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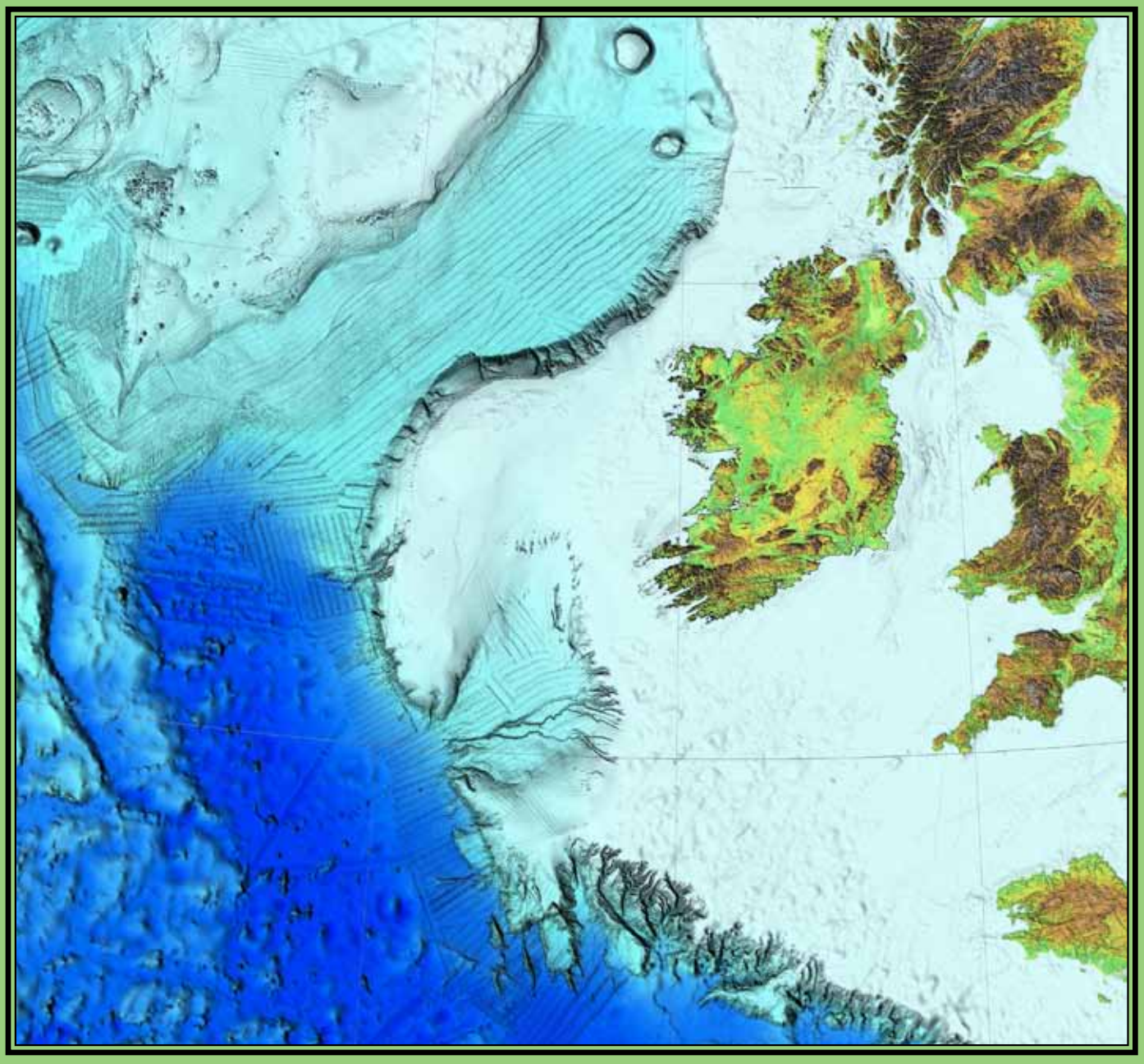
Spring 2014 — Volume 1



Porcupine Marine Natural History Society

Newsletter

Vo. 1 Spring 2014

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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
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Cover Image: Porcupine Bank — Bob Downie

Editorial

This Porcupine publication is looking a little different from previous ones and I am pleased to announce that the newsletter is now to be known as the *Porcupine Bulletin*.

Over the years the newsletter has transformed considerably from its beginnings as a 6 page type written publication in November 1976, to a colour, 84 page publication with a diverse and interesting selection of articles.

Last year it was felt by the Council that the Porcupine Newsletter should change its name to better reflect its content and where it sits within the field of scientific publications - the Porcupine Newsletter is (or rather was) so much more than a "newsletter", and so the Bulletin is born!

I am thrilled to say that as the newsletter has grown in diversity, quantity and quality more people seem encouraged to contribute. This has made working on the Bulletin an exciting opportunity. Due to the increase in numbers of articles, putting together the Bulletin has become very much a team effort and I would like to thank all those that have volunteered their precious time in getting the newsletter and now Bulletin to the standard it now is. Thank you! I would also like to say a big thank you to all contributors as this is what has made the Bulletin what it is now AND keep sending in your articles – be they snippets, fieldwork stories to latest research and articles you would like peer reviewed.

Please enjoy reading the new Porcupine Bulletin.

Vicki Howe

Hon. Editor

Photo: Juliet Brodie

ANNOUNCEMENTS

Council Member News

In January 2014 Council member Peter Barfied announced the safe arrival of baby Giorgia Grace Barfield – born Monday 13th January 2014. Congratulations Peter and Evelina and welcome to the world Giorgia!

Porcupine Newsletter Student Prize 2013 - Winner

After much reading, discussion and debate I am delighted to announce we have a winner for the 2013 Student Prize. Congratulations to Cass Bromley. You can read this article in the Autumn 2013 Newsletter, number 34.

The 2013 prize was contested by more authors than ever before and we were impressed with the standard of the submissions. Thank you to all who submitted articles and good luck with your future writing. We hope more Porcupines will follow their lead and submit papers for the 2014 prize.

Porcupine Bulletin Prize 2014

For the fourth year a prize will be awarded to the best article published in the Bulletin by a student or amateur enthusiast (i.e., not professionally employed in the marine field), as judged by a subcommittee of the Council.

The prize is £50, and 1 year's membership.

There are no exclusive themes. An article could be on a project or thesis you are working on; a visit or field trip you have made to a shore or dive site; a particular marine organism you are interested in and have been researching (in the field or desktop) etc. There are many examples you can draw on for inspiration in past newsletters.

To be considered for the prize, please make your status clear on submission of your article to the Honorary Editor – Vicki Howe, viks@sun-fish.co.uk

For Instructions to Authors please see http://www.pmnhs.co.uk/files/instructionstoauthors.pdf

The PMNHS looks forward to your contributions.

We are grateful to Frank Evans for suggesting that a prize be created.

Porcupine Small Grants Scheme 2014-15

The Society has run a Small Grants Scheme for the previous six years (http://pmnhs.co.uk/category/grant-scheme), offering support for small projects that further its aim of promoting an interest in the ecology, taxonomy and distribution of marine fauna and flora in the N.E. Atlantic. The scheme is run on a year-by-year basis (dependant on available funds) and has been very successful to date. Last year, one grant was made to David Kipling for *Improved resources for the* in situ *identification and recording of British ascidians*. Porcupine Council decided not to run the scheme this year, but will review the situation again in the Autumn for 2015-16.

Porcupine Field meeting 2014: Isle of Man, 1–5 August

Organiser: Angie Gall.

There are still spaces available on our exciting field meeting this summer in the Isle of Man. It is a joint project with the Manx Wildlife Trust and *Seasearch*, with the aim of exploring

and gathering information within the island's Marine Protected Areas such as Ramsey Bay Marine Nature Reserve.

We have planned 5 days of diving and shore surveying around the island from 1st to 5th August. Whether you are an expert or a complete beginner you will be welcome to join in with the activities.

For more information and a booking form please visit our website www.pmnhs.co.uk

Recent sad news

We are sad to hear of Dennis Seaward's death on 9th January, after a long illness. He died quietly, in a nursing home in Cambridge, where he had moved in his last weeks to be close to his son Paul. Dennis was involved with the Society in the early years and was our Marine Records officer. Many will be familiar with his large-scale collation and mapping of mollusc records.

Paul and his sister Caro are trying to arrange a celebration of his life and work, with memories of his molluscing and other activities, probably at or near his home in Chetnole, Dorset, at around Eastertime. They would be delighted if friends would like to come, or contribute memories. For any more information or to contribute memories, Paul can be contacted on: PSeaward@histparl.ac.uk.

11th MBA Postgraduate Conference

University of Hull (Scarborough)
6th – 10th May 2014

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.

This year's conference will be held at the Centre for Environmental and Marine Sciences at the Scarborough Campus of the University of Hull.

Visit http://www.11thmba.org for further details.

World Oceans Day: 8th June 2014

Continuing the 2-year theme for 2013–2014: **Together we have the power to protect the ocean!** This two-year theme focuses on getting involved with ocean conservation in our personal lives, with our communities, and globally. Visit WorldOceansDay.org for more information and resources.

Events will be posted from March 2014 onwards.

Unknown Wales 2014

A conference to celebrate Welsh wildlife

Amgueddfa Cymru-National Museum Wales, Cardiff, Saturday 11th October

The *Unknown Wales Conference* is an opportunity to explore Welsh wildlife, from the latest breakthroughs in scientific research to habitat management for species. The conference celebrates new discoveries and new thinking on nature in Wales, whether on land or in the sea, through a series of short talks.

There is also a photography competition with the theme "Conservation in Action".

Further details of the conference and the photography competition will be announced at the end of March on the Welsh Wildlife Trust's website: http://www.welshwildlife.org

Patrick James Sandilands Boaden (1936-2013)

Dr Pat Boaden, marine biologist, musician, poet, advocate for wildlife, and former Director of the Queen's University Marine Laboratory in Portaferry, passed away after a long illness on 11 November 2013. Pat was an internationally recognised expert on 'meiofauna' or interstitial fauna —the astonishing microscopic creatures that live among sand grains on the sea floor. He was much loved by the people who knew him, and he made even the rainiest day on the seashore a delightful adventure.

Born in Andover, Hampshire, and educated at Wansted High School in Essex, Pat completed his university and postgraduate studies in Wales, with a BSc from University College of North Wales and his PhD at the Marine Sciences Laboratories, Menai Bridge (now School of Ocean Sciences, Bangor University), where he met his wife Cherry. His distinctive goatee beard arrived in 1959 and stayed for the rest of his life. His career with Queen's University Belfast began as an assistant lecturer, initially as a temporary contract but extended far longer than anticipated, becoming acting director of the Marine Laboratory in Portaferry in 1968, made permanent in 1971. He oversaw a considerable expansion of activity in the Marine Laboratory, from undergraduate field courses to a new research boat, the *Nerilla*. He inspired countless students to pursue marine biology and continued mentoring younger researchers until his death, whilst keeping fond and productive contact with older ones. He published 60 scientific papers, including highly cited fundamental work that laid the foundation for wide-ranging large-scale research projects; he was the first to observe the invasive seaweed *Sargassum muticum* in Strangford Lough, and also wrote on the contributions of rare meiofaunal groups to understanding the origins of animal life on earth. He became a key figure in the developing international group of specialists working on the meiobenthos. Together with researchers in University College Galway, he organised the 11th European Symposium on Marine Biology in 1976. He had an encyclopaedic knowledge of marine life; during shore walks with the public or eminent scientists alike, he could identify nearly any marine animal put in front

of him, no matter how tiny, and often his voice could be heard on Radio Ulster, painting verbal pictures of the beasts he found, with accuracy and humour.

Pat's feeling for the marine environment soon led him to become a member of the Nature Reserves Committee, the Government's advisory body at that period, an effective membership which lasted for many years. In 1969, he was a member of a group of marine and coastal ecologists who made recommendations on the future conservation of many important sites in the Province. His involvement in Strangford Lough was particularly significant; one of his first major achievements was to ensure that the Dorn, a particularly unusual and scientifically valuable site, should be designated as a nature reserve. The National Trust invited him to be chairman of their Strangford Lough Committee and subsequently its Wildlife Panel, seeing the Trust through a period of significant and at times controversial change on the Lough. It is a mark of Pat's character that whilst many of these meetings were intense, they were carried out in an atmosphere of friendship and shared values. From 2002–2010 he was appointed to the Council of Ulster Wildlife (then Ulster Wildlife Trust), and subsequently served as its chairman, where his skills and humanity were obvious and well received. Whilst Ulster Wildlife campaigns for all aspects of Northern Ireland's wildlife, it's key role in marine conservation was greatly enhanced by Pat's involvement, and his interest and support can be traced through to today's 'Living Seas' campaign.

Pat wrote an extensive and often hilarious serialised history of the Marine Laboratory published in the *Journal of the Upper Ards Historical Society*. He also played an active role in parish affairs for the Church of Ireland, Ballyphilip. He was an acclaimed speaker and would often lead otherwise austere scientific gatherings in songs of his own composition. There were always surprises; on one occasion he presented the history of Strangford Lough backwards, starting with 'yesterday' and finishing in the Silurian era. He was musical, an enthusiastic fiddle player with a considerable repertoire of traditional Irish tunes. He composed his own carols for the family Christmas cards each year. In the 1970s he played in a zoology department jazz band, and performances echoed with his refrains of 'Dr Jazz' floating above the rhythms of drums and guitar. Among his professional writings, he is famous for authoring a scientific paper entirely in rhyming couplets, combining good science with poetry. Above all, Pat was fun to be with; his quirky sense of humour often involved labyrinthine jokes and puns of widely varying quality. He and his wife Cherry were always welcoming and very hospitable, and their annual parties will long be remembered by Portaferry folk and academics alike, for their company, food and drink, bizarre puzzles, and above all, laughter.

All these elements are a testimony to Pat's abilities and career, but it is his kindness, humour and friendship that will remain strongest in everyone's mind, especially the numerous marine biologists whose careers started under Pat's kindly tuitions. We all have lost a true friend, but his true legacy will be our continuing work for marine life and all biodiversity, especially in his beloved Strangford Lough.

Pat is survived by his wife Cherry Boaden, and Sarah, Jonathan, and Helen.

Bob Brown

Blitzing Strangford Lough

Dean Woodfin Jones

It had been quite some time since I had the pleasure of visiting the beautiful Strangford Lough in Northern Ireland. I recall fond memories of feeding endangered Nene geese at the Wetland and Waterfowl Trust centre at Castle Espie and laughing hysterically with my little brother as we watch fluttering scallops comically trying to escape our grasp, in the touch tanks at Portaferry's aquarium.

Fast forward a couple of years and I am studying hard to obtain a career as a marine biologist in the handsome city of Edinburgh, as well as volunteering at the National Museums of Scotland, where I was given the good fortune of taking part in the 2013 Strangford Lough Blitz!

Strangford Lough, located in Co. Down was selected as the study area due to its designation as a Special Area of Conservation, as well as being one of only three Marine Nature Reserves in the United Kingdom. The area is protected for its enormous diversity and abundance of wildlife ranging from sponges to seals which feed, breed and seek shelter within the Lough. Furthermore Strangford is special in that it is the largest saltwater loch in the whole of the UK, containing a multitude of important dissimilar habitats, stretching from its outer wave beaten shores and fast flowing "Narrows", to the calm expanses of the northern mudflats. These narrows are infamous for their powerful tidal currents, flowing to and from the Irish Sea where once they led great invasions of Viking barbarians, transported in dragon clad longboats, into the Lough.

On the morning of Tuesday 20th August 2013, Strangford was being invaded again, not by Vikings but by 46 friendly, knowledgeable marine enthusiasts from numerous locations around the globe and from various organisations which include the National Museums of Northern Ireland, Northern Ireland Environment Agency, the Conchological Society of Great Britain and Ireland, assorted Universities and of course the Porcupine Marine Natural History Society.

With sample buckets and identification literature in hand we hit the shores. The aims of the 7 day Blitz, were to collect and record as many species as possible in order to map the presence and distribution of both native and non-native species in the area, as well as noting priority habitats/species (maerl beds and seagrass beds) from a range of variable intertidal and sub-tidal habitats.

Within these 7 days we visited some truly stunning sites like the Dorn (Figure 1), Granagh bay and the Mahee Island rapids (Figure 2). Here we gazed upon abundant growths of sea anemones (Figure 3), sponges and ascidians which clothed the surrounding rock and boulders, as well as dense colonies of peacock worms *Sabella pavonina*, invasive alien caprellids, numerous nudibranchs and more

Fig. 1. The team at The Dorn rapids, 23rd August

Fig. 2. Fiona and Paula Lightfoot at Mahee Island, 24th August

algal species than you could shake a stipe at. All in all a whopping total of 605 live taxa plus 14 other shell samples were identified (Figure 4) during this blitz, including two new non-native species (*Bugula neritina* and *Gracilaria vermiculophylla*).

This information is vital and will be put to good use with existing data in order to further protect and efficiently manage this Lough, providing future generations with similar warm-hearted memories as I share with this area and its wildlife.

I'd like to take this opportunity to thank everyone that was involved in the 2013 Blitz especially the likes of Fiona Ware and Lewis Press who gave me the opportunity to take part in these fantastic surveys and enlightened me when faced with unknown taxa. I would also like to thank Julia Nunn, Bernard Picton and Claire Goodwin for organising this Blitz and Queens University Belfast for the use of the Portaferry Marine Station. To anyone interested in marine biology and conservation I could not recommend this experience enough. I found my time here very rewarding and inspiring as I learned about and observed many beautiful marine creatures within this jaw dropping region of Northern Ireland. I look forward to blitzing again in the near future and the prospect of someday reacquainting myself with some of my new found Strangford friends and hopefully, with any luck, making some new ones in the process.

Cheers!

Fig. 3. Dahlia anemone at Mahee Island, 24th August

Fig. 4. Dean, Fiona and Lewis in the lab

Historical overview of seaweed recording on Guernsey

Kath Slade

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This article gives background to the report on seaweeds recorded on the 2012 Porcupine field meeting to Guernsey published in this newsletter. For a general account of natural history collections in the Channel Islands see Mackie (2013).

Early records of marine algae on Guernsey appear as species lists, for example those published by Babington (1839), who listed 37 species, and by Greville (1841), who listed 89 species. The latter admitted at the time that "*we know so very little of the marine botany of the Channel Isles*". Later, Ansted & Lathan (1862) listed around 130 species and believed their account to be "*extensive but not complete*". They attributed the list to Miss Le Lievre who was "*well known as* [an] *accurate and conscientious naturalist, who* [has] *carefully studied this department of botany.*"

Systematic recording of Guernsey marine algae began with Ernest David Marquand. He lived in the Channel Islands from 1888 to 1895 and "*was responsible for the large majority of earlier original data from Guernsey*" (Price *et al*. 1979). He, with his wife, recorded 236 seaweeds and their distributions (Marquand 1894), increasing this seven years later to 252 species (Marquand 1901). His systematic lists were later reproduced in Chalon (1905) and Heurck (1908).

Marquand thought Guernsey to be particularly rich for algae due to the island's southerly position so that the seaweeds attained, "*a luxuriance of growth and development which is quite exceptional, if not unknown, on the English shores*". He recorded that this abundant natural resource was not overlooked by local farmers, who harvested seaweed for use as manure by gathering drift and by wrack-cutting with billhooks (Marquand 1901).

Marquand was an avid collector and preserved many seaweeds as herbarium specimens. He also took an interest in other people's collections and noted a very early "*fresh-looking specimen of* Fucus vesiculosus" collected from Guernsey in 1726 housed at the Royal Botanic Garden, Kew (presumably transferred to the Natural History Museum, London with the other algal collections in 1961 (Perkins 1992)). Marquand's specimens survive in herbaria around the UK and National Museum Wales holds around 500 of his seaweed specimens, representing many of his Guernsey records.

Marquand found four species of seaweed in Guernsey that were not on the British list. These included the wormlike brown seaweed *Liebmannia leveillei*, subsequently found by Lyle on Guernsey in 1911 (see Fig.1). This rare summer annual, at the northern limits of its distribution (its most northerly record is in south-west Ireland (Hardy & Guiry 2003)), has not been found in the UK since.

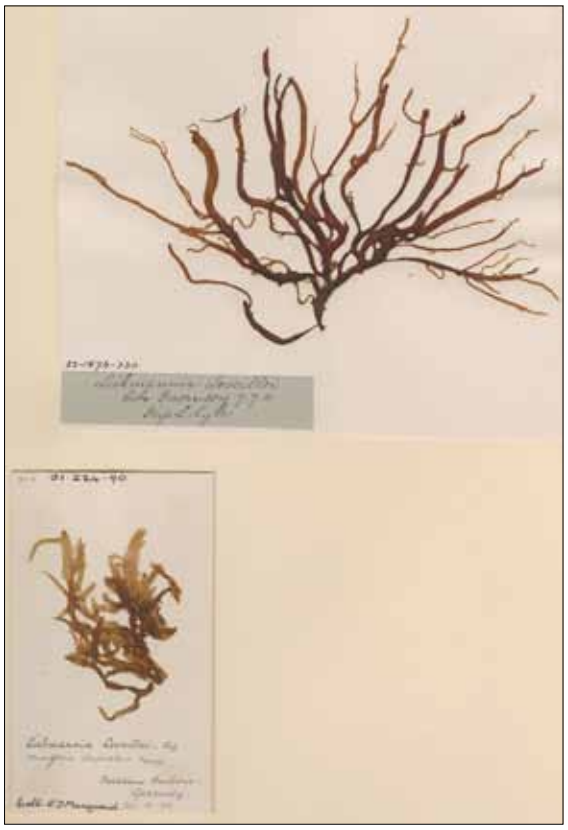

Fig. 1. Specimens from National Museum Wales of Liebmannia leveillei *collected from Bordeaux Harbour by Ernest Marquand in 1893 and from Cobo Bay by Lilian Lyle in 1911.*

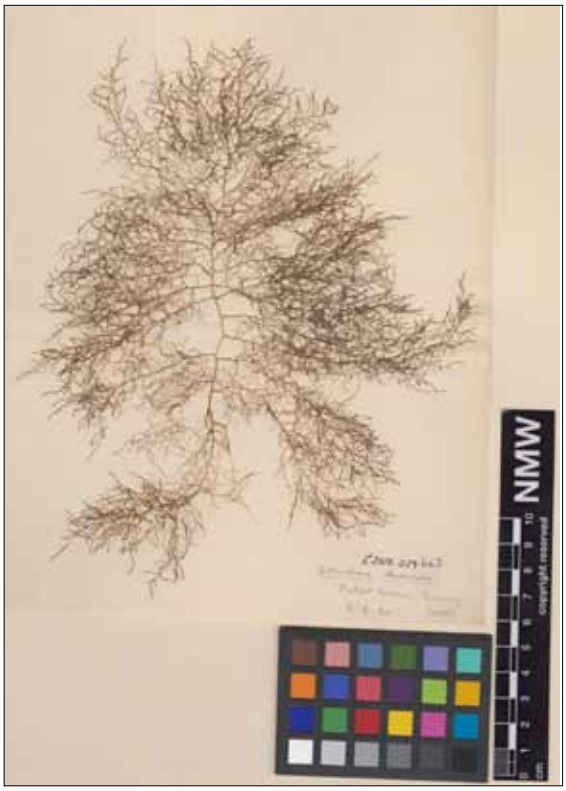

Fig. 2. Specimen from National Museum Wales of Spreading Worm Weed Helminthora divaricata*, a rare gelatinous elastic red seaweed collected as drift by Margaret Martin on the British Phycological Society excursion to Guernsey, 1960. It is placed in the Nemaliales, a group Martin had a particular interest in.*

In the 1920s, Lilian Lyle published several papers on the seaweeds of the Channel Islands. Despite being curtailed "*owing to the outbreak of the War*", her first publication (Lyle 1920) added 46 species to Marquand's Guernsey list. She stated that the area had been well studied but "*one need never despair of making new discoveries*" as "*in no two years does it seem possible to find all the same algae*". She noted that new species were continually arriving and cited the newly arrived non-native brown seaweed, the Oyster Thief (*Colpomenia peregrina*), as an example. Lyle (1920) discussed the marine ecology of Guernsey in detail, and extended this in a later publication with comparison to the wider European marine flora (Lyle 1923a).

Southern elements of the British flora are represented on Guernsey by species such as the rare Peacock's Tail (*Padina pavonica*) and Golden Kelp (*Laminaria ochroleuca*), with its distinctive yellow frond base and smooth, inflexible stipe (Bunker *et al.* 2010). Golden Kelp was first recorded in the Channel Islands by Chemin (1934a, 1934b) and said to be widespread by Dixon & Swale (1958), especially on Guernsey and Alderney. Dixon and Swale noted distribution changes of ten other non-natives and newly recorded species from excursions to the Channel Islands by the British Phycological Society in 1955 and 1957.

A joint collecting trip of the British Phycological Society and the Société Phycologique de France in 1960 deployed well-organised teams totalling 50 phycologists to scour the shores of Guernsey (Dixon & Kain 1961; Feldmann 1961). They recorded 243 seaweeds species at 21 localities, with excursions concentrating on Portelet, Bordeaux and Lihou, as well as the islands of Sark and Herm. Their findings were published as a checklist (Dixon & Kain 1961) with the caveat that the list was not complete and that not everything had yet been identified. Crucially, voucher specimens were collected for most records for future consultation, although it was not possible in the publication to record which herbaria the specimens were deposited in.

In 2010, National Museum Wales acquired some of these 1960s voucher specimens when the collection of William Eifion Jones, who co-led the field excursion (Feldmann 1961), was donated. This contained specimens collected by Margaret T. Martin (a founder of the British Phycological Society) on the 1960 trip (see Figure 2), as well as some she collected in Guernsey in 1932 and 1952.

With increasing non-native species entering the UK, the total number of seaweed species recorded from Guernsey is likely to increase. Therefore, there is still a need to keep species lists up to date to record temporal and spatial change in marine floras. More recent publications on the algae of Guernsey focus on the ecology of particular groups, such as *Codium* (Trowbridge & Farnham 2004, 2009). These studies rely on these basic floristic data. The 2012 Porcupine field meeting to Guernsey included collection and identification of seaweeds, and a report of this is included in this newsletter.

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Recording Seaweeds, Guernsey, 5-9th April 2012

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The Amgueddfa Cymru-National Museum Wales (NMW) algae collection is one of the largest in the UK, and specialises in the Welsh flora. Specimens date from the beginning of the 1800s to the present day, with many important phycologists represented such as W. Eifion Jones, Lewis Weston Dillwyn, E.M. Holmes and Guernsey's own E.D. Marquand. One of the aims that we had for this field trip was to strengthen NMW's collection. In particular, we wanted to collect specimens of non-native seaweeds.

Recording in 2012

This is a report on the seaweeds recorded on the 2012 Porcupine field trip, with an update to the list published in PMNHS Newsletter No.33. We had significantly less than the 50 phycologists who took part in the 1960s Guernsey survey (see Historical overview of Seaweed Recording on Guernsey in this newsletter), however, everyone was very determined to record. It was fantastic to be in a group recording such a diversity of marine life. We do not intend this to be a complete list of the seaweeds of Guernsey; in addition, not all herbarium specimens at NMW have yet been identified. By pooling everyone's contributions, 110 seaweed taxa have been identified from the trip so far, or over a third of the flora of Guernsey.

Localities

Lihou Causeway and Portelet had the highest number of seaweed records (see Table 1). At Portelet on Thursday 5th April, we found and collected many Oyster Thief (*Colpomenia peregrina*) plants to expand the non-native seaweed collection at NMW. On Friday 6th April, the deep, sheltered pools around low tide at Lihou provided us with a chance to see the bright iridescent colours of Bushy Rainbow Wrack *Cystoseira tamariscifolia*

Locality	No. of Algae/Plant taxa	Date
Portelet	58	05/04/2012
Lihou Causeway	55	06/04/2012
L'Ancresse Bay	32	08/04/2012
Grand Havre	31	07/04/2012
Belle Grève	30	08/04/2012
Bordeaux Bay	25	09/04/2012
L'Eree	23	06/04/2012
Shell Beach (Herm)	20	07/04/2012
Petils Bay	17	09/04/2012
QEII marina	13	09/04/2012
Vallette	12	09/04/2012
Gouliot Cave (Sark)	9	08/04/2012
Perelle Bay	1	06/04/2012

Table 1: Number of marine algae taxa recorded at each locality (localities are on Guernsey unless otherwise stated).

(Figure 1). Shallower pools revealed Pink Plates *Mesophyllum lichenoides*, a red seaweed made hard and brittle by calcification. Anna Holmes-Brain (NMW) brought a few seaweed specimens back after a search for molluscs at Perelle Bay. These included Oyster Thief, which was common and growing as an epiphyte, forming large, air-filled balls.

The rocky shore at Grand Havre is sheltered by the sea wall and proved a diverse place to look for seaweeds on Saturday 7th April. Zones on the shore began with channelled wrack *Pelvetia canaliculata* at the top, giving way to bladder wrack *Fucus vesiculosus* and iridescent

*Fig. 1. Bushy Rainbow Wrack (*Cystoseira tamariscifolia*) in a deep pool at Lihou.*

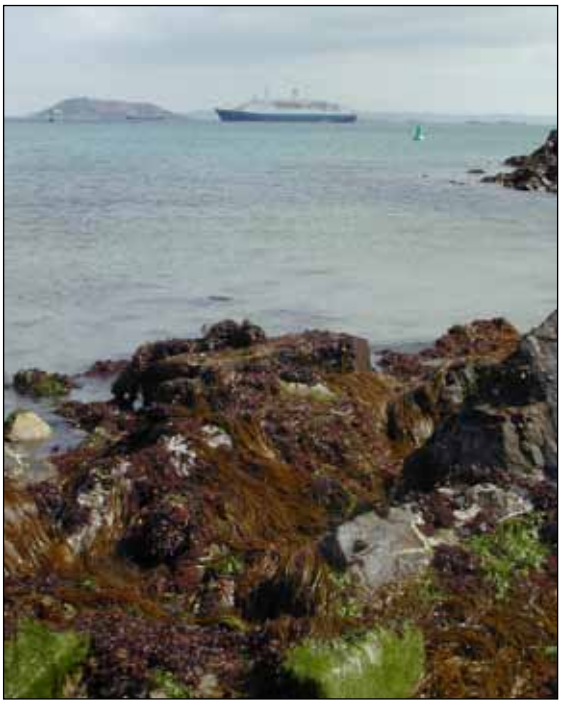

*Fig. 2: Long straps of Thong Weed (*Himanthalia elongata*) on Belle Grève Bay.*

carrageenan *Chondrus crispus*; further down toothed wrack *F. serratus* became common. Grape pip weed *Mastocarpous stellatus*, pepper dulse *Osmundea* and dulse *Palmaria palmata* were frequent at mid-shore. At low tide, golden kelp *Laminaria ochroleuca*, Furbellows *Saccorhiza polyschides* and bushy berry wrack *Cystoseira baccata* were found in the calm waters, the latter identified by Paul Brazier (Natural Resources Wales). Bushy berry wrack had numerous plants of the non-native Bonnemaison's hook weed *Bonnemaisonia hamifera* attached to it with hooks. The tiny red alga, *Stylonema alsidii* was later identified in the lab, collected from the lower shore and growing as an epiphyte on *Polysiphonia*. *Stylonema* cells are encased in a mucilaginous thallus 'tube', resembling a string of purple beads under the microscope.

Another pleasant day of recording on Sunday 8th April found the majority of the group at the south end of Belle Grève Bay (Figure 2). The deep pools right next to the marina were the highlight for the authors, where we found the largest example of the non-native brown seaweed Wakame *Undaria pinnatifida* (Figure 3). Several species of *Cystoseira* accompanied the Wakame in the pools, plus specimens of sugar kelp *Saccharina latissima*, wireweed *Sargassum muticum* and golden kelp *Laminaria ochroleuca*. Fiona Crouch recorded nine seaweeds from Sark and kindly brought back a specimen of the bright pink sea beech *Delesseria sanguinea* for the NMW herbarium (Figure 4).

On Monday 9th April, the weather was unseasonably cold, wet and windy, meaning that the sites visited may have been under-recorded. Marc Hubble recorded seaweeds from Bordeaux Bay, while a group collected from Petils Bay. Later the same day, with the aim of discovering further non-native seaweeds, a small group collected specimens from the Queen Elizabeth II marina in cold but slightly more sheltered conditions. Non-native species can hitch a ride on the hulls of ships or in ballast, so often appear first in harbours and marinas. The expected non-native species *Asparagopsis, Colpomenia, Sargassum* and *Undaria* were found, although others such as *Antithamnionella ternifolia* may have been overlooked due to the bad weather.

*Fig. 3: Japanese Wakame (*Undaria pinnatifida*) in deep pools just below the Queen Elizabeth II marina.*

We had some discussion about the identity of the flat red seaweeds seen during the week. These could sometimes be large and conspicuous on the shore, with some specimens being slimy while others were rough. Some flat red plants from Lihou, Petils Bay and

*Fig. 4: Sea Beech (*Delesseria sanguinea*) specimen in NMW collected by Fiona Crouch from the entrance to Gouliot Caves on Sark.*

Grand Havre found at low tide, have since been identified as beautiful kidney weed *Kallymenia reniformis*. Marc Hubble collected a specimen from Lihou that was later confirmed by Juliet Brodie (Natural History Museum, London) as starry liver weed *Schizymenia dubyi*. *Schizymenia* is less slippery than *Kallymenia* and has refractive gland cells that show as bright stars under a microscope. In addition, the tetrasporangial phase of *Schizymenia* is crustose, so finding tetrasporangia on a foliose frond can rule out this species. There are still specimens of these flat red seaweeds that have not yet been given a name; firm determinations may only be achievable with molecular work.

Additions to NMW

So far, specimens collected on this trip have succeeded in adding five new species to the algal herbarium at NMW. These are *Antithamnionella ternifolia, Asparagopsis armata, Heterosiphonia japonica, Undaria pinnatifida* and *Laminaria ochroleuca* (Figure 5), all but the latter being non-native UK species. Six species were added that had not previously been represented in the Channel Isles in the herbarium, plus a further 13 that had no representative specimen in NMW since the 19th century. An example of this being *Gigartina pistillata* which was last collected in 1894 from the Channel Isles.

Non-Native Seaweeds

The Channel Isles are known for their large numbers of introduced species. In total, ten non-native species were recorded in April 2012 (Table 3), all of which are known to be common in the Channel Isles. Wireweed *Sargassum muticum* has become established along the southern coast of England where it can become a nuisance in harbours and take over rock pool habitats (Sewell 2011). It was the most frequently recorded non-native seaweed during the week.

The two more recently arrived non-native species to the Channel Isles, highlighted in Paul Chambers' article (2011), were not found during the week. The first being *Polyopes lancifolius*, a furry red seaweed, originally from Japan, found on Jersey in 2011 but as yet not seen on Guernsey. The second, Grateloup's fringe weed *Grateloupia subpectinata*, a flat red species recorded from Lihou causeway on Guernsey in 2002, and now also found on Jersey (Chambers 2011). An identification sheet for this species is available via a link in Chambers (2011); he asks anyone spotting the species to send the record with a photo into the Guernsey Biological Record Centre.

Selected seaweeds from our collection are being uploaded to the Seaweed Collections Online Website http://seaweeds.myspecies.info/ as part of a project run by the Natural

Fig. 5: Laminaria ochroleuca *at Belle Grève Bay, just north of the marina at St Peter Port*

Scientific Name	Portelet Bay	Lihou Island	Shell Beach (Herm)	L'Ancresse	L'Eree	Belle Grève Bay	Bordeaux	St.Peter's Port (QEII marina)	Gouliot caves, Sark	Vallette	Petils Bay	Perelle Bay	Grand Havre	Non-native species? (UK)	Reproduction	Notes
Chlorophyta																
Bryopsis plumosa									1							
Chaetomorpha sp.	1															
Chaetomorpha linum	1	1			1	1										
Cladophora sp.	1					1		1	1							
Cladophora rupestris	1		1													
Codium sp.		1					1			1						
Codium adhaerens				1												
Codium fragile fragile	1	1												Y		
Codium tomentosum	1	1	1	1	1											
Codium virgata		2														
Ulva sp.					1	1	1									
Ulva compressa					1											
Ulva intestinalis	1	1	1	1			1	1		1						
Ulva lactuca	1	1		1	1	1	1	1		1						
Phaeophyta																
Alaria esculenta	2															As drift at Portelet
Ascophyllum nodosum	1	1	1				1									
Asperococcus sp.	1	1														
Bifurcaria bifurcata	1	1	1	1	1	2	1			1	2					
Colpomenia peregrina	1	2			1	1	1	1		1	2	2	2	Y		
Cystoseira baccata	1					2							2*			*Determined by P.Brazier
Cystoseira nodicaulis	1					2										
Cystoseira tamariscifolia		1											2			
Desmarestia sp.								2								Possibly D.viridis, requires confirmation.
Dictyota dichotoma	1	1				1				1	2		2			
Ectocarpus sp.						1										
Fucus serratus	1	1	1		1	1	1				2		2			
Fucus spiralis	1		1	1		1	1									
Fucus vesiculosus	1	1	1	1	1	1	1						2			
Himanthalia elongata		1	1	1			1				2		2			
Laminaria digitata		1		1			1		1							
Laminaria hyperborea											2		2			
Laminaria ochroleuca						2					2		2			
Pelvetia canaliculata	1	1			1		1						2			
Punctaria latifolia						1										
Saccharina latissima	1	1				2	1			1	2					

Table 2: Species list for marine algae recorded on the Porcupine field trip to Guernsey, April 2012. Includes updates to the species list published in PMNHS Newsletter No.33: 1 = Recorded in PMNHS Newsletter No.33, 2 = Updates since No.33

Scientific Name	Portelet Bay	Lihou Island	Shell Beach (Herm)	L'Ancresse	L'Eree	Belle Grève Bay	Bordeaux	St.Peter's Port (QEII marina)	Gouliot caves, Sark	Vallette	Petils Bay	Perelle Bay	Grand Havre	Non-native species? (UK)	Reproduction	Notes
Saccorhiza polyschides				1							2		2			
Sargassum muticum	1	1		1	1	1	1	1		1	2		2	Y		
Scytosiphon lomentaria		1														
Stypocaulon scoparium		1														
Undaria pinnatifida						2		1						Y		
Rhodophyta																
Ahnfeltia plicata	1															
Antithamnionella ternifolia													2	Y	Sterile	Confirmed by C.Maggs
Apoglossum ruscifolium	1							2								
Asparagopsis armata	1	1				2		2					2	Y		
Boergeseniella fruticulosa	1															
Bonnemaisonia hamifera	1	1				2							2	Y		
Bornetia secundiflora	1															
Calliblepharis jubata	1	1		1												
Callophyllis laciniata		1														
Ceramium sp.	1	1								1						
Ceramium shuttleworthianum		1														
Champia parvula		1														
Chondracanthus acicularis	1		1	1			2						2			
Chondrus crispus	1	1	1	1	1	2	1	2		1	2		2			
Chylocladia verticillata	2			1	1								2			
Corallina caespitosa		1														
Corallina officinalis	1	1	1	1	1		1		1	1	2					
Corallinaceae	1	1	1	1	1	1	1									
Cryptopleura ramosa	1			1	1											
Delesseria sanguinea									1							
Dumontia contorta		2			1	1	1						2		Sterile	
Furcellaria lumbricalis	1	1														
Gastroclonium ovatum	1	1	1	1	1	2					2		2		Tetrasporangial	
Gelidium sp.					1											
Gelidium cf.*pusillum*		2											2			
Gelidium crinale	1															
Gelidium microdon		1														
Gelidium pusillum	1			1												
Gelidium spinosum				1												
Gigartina pistillata													2		Female	
Gloiosiphonia capillaris		1											2		Sterile	
Gracilaria sp.			1													

Table 2 (cont.): Species list for marine algae recorded on the Porcupine field trip to Guernsey, April 2012. Includes updates to the species list published in PMNHS Newsletter No.33: 1 = Recorded in PMNHS Newsletter No.33, 2 = Updates since No.33

Scientific Name	Portelet Bay	Lihou Island	Shell Beach (Herm)	L'Ancresse	L'Eree	Belle Grève Bay	Bordeaux	St.Peter's Port (QEII marina)	Gouliot caves, Sark	Vallette	Petils Bay	Perelle Bay	Grand Havre	Non-native species? (UK)	Reproduction	Notes
Gracilaria gracilis	1															
Griffithsia devoniensis	1															
Gymnogongrus crenulatus	1															
Halurus equisetifolius				1												
Halurus flosculosus	1															
Haraldiophyllum bonnemaisonii				1												
Heterosiphonia japonica	1						2*							Y	Sterile	* Confirmed by C.Maggs
Heterosiphonia plumosa				1												
Hypoglossum hypoglossoides		1				2							2		Male, sterile & tetrasporangial	
Jania rubens	2												2			
Kallymenia reniformis		1									2		2		Tetrasporangial	
Lomentaria articulata	1	1		1	1	2	1						2		Tetrasporangial	
Lomentaria clavellosa								2					2		Tetrasporangial	
Mastocarpus stellatus		1	1		1		1		1	1	2		2			
Mesophyllum lichenoides	1	2		1	1	2										
Nitophyllum punctatum				1												
Osmundea hybrida			1													
Osmundea osmunda	1	1	1													
Osmundea pinnatifida	1	1		1			1		1							
Palmaria palmata	1	1		1		2					2		2			
Phyllophora pseudoceranoides				1												
Plumaria plumosa									1							
Polyides rotundus	1	1														
Polysiphonia	1	1			1	1	1									
Polysiphonia elongata		1														
Porphyra sp.				1												
Porphyra purpurea	1	1														
Pterocladiella capillacea	1															
Pterothamnion plumula								2							Tetrasporangial	
Pyropia leucosticta	1													Y		
Rhodomela confervoides											2					
Rhodothamniella floridula			1													
Rhodymenia pseudopalmata		1														
Schizymenia dubyi		2*				2									Female	* Confirmed by J.Brodie
Sphaerococcus coronopifolius				1										Y		
Stylonema alsidii													2			
Vertebrata lanosa	1	1	1													

Table 2 (cont.): Species list for marine algae recorded on the Porcupine field trip to Guernsey, April 2012. Includes updates to the species list published in PMNHS Newsletter No.33: 1 = Recorded in PMNHS Newsletter No.33, 2 = Updates since No.33

Fig. 6: Pressed specimen of the fine filamentous red seaweed Antithamnionella ternifolia *collected from Grand Havre. Shown here growing on* Cystoseira.

History Museum, London. This collaborative project between museums and botanic gardens from across the UK brings together their seaweed collections into one virtual space. Seaweed species chosen for the project include non-natives, indicators of environment change, large brown seaweeds, and those of conservation concern. Initially, data from around 600 NMW specimens will be available with high-resolution images of the specimens. Full lists of the Green and Brown Algae specimens held at NMW are accessible via the NMW website (http://www.museumwales.ac.uk/en/biosyb/lowerplants/collections/).

Anyone wishing to visit the NMW herbarium or obtain loans or scans of specimens, contact details are above. If you feel you are able to contribute to the herbarium you can do so either by donating specimens or by volunteering.

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Scientific Name	Common Name	First seen in UK/ Ireland/Channel Isles	Country of Origin
Red Algae			
Antithamnionella ternifolia		1921	uncertain
Asparagopsis armata	harpoon weed	1939	Australia
Bonnemaisonia hamifera	Bonnemaison's hook weed	1890	Japan
Heterosiphonia japonica	siphoned Japan weed	2001	Japan?
Pyropia (Porphyra) leucosticta	pale patch laver		
Sphaerococcus coronopifolius	berry wart cress		
Brown Algae			
Colpomenia peregrina	oyster thief	1907	Pacific
Sargassum muticum	wireweed	1970s	Pacific
Undaria pinnatifida	wakame	1994	Japan/China
Green Algae			
Codium fragile ssp. *fragile*	dead man's fingers		Japan

Table 3: Notes on non-native algae collected from Guernsey, April 2012. Sources: Bunker et al. *(2010); Brodie* et al. *(2012); Cotton (1908); Maggs & Stegenga (1999)*

SHORT ARTICLES

Exceptionally large Brown Crabs *Cancer pagurus* L. from Irish and UK waters

Declan T.G. Quigley[1]& Gavin Keirse[2]*

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On 10 March 2013, the MFV *Boy Conor W295* (Skipper: Mr Paul Ennis, Duncannon, Co Wexford) captured an exceptionally large male brown crab *Cancer pagurus* L. weighing 4.313 kg and measuring 273 mm carapace width (CW) in a soft-eye lobster pot at a depth of 32 m off Tuskar Rock (52°12.175' N, 06°12.445' W), Co Wexford (Figure 1). The current specimen represents one of the largest authenticated from Irish waters to date.

M'Skimin (1909) noted some specimens of *C. pagurus* weighing up to 3.2kg had been taken at Carrickfergus, Co Antrim during the early 1800s. Thompson (1856) reported that a specimen of *C. pagurus* weighing 4.313 kg was taken in Strangford Lough, Co Down during January 1836 and that another large specimen weighing 4.086 kg was taken in Belfast Bay during August 1841. Thompson noted that while both of these specimens were of extraordinary magnitude for the North of Ireland, they were not larger than what are commonly to be seen in the London market.

A specimen weighing 6.356 kg and measuring 279 mm CW was taken off Cornwall during 1895 (Spurling 1981). Another specimen weighing 6.4 kg and measuring 292 mm CW was examined at a processing factory in Selsey, W Sussex, during 2003 (www.glaucus.org.uk/Cancer). An even larger, albeit unauthenticated male specimen weighing c.8 kg and measuring c.305 mm CW was taken by a SCUBA diver at a depth of c.53 m on the wreck of the *Empress of India*, c.20.8 km off Lyme Regis, Devon on 29 June 2008 (www.glaucus.org.uk/Cancer).

Fig. 1: Exceptionally large brown crab Cancer pagurus *L. captured by Mr Paul Ennis off Tuskar Rock, Co Wexford*

According to Falciai & Minervini (1992), *C. pagurus* attains a maximum CW of 300 mm. Ingle (1996, 1997) remarked that the CW of inshore specimens rarely exceeds 160 mm and that the largest specimens occur in offshore waters at depths down to 90 m on rocky substrates. Clarke (1986) recorded a specimen from a depth 520 m off Tory Island, Co Donegal (55°37.5′ N, 09°30.5′ W) on 19 July 1973 [BM (NH) 1981: 96]. During the course of several extensive surveys of both inshore and offshore commercial brown crab fisheries in Irish waters, the maximum reported CW was 220 mm and specimens >200 mm CW accounted for <1% of the total catch (Fahy *et al.* 2002, 2004; Fahy & Carroll 2008; Meredith & Fahy 2005; Tully *et al.* 2006). It is possible that some of the largest specimens may occur in currently unexploited and/or inaccessible areas (e.g. wrecks and reefs) in both Irish and UK offshore waters.

Acknowledgements

We are grateful to Mr Paul Ennis for bringing the current specimen to our attention and to Dr Edward Fahy for information on his brown crab research in Irish waters.

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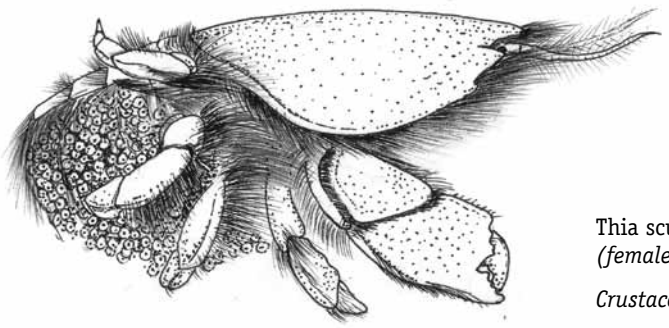

Chris Meechan

Thia scutellata *(Fabricius, 1793) (female with eggs)*

Crustacea: Thiidae

Also known as the Thumbnail crab. In the UK, found mostly in the Irish Sea and southwestern coasts, burrowing in sand and mud.

Porcupinella and other Pennatulacea from the Porcupine Abyssal Plain

Tammy Horton, Mike Thurston, Pablo López-González & Francisco J. García Cárdenas

In a recent edition of the Porcupine Newsletter (Spring 2012, Number 31, p. 59) mention was made of the newly established sea pen genus *Porcupinella*. The pennatulaceans are one of the most recognisable anthozoan groups in the deep sea. This octocoral order includes more than 200 species in 35 genera and 14 families (Williams 1995; López-González *et al*. 2002, López-González & Williams 2002, 2011). The families Kophobelemnidae, Protoptilidae and Scleroptilidae include species occurring as deep as 4,400 m, while the monogeneric family Umbellulidae has been recorded deeper than 6,000 m. At present, species of the genera *Umbellula* (Family Umbellulidae), *Kophobelemnon* (Family Kophobelemnidae) and *Porcupinella* (Family Chunellidae) have been reported for the Porcupine Abyssal Plain (PAP) (see Rice *et al*. 1992; Tyler *et al*. 1995; López-Gozález & Williams 2011). There are very few studies on Pennatulacea species from PAP, and those that do exist, focus mainly on distribution and biological aspects (Rice *et al*. 1992; Tyler *et al*. 1995). The results of a PhD Thesis on the taxonomy of the genus *Umbellula* (part of the material from PAP) remain to be published (Dolan 2008).

The aptly named *Porcupinella profunda* López-González & Williams, 2011 was described from material collected from about 4840 m on the PAP (~48.8°N, 16.5°W), 340 miles southwest of Ireland. This material was collected during four RRS *Discovery* cruises carried out during the 3-year multidisciplinary EC MAST III BENGAL research programme in 1997-98 (Billett & Rice 2001). As the curator of the Discovery Collections at the National Oceanography Centre in Southampton, where the bulk of the RRS *Discovery* cruise material is retained, I was interested to know if the new genus was present in our samples. Contact was made with the first author of the paper describing the new genus and species, Pablo López-González (University of Seville) to ask if he would be interested in applying for a Porcupine Grant to study the collections of Pennatulacea in the Discovery Collections. In May 2013, Pablo and his PhD student Francisco J. García Cárdenas (at the University of Seville studying Biology and Phylogenetic Reconstruction in sea pens) came to Southampton for a three-day study visit. Prior to the visit we (Tammy Horton and Mike Thurston) moved the entire pennatulacean collection (250 jars and tubs) from the outside storage facility to a 6th floor laboratory where work could take place. Time was short, but over the three days Pablo and Francisco worked very hard to identify all of the material at hand and to catalogue their findings. During their short stay, more than 850 specimens belonging to at least 18 North Eastern Atlantic sea pen species were identified and examined. A total of 27 samples, previously considered to be *Umbellula carpenteri*, were identified as *Porcupinella profunda*.

Sea pen species in the Discovery Collections:

Anthoptilum grandiflorum (Verrill, 1879)

Distichoptilum gracile Verrill, 1882

Funiculina quadrangularis (Pallas, 1766)

Kophobelemnon macrospinosum Thomson, 1917

Kophobelemnon stelliferum (Müller, 1776)

Pennatula aculeata Danielssen, 1860

Pennatula cf *rubra* (Ellis, 1761)

Pennatula phosphorea Linnaeus, 1758

Porcupinella profunda López-González & Williams, 2011

Protoptillum thomsoni Kölliker, 1872

Scleroptilum grandiflorum Kölliker, 1880

Umbellula cf *aciculifera* JS Thomson, 1915

Umbellula cf *durissima* Kölliker, 1880

Umbellula cf *encrinus* Linnaeus, 1758

Umbellula cf *hemigymna* Pasternak, 1975

Umbellula cf *huxleyi* Kölliker, 1880

Umbellula cf *spicata* Kükenthal, 1902

Umbellula monocephalus Pasternak, 1964

Significant numbers of the specimens were found to be preserved in formalin. This was originally used for fixing material at sea. Long-term preservation in ethanol 70-80% is recommended because of acidification problems and the consequent dissolution of calcareous sclerites (important taxonomic characters in octocorals). Unfortunately, the Discovery Collections have had no dedicated curatorial staff for some decades and the lack of proper care and treatment of the specimens is the result. Visits such as this provide an ideal opportunity to provide further attention to the collection as it is re-catalogued and re-shelved. Following the study visit the samples preserved in formalin were transferred to 80% Industrial Denatured Alcohol (IDA), alcohol-preserved samples were topped up with IDA and the whole collection was re-shelved in taxonomic order. A full catalogue (including current identification, station data, notes, shelf location, etc.) of the whole collection has been produced.

This was a very successful project by a Porcupine grant holder. The visit has enabled a full re-catalogue of the Pennatulacea held in the Discovery Collections, some 850 specimens. Most of the material has been re-identified to species level, and has been properly curated with updated labels to reflect the new identifications. It is hoped that further papers will be published as a result of this study and three loans of material from the collections have been agreed to facilitate this.

This collection should be considered as one of the most important in number of deep-sea pennatulacean species and specimens from the northeastern Atlantic Ocean. The collection is of special interest for updating morphological descriptions of poorly described older species, and for studies of morphological variability. The large collection also includes numerous samples of several species (e.g. *Kophobelemnon stelliferum* and *Pennatula aculeata*) including colonies of different size classes, which will enable further biological and ecological studies to be undertaken (e.g. growth rates, sex ratio, reproductive rates).

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Sausage catches huge rare fish

Anne Bunker

A very rare fish caused great excitement amongst anglers in the Milford Haven Waterway, Wales, on Friday 2 August last year. Local boys caught the sturgeon using a small rod and sausage bait! At a metre long this was quite a baby for a sturgeon. A female can reach 3.5 meters and live to 100 years old. The boys apparently took the fish to an angling shop to find out what it was and, on being told (incorrectly) that it is illegal to possess a sturgeon*, threw the now dead fish back in. A photograph taken by a visiting angler was tracked down and circulated to knowledgeable people around Europe.

Characteristic bony plates along its back and sides suggested it to be *Acipenser sturio*. (There seems to be much confusion about sturgeon species and their common names: The International Union for Conservation of Nature (IUCN) gives the common names for *A. sturio* as Atlantic Sturgeon, Common Sturgeon, and Baltic Sturgeon whereas the German Federal Agency for Nature Conservation (Bundesamt für Naturschutz, BfN) gives European Atlantic or European sturgeon for short). Just one photograph was not enough to be sure of the identification though and the closely related *Acipenser oxyrinchus* (IUCN: Gulf sturgeon, BfN:

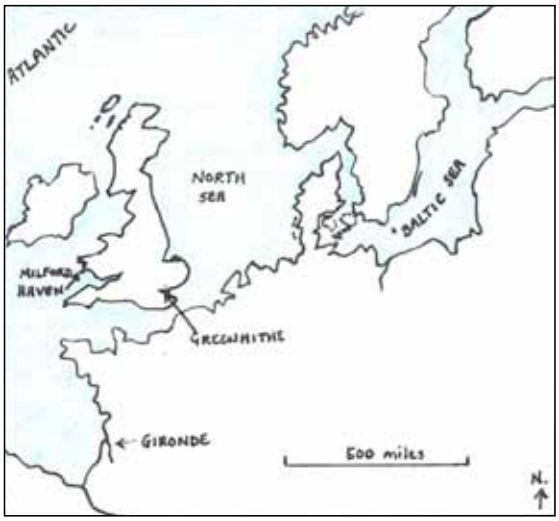

Fig. 1: Map to show locations referred to in text.

North American Atlantic sturgeon or Atlantic sturgeon for short) is another possibility.

A.oxyrinchus occurs in the Atlantic coastal waters of Canada and the United States with spawning rivers in both countries. Archaeological remains suggest that *A. sturio* colonised the Baltic Sea about 3000 years ago from the North Sea, and vanished from the Baltic Sea about 800 years ago. Climatic changes about 100 years ago (Little Ice Age) might have had an impact indirectly in favouring introgression by hybridization with *A. oxyrinchus* (IUCN redlist 2014).

Fig. 1: Sturgeon landed at Hobbs Point, Pembroke Dock, Milford Haven Waterway, 2 August 2013. Copyright Levi Lloyd.

Another sturgeon was landed three months later (2 November 2013) from the River Thames at Greenhithe, Kent. This one was a 10 lb Siberian sturgeon *Acipenser baerii* caught on worm bait. Prior to 2013, the last sturgeon record in UK waters was of a fish more than eight feet long, caught by a trawler a mile and a half off Port Talbot, Wales in 2004, identified by the Natural History Museum as *A. oxyrinchus*.

The world's sole remaining known population of *A. sturio* is restricted to the Gironde River in southwest France. The 1994 cohort is the only one born naturally in the Gironde basin since the end of the 1980's (Rochard *et al*. 2001). The current population size is estimated to be only 20-750 wild, mature individuals (in the past three years there has been substantial stocking, but these animals will not reproduce until around 2016 (BfN 2014). There has been more than a 90% population decline in the past 75 years (BfN 2014).

Sturgeon are anadromous (spend at least part of their life in salt water and return to rivers to breed). Males reproduce for the first time at 10-12 years, females at 14-18. There are indications that males reproduce at two year intervals and females at three to four year intervals. Like salmon, adults do not eat during migration and spawning (BfN 2014).

As part of conservation efforts around Europe, there are various re-introduction programmes and habitat improvement schemes in place.

Could the Milford Haven sturgeon be one of the fish from a re-introduction programme? No tag was apparent. It would be nice to think that the Milford Haven Waterway, part of the Pembrokeshire Marine Special Area of Conservation, could support these rare fish. Local anglers say there is an old record of a sturgeon being caught further up the estuary (no actual record has yet materialized). Another possibility is that this was an escape/discard from the pet trade as has been suggested for the Greenhithe sturgeon. A quick search of the internet reveals a plethora of information about keeping sturgeon, several species for sale and even an Atlantic sturgeon on show at the Aqua 2013 trade show. The morals of keeping long-lived migratory fish captive is another subject but the impact of non-native introductions on such threatened wild populations is a clear conservation issue.

Overfishing (for both meat and caviar), pollution of estuaries and installation of locks and weirs stopping migration up rivers to spawning grounds has made the sturgeon such a rare fish today. With the IUCN saying that sturgeon are more critically endangered than any other group of species, support for sturgeon conservation is certainly needed. This article is intended to bring the sturgeons' plight to more people's attention.

If you accidently catch a sturgeon this is the action you should take:

1. Note the date of the catch, the size and weight of the fish and the location (GPS or zone);

2. If it has a marking, leave it there and note the number;

3. Release it with care;

4. Tell your local Inshore Fisheries and Conservation Authority or Cefas (01502 562 244);

5. Mr Steve Colclough (Institute of Fisheries Management) would also like to hear from you directly at srcifm@gmail.com or 01634 327899. Website for Institute of Fisheries Management: www.ifm.org.uk .

*It is illegal to offer *Acipenser sturio* for sale.

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Shoresearch Surveys engage with Citizen Scientists in Marine Protected Areas

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As part of the Interreg funded, PANACHE project (Protected Area Network Across the CHannel Ecosystem) Cornwall Wildlife Trust, Dorset Wildlife Trust, Kent Wildlife Trust and Hampshire and Isle of Wight Wildlife Trust have been delivering citizen science surveys using a standardised method called Shoresearch. This user-friendly method has been designed to engage with people and develop their interest in marine life, whilst gathering information useful in arguing the case for Marine Conservation Zones (MCZs) and monitoring other Marine Protected Areas along the Channel coast. The Shoresearch method was devised with the help of Natural England and the Marine Biological Association, and focuses on twenty 'core' species that include: MCZ Features Of Conservation interest, Biodiversity Action Plan (BAP) species, non-natives and climate change indicators. There are three methods used in the surveys:

1. 20 minute timed search for core species. Gives a comparable gauge of species abundance. Very useful with new volunteers.

2. Walkover survey, essentially a rockpool ramble, where you record what you find. A popular and important method of gathering information in a way that is informal and allows people to do their own thing. Each species is scored for abundance using the JNCC SACFORN scale, and the zone on the shore recorded. Records of particular significance are carefully photographed and GPS position recorded. Records are verified by experts and data is entered in the Marine Recorder database.

3. Transect survey where the zonation on the shore is recorded and the widths of zones are measured to provide a data set that will be useful in comparing changes on the shore with time.

In Cornwall we got off to a good start in 2013, with training days being run in the classroom and on the shore at Prisk Cove Helford. A total of 25 volunteers were trained, comprising a good mixture of interested lay persons, marine graduates, college lecturers and specialist experienced naturalists. We were lucky to have the help of David Fenwick who is an expert on shore identification and has a specialism in the study of stalked jellyfish Stauromedusae.

A total of 14 days of surveying were carried out within recommended Marine Conservation zones, Voluntary Marine Conservation Areas (VMCAs) and Special Areas for Conservation (SACs) across Cornwall's south coast last year.

We recruited lots of new volunteers through the summer and now have 60 people on the project's mailing list! The surveys have been good fun and enjoyed by all and there have been many highlights including: recording a total of four species of stalked jellyfish (including BAP species) in several locations including Mounts Bay, Looe, St Agnes and Polzeath. Recording giant gobies in rockpools in Falmouth and finding Scarlet and Gold cup corals near Cawsand.

I am still amazed how many species of interest can be found on Cornish shores. The rugged serpentine boulders of Poltesco cove on the Lizard made for one of the most interesting and species rich shorelines visited. Under-boulder communities rich in life were present and we were thrilled when a volunteer uncovered a tiny and brightly coloured squat lobster. Having been a crustacean fan for many years I was convinced we had stumbled upon a new species but calling in on Dr Paul Gainey's home laboratory I was equally excited to discover it was in fact a juvenile blue striped squat lobster *Galathea strigosa*.

The beautiful low tide lagoon on the far south of Hannafore point in Looe is the place I have enjoyed visiting the most. The pebbly seabed in this shallow lagoon is covered in purple coralline algae, clumps of red *Chondrus crispus* and fluffy pink *Asparagopsis armata* and *Jania*, interspersed between large stands of *Sargassum*, iridescent rainbow wrack and patches of healthy and vivid green eelgrass. Carefully wading through this scene you can

easily forget you are in the UK, it is like being on a tropical reef! These stands of seaweeds have been found to be full of life and on our last visit we recorded 13 stalked jellyfish in one survey, many found growing on *Sargassum*, and a total of 4 species have been recorded in this site through last year.

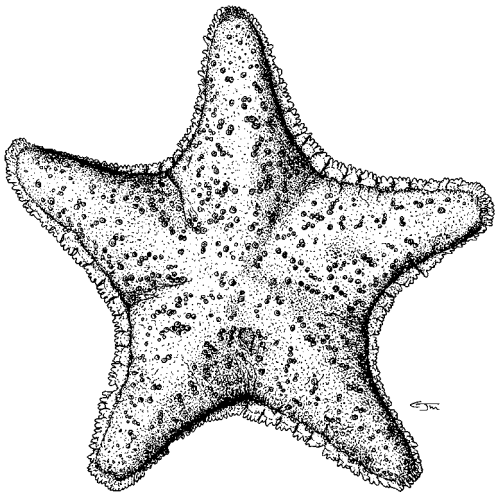
Visiting this habitat at night time during the Looe Bioblitz was an incredible privilege – led by the Marine Biological Association's Jack Sewell, we followed the overflow pipe to the lagoon which was bathed in moonlight. We were amazed by the way that the torchlight caused the rainbow wrack to glow blue – the colours were incredible and we uncovered sleeping wrasse, greater pipefish, more stalked jellies and a wealth of marine diversity. It was a fantastic experience and one that I will never forget!

We have been successful in highlighting the incredible species richness and beauty of our rocky shores and are planning to continue using the Shoresearch method after the completion of this 2 year project.

This year we will be focussing in on the second tranche of Cornish south coast recommended MCZs – Mounts Bay and Land's End, as well as continuing to survey the south coast VMCAs and SACs.

Please visit our webpage www.cornwallwildlifetrust.org.uk/shoresearch to find out more and for news of the project visit our blog http://shoresearchcornwall.blogspot.co.uk/

We require volunteers of all ability – from experts in their field to total novices who are keen to learn. It is surprising how every visit to the shore yields new discoveries! Come along and join in!



Chris Meechan

Hippasteria phrygiana (Parelius, 1768)

Echinodermata: Goniasteridae

Also known as the Rigid cushion star. Uncommon in British waters, primarily recorded from Scotland and Shetland but also the North Sea, Plymouth Sound, Hampshire and off St David's Head, Wales. From 20-850 m depth.

Online recording – are we all swimming in the same direction?

Paula Lightfoot

What equipment do you use to record marine species? Dive slate, waterproof notebook, underwater camera, ROV, grab sample, dredge... how about your smartphone? I'm not suggesting you take your phone or laptop for a dive, but there are a growing number of smartphone apps and websites for recording marine wildlife, including the latest NatureLocator app "Sealife Tracker" for recording marine invasive and climate change species.

This raises important questions, such as what happens to the data collected, how are records quality controlled, why do we need so many different apps and websites for recording wildlife and are all these different systems linked together in any way? In fact, many of these seemingly different online recording systems do 'talk to each other' and so do the organisations involved in developing them!

The Sealife Tracker app uses the free open-source software Indicia, which was developed through the Big Lottery funded OPAL (Open Air Laboratories) project. Records captured through this app are delivered directly into a central database hosted by the Biological Records Centre at CEH Wallingford, where they are made instantly available via the iRecord website (www.brc.ac.uk/iRecord). Experts verify the records, and are assisted in this task by the automated verification checks that are built into iRecord. These automated checks are based on verification rules developed by the Marine Biological Association (MBA) and flag up any records of species that are outside their known geographic or temporal range or that are especially difficult to identify.

Once verified, the Sealife Tracker records will be shared via the NBN Gateway in a dataset administered by the MBA. This whole process of data capture, verification and dissemination can take less than a week, as already demonstrated by data collected through the PlantTracker app, the terrestrial equivalent of Sealife Tracker, which was launched in 2012.

This is a typical example of data flow from an Indicia website or app, although some portals also enable recorders to tag records as sensitive, so they are not publicly visible in either iRecord or the NBN Gateway, but they can be made available to approved organisations for conservation or research. Some other examples of Indicia online recording sites and iRecord forms for recording marine species include:

- North East Cetacean Project - www.northeastcetaceans.org.uk
- ORKS (Online wildlife Recording for Kernow and Scilly) - www.orks.org.uk
- British Phycological Society online recording site - www.bpsalgalrecords.com
- Whale and Dolphin Conservation online recording site (in development)
- Yorkshire Naturalists' Union intertidal recording form – www.ynu.org.uk/record/intertidal
- Mitten Crab Recording Project - http://mittencrabs.org.uk/
- RISC (Recording Invasive Species Counts) Project – www.nonnativespecies.org
- Mammal Society National Mammal Atlas Project - http://www.mammal.org.uk/nmap
- iRecord recording forms for St Abbs and Eyemouth Voluntary Marine Reserve
- iRecord intertidal recording form

In addition, work is underway to develop Indicia-based online recording for Seasearch, the national recording scheme for volunteer divers, and for the Wildlife Trusts' Shoresearch and other marine recording programmes.

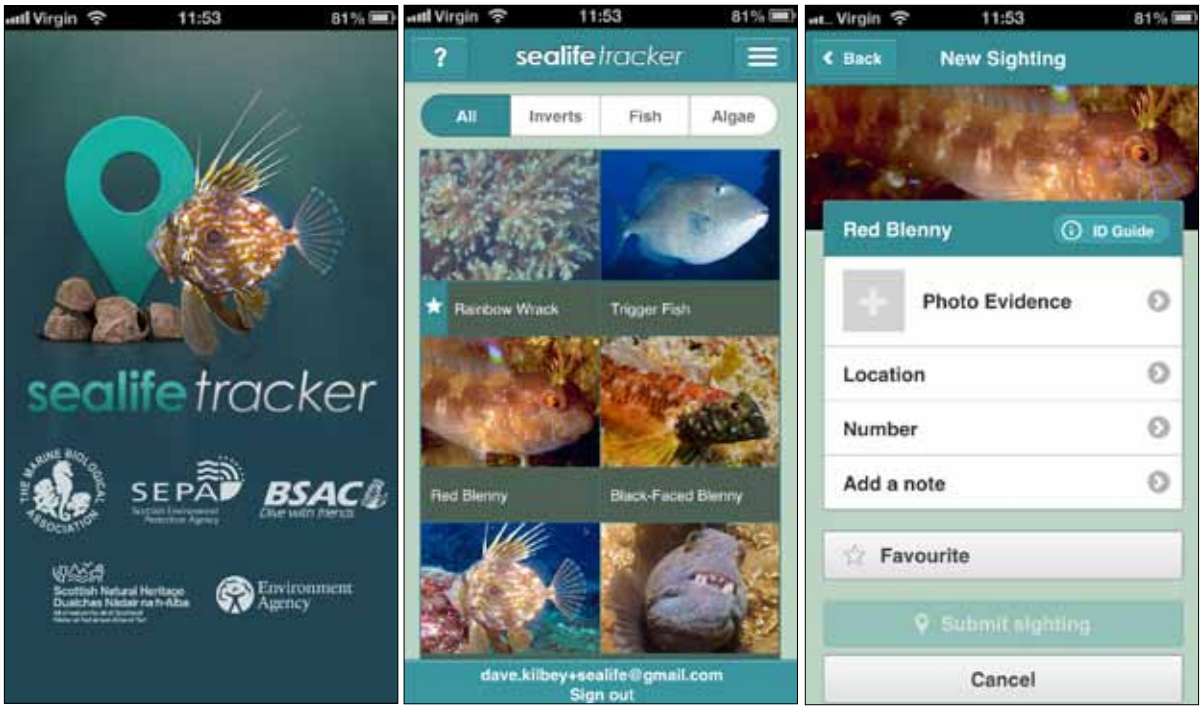


Fig. 1: The Sealife Tracker app developed by NatureLocator for the Environment Agency, BSAC, the Marine Biological Association, the Scottish Environment Protection Agency and Scottish Natural Heritage

So why do we need so many different websites and data entry forms? The great advantage of Indicia is its flexibility. It enables users to create data entry forms that are tailored to particular survey methodologies, habitats, sites or groups of species, and to package these forms in websites designed to appeal to different target audiences, from experienced naturalists or professional ecologists to the general public.

This flexibility is underpinned by standards. These sites may look different, but all capture data in the same format and make it available in iRecord, which not only provides a centralised verification function but also a central point for enabling individual recorders to manage their own records and photographs, and to view maps, charts and summaries of their data. iRecord incorporates the UK Species Inventory which is managed by the Natural History Museum, so the taxonomy is compatible with Marine Recorder and the NBN Gateway. It is currently being updated with the MS BIAS (Marine Species of the British Isles and Adjacent Seas) list from WoRMS (World Register of Marine Species) so will be as up-to-date as possible for marine taxonomy.

Of course, there is still a need to facilitate data flow between all online recording systems, not just those built in Indicia. The Marine Biological Association is currently working with the Biological Records Centre on a Defra-funded pilot project to develop systems of data exchange for verification between different systems, with the aim of enabling recorders and verifiers to use whichever system suits them best, with the confidence that their records will be made widely available for use as quickly as possible.

Non-native marine algae in southeastern England

Ian Tittley

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The spread and impact on native communities of non-native marine species to the coasts of Britain and Ireland is a major issue of concern for conservation. This is reflected in articles published by Porcupine members in the Society's Newsletter (Davis & Davis 2006; Anon. 2006; Evans 2009; Junnie 2010; Brazier 2011; Brodie 2012; Hitchin 2012). When I first started studying the marine algae of Kent in the 1960s, non-native benthic marine algae were unknown there (cf Tittley & Price 1977) although non-native animals such as *Elminius modestus* Darwin and *Crepidula fornicata* (Linnaeus) were present; the animal list is longer now with the recent arrival of the non-native sea-squirt *Didemnum vexillum* Kott and other species. Probably one of the most impactful non-native animals is the Pacific Oyster *Crassostrea gigas* (Thunberg) which at places in Kent and Essex is present in plague amounts changing dramatically the nature of intertidal biotopes. In the extensive marshy areas of southeast England, the cord grass *Spartina anglica* C.E.Hubbard, an amphidiploid descendant of the American *S. alterniflora* Loiseleur-Deslongchamps, has spread widely causing large scale accretion and perhaps influencing the loss in Kent of the native *S. maritima* (Curtis) Fernald. In the tidal Thames, the non-native marine diatom *Hydrosera triquetra* G.E.Wallich is locally abundant on river walls in central London. Since the late 1980s, non-native benthic algae have spread to Sussex, Kent and Essex; their impact on the local ecology varies from insignificant to considerable. This article describes their current status and updates a previous local report (Tittley 2010).

Fig. 1: Rafting Sargassum muticum*, Herne Bay, Kent*

The first and most obvious arrival was the brown alga *Sargassum muticum* (Wireweed; Figure 1) which in Sussex occurs sporadically in the west of the county on stones and shells, in Brighton marina, and in the east of the county on chalk shores from Brighton to Beachy Head (Tittley *et al.* 2010), in the lagoons between the intertidal sandstone ridges near Eastbourne, and at Hastings. Wireweed was first found in Kent in 1988 at Margate where it occurred sporadically in rock pools (a previous survey (Tittley *et al.* 1986) did not record the species). It was subsequently found in south Kent near Dover and now occurs in many places between Deal and Folkestone. On the north Kent coast it has spread west to Oare Creek at Faversham (Tittley 2013) and in the Margate area forms abundant blanketing growths in natural and man-made pools. *Sargassum muticum* is now the characterising species of the deep pool biotope formerly characterised by *Halidrys siliquosa*. Across the Thames estuary in Essex *S. muticum* occurs in the Blackwater estuary where it grows on stones and shells and most abundantly on floating oyster rafts. *Sargassum muticum* has been found widely as viable drift material and is also a common rafting species whereby plants are moved attached to their substratum, usually a small stone or shell (in north Kent often clumps of *Crepidiula fornicata*). Both drifting and rafting are important means of dispersal. Currently *S. muticum* does not occur on the east coast of England north of Essex but is present

Fig. 2: Caulachanthis okamurae*, Epple Bay, Birchington, Kent*

in northern France (having been found at Boulogne in 1981 prior to its discovery in Kent, (Coppejans 1995)) and the Netherlands where it was first found in 1980 (Stegenga & Mol 1983).

A non-native alga that has spread very recently (first noted in 2008) to the southeast of England is the diminutive red alga *Caulacanthus okamurae* Yamada (Figure 2); it was first recorded in southern England in 2004. This pinkish-red, wiry, turf-forming plant resembles the native *Gelidium pusillum* (Stackhouse) Le Jolis but differs in having terete thalli, small spiny branchlets, a distinct central axial filament, and zonately divided tetraspores. A recent survey of chalk shores in Sussex (Tittley *et al.* 2010) revealed it to be consistently present from Brighton to Beachy Head; it is similarly abundantly present in Kent on wave-washed rocks and boulders from Folkestone to Deal (members saw it during the Porcupine M.N.H.S. field visit to St Margaret's Bay near Dover). A recent survey of the Thanet SAC (Tittley *et al.* 2012) revealed *Caulacanthus* at Ramsgate as a carpet of turf-forming growth over mussel bed and chalk reef; it has spread rapidly around the SAC since a previous survey when it was not recorded (Tittley *et al.* 2006). Thus far *Caulacanthus* has not been found in Essex but has spread to the Netherlands. In Sussex and Kent it grows among the turf-forming *Gelidium pusillum* and *Osmundea pinnatifida* biotope as a codominant species; occasionally it is found as an epiphyte on the lower stipes of *Fucus serratus*.

The large foliose red alga *Grateloupia turuturu* Yamada ('Devils Tongue Weed') is another relatively recent (1969) introduction to

Fig. 3: Grateloupia turuturu*, Herne Bay, Kent*

Britain. The first records in southeast England were of populations growing just below water level on floating pontoons in Brighton Marina, and in Dover and Ramsgate harbours. In Sussex it now occurs on the intertidal chalk reefs

Fig. 4: Undaria pinnatifida *in Ramsgate harbour, Kent (B.Chapman, Kent Wildlife Trust)*

between Brighton and Beachy Head (Tittley *et al.* 2010). In Kent it has not been found on chalk reef but in 2012 drift plants were washed ashore at Herne Bay and Birchington (Tittley 2013), and in the summer of 2013 it was found growing on a navigation buoy near Sheerness. *Grateloupia turuturu* is one of the largest red algae in Britain and the linear-lanceolate fronds found at Herne Bay measured over 1 m long (Figure 3); plants were abundantly fertile with cystocarps. The discovery of fresh, healthy, fertile drift plants suggests a nearby population. Currently *G. turuturu* is not present in Essex.

The large kelp-like brown alga *Undaria pinnatifida* (Harvey) Suringar (Figure 4) is another recent immigrant to Britain, first found in Southampton Water in 1994 and which has subsequently spread along the south coast of England (Hardy & Guiry 2006) east into the southern North Sea. In Kent and Sussex it occurs on floating pontoons on marinas in harbours and in the summer of 2013 it was found growing on a navigation buoy near Sheerness. In west Sussex it was found in the natural Chichester Harbour growing on *Crepidula fornicata* while in Essex it occurs on floating oyster rafts near Mersea Island in the Blackwater estuary. The Essex record represents its current northeastern distributional limit in England although it is known from the Netherlands (Stengenga *et al.* 2007).

Four other non-native marine algae have been found recently in southeastern England but are less noticeable and impactful. The brown alga *Colpomenia peregrina* Sauvageau ('Oyster Thief'; Figure 5) occurs sporadically, mostly as drift, and epiphytic on larger algae. Although present in England since 1907 it has been found only recently in Kent and Sussex. It is present in northern France (Coppejans 1995) and known only as drift in the Netherlands (Stegenga & Mol 1983). The green alga *Codium fragile* (Suhr) Hariot ssp. *fragile* ('Green-fingers') has been known to occur in southern England since the early 20th century but has been found only very recently in Kent (Cliftonville near Margate) and Essex (Canvey Island) where in both cases plants occurred in man-made swimming pools as occasional fronds (Tittley & Hitchin 2012). The species is also known to occur in northern France (Coppejans 1995) and the Netherlands (Stegenga & Mol 1983) where it was first found in Europe. The red alga *Bonnemaisonia hamifera* Hariot occurs only rarely in southeastern England having been found only once, as the filamentous tetrasporangial stage epiphytic on large algae, in a tidal swimming pool at Cliftonville near Margate. The record is in a gap in its distribution between West Sussex and Northumberland (Hardy & Guiry 2006). Both stages in its life cycle have been recorded as drift in the Netherlands (Stegenga & Mol 1983) but not in northern France. The related *Asparagopsis armata* Harvey has been found only rarely in southeast England (Hardy & Guiry 2006) and once in Kent between Dover and Folkestone where the tetrasporophyte occurred as an epiphyte on larger algae at lower mid-littoral levels. The Kent location represents its current eastern limit of distribution in Britain (cf Hardy

Fig. 5: Drift Colpomenia peregrina, *Birchington, Kent*

& Guiry 2006) although both stages of its life cycle have been found in the Netherlands but only as drift (Stegenga *et al.* 1997); it has not been recorded in northern France.

The diatom *Hydrosera triquetra* is a tropical, filamentous species that comprises a chain of cells and superficially resembles a filamentous brown alga. It was first found in Europe in 1971 (Gleave 1972) among green algae on the walls of the tidal Thames in London and is now present as a golden brown zone on the lower parts of river walls in central London; its distribution remains restricted to between Greenwich and Putney.

Two (*Caulacanthus okamurae, Sargassum muticum*) of the eight species of benthic marine algae that have spread to southeast England during my working lifetime occur widely, are aggressive colonizers and are locally dominant species that have changed community structure; it is anticipated that *Grateloupia turuturu* will become established on chalk shores of Kent as in Sussex and that *C. okamurae* will grow more extensively on wave-washed intertidal reefs. *Sargassum muticum* with its ability to grow on small stones and shells will occur more widely and commonly in North Kent and Essex. In a previous article on man-made structures (Tittley 2013b) I drew attention to their importance for the settlement and establishment on *Crassostrea gigas*; in the course of a recent survey of the creeks of North Kent where typical wetland communities prevail I came across an isolated, dense, population of *S. muticum* growing on the intertidal concrete apron of an outfall from an inland tidal saltwater pond (Tittley 2013c), demonstrating its ability to spread (perhaps as driftweed or a fouler of boat hulls) to an unexpected and isolated location and grow there if conditions are suitable.

Despite official awareness of the impacts of non-native marine algae, international cooperation is needed to halt the spread of these unwanted species. Until this happens non-native algae will continue to arrive and once present there is little hope of controlling their spread and impact (attempts at locally uprooting *S. muticum* in Thanet have proved to be only a temporary measure as recolonisation soon occurs). The recent condition status monitoring of the Thanet Coast Special Area of Conservation (Tittley *et al*. 2012) relocated all features and confirmed that 'favourable condition' had been mostly achieved but with the caveat that the increasing abundance of invasive non-native species could lead to a future deterioration in condition.

Porcupine members are asked to send the author and colleagues (J. Brodie, J. Pottas) at the Natural History Museum records of non-native algae and, if possible, voucher specimens as for some species (e.g. *Caulacanthus okamurae, Gracilaria vermiculophylla* (Ohmi) Papenfuss, *Heterosiphonia japonica* Yendo, *Undaria pinnatifida*) there are few herbarium specimens and consequently poor temporal and geographical historical records.

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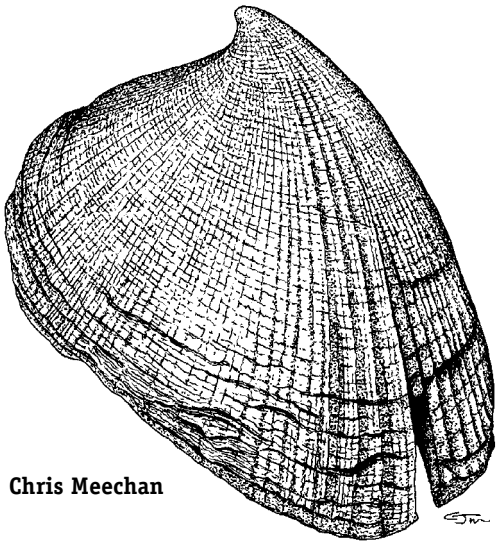

Chris Meechan

Emarginula crassa (Sowerby, 1813)

Mollusca: Fissurellidae

Also known as the Thick slit limpet. Found on hard surfaces, usually under stones, from low water to 200 m depth. Northern species in the UK, found in west Scotland, Orkney and Shetland, also southwest Ireland and Antrim.

Spanish or Mediterranean Ling *Molva macrophthalma* (Rafinesque, 1810) in Irish and UK waters: Further records and a review of records

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During July 2002, a specimen of the Spanish or Mediterranean Ling *Molva macrophthalma* (Rafinesque, 1810), measuring 380 mm TL and weighing 220 g, was captured by the MFV *Aaltje Adriaantje* (PZ198) while beam trawling (using 80 mm mesh nets) at a depth of 60-90 m, SW of Cornwall (ICES Division VIIf, 29E3) and landed into Newlyn, Cornwall on 29 July 2002. A further specimen, measuring 520 mm, captured from the same area, was landed into Newlyn 22 September 2005 (Paul Nelson pers. comm.).

During May 2011, the MFV *Eblana* (D379) [Skipper: Peter Lynch, Howth, Co Dublin] captured another specimen (Figure 1) measuring 455 mm TL and weighing 118 g while demersal trawling (using 100 mm mesh nets) at a depth of 134 m on the Jones Bank (49°54.30′ N, 07°39.63′ W) [ICES Division VIIh, 28E2], SW of Cornwall, UK. The following morphometric and meristic details were recorded: pelvic fin extended 15 mm beyond the tip of the pectoral fin; snout length 21 mm; eye diameter 20 mm; chin barbel length 7 mm; first dorsal fin ray count 10 mm (Figure 2). The gills were heavily infested with the marine parasitic copepod *Lernaeocera*, most likely *L. lusci* (Bassett-Smith, 1896) [M. Holmes pers. comm.]. Although *L. lusci* has previously been recorded from several species of marine fishes, including the 'Common' Ling *M. molva* (L.) this is possibly the first known record from *M. macrophthalma* (http://www.marinespecies.org/aphia.php?p=taxdetails&id=135994). The current specimen of *M. macrophthalma* was donated to the National Museum of Ireland (NMINH: 2012.51.1).

Although some authors (Svetovidov 1986; Cohen *et al*. 1990) consider that the Spanish Ling is a sub-species (*M. dipterygia macrophthalma*) of the Blue Ling *M. dipterygia* (Pennant, 1784), there are clear diagnostic morphological differences between them (Wheeler 1969, 1978). Furthermore, *M. macrophthalma* has been shown to have a distinct electrophoretic profile (Durand *et al*. 1985) and is currently officially recognised as a distinct species (www.fishbase.org). Nevertheless, the Spanish Ling is frequently confused with the Blue Ling, and both species are sometimes captured together along with *M. molva* [Fraser-Brunner & Palmer 1951; Wheeler 1969, 1978].

Wheeler (1969, 1978) remarked that *M. macrophthalma* reaches the northern limit of its European distribution off southern Ireland, is rarely recorded further north, and that there is no evidence of its occurrence off either British or Irish (inshore) coasts. It is a deep-water fish, living at depths of 200-1000 m, usually over muddy bottoms. Although it spawns along the edge of the continental shelf, little is known about its biology. Kay & Dipper (2009) remarked that it is found offshore along

Fig. 1. Spanish or Mediterranean Ling Molva macrophthalma *(Rafinesque, 1810), Loop Head, Co Clare, 3 June 1990*

Fig. 2. Anterior detail of Spanish or Mediterranean Ling Molva macrophthalma *(Rafinesque, 1810), Jones Bank, SW Cornwall, May 2011.*

the west coast of the British Isles but has not so far been recorded from Welsh waters.

Svetovidov (1986) noted that although the Spanish Ling has been recorded, albeit rarely, from as far north as the Faroe Islands [one record], it normally extends southwards from Ireland to Morocco and into the western Mediterranean. A single specimen of Spanish Ling from the Faroe Islands is in the collections of the British Museum of Natural History (BMNH) registered as *M. abyssorum* (Nilsson, 1832) [BMNH 1894.3.29.2], which is a junior synonym of *M. dipterygia*.

Fraser-Brunner & Palmer (1951) remarked 'We suspect that the range of *M. macrophthalma* extends further north (than western Ireland) than has been supposed, but misidentification has concealed the fact'. In addition to the single Faroe specimen mentioned above, there are two more specimens of Spanish Ling in the collections of the BMNH registered as *M. elongata* (Otto, 1821) [BMNH 1920.12.1.20-21], a junior synonym of *M. macrophthalma*, which were taken on the Lousy Bank (60.33° N, 12.66° W) during 1920. The dominance of *M. macrophthalma* in one small cluster on the Rockall Bank during 1983 was ascribed to the influence of the Lusitanian (Mediterranean) fauna on that community (Ratz 1984).

Details on all known specimens of *M. macrophthalma* recorded from Irish and UK inshore waters (depths <200 m) are summarized in Table 1. Although only 7 specimens have been recorded from inshore waters, the Spanish Ling is generally considered to be relatively frequent in its occurrence in deeper offshore waters (>200 m) (Wheeler *et al.* 2004). Since it was first reported from Irish offshore waters during 1901 (Holt & Byrne 1906), the species has been recorded infrequently from several offshore locations, including W and SW Ireland, Porcupine Seabight, Goban Spur, Farm Bank, Porcupine Bank, Rockall Bank, Lousy Bank and NW Scotland [Fraser-Brunner & Palmer 1951; Blacker 1962; Bridger 1978; Latrouite *et al.* 1984; O'Riordan 1984; Ratz 1984; Merrett et al. 1991; Gordon & Hunter 1994; Quigley & Flannery 1994; Warnes & Jones 1995; Gordon *et al.* 1996; Iglesias 2008; Priede *et al.* 2009; Quero *et al.* 2011; Went 1962, 1963; Global Biodiversity Information Facility (GBIF) Data Portal, www.gbif.org; BMNH Fish Collection Database, www.nhm.ac.uk].

The vast majority of offshore specimens were recorded by research vessels rather than commercial vessels which suggest that the species may be discarded by the latter vessels due to its relatively small size. Nevertheless, considering the absence of the species from the vast majority of research studies carried out in both Irish and UK waters over the last 150 years (e.g. Haedrich & Merrett 1988; Rice *et al.* 1991; Connolly & Kelly 1994a & b, 1997; Kelly *et al.* 1997; Ellis *et al.* 2002; Gordon 2003; Nolan 2004a & b; Tidd & Warnes 2006; Kavanagh 2009; Johnston *et al.* 2010), it is possible that it may not be particularly abundant and/or may have evaded capture or may have been misidentified. Accurate species identification is fundamental to fisheries research and bad taxonomy affects the overall regulation and conservation of fisheries resources.

The Spanish Ling is relatively small (maximum TL 1080 mm and weight 7 kg) in comparison with the 'Common' Ling (maximum TL 2000 mm and weight 45 kg) and Blue Ling (maximum TL 1550 mm and weight 30 kg) (Wheeler 1978; Cohen *et al.* 1990) and is not specifically targeted by commercial fishing vessels at the northern extent of its range. The largest specimen recorded from Irish and UK inshore waters to date measured 996 mm (Minchin & Molloy 1978). As its junior synonym *M. elongata* suggests, the Spanish Ling's eel-like shape, compared to the more robust 'Common' and Blue Ling, probably makes it less vulnerable to capture in both commercial and research trawls. Indeed, it is possible that the species may be more common in inshore waters than the current paucity of records would suggest.

Considering the Spanish Ling's comparatively small size and potential misidentification with the Blue Ling, it is possible that any by-catch taken by commercial vessels is either discarded or simply marketed as 'Ling'. On 15 June 1916, H.E. Rees, Fish Salesman and Steam Trawler Manager at Swansea Fish Market wrote to Tate Regan in the BMNH about a specimen of *M. elongata* which was captured by the ST *Caswell* on 7 May 1916 at a depth of 600 m, 144 km SSW of the Bull Rock, Co Mayo (BMNH 1920.12.1.20-21). He remarked: 'The captain tells me he caught one some time ago, but threw it overboard again. I am afraid many good specimens of rare fish share that fate'.

The commercial exploitation of Blue Ling and 'Common' Ling is currently regulated by annual EU total allowable catch (TAC) and quota regimes but the Spanish Ling is not (http://ec.europa.eu/fisheries/documentation/publications/poster_tac2012_en.pdf). Although the Food and Agriculture Organization of the United Nations (FAO), state that the Spanish Ling is of no interest to fisheries (www.fao.org/fishery/species/2221/en), the species has been specifically recorded in FAO catch statistics during recent years. For example, during 2009, 2010 and 2011, Spanish vessels were reported to have landed 104, 2 and 5 tonnes respectively (http://www.fao.org/fishery/statistics/global-capture-production/en). However, according to statistics published by the International Council for the Exploration of the Sea (ICES) [http://info.ices.dk/fish/CATChSTATISTICS.asp], Spanish vessels landed a total of 530 tonnes during 2009, the vast majority (90.8%) from ICES Division VIIIc (N and NW Spain), and the balance from the Portuguese coast (ICES Division IXa) [8.7%] and Bay of Biscay (ICES Divisions VIIIa, b and d) [0.5%]. According to ICES, Spanish vessels landed 27 tonnes during 2010, the vast majority (93%) from ICES Division X (Azores) and the balance from ICES Division VIIIc (N and NW Spain).

Considering the current increasing trends in sea water temperatures, particularly in NW European seas (Boelens *et al.* 2005), it is possible that the Spanish Ling may extend its range and abundance further northwards and the species may eventually become commercially important as many native cool-water temperate species continue to be overexploited and/or retreat northwards. Swaby & Potts (1990) suggested that uncommon marine fish species and particularly those on the edge of their distribution can provide essential indicators of environmental change because they, more than their terrestrial counterparts, can move freely in response to environmental factors and are thus better indicators of change.

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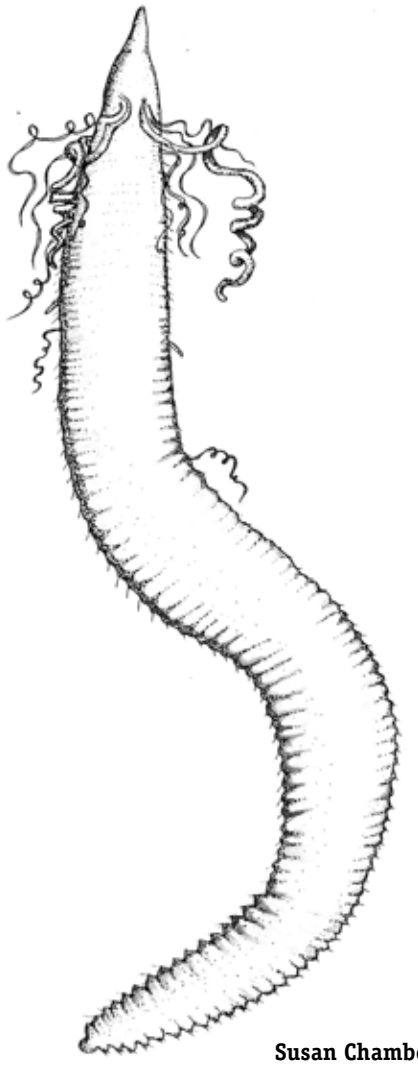

Susan Chambers

Chaetozone christiei *Chambers 2000*

Annelida: Polychaeta: Cirratulidae

Marine bristleworm described in 2000 from British waters. It is found intertidally and in shallow sub-littoral habitats in clean, stable sand.

Estimating the jellyfish diet - digesting the errors of gut-content analysis

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The term 'jellyfish' encompasses a wide range of species and taxonomic groups, from cnidarians (the division of the animal kingdom that includes jellyfish and coral) to ctenophores (a division commonly known as comb jellies). Dense blooms of jellyfish can be a natural feature of marine ecosystems; however, media reports and some scientific publications have fuelled the idea that jellyfish may dominate in certain areas in the coming decades (Schrope 2012). Historically, long-term monitoring of jellyfish populations has been challenging because of their fragile and delicate consistency. This makes them difficult to sample and ignored in traditional time-series studies. However, there is some circumstantial and direct evidence to suggest that human activities – specifically overfishing, increased pollution, climate change, habitat modification and the introduction of alien species – contribute to jellyfish outbreaks (Richardson *et al*. 2009).

The consequences of jellyfish blooms are wide-ranging, impacting individuals (e.g. stings to tourists) to whole economies. The fisheries industry can suffer considerably. Burst fishing nets, contaminated catches, the killing of farmed fish, interference with acoustic fish assessments and the reduction in commercial fish abundance through competition and predation have all been linked to jellyfish blooms. For example, in 2007 a dense bloom of *Pelagia noctiluca*, commonly known as the mauve stinger, killed more than 250,000 salmon at a fish farm in Northern Ireland (Doyle *et al.* 2008). Since the early 2000s, blooms of the giant Nomura jellyfish (up to 2m in diameter and weighing 200 kg) have caused catastrophic problems in the Far East by clogging and bursting fishing nets (Schrope 2012). The potential for large-scale detrimental economic and environmental impacts has highlighted the need for a wider and more detailed knowledge of the feeding habits of jellyfish and their role in the marine food web. It is also important to understand if jellyfish select for certain prey types, so that we can assess if their diet overlaps with other marine predators, such as fish larvae. This will allow scientists to more accurately predict the effects that jellyfish blooms will have on the marine ecosystem.

Determining the feeding rates of jellyfish and their selectivity for specific prey using laboratory experiments presents a variety of problems. Rearing jellyfish in captivity is labour intensive and often difficult. It is not easy to replicate the natural environment in the laboratory without the use of specialist equipment. For example, while jellyfish are free-swimming organisms, they need a certain level of water movement and flow to stay afloat. To achieve this, aquariarists use a kreisel (Figure 1), which is a specialist jellyfish tank that keeps these gelatinous predators suspended in the water. Traditional aquariums do not provide the correct conditions of water-flow and the jellyfish tend to congregate in the corners, hindering natural movement, which leads to unhealthy individuals and ultimately death. Laboratory experiments can also suffer from 'container effects', where the physical confinement of the tank can affect the natural swimming and feeding behaviour of the jellyfish. In addition, jellyfish can be voracious predators, so laboratory feeding experiments need to consider the prey density introduced to predators, as well as the incubation time with this prey, to obtain meaningful results.

To avoid the problems associated with laboratory experimentation, a common method of assessing jellyfish diet is to perform gut-content analysis. This involves sampling individuals directly from the environment, examining their guts and counting each prey type. Individuals need to be sampled quickly, using a gentle method, to avoid damage, minimise feeding in the sampling net and regurgitation of prey through stress. There are many advantages to this method. As well as avoiding the problems associated with laboratory experimentation, it directly assesses their natural diet. The disadvantage of gut-content analysis is that it can only

Fig. 1: Experimental kreisel containing Aurelia aurita *medusae*

provide qualitative information about the jellyfish diet; it cannot be used directly to estimate feeding rates and selectivity. This is because two factors need to be considered. (1) Different prey types are not likely to be similarly recognisable within the stomach. This means that the analysis of food selection may be biased, which favours prey types with hard body parts and easily recognisable structures. (2) Different prey items may be digested at different rates and therefore predation pressure on different prey types may not be reflected accurately in the gut contents.

To compensate for these factors, the number of each prey found in the gut of the jellyfish is divided by an estimation of digestion time for that prey type. This provides information on their feeding rate (i.e. number of prey eaten per hour). Feeding rates can then be compared across the different prey found in the gut, to find out if the jellyfish is eating more of one prey than another. Feeding rates can also be compared to the prey found in the water at the time of sampling, to see if they are eating different proportions of prey items than are found in the environment, which may indicate selectivity. This information helps us to understand the trophic ecology of jellyfish and the role they play in the marine food web. Clearly, if we are to obtain accurate estimates of feeding from the gut-content counts of prey, we need to apply accurate estimates of digestion times.

This is where our study started. Our initial project was to assess the diet of jellyfish, to see if they were selectively feeding on different prey types. In researching the methods we would follow, we found no standard approach to estimate digestion time in jellyfish. Furthermore, no comparison has been made between the different methods used. We felt this would probably lead to very different digestion time estimates and, therefore, different estimates of feeding rates. Our research revealed that three primary approaches have been used to estimate digestion times. 1) The Manual-feeding method physically constrains the jellyfish in a small amount of seawater, before introducing prey to the stomach by pipette and observing the digestion under a microscope (Suchman & Sullivan 2000). 2) The Natural-feeding method allows the jellyfish to feed naturally before physical constraint and the observation of the progress of digestion (Uye & Shimauchi 2005). 3) The Steady-state method allows the jellyfish to feed and swim naturally, estimating digestion time by knowing how many prey the jellyfish have eaten from the kreisel and how many prey are found in their guts at the end of the experiment (Båmstedt and Martinussen 2000).

We compared the three methods using the moon jellyfish, *Aurelia aurita*, (Figure 2) as our test subject, provided by the aquarium at the Horniman Museum, London. Previous studies have shown that temperature and prey type can both influence digestion time, so we used the same prey (adult female *Acartia tonsa* – a small planktonic marine copepod) for all three experiments and performed them at the same temperature. We found that digestion times estimated by the three methods differed considerably, ranging from 1 to 3 ½ hours (FitzGeorge-Balfour *et al*. in press). Feeding rates estimated using these digestion time estimates would vary by a corresponding ~4-fold difference, producing

Fig. 2: Aurelia aurita*, commonly known as the moon jellyfish.*

very different information about the diet of the jellyfish. We attributed the large difference to the approaches used by each method and the degree to which the jellyfish are allowed to feed and swim naturally. For example, being trapped in a small space and force-fed food is not akin to the natural behaviour of most animals! The steady-state method would seem like the preferred method, as it allows the jellyfish to behave naturally, however, counting out enough prey to fulfil the criteria of the method and to assess how many the jellyfish has eaten is not an easy job, considering the tiny (<1 mm) size of prey. We suggest that jellyfish are allowed to swim and feed as naturally as practically possible when estimating digestion time. We also advise that a range of digestion times are applied to jellyfish gut-content counts to allow for variation. These recommendations will hopefully improve our ability to more accurately predict the impact of these important gelatinous predators on the marine ecosystem.

Acknowledgements

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The importance of discriminating between seaweed species

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The seaweeds - red (Rhodophyta), green (Chlorophyta) and brown (Ochrophyta) – are marine macrophytes that occur on shores and the shallow subtidal of rocky coasts around the world. With over 10,000 species described (c. 6500 red, 1500 green and 2000 brown), they represent a significant proportion of biodiversity in the shallow marine environment. We do not know how many species there are in total in the world, but it is estimated that there may be as many as 30,000 species still to be discovered. The potential for so many species reflects the challenges of discriminating between species and determining relationships. For example, Linnaeus's concept of the algae in 1753 was of a few genera within a subdivision of the Cryptogamia, a class which also included the ferns, mosses and fungi (see Brodie & Zuccarello 2007). Current classification places the red and green algae (ancestors of the land plants) in the same eukaryotic supergroup (Archaeplastida or Primiplantae) whereas the brown algae are in a different supergroup (Stramenopila).

Traditionally, the identification of seaweeds has been based on morphology. However, it can be extremely difficult to identify and classify seaweeds on morphological grounds for a number of reasons. Conspicuous characters are often lacking although morphology can be highly variable within and between species. It is common for highly convergent morphology to occur that can conceal cryptic species that have been discovered from molecular data. Many benthic macroalgae are host to a wide range of green, red and brown algae which live partly (epi-endophytic) or wholly (endophytic) inside the organism. A good example of cryptic diversity can be found within endophytic taxa of the green algae (Figure 1). These endophytes have a relatively simple morphology and lack diagnostic characters that make identification very difficult or impossible. A molecular phylogeny of the microfilamentous genus *Acrochaete* (now transferred to *Ulvella*; see Nielsen *et al*. 2013) and other endophytic green algae in the family Ulvellaceae (Ulvales) by Rinkel *et al*. (2012) revealed a diversity that exceeded the number of taxa determined morphologically. Of twelve species of *Ulvella* (as *Acrochaete*) revealed by the molecular analysis,

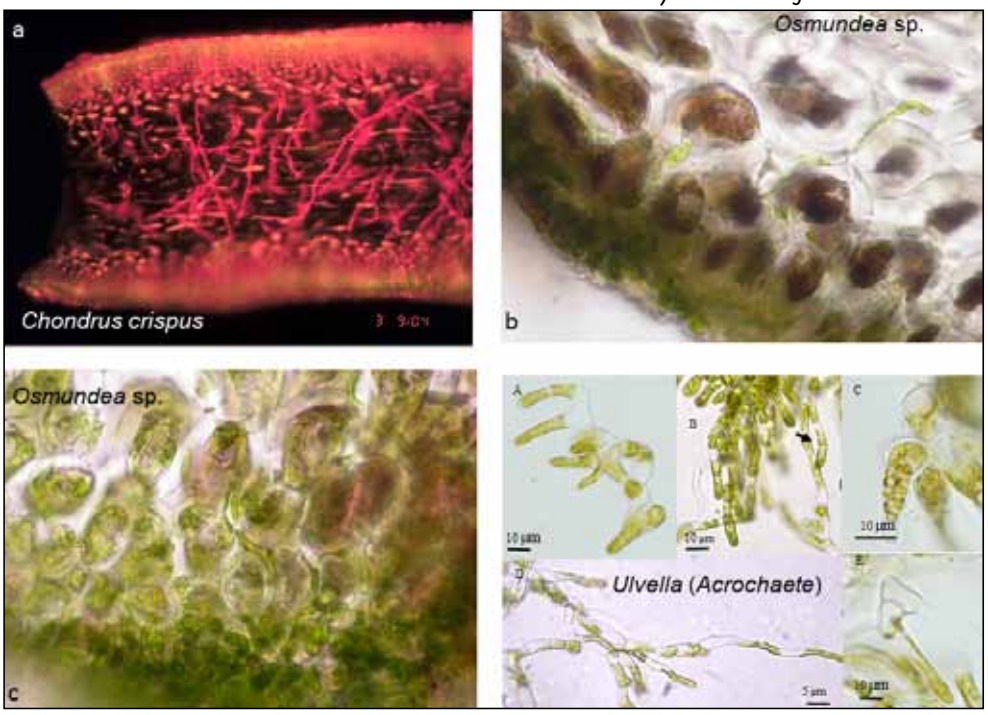

Fig. 1: Examples of green algal endophytes. a) Green filaments (crimson) in the red algal host Chondrus crispus*; under autofluorescence. b) & c) Green algae in the red algal host* Osmundea *sp. d)* Ulvella *isolated from a variety of seaweed hosts and free-living in culture.*

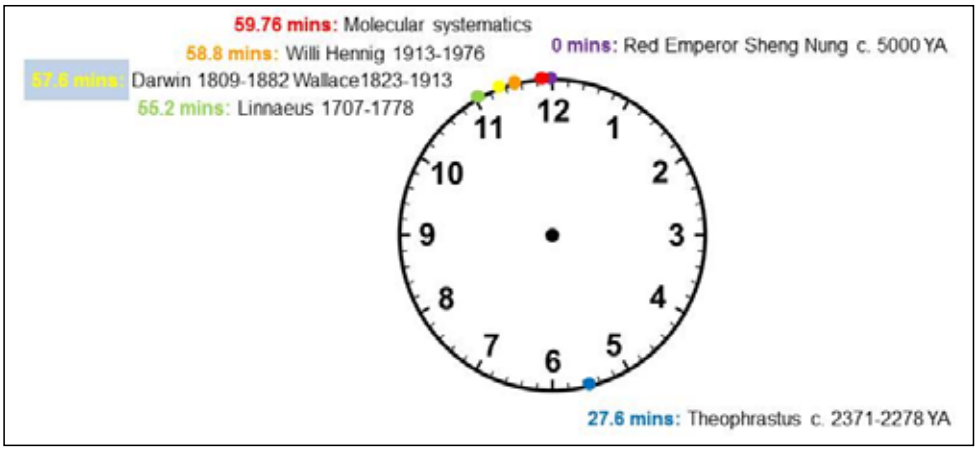

Fig. 2: A brief time history of systematics where years are converted to minutes.

six were new species of the genus. At least two unknown genera were found in a separate family, the Kornamnniaceae (Ulvales), and new species occurred in the Ulotrichales, a sister order of the Ulvales.

The red algae also present particular challenges because of the complexities of their life histories, many of which have a heteromorphic alternation of generations where the separate stages may have been described as different species. A good example of this can be found in the cosmopolitan red algal order Bangiales, where the macroscopic foliose or filamentous gametophyte phase alternates with a microscopic conchocelis (shell-boring) sporophyte phase (Brodie & Irvine 2003). The order, which traditionally had two genera, *Porphyra* and *Bangia*, has recently undergone a generic revision based on a two-gene molecular phylogeny (Sutherland *et al*. 2011). The recognition now of at least eight bladed genera and seven filamentous genera demonstrates the extent of the genetic diversity that exists which is not reflected in the morphology.

The application of molecular techniques to systematics has been transformative in our understanding of life on earth. To illustrate just how rapid and profound the molecular revolution has been it is worth considering molecular taxonomy in the context of a brief history of systematics (Figure 2). As humans, we are hard-wired to distinguish between different organisms: they are our food, medicine and raw materials upon which we depend. The date at which modern systematics began is debatable but written documentation dates back to China, c. 5000 years ago with Sheng Nung, the Red Emperor who had a botanical garden and tested plants on himself. If we take this as a starting point, it is over 3500 years before the next major impact on the subject, with the Greeks, notably Theophrastus (c. 2371-2278 years ago). It is not until the 18th century that we have the next revolution with Linnaeus (1707-1778), whose binomial system for naming of plants we still use today. In the 19th century Darwin (1809-1913) and Wallace (1823-1913) changed thinking for ever with their theory of natural selection, followed by Willi Hennig, who in the 20th century was the founder of cladistics (phylogenetic systematics). But it is only in the last 20-25 years that we have had molecular systematics.

The application of molecular techniques in the identification and systematics of the seaweeds has revealed hitherto unrecognized diversity that is not necessarily reflected in their morphology. This has led to a fundamental shift in species concepts with profound implications for understanding distribution, rarity and endemism. The calcified red seaweed *Corallina officinalis* L. (Figure 3) provides a powerful example to illustrate this impact. *Corallina officinalis* Linnaeus is a geniculate (articulated) seaweed and the most commonly recorded species of *Corallina* worldwide. There are c. 20 species of *Corallina* listed (Guiry & Guiry 2014), but the exact number is uncertain due to the difficulties of distinguishing between species and the lack of well-defined species concepts for many of the taxa.

The name *Corallina officinalis* has been used around the world and analysis of records from herbarium collections and distribution records

Fig. 3: Corallina officinalis. *a) Habit. b) & c) Tips of fronds to show articulated appearance and characteristic trifurcate apical intergenicula; reproductive conceptacles are also present as terminal cone-shaped structures on the apex of some branches*

would suggest that it has a cosmopolitan distribution largely in temperate waters (see Brodie *et al.* 2013). *Corallina officinalis* Linnaeus is the type species of the genus and has recently been circumscribed by Brodie *et al.* (2013) including selecting an epitype from the UK. It was also clear from our earlier studies that in the UK there were two genetically distinct species going under this name (Robba *et al.* 2006; Walker *et al.* 2009). Further evidence from a molecular phylogeny based on a large dataset of *Corallina* species from around the world (Brodie, Williamson & Walker, unpublished data) suggests that the species is virtually confined to the North Atlantic and that the name has been misapplied elsewhere. In terms of understanding the distribution of *C. officinalis* (Figure 4), a map constructed from literature records would imply that the species is cosmopolitan. A map constructed based on only those records that are proven to be *C. officinalis sensu stricto*, indicates that the species is virtually endemic to the North Atlantic (with a couple of outliers off the coast of Pacific N. America; P. Gabrielson, pers. comm.). Here it is crucial to appreciate that the information listed is from the literature and that different species may be included under the entry of a particular name.

In conclusion, it could be asked whether any of this matters. The examples I have used to illustrate the importance of discriminating between species and the impact molecular systematics has had on understanding their diversity, relationships and distributions and the principles apply to all the algae. In the case of the species that have heteromorphic life history phases, consideration needs to be given to the distribution and dispersal patterns of the different phases and how each might respond to environmental change. The example of the endophytic green algae demonstrates the extent of diversity still to be discovered. Not only are the species cryptic morphologically but they are also hidden within the host. Seaweeds also have microbiomes, the diversity of which we know almost nothing, nor the impact of e.g. climate change and ocean acidification on the composition of those microorganisms. *Corallina officinalis* raises questions in relation to making conservation judgements. If a decision had to be made on which areas of the world should be conserved on the basis of hot

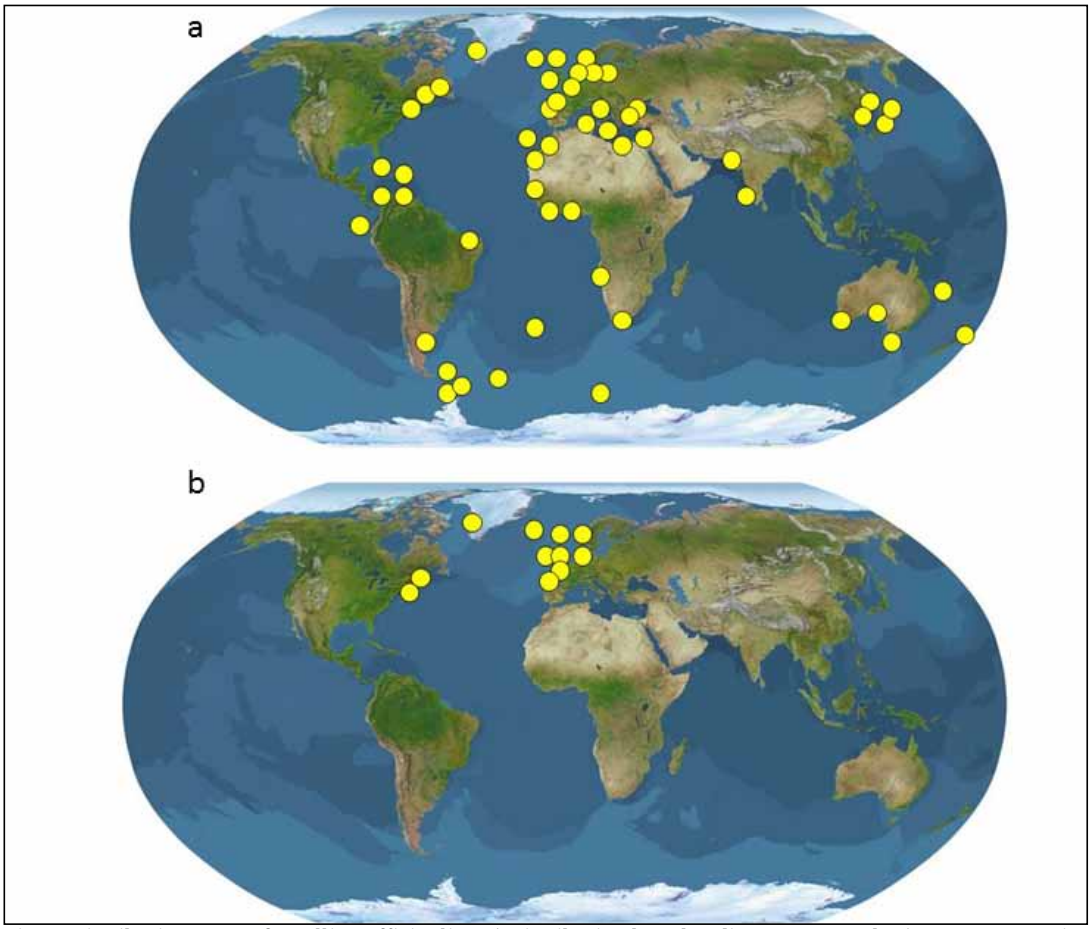

Fig. 4: Distribution maps of Corallina officinalis. *a) Distribution based on literature records. (Data source: Guiry & Guiry 2014.) b) Distribution of* C. officinalis sensu stricto *based on molecular data. (Data source: Brodie, Williamson & Walker, unpublished data).*

spots of endemic or rare species, a distribution of a species deemed cosmopolitan on the basis of the use of a name could lead to it being of least concern. The actual distribution might lead to a very different outcome.

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Recording Seaweeds in the British Isles

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On rocky shore surveys seaweeds are often overlooked or dismissed. Yet they are an important part of the biota with over 650 species in the British Isles, between the green, brown and red groups, which represent about 7% of the world's seaweed flora. They are responsible for the habitat conditions in some habitats such as subtidal kelp forests and intertidal fucoid-dominated shores, which determine the animal species that can occur. The British Phycological Society (BPS) recently celebrated its 60th birthday. The dominant emphasis in phycology has changed considerably over these 60 years to become much more microscopic and biochemical, but there has always been a continuing interest in the seaweeds. Indeed it was the seaweeds which were the initial impetus to forming the BPS.

In 1951, an informal gathering at Bangor formed a steering group to establish a phycological society. Part of that meeting was five days of seaweed collecting in the Menai Strait and Anglesey. This was the start of a regular event. The new society's aims included field meetings, a marine algal checklist and new guides to the British seaweed flora. This was seaweed-biased, unsurprisingly since the initial steering group were all seaweed specialists.

The marine field meetings were a more or less annual event for several decades as shown in Table 1.

Year	Area	Shores visited	Epilithic taxa recorded at meeting	Total published species records over all shores visited
1951	Menai and Anglesey	5	-	-
1953	Plymouth			
1954	Aberystwyth			
1955	St Bees Head, Cumbria	1	90	90
1956	Pembrokeshire	6	179	440
1958	Mayo, Clare, Kerry	15	209	787
1959	Northumberland	8	112	352
1960	Guernsey	21	267	1222
1962	Shetland	34	156	1077
1965	Normandy			
1967	Scilly Isles	34	241	1201
1969	Wexford	8	234	630
1971	Lewis & Harris	12	204	635
1972	Eastern border counties of Scotland	9	207	716
1973	Orkney	10	210	621
1975	Grampian	20	183	748
1976	Galloway	12	192	698
1977	Dorset			
1978	Glamorgan	8	146	408
1992	Anglesey	3	82	142
1993	Isle of Wight	7	133	259
1994	Yorkshire	3	90	161
Total of published species records over all meetings			**10187**	

Table 1: The marine BPS field meetings of the first 40 years which played a major role in mapping British seaweed distributions. The table does not include the more recent seaweed field meetings which have had a mainly teaching function.

Each year, an area lacking seaweed distribution knowledge was chosen. Experts and novices would visit for one week. Usually about 12–18 experts would attend. At least one different shore was visited each day and thoroughly sampled for the full species list. Samples were worked up in local laboratories, such as schools, until late evening. Novices learnt from the experts. The experts compiled an authoritative species list for publication, which for many of the meetings was published as a refereed paper in the British Phycological Journal. The outcomes of these meetings can be summarised as:

• Refereed published recordings for the BPS seaweed mapping scheme leading to the publication of the *Atlas of British Seaweeds* (Hardy & Guiry 2003),

• Authoritative full species lists for individual shores giving an idea of expected species richness,

• Database of seaweed distribution, unrivalled in many countries, that can be used as a baseline for assessing future change or devising conservation and quality assessments of shores,

• Younger members learning from more experienced ones,

• Sharing taxonomic expertise with visiting overseas field workers.

The field meetings were just one of the sources of data that contributed in a geographically structured way to the landmark publication Hardy & Guiry (2003) - *A Checklist and Atlas of the Seaweeds of Britain and Ireland* published by the BPS. This volume provides detailed distribution maps for 629 species of British seaweeds on a 10 km square basis as well as brief habitat notes that may help in evaluating possible identifications. It is a really useful publication for people making shore surveys and assessing possible changes in species distributions. The first edition of the atlas can be downloaded free of charge from the BPS website at http://www.brphycsoc.org/atlas.lasso. The second edition is only available for sale but is not much different from the first one. The seaweed records used in the creation of the atlas are fully publicly available via the NBN Gateway in a dataset administered by the BPS.

Both the Atlas and the field meetings are features from the past. Most of the Atlas recordings are from the 1960s through to the 1990s. The field meetings decreased in frequency after 1978 (Table 1) and one whose main aim was recording rather than teaching had not been held after 1994 until 2013. A need to resume seaweed-based field meetings was identified in the BPS for the following reasons:

• Increased emphasis on seaweeds for monitoring and conservation assessment (EC Water Framework and Marine Strategy Framework Directives),

• Changing distributions owing to climate change,

• Suspected decline of some of our major seaweed species e.g. fucoids,

• To check non-native species (now 6% of UK flora),

• Poor knowledge of long-term stability of our seaweed populations.

Over the years when the field meetings were in abeyance there had been an increased public emphasis on biological recording and a massive improvement in electronic recording and mapping possibilities. The BPS has responded to this by the resumption of seaweed field meetings from 2013, and by re-establishment of the seaweed recording scheme using modern electronic approaches. A field meeting at the Dove Marine Laboratory in summer 2013, held jointly with Seasearch, tested the possible success of seaweed recording field meetings and was used to trial a new online recording portal for seaweeds set up by the BPS. This article now describes in succession the online recording scheme, the success of the meeting held in 2013 and the Seasearch collaboration.

British Phycological Society Online Recording website

Plans were drawn up to develop an online recording scheme through the Biodiversity and Conservation Committee of the BPS in 2008. The opportunity arose in 2012–13 to get the scheme up and running by means of

Fig. 1: The British Phycological Society's online recording website

a grant from the Big Lottery funded OPAL Grants Scheme which funded the setting up of the scheme using the Indicia online recording toolkit, as well as a field meeting to try out the recording portal. Online recording will enable evidence to be gathered to determine change in the seaweed flora including, for example, assessment of reported losses of the habitat-forming large brown seaweeds and spread of invasive non-natives. Data from the scheme can be fed into coastal quality assessments, including the European Water Framework Directive and Marine Strategy Framework Directive. Traditional seaweed teaching in Universities has virtually collapsed in the UK and this initiative has the potential to raise awareness and broaden the appeal of seaweed studies. It is also anticipated that it will facilitate a wider engagement in seaweed recording and will complement existing outreach initiatives, including The Big Seaweed Search (OPAL/Natural History Museum/BPS http://www.nhm.ac.uk/nature-online/british-natural-history/seaweeds-survey/) which has been running for several years. The online recording portal on the BPS website is open to anyone to enter seaweed records.

Data are stored at the Biological Records Centre and will be freely available through the NBN Gateway and to DASSH (Data Archive for Seabed Species and Habitats). Records will be verified by a panel of experts provided by the BPS, using the verification facilities provided by iRecord (www.brc.ac.uk/iRecord). The recording site can be accessed directly at http://www.bpsalgalrecords.com/ or from the "seaweed recording" link on the front page of the BPS website www.brphycsoc.org.

The 2013 BPS seaweed field meeting

In order to get the online recording off to a good start, a field meeting was proposed that would revisit the Northumberland coast where the BPS had held a meeting to study seaweeds in 1959. As well as setting up online recording, the OPAL grant required us to publicise the BPS more widely. Therefore the meeting was held jointly with Seasearch at Newcastle University's Dove Marine Laboratory - a centre of excellence for outreach activities - from 24th to 28th July 2013 (inclusive). The BPS had recently contributed some funding to the publication of the *Seasearch Guide to Seaweeds of Britain and Ireland* (Bunker *et al*. 2010), which has been very successful and the collaboration in the meeting builds on this. Seasearch collaboration (described in more detail in the next section of this article) brought biological recorders to the field meeting from outside of the BPS and enabled some sublittoral sampling as well as in the intertidal zone. There were 31 participants (10 BPS members; 12 Seasearch

Fig. 2: Ruth Crundwell, Fiona Tibbitt and Clare Scanlan collecting seaweeds on the shore at Boulmer

members and 9 others). Participants included staff of statutory agencies (e.g. SEPA, Natural England, JNCC), some consultants, academics and amateurs. Two came from Poland, the rest from the UK. This was a greater number of participants than had previously usually attended the BPS seaweed field meetings. Three shores were exhaustively sampled in the intertidal zone (Boulmer, St. Mary's Island, a conservation area near the laboratory and Whitburn, Co. Durham) and a further two shores gave sublittoral records.

The Dove Marine Laboratory is thanked for giving a reduction on the normal fee for lab hire, which enabled the OPAL grant to completely cover the cost, so that, on this occasion, we did not have to charge a registration fee, with the hope of encouraging wide participation. Although this field meeting was deliberately not a teaching meeting, the friendly atmosphere in the lab meant that the professionals and experts gave lots of help to those less experienced, but still had time to collate academically credible recordings. The participants led us to believe that the meeting was a resounding success.

A provisional total of 141 seaweed taxa was recorded, distributed between the intertidal shores visited as shown in Table 2. Ten of the taxa were recorded only in the diving surveys. It is hoped to publish a list of the taxa recorded in the BPS bulletin *The Phycologist* in spring 2014. The records have been entered into the BPS online recording site and will be available via the NBN Gateway in due course.

Locality	Total	Red	Brown	Green
Boulmer	86	44	27	15
Whitburn	79	43	17	19
St Mary's Island	75	34	21	20

Table 2: Totals of seaweed taxa recorded on three shores at the BPS field meeting in summer 2013

It would be good to continue with marine field meetings, an original aim of the BPS, now that they have been restarted and the BPS is considering possible venues for another meeting in 2014. The convener of the BPS Biodiversity & Conservation Committee, Martin Wilkinson m.wilkinson@hw.ac.uk would love to hear from Porcupine members with a view on where meetings might be held or who would just like to be kept informed with a view to taking part.

The Seasearch participation in the BPS field meeting

There was a time when the algal records found on many Seasearch forms were often no more detailed than "red / green / brown seaweeds", "encrusting pink algae" and "kelp". The publication of the excellent *Seasearch Guide to Seaweeds of Britain and Ireland* (Bunker *et al.* 2010) changed all that, greatly increasing the ability and enthusiasm of Seasearch volunteers to record the wonderful diversity of seaweeds that we see on our dives. Nevertheless, many species cannot be identified with certainty *in situ* or from photographs, so the opportunity to join the British Phycological Society's field

Fig. 3: Seasearchers Nikki Taylor, Wendy Northway, Fiona Tibbitt and Allison Gleadhill identifying seaweeds in Dove Marine Laboratory

meeting and to learn how to collect, identify and preserve seaweed specimens was clearly not to be missed!

A programme of Seasearch dives was planned to complement the intertidal fieldwork, enabling participants to take part in shore surveys, diving and lab work every day if they had the inclination (and the energy!).

The sites visited by divers were Brown's Bay and St Mary's Island in north Tyneside and Sugar Sands in Northumberland. These shore dive sites provided a good range of seaweed-rich habitats in the sublittoral fringe and the upper and lower infralittoral zones.

For many of us, putting seaweeds into plastic bags whilst wearing thick neoprene gloves and being pushed back and forth by the swell was a new diving challenge. Some seaweeds inevitably escaped during this fiddly operation, but we improved our technique with practice and managed to end each dive with a good collection of specimens. These were brought back to the lab, where everything needed for identification was laid on for us, including microscopes, trays, a comprehensive collection of seaweed identification guides and keys, and most importantly plenty of help and guidance from BPS experts.

We also learned how to press seaweeds to build up our own reference collection, a valuable resource for our own use and for demonstrating to others on Seasearch courses.

Although the week started with blazing sunshine, the weather and sea conditions deteriorated, and dives planned for Beadnell and the Durham Heritage Coast on the last two days had to be cancelled. This was disappointing, but the extra time in the lab

Fig. 4: A collection of pressed seaweeds from Seasearch dives

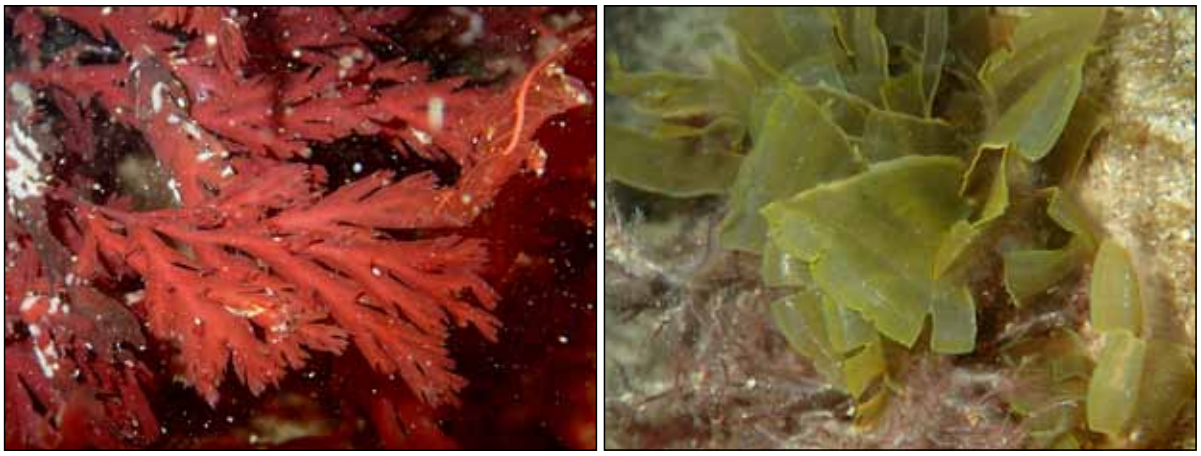

Fig. 5: Two of the species recorded by Seasearch divers during the BPS field meeting: Odonthalia dentata *at St Mary's Island (left) and* Taonia atomaria *at Brown's Bay (right)*

turned out to be very useful, as the amount of seaweed awaiting identification and pressing was increasing...and growing rather smelly!

A total of twelve divers took part, some of whom were local to the north east, others travelling from Yorkshire, Cheshire and Norfolk. Some joined for the whole event, while others dropped in for parts of it. All agreed it had been an extremely useful and enjoyable experience and had increased their knowledge of seaweeds. Five Seasearch Survey forms and three Observation forms were completed, containing over 240 records of over a hundred species, including fifty species of seaweed. These included several species that were not recorded during the intertidal surveys, including *Cryptopleura ramosa, Delesseria sanguinea, Desmarestia aculeata, Desmarestia ligulata, Taonia atomaria* and *Hypoglossum hypoglossoides*.

The Seasearch records have now been entered into Marine Recorder and will appear on the NBN Gateway early in 2014. Like the 'Seaweed East' survey organised by Seasearch coordinators Rob Spray and Dawn Watson in 2011 (see Porcupine Newsletter No. 31), the BPS field meeting has made another important contribution to our understanding of seaweed distributions on the under-recorded east coast of England.

Seasearch are very grateful to the British Phycological Society for being so generous with their time and expertise during the field meeting, and we look forward to taking part in future field meetings.

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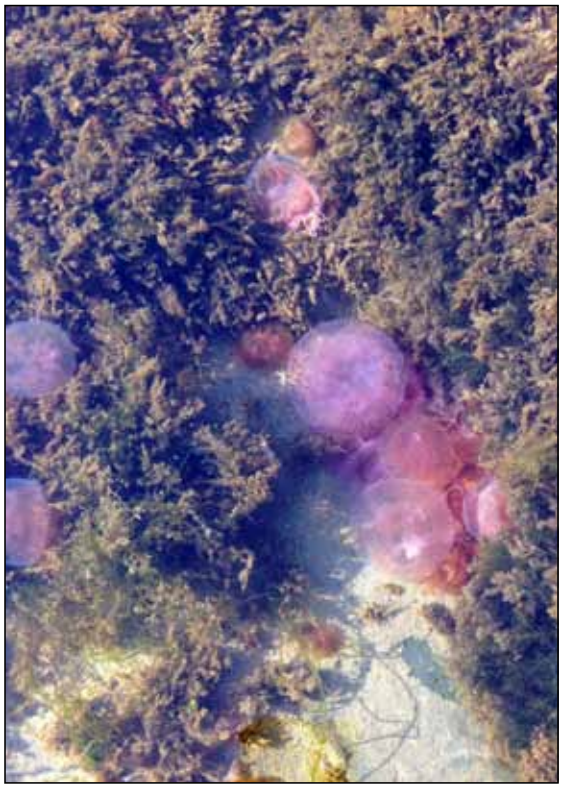
Mauve stingers

Fiona Crouch

Picture the scene: you travel from Plymouth to Northern Ireland to run a rocky shore training course (well a few); you do all the introductions on the survey techniques to be practiced on the shore (indoors); get wrapped up for the weather; do your health and safety talk; go down on the shore and yikes, mauve stingers (*Pelagia noctiluca*) everywhere!



Mauve stingers in a rockpool

Portrush was the venue for a Shore Thing survey training course organised by the Ulster Wildlife Trust on the 15th October 2013. This also happened to be the time that swarms of mauve stingers hit the coast of Ireland prompting media headlines such as: 'Dangerous and costly jelly washing ashore in Ireland by the thousands' and fears that there could be a repeat of the 2007 swarms which caused millions of pounds worth of losses to salmon farmers along the Antrim coast. Of course this is of great concern but WHAT ABOUT MY TRAINING COURSE?!

Julia Nunn risking life and sting to get a closer look

I have to confess that in the past I may have laughed a little at people doing surveys in gloves. I've even seen bright yellow marigolds deployed to prevent any contact with marine organisms. All I could think of was those marigolds as I looked down at the stranded jellyfish on the rock, in the seaweed, and hundreds pulsating in the rockpools. Marigolds would have been very handy on the 15th October. That will teach me.

Needless to say we made a half hearted attempt at a timed species search because – 1. You couldn't touch anything in case you got stung and 2. We were too distracted by the jellyfish. Just shows that you can do all the preparation but you can never truly prepare for what nature will throw at you, but that's what makes working in the marine environment so interesting.

A review of online publication catalogues for the statutory nature conservation agencies

Website Reviews by Jon Moore

Email: jon@ticara.co.uk
9 January 2014

The statutory nature conservation agencies – SNH, NE, NRW, NIEA and JNCC (see full titles below) – carry out and commission large amounts of marine biological research, and have done since 1991 (and before if you include the Nature Conservancy Council). Most of the resulting reports have understandably remained as grey literature known only to a few people and difficult to access, but the internet should now make that a thing of the past. I have long felt that the agencies should rejuvenate their back catalogues and make them easily available through their websites. However, I know that a surprisingly large number of reports from even the last ten years are still not easily accessible – for a number of reasons, including under-resourced publication teams. The following paragraphs describe how well each agency currently provides online access to research publications. Having spoken to a number of the publication staff in those agencies I know that they all have plans for improvement, some with a higher priority than others, so I hope that the limitations described below will soon disappear.

Scottish Natural Heritage: www.snh.gov.uk

Scottish Natural Heritage
All of nature for all of Scotland

The SNH online publications catalogue is easy to find and includes the majority, but not all, of the commissioned research reports (over 1000, about 100 marine) that SNH has published since 1991. Most impressive is that everything in the catalogue is freely available for download in pdf format. Unlike the NE and JNCC catalogues (see below), the SNH catalogue does not provide listings under subject headings, but it does provide a dedicated search tool that is easy to use, fast and effective, if not particularly sophisticated. The search tool only looks for words in the title and in a brief précis, so you can't search for authors, publication year or any other subject matter; but if you know one or two key words then it quickly provides a browseable list that is informative (although it excludes authors) and from which you can download any publication. One small glitch is that the commissioned report category in the search tool doesn't include the report series before 2004, but they are included if you select any category.

Natural England: www.naturalengland.org.uk

NATURAL ENGLAND

The NE online publications catalogue is easy to find and includes the publications of its earlier incarnation English Nature. About 850 research reports (around 100 marine) have been produced since 1991 and the majority, but not all, are listed in the catalogue. You can browse the catalogue under various categories or use the search tool at the top of the page. Both have limitations, and while NE's publications team are continuously adding more content and have made great improvements over the last two years it is not always easy to find what you want. When you browse one of the subject categories (e.g. Marine) you get a long list of titles and publication dates (but not authors) that can be sorted by dates. If you find a title of interest to you, selecting it brings up more details. If you have selected a title published after 2004 it is likely that the details will be informative with a link to a freely downloadable pdf. But, if you select an earlier title, it is likely that you will just find contact details of the Enquiry Service from which you can request a printed copy. A brief abstract would be very useful and NE have just told me that they should shortly be able to add abstracts for the reports that are not yet digitised. The search tool at the top of the page can be used to carry out a text search of all the digitised files in the publications catalogue, but it doesn't search the catalogue itself. The search can be good for finding

reports that are available in pdf format, but it won't easily find many of the earlier titles. The output listing from the search is also likely to be long and doesn't bring up the basics (titles, dates, authors or abstracts). You can only find out more about the contents of a file by downloading and opening it.

Natural Resources Wales:
www.naturalresourceswales.gov.uk
[www.ccw.gov.uk]

NRW is a very new organisation that has not yet fully integrated all the facilities of its previous organisations – i.e. including the Countryside Council for Wales. Like the other agencies, CCW has produced large numbers of research reports since 1991, many marine, but I have not been able to find out how many. I know that a large proportion of those published before 2000 have not yet been digitised and that this is not currently a priority. Online access to CCW's publications is currently only available from its archived website, to which there are links (if you can find them) from the NRW website. Once found, the archived Research and Reports webpage is, however, almost useless because it simply provides a long list of titles (with brief précis), most recent (2011!) first, without any means to search or sort them. Luckily there is also a link to CCW's in-house library, which has an online search facility for its complete holdings (the only agency library to do so). This is a proper library search tool, being much more advanced than any of the online publication catalogue search tools described in this article, allowing filtered searches for titles, keywords, authors, dates, and subjects. The resulting search output is also advanced, but unfortunately doesn't include any abstracts or links to downloadable pdfs for the CCW reports. This makes it difficult to identify reports of interest without requesting copies. The library service is good and if a digital version is available they can email it, but there is currently no online facility to download them without manually searching through the long list on the Research and Reports page. There is of course the standard search tool at the top of the page for searching the whole CCW website, which can be useful, but it is a very blunt tool when looking for published reports.

Northern Ireland Environment Agency:
www.doeni.gov.uk/niea

Like NRW, biology and nature conservation is only a part of NIEA, which had a previous incarnation (the Environment and Heritage Service) before 2006. However, the NIEA website provides access to a large publications catalogue that is fairly easy to find and includes some marine biological related titles in a Research & Development Series (less than 20). I assume that the catalogue includes all of the R&D reports, which are all available for pdf download, but it appears not to include many EHS reports from pre-2006. The catalogue can be searched with a fairly complicated tool that offers many subject categories and can filter by publication dates, but the text search is limited to the publication titles (not authors or abstracts). The resulting output lists titles and dates and a link to download the pdf, but no additional information.

Joint Nature Conservation Committee:
http://jncc.defra.gov.uk

JNCC's research report series runs to about 500 titles, but they have also produced a number of review documents (e.g. the Marine Nature Conservation Review series and the Irish Sea Pilot). The online catalogue, which is easy to find, consists primarily of informative listings under various subject headings. This works for the review documents, because they fit well into the defined categories and the lists are short and reasonably quick to browse. However, the JNCC research report listing is longer (181) and more difficult to browse. That listing is also very incomplete – the most recent report listed is No. 493 – most of the missing titles being published before 2000.

Selecting a title from a listing brings up an expanded description, which usually includes a link to a freely downloadable pdf (and the file size). For many of the review documents, however, it refers you to the website of the natural history bookshop, from which you can purchase the document. The only search tool available is the standard search tool at the top of the page for searching the whole JNCC website; this may be good enough for finding reports for which you know the title or some key words, but is no substitute for a dedicated search tool. It certainly can't find the large number of reports that do not appear to be listed anywhere.

JNCC also hold an archive of reports and publications from the Nature Conservancy Council (pre-1991). However, the online listings do not include any of the CSD (Chief Scientists Directorate) reports which included the marine related research reports. An online catalogue of that collection would be very useful, even if the reports themselves remained only in hard copy for a few more years.

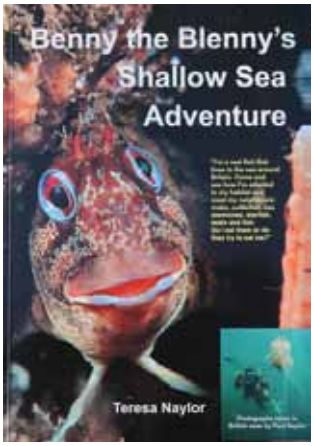
In conclusion, the five agencies vary greatly in the content and search facilities of their online publications catalogues, but they all have improvements to make. As one publication staff member explained to me, if you know the title you are looking for, the quickest way to find it is often to carry out a standard internet search from your browser's main search page. However, that won't find the large number of reports that are still not scanned and probably won't even find reference to those that are not listed in a catalogue.

Please note that any errors or views expressed above are solely those of the author.

Benny the Blenny's Shallow Sea Adventure – Teresa Naylor

Tompot Publications, 2013, 41pp.
ISBN 978-1-909648-00-5
Available from bookshops and online £8.99
More details at www.bennytheblenny.com

Book review by Frances Dipper



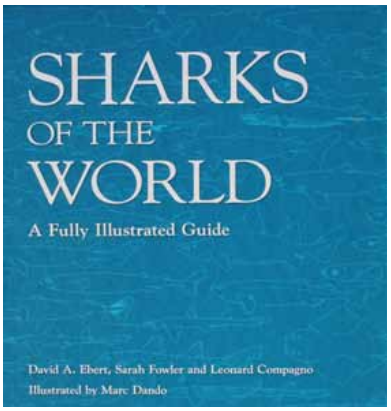
Christmas may be over but there's always birthdays, special treats, starting school or any other excuse to give this happy little book to your children, grandchildren, nieces and nephews. Using Paul Naylor's always excellent underwater photographs, it tells the real life story of a tompot blenny living in Cornwall and the divers (Teresa and Paul) who come to visit him. No-one can resist the cheeky face of a tompot and younger readers will love the speech bubbles through which he tells his own story. "Zoom in" boxes give more information for older readers about Benny's home, neighbours and the dangers he faces. His 'close neighbours' include a velvet swimming crab who reminds me of a crusty old man living down the street.

The book is aimed at 7-11 year olds and is fun, educational and above all real and accurate. However, whilst there is certainly enough to interest an 11 year old, I suspect it will have more appeal for the younger end of this range. The price may put off some people but it is produced on high quality paper to show the photographs off to full advantage. So before your next child-accompanied seaside visit, show them what really lives just below the low tide. Oh, and if any of you diving mums and dads see Benny, do give him my regards and congratulate him on his adventure.

Sharks of the World: A Fully Illustrated Guide – David A. Ebert, Sarah Fowler & Leonard Compagno. Illustrated by Marc Dando.

Wild Nature Press, 2013. 528 pp.
ISBN 978-0-9573946-0-5
Available from www.wildnaturepress.com & www.nhbs.com £45

Book Review by Frances Dipper



This is a book that you should have absolutely no hesitation in buying if you have any interest whatsoever in sharks. As sharks are apex predators in the ocean and face an uncertain future, all (prickly) Porcupine persons should, by definition, be interested even if you are not as 'fishy' a person as I am. The book starts with an excellent introductory chapter covering the structure, classification, evolution, biology and conservation of sharks. Read this and you will gain a thorough grasp of how these animals work, without having to wade through more technical texts, and without nodding off. I am aware now of exactly how a shark will know where I am, how it will move to find me, which teeth it will use to bite me and how it will digest me. It's just a shame that over 5% of the species may never get the chance because they are endangered, another 25% are moving that way and around 45% we just don't know enough about.

Following on is an identification key to orders and families which does require a very close look indeed in some cases but would get you some way even with just a photograph. I tried it on an aquarium photograph of a smoothhound and got nearly there before having to look at teeth and nictating eyelids. The bulk of the book describes the identification, distribution, habitat, behaviour, biology and status of the 500 or so known shark species plus a general description of each order and family. Teeth are the very essence of sharks and each species has a drawing and/or description of its teeth - much of this information is from previously unpublished (but scientific) resources and it must have been a Herculean task to gather it together.

The book may seem familiar to anyone who had previously bought the 2005 Collins Field Guide of the same title. How things have moved on since then. The current book includes 90 species not in the Collins guide; it is an astonishing fact that more than 180 species of sharks, rays and chimaeras have been formally described in the past decade and this book includes 77 sharks described since 2005. I was delighted to have been part of a series of fish market surveys in NW Borneo in which the Borneo Shark, *Carcharhinus borneensis* re-appeared after its last record in 1937. The style and presentation are also greatly improved.

This book has that rare quality of being accessible for the non-scientist, with beautiful colour illustrations of every species supplemented by colour photographs and at the same time an unbeatable, accurate scientific reference book. An excellent combination indeed.

NB. I might be just a tiny bit biased as Wild Nature Press is due to publish my book *The Marine World. A Natural History of Ocean Life* in March 2015 as the second book in this series also illustrated by Marc Dando.

Strands: A year of discoveries on the beach – Jean Sprackland

Vintage Books: £8.99

Book review by Angie Gall

I read this book while nursing my baby during the night and, though I often picked it up at 3 am or 4 am with heavy eyelids, the book kept me awake by transporting me to a stretch of beach at Ainsdale Sands in the northwest of England, on which the author focuses. It is likely that many Porcupine members are keen beachcombers and will enjoy sharing the familiar sense of excitement that comes from finding something new washed up on the shore. We may not be surprised by some of the author's 'discoveries' such as that hydrocolloids from seaweeds are used in some jams and that there are 'a thin red type [of worm] that look like the liquorice laces I used to buy from the sweetshop on the way to school' and that jellyfish are on the rise globally as a result of overharvesting of their natural predators. But as well as the organic, she also finds and muses about man-made items like shipwrecks and messages in bottles; and we learn about William Hutchinson, the Liverpool dockmaster who pioneered modern tide-tables.

The format of the book is a chapter for each item she discovers, described on the book's jacket as a series of meditations, and the seasons progress through an entire year of walking and celebrating the same stretch of beach. The subjects have been diligently researched and are brought to life by Sprackland's descriptive talents. It is a gentle, poetic tribute to the flotsam and jetsam of the tideline and sometimes I kept reading it long after the baby had fallen back to sleep.

In need of weed – a Seasearch journey

Sarah Bowen

Confession time – I am not a marine biologist. My day job is as an Assistant Director for Barnardo's children's charity, based in Cardiff. With a degree in English followed by a Master's in Social Work, my background couldn't be further from anything marine-related. And yet here I am, an active Seasearch diver and Porcupine member. Here is the story of how I got here.

My diving career began, almost by accident, with a try-dive in Connemara in 1994. The plan had been to go for a long walk, but the cloud layer grazing the tops of our heads put paid to that. Instead, David and I followed a small sign pointing down a single track road announcing PADI try-dives. A few hours later I was in a drysuit in a sheltered natural harbour, and from the moment I saw the first flatfish on the sand I was hooked - despite the buoyancy issues and the inconvenience of all the kit involved.

Fast-forward to 2006 and we discovered Seasearch. I can't remember exactly how this happened, but we had spent a happy few summers diving around Pembrokeshire and Cornwall with commercial "RIB shuttle" providers. To be honest, after yet another trip to Junko's rock and Hen and Chicks, we felt that there must be something more out there. We couldn't put a name to what that "something" was, but a sense of frustration at the limitations of this approach to diving was creeping in. The purchase of identification books had started already – it was just a shame that we got funny looks on the boat when we enthused about the 'squidge' we were seeing.

We were lucky enough that our first experience of a Seasearch weekend was on a boat called *Lo*

Entropy, running out of Burry Port. Porcupine Newsletter Editor Vicki Howe was the local Seasearch co-ordinator at the time, and was brave enough to allow us to join a group of seasoned Seasearchers for a trip out to the Smalls. My logbook for that weekend states "Great boat, nice people, think we may want to do more of this". For some reason the incomprehensible Latin names and lengthy paperwork didn't put me off!

My next log-book entry was for the Observer course sign-off dives the following Spring. Trying to complete a dive at Stackpole Quay wearing a new drysuit in a significant swell and negligible visibility was possibly not the best start. My comments were less than complimentary, full of complaints at not having seen much and compounded by one of the other participants who returned with a slate full of notes on red seaweeds. There was clearly going to be an awful lot more to this Seasearch lark.

A few more dives to get used to the new drysuit and we were ready for the Surveyor course in Marloes Village Hall. Kate Lock and Jen Jones facilitated, with help from Steve Bound. They were all very welcoming and we joined a group of around 16 trainee Surveyors. I vividly remember the morning of that first day, feeling more than a little overwhelmed by all the information on habitats and how to record them. And that was the previous version of the Surveyor course when biotopes weren't even mentioned! We survived, of course, and everyone was very supportive and helpful. The single most useful piece of advice I had in the early days was not to attempt everything – pick an area of interest and gradually build up knowledge of that, a little at a time.

Probably the first time I felt like a 'real' Surveyor was when we joined one of Sally Sharrock's trips to the Scilly Isles, staying on St Martin's. Being around keen, knowledgeable people for a whole week was both exhilarating and exhausting. So exhilarating in fact that when Angie Gall mentioned that there was another opportunity for a week in the Scillies later in the season, we didn't hesitate. Staying in an underground bunker was a very different experience, but this time we had space for a laboratory too and even more opportunities for macro identification. As 'citizen scientists' we were able to help Claire

The nudibranch Discodoris rosi

Goodwin from NMNI with her sponge project by collecting samples of sponge crust during dives and cataloging them afterwards.

Along the way, our enthusiasm has been fed by finding unusual species in places where they hadn't previously been recorded. Some of our early digital photographs from Cornwall show fuzzy images of nudibranchs that we couldn't identify at the time with the books we had. One of them turned out to be *Discodoris rosi* – not a native of mainland UK shores but common further south. It was several years later and the sighting of another animal in the Scillies that finally enabled us to make that identification. Another example was the *Trapania tartanella* we found on the Manacles. For a few years it stayed in the archive where we assumed that it was just *Polycera* sp. until we looked more closely and compared it with a specimen David had found at Skomer Island.

Participation in specialist courses on a variety of subjects has been a sobering reminder of just how little we know. On a nudibranch course in Plymouth led by the incomparable Bernard Picton came a "lightbulb" moment regarding their food sources. During that course I learned just how specific they are in their choice of food; therefore you need to find the food-source in order to find the nudibranch. That was just the incentive I needed to do some work on hydroids, so I printed off all the information from the website Habitas (www.habitas.org.uk/marinelife) and added it to my reference collection. Now, of course, there is a Seasearch hydroid and bryozoan identification book. This mantra has served us well – sampling small pieces of apparently random hydroids has yielded specimens as diverse

as *Tergipes tergipes*; a variety of species of *Cuthona* (including *C. caerulea* – the source of a particularly long-running domestic when David found one on Skomer and didn't show it to me at the time), a *Janolus hyalinus*, and some tiny *Eubranchus* species. A particular highlight was in Strangford Lough last August when we saw some small sea-pens on one particular site. Several moments later I could hear squeaks of excitement from David as he had found an *Armina loveni* nudibranch crawling over the surface of the sand! It hadn't been recorded in Strangford Lough for over 20 years.

The seaweed course with Francis and Anne Bunker and Christine Maggs illustrated for me first how far I'd progressed, but also how little I still knew. Participants on that course ranged from marine biologists to shore-searchers, with a few recreational divers thrown in. I ended up somewhere in the middle; between the microscopes of little pieces of green string (which now I realize are *Cladophora* sp.) and the intertidal *Fucus* species, but the world of seaweeds was another new and exciting area with immense possibilities. My enthusiasm led me to the National Museum of Wales, where I spent an interesting afternoon poring over the Dilwyn collection and Henry Bradbury's *Nature Printed Seaweeds*, promising the curators that I would provide them with specimens of sub-tidal weeds when I next had the chance.

Along the way, experiences have ranged from the sublime to the ridiculous. Sublime include the ascidian-rich limestone reefs of South Pembrokeshire, fabulous scenic diving in the Scillies and Sark and diverse Scottish lochs. A more amusing experience was helping to ground-truth dolphin foraging areas in Cardigan Bay. We saw sand – a lot of it! Probably the most ridiculous was the day that a very experienced skipper misjudged the falling tide and grounded the boat. For several hours. At least it was near a pub.

One of the most important aspects for me is that the knowledge that I am gaining is not just for selfish purposes. Transferring knowledge from my head onto a combination of paper forms and photographs makes it useful for others, and gives me a sense of satisfaction of contributing to a wider picture. And the more of this I do, the more ambitious I become. I still struggle with

Red seaweed Halarachnion ligulatum

the diagrams and "percentage bottom cover" sections on the Seasearch forms, and have to force myself to look at the 'big picture' at the start of a dive, visibility allowing. David and I are notorious on any Seasearch boat for barely moving during a dive. Whilst others may have drifted considerable distances, skippers who know us can pretty much guarantee that they can pick us up close to where we were dropped in.

I continue to enjoy the challenge of Seasearch; meeting a range of interesting, knowledgeable people and furthering my own knowledge too. 2014 will be equally exciting I am sure with the Porcupine Isle of Man trip in August as a highlight. Work on the next Seasearch book on Seasquirts and Sponges continues; when David and I tentatively volunteered to take this on in the summer of 2012 it was as a result of frustration and a lack of any up-to-date photographic guides. 2013 was a busy and productive year collecting samples and organising field trips in Pembrokeshire (funded by Porcupine), North Wales and Scotland. We now have to sit down and make some sense of it all, but I am hopeful that not being an expert will be a distinct advantage in ensuring that what we produce is accessible to a range of groups, both those with and without a marine biology background.

Not bad for an English graduate turned social worker who had never even snorkeled before that try-dive in Ireland!

How I became a marine ecologist: the long and winding road to Galway

Louise Firth

Ryan Institute, National University of Ireland Galway, University Road, Galway, Ireland

I was delighted to be asked to write this piece for the Porcupine Newsletter as I happen to enjoy telling my story. Like many biologists it involves a long and winding road that has taken me to many places (most of them beautiful) where I have worked with some fantastic organisms and people. I am currently based at the National University of Ireland Galway where I lecture Zoology and Marine Science and conduct research in intertidal and shallow subtidal habitats.

My interest in the sea began with rockpooling at the beach and continued with regular exposure to David Attenborough programmes. When it came to choosing a course to study in university, the choice was simple – Marine Science at the National University of Ireland Galway (formerly University College Galway) as this was the only marine course on offer in Ireland at the time. To cut a long story short; despite my parents instructing me to put down Dublin universities only on my college application form, I put Galway as my number one choice. Naturally, my parents were surprised when I was offered a place in Galway but would not support me to go. I think it was a combination of the fact that they hoped that I might choose a path with more secure job opportunities (quite right) and that I might enjoy the student life in Galway too much (also quite right)! As a result, I had to resit my exams and apply again for Science at University College Dublin (UCD). Everything happens for a reason. Despite being quite disapointed at the time, with hindsight, I now realise that Dublin was a better path for me anyway. I am not sure if I would have even passed 1st year if I was living the student life in Galway!

Following a second attempt at my exams, I was offered a place to study Science at UCD. I chose all Zoology and Ecology-related subjects and specialised in Zoology in my 3rd year. I learned to dive during 3rd year which introduced me to some beautiful subtidal sites on the west coast of Ireland, further inspiring my love of the sea. That summer I did a bursary placement which involved helping a new PhD student (Nessa O'Connor, now a lecturer at Queens University Belfast) set up her experiment on the shores of Muighinis Island, Connemara, Galway. This experience consolidated my desire to pursue a career in marine ecology. No doubt the inspirational beauty of Connemara (Figure 1) had something to do with this…..

Fig. 1: Happy out! On the shore at Muighinis Island, Connemara, Galway, Ireland.

I developed my 4th year honours project on limpets into a larger study for my PhD also at University College Dublin with Tasman Crowe. My PhD involved a series of surveys and manipulative experiments documenting patterns of distribution of limpets (*Patella vulgata, P. ulyssiponensis*) in Ireland (Firth & Crowe 2008) and testing hypotheses about habitat suitablility and competition as factors underpinning these patterns (Firth & Crowe 2010). The majority of my research was based on Muighinis Island in Connemara and I relished my trips west to monitor my experiments. I also developed a predicitve framework for testing the effect of the arrival of the southern species *Patella depressa* on Irish species (Firth *et al.* 2009). This part of my work was in collaboration with the Marine Biological Association and

Fig. 2: (a, top) The Swire Institute of Marine Science, University of Hong Kong; (b, bottom) Competition for space on Hong Kong shores.

Plymouth University which laid the foundations for future projects. Aside from the research training and obtaining my PhD, this was a very fruitful period in my life as I met my husband, Antony Knights, also a marine ecologist who was also based in my lab (now at Plymouth University).

I graduated from my PhD in 2007 and the next year comprised a series of short postdocs in Hong Kong, South Carolina and Florida. On attending a conference in 2006, I met Gray Williams and he invited me to visit the Swire Institute of Marine Science in Hong Kong (Figure 2a). A few days after graduating I flew out to Hong Kong for two months during the very hot and wet monsoon season to conduct

Fig. 3: (a, top) The saltmarshes of South Carolina; (b, bottom) Dolphins in the saltmarshes.

research on the effects of extreme heat stress and rainfall on limpets (Firth & Williams 2009). Having only seen Irish and British rocky shores, working in Hong Kong opened my eyes to the incredible biodiversity of the tropics. I got a new appreciation for the concept of competition for space on rocky shores (Figure 2b)!

Following this I visited my husband for a month at Coastal Carolina University in South Carolina where I got to work in the incredible extensive saltmarshes of South Carolina (Figure 3a) investigating variability in oyster recruitment in relation to tidal flow and predation pressure (Knights *et al.* 2012). This was great fun and involved navigating the creeks of the saltmarshes in a little aluminium skiff, dodging dolphins (Figure 3b), sharks and thunderstorms. I discovered that I was terrible at trudging across the oysters and mud. I vowed to only work in the safety of hard substrata where I couldn't lose my wellies and get bacterial infections from slicing my hands open on *Perkinsus*-infested oyster shells!

As my husband was based in South Carolina my job search now focused on the east coast of the United States and I was very happy to get a postdoc with Susan Bell at the University of South Florida in Tampa on the Gulf Coast (only a 9-hour drive to South Carolina!). The closest thing to rocky shores in Florida are the hard substrates provided by piers, bridges and pontoons and these habitats provided me the opportunity to work with a recent invader to Florida - the green-lipped mussel, *Perna viridis* (Figure 4). I had lots of plans to conduct experiments on competition between the mussel and the native oyster but the very cold winter of 2007/08 led to a widespead mortality event and I was very lucky to be able to turn what was supposed to be a competition study into an extreme weather/mortality event study (Firth *et al*. 2011). Much of my time in Florida was spent hanging out under bridges around Tampa Bay, sometimes trying not to wake up the homeless people who scared me. I have to admit that I missed the beautiful rocky shores of Connemara during this time! During my time in Florida I had the opportunity to teach marine biology to undergraduate students. This was my first taste of lecturing and I loved it. This helped to consolidate my thoughts that I wanted to become a lecturer and lead my own research group.

My husband and I got married in April 2008 and we moved back to Ireland in June of that year. It was such an exciting time and we were really looking forward to living together and working back in Ireland. Having studied for our PhDs during the time of the Celtic Tiger we assumed that we would have no trouble getting jobs. This was not the case and we spent the next year unemployed, writing up papers and competing for the same jobs – a great start to married life! Thankfully it came to an end when we both got jobs at the environmental consultancy APEM Ltd in Manchester. I did enjoy this work but really missed doing independent research. This experience only served to further fuel my desire to secure an academic position and get back on track to becoming a lecturer.

Within six months I secured a postdoctoral position at Bangor University working with Steve Hawkins on two projects (www.urbaneproject.org, www.theseusproject.eu) relating to the ecology of artificial coastal defences. This was a particularly enjoyable position as I had significant freedom to carry out the research (Firth *et al.* 2013a, b) while getting invaluable experience in multitasking by simultaneously conducting MarClim surveys with Nova Mieskowska (Marine Biological Association), teaching, liaising with stakeholders, organising conferences and editing a special volume of a journal. I was very fortunate to work with some great colleagues at Bangor, Plymouth, Southampton, Aberystwyth and Bologna Universities. This position also introduced me to ecological engineering as I had to design and implement a habitat enhancement unit that could be incorporated into artificial coastal defence structures to promote biodiversity conservation. The resulting product was the "BIOBLOCK" (Figure 5) which has been in place in Colwyn Bay since February 2012. I am happy to say that it is currently supporting twice as many species as the surrounding boulders (Firth *et al*. 2014) and is very much doing what it was designed to do.

Fig. 4: Perna viridis*, the green-lipped mussel.*

Fig. 5: The BIOBLOCK – precast habitat enhancement unit, Colwyn Bay, North Wales.

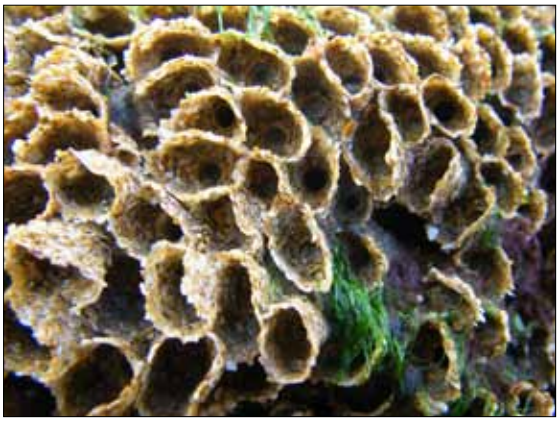


Fig. 6: Sabellaria alveolata*, the reef-forming polychaete worm.*

In January 2012 I got my lucky break and was appointed to my current position of University Fellow at the National University of Ireland Galway. This is almost the dream position – lecturing and research in Galway (finally I got here!). This has been my first independent position and I am loving it. If I am interested in something, I apply for funding and conduct research on it. In 2012 I was successful in getting a Porcupine small grant (thank you!) to resurvey the distribution of the reef-forming polychaete wom *Sabellaria alveolata* (Figure 6) in NW Britain. The results of this will be described in a future volume of the Porcupine Newsletter. I continue to work on *Sabellaria* and I am currently conducting surveys in Ireland and France and look forward to doing molecular work with colleagues in France this summer. Inspired by the Urbane and Theseus projects, I initiated an ecological engineering project on the Martin Connolly Causeway in Galway Bay which featured in the Irish Times Newspaper in May 2013. It is very nice to be working on something that captures the public interest.

I mentioned above that this is "almost" the dream position. It would be the dream position if it was permanent. But alas, like many others, I am in search of that elusive permanent position. Now that I have had a taste of independence, I want it even more! I have thoroughly enjoyed my winding road to Galway but I look forward to stopping for a bit. I long to be in one place for more than two years, make true friends and start my own time series. The question is, where will that be?

And that is my story thus far. I feel like I have come full circle but of course the story doesn't end here. I am eternally grateful to my parents for inspiring my passion for the sea by taking me to the beautiful beaches of the west of Ireland as a child. I am also very grateful for them for preventing me from studying in Galway. Would I be where I am now if I had? Would I have met my husband? Somehow I doubt it……

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That said, we will do our best with whatever you send.

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