The Phycologist

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AlgaeVision | Student Reports | Harry Powell

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Editorial

Welcome to the Spring Edition of *The Phycologist.* As ever, I hope you enjoy the read. This edition contains interesting articles on the new version of the AlgaeVision website, a number of student reports including the Manton Prize winner's report from the 2015 BPS Annual meeting, and further reports from the joint BPS/EPC6 meeting. Included are also a number of training course announcements. Sadly we also detail an obituary for Harry Powell RIP – you may recall his wonderful article in the spring 2012 edition reflecting on 60 years' of the BPS.

And don't forget…..The British Phycological Society's Annual Meeting will be held at Bournemouth University (Kimmeridge House, Talbot Campus) from Wednesday 22nd to Friday 24th June 2016. The meeting will start at lunchtime on Wednesday, and finish on Friday afternoon. The conference dinner will be held on Thursday evening in Bournemouth. Accommodation available in Bournemouth includes a wide range of hotels and B&Bs.

Two special sessions are planned, one on algal biotechnology in association with Phyconet and one on freshwater algal ecology. Events will include student reception on Wednesday night, Manton student prize presentations, and poster prize for best student poster.

Full details are available: http://www.brphycsoc.org/meetings.lasso

Remember - do keep sending in your contributions. Write to us with your phycological views, news, work events, or any matter you wish to share with readers of The Phycologist*. YOUR input is required; all relevant material will be considered (job adverts, science reports, book reviews, news items of topical interest, meeting announcements, research news, and suggestions for future articles are always welcome). Without YOU the newsletter would not exist.*

As a reminder, previous issues of *The Phycologist* can be downloaded at http://www.brphycsoc.org/phycologist.lasso.

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Cover image by Sabrina Heiser in Antarctica

New Version of the *AlgaeVision* Website

David M. John and Jo Wilbraham, Department of Life Sciences, Natural History Museum, London, SW7 5BD, UK
Chris F. Carter, 6 Church View, Wootton, Northampton NN4 7LJ, UK

A new version of *AlgaeVision* is soon to be released and will include more than twice the number of images of freshwater and subaerial algae compared to the earlier version (York & John, 2005). All major algal phyla are included except for diatoms and there are also a few images of brackish water cyanobacteria. The earlier version only included images of algae collected from the UK, but the new version includes examples of algae collected from Ireland and a small number of images of Scandinavian and Icelandic specimens of species in the British freshwater algal flora. Of the 250 genera, 680 species and 80 intraspecific taxa photographed the majority belonged to the green algae (Chlorophyta), the most taxonomically diverse of the groups included in the image catalogue.

The AlgaeVision website is intended to be a reference resource designed to assist algal identification and therefore every attempt has been made to focus on diagnostic features (e.g. cell/colony morphology, chloroplast(s), other cytological features) essential for naming non-marine algae with a fair degree of confidence.

The species are listed alphabetically under the genera and a thumbnail image links to the individual entry. Each entry includes the currently accepted binomial name, author(s) of the name, dimensions (unless scale bar on image), photograph type (brightfield, differential interference contrast (DIC), phase contrast, anaglyph), copyright holder, collection information (if known), description of the image and taxonomic or other comments. Finally, reference is given to pages where the species is described and illustrated in the 2nd edition of *The Freshwater Algal Flora of the British Isles* (John et al., 2011). Almost two-thirds of these images are in the photo catalogue DVD accompanying this edition.

A new feature for this version of *AlgaeVision* is to link each entry to the relevant page in *AlgaeBase* (Guiry & Guiry, 2016). Unlike the earlier version the entries are no longer accompanied by a unique eight-digit code number since these codes are available on the Centre for Ecology and Hydrology website (Whitton & John, 2014).

Whenever possible photographs are taken of living algae since on preservation important diagnostic features can be lost or become difficult to interpret. Sometimes several images are presented to show the range of forms exhibited by morphologically variable species. There are many images of reproductive structures which are essential for species identification in genera such as *Vaucheria*, *Spirogyra* and *Oedogonium*. Some SEM photographs are included to assist interpretation of structures visible under the LM, particularly in the case of dinoflagellates and the euglenoid genus *Trachelomonas*.

Sometimes a single image is insufficient if all the features needed for identification are not clearly visible. For this reason a single specimen of a desmid or other 3-dimensional algae are occasionally photographed at several focus points or in more than one plane. Many of the images produced by Peter York in the earlier version of AlgaeVision used auto-montaging software developed by the Synoptics Group. This software enabled a completely in-focus image to be created by electronically processing a series of partially focused optical slices. In this new version some of the images taken by Dr Chris Carter use another version of image auto-montaging software known as 'Helicon Focus'. Often these new images are arrangeIld as a montage and sometimes include views of empty cells since wall ornamentation is more clearly visible in such cells. These images of the 3-dimensional aspects of desmids complement those in the two posters produced by David Williamson in which the line-drawings only show cells in 2-dimensions (Williamson, 2011). Another feature of the new version is the presence of anaglyphs (see *Sphaeoplea soleiroli*, *Hydrodictyon reticulatum*, *Chara vulgaris* var. *papillata*) which are 3-D images that need to be viewed using special glasses having a red left lens and a cyan right lens.

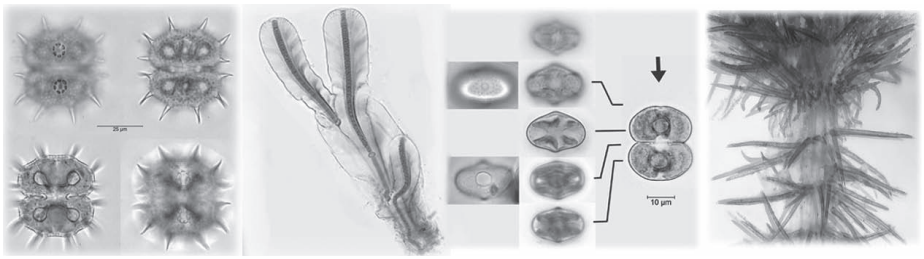
A few images are of algal habitats and sometimes show conspicuous macroscopic growths of algae and the discolouration of terrestrial surfaces or water caused by the presence of large quantities of planktonic microalgae or floating mats of filamentous algae.

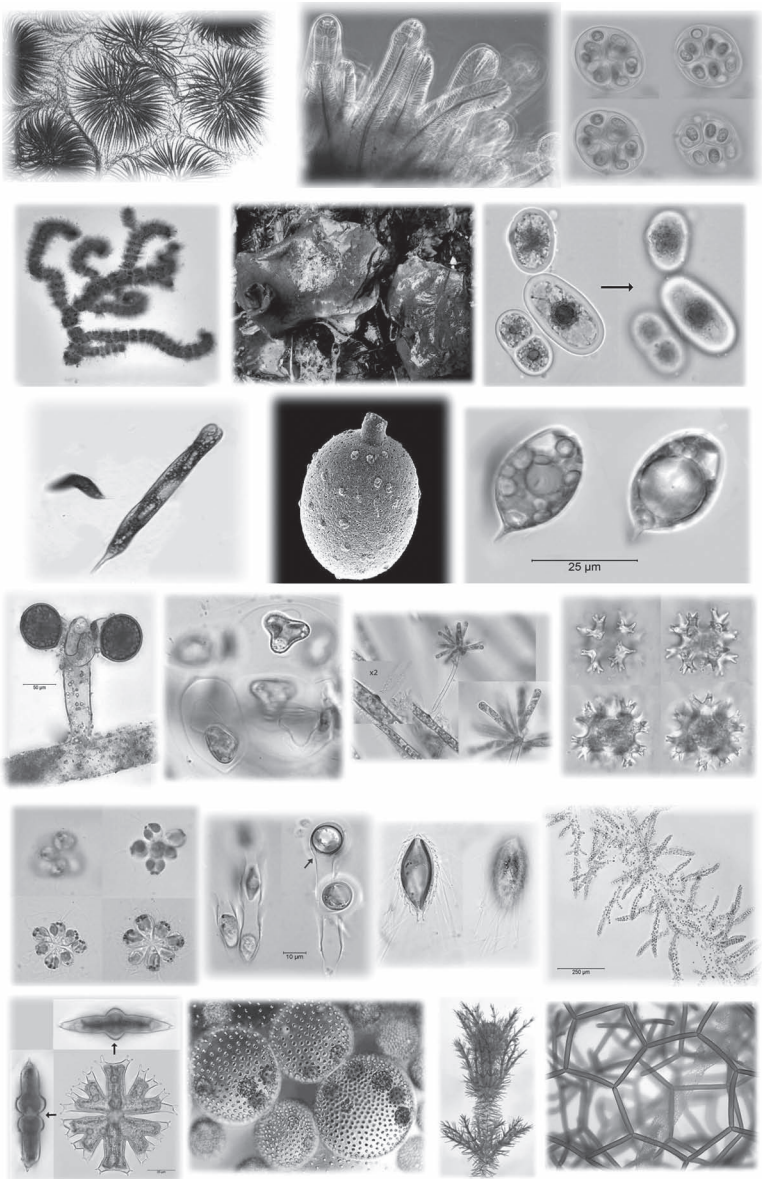
The new version of *AlgaeVision* (Version II) has been compiled and edited by David M John, Jo Wilbraham and Chris F Carter and should be cited as follows:

Carter CF, John DM, Wilbraham J (2016) *AlgaeVision*: Virtual Collection of Freshwater Algae from the British Isles. Version II. World-wide Web Electronic Publication. (http://www.nhm.ac.uk/botany/algaevision).

The intention is to produce regular update of *AlgaeVision* and to expand this online catalogue by the addition of further images.

A searchable photo catalogue of freshwater and subaerial algae





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Whitton BA, John DM (2014) *Coded List of British Freshwater Algae 2014*. http:// www.ceh.ac.uk/services/coded-list-freshwater-algae-2014

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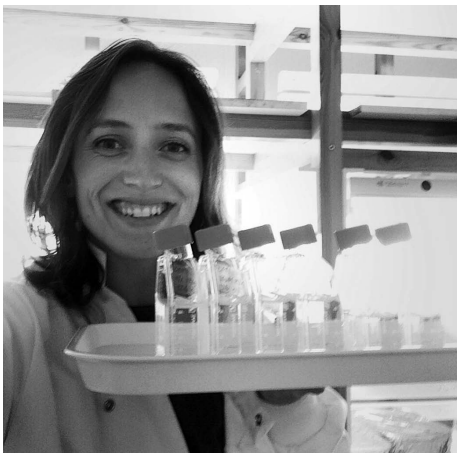
Acknowledgements

The online database and website for *AlgaeVision* (Version II) have been developed by Alistair Paterson and Lucy Brooks (Natural History Museum). Professor Michael Guiry kindly provided links to pages in the *AlgaeBase* website. Special thanks go to Roy Merrit for providing one of us (Dr Chris Carter) with fertile material of *Vaucheria* to photograph and David Williamson for confirming or identifying the desmids and giving advice on key features to photograph. Very large numbers of people have contributed material and images to *AlgaeVision* and all are acknowledged on the new website page.

Student Bursary Award Reports



A New Age of Discovery for Aquatic Microeukaryotes

'A New Age of Discovery for Aquatic Microeukaryotes' was an exciting new meeting held at the EMBL in Heidelberg, Germany. I was fortunate enough to attend with the financial support of the British Phycological Society, enabling me to present my first conference poster 'Physiological differences in the requirement for calcification between *Coccolithus braarudii* and *Emiliania huxleyi*'. The experience was incredibly enriching, giving me the opportunity to share my research with colleagues and listen to presentations from some of the leading experts in microeukaryotic research. The 'Weird and Wonderful Organelles and Symbionts' session was particularly interesting; I learnt far beyond what I originally understood to be the theories behind the evolution of eukaryotic life. I enjoyed Rachael Foster's presentation where she explored host-symbiont relationships in open ocean phytoplankton and asked: who is fixing the carbon? I also thoroughly appreciated Sonya Dyhrman's talk in the 'Small Microbe, Big World' session where she demonstrated that if the annual bloom does not occur for the first time in 20 years, do not be disheartened, you can simulate it in a bucket with a bit of ingenuity and a lot of perseverance. A very good take home message for an early stage PhD student: do not give up, there is always a solution or alternative.

Another element of the conference that struck home was the high level of phycological research on show from Plymouth. The Marine Biological Association of the UK and The Sir Alistair Hardy Foundation for Ocean Science were represented at all levels: invited speaker, presentations, posters and flash talks. The experience made me proud to be part of a small but vibrant marine research community with high impact outputs.

I am very grateful to the BPS and the organisers of the conference for the opportunity to take part in such an exciting meeting! I hope it will be repeated in a couple of years' time and thoroughly recommend it to all interested in this field.

Charlotte Walker
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The 6th European Phycological Congress, London, August 2015

In August 2015, the **6th European Phycological Congress** was organised by FEPS and the BPS in London. This meeting is held only every 4 years and tours through Europe. I felt quite lucky that the meeting coincided with the timing of my PhD. Being half way through the third year of my PhD, I thought that this was a brilliant opportunity to present my work to a rather big and diverse audience. Earlier in the year I had seen the opportunity on the website to apply for a presentation in the Student Manton Session. For the talk selection process a two minute pitch video about my own research had to be submitted. This led me to first hesitate – it seemed like a complex task and I had never made anything like it. Looking back I am glad that it did not hold me back from applying. Making the video seemed like a difficult task in the beginning – but as soon as I got into it, it turned out to be actually a lot of fun (not only for me but also for my whole lab. Thanks to everyone again for some helpful and other more crazy ideas of how to spice it up!). I would definitely do it again and can recommend to everyone to try it. Later in the year my video had been selected for one of the ten oral student presentations. In the meanwhile I had also applied to FEMS for a meeting grant to cover my registration fee and to the BPS for a travel grant to fund my stay in London and my travel expenses.

When the conference had started it seemed to me that all the work had paid off nicely: both my funding applications had been successful and I was given the opportunity to talk in front of a variety of people from all over the world. The whole conference was very well organised and an incredible amount of interesting research was presented. Additionally, a student symposium was organised talking about various topics such as funding, career paths and open source software. It was interesting to hear personal viewpoints and advice of experienced researchers. I had the opportunity to meet familiar faces that I had met already the year before at the Annual Meeting of the BPS and other conferences, but also meet new people and make new contacts.

During the Manton Session a lot of excellent research was presented very professionally. I felt very privileged to present my work with the title "Investigating the feasibility of high value compound pro-

duction in microalgae" within this framework and it was a great pleasure. The audience asked several very interesting questions. I was surprised when the BPS president announced at the conference that my presentation was chosen for the second prize. Thank you very much again to the BPS and the committee! The standard of all student presentations was very high and everyone would have deserved it. Looking back, the conference was a very nice and productive week in London. It was a great opportunity to meet friends from previous meetings, make new friends and get an overview of the latest research in the field. I want to thank the organisers for a great conference, the scientific committee for choosing my presentation for the Manton Session, FEMS for the meeting grant and the BPS for not only funding my travels and stay in London but also for the prize that will be a great memory on my bookshelf.

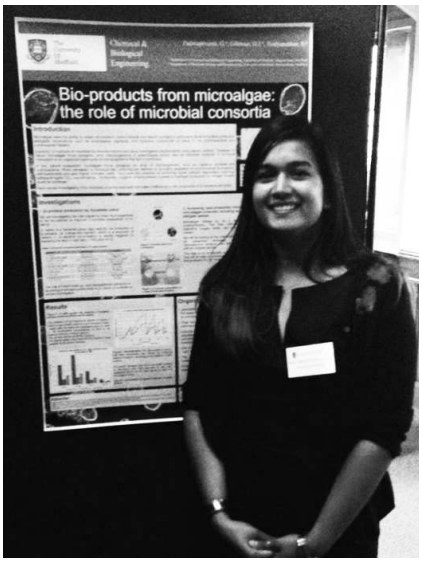
Julie A. Z. Zedler, University of Kent, Canterbury

The **6th European Phycological Congress** took place from the 22nd to the 28th August in the dynamic city of London. The weeklong congress showcased work from approximately 400 delegates within the fields, to name a few, of genetic manipulation, metabolic engineering and biodiversity. The talks also provided great insight into ecology, climate change and microbial interactions.

As a PhD student of Chemical and Biological Engineering, at the University of Sheffield, my work with microalgae is focused strongly on the enhancement of bioproducts output. My work consists in stimulating further accumulation of carotenoids within Dunaliella salina by engineering a dynamic system with other microorganisms. When the EPC6 registration opening was announced, I did not want to miss the opportunity of meeting some of the pioneers in the phycological world.

Drawing parallels of the meeting to a journey within the microcosm of algae, in my opinion is best fitting. Every morning a plenary speaker would provide fascinating overviews on the world of algae, from a trip in history you would jump into a world of biological clocks and morphological responses. The delegates would not only provide their expertise and latest discoveries, through oral and poster presentation, but also convey the environmental and ecological challenges that various regions are faced with. Of great interest to me were the Algae-microbiome interactions: integrative overview from biology to chemistry and the Algae in stressful environments in coastal systems symposiums. These symposiums shed light on and confirmed the rationale that I was applying to my own work. The Irène Manton, young researchers' presentations, where the speakers in the symposium delivered their talks with great passion and by attributing personalities to their species, was encouraging and memorable.

Attending this international congress, gave me the chance to not only meet fellow researcher but also to forge new friendships. I would like to thank the British Phycological Society for sponsoring me to attend this event, where I was also given the opportunity to present my poster and receive feedback from colleagues involved in similar endeavours.



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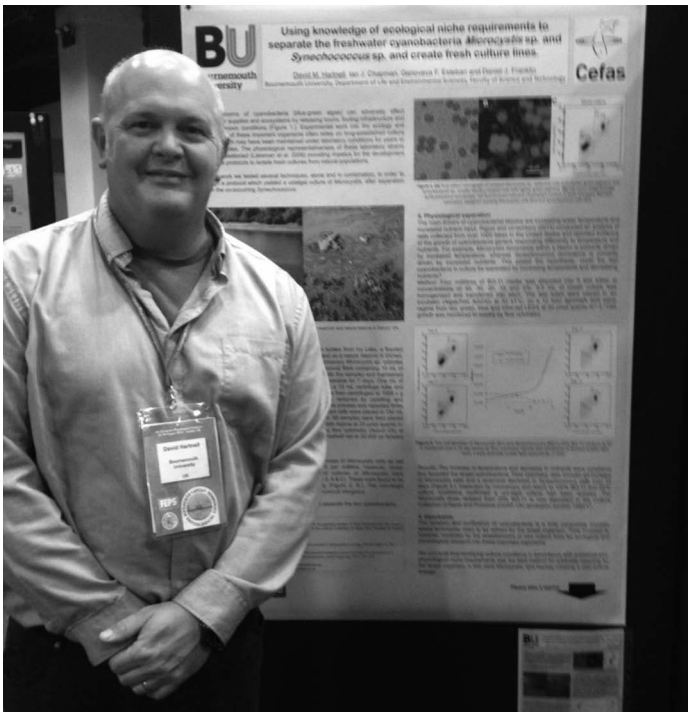


The **6th European Phycological Congress** coincided with the annual meeting of the British Phycological Society held at the Hotel Novotel, London West. The meeting brought together European Phycological Societies, attracting over 400 delegates from 43 countries. The four days of three concurrent sessions in 15 symposia covered all aspects of phycology; macro, micro, marine and freshwater. The Novotel provide excellent conference facilities, friendly helpful staff and everyone remarked at the quality of food served for lunch and the banquet. I am very gracious to the BPS awards and training committee for the opportunity the travel grant gave to my career in phycological research.

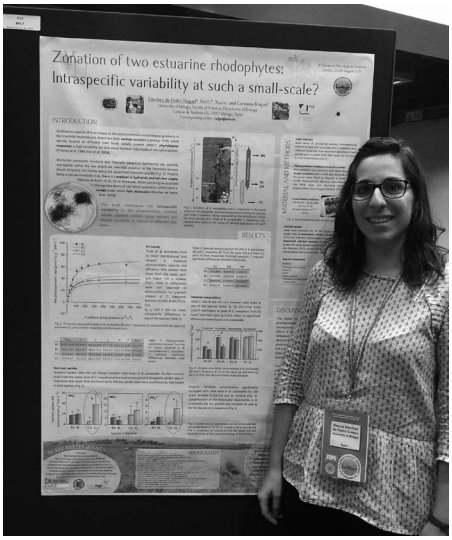
Over the last twelve months I have been studying the incidence and toxicity of freshwater cyanobacterial blooms in relation to changing environmental conditions for a PhD at Bournemouth University. I presented a poster at EPC6 on techniques to purify and isolate Microcystis to provided cultures for physiological and ecological research. As part of the work involves viewing field samples under light microscopy I found my attendance to the meeting developed my understanding of the biology of other microbial algae I have been identifying. Symposium topics were broad allowing contributions from all areas of phycology, for instance there were oral papers on cyanobacteria in

'algae in stressful environments', 'phylogenomics', 'freshwater phytoplankton' and other symposia. The rooms were conveniently close, allowing delegates to move between symposia cherry picking talks to their interests with minimal disruption to the speakers. I enjoyed the talks presenting new techniques in phytoplankton research that would be applicable to my research and those concerned with algal taxonomy and evolution.

The quality of subjects and speakers was exceptional, but presentations that stood out included; John Archibald's plenary on endosymbiosis and the evolution of the complex cell, a concise historical tour of endosymbiotic research, concluded with the questions yet to be answered in endosymbiosis, summed up as a 'black hole' in our understanding of biology. David Mann gave an outstanding oral paper on alien marine benthic diatoms, highlighting problems with taxonomy and ecology with two case studies; the first record of a diatom found on the north west of England and an 'alien' diatom of questionable taxonomy, which is probably endemic to European waters. John Archer's oral paper was shedding light on cyanobacterial evolution by applying a novel genomics algorithm to whole genome DNA, the program is rapid and has clarified some inconsistences in cyanobacterial phylogenetic trees obtained from 16S rRNA data. Ellen van Donk's plenary was a tour de force of phytoplankton chemical signalling and ecological interactions affecting the aquatic microbial community and it was an superb introduction to the symposium 'algae and signalling'. Another notable symposium was 'ecology, physiology, and taxonomy of freshwater phytoplankton' and was also the session in which I presented my poster; I received encouraging feedback and extended my network of connections. Lastly, Christine Maggs's BPS presidential lecture was a 'potted history' of her academic career in phycology; it was a privilege to have an insight into her career, especially as she is now my Executive Dean at Bournemouth University.

In summary, EPC6 was an exceptional conference with presentations of international importance, I am very grateful to the organisers and also the BPS for their bursary award. My attendance provided an opportunity to expand my scientific understanding, extend my network and framed my research within the discipline of phycology.

David Hartnell, University of Bournemouth



When the previous European Phycological Congress was held I was just starting my PhD on the ecophysiology of estuarine macroalgae, at the University of Málaga (Spain). Since then, I have been looking forward to the **6th EPC congress**, which has been my first international conference. There I have had the opportunity to get to know the phycological community, discover interesting topics I had never heard about before, and exchange ideas and concerns with international scientists.

Although the congress kicked off in August 2015, I felt part of it when I decided to participate in the Student competition. They asked us to record a video where we pitched our research topic in just 2 minutes, a bit challenging at the beginning. However, it was a great exercise for us young scientists to distil the essence of our investigation. But those hours I spent talking to the camera were worthwhile since I was privileged to present part of the research undertaken during my PhD at the Manton Session. During that afternoon I had the pleasure to share session with other young and talented phycologists working on diverse and enticing topics, from micro- to macroalgae and from basic to applied science. The talks were carefully prepared and performed, and had a great scientific quality. My presentation entitled "Nutrient and light responses in two estuarine rhodophytes: implications for their zonation" was focused on the intertidal zonation of *Bostrychia scorpioides* and *Catenella caespitosa* from a temperate estuary. Using ex situ photoacclimation and nutrient uptake experiments I found different light and nutrient requirements for each species, which were meaningful for explaining their in situ zonation. I received positive feedbacks, and the biggest prize I won was to have the opportunity to present an oral paper at the congress. I couldn't have enjoyed the experience anymore and I congratulate the winners once more!

Apart from the highly recommendable Manton experience, I learned about many issues at the different sessions I attended. As an ecophysiologist of seaweeds I was interested in the talks focused on biodiversity and ecosystem function, the effect of global change on algal assemblages or macroalgae in stressful environments in coastal systems. While I could more or less know what to expect in these sessions, I was positively surprised by other sessions less related to my background, as the one on the algal-microbial interaction, which made me think about how much is yet to be explored. The overall content of the program was good and diverse, but if I had to criticize any session, me and some other students felt a little dissatisfied with the student symposium. Maybe we expected to learn something new about the possible future paths of a phycologist or the actual links to the industry, both beyond particular experiences which were merely examples of it.

In the more relaxed atmosphere during the poster sessions, after the delicious buffet lunch or the "campsite lunch", I could engage in lively debate with other researchers. I also contributed with a poster entitled "Zonation of two estuarine rhodophytes: Intraspecific variability at such a small-scale?", which was complementary to the oral paper. The posters were plenty of interesting and diverse research, with a high participation of students, and just to read all the poster titles was quite time-consuming. Of course, it was much easier when the authors were standing next to their posters to tell you their stories "in vivo".

In summary, it has been an enriching experience and I hope I can join the next EPC in Zagreb in 4 years, wherever we'll be and whatever research avenue we'll be exploring. I am very grateful to the British Phycological Society for supporting me financially and promoting the student participation in this kind of events.

Raquel Sánchez de Pedro

The **6th European Phycological Congress** took place in London and brought together phycologists not only from Europe but from all over the world. The scope of the meeting was breath taking and, over the 4 days of lectures and poster presentations, covered every area of phycology. While difficult to single out a specific session, the highlights for me were the plenary speaker John Archibald ("One plus one equals one: symbiosis and the evolution of complex life") and the many presentations on the algal microbiome and the role of algae in global biogeochemistry.

I had the pleasure to attend this meeting as one of the students shortlisted for the Irene Manton Student Prize Competition with the oral paper entitled "Multidisciplinary analysis of a freshwater lake microbial community under differing nutrient regimes". This competition has been held each year at the annual meeting of the British Phycological Society (BPS) and awards the best oral papers by postgraduate students. The tradition was not interrupted and this session was integrated in the EPC6 programme with 10 student presenters (selected on the basis of a two minute video pitch of our research). For me it was an honour to disseminate my research to such a broad audience and simultaneously share the stage with nine truly excellent young scientists from all over the world. The organisation of the meeting showed further commitment to young scientists by hosting a student symposium on the penultimate day of the congress. This symposium was a blend of inspiration, career advice and useful scientific tips.

I'd like to thank the BPS for awarding me with the 3rd prize in the Irene Manton Student Competition (congratulations also to Sohail Keegan Pinto (1st prize) and Julie Zedler (2nd prize)) and for the financial support that made my attendance possible. I'm also grateful for further financial support from FEMS who awarded me a FEMS meeting grant. Finally, a big thank you to everyone involved in organising this incredible meeting. I hope to see you all again in future BPS annual meetings and in Croatia in 2019!

David Russo d.russo@sheffield.ac.uk

Matthias Schmid,
National University of Ireland Galway,
Botany and Plant Science,
Ryan Institute

I was very grateful to receive the travel bursary of the British Phycological Society to attend the **6th European Phycological Congress** last summer in London. The time of the conference also marked the final months of my PhD and it was great to summarize the main findings of my project and present them to an audience of international algae experts.

My PhD project at the National University of Ireland Galway was part of NutraMara, Ireland's Marine Functional Food Research Initiative, which aimed at an optimised utilisation of Ireland's marine resource for use in Functional Foods. The main focus of my research was to investigate the impact of abiotic factors on content and composition of fatty acids and pigments in different commercially and ecologically important seaweed species (e.g. *Palmaria palmata*, *Laminaria digitata*, *Fucus serratus* and *Ascophyllum nodosum*). My research covered both the investigation of natural variability observed in field collected seaweed samples from different sampling seasons and locations and the further investigation of the impact of temperature and light under controllable laboratory conditions.

The 6th European Phycological Congress (EPC 6) presented an excellent opportunity to share some of the findings of my PhD with a wide audience of international phycologists. I applied for an oral presentation with the title "Plasticity of fatty acids and lipids in macroalgae" which highlighted some of the main findings of my PhD on variability of fatty acids in seaweeds. My talk was accepted for the session "Algal Lipids not just for burning". Most talks of this session focussed on microalgae and I was happy to add a bit of variety with my talk on fatty acids in seaweeds. I believe the talk was well received and it represented an important stepping-stone for many interesting conversations after the talk and during the coffee breaks of the conference.

Being in the final stages of my PhD then, many of the conversations and comments were particularly valuable to interpret and discuss the findings of my PhD. I was able to submit my thesis a few months after the congress.

In addition to the scientific programme, the conference also was a perfect opportunity to deepen existing friendships and make new ones with students from around the world. I am very grateful for receiving the travel award which gave me the opportunity to attend this excellent conference.

Sampling in a somewhat different, but challenging location!

I have been very grateful to receive one of the BPS student bursaries to attend the **EPC6 in London**. It has been a great opportunity to meet phycologists after spending the last 2.5 years a little isolated from direct contact to the scientific community – in Antarctica.

British Antarctic Survey (BAS) has a year-round time-series that has been going on since 1997. The British base for ongoing biological and oceanographic research is Rothera, which is located on Adelaide Island half way down the Western Antarctic Peninsula. If weather permits data are collected twice a week in the summer and once a week in the winter. We sample for physical data in the water column (salinity, temperature, fluorescence and available light) down to 500m as well as phytoplankton size distribution and nutrients at 15m.

Every year BAS employs a Marine Assistant who is responsible for continuing the time-series. Whilst a lot of oceanographic sampling is conducted from big research vessels, ours is a little smaller and lack an electrical winch and a big CTD with a rosette of Niskin bottles (especially designed water sampling bottles which can be triggered to close at a desired depth). So what does a day for a Marine Assistant look like?

The first thing I usually do in the morning is to check the current weather and the weather forecast for the day (we only have a forecaster on base during the summer, so in the winter, the forecasts were mostly computer generated and not very reliable). This gave me an idea whether it was an indoor or outdoor day. Once fuelled up with breakfast (5 minute walk from the room), all of us headed down to the boat meeting to plan the day. On the way to the lab we also get the first glance onto Ryder Bay where most of our work takes place. The view varies from being absolutely clear, over slightly covered with ice, or being packed full with icebergs. The latter is rather disheartening, as it will stop us from launching the boats.

In the summer we have several visiting scientists and hence more projects which require the sampling boats. In the winter it is just the Dutch Marine Assistant and myself. Once the sampling and diving operations for the day are arranged we quickly get on our way – even though it looks good, the weather can turn quite suddenly. The RIB (rigid inflatable boat) is loaded up with all the essential equipment: CTD, Niskin bottle, sampling bottles and not to forget: hot juice and snacks! As soon as we are warmly wrapped up and zipped up in our boat suits we get the boats to the wharf with the tractor and launch them with the crane. Once on the water we make a quick call to base to communicate our intentions for the day and make sure that the VHF radio is working ok in case we encounter any problems.

The drive to the sampling site takes about 5-20 minutes depending on ice conditions – this usually reminds me of how beautiful and special the place is and leaves me with a feeling of gratitude that I had the opportunity to spend 2.5 years in Antarctica. Once we get to the site we turn the engines off and are left with the quiet of the ocean, crackling of melting sea and glacier ice, the occasional squawk of a penguin or breathing sound of a marine mammal. However, the instruments need to get in the water. Once the CTD has been acclimatised, we let it go down to 500m. Earlier I mentioned that we lack an electric winch. So in order to get it back up, we need to use a hand winch. This is the point in time when it comes in handy to befriend a lot of people on base and offer them beautiful trips out on the boat – since they are stuck here now with us, they might as well keep themselves warm by taking a couple of turns on the winch. The bribe of hot juice and snacks helps too!

As soon as the CTD is back in the boat, the Niskin is attached to the line. This usually only goes down to 15m. The water is than decanted from the Niskin. However, we cannot just pour it but need to use a little tube attached to the bottom to ensure high quality sampling. Once the thin lab gloves are on (not more than thin woollen gloves fit underneath them which also frequently soak up with water) we get going. In the summer this is usually fine and the hands only get cold towards the end. In the winter I more often have to take breaks in between to warm up my hands again – but luckily we usually have a hot water bottle with us! It gets more annoying, once the air temperature is so low that even salt water freezes and the decanting of water through a thin tube is impossible as it just keeps freezing up. Here we have to compromise by either pouring the water out from the top or taking the full Niskin bottle back to the lab. I very much enjoyed encountering all different kinds of problems during my time in Antarctica and finding a way to work around them.

Once back in the lab it is usually lunchtime – perfect for warming up and gathering energy for the afternoon in the lab. Unfortunately, there is only one of me and hence not enough time to analyse the samples for everything. So we preserve a lot of the samples in various different ways depending on the further testing (i.e. Barium, CO2, HPLC, nutrients or viruses). However, we are able to run the samples for ammonium as well as size fractionation for the phytoplankton. I presented the data from the latter for the last 18 years on a poster at the EPC6 in London.

Apart from encountering whales, seals and penguins during

our sampling, the most memorable experience for myself was the day the sea ice was finally thick enough to venture on for several kilometres off base and sample through it for our CTD and water collection. The sea ice that only forms in the winter around Rothera supported 3 of us and 2 skidoos with sledges carrying our sampling equipment including our winch. Standing on top of 500m where we usually visited in a RIB was somewhat magical!

After this amazing and unique experience I am now looking forward to pursuing a PhD in chemical ecology of Antarctic macroalgae and invertebrates.

For more information on live on base please visit: http://penguinlandadventures.blogspot.co.uk

Additionally, the videos on my stream visualise sampling and the underwater world around Antarctica:

https://vimeo.com/108655380

Sabrina Heiser

I am currently a first year PhD student in the University of Birmingham under the supervision of Dr. Juliet Coates. My Research focuses on the growth and development of Ulva sp. Last August I was fortunate enough to be able to attend the 6th European Phycological Congress in London which was held in the Hotel Novotel. This congress was a joint venture between the Federation of European Phycological Societies (FEPS) and the British Phycological Society (BPS).

The meeting was divided into 16 symposia for both posters and presentations, including 'Algae-microbiome interactions: integrative overview from biology to chemistry', which was the symposium related to my poster. The whole meeting was very well organized and days would start with a plenary session in the Main Hall followed by the consecutive talks, coffee break, lunch and afternoon talks. All the talks in this symposium were very interesting, however, I particularly enjoyed the public lecture on the ocean acidification by Dr. Jason Hall-Spencer, which highlighted research focused on how marine life will cope with ocean acidification.

The poster sessions were held usually after lunch, between 13:30 p.m. and 14:30 p.m. I presented my poster, entitled "Cross-testing of bacteria isolated from Ulva mutabilis and Ulva linza", in the second session. It was an excellent opportunity not only to present my preliminary results, of my collaborative experiments in Dr. Thomas Wichard's lab (Friedrich Schiller University Jena), but also to get valuable feedback and comments from other attendees.

Interacting with most of the participants was very helpful in creating a network for future project opportunities and also to meet scientists and fellow researchers with similar interests from various institutes and universities. As well as meeting many big names I also made a lot of friends and hopefully I will get to see them again at the next conference.

I am very grateful to the British Phycological Society for their financial support in order to attend this great conference and would like to thank everyone involved for making this meeting such a unique experience.

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Final Report on the 6th European Phycological Congress (EPC6)

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The **6th European Phycological Congress** was held in London, UK, from 24 to 28 August 2015 at the Novotel Hotel in Hammersmith (west London). EPC6 was co-sponsored by the Federation of European Phycological Societies (FEPS) and the British Phycological Society (BPS).

Planning for the Congress began several years before when an Organising Committee was formed. Prof Jane Lewis and Prof Elliot Shubert were designated Co-Chairs of the EPC6 Organising Committee. The Committee was composed of: Geoff Codd, Eileen Cox, Claire Gachon, John Harburt, Anne Jungblut, Jerilee Pinto, Michael Steinke, Graham Underwood, Susy Whitaker and Chris Williamson. In addition, a Scientific Committee was established by FEPS and was Co-Chaired by Olivier de Clerck and Peter G. Kroth. The Scientific Committee was composed of: Francisco Arenas, Jean-Paul Cadoret, Mark Eliáš, Claire Gachon, Gwenael Piganeau, Fabio Rindi, Graham Underwood and Elżbieta Wilk-Woźniak. All committee members are to be congratulated for contributing their ideas, energy, commitment and completing their tasks, which ensured that EPC6 was a successful Congress.

It was a major challenge to organise EPC6 not knowing how many would attend, based on a guestimate of numbers from EPC5 (350 attendees). In the end, we had 450 attendees from 45 different countries. Nineteen PhD students or young Post Docs were supported by a grant provided by the Federation of European Microbiological Societies (FEMS). Overall, 30% (132) of the participants were students attending EPC6.

We spent Friday and Saturday preceding the Congress getting all the supplies organised, registration packs collated, registration table set up, rooms labelled and poster boards set up. Once the Welcome Reception began we could relax a little and the hotel staff took over. The meeting was designed with two days of talks and posters followed by a mid-week excursion and ending with two days of talks and posters. A robust scientific programme was organised by the Scientific Committee, which was composed of 201 oral presentations (invited symposia and contributed) and 205 poster presentations. The presentations were organised into 17 symposia (Algal diversity and species delimitation: new tools, new insights, Shedding new light on photosynthesis and its role in global biogeochemistry, Algal lipids not just for burning, Molecular cell biology, Algal biodiversity and ecosystem function: new scenarios in coastal systems, Algae in stressful environments in coastal systems, Global change and algal assemblages: the fate of our seas, Genetic engineering in algae: novel molecular tools and novel model species, Ecology, physiology and taxonomy of freshwater algae, Omics and genetic resources towards algal domestication, The fate of marine forests in a changing ocean, Algae and signalling: regulation of processes from cell to globe, Algae-microbiome Interactions: integrative overview from biology and chemistry, Phylogenomics: new approaches to solving old problems in algal evolution, Symbiodinium as a model organism; "Phycomorph": morphogenesis and development of macroalgae, Irene Manton Student Prize Competition (BPS) and Student Symposium).

Each day (Monday, Tuesday, Thursday, Friday) began with an invited Plenary Lecture, all of which were interesting, challenging and thought provoking. The order of the Plenary talks were: John Archibald: "One plus one equals one: symbiosis and the evolution of complex life", Ellen Van Donk: "Chemical information transfer in plankton communities", Maria Mittag: "Light sensing and the circadian clock in a flagellate green algae", and Ester A. Serrão: Extant or extinct tipping points: climate changes drive genetic diversity and dynamics of marine forests".

Special lectures were presented by: Christine Maggs, BPS Presidential Address, "Seaweeds: the good, the bad and the pretty" and Jason Hall-Spencer, Public Lecture, "How will marine life cope with ocean acidification?"

The winner of the Irene Manton Student Prize Competition sponsored by BPS was Sohail Keegan Pinto (University of Hokkaido) for his presentation on the "Diversity and phylogeny of the benthic dinoflagellate genus Testudodinium (Dinophyceae)". The winners of the Poster prizes sponsored by FEPS were: 1st: Lea Cabioch (Station Biologique, Roscoff) (£250), 2nd: Sarah Heath (University of Edinburgh) (£150) and 3rd: Bo Ra Kim (Kongju National University) (£100). Runners up were: Klaus Herburger (Université de Bretagne Occidentale).

Despite the intense scientific presentations (three concurrent sessions daily over four days), attendees found time to relax in the hotel lounge and bar. On Wednesday, two coaches (100 people) took the tour to Stonehenge (World Heritage site of the Neolithic and Bronze Ages displaying the famous stone circle dating 3,000 BC) and Salisbury Cathedral (display of 800 year-old Magna Carta). Despite it being a long day, everyone enjoyed the tour. The Congress Dinner was on Thursday evening. Everyone enjoyed a special meal of roast lamb and all the trimmings, and recognition of the winners of the Manton and Poster Competitions and the recipients of the FEMS stipends. The evening was topped off with live music by "The Beat Collective": a group of five talented musicians playing songs from the 70s and 80s. Everyone was on the dance floor until the band stopped playing at midnight.

Registration covered lunch, which was served buffet style with eight stations. Each day was a different menu with a variety of choices. The quality of the food was excellent and everyone enjoyed it.

Finally, we would like to extend our appreciation to Sophie van den Toorn and all of the staff at the Novotel for their assistance and service, John Copestake and his staff at Euro Presentation for organising and running the audio visual equipment, Taylor & Francis for sponsoring the EPC6 Programme and Book of Abstracts and the opening reception, and the sponsors (Allen Press, Algenuity, Applied Maths, crùbag, E. Schweizerbart, Elsevier, FEMS, FlowCam, Global Seaweed, Photon Systems Instruments, pyroscience, Springer, VLIZ, Walz, and Xanthella). We would like to thank the Natural History Museum and the University of Westminster for their support.

The 7th European Phycological Congress will be held in 2019 in Zagreb, Croatia.

Manton Prize Winner, EPC6, 2015

Sohail Keegan Pinto skpinto@mail.sci.hokudai.ac.jp

On 25th August 2015, I had the incomparable opportunity to present my work at the Manton session at the EPC6/BPS Annual Meeting. This long journey began with my desire to attend the conference when I first heard of it in late 2013, and culminated in my being awarded the Manton Prize, to my utter shock and delight. Despite continual jovial references to myself as a career student, the EPC6 was my first international conference, and the receipt of the Manton Prize was the icing on the cake. I addressed the biodiversity and phylogeny of *Testudodinium*, a genus of benthic dinoflagellates, highlighting morphological and DNA sequence evidence to support my case. This topic is part of my doctoral thesis work, which in its entirety addresses the diversity of benthic dinoflagellates in the area around the Satsunan Islands in sub-tropical Japan.

I arrived at phycology by a very round-about route. I have always been interested biology in general, and in evolution in particular. In my prior education, I have pursued research in the genetics of E. coli DNA repair mechanisms, and in the microbial reduction of metals in deep sediment from the Helgoland Mud Area in Germany, only to conclude that, as fascinating as these topics were, I wasn't the best fit for them. In early 2013, while working on the genetics of *Emiliania huxleyi* as part of a lab rotation course during my master programme, I was informed of an opportunity to apply to Hokkaido University for a PhD. I found Professor Takeo Horiguchi, who works on the taxonomy and phylogeny of microalgae and protists. In addition to my aforementioned interest in evolution, I had developed a supplementary interest in taxonomy, making this opportunity impossible to pass up; I applied forthwith, with the guidance of Professor Horiguchi, and was accepted into the course. I am currently right in the middle of a three-year doctoral programme.

I find dinoflagellates extremely interesting. They have a unique biology, which poses many issues in the application of standard techniques to investigation of the various species from the angle of DNA sequencing and analysis. Conversely, this same biology makes the preparation of samples for electron micrographs a short and simple process. I greatly appreciate that I have the opportunity to do everything myself, thereby increasing my already diverse skill set. However, since I am new to the field, there is still much I have to catch up on with regards to the state-of-the-art. In the end, the more I find out the more fascinated I become. Studying at Hokkaido University is more than conducive to my research activities. I am deeply grateful to Professor Horiguchi, who guides my thesis, for all the help and support he has extended and continues to extend to me.

My experience at the EPC6 was second to none, despite a bout of food poisoning. I attended every talk I possibly could, and the depth and width of the research in phycology astounded me. I especially appreciated the student symposium: hearing from scientists about their personal experiences in the system was most enlightening. It only served to reinforce my view that being a scientist in today's world requires public relations skills and business sense as never before. Also fascinating were the talks on diversity of microalgae. I found the presentations of my fellow participants in the Manton session very interesting, and the session as a whole highlighted how diverse research in phycology is and will continue to be.

To conclude, I am extremely grateful to the Hokkaido University, with supports my studies through the Hokkaido University President's Scholarship, and to the JSPS, which provided financial support through Professor Horiguchi, enabling me to attend the conference. And I cannot truly express the depth of my gratitude to all the organisers of the conference for all the help and support extended from the time I registered through a most wonderfully organised event.

The Aquatic Biodiversity & Ecosystems Conference – Liverpool 2015

Louise Firth, School of Geography, Earth & Environmental Science, Plymouth University, Drake Circus, Plymouth, PL4 8AA

Official photo and diversity of the delegates.

The Aquatic Biodiversity and Ecosystems Conference was a meeting for aquatic scientists (both marine and freshwater) with a focus on evolution, interactions and long-term change - particularly how these shape patterns of biodiversity and the relationships between biodiversity and ecosystem functioning. The scope was deliberately broad encompassing natural and highly modified habitats in both marine and freshwater aquatic systems. Ecology and Evolutionary Biology were the key focus, but the meeting also catered for an interdisciplinary approach to studying and managing aquatic ecosystems, especially unravelling local and regional scale impacts from global climate driven change. The University of Liverpool hosted the seminal "Plant-animal interactions in the marine benthos" conference in 1990. This was a one-off conference that focused on biotic interactions between benthic marine organisms. One of the aims of Aquatic Biodiversity and Ecosystems Conference 2015 was to provide a forum to revisit some of the themes of Plant Animal Interactions, review scientific advances in the field after 25 years, and to broaden it to freshwater systems.

The conference was jointly hosted by the University of Southampton and Plymouth University between August 30th and September 4th 2015. The organising committee led by Louise Firth (Plymouth University) included Steve Hawkins, Hanna Schuster, Katrin Bohn (University of Southampton), Antony Knights (Plymouth University), Leonie Robinson (University of Liverpool), Nessa O'Connor (University College Dublin), Ian Donohue (Trinity College Dublin), Martin Genner (Bristol University), Gray Williams (University of Hong Kong), Iwan Jones (Queen Mary University London) and Chris Frid (Griffith University). Over 300 delegates (Figure 1) from over 40 countries came to the conference representing all continents (Figure 2).

There was a stellar line up of plenary speakers linked with the conference themes: Steve Hawkins (University of Southampton) and Brian Moss (University of Liverpool) gave a regional perspective on day 1. The British Ecological Society sponsored a special session on "Biodiversity, ecosystem functioning and stability" featuring Kevin McCann (Guelph University), Brian Silliman (Duke University) and Emma Johnston (University of New South Wales). The "Evolutionary biology: speciation, phylogeography and biogeography"

The Hawkins Collection: awarded to Prof. Steve Hawkins for his contribution to science.

talks featured Christine Maggs (Bournemouth University), George Turner (Bangor University) and Lynn van Herwerden (James Cook University). The "conservation, management and policy" talks featured David Lodge (Notre Dame University) and Jake Rice (Canadian Department Fisheries and Oceans) and the talks on "Global environmental change" featured Brian Helmuth (Northeastern University), David Dudgeon (University of Hong Kong).

In addition to the plenary speakers, the conference featured an excellent line up of keynote speakers: Laura Airoldi (University of Bologna), Amanda Bates (University of Southampton), Lisandro Benedetti-Cecchi (University of Pisa), Jennifer Dodd (Glasgow University), Romina Henriques (University of Stellenbosch), Stuart Jenkins (Bangor University), Rebecca Kordas (Imperial College London), Pippa Moore (Aberystwyth University), Eoin O'Gorman (Imperial University), Anne-Marie Power (National University of Ireland Galway), Steve Swearer (University of Melbourne) and Guy Woodward (Queen Mary University London).

The social events kicked off on Monday 31st August with a cultural walk – "the imbibing emporiums of Liverpool". Delegates were provided with an informative guide of the history of Liverpool told through its finest pubs. The Philharmonic Pub on Hope Street was the social heart of the conference where delegates could meet in beautiful rooms and were encouraged to visit the even more beautiful urinals in the gent's toilets. The social highlight of the conference was a very well attended conference dinner held at the Marriott Hotel with some good food and even better dancing. Songs of note included classics from the Northwest such as Oasis' "Don't look back in anger" and Gerry and the Pacemakers' "You'll never walk alone". Steve Hawkins' contribution to science/retirement from "wearing a suit" was recognised through the presentation of "The Hawkins Collection" (Figure 3) - 50 limpet shells from a range of aquatic habitats (freshwater, coastal & deep sea) donated by 63 aquatic scientists from all over the world. The collection provided a visual testament to Steve's impact on peoples lives and careers.

The prizes for best student oral presentations were sponsored by the Marine Biological Association of the UK and were awarded to Rebecca Atkins (1st prize, University of Georgia) and Curtis Horne (2nd prize, Imperial College London). Joint 3rd prize for student talks was awarded to Ben Harvey (Aberystwyth University) and Carla Lourenco (Rhodes University). The prizes for best student poster presentation were sponsored by MARS Network and awarded to Elizabeth Elliott (1st prize, Plymouth University) and Zahra Alsaffar (2nd prize, King Abdullah University of Science and Technology, Saudi Arabia). Runners up (joined 3rd prizes) included Nathan King (Aberystwyth University) and Rebecca Atkins (University of Georgia).

The organisers wish to thank the University of Liverpool conference organising team for all their help. The organisers would also like to thank the British Phycological Society for their generous support towards plenary and keynote speakers at the conference.

The organisers are curious to hear who might be interested in taking on ABEC in 2020…..

Attendance at the 2015 Aquatic Biodiversity and Ecosystems Conference in Liverpool

Rebecca Atkins, PhD Student, UGA Odum School of Ecology

The Aquatic Biodiversity and Ecosystems Conference (ABEC) was an incredible undertaking for all those involved in its organization. Building off of a previous conference that took place in 1990, ABEC was organized to both reflect upon the past 25 years of marine and aquatic research, and also to set the stage for future work and collaborative efforts. Having yet to attend an international conference, I was unsure of what to expect.

ABEC surpassed all of my expectations, encompassing a breadth of disciplines and actively seeking to bring together a diverse group of researchers, both established and emerging. The city of Liverpool, with its rich history and an abundance of pubs, was a brilliant choice to not only host this eclectic gathering, but to also foster dynamic interactions and collaborations. Amidst several days of contributed and invited talks, were a smattering of lively tea breaks, special topics workshops, and an exciting evening of pub exploration. Throughout this time, I had numerous opportunities to attend a variety of presentations. I was able to converse with researchers who shared similar interests and enthusiasm, while also networking with fellow graduate students from around the world. As a first year PhD student, attending ABEC gave me the motivation to continue exploring my ideas, expanding my perspectives, and seeking input from others. I also took another stab at conquering my fear of public speaking by presenting both a talk and a poster. Both were well received and resulted in insightful feedback.

One additional, and personally rewarding, result of this conference was earning recognition for both best student oral presentation (first place) and best student poster (third place). This

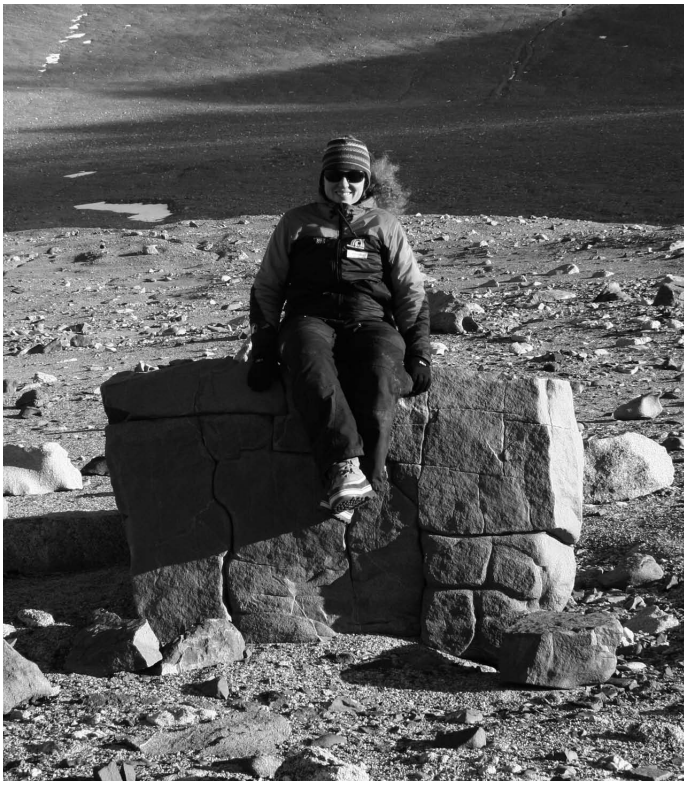
was truly an honor that I will not forget. Being surrounded by a global network of scientists, enjoying a vibrant city, and talking about innovative and engaging research has instilled within me the desire to continue fostering broader collaborative efforts that seek to answer globally relevant questions.

I am extremely grateful to the British Phycological Society for giving me such an incredible opportunity, and for allowing me to experience my first conference abroad. Having attended, I feel that I have formed a number of valuable professional and academic connections, which will likely result in future collaborative work outside of my host institution. I have also gained greater confidence in my ability as a researcher, and I'm excited to convey my experiences to peers back at my home institution.

Antarctic field expedition to the Wright Valley to study cyanobacteria and microbial diversity in freshwater ecosystems

In January 2012, I was fortunate to participate in an Antarctic field trip to the Upper and Lower Wright Valley, Southern Victorialand, Antarctica because of a project award by the British Phycological Society. The field team consisted of Dr Ian Hawes (Canterbury University, Gateway Antarctica, New Zealand), Dr Hana Christenson and me. The logistic support was provided by the New Zealand Antarctic Programme, which meant that we deployed to Antarctica from Christchurch New Zealand. After several days at the New Zealand Antarctic station Scott Base, where we had to carry out Antarctic field training and pack our field and camping gear, we were put into our field site in the McMurdo Dry Valleys by helicopter. Our first camp was in the Upper Wright valley at the foot of the Upper Wright Glacier, which is an area also called the Labyrinth because of its high ridges and canyons, thought to have formed due a flood release of a subglacial lake 12.4 and 14.4 million years ago (Denton & Sugden 2005). The second sampling areas were in the Lower Wright Glacier near Lake Brownsworth. Both areas have numerous meltwater ponds ranging in size from less than a meter to 20 meters across. The meltwater ponds also had a range of conductivities ranging from 0.14 to 45 mS/m. As part of the fieldwork, we sampled cyanobacterial-based microbial mats for DNA and microscopy identification from many of the ponds. Most cyanobacterial mats in the Wright Valley meltwater ponds were between several mm to centimetre thick and were made of two distinct layers, an orange carotenoid-rich upper and green chlorophyll pigmented lower layers. The composition was dominated by oscillatorian cyanobacteria such as *Leptolyngbya*, *Pseudanabaena*, *Phormidium* and *Oscillatoria*, with some unicellular morphotypes such as *Chroococcus* and nitrogen fixing filamentous Nostoc also being present. Some of the slopes between ponds had shallow meltwater runnels with microbial mats, which contained the less common genera *Schizothrix* and *Calothrix* in addition to the other more common oscillatorian cyanobacteria. Subsequently, morphological and molecular analysis have been carried out, both on the environmental samples and on cyanobacterial cultures that were isolated from them, and the results are currently being prepared for publication.

The other objective of the fieldwork was to obtain sediment and water samples from cryoconite holes in the Upper and Lower Wright Glacier that we accessed from the first and second camp site. The data obtained from the Wright Valley will be compared with for a comparison with other glaciers in the Southern Victorialand such as the Koettlitz and Diamond Glaciers. Cryoconite holes are water-filled pockets in glaciers, which form when darker sediments melt into the glacial ice. They are important ecosystems contributing to the biological diversity and productivity of glacier ecosystems, in which cyanobacteria



are the key primary producers. Although it was a relatively cold year, we were able to find cryoconite holes on both the Upper and Lower Wright Glaciers containing liquid water for DNA and water chemistry analysis. Subsequent Automated rRNA Intergenic Spacer Analysis (ARISA) and high throughput analysis published by Webster-Brown et al (2015) found that microbial communities differed among the different glaciers.

In summary, this was my first trip to the Upper and Lower Wright Valley to collect cyanobacteria-based microbial mat communities from freshwater ponds, and glacier cryoconite hole material. Further analysis will help to improve our understanding of the diversity, ecology and biogeography of cyanobacteria and microbial diversity in Antarctica and the importance of environmental variables shaping microbial biology in freshwater ecosystems in Antarctica.

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1: Ian and Hana are drilling a whole into the ice to collect samples from a cryoconite hole on the Upper Wright Glacier, Antarctica.

2: Cyanobacteria-based microbial mat collected from a pond in the Wright Valley. The microbial mat has typical carotenoid rich upper layer and green-pigmented under layer.

3: Anne D. Jungblut sitting on one of the many amazingly weathered rocks at the end of a long day out hunting for green slime in the McMurdo Dry Valleys, Antarctica

Report of a BPS Summer Studentship

The distribution of Tetracyclus *spp in Great Britain and implications for defining "rare" diatoms*

Susannah Collings and Martyn Kelly

The Aquatic Biodiversity and Ecosystems Conference (ABEC) waDistribution mapping, though common for many groups of organisms and, indeed, larger marine algae, is not widely practised for freshwater microalgae. Whilst the taxonomic literature invariably includes comments on the distribution of particular organisms, these can rarely be substantiated, with the result that it is difficult to make evidence-based cases for the consideration of freshwater algae by conservation organisations.

The immediate problem facing those wishing to map the distribution of freshwater algae is the absence of systematic records of distribution; in turn reflecting the absence of a recording infrastructure (often managed by enthusiastic amateurs). Many freshwater phycologists may have detailed records in notebooks or on their computers, but the absence of a recording infrastructure means that these are rarely shared in a manner that permits mapping. Since the late 1990s, however, the situation has started to change, particularly for freshwater diatoms, due to their use for statutory ecological assessment. Large databases now exist within the UK's environment agencies and it should, therefore, be possible, to extract records and location information in order to produce maps.

Yet this, in turn, raises a further series of problems:

1. The diatoms have been subject to unprecedented taxonomic reorganisation over the period that records have been collected routinely. It is not easy for analysts to keep up with all the nomenclature changes and, as a result, there are issues of precision around many of the names stored on a computer.

2. Sampling has largely been restricted to hard surfaces in shallow rivers and in the littoral zones of lakes. Any diatom with a preference for other types of substrates, or for aerial or sub-aerial habitats, is likely to be under-recorded. It is possible that a small number of records may be erroneously interpreted as indicating rarity when the reality is that the few records that are found are, in fact, atypical of the species as a whole.

3. The diatomist traditionally works from "cleaned" valves and frustules and there is no certainty that a small number of valves in a sample means that a viable population of the species in question was present at the site.

The standard recording unit for distribution maps is the 10 x 10 km square, termed a "hectad". These issues translate into risks of "false negatives" (points 1 & 2: the absence of a record is due to taxonomic/identification and sampling issues and not to the genuine absence of the species from a particular location) and "false positives" (point 3: an empty valve is washed into a site when, in fact, no viable population is found at the location. The standard sampling procedure (assuming approximately 10 cm2 is removed from each of five stones) covers just 0.0005 per cent of the total area within a hectad!

Point 1 can be addressed by focussing attention on species and genera where taxonomic concepts have remained stable, and which are sufficiently clearly delimited that the risk of misidentification is low. The genus *Tetracyclus* fulfils both of these criteria and is, in addition, relatively rarely encountered. Using a large database of diatom records it should therefore be possible to map the distribution and then to make a formal evaluation of the status of species within the genus using IUCN criteria.

Point 2 can only be addressed using the published literature on the habit of the species in question.

Point 3 is difficult to address. Records constituting very small numbers of valves could be construed as indications that there is no viable population at the site; on the other hand, some species may be genuinely rare within the site (alpha-diversity) as well as within a region (beta and gamma diversity). A small number of valves may also indicate the presence of the species in the vicinity, even if there is not a viable population in the stream itself.

The database used for this study is the result of the amalgamation of three datasets from which UK's ecological assessment tool, DARLEQ, was developed. Two represented rivers (Kelly et al., 2008) and lakes (Bennion et al., 2014) whilst a third included records from low alkalinity running waters in the UK and Ireland (Juggins et al., 2016). There are a total of 6308 samples; however, it was only possible to set up a base map for Great Britain for this study, which encompassed2588 sites (1753 in England; 598 in Scotland; 236 in Wales) spread across 923 hectads.

Species	Sites					
	Scotland	England	Wales	Ireland	Total	Mapped
T. lacustris	4	2	0	0	8	6
T. emarginatus	9	2	2	3	18	13
T. rupestris	1	0	2	0	5	3
Tetracyclus sp.	1	0	3	0	4	0

	Water body type				
	Standing	Running		Total	Mapped
T. lacustris	5	3		8	6
T. emarginatus	5	13		18	13
T. rupestris	2	3		5	3
Tetracyclus sp.	0	4		4	0

Table 1. Distribution of *Tetracyclus* spp. in the UK and Ireland, based on records in the DARLEQ databases.

Of these, *Tetracyclus* was present only in 31 sites across the UK and Ireland (Table 1), of which 22 could be linked to map coordinates in Great Britain and which are included in the distribution map (Fig. 1). Nineteen of the thirty-one records where the *Tetracyclus* species were found were river sites rather than lake sites. All three species were recorded in sites across Scotland, with most records coming from Scotland (14 sites in Scotland, 4 in England, 4 in Wales and 3 in Northern Ireland). Records are concentrated in the north Wales, Northumberland and Scotland, with two outliers in Pembrokeshire and Wiltshire. One of the Welsh locations sampled was Llyn Perfeddau, the lake in which the first *Tetracyclus lacustris* specimens were described by John Ralfs in 1843. The lake was re-sampled by Pentecost (2014); however, he was unable to find *Tetracyclus* species in any of his samples. The number of valves was, in all cases, low, with a maximum relative abundance of 1.2%.

Each of the *Tetracyclus* species individually fulfils the JNCC criteria for "rare", being found in less than 15 hectads. It is possible that more records will come to light; however, coverage of database as a whole is such that this is unlikely to radically change the picture presented here. It is, however, likely that the low number of records for *T. emarginatus* and *T. rupestris* is a consequence of habitat rather than purely distribution. Krammer and Lange-Bertalot (1991) describe *T. emarginatus* as being a "rare littoral form", with recent records only from northern Europe (including Scotland), whilst localities in north Europe for *T. rupestris* is, according to their account, "… seem to be missing". However, their description of the habitat of *T. rupestris* is similar to that of West and Fritsch (1927): dripping rocks (and moss lawns) in mountainous regions, which means that our dataset may underestimate the true distribution.

Although there have been efforts to establish "red lists" based on diatoms, the experience of this study (as for Denys, 2000) is that there are significant problems, and that a very large number of species will be categorised as "insufficient evidence". Simply plotting distribution is also only a first step: the IUCN's definition of "rare" is 'a species that has a high risk of extinction in the wild', which. These issues can be circumvented, to some extent, by assigning species associated with threatened habitats to "endangered" categories a priori. Yet this, in turn, introduces circularity: a habitat cannot be conserved on the basis of the presence of "red list" organisms, if their presence on the red list itself is due to their association with that habitat.

On the other hand, the case for including algae when assessing conservation needs to be evidence-based. The situation at present is that the most important primary producers in freshwaters are completely ignored except when they are perceived as problematic. Even if we can only make firm statements about the rarity of a few species, we would at least have made the case that conservation agencies should start to take freshwater algae seriously.

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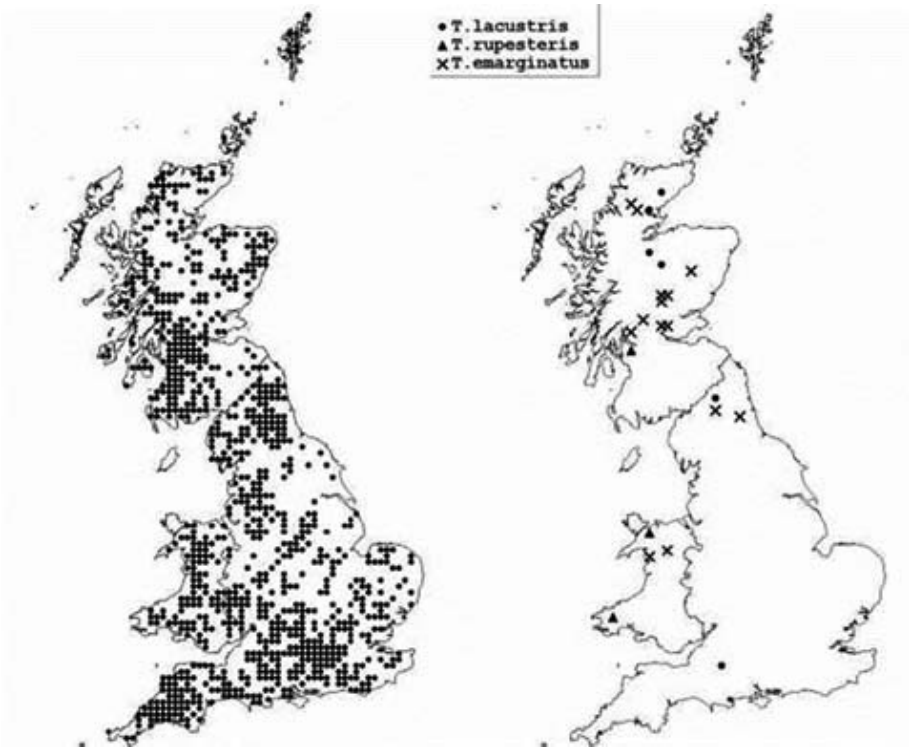

Fig. 1. The distribution of *Tetracyclus* spp in Great Britain, based on records in the DARLEQ database. Left: hectads for which at least one record is available; right: hectads from which *Tetracyclus* spp. has been recorded.

How the BPS Changed My Life

Marie Pažoutová

Some year ago, I (joking!) accused Heroen Verbruggen of being responsible for me getting pregnant. Indeed, he refused he could have played any direct or indirect role in this – probably with a good laugh by his Apple laptop somewhere in Melbourne. You know what, thinking of it now, I should actually blame the BPS. It is a kind of a long story... let me explain.

At the end of my Master's studies, I got a funding to visit my first international meeting (in Oban, focused on culture collections of algae). I was excited and I realized that meetings are crucially important for scientists, and for a young apprentice even more so. Soon I became a member of the British Phycological society. I visited the meeting in Cardiff in 2011, where I held my first oral presentation in English. I remember meeting enormously nice people, like Juliet Brodie (can't remember if Chris Maggs was there that year). I also remember a rising phycological star from Belgium – when people were chatting, drinking coffee and eating cakes, he was stuck in an armchair, poking in his small Apple and running trees. I would not address this busy, focused guy myself. On the last day of lectures, Heroen (yes, it was him) did a mistake, however, rising his head from the screen and saying he liked the Oocystaceae tree in my presentation. Oh, really! was the beginning, followed by – would you perhaps like to get the pdf of that paper? and finished (after few months and few emails) by me eventually asking if I could visit Heroen in Gent for two months. I guess at that time he hadn't learned yet to say no.

So it happened that I spent the autumn 2011 in Gent. I was certainly not the brightest nor quickest of Heroen's students, but he was surprisingly patient with me. I had a great time, living on pure endorphin. I enjoyed the days in Olivier de Clerck's lab when Oli, Heroen and Frederik Leliaert were working together on the same floor. After few years of fruitless struggling with my PhD, losing interest, energy and hope, working with Heroen was for me like a light at the end of the tunnel. I could see again that science can be – it must be – fun and joy. Despite the fact that the busy trio of phycologists went hardly out to have a beer, I left Gent with a strong emotional bond to the place. The memories of riding the Ugent yellow bike (kindly provided by Olivier's department) and gulping the science endorphins never lost its sweetness.

In the 2012 I again joined the BPS meeting with the society's financial support and I presented the project on *Halimeda* hybrid speciation, the one I worked on in Gent (a presentation original by the fact that I had no results at all, yet the audience was still incredibly supportive and nice.). It was also an opportunity to meet several colleagues, who later became my friends and collaborators (I especially recall the hilarious fun of sharing gossips with some).

One day back at home, when looking for a specific phylogenetic tool, I found myself browsing web pages of some bioinformatics group and voila, it said 'Gent'! My eyes got wide and I immediately searched the whole web through, finding 'no job openings' and a call to apply for a NGS sequencing workshop. I applied immediately. As a participant from an 'Eastern' country, I was also able to suggest a sequencing project for this workshop and my proposal was successful. So there I was in Gent again, learning about genomics with the people from Yves Van de Peer's group (VIB). The next steps were simple: I first came

back for a week to strengthen the collaboration on the "Whole genome sequencing of the Antarctic green alga *Prasiola crispa*" project of mine. Then I asked for a scholarship from the FEMS, through the membership in the BPS society with the kind help of prof. Paul Hayes. Combining two different funding, I moved to Gent for more than half year and enjoyed the opportunity to work at the grounds of the VIB institute (not talking about meeting old friends and developing some passion for the Belgian beers). And you get the long expected point now: nine months after the end of my research visit, my half-Flemish son Krystof Joan was born.

So there it goes: if I didn't know the BPS, and the society would not be such a great support for students, I would not make it to Cardiff, therefore I would not meet Heroen and ask him for help, and I would not fall in love with Gent, and I would not keep coming back, and I would not get the FEMS sholarship... etc. etc.

Deep from my mothers' isolation and the 'dishes and diapers' routine, as I call it, the BPS even helped me to attend the meeting in London, 2015, together with my 6 months old baby. It was a cool challenge and a great experience, and I would not make it without the society's support.

Years of friendship and collaboration with Fabio Rindi that was initiated at the BPS meetings bore also some fruits with IF: a study on sexuality of the trebouxiophytes (Fucikova et al. 2015) and a very recent description of two new genera of Prasiolales (Heesch et al. 2016 in the society's journal EJP).

At the end of my narrative, I'd like to thank all the people who make the BPS what it is. All the people who work and volunteer for the society, all the kind scientists who talk to strangers and are so, so supportive to students. For this, I was extremely grateful and I find it a great attribute of the society. For every student of phycology I strongly recommend joining the BPS and discovering all the benefits the membership can bring.

1 - discussing at the NGS workshop in Gent, 2012, Monica J. Moniz and me.

2 - at the NGS workshop in Gent, 2012, Monica J. Moniz, Stephane Rombauts and me.

3 - a group photo from the NGS workshop in Gent, 2012 me on the left, having a fight with Pierre Rouzé.

4 - at my desk at the VIB department during research visit funded by FEMS via BPS, Gent 2014.

5 - at the BPS / FEPS meeting in London, 2015.

PRESS RELEASE – PHYCOMORPH COST ACTION (FA1406)

"Advancing knowledge on seaweed growth and development"

Dr. Christos Katsaros, University of Athens, Faculty of Biology, Department of Botany, Athens 157 84, HELLAS (GREECE)

Workshop and Training School on "Macroalgae Development & Cultivation", Nea Peramos, Kavala, Greece, February 15-19, 2016

The Workshop (WS) and Training School (TS) organized in Fisheries Research Institute (Hellenic Agricultural Organization (HAO) - DEMETER), Nea Peramos, Kavala, Greece, on February 15-19, 2016 was completed with great success. The subject of this meeting was seaweed development & cultivation, and it was within the frames of the Phycomorph-COST (Cooperation in Science and Technology) Action FA1406, entitled "Advancing knowledge on seaweed growth and development".

The local organizers were Dr. Sotiris Orfanidis (Senior Researcher, Fisheries Research Institute, HAO-DEMETER) and Dr. Christos Katsaros, (Professor, Faculty of Biology, University of Athens, Greece).

More than 35 phycologists participated, including both academics and aquaculture R&D experts, from 15 different countries (Belgium, Croatia, Cyprus, Denmark, Estonia, France, Germany, Greece, Israel, Italy, Morocco, Portugal, United Kingdom, Spain, and Turkey).

The presentations were of high quality, presented by expert scientists, who presented the current knowledge and experience on seaweed development & cultivation, and discussed the possibilities of development of innovating aquaculture techniques for the production of new, environment-friendly substances based on seaweeds, in parallel providing new working positions. Particular attention was given to the Integrated Multitrophic Aquacultures (IMTA). The young scientists took the advantage to be trained by the experts in the training school.

www.micscape.org

David Walker, Voluntary editor of Micscape Magazine

In the February 2016 issue of the monthly e-zine Micscape the author Wim van Egmond with the phycologist Frans Kouwets as collaborator published: "The riddle of the 'green streaks'. In search of the first microorganism which Antoni van Leeuwenhoek described." http://www.microscopy-uk.org.uk/mag/artfeb16/wimleeuwenhoek2.html (PDF version linked to in page).

It is a reassessment of whether Van Leeuwenhoek's first description of an aquatic microorganism was Spirogyra (as later attributed by Dobell, 1932) or a proposed more likely candidate, a coiled planktic species of cyanobacteria in the genus *Dolichospermum*. *Dolichospermum* seems to better match all the clues which Van Leeuwenhoek provides when using the original Dutch.

In particular, it is proposed that he was more likely to first describe the external form of the organism as having a spiral arrangement rather than first discussing its internal structure. If *Dolichospermum* is the more likely, it would also be the earliest report of a microscopical study of a cyanobacterial bloom.

Micscape, established 1995, is an e-zine for microscopy enthusiasts and has contributors with extensive experience of their fields of interest.

Wim van Egmond is a multi-award winning photomicrographer and lives a short distance from the former site of the Berkelse Meer where Van Leeuwenhoek took his sample.

A new checklist of freshwater diatoms of Britain and Ireland - Part 1

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Although diatoms are the most species rich group of freshwater algae in the UK, there has been no systematic attempt to produce a checklist of UK records since 1998 (Whitton et al., 1998; drawing, in turn, on Hartley, 1986). There are, however, continuing obstacles, as diatom taxonomy is in a state of flux. In 1998 the broad outline of a new generic classification was in place (e.g. Round et al., 1990) but many species that conformed to the new generic concepts had not been formally transferred. At that time there was a pressing need for a checklist, as diatoms were beginning to be used as part of the UK's ecological assessment toolkit, and a comprehensive taxon dictionary was necessary in order to maintain a central database.

The rate at which generic boundaries have been revised and new species described has accelerated since 1998 and the task of evaluating and recording these changes became so large that revisions of the diatoms in subsequent versions of the Whitton et al. checklist (the latest in 2014: Whitton & John, 2014) were not possible in the absence of adequate financing. Some changes to the taxon dictionaries underpinning national databases have been made via the National Biodiversity Network; however, these have been piecemeal and there is no central repository for new records of the UK freshwater diatom flora.

Although checklists may seem anachronistic and far from the cutting edge of systematics, they play an important role in making new developments in taxonomy accessible. We have, for example, been involved in workshops to update the skills of diatom analysts; yet they (and we) are often frustrated to find that the latest names are not available in databases underpinning routine monitoring, and new records of 'new' taxa cannot be differentiated adequately. In recent years, a combination of fragmentation of the UK's environment agencies and tight budgets has meant that updates to taxon dictionaries are rarely as thorough as required.

The Freshwater Diatom Flora of Britain and Ireland, a project part-financed by the BPS to produce an online flora, provides the opportunity to address these issues and to produce a new checklist of validated records that can then be incorporated into taxon dictionaries. The checklist, in turn, helps to define the scope of the task facing the Flora team. Our intention is to produce periodic updates in The Phycologist, akin to those for the Freshwater Algal Flora of the British Isles (John & Whitton, 2015); as the list grows in length, versions will also be made available online. This first part partly reflects work on the Freshwater Diatom Flora to date; future updates will focus on particular genera and families.

Notes:

1. Records are limited to diatoms recorded from the UK and Ireland inland waters; occasionally species described as "brackish" in the literature have been included, but only if there are substantiated records away from the coast.
2. We made several orthographic corrections.
3. Status: A = currently accepted name; S = synonym. Synonyms are limited to recently-used names; B = basionym.
4. √ = new record (i.e. not recorded in Hartley (1986); Hartley et al. (1996) or Whitton et al. (1998) and/or recent nomenclatural change).
5. * = provisional record, but needs further investigation.

Taxon	Status	New Record
Class: Coscinodiscophyceae		
MELOSIRA C.Agardh 1824	A	
Melosira arentii (Kolbe) Nagumo & H. Kobayasi 1977, nom. inval.	A	
Cyclotella arentii Kolbe 1948	B	
Brevisira arentii (Kolbe) Krammer 2001	S	
Melosira dickiei (Thwaites) Kützing 1849	A	
Orthoseira dickiei Thwaites 1848	B	
Melosira undulata (Ehrenberg) Kützing 1844	A	
Gaillonella undulata Ehrenberg 1840	B	

Melosira undulata var. *normanii* Arnott in Van Heurck 1882, nom. inval.	A	
Melosira varians C. Agardh 1827	A	
ORTHOSEIRA G.H.K.Thwaites 1848	A	
Orthoseira dendrophila (Ehrenb.) F.E. Round, R.M. Crawford & D.G. Mann 1990 nom. inval.	A	
Porocyclia dendrophila Ehrenberg 1848	B	
Melosira dendrophila (Ehrenberg) R. Ross & P.A. Sims 1978	S	
Aulacoseira dendrophila (Ehrenberg) R.M. Crawford 1981	S	
Orthoseira dendroteres (Ehrenberg) Genkal & Kulikovskiy in Kulikovskiy et al. 2010	A	
Liparogyra dendroteres Ehrenberg	B	
Melosira dendroteres (Ehrenberg) R. Ross 1947	S	
Orthoseira epidendron (Ehrenberg) H. Kobayasi in Mayama et al. 2002	A	
Stephanosira epidendron Ehrenberg 1848	B	
Melosira epidendron (Ehrenberg) Boyer 1926	S	
Aulacoseira epidendron (Ehrenberg) R.M. Crawford 1981	S	
Melosira roeseana var. *epidendron* (Ehrenberg) Grunow in Van Heurck 1882	S	
Aulacoseira dentroteres (Ehrenberg) R.M. Crawford 1981	S	
Class:Fragilariaceae		
DIATOMA Bory 1824	A	
Diatoma ehrenbergii Kützing 1844	A	
Diatoma vulgaris var. *ehrenbergii* (Kützing) Grunow 1862	S	
Diatoma elongatum (Lyngbye) Agardh 1824	A	
Diatoma tenue var. *elongatum* Lyngbye 1819	S	
Diatoma grande W. Smith 1855	A	*
Diatoma mesodon Kützing 1844	A	
Diatoma moniliforme (Kützing) Williams 2012	A	
Diatoma tenue [var.] α moniliforme Kützing 1834	B	
Diatoma tenue C. Agardh 1812	A	
Diatoma vulgare Bory 1824	A	
Diatoma vulgare var. *breve* Grunow 1862	A	
Diatoma vulgare var. *lineare* Grunow in Van Heurck 1881	A	
Diatoma problematica Lange-Bertalot 1993	A	√
ODONTIDIUM Kützing 1844	A	√
Odontidium hyemale (Roth) Kützing 1844	A	√
Conferva hyemalis Roth 1800	B	
Diatoma hyemale (Roth) Heiberg 1863	S	
HANNAEA R.M.Patrick in R.M.Patrick & Reimer 1966	A	
*Hannaea arcus (*Ehrenberg) R.M.Patrick 1966	A	
Hannaea arcus var. *amphioxys* (Rabenhorst|) R.M. Patrick in R.M. Patrick & Reimer 1966	A	
Ceratoneis amphioxys Rabenhorst 1853	B	
Hannaea linearis (Holmboe) Álvarez-Blanco & S. Blanco 2013	A	
Ceratoneis arcus f. *linearis* Holmboe 1899	B	
Hannaea arcus var. *linearis* (Holmboe) R. Ross in B. Hartley 1986	S	
Class: Bacillariophyceae		
ACHNANTHIDIUM Kützing 1844	A	

Note: Monnier et al. (2007) argued for species of *Psammothidium* to be combined into *Achnanthidium*; however, we have retained the separation between these two genera.		
Achnanthidium affine (Grunow) Czarnecki 1994	A	
Achnanthidium atomoides Monnier, Lange-Bertalot & Ector in Monnier et al. 2004	A	√
Achnanthidium atomus (Hustedt) Monnier, Lange-Bertalot & Ector in Monnier et al. 2004	A	
Achnanthes atomus Hustedt 1937	B	
Achnanthidium caledonicum (Lange-Bertalot) J.E. Slade & R.J. Stevenson 1997	A	√
Achnanthes caledonica Lange-Bertalot in Lange-Bertalot & Moser 1994	B	
Achnanthes microcephala f. *scotica* J.R. Carter & Bailey-Watts 1981	S	
Achnanthidium catenatum (Bílý et Marvan) Lange-Bertalot in Lange-Bertalot & Genkal 1999	A	√
Achnanthes catenata Bílý et Marvan 1959	B	
Achnanthidium crassum (Hustedt) Potapova & Ponader 2004	A	
Achnanthes crassa Hustedt 1938	B	
Achnanthidium eutrophilum (Lange-Bertalot in Lange-Bertalot & Metzeltin) Lange-Bertalot 1999	A	√
Achnanthes eutrophila Lange-Bertalot in Lange-Bertalot & Metzeltin 1996	B	
Achnanthidium exiguum (Grunow) Czarnecki; 1994	A	
Achnanthes exigua Grunow 1880	B	
Achnanthidium exile (Kützing) Heiberg 1863	A	
Achnanthes exilis Kützing 1833	B	
Achnanthidium gracillimum (F. Meister) Lange-Bertalot in Krammer & Lange-Bertalot 2004	A	
Microneis gracillima F. Meister 1912	B	
Achnanthes gracillima (Meister) Mills 1933	S	
Achnanthidium minutissimum var. *gracillimum* (Meister) Bukhtiyarova 1995	S	
Achnanthidium altergracillima (Lange-Bertalot) Round & Bukhtiyarova 1996	S	
Achnanthidium kryophilum (Boye-Petersen) Bukhtiyarova 1995	A	
Achnanthes kryophila J.B. Petersen 1924	B	
Psammothidium kryophilum (Petersen) E. Reichardt 2004	S	
Achnanthidium lineare W. Smith 1855	A	
Achnanthidium minutissimum var. *inconspicuum* (Østrup) Jüttner & E.J. Cox in Jüttner et al. 2010	S	
Achnanthidium microcephalum Kützing 1844	A	
Achnanthidium minutissimum (Kützing) Czarnecki 1994	A	
Achnanthidium modestiforme (Lange-Bertalot) Van de Vijver 2002	A	√
Achnanthidium neomicrocephalum Lange-Bertalot & F. Staab 2004	A	
Achnanthidium pusillum (Grunow in Cleve & Grunow) Czarnecki in Czarnecki & Edlund 1995	A	√
Achnanthes pusilla Grunow in Van Heurck 1880	B	
Rossithidium pusillum (Grunow) Round et L.Bukhtiyarova 1996	S	
Achnanthidium pyrenaicum (Hustedt) H. Kobayasi 1997	A	√
Achnanthes pyrenaica Hustedt 1939	B	
Achnanthidium biasolettianum (Grunow in Cleve & Grunow) Round & Bukhtiyarova 1996	S	
Achnanthidium rivulare Potapova & Ponader 2004	A	*
Achnanthidium rosenstockii (Lange-Bertalot) Lange-Bertalot in Krammer & Lange-Bertalot 2004	A	
Achnanthes rosenstockii Lange-Bertalot in Lange-Bertalot & Krammer 1989	B	
Achnanthidium rostropyrenaicum Jüttner & E.J. Cox in Jüttner et al. 2011	A	
Achnanthidium saprophilum (H. Kobayasi & Mayama) Round & Bukhtiyarova 1996	A	
Achnanthes minutissima var. *saprophila* H. Kobayasi & Mayama 1982	B	
Achnanthidium sieminskae Witkowski, Kulikovskiy &; Riaux-Gobin 2012	A	*
Achnanthidium subatomus (Hustedt) Lange-Bertalot 1999	A	

Achnanthes biasolettiana var. *subatomus* Lange-Bertalot in Lange-Bertalot & Krammer 1989	S	
Achnanthes subatomus Hustedt 1939	B	
Achnanthidium subhudsonis (Hustedt) H. Kobayasi in Kobayasi et al. 2006	A	√
Achnanthes subhudsonis Hustedt 1921	B	
Achnanthidium thermale Rabenhorst 1864	A	√
ADLAFIA Lange-Bertalot in Moser et al. 1998	A	√
Adlafia bryophila (Petersen) Lange-Bertalot in Moser et al. 1998	A	√
Navicula bryophila J.B. Petersen 1928	B	
Adlafia langebertalotii Monnier & Ector 2012	A	*
Adlafia minuscula (Grunow) Lange-Bertalot in Lange-Bertalot & Genkal 1999	A	√
Navicula minuscula Grunow in Van Heurck 1880	B	
Adlafia minuscula var. *muralis* (Grunow) H. Lange-Bertalot in Lange-Bertalot & Genkal 1999	A	
Navicula muralis Grunow in Van Heurck 1880	B	
Navicula minuscula var. *muralis* (Grunow) H. Lange-Bertalot in Lange-Bertalot & Rumrich 1981	S	
Navicula cloacina Lange-Bertalot & Bonik 1976	S	
Adlafia muscora (Kociolek & Reviers) Lange-Bertalot in Moser et al.		
1998	A	*
Navicula muscora Kociolek & Reviers 1996	B	
Adlafia parabryophila (Lange-Bertalot) Lange-Bertalot in Moser et al. 1998	A	*
Naviculadicta parabryophila Lange-Bertalot in Lange-Bertalot & Metzeltin 1996	B	
Adlafia suchlandtii (Hustedt) Lange-Bertalot in Moser et al. 1998	A	√
Navicula suchlandtii Hustedt 1943	B	
AMPHORA Ehrenberg ex Kützing 1840	A	
Amphora aequalis Krammer 1980	A	*
Amphora copulata (Kützing) Schoeman & R.E.M. Archibald 1986	A	
Frustulia copulata Kützing 1833	S	
Amphora delicatissima Krasske in Hustedt 1930	A	
Amphora difficilis Levkov 2009	A	*
Amphora eximia J.R.Carter in E.Y.Haworth 1974	A	
Amphora extensa Salah 1955	A	
Amphora inariensis Krammer 1980	A	
Amphora indistincta Levkov 2009	A	√
Amphora levenensis E.Y. Haworth 1974	A	
Amphora libyca Ehrenberg 1840		1
Amphora minutissima W. Smith 1853	A	
Amphora ovalis (Kützing) Kützing 1844	A	
Frustulia ovalis Kützing 1833	B	
Amphora paracopulata Levkov & Edlund 2009	A	
Amphora pediculus (Kützing) Grunow in Schmidt et al. 1875	A	
Cymbella pediculus Kützing 1844	B	
Amphora ovalis var. *pediculus* (Kützing) Van Heurck 1885	S	
Amphora subatomus Levkov 2009	A	*
HALAMPHORA (Cleve) Levkov 2009	A	√
Halamphora dusenii (Brun) Levkov 2009	A	√
Amphora dusenii Brun 1901	B	

Halamphora montana (Krasske) Levkov 2009	A	√
Amphora montana Krasske 1932	B	
Halamphora normanii (Rabenhorst) Levkov 2009	A	√
Amphora normanii Rabenhorst 1864	B	
Halamphora oligotraphenta (Lange-Bertalot) Levkov 2009	A	√
Amphora oligotraphenta Lange-Bertalot in Lange-Bertalot & Metzeltin 1996	B	
Amphora veneta var. *capitata* E.Y. Haworth 1974	S	
Halamphora thumensis (A. Meyer) Levkov 2009	A	√
Amphora coffeiformis var. *thumensis* Mayer 1919	B	
Amphora thumensis (Mayer) Krieger 1929	S	
Cymbella thumensis (Mayer) Hustedt 1945	S	
Halamphora veneta (Kützing) Levkov 2009	A	√
Amphora veneta Kützing 1844	B	
ROSSITHIDIUM Round et L.Bukhtiyarova 1996	A	
The status of *Rossithidium* has been disputed and some species (e.g. *R. pusillum*) transferred to *Achnanthidium*. However, two species remain in *Rossithidium* pending their formal transfer.		
Rossithidium lineare (W.Smith) Round et L.Bukhtiyarova 1996	A	
Rossithidium petersenii (Hustedt) Round et L.Bukhtiyarova 1996	A	

Notes:

1 The name *Amphora libyca* was used incorrectly following Krammer & Lange-Bertalot 1986, p. 345.

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INTRODUCTORY COURSE ON FRESHWATER ALGAL IDENTIFICATION

Van Mildert College and School of Biological and Biomedical Sciences, Durham University, UK

***Organizers*: BRIAN WHITTON (DURHAM) and DAVID JOHN (LONDON)**

Sunday 10 July - Saturday 16 July 2015

AIM To train staff from Environment Agency, SEPA, water plcs, consultancies, museums, research students and overseas visitors in the identification of the more widespread and environmentally important microscopic and macroscopic freshwater algae. Topics introduced include monitoring, field sampling, preservation, harmful and nuisance algae and implications of the EU Water Framework Directive.

COURSE LEADERS Prof. David John and Prof. Brian Whitton. Dr Gordon Beakes (University of Newcastle), Dr Alan Donaldson (consultant) and Dr Martyn Kelly (Bowburn Consultancy) also contribute.

WHERE Accommodation in Van Mildert College and the course in the School of Biological and Biomedical Sciences (about 600 m away). All meals and evening lectures are in the College. Parking near the College will be available for anyone bringing a car, but it is essential to reserve this in advance.

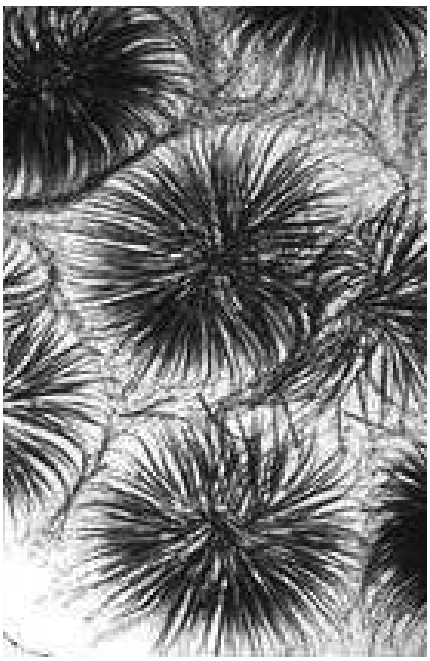
LECTURES and/or practicals run until 2120 each evening, including the Sunday. The formal part of the course ends at 1300 on the Friday, with most study during this period is in the laboratory or seminar room, but there is a short field excursion on the Tuesday afternoon. Following the end of the formal course there is a half-day field visit to river sites and to streams influenced by former lead-zinc mining. This concludes with a meal in an Alston pub.

COSTS The inclusive cost for all participants other than full-time research students is £900 (no VAT charge) for those making a firm reservation by 1st April. The discounted price for anyone wanting to leave after lunch on Friday is £860 and for full-time students wanting to stay the full period is £800. Students who have been members of the British Phycological Society for at least three months (essential!) may apply directly to the Society for some support, but any decision rests with the Society. Details are on the BPS website (http://www.brphycsoc.org/funding.lasso), but it is recommended that an application is submitted as early as possible.

Van Mildert College can provide accommodation for anyone wanting to stay extra nights at the beginning or end of the course (cost £36.50 for B & B, with, if required, lunch £10.00 and dinner £12.50). Payment can be included in the main invoice, provided organizers know well in advance, but otherwise it can be paid directly to the college after arrival.

BOOKING Provisional and firm reservations for one of 16 places should be made by email (b.a.whitton@durham.ac.uk) to B.A.Whitton Algal Training, 74 Archery Rise, Durham DH1 4LA, UK. A full refund will be made to anyone paying in advance, but then cancelling before 1 June, while 50% refund will be made to anyone cancelling between then and 1 July.

WHAT TO BRING Members are encouraged to bring boots for field visits and (preferably) fresh samples from their local waters. There is no need to bring a laboratory coat, as these will be loaned. Everything else is provided, including access to The Freshwater Algal Flora of the British Isles and associated DVD. Some people may find it useful to bring their own portable computer, but the risk of loss for this and other equipment such a camera must be covered by their own insurance. The training manual will be distributed in advance; if you have booked, but not received a copy by 1 June, please inform the organisers. Overseas members need not bring clothes for the field visit - these will be loaned. The College has facilities for accessing the internet.



TRAVEL Durham is on the main rail line between London King's Cross and Edinburgh. Trains are at least once an hour and the journey from London (400 km) takes three hours (sometimes longer on a Sunday). Overseas members should contact the organizers for advice on buying their ticket. (Advance booking is essential to get the cheapest.) A taxi from the station to Van Mildert College (about 2 km, but a moderate hill for walkers) costs about £4.00 The nearest airport is Newcastle-upon-Tyne. Avoid Teesside and Durham airport, unless this provides the only suitable flight. There is a rail route from Newcastle airport to Durham, though this involves changing at Newcastle main rail station and the overall journey can take anything from 1.5 to 2 hours, depending on the connection at Newcastle. A taxi from Newcastle airport to Durham (40 km) takes 35-45 minutes and costs about £48. The organizers almost always collect members at the airport, but it may not be possible to help with the return journey.

PROGRAMME The course (which has run since 1992) is a mixture of lectures and practicals, together with an afternoon field trip. Members should arrive by 1700 on the Sunday (though they can take their room earlier in the day), while the daily programme runs from 0900 to 2120. The main course ends after lunch on Friday, but you most people are likely to join the visit to field sites later that day and leave after breakfast on the Saturday. There is no formal test, but the course ends with a slide-show quiz and a prize for the winner.

Brian Whitton and David John give the majority of lectures. Gordon Beakes helps on the Tuesday; Alan Donaldson (special expertise blue-green algae/cyanobacteria) helps on several days; Martyn Kelly (diatoms) gives lectures and practicals on Wednesday morning and afternoon.

All participants are expected to have read the Manual before joining the course !

FURTHER INFORMATION Anyone wanting more details, including a copy of a previous year's programme and manual is welcome to contact

Brian Whitton: b.a.whitton@durham.ac.uk phone +44(0)191-3867504 or David John: d.john@nhm.ac.uk or d_m_john@ntlworld.com phone +44(0)208-4646367/07920124825 or Department of Life Sciences, Division of Diversity and Informatics, Natural History Museum, Cromwell Road, London SW7 5BD, UK.

Identifying freshwater macroalgae

Organizers*: Martyn Kelly & Allan Pentecost, Freshwater Biological Association, Windermere, Cumbria*

Wednesday 25 – Thursday 26 May 2016

Two day course: Wednesday 25 – Thursday 26 May 2016

Cost: £275; early bird rate £260*; FBA member £250

A two-day course including field and laboratory-based exercises to introduce participants to the biology and identification of those larger freshwater algae most likely to be encountered during LEAFPACS and other freshwater surveys. Also includes an introduction to the use of macroalgae for rapid assessment. Martyn Kelly is a freelance consultant, specialising in the use of algae for environmental monitoring. Allan Pentecost of the FBA has studied algae for 50 years and has published many research papers and a book on algal ecology and taxonomy. He is currently involved in a number of research projects on the English Lakes.

Freshwater Biological Association

Introduction to phytoplankton

Organizers*: Allan Pentecost, Freshwater Biological Association, Windermere, Cumbria*

Tuesday 6 – Wednesday 7 September 2016

Two day course: Tuesday 6 - Wednesday 7 September 2016

Cost: £220; early bird rate £205*; FBA member £195

This two day course will provide methods of collection, examination and identification of the common freshwater phytoplankton. The Lake District contains a great diversity of fresh waters and a wide range of material will be available for study. A field trip will be included and the lectures will cover both practical and theoretical aspects of phytoplankton ecology.

For further information and to book a place on the courses, please contact the Freshwater Biological Association: events@fba.org.uk; +44 (1539) 442468

Website: www.fba.org.uk/courses

**Early bird rates apply to fees paid at least eight weeks before the start of the course.*

Obituary

Henry T. Powell BSc, MSc
2 May 1925 – 2 January 2016

Harry Powell, seaweed ecologist, community stalwart and campaigner, was born and brought up in Abergavenny, Wales and studied at The University of Wales, Aberystwyth during WWII. He was awarded a 1st class Honours degree in Botany and worked for two years with Prof Lily Newton before joining the Scottish Marine Biological Association (later known as the Scottish Association for Marine Science) in Millport, the Firth of Clyde in 1948, an institution where he was to remain for the rest of his career.

Harry was the founding secretary of the British Phycological Society in 1952 and described the early days in detail during a presentation he gave to the 58th BPS Meeting in Oban in January 2010 (ref. 5). He was also a founder member of the Institute of Biology. It was at Millport that he met his future wife Grace, who was there as an undergraduate studying on a field course. They married in 1956 and later their two children, Anne and David, were born there. During Harry's early career he worked on barnacles, but his main interest was in seaweeds and, in particular, their ecology on rocky shores. He carried out seaweed surveys all around the Scottish coast, publishing several significant papers, including two in the highly prestigious journal Nature, and conducted important studies on the distribution of *Fucus* species (refs. 1 to 4).

In 1967 the SMBA relocated to Oban and Harry was a member of the small group who came to oversee the building of the laboratory at Dunstaffnage. His family moved to their new home in Connel that year, but Harry also negotiated with the council housing department to allocate a number of new homes in Dunbeg to ease the resettlement of the remaining staff from Millport. During that period he was a union rep, chairman of the SMBA IPCS union branch, and was active in the SMBA social club and management of the canteen.

An important piece of work led by Harry in the late 1970s was the 'Survey of the Littoral Zone of the Coast of Great Britain' for the Nature Conservancy Council, involving a large team of scientists carrying out fieldwork.

Following retirement in 1989 Harry was a driving force as chairman of the Lorn branch of the Scottish Wildlife Trust Support Group and was chairman of Connel Community Council.

Harry worked tirelessly to secure funding to build a first-class modern village hall in Connel. His other lifelong interest was in the Liberal party, where he was a committed volunteer and campaigner. His scientific training and career had made him an extremely precise, inquisitive, and determined individual, a master of detail in everything he did.

Harry never took to email or the internet and refused to learn. In this digital age he would call up the lab and request hard copies of seaweed papers he had heard of.

When the Green Seaweeds of Britain and Ireland was published in 2007 (ref 6) Harry was indignant that the authors had no records of *Codium adhaeran*s in Britain north of Devon and Cornwall. He insisted he had evidence of it in Scotland and to this end first in 2010 he persuaded intrepid colleague, Clive Craik, to collect a sample from a small island in Loch Nan Uamh on the road to Mallaig. There is still progeny from this sample in the CCAP collection. Further, in 2012, Harry (age 86), Robin Harvey and I set off to Degnish Point where he had spotted it carrying out the NCC survey. We had to get the timing right to match the low spring tide and to get there trekked across a mile of very rough ground. Indeed, the *Codium adhaerens* was spotted and a sample brought back to the lab. To my regret, we have not had these records formally accepted as yet.

Harry's last act involving the world of phycology was to receive a visit in hospital in late November from Andrew Want, a Heriot Watt Research Associate based in Orkney and working on seaweed ecology and wave energy production. At the summer 2015 EPC/BPS meeting in London, Andrew had presented his work (ref 7) comparing the current distribution of *Fucus distichus anceps* with Harry's findings published in 1957 and 1963 and Andrew expressed a wish to come and present the work to him. This was arranged and Andrew travelled from Orkney and duly presented the paper from his laptop in the hospital reception. Harry was clearly stimulated by this and his still sharp brain recounted details of the work. He even delivered a couple of critical remarks to help improve the slides!

Aside from his work, his main love was for his family: his late wife Grace, his children, Anne and David, and his grandchildren, Jenny, James and Maxwell.

Harry passed away peacefully in the Lorn and the Islands Hospital, Oban age 90.

Epilogue: On 22nd February 2016, Harry's daughter Anne deposited many boxes of papers, books, field notebooks, correspondence, herbarium samples and slides back in a room at SAMS. A task force has been assembled and we hope to find new homes for a selection of the material.

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3) Powell HT (1958) Occurrence of forms of *Fucus distichus* L. emend Powell on North Rona and Sula Sgier. *Nature* 182, 1246.
4) Powell HT (1963) New records of *Fucus distichus* subspecies for the Shetland and Orkney Islands. *Br.phycol.Bull.* 2 247-254.
5) Harry T Powell (2010) *The Phycologist* Number 78 p4.
6) Brodie J, Maggs CA & John DM (ed) 2007 *Green Seaweeds of Britain and Ireland*. Published by The British Phycological Society ISBN 0952711532
7) Andrew Want (2015) Fifty years after Powell: the distribution of *Fucus distichus anceps* on the extreme exposed rocky shores of Orkney and its role as an indicator species. (Presented at the European Phycological Congress 6, London 23-28 August 2015.)

Obituary contribution for Harry Powell

Douglas A MacInnes, Glenside Farm, Culzean, Maybole, Ayrshire, KA19 8JH

Executive Director, Marine Biopolymers

I shall attempt to explain my own involvement with HTP over the forty years I knew him first as an undergraduate working for HTP in the Phycological department of SMBA along with the late Mike Picken. The year was 1973 and HTP was heavily involved with all aspects of Littoral and sublittoral macro algae evaluation.

Fieldwork was an essential part of our work with growth studies specifically on *Laminaria hyperborea* in differing exposure locations involving a considerable amount of sub aqua diving and many journeys in all classes of small boats usually with HTP at the helm. HTP was meticulous in all aspects of field work and recording of species as well as detailed measurement of the plants and the locations around the lochs of the West of Scotland.

His note taking and editing were legendary and my field work journals contained many corrections to my spelling which he continued through all the forty years I knew him first as an undergraduate then graduate as well as working with Harry as a committee member of Connel Village Hall. Harry was equal with all who knew him making corrections to many eminent scientist's papers and articles to be included in the Phycological Journals. In this year Harry introduced me to the work of the Institute of Seaweed Research. He was instrumental in saving the archives and it was his wish that these papers be saved for science and we talked on their importance on many occasions over the years and as little time as late 2015 we spent several days in the library of SAMS examining the work of Black, Walker, Percival and other significant contributors to Seaweed Research.

HTP undertook projects to assist the commercial evaluation of seaweeds in different parts of the world being sent in the mid-1970s by Alginate Industries Limited to the Falkland Islands to evaluate the possibility of setting up a harvesting operation, with a view to creating an Alginate extraction plant using the indigenous seaweed. His detailed notes and samples recovered from the field trip occupied our department for many months and greatly added to the understanding of the seaweed species in the Falklands.

HTP was instrumental in aiding my career progression when I obtained employment as a research scientist based on his recommendation with Alginate Industries Ltd. On many occasions over the years our paths would cross either through our mutual involvement with Connel Village Hall committee or his visits to the Factory supporting the Liberal Party prospective candidates where I am pleased to report he would provide them with detailed notes and correct their spelling and grammar.

On Harry's retirement in 1990 from SMBA The predecessor to AIL -, Kelco was able to secure his services to estimate the feasibility of utilization of *Laminaria hyperborea* as a resource to supply their Scottish factories. The study conducted over four years was the building block for the foundation of MBL survey in 2013. The customary detail he conducted this work allowed MBL to replicate this excellent work in with guidance and help from Harry in his 89th year who in conjunction with Prof Matt Dring enthused and encouraged MBL to sustainably harvest and manage the resource offering advice to MBL and senior people within SNH where HTP was greatly respected.

His last significant work with MBL was to aid with the creation of the *Laminaria* Study group composed of Experts in Science and Seaweed Harvesting, held at his beloved SAMS where we as a group evaluated how best to manage and monitor the effect of harvesting minimizing the ecological impact on the important seaweed resources off the West Coast of Scotland. Harry was a giant in our industry and his liberal stance and meticulous detail have laid the foundation for the resurgence of a sustainable industry in Scotland.

INSTRUCTIONS FOR CONTRIBUTORS

Copy which is submitted for publication in *The Phycologist* should be concise and informative. Articles should be scientifically sound, as jargon free as possible and written in a readable scientific magazine style. Unless absolutely essential references should not be included. All types of relevant material will be considered, these include job advertisements, scientific reports, book reviews, news items of topical interest, meeting announcements, grant awards, promotions, appointments, profiles of eminent phycologists and obituaries. If you are interested in submitting material that does not fall within any of these broad categories, or you are unsure of the appropriateness of a potential article, then contact the editor. Suggestions for future articles or a series of articles are welcomed.

Copy should be submitted, preferably as attachments to email or on disc (MS Word for Windows or Rich Text Format). **Illustrations and photos to accompany copy are welcomed and should be supplied as JPEG or TIFF file-format no less than 600 dpi resolution**. The editor reserves the right to edit the material before final publication.

Submission of Copy and Deadlines

Copy should be submitted to:

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