with arches, gullies and geos. It was covered with the same amazingly vibrant coloured turf as we had seen on the wreck when lit up by our torches.

On other occasions we have also dived the cliffs on the west side of Rousay and Birsay. They are also full of life as shown in the photos.

It has been a real eye opener to see that so much incredible marine life survives on the exposed cliffs that spend much of their time being pounded by big breakers and very strong swells. We are already planning to spend much more time diving the miles of cliffs when the weather conditions allow.





## Winners of the 2016 UK Awards for Biological Recording and Information Sharing

Purba Choudhury



The winners of the second UK Awards for Biological Recording and Information Sharing were announced at the National Museums Scotland in Edinburgh during an evening ceremony on Thursday 17 November 2016.

These awards have been developed by the National Biodiversity Network, the National Forum for Biological Recording and the Biological Records Centre and are sponsored by Swarovski Optik UK. Their intention is to recognise and celebrate the outstanding contributions made to biological recording by adults and young people, which is helping to improve our understanding of the UK's wildlife.

Chris Wood was the 2016 winner of the David Robertson adult award for recording marine and coastal wildlife. Chris co-ordinated the UK-wide Seasearch programme since its launch in 2003 until September 2016 when he retired. Seasearch is an underwater biological recording scheme that involves training recreational divers in marine identification and recording, running dedicated surveys and ensuring the data contributes to national datasets.

Over the past 14 years, Chris has overseen or directly contributed to an incredible range of achievements:

- Seasearch volunteer divers have undertaken 17,000 survey dives;
- 505,000 species and 59,000 habitat records input to the NBN Gateway;
- over 600 Seasearch courses;
- 750 qualified Seasearch divers;
- author of the *Guide to UK Marine Life* and *Guide to Anemones & Corals*;
- editing a series of other well-respected guides to identifying marine life.

Chris's leadership of the Seasearch programme since its launch has made a significant contribution to the UK's marine dataset and

thus knowledge of marine life, to increasing the identification and recording skills of hundreds of volunteer divers and to the conservation of the UK's marine biodiversity.

He said "I have been fascinated by the underwater world ever since I stuck my head under it with a mask and snorkel in the Channel Islands as a ten year old. Moving on from snorkel to SCUBA was a natural progression at University and I have been diving, both in the UK and overseas, ever since. What is special about UK diving is the diversity. You can move from cold water arctic species in deep Scottish sea lochs to the southerly species in the relatively balmy south-west of England."

The David Robertson youth award is presented in honour of the Scottish naturalist David Robertson (1806–1896) who founded the University Marine Biological Station at Millport, which opened in 1897. Millport Marine Biological Station closed in 2013, but re-opened in 2014 as Millport Field Centre thanks to the Field Studies Council.

It was won by Jordan Havell, aged 14, for recording marine and coastal wildlife. Jordan has worked really hard on raising awareness of stranded mammals around the UK coastline. Two years ago he started a Facebook page 'Jordans stranded mammal campaign' (<https://www.facebook.com/Jordans-stranded-mammals-campaign-155202464888051/?fref=ts>) which has over 500 likes.

Jordan has contacted nearly every coastal council to ask that they use the British Divers Marine Life Rescue (BDMLR) poster around their areas. He has permission to use them and in January 2016 became a qualified BDMLR marine mammal medic – his young age disallows him from taking part in sea rescues but Jordan has assisted with writing notes and taking photos.

He recently completed the Royal Foundation wildlife course and is awaiting his Gold Award from the Gerald Durrell Conservation Trust. He also received a letter from Sir David Attenborough congratulating him on his marine work and encouraging him to continue and expand it as far as possible. In 2015 Jordan won a national Animal Hero Award and he also holds a John Muir Trust Award for conservation.

On receiving the David Robertson youth award Jordan said "I enjoy recording wildlife as it

gets me out on the coast on a very regular basis. I feel it's important to record what I see to help with the national databases. I want to work with marine wildlife so recording different species and marine habitats helps expand my own knowledge of understanding what is there and any changes that occur."

Gilbert White (1720–1793) is remembered in these awards because his name is synonymous with biological recording. He was one of the first English naturalists to make careful observations of his surroundings and record these observations in a systematic way. He transformed the way we look at the natural world and is recognised as one of the fathers of ecology.

Richard Comont was the winner of the Gilbert White adult award for recording terrestrial and freshwater wildlife. Richard is a dedicated biological recorder with almost 50,000 records on iRecord (a website for managing and sharing wildlife records) and more than 5,000 species recorded across 75 groups! He records more than two thousand species every year, with up to 13,000 records, mostly in his own time.

Richard co-leads the national Garden Bioblitz project with four friends, an annual event to introduce the general public to wildlife recording, and the wealth of wildlife in their own gardens which hundreds of people take part in across Britain and Ireland annually. He is also part of the UK Ladybird Survey national recording team, verifying ladybird records on iRecord and wrote the identification sections of ladybird books and charts.

His job with the Bumblebee Conservation Trust is to run two bumblebee recording schemes, BeeWalk and BeeWatch, which between them have generated over 60,000 records of some of our most charismatic but least-known species.

BeeWalk in particular is a standardised transect-walking recording scheme which has helped inspire equivalent schemes across Europe. Richard has been the only person running the scheme since 2013 and has been vital to its acceptance in the scientific community, supporting over 200 volunteers every year, identifying over 4,000 bee photos and working hard to test the validity of the scheme's assumptions.

Richard said "The main reason that I spend my spare time doing biological recording is the endless fascination of how much there is to find, even on your own doorstep. Wildlife isn't just lions and tigers and elephants, and nature isn't confined to tropical rainforests or the plains of the Serengeti, it's all around us. Biological records also have the power to inform about what's happening to our world - from the effects of the spread of the Harlequin ladybird to the impacts of global warming. They're a window into the world of wildlife for those who aren't out looking - and the best way we have of demonstrating when something needs to be done."

George Garnett (17 years old) is the winner of the Gilbert White youth award for recording terrestrial and freshwater wildlife. George has a real passion for plants and his knowledge is phenomenal. George lives on Guernsey, not the easiest of places for scientists around the world to get to, so he wants to get Guernsey herbarium digitised so others can access it. He also has his own herbarium. He is currently helping update the island checklists and curating the herbarium there. A feat for anyone, let alone a 17 year old. George is a keen photographer and posts his plant photos on Flickr with GPS data so they can be used by generations to come. His Flickr can be found here: <https://www.flickr.com/photos/131562411@N08/albums/with/72157657986001545>

He also shares his knowledge and passion on Twitter @george\_garnett and is always happy to help others with plant knowledge.

Essex Wildlife Trust River Wardens were the 2016 winners of the Lynne Farrell group award for biological recording. The award is named after Lynne Farrell, a well-respected botanical tour, expedition and field meetings leader who co-authored the first *British Red Data Book on Vascular Plants*.

Essex Wildlife Trust River Wardens are a group of around 150 volunteers, monitoring 16 river catchments in Essex. The River Wardens monitor river quality via freshwater invertebrate sampling; and take part in targeted invasive and protected species surveys to fill in gaps in our existing knowledge of the distribution of these species in Essex. In addition to this they patrol their stretch of

river regularly and report problems or any unusual activity, acting as an early warning system for potential pollution incidents and highlighting areas of improvement.

The benefits of this scheme have been far reaching. As well as contributing to the national Riversearch and Riverfly monitoring schemes, the River Wardens also work with Rivercare and other local organisations including canoe and angling clubs to promote data sharing and participation in the scheme to a wide audience that was not previously engaged with biological recording.

Essex River Wardens contributed 2,500 volunteer hours in 2015, and the scheme is continuing to grow, being set to expand to coastal areas.

Caledonian Conservation Ltd was presented the 2016 John Sawyer NBN Open Data award in recognition of the openness of the data they provide to the NBN Gateway as the datasets are all available at capture resolution under a CC-BY licence, making the data available for anyone to use for research, education and further commercial work.

This ecological consultancy provides a range of ecology and ornithology services for development and conservation in the UK. They also provide a range of environmental

education and training services, as well as wildlife and wild camping experiences.

The John Sawyer NBN Open Data Award is awarded to a member of the National Biodiversity Network who is making a valuable contribution to open biodiversity data in the UK. This award recognises and celebrates the outstanding contribution of NBN Data Partners towards achieving the NBN vision of “collecting and sharing biological data openly to educate and inform”.

Presenting the awards, Professor Michael Hassell, Chairman of the National Biodiversity Network said “The painstaking work that individual and groups of biological recorders undertake over many years is all too often not publically recognised. We wanted to correct that, and celebrate the outstanding contributions that British biological recorders have made to improving our understanding of wildlife in the UK.”

The prizes for the David Robertson awards for marine and coastal recording are sponsored by Paramo Directional Clothing. The prizes for the Gilbert White awards for terrestrial and freshwater recording are sponsored by Swarovski Optik UK, and the prize for the Lynne Farrell group award for biological recording is sponsored by the Field Studies Council.



*The winners of the 2016 UK Awards for Biological Recording and Information Sharing*

## Fishy fieldwork

Frances Dipper

Whilst there are many advantages to living near Cambridge, such as excellent pubs and the Cambridge University Library, there is one major disadvantage and that is, the sea is a long way away. So it is difficult to get an adequate number of organised 'fishy fieldwork fixes'. This is where Porcupine comes to the rescue. Porcupine field trips provide a wonderful chance to indulge in fish-watching (or crab-chasing, or seaweed-sussing or whatever your passion is). It's like going to the gym – you're much more likely to do it if others are going too. The overall aim is of course, to record species and habitats and ultimately to make those records available to all. But no-one is breathing down your neck, even though the rain may be. So there is time to peer into pools, take photos, make notes and generally indulge in good old fashioned Natural History. So here are some fishy highlights and hints.

Rock pools provide a refuge for a wide variety of small fishes and a few species are found nowhere else. But pools are by no means the only or the easiest place to find seashore fish and whilst a hand net is a useful tool, small fish are experts at hiding in cracks and crevices and under seaweeds, where they are difficult to winkle out. Whilst working on my PhD in the Isle



*A shallow off-white tray is useful for photographing netted specimens that won't stay still if released. Sea stickleback (Spinachia spinachia), Ulva September 2016.*

of Man in the seventies, I experimented with netting small wrasse from pools on the beautiful rocky shores around Port St Mary. Invariably I only caught one or two. But judicious use of a water soluble fish anaesthetic in the same pools resulted in numerous specimens. I am not recommending this as a sensible sampling technique today, but am just illustrating the fact that fish are very good at hiding. So my approach now is often simply to sit or lie next to a shallow clear pool or wade and stand still and watch. On a calm day it is surprising what comes out of hiding.

Sometimes shoals of small pelagic fish become trapped in large rock pools as the tide



*This painted goby (Pomatoschistus pictus) was stalked and photographed by standing in 30 cm of water and dipping a small compact waterproof camera under the surface (Ulva, September 2016).*



*Crystal gobies are delicate and rarely survive handling. This one was taken to the pub for a closer (and warmer) look before it, (and some Porcupines), were pickled.*

recedes. This is an excellent opportunity to sit down, have a sandwich and watch their mesmerising schooling behaviour. Crystal gobies (*Crystallogobius linearis*) and sand smelts (*Atherina presbyter*) were the finds of the day during the Porcupine Aberystwyth field trip last October. Crystal gobies are so transparent that you wonder if you have simply got spots in front of your eyes – the spots are the eyes and swim bladder which show up as dark splotches. This provides them with good camouflage when swimming around

up in the water column. The transparent goby (*Aphia minuta*) is similarly see-through but grows a little larger and has scales, unlike the naked crystal goby. 'Mackerel-midge' larvae are the tiny young of rocklings, with shiny bluish to greenish backs. They float and swim in surface waters but dense shoals are sometimes found in rock pools. Juvenile grey mullet are another possible find.

Don't neglect small pools high on the shore. Montagu's blenny (*Coryphoblennius galerita*) is regularly found in middle and upper shore



*A typical habitat for Montagu's blenny. There is one in the centre!*



*Shannies (Lipophrys pholis) can often be held in the darkness of your hand and then gently put back down and will stay still if you slowly remove your hand. Aberystwyth Pier Rocks, October 2016.*

pools especially those lined with encrusting pink coralline algae. The rare giant goby (*Gobius cobitis*) hides in high level pools in SW England, sometimes in pools so small they hardly fit.

Seaweed-covered boulders and gullies are rich hunting grounds for shore fish, especially where there is loose shell gravel or other material beneath the rocks. This retains water and allows the fish to wriggle underneath. Turn over rocks and slowly move seaweed aside in the mid- to lower shore region and you will typically find blennies, gobies, pipefish, sea snails, rocklings and clingfish. A small, short-



*Porcupines netting in the Gannel. Cornwall, 2012.*



*Juvenile sand sole (Pegusa lascaris). Note the rosette-like nostril on the underside. Cornwall, 2012.*

handled aquarium net is useful to scoop the fish up for a closer look before returning them to the same spot (how would you like to be yanked from your home and then dumped in the next town).

Sandy shores and shallows are home to many juvenile flatfish, sand eels, sand smelts and gobies, and wading along the shore line with a wide push net can be rewarding. If nothing else, you might catch enough brown shrimp for tea. Flatfish can be difficult to identify, especially small ones but at least the juveniles are small enough to put into a tray for a close examination. If you are feeling lazy then try standing with a wide push net in the downstream flow of a sandy estuary and wait for the fish to come to you.

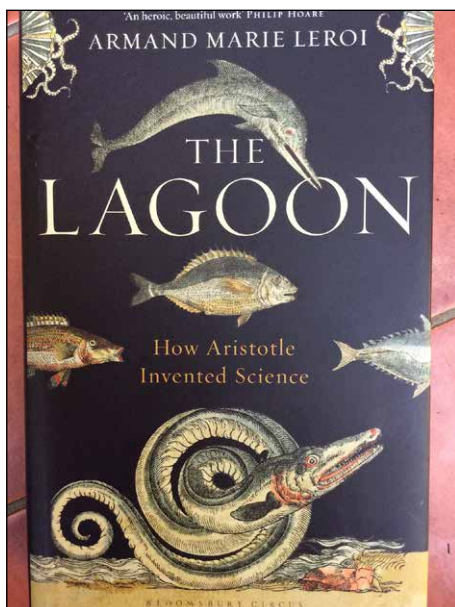
Equipment I find useful includes a kneeling/sitting pad (I got a lightweight folding pad from a shop selling walking and climbing equipment); a small off-white tray; a white bucket; short-handled aquarium net; folding walking stick (slippery rocks!) and my trusty waterproof compact camera (the only thing that costs more than a few pounds). Happy hunting.



*Lesser weeverfish (Echiichthys vipera) are nearly as prickly as Porcupines and pack a painful sting. They can be a hazard when searching through dredge, trawl and net material.*

## The Lagoon: how Aristotle invented science – Armand M. Leroi

Bloomsbury Circus, 2014  
ISBN 978 1 4088 3620 0. 501pp.



Book review by Chris Mettam  
(mettam@cardiff.ac.uk)

If you have any interest in marine natural history, you cannot help but be intrigued, and possibly puzzled, by the dust jacket of this book. The title, subtitle and decorative illustrations (chosen by the author, not the publisher) are all interesting enough but it is not immediately obvious how they interconnect. The several different fishes, the dolphin and the paper nautilus, whose tentacles dangle from the top corners (all reproduced from antique illustrations) are not the kind of creatures that we usually associate with lagoons nor, perhaps, with Aristotle. Then what of Aristotle inventing 'science' – was Aristotle truly a 'scientist', a word not coined until the nineteenth century?

We all know, or think we know, something about Aristotle: a philosopher of ancient Greece, he lived a few centuries before the Common Era (as we have learned to call it); he was a pupil of Plato and tutor of the young Alexander the Great; his writings, salvaged

and conserved by Arab scholars along with other classical works, were re-absorbed into European culture centuries later, to inspire, among others, Linnaeus in his classified inventory of the animal, vegetable and mineral kingdoms. The *Scala Naturae* became the *Systema Naturae*, elaborated and Latinized. If you consider yourself to be a malacologist or an entomologist, you are recycling Aristotle's original Greek names for creatures that we now classify as molluscs and insects.

Aristotle's less helpful legacy was his erroneous belief that all sorts of animals, from flies to fish can arise by spontaneous generation; that the heart, not the brain, is the body's supreme controller; that the world is made from four elements (earth, water, air and fire) rather than atomic particles. His views, when they were eventually adopted throughout Europe, became so authoritative and persistent, it could be argued that he did not advance science – he held it back for generations (1). How then can Aristotle be the inventor of science?

Thus the author challenges our pre-conceived notions, even before we have opened the book.

Do you wish that you could emulate C.R. Darwin, that most celebrated of all nineteenth century biologists? You have probably already done so, without knowing it. He, apparently, always intended to read Aristotle but never quite managed it – same here. It is much too daunting. Now Leroi has made it possible with this engaging and stimulating book, presenting a modern assessment of Aristotle to a modern audience. It cannot have been an easy task. If you go online for information about Aristotle, the accounts you are likely to find are stultifying beyond belief. Not so this book. It is a pacey, sometimes racy, account of the man, his works and his contemporary significance, with an emphasis on his investigations into biology – "the subject he loved most". Marine natural history plays a big part: hence the dust-jacket's design.

The book has clearly been a labour of love for its author. He has revisited Aristotle's old haunts. He has consorted with scientists, naturalists and fishermen in Aristotle's homeland as well as with scientists and philosophers worldwide (or at least with historians of philosophy) and

he brings his own sensibilities as a practising biologist (he is a Professor of Evolutionary Developmental Biology at Imperial College, London). (2)

The Lagoon? Well, that is a seawater inlet, shaped like a partly deflated balloon, that occupies the centre of the Greek island of Lesbos (3) and connects to the Mediterranean by a narrow strait, some 3.5 km long and mostly about 1 km wide. The British scholar-naturalist D.W. Thompson (he of the uniquely wonderful book, *On Growth and Form*) named it so, and located it as the place where Aristotle made his acute natural history observations and thought deep thoughts. Leroi acknowledges a great respect for Thompson and has not changed the name. But it is not what we normally call a lagoon, and its fauna consists of typical marine species that come and go.

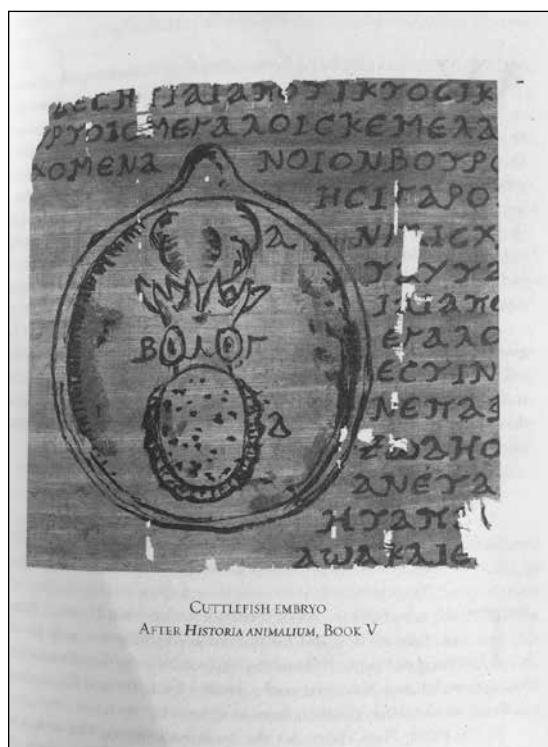
The book is structured for easy reading. There are chapters (with such mystifying titles as 'The Dolphin's Snore' and 'The Soul of the Cuttlefish') but the whole book is a sequential run of sections (numbered with Roman numerals, I to CXIV), some just a few lines long, others several pages. Each is the elaboration of a thought and a change in direction of the stream of consciousness. We are whisked along from a lyrical description of the Greek countryside to an appreciation of Aristotle's observational skills, his conceptual skills or some historical incident in his life, and back again. Each section ends on a page-turner and the next often continues with a 'But' or an 'And', so that reading becomes compulsive; hours pass and still you cannot find a place to stop. I recommend reading the 'Notes' for each one as you go. They tell you the sources of the information you have just read but also give each section an explanatory title – much more useful than just a number (4). Without it, it is sometimes difficult to know just what is being discussed.

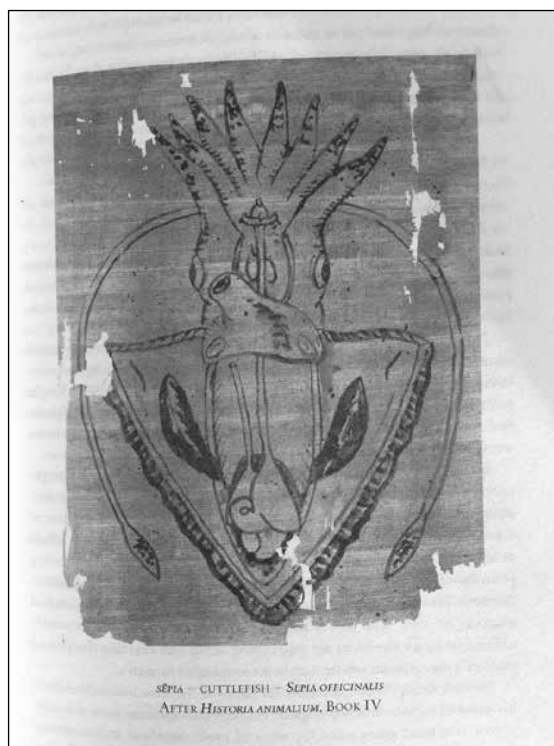
The writing is brisk, confident and charming with more than a hint of macho swagger. There are witty side-swipes at everyone from Plato to S.J. Gould to amuse the reader and the language is refreshingly free from pomp or coyness – especially on matters of bodily functions and body parts. In places it could be

D.H. Lawrence or Germaine Greer writing the terse Anglo-Saxon words. I tried to relocate examples for this review but they were not indexed.

I can forgive Leroi, born in South Africa and brought up in New Zealand and Canada, for not knowing that British Three-spined sticklebacks do not usually live in the sea; they are freshwater fish for the most part, occasionally moving into brackish and marine conditions. Also, I think it likely that its binomial *Gasterosteus aculeatus* refers more to its bony flanks and three dorsal spines than to its spiny pelvic fins, as he implies. This is a small quibble. (Aristotle said nothing about this spiky fish; it is only there to illustrate his deductive logic). Another trivial error is the name of the nudibranch *Discodoris* (sic) mentioned on p. 376.

More disconcerting is Leroi's assertion that Aristotle makes the "rather brilliant" observation that cuttlefish guts are "twisted into a U" and "equally brilliantly, he notices that gastropods have the same twisted geometry. In both cephalopods and gastropods, this is the result of ... torsion during which, as embryos, their bodies become twisted about". Not so. Torsion is a feature unique to gastropods, during which the viscera rotate and the anus





finishes up just about directly over the head. It is all the more strange that Leroi should make this error (not insignificant in the context) because he tells us at the outset that mollusc shells were his first zoological passion and that his emotional affinity with Aristotle was founded on discovering their shared interest in what went on inside the shell. He must have moved on from those days (5).

We can all lament the fact that none of Aristotle's drawings survive, for they would surely tie together his disjointed discussions and perhaps confirm the disputed identification of his subjects (6). In the book, a few specially commissioned diagrams attempt to convey how Aristotle's illustrations might have looked. Who knows? Making them look ancient and tatty is an odd conceit, and does not work for me. One of these drawings "after" Aristotle is of a dissected cuttlefish. It (correctly) shows no torsion: cuttlefish demonstrably do not "defaecate on their heads", as the text claims.

Did Aristotle invent science? Aristotle set the lead by seeking evidence for his ideas – and an 'evidence-based theory' certainly beats one that is based on ignorance, or wishful thinking. But evidence is not enough: without putting the hypothesis to the test, evidence can lead you astray. Thus Aristotle wrongly concluded

that spontaneous generation is a reality from convincing-looking evidence: create suitable conditions for the culture of oysters and they will come (to know how they really manage it needed the invention of the microscope to see the tiny larvae); juvenile eels arrive in coastal waters every year but grown eels at the fish-market never have eggs or sperm. It was an unimaginable conjecture that eels should swim out from the Mediterranean Sea into the unknown world, growing their gonads as they swam; even less likely for their offspring to return as a new generation of tiny eels (as, of course, they do). Much more reasonable to suppose that laying eggs is just an option that eels do not use.

It seems that Aristotle had an aversion to the particulate view of things (possibly because he did not think of it first). His elements have nothing to do with chemical elements as we know them. I had imagined that Aristotle's elements might correspond to a physical, mechanical view of materials: earth (solid) resists all forces; water (liquid) does not resist shear forces (you can stir your coffee endlessly); air (gas) does not resist tension (gases will expand to fill a space). But no, his idea is more of a mystical obsession where both his physiology (particularly the role of heart and brain) and cosmology are based on the interplay of the four elements. Not until the seventeenth century was the notion of spontaneous generation of animals demolished, and the heart finally shown to be merely a pump, circulating blood (7).

Yes, Aristotle made mistakes, but the case is well made that he was a meticulous naturalist. Some of his observations have only recently been confirmed and some still await confirmation. Leroi's new additions confirm "fellating fishes", apparently a rather fanciful reference to a wrasse *Symphodus ocellatus*, and a woodpecker with unusual nesting habits that are peculiar to Lesbos. Leroi dismisses the "lizard" that "gets up the nostrils of an ass" as a piece of nonsense but I wonder whether this might be a wildly confused reference to a tongue worm: it looks a bit like a lizard and lives in nasal cavities.

Some unlikely explanations have been revived.

Although he probably never saw one, Aristotle reasoned that elephants must be semi-aquatic, using their trunks as snorkels. I did not believe Leroi's assurance that "recent studies ....show that the elephant evolved from an aquatic ancestor". Maybe it depends how you define aquatic. For me, a truly aquatic animal would be, say, a sirenian (sea cow). Notwithstanding recent claims, the elephant ancestor is likely to have been semi-aquatic at best, inhabiting marshy edges of Tethys, the forerunner of the Mediterranean Sea (8).

Aristotle was certainly the original nature-philosopher. But did he invent science? You should read this entertaining book and decide for yourself (9). By the way, it says on the front cover that it is "an heroic, beautiful work". And so it is.

1. Leroi cites Mayr, 1982, *The Growth of Biological Thought* and Medawar & Medawar, 1985, *Aristotle to Zoos*, among others with this view. It was not Aristotle's fault that his errors persisted for so long. I tend to blame the Romans, who took over as empire builders. When Constantine realized that Rome could subjugate its empire more readily by supplementing military might with a religion in which all injustices were not expected to be resolved until after death, he combined Church and State as an unbeatable, oppressive and implacable force. Aristotle's ideas, albeit pagan, were cautiously incorporated but his teaching that we should construct our world view from the evidence of our senses was firmly overruled: open-minded investigation was not fully liberated again until the seventeenth century or later. Then, it became important to know what Aristotle had actually said, two thousand years before

2. I was surprised how busy Aristotelian scholars have been in recent years. In a bibliography of 17 pages, I would categorise around two thirds of the references as 'history of philosophy' (including many from academics who are still working on new translations and new interpretations). The remaining references provide the modern biological context.

3. How sad to reflect that Leroi's idyllic island is now principally known as the landing point for desperate folk fleeing to Europe from tyranny or poverty in their homelands. How sad too that the culture that once valued classical scholarship so highly looks in danger

of becoming as introverted as Europe was in the middle ages.

4. I am not the only one who gets confused by Roman numerals. The typesetter has mistaken XXVII for XXXVII. I bet he or she would not have made a similar error with Arabic numerals.

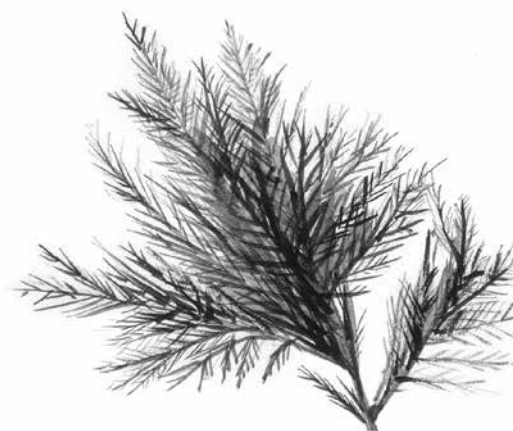
5. Leroi is uncharacteristically coy about naming those who helped turn him from a shell-collector into a scientist (p.4). The blind evolutionist is easy to identify. The "awesome Blackbeard-like" marine biologist "whose violent impatience was checked only by kindness to match", and who showed him how to dissect a snail, sounds to me like my old chum, the late Andy Forester. But who, I wonder, was the "cowboy-aesthete"?

6. I suspect their absence is partly because copying drawings and diagrams that you barely understand is much more difficult than copying text, and partly because figures are generally undervalued. We stress literacy and numeracy in education but we do not even have an accepted term for interpreting diagrams (graphicacy perhaps?).

7. W. Harvey is usually credited with both achievements

8. Elephants and sea cows are sometimes classified together as tethytheres – beasts of the Tethys.

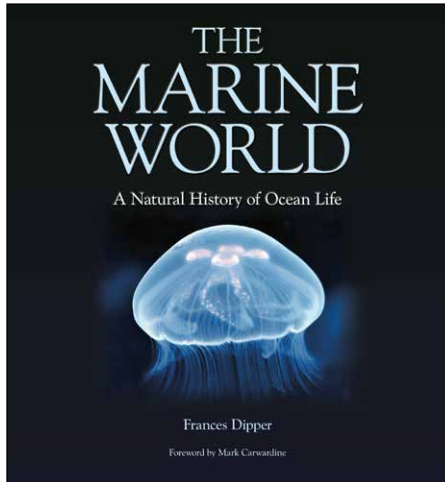
9. An associate of mine, an expert on scientific methodology and a strict Popperian, has a very clear notion of experimental science: he asserts that a lot of biology, including modern taxonomy, is not scientific at all. It all depends on your definition.



*Drawing: Feathery brown seaweed  
(Anne Bunker)*

# The Marine World: A Natural History of Ocean Life – Frances Dipper

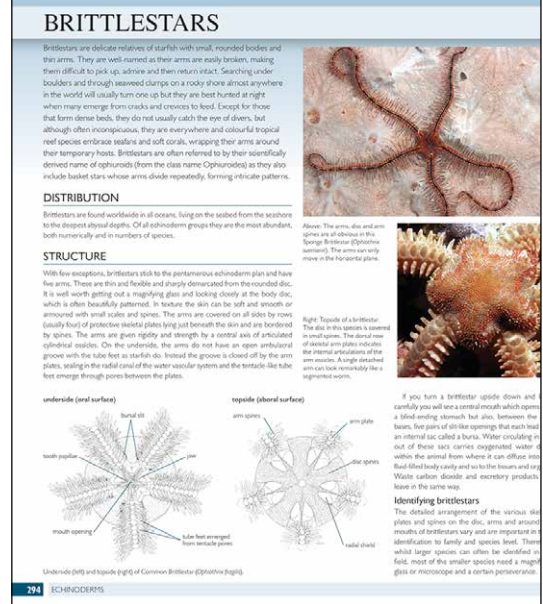
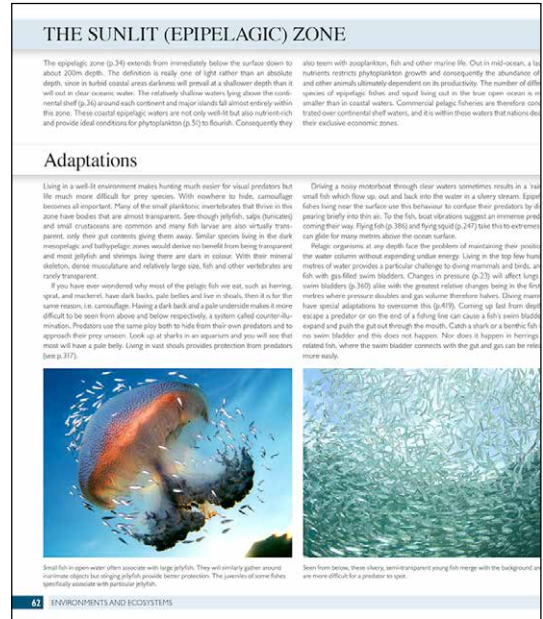
Wild Nature Press, 2016.  
Hardback 544pp.  
ISBN: 978-0-9573946-2-9



Book review by Fiona Ware

I was very lucky to win a copy of *The Marine World* in the PMNHS Conference 2016 raffle. The book was still in press but the publicity material looked amazing and I was delighted when, a few weeks later, my signed copy arrived – a big thank you to Frances.

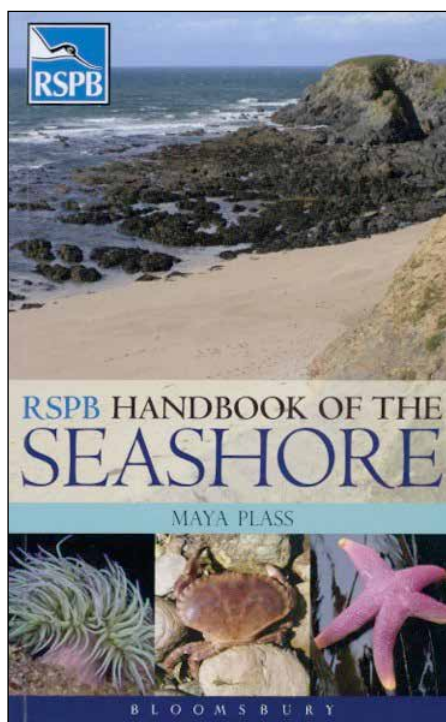
*The Marine World* really is a splendid achievement and should find a place on the bookshelves of any naturalist with an interest in the oceans. It is authoritative and forms a rich source of detailed and up-to-date information on marine natural history. But despite this, it is very far from being a 'dry' textbook of densely packed information. It is well structured in a series of sections which can be read independently of each other. The text is readable, accurate and clear. The imagery is spectacular, well-chosen and supplemented by elegant diagrams and drawings that help the reader visualise the organisms and biological systems described. The book succeeds in presenting detailed high quality information in an easily absorbed and attractive format. It offers a great resource to both amateur naturalists and marine professionals alike.



## RSPB Handbook of the Seashore – Maya Plass

Bloomsbury 2013

ISBN 978-1-4081-7836-2



*Book review by Sarah Bowen*

Published in 2013, this guide to intertidal life is the most recent of a selection of colourful, accessible identification books that have appeared in print over the last few years. It follows Judith Oakley's *Seashore Safaris* (2010, Graffeg) and the Collins *Complete Guide to British Coastal Wildlife* (Sterry/Cleve) in 2011, reviewed in Bulletin 33 (Spring 2013). Another book on a similar theme is *The Essential Guide to Beachcombing and the Strandline* (Trehwella/Hatcher) published in 2015 and which concentrates more on the treasures of the seashore rather than pure identification (see Bulletin No. 5, Spring 2016 for a review). Perhaps that can be the subject of a future review?

This book is not as wide-ranging as the Collins guide which embraces plants, birds, insects and other terrestrial life found around the coasts. Rather, it concentrates on intertidal and shallow subtidal species as well as a small section at the end about treasures that can be found on the strandline.

Plass has an engaging writing style instantly connecting the reader with the subject, and conjuring up a vivid description of a day trip to the beach in her introduction. The section entitled "Where to Look" gives a concise and helpful introduction to habitats and zonation.

What is appealing about this book is not so much the selection of species listed, which probably inevitably, given the location of the author, is somewhat biased towards the south and west of the British Isles, but the wealth of information in the introductory pages for each phylum. Quirky touches include literary quotations from a range of sources introducing each chapter. They encompass an eclectic selection ranging from the great British Victorian naturalists to Charles Dickens to Ted Hughes. As an English Literature graduate, I particularly appreciated that touch. My favourite is this one:

*"I see the glorious sea cucumber.... a magnificent coronet of plumes wherewith the headless king is adorned"*

Philip H. Gosse, *A Year at the Shore* 1865 (p197)

Woven throughout is the theme of conservation and the importance of taking care of our marine environment. Introducing the reader to the way in which observations can contribute to records and somehow be 'useful' is another great way of making connections between the reader and the marine world. It is clear that Plass has very strong views on the importance of conservation and the impact of climate change.

The attempt to encompass the notion of the 'value' of our oceans is possibly less successful. Plass explains that it only 'touches on the subject' but it feels a bit rushed. This is perhaps inevitable as the book tries to cover every aspect of the marine environment.

Each phylum has a section with line drawings and general introductory information. It would be easy to bypass these if simply using the book as a field identification tool, but these short chapters are packed with interesting nuggets of information for anyone wanting a little more general detail and are well worth reading.

Progressing to the species descriptions of each phylum in turn, there is good coverage of many species likely to be found by a rock-pooler.

### Sand Mason *Lanice chonchilega*

This segmented worm is found on soft, sandy intertidal and subtidal sediments all around the British Isles. The annelid worm's self-constructed tube is made up of small fragments of sand, rock, and shell held together by mucus. The worm is surprisingly lengthy, at up to 30cm, but only the head end protrudes through the tube. When the tide is high it extends its white tentacles to feed on passing organic matter that gets trapped in the tentacles. This is the part most likely to be seen, the fine tentacles covered in shell fragments, along with a section of the shell-covered tube protruding from the surface of the sand.

LENGTH Up to 30cm

ZONE Lower shore to subtidal

DISTRIBUTION All of British Isles

SIMILAR SPECIES None



### Twin Fan Worm *Bispira volutacornis*

The Twin Fan Worm is found in the south-west reaches of the British Isles, in the low-shore tidal pools, on shaded rocky overhangs and subtidally. This annelid is similar in appearance to the Peacock Worm, with an attractive fan-shaped feeding apparatus of many tentacles, but it has a bi-spiral arrangement of two whorls of tentacles. The feeding tentacles tend to be pale cream or brown. It retracts its fan into its tube when under threat. The tube, which is made from mud and mucus, is attached to the sediment or nestled into a crevice.

LENGTH Up to 10cm

ZONE Lower shore to subtidal

DISTRIBUTION All of British Isles

SIMILAR SPECIES *Myxiolella infundibulum*, *Sabella pavonina*



### Peacock Worm *Sabella pavonina*

The Peacock Worm can be found throughout the coastal British Isles on very low tides and in the subtidal regions. As the name implies this is another colourful and attractive worm. The Peacock Worm can be up to 30cm long, but on the seashore its visible part will be the 10cm-long muddy tube from which the worm extends its red-orange, banded, feathery tentacles like a beautiful flower. The tentacles catch passing food. It retracts them when there are potential predators around.

LENGTH Up to 30cm high

ZONE Lower shore to subtidal

DISTRIBUTION All of British Isles

SIMILAR SPECIES *Bispira volutacornis*, *Myxiolella infundibulum*



### Honeycomb Worm *Sabellaria spinulosa*

The Honeycomb Worm is most common on the south and west coasts of England. It is a tube-building segmented annelid worm, using fragments of coarse sand to build the tube. Honeycomb Worms aggregate on rock surfaces to form large, extensive reefs that delineate the rocky seashore and down into deeper water. These aggregations are Biodiversity Action Plan habitats valuable for feeding birds. They also act as sheltered areas for other intertidal species. The larvae are thought to settle where living or dead remains of their own species exist or have existed. The worm itself is 2-3cm long, and pale with gills running along its back.

LENGTH Up to 3cm

ZONE Mid shore to subtidal

DISTRIBUTION S and W coasts of England

SIMILAR SPECIES *Sabellaria alveolata*



As previously mentioned, there is a distinct bias towards species found predominantly in the south-west – examples from the seaweed section alone include Rainbow Wrack (*Cystoseira tamariscifolia*), *Padina pavonica*, *Colpomenia peregrina* and *Codium tomentosum*. I spent some considerable time looking at the seaweed section by way of example – of course I was going to be positively disposed to it when headed up with a quotation describing seaweeds as “flowers of the sea”!

The selection is not exhaustive, for example the genera *Ceramium* and *Polysiphonia* are not mentioned at all. Both are common rockpool species, even if they can't be easily identified beyond species level. The red weeds seem to be mainly subtidal and less likely to be seen on the shore.

The approach of weaving in an interesting fact alongside the description continues in the text of the species descriptions. For example, I didn't know that Wentletrap is the

Dutch word for a spiral staircase! There are more quirky touches here too – the holdfast of Furbellows is described as a “brown warty lump” that reminds the author of the “brain of a sea monster”.

The layout of the book is nice and clear with two species to a page, but the constraints of this format are sometimes apparent where more than one photograph would be useful to illustrate the different appearance of animals underwater and above it. This would be particularly helpful for more of the anemones. The strawberry and beadlet anemones are shown with both expanded tentacles and closed up above water, but the same is not the case for the jewel or gem anemone.

*Alcyonium digitatum* when seen on the shore is more likely to have its polyps retracted, so it is a pity that the illustration shows it as it would appear subtidally with a bit of current. It can easily be mistaken for a seasquirt, as I know, having collected pieces only to discover

the polyps emerging later on, much to my embarrassment!

In other parts of the book are some perhaps surprising omissions for such a guide – there are no *Sagartia* anemones and *Elysia punctata* is included but not *Elysia viridis*. *Berthella plumula* is absent too. Seasquirts don't include *Morchellium argus* (often found as pendulous, pinky jelly lumps under overhanging boulders on the shore) or the non-native *Corella eumyota*. Another non-native, *Didemnum vexillum* is included, despite its thankfully limited distribution.

Shelled molluscs are well represented, as are the diversity of different crustacea including sea slaters and isopods. The fish section is fairly extensive, and includes a number of subtidal fish only likely to be found in the deepest rockpools. The bright green Ballan wrasse pictured confused me initially until I realised that it is a juvenile but there is no mention of that fact.

One slightly frustrating aspect of the book is the number of typographical mistakes throughout the text, and affecting some of the Latin names. A minor issue perhaps, but some more thorough proof-reading would have prevented this. There are also some photographs which look to me as though they are mistakenly identified – the photograph captioned as *Laminaria hyperborea* looks suspiciously like *L. ochroleuca* and the *Obelia longissima* description shows a picture that is more typical of *O. geniculata*.

Minor grumbles aside, this is an attractively presented book that packs a great deal of information into its pages. The author admits in her introduction that the descriptions may sometimes seem anthropomorphic, and perhaps they are. A professional biologist looking for a robust taxonomic guide to these animals may not find what they are looking for, but as an accessibly written and fascinating insight to the world of the seashore it works very well indeed. Maya Plass certainly succeeds in her intention to connect the reader more easily with the amazing creatures that live on our seashores.

### Would you like to contribute to the next *Porcupine Bulletin*?

- We are always open to offers of book reviews, website reviews and reviews of mobile apps!
- Interesting or topical sightings of marine life, or stories of your fieldwork experiences are always enjoyed;
- Informative line drawings of marine life are great for filling in small spaces at the end of articles;
- Articles on any subject relevant to marine natural history
- or anything else that you feel would be of interest to the readership!

In the first instance, please contact Vicki Howe with what you would like to offer. Guidelines to Authors are printed on the back page of the Bulletin, please take note of these when writing your article and particularly with reference to any images you wish to have printed.

Deadlines for contributions are:

Autumn 2017 issue - Friday 9th June 2017

Spring 2018 issue - Friday 8th December 2017

### Joke Corner

Q.What do you give a fish who can't hear?

A. A herring aid!



## How I Became a Marine Biologist

Shelagh Smith



*Falkland Islands, 1989*

When I was a little girl I wanted to go to sea and be a marine engineer like my grandfather. Obviously, not possible. I collected my first sea shell - *Pecten maximus* - on the shore in France in 1948, how it survived to end up in the collections of the National Museums of Scotland I have no idea.

Fast forward to University years (Edinburgh) where I studied Zoology and then Geology which gave me invaluable training in the way to look at things, describe things and relate them to each other and, to enquire and think outside the box. With First Class Honours and a PhD on part of the Cuillins of Skye I was totally unemployable in the field of mapping and prospecting, no women in mixed teams in the back of nowhere! I settled for marriage to a husband who worked for the Scottish Geological Survey, so at least I could get out into the wilds of the Scottish highlands. I like orogenics, plate tectonics, vulcanology and got involved in hydro-electric schemes.

So to children, taking them on the shores of the Firth of Forth and elsewhere where we had shell collecting competitions. I soon found out that the easily available shell books were inadequate for identifying our finds and so I started to pester David Heppell in the Royal Scottish Museum. I had found molluscs. I had found taxonomy and nomenclature. David's assistant left and I talked my way into a very part time job at the princely sum of 5 shillings per hour (1974). David gave me all sorts of

jobs curating collections such as that of A. E. Salisbury whose shells were from all over the world. I had access to the extensive library.

Much of the mollusc library was in the room where we worked, the rest easily accessible until the librarians decided to re-organise everything so that what we wanted was virtually inaccessible.

Graham Oliver came in employed as a full-time assistant while he completed his PhD. Here we came up against the new rules for requirements for a PhD. I had had the essential Latin and one modern foreign language but had to take classes in German to augment my French. As these were no longer required I was translating essential works for Graham, not that his lack of languages has done him any harm. I even won a nomenclatural argument with David as the Greeks had the right word for it. When Graham left I was invited to apply for the full time post doing exactly the work I had been doing for years. I failed the interview as a very eminent zoologist decreed I was unsuitable as I had no training in Zoology, apparently two good years' zoology at university didn't count. But worse than that the week before I had laid into the Museum representative on the panel for being a useless twit (correct in everybody's opinion).

This was the very best thing that could have happened to me. I could now launch myself as a self-employed marine biologist. The rest, including Porcupine, is history.



*Inside the dredge (literally) on Challenger - I'm the yellow object! (Porcupine Bank, 1981)*

## Instructions to authors

Although we can deal with most methods and styles of presentation, it would make our editorial lives easier and speed up publication if contributions to the *Bulletin* could follow these simple guidelines. Please submit material in electronic format where possible either by e-mail or CD.

### Title, Author(s) & Address(es)

Title should be concise, informative and in bold type. Include author(s) names each with one full Christian name. In multiauthored contributions, the last name is separated by an ampersand, e.g., John Smith, David G. Jones & Susan White.

Include any institution/place of residence & contact details to appear with your name at the beginning of your article. Multiple author addresses can be linked to authors by superscript numerals.

### Text

- Times New Roman font, 12pt, single line spacing, saved as a Word document (.doc/.docx)
- Use bold to highlight headings but do not use any Word 'styles' to format text. Avoid using headers and/or footers where possible.
- Reference tables & figures in the text as Figure 1, Table 1 etc. and in legends as Table 1: , Fig. 1: (individual parts A, B etc should be described also).
- Indicate where figures should be placed e.g. Insert Fig.1 here (send image files separately to text)

### Illustrations (Figures and Plates)

- Photographs: greyscale or colour (RGB) JPGs or TIFFs with a resolution of 300 pixels per inch and maximum width of 16 cm. Save at **high quality** (very important).
- Line drawings (particularly maps): EPS (preferred) or TIFF files. If it is a detailed map which will need the full page width, save it with a width of 16 cm. Maps with complicated colouring schemes are difficult to interpret in print – please consider using easily distinguished symbols instead.
- Graphs, histograms, etc. can be supplied as line drawings, or Excel files, each saved as a separate sheet

We can scan good quality photographs, transparencies and hard copies of drawings, where necessary.

For each illustration, photo etc. submitted, please provide: Filename, Caption, Photographer (if appropriate) and please be aware of any copyright issues.

**Do NOT embed images in the text** as they cannot be extracted at high enough quality to reproduce in the *Bulletin*. Send as separate image files, preferably with the caption as the file name though this is not essential.

### Scientific names

Latin names should be italicized. The entire scientific name should be given in full the first time it is mentioned, but thereafter the genus can be abbreviated — except at the beginning of a sentence. Authorities for taxa follow standard taxonomic guidelines, with a comma before the date; e.g., *Zeuxo holdichi* Bamber, 1990; *Melinna albicincta* Mackie & Pleijel, 1995; *Neanthes irrorata* (Malmgren, 1867).

### References

- Do not leave a line space between references. Journal titles should be cited in full.
- Citations in text: ....Brown & Lamare (1994)...or... (Brown & Lamare 1994)...., Dipper (2001)... or...(Dipper 2001).
- The main reference styles are as follows:

Brown, M.T. & 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, London. 96pp.

Ellis, J.R., Lancaster, J.E., Cadman, P.S. & Rogers, S.I. 2002. The marine fauna of the Celtic Sea. In J.D. Nunn (Ed) *Marine Biodiversity in Ireland and adjacent waters. Proceedings of the ECSA Conference, 26-27 April 2001*. Ulster Museum, Belfast. pp. 83-82.



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