

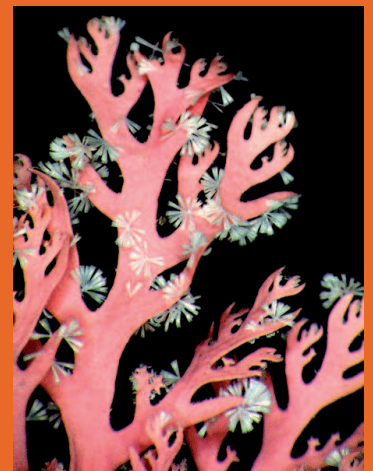
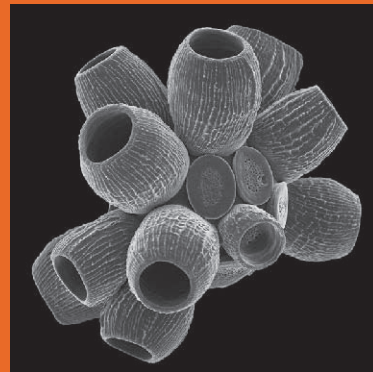
The Phycologist

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The Newsletter of the British Phycological Society

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2014 British Phycological Society

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This autumn edition is packed full of Student Bursary Award Reports, a ringing endorsement that the BPS is a worthwhile and supporting Society – as highlighted in our first article. We also detail highlights of the last Annual Meeting held in Galway – by all the accounts it was a great meeting and a craic, one not to have been missed. We are all looking forward to the 2015 meeting held in conjunction with EPC6, with details available on-line <http://www.epc6.org>.

You will also have noticed from the cover, that the time has come round again to highlight the Hilda Canter-Lund photography awards, the winner and the shortlisted images. This year the winner was John Huisman. Congratulations! Inside you will find a full colour spread of the winning image and runner-up images.

Corrections and additions to the Freshwater Algal Flora of the British Isles are also detailed, listing many updates. Please check and continue to send in any new additions to David and Brian.

Enjoy this issue!

Remember - do keep sending in your contributions. Write to us with your phycolgical 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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Review of the 62nd BPS Annual Meeting

National University of Ireland, Galway

The 62nd Annual Meeting took place at the National University of Ireland, Galway. Maeve Edwards volunteered to organise the meeting despite having recently taken over the role of Treasurer from Michelle Tobin. The saying “if you want anything doing ask a busy person” springs to mind – although Maeve may not thank me for saying so in case anyone else thinks of asking her to organise another conference in the near future. From the point of view of a delegate everything ran smoothly – the Arts Millennium Building was an ideal venue with presentations being given in the Ó Tnuathail Lecture Theatre and poster presentations and tea and coffee breaks being held in the foyer which gave plenty of opportunity for everyone to mingle and chat. There were sessions on Freshwater and Marine Microalgae, Applied Phycology, Seaweed Ecology, Harmful Algal Blooms, and Phylogeny and Biodiversity. There were a good number of student presentations in the Manton Sessions and a wide range of posters on display to stimulate discussion over a glass of wine at the Poster Session.

The British Phycological Society has an international membership and the Annual Meeting attracts an international field of speakers and delegates so the opportunity to discuss academic matters in a relaxed setting is a hallmark of the conference. This year there was a wine reception at the Kitchen Cafe in Galway Museum where we were entertained by a Galwegian Traditional Irish band playing traditional Irish music and the Society Dinner was held at the Harbour Hotel where we were encouraged to let our hair down

dancing to Mikey and the Scallywags. Prizes were presented to Martyn Kurr, winner of the Manton Prize for his presentation “Stress intensifies sexual dimorphism in a long-lived alga”, and to Beatrix Siemering winner of the Poster Prize for her poster “Advective transport of harmful algal blooms”. Another appointment was celebrated at the dinner following an announcement made at this year’s AGM when Linda Medlin was offered Honorary Life Membership of the BPS for her active support of the Society for many years, not least of which has been her enthusiastic dancing at the annual meetings, and also for her innovative academic work and contribution to phycology. All in all, another very successful and enjoyable annual meeting.

In recent correspondence feedback from one BPS member who contacted me on another matter said, “A ringing endorsement that the BPS is a worthwhile and supportive society”.

Thank you to Maeve and remember to check the BPS website for details of EPC6 which will be hosted in London in August 2015.

Details of EPC6 are now available –
<http://www.epc6.org>

Dr Jane Pottas
BPS Secretary



BPS President Chris Maggs with Honorary Life Member Linda Medlin (TOP) and with Martyn Kurr winner of the Manton Prize (RIGHT)



Poster Prize Winner



Beatrix Siemering,
SAMS, beatrix.siemering@smas.ac.uk

My passion for biology started from a young age as I was always fascinated with life itself and its ability to prevail. A visit to a marine biology lab on the Isle of Giglio in Italy and a diving course in Australia later on confirmed my interest in marine science and I decided to study marine biology at Newcastle University. During my Bachelor degree I developed a strong interest in marine microalgae and biological oceanography. After graduation it was clear to me that I wanted to pursue a career in marine science and fortunately I was able to start a PhD on the advective transport of harmful phytoplankton at SAMS in Oban.

What I enjoy most about my project is its interdisciplinary nature. I will be looking at the biology of harmful phytoplankton species and the role of physical factors in bloom formation, such as currents, wind and radiation. During the first year of my project I used an individual based model for *Karenia mikimotoi* coupled with the POLCOMS hydrodynamic model for the Scottish shelf sea to explore the relationships between biological behaviour of cells and physical environmental drivers. Further work will include studying different harmful species and different model frameworks to explore further relationships between bloom development and ocean physics. Next to computational modelling I will also be able to join a research cruise in October to collect data on species communities and environmental factors in my study area.

The best thing about studying in Oban is that I am fortunate enough to work with a group of brilliant and enthusiastic scientists. Everybody that I have met here has been very welcoming and encouraging; I am very grateful for the support and advice I get from my supervisors Keith Davidson, Mark Inall and Eileen Bresnan. I would also like to thank the British Phycological Society for organising an exciting and inspiring 62nd annual meeting in Galway and awarding me the Poster Prize for this meeting.



BPS President Chris Maggs and Beatrix Siemering

Student Bursary Award Reports

The Alg'n'Chem and the Young Algaeneers Symposium 2014 in Montpellier and Narbonne, France



The Alg'n'Chem is an international conference, which was held for the second time in Montpellier, France, from 31st March to 3rd April. It focuses on the production of chemicals in algae and the future of algae in industry. The Young Algaeneers Symposium (YAS) is an international symposium in the field of algae biotechnology, organised by young scientists, specifically for PhD students and early career post-docs. It was held for the first time two years ago in Wage-

ningen, Netherlands, and offers a very good opportunity to network, discuss on-going research and exchange knowledge with other young scientists. The YAS was held from 3rd April to 5th April, with both conferences combined for one day in Montpellier.

The Alg'n'Chem 2014 gave me an excellent insight into the range of companies in Europe that are currently using algae in their production chain. Furthermore, it was very interesting to hear about their product focus, which moved away from biofuels to high value products used in cosmetics, food supplements and animal feed. In addition, the conference included presentations about EU regulations and patent law. The lunch breaks, where everybody was seated around tables that were chaired by one of the keynote speakers, offered great opportunities to speak to employees of these companies and to network with other scientists. Whereas the Alg'n'Chem offered very interesting presentations mainly summarising the on-going research in the field, the use of algae in industry and potential applications of algae for the future, the oral and poster presentations during the YAS 2014 were mainly about specific PhD

and research projects. This provided a good opportunity to learn about specific methods, solutions to address the everyday problems encountered in the laboratory, and new research focuses. The main topics here were photobioreactor design, optimisation of culture conditions and lipid production, algae for wastewater treatment and genetic engineering of microalgae.

Additionally, I had the opportunity to present the results of my PhD project about the "Synthesis of antibacterial bacteriophage proteins in microalgae" in oral presentations at both conferences, to discuss my work with other participants and to get very valuable feedback.

I am very grateful to the British Phyco-logical Society for the financial support that enabled my attendance at these interesting and valuable conferences and in general for giving early-career researchers the opportunity to participate at conferences and symposia.

Laura Stoffels
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I had the opportunity to attend and present my work in the Alg'n'Chem conference and the Young Algaeneers Symposium, held in Montpellier/Narbonne last April. These conferences were a very good mixture of molecular biology, engineering, photobioreactor design and applied research using microalgae.

The Alg'n'chem conference focused on the use of microalgae in commercial processes and its value as a fairly new source for the generation of high-value products, such as cosmetics, carotenoids, lipids and polysaccharides, as well as biomass. There were many industrial representatives presenting the work their companies are carrying out, which was very interesting, especially for young researchers like

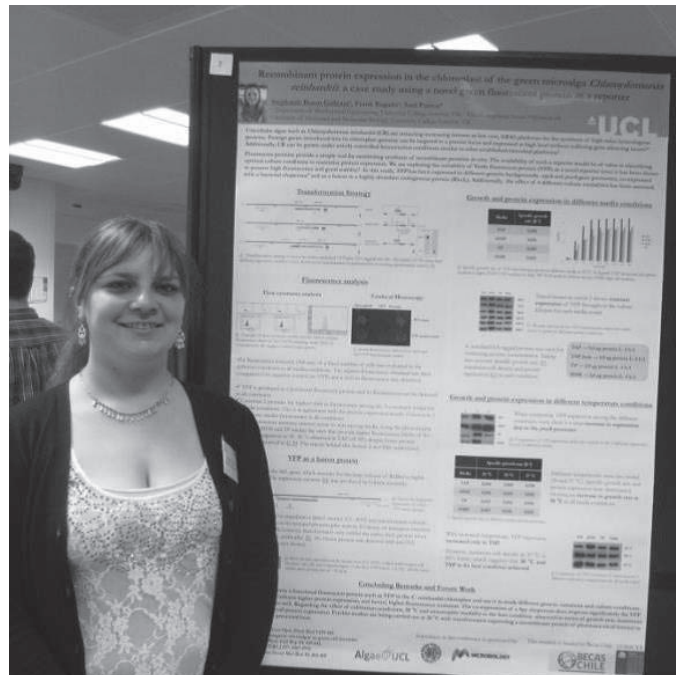
me, still much more related to academia. We also had the opportunity to visit the facilities of Salinalgae, a pilot plant research platform dedicated to cultivate marine species for the production of high-value compounds and bioenergy.

The Young Algaeneers Symposium, on the other hand, was a more academic-focused meeting of young researchers in the field, mostly PhD students, in which we had the opportunity to share our research in a more relaxed atmosphere. The main topics covered involved the production of various high-value compounds, the use of microalgae for wastewater and flue gas treatment, and optimisation of strain features/cultivation conditions.

I was invited to present a poster on my almost-completed research on the use of a green fluorescent protein as a marker to study the effect of different culture conditions and different regulatory sequences in the chloroplast of *Chlamydomonas reinhardtii*, which was an excellent opportunity not only to present my work but to get valuable feedback and comments from other attendees.

I'd like to express my gratitude to the British Phycological Society for supporting my attendance to these conferences and in general for supporting young researchers in participating of these events.

Stephanie Braun Galleani
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Young Algaeneer Symposium

I am currently a second year PhD student in the University College of London under the supervision of Dr. Saul Purton. My research focuses on the production of the Infectious Bronchitis Virus (IBV) peptide vaccines in the algal chloroplast, and the efficacy of the engineered algae as a low-cost oral vaccine for poultry. Therefore, I genetically modified the chloroplast of *Chlamydomonas reinhardtii* with the regions of IBV gene and expressed it as a fusion to a protein adjuvant, Cholera Toxin B (CTB) with a view to using it as an edible vaccine for chickens.

Early April this year, the Young Algaeneer Symposium (YAS) took place at Montpellier and Narbonne, France. This is an international symposium in the field of algae biotechnology mainly for young scientists. The YAS committee kindly accepted me to give a talk during one of the plenary session. After my presentation, I received many positive feedbacks that were very relevant and useful to my research.

YAS brought together a diverse group of young scientist working on a broad range of topic such as photosynthesis, downstream processing, reactor operation and growth strategies, genetic engineering, life cycle analysis, growth and metabolic modelling and photobioreactor design. These topics were very relevant towards my PhD research project. All talks in this symposium were very interesting, however, I particularly enjoyed the talk on the global view of algae biotechnology, which highlighted research focused on the industrial application of algae.

Attending this international symposium gave me a chance to meet and build a network with fellow researchers from various institutes and universities around the world. I am very grateful to the British Phycological Society for funding me so that I could attend and present my work at this important symposium.

Priscilla Rajakumar
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3rd International Phytoplankton 2014 workshop



I am a PhD candidate under Dr Nicolas Touzet's supervision at the Centre for Environmental Research Innovation & Sustainability at IT Sligo on the northwest coast of Ireland. Here we are involved in a number of microalgae-based research projects: isolating, culturing and examining local Irish strains for metabolites of interest and potential biotech applications.

This year I was awarded funding by the British Phycological Society (BPS) and the Irish Marine Institute (MI) to attend the 3rd International Phytoplankton 2014 workshop at the Citadel Hill Laboratories Plymouth, hosted by the Marine Biological Association (MBA) and Sir Alastair Hardy Foundation for Ocean Sciences (SAHFOS), at historical, 'Laboratory' on the Citadel of Plymouth Hoe.

The MBA has been monitoring phytoplankton since 1924 and has produced a number of seminal works on marine and phytoplankton taxonomy and ecology. The MBA maintains one of the oldest culture collections in the world established in 1905 by E.J.Allen, which has been brought to a staggering number of over 600 strains by Mary Park between 1941 and 1973.

This two week intensive training workshop in mid-July this year brought together leading experts in applied phytoplankton taxonomy, harmful algal bloom ecology, molecular ecology, protest culturing and policy developments.

The training was delivered to an international group of attendees from Ireland North and South, Scotland, England, Germany, Italy, the USA, New Zealand, India, Singapore and China. The student body represented educational establishments, research centres and public environmental bodies.

Dr Rowena Stern of the MBA guided the group through algal classification, evolution of algal lineages, plastid endosymbiosis reviewing species concepts and gene transfer. Molecular characteristics were highlighted and a concise overview of some of the discerning and taxonomic features of various morphogenetic groups was covered.

Harmful algal bloom trail blazer Dr Karen Steidinger of the Florida Fish and Wildlife Conservation Commission is one of the few women to have had a genus named after her. Karen enthusiastically guided us through the taxonomy of dinoflagellate groups using lectures and lab time, consisting of live culture observations, slide mounting and preservation. These exercises were made possible by the amazingly wide range of cultures made available for this workshop.

Karen further guided us through some of the many lessons learned through her personal experience with harmful alga bloom ecology, history, up to current developments of monitoring probes and emphasised the ongoing positive relationships within applied morphogenetic analysis.

Professor Carmelo Tomas of the University of North Carolina at Wilmington then provided an online Q&A session on Raphidophytes and additional material on culturing methods.

Dr Richard Pipe, who has been responsible for the maintenance of the Plymouth culture collection, brought us through the steps required for isolation and maintenance of cultures. The Plymouth culture collection which numbers more than 400 strains from 80 genera plays a vital part in the world of phycology as a provider of high quality teaching and research material, providing fundamental services in the field of biodiversity, ecological morphogenetic studies, and biodiscovery.

Dr Ian Probert of the Marine Station of Roscoff, France, covered the vast groups of lesser known flagellates which provide huge biodiversity and ecosystem services, managing to highlight morphological traits for each by light microscopy. He discussed current molecular phylogenetic works carried out and the rise and fall of hacrobia, a proposed short lived monophyletic group. This was followed by a wonderful glimpse into the ornate world of haptophyte and coccolithophore cultures.

Dr Diana Sarno of the Stazione Zoologica Anton Dohrn of Naples gave a detailed account of the morphology and phylogeny of the diatom group. She demonstrated the taxonomic diversity of *Chaetoceros* sp. from the Gulf of Naples and detailed the cryptic and pseudo-cryptic speciation of the genus *Pseudo-nitzschia* through lectures and microscopy.

Dr Abigale McQuatters-Gollop of SAHFOS gave an insightful lecture into the work of championing the fundamental importance of continued inclusion of phytoplankton as a bio-indicator of ecological change for incoming and existing policies.

Dr Gerald Boalch presented a personal historical data of 50 years of phytoplankton samples taken from the Coast

of Plymouth and demonstrated the depth of knowledge and importance of technology transfer relating to long term monitoring programs. Lastly the group was taken on a tour of SAHFOS, which is the international charity that operates the Continuous Plankton Recorder (CPR) survey. Amazingly, the Foundation has been collecting data from the North Atlantic and the North Sea on biogeography and ecology of plankton since 1931. SAHFOS now deploys CPRs and maintains data along with samples of historical national and international 'silks' which are preserved to this day. This data is the largest phytoplankton data set in the world.

Since returning I have been hacking away trying to identify the multiple 'smallies' we've in our culture and I will confirm or further investigate my identifications using molecular techniques. The training received at the International Phytoplankton Workshop 2014

will contribute greatly to the taxonomic and phylogenetic characterisation of strains and enhance future research into our diverse microalgal community.

I would like to take this opportunity to express my gratitude to the MI and the BPS for allowing the opportunity to learn and integrate this knowledge into my research. I would also like to thank the MBA and the staff of SAHFOS for the limitless hospitality over the course.

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Workshops on "Algaculture for Biotechnology" and "Molecular Methods for Algae Research"

In early June I was given the opportunity to attend workshops on "Algaculture for Biotechnology" and "Molecular Methods for Algae Research" run by the Scottish Association of Marine Science (SAMS). Situated on the Dunstaffnage peninsula close to the small town of Oban on the West Coast of Scotland, SAMS is accredited as a leading institute of marine science with a mission to support world-class research to better understand the development of a sustainable relationship with the marine environment.

Our first workshop, Algaculture for Biotechnology, started off with an introduction by Dr. John Day, Head of the Culture Collection of Algae and Protozoa at SAMS with an interesting lecture about the diversity, culturing and potential of algae. This was followed by specific lectures on algae nutrition and photosynthesis presented by Dr. Ray Leakey and Dr. Michele Stanley, respectively, detailing the complexities of algae needs during growth. Our attentiveness was then put to the test with afternoon laboratory sessions allowing us the opportunity to develop the practical skills to cultivate and maintain algae for ourselves. The first sessions covered the basics of preparing media and different techniques of sterilization. This lead on to the more difficult method of learning how to isolate a single algal cell from a mixed culture and understanding the various needs of individual species for long term maintenance.

The second day began with a morning of lectures concerning algae biotechnology and its future with a specific study on macroalgae and the issues the industry faces with mass cultivation. There was also a lecture held by Dr. Claire Gachon on the genomics and diversity of organisms present in the field of phycology. As



with the previous day there was a practical session on techniques for algal enumeration with specific emphasis on the accuracy of the different techniques. This was followed by a tour of the facilities at SAMS which concluded the Algaculture for Biotechnology workshop.

The second workshop, Molecular Methods for Algae Research, followed the same daily layout as the previous workshop with lectures in the morning and practical elements in the afternoon. The topic of bioinformatics, which has become an increasingly important tool when investigating the ecology and taxonomy of organisms, was focused on heavily in the course. The lectures gave us information on the theory behind the extraction of algal DNA and the processes of amplifying and quantifying this DNA. The practical sessions demonstrated the difficulty in DNA extraction from algae because of their physiological make up

and diversity. We were given two organisms to practice the extraction technique on; a green microalgal and a diatom. These two species were selected because of their structural differences and how this impacts on the DNA extraction.

The second day of this workshop detailed the principles of quantitative PCR and gene expression lead by a morning of lectures presented by Dr. Gachon. In the afternoon we were given sequences of microalgae and protists with the aim of using available software to identify the mystery species. This concluded the second workshop on Molecular Methods for Algae Research.

As a PhD student I found that both workshops were extremely useful in providing the knowledge and skills necessary to aid my research. I would highly recommend both workshops to anyone in the field that is interested in increasing their practical skills with regards to algae. I would like to thank the British Phycological Society for funding my attendance and SAMS for providing the course and all those involved in the teaching of it.

Laurence Evans
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2014 BPS annual meeting in Galway



Having spoken to people who attended the BPS annual meeting, in Belfast last year, my interest was piqued. As a PhD in Chemical and Biological Engineering, in Sheffield, I seldom have the opportunity to connect with senior phycologists and young researchers all in the same venue. So when the opportunity arose to attend the 2014 BPS annual meeting in Galway, a city on the west coast of Ireland, I did not hesitate in registering. As a student member, for over a year, I felt that attending this meeting would allow me to network with fellow phycologists and find out the breadth of research that is being conducted in the UK. Fortunately, the BPS was kind enough to fund my trip to Galway and allow me to experience this excellent meeting.

My abstract, submitted for an oral presentation, was accepted and I was given the privilege to take part in the Manton sessions. My presentation entitled “A Metaproteomic Assessment of the Microbial Loop During Algal Bloom Formation” represented the cumulative work of the first 18 months of my PhD. These sessions allowed me to expose my research to people of diverse fields and backgrounds that differ substantially from my daily applied phycology surroundings. Over the three day meeting the diversity and quality of the presentations and posters was astounding. The importance of interdisciplinary work was definitely one of the focuses of several presentations and one of the overarching themes of the meeting. The need

to bring together researchers from different fields to tackle global issues, of increasing complexity, makes these meetings crucial in our development as problem solvers.

The highlights of the meeting did not end at the excellent scientific programme. Galway and its surrounding areas make for a breathtaking spectacle and its vibrant community provided entertainment for the duration of my stay. It was, without a doubt, an inspired choice for this meeting. To match the location, the BPS organised two social events that were immensely festive and allowed for informal networking. These events really showed that the BPS is not only a group of researchers but also a group of friends and family of which I am proud to be a part of.

I came back from this meeting with an increased awareness of the field of phycology and with the sense that I had just met an incredible group of people whom I will call friends for a long time to come. I would like to thank the BPS for the funding and support and everyone that helped make this meeting a unique experience.

David Russo
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62nd Annual Meeting British Phycological Society (25-27th June 2014)

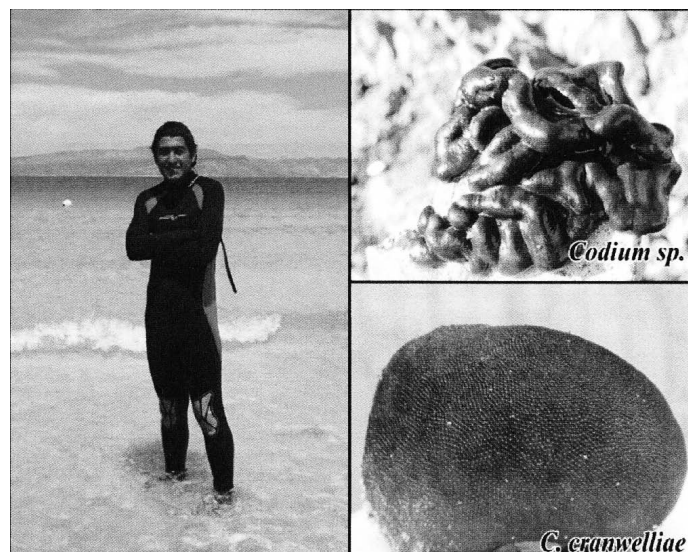
As young phycologist I have always been interested in understanding as many biological aspects of seaweeds as possible. Initially my first contact with the seaweed world was through taxonomy; since that time I have developed a voracious appetite for wondering about many topics such as ecology, biogeography, phylogenetics, evolution, and the role of seaweeds in a rapidly changing environment. After the conclusion of my master degree last November 2013 at the University of Baja California I took advantage of the International summer studentships program granted by the University of Auckland, New Zealand. Under the gentle supervision of Wendy Nelson and Judy Sutherland, I surveyed the species diversity of the prostrate forms of the genus *Codium* in New Zealand using morphological and molecular techniques.

After a fascinating summer in New Zealand, I started this year fully charged with energy, seeking to face new challenges and to participate in outstanding conferences to present the results of my research work. Quite soon, whilst I was coming back to Mexico I realized that the application for student bursaries from the British Phycological Society was open. This year the meeting was held in the mythical city of Galway, Ireland. From my personal experience I have been delighted by the lifestyle and the green environment of County Galway since my first day in this gorgeous city. Then, I didn't think twice; as soon as possible I filled out my application form for the student bursary and I received the favorable response quickly; the BPS council approved my funding request to attend the meeting in Galway. After this wonderful notice, I filled my pockets with liveliness and inspiration and I took one of the longest trips in my life from the east coast of Mexico to the west coast of Ireland. More than 24 hours of flying was worth it. Because, this year the meeting was held at the NUI Galway, the conference was friendly and very well organized spanning across a wide spectrum of topics of freshwater and marine algae (micro and macro) such as ecology, phylogeny, biodiversity and harmful algal blooms. In particular the extensive number of presentations focused on ecology/applied phycology was a clear trend during the meeting. I appreciated the opportunity to talk with other students and top-class phycologist from the BPS. The social interaction during the coffee breaks and the very thoughtful feedback during the talks has contributed to the friendly environment of this conference. Describing the 62th BPS meeting I would like to say "It was like being an intertidal seaweed swaying rhythmically with the wave of astounding session talks, stunning student posters and breath-taking plenary lectures by the top-class phycologist from the BPS". After these series of privileged events I am so grateful to my supervisors in Mexico and New Zealand. They have left a memorable imprint in my career as a phycologist. Thanks for your delightful assistance.

I am also grateful to the British Phycological Society for giving me the opportunity to attend this outstanding meeting in Galway. I was pleased with the 61st version of the BPS meeting, held in Belfast 2013; this year the meeting in Galway was memorable. I presume if the BPS Annual meeting continues to follow the same trend, the next edition in London may be one of the most memorable meetings for BPS members. Personally, I would like to say to the phycological community, if any of you perceive a single chance to attend the next annual meeting that will be held in London, don't hesitate to make your registration as soon as possible, you will not regret it.

Néstor M. Robinson

University of Baja California Sur (UABCS), Mexico, robinson.biol@gmail.com



62nd Annual Meeting of the BPS Attendance Report



one year into my PhD. My presentation with the title “Novel strategies for the production of high value compounds in transgenic microalgae” outlined the results of my first year. The questions, that came up from my talk were very interesting and also very different from what I have been asked before. My PhD project is part of the European FP7 project PHOTO.COMM and a very important part of our consortium is the close collaboration with algal companies and the industrial application of our research. Therefore I regularly get a lot of input from the applied and industrial point of view, but rarely from a phycologist’s.

Generally, from the applied sessions of the meeting my personal take-home message clearly was that the communication of experts in different fields is crucial and that this could probably help to erase problems, before they even turn up, in the future. However, I also realised, during my own talk, that it is difficult to present your work to an audience that has a background that is different from your own. I think that knowledge exchange between fields is very valuable for everyone and should be pursued even more intensely in the close future.

This meeting gave me the opportunity to meet many new people in the field. In my opinion, there were many very good talks giving a broad overview that allowed the attendees to get up to date with the latest research in the algal world. Finally, the field trip at the very end also showed me how pretty Ireland is with all its seaweed diversity. I am very grateful to the BPS for funding my attendance and would like to thank everyone involved for making this meeting such a unique experience.

Julie A. Z. Zedler
University of Kent, zedler.jaz@gmail.com

When I started my PhD at the University of Kent, last year I moved from physiological and genetic investigations of macroalgae, during my undergraduate research project, to the much more applied part of phycology. My PhD focuses on metabolic engineering and algal biotechnology using typical model organisms such as *Chlamydomonas reinhardtii*. As I became more engaged in my PhD project, I realised that I was now working in a field that is very different from classical phycology.

When I saw the programme of this year’s 62nd BPS meeting in Galway, I noticed that one of the special sessions was on applied phycology. In my opinion this was a very good opportunity to get feedback and input on my research from a different point of view. I felt privileged to be allowed to talk as part of the Manton session and present my research to the society, albeit being just about

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1st Integrated Marine Biogeochemistry and Ecosystem Research (IMBER) Open Science Conference

This 1st Integrated Marine Biogeochemistry and Ecosystem Research (IMBER) Open Science Conference was held in beautifully sunny Bergen from the 22th to 27th of June 2014. Future Oceans contained 6 plenary presentations, 24 parallel sessions, 2 poster sessions and 10 workshops and received around 500 delegates from across Europe, Scandinavia, USA, Australia, Africa, South America, Canada, Japan, China, India, New Zealand, Taiwan, Israel, Saudi Arabia, republic of Korea and Russia.

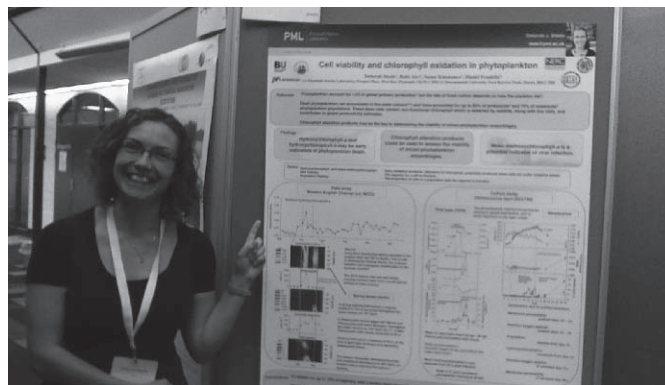
The theme “Research for Marine Sustainability: multiple stressors, drivers, challenges and solutions” was

reflected in the diversity of the parallel sessions. Topics included the ocean carbon cycle, ecological and environmental variability, trait-based modelling of planktonic ecosystems, the dark ocean, mesopelagic functional groups, impact of climate change on marine ecosystems, changing arctic regions, boundary current in the Indian ocean, biogeochemical dynamics, incorporating higher trophic levels in end-to-end models, etc. Sessions were rounded off by open discussions which, for the most part, fostered debate followed by resolution, focus and plans of action for strategic aiming of research. The two dedicated poster sessions were also well attended and lively.

Special student events including a scientific peer review and publication workshop, dedicated lunches were students were invited to sit-down with established scientists, and presentation prizes. A mentoring scheme was in place, where interested students were paired with volunteering scientists for guidance before and during the conference.

Particular highlights of the conference were a 2014 map of global Marine Protected Areas and No-take Zones presented by Coleen Moloney; and the description of finding ubiquitous healthy diatoms from 2000m to 4000 m depth in the Atlantic, Pacific and Indian oceans by Susana Agustí. This 1st IMBER Open Science Conference provided an opportunity for outsiders, like me, to join their agenda of understanding the sensitivity of marine biogeochemical cycles and ecosystems to global change, predicting ocean responses, and the effects on the Earth System and human society.

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6th Symposium on the biological and environmental chemistry of DMS(P) and related compounds



The timing of the 6th Symposium on the biological and environmental chemistry of DMS(P) and related compounds could not have been better for my PhD. I am currently in my fourth year writing-up period, studying the effects of ocean acidification on the production and breakdown of DMS and DMSP and some halogenated trace gases. The break from writing to attend the conference at the Institut de Ciències del Mar in Barcelona was as welcome as it was useful! The availability of so many important but as yet unpublished research findings was hugely valuable in helping to develop my thesis introduction, and gain some useful hints for further analysis of my datasets.

The conference was attended by about 80 researchers from across the world who are all active in the still-developing field of DMS(P) research. Dimethylsulphoniopropionate (DMSP) is a multifunctional compound produced by phytoplankton and some macroalgae, with a range of roles: from an osmolyte to cryoprotectant to grazing deterrent; it breaks down in the water column to dimethylsulphide (DMS), a climatologically important trace gas.

As I am near the completion of my PhD research, I have already collected all my results and completed the majority of the analysis, and was keen to present my findings and hear the opinions and thoughts of several key figures within the research field. I was offered an oral presentation with the title 'The influence of Ocean Acidification on DMS and DMSP production', and this was the first time I had been offered a presentation of my research at an international conference. I am very grateful for the bursary from the BPS which enabled my participation by covering the conference fee and part of the cost of travelling to Barcelona.

The meeting lasted for five days, and started on the Monday with an introduction and welcome from the conference organiser, Dr Rafel Simó, before the jump straight into the presentations and research discussions. Topics were wide ranging, from the current status of the DMS climatology and atmospheric modelling scenarios, to factors affecting DMS(P) distribution and production, to detection

of DMS by krill-eating penguins for identification and location of suitable food sources. The evenings included networking opportunities in the outdoor poster-sessions, and the Thursday afternoon offered an excursion to the monastery at Montserrat, which doubled as a networking opportunity and an opportunity to sample the local cuisine!

Discussion topics during the meeting were focussed on the debate around the roles of DMSP within the algal cell, particularly the hypothesis that DMSP acts as part of an anti-oxidant cascade within the cell. A debate session had some of the key researchers in the field put forward the arguments for and against this role for this compound.

Overall the conference was both detailed and intensive, and was all the better for having a single theatre

for all the presentations rather than parallel sessions as it meant that all participants could go to all of the research presentations. Attending this symposium whilst I was writing my thesis gave me an excellent overview of the whole field of DMSP-related research and how my own project fitted into this, which is important for the context of my work. I would recommend the DMSP symposium series to anyone working in the field and I hope that I will be able to attend the next one in 2018.

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Gordon Research Conference on Global Change Biology



In July I was fortunate enough to be able to attend a Gordon Research Conference on Global Change Biology in the United States which was held for the first time. Because the conference was during the high season, flight prices were high so I decided to apply for a BPS travel award. The positive outcome of my application together with a GRC student fellowship allowed me to comfortably attend the conference.

The conference centre was located in Waterville Valley, which is a winter holiday destination in New Hampshire, where we were located in a holiday resort with restaurants and little shops. Most attendees shared a flat with a small kitchen, nice living room and individual rooms. The conference centre itself was located in a different building only 5 min away.

The whole meeting was very well organized and days would start with breakfast followed by the first session of consecutive talks and followed by a lunch break. The af-

ternoons were free with organized excursions like hikes, mountain bike or kayak trips. Poster sessions were held in the evening before dinner which was followed by an evening session. Breakfast, lunch and dinner allowed plenty of time to interact with fellow participants (about 150) and engage in stimulating scientific discussions. The sessions covered a wide range of global change biology topics from evolution and adaptation to biogeochemical cycles and paleo proxies to ecosystem modelling. It was very interesting to follow talks on such a variety of topics that are all connected by ocean global change. A small number of speakers provided insight into their development of scientific instruments to study or manipulate marine environments. My personal highlight was a talk about “FOCE: The Evolution of In Situ Free Ocean CO₂ Enrichment Experiments”. This instrument is deployed at an area of interest and allows CO₂ (and many other variables) manipulation of the enclosed environment. It was very motivating to see that there are also possibilities for scientists in the area scientific instrument development.

A group of senior scientists organized a “mentor panel” during one of the lunch breaks which was attended by a great number of early career scientists. The topics discussed ranged from work-life balance, finding a job after your PhD or the two body problem. The insights and comments from the senior scientists were very valuable and encouraged us to think about our desired career paths.

I had the opportunity to present a poster about my experimental evolution with two model diatoms. I’m interested in the long-term adaptation of *Thalassiosira pseudonana* and *Fragilariopsis cylindrus* to high and low temperatures. My first results indicate that *Thalassiosira* is able to adapt to high and low temperatures and that this adaptation is not reversible in case of cold adaptation. These findings were of great interest to the participants and the-

re was almost not enough time to discuss my data with everyone interested. I received some very good feedback and comments from the top scientists in the field which reinforced me about my research and accomplishments.

Attending this conference gave me the opportunity to present my ongoing research to leading scientists in the field of experimental evolution and I also received an invitation to the next meeting. Interacting with most of the participants was very helpful in creating a network for future project opportunities but also to meet scientists from similar fields or outside of academia.

I am very grateful to the British Phycology Society for their financial support to cover my travel expenses in order to attend this great conference in New Hampshire, USA.

A link to the poster is available <http://www.eposters.net/poster/experimental-evolution-in-diatoms-thermal-longterm-acclimation-in-two-model-diatom-species>

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The 16th International Conference on the Cell and Molecular Biology of *Chlamydomonas*



In June of this year, I attended the 16th International Conference on the Cell and Molecular Biology of *Chlamydomonas*, kindly supported by a bursary from the BPS. Held in the spectacular surroundings of the Asilomar Conference Grounds in California, where the famous moratorium on recombinant DNA technologies was decided in 1975, the conference certainly put on a show fitting of its location.

Held every two years, the Chlomy conference brings together world leaders in the field, along with a whole bunch of students like me, to discuss the versatile green alga *Chlamydomonas reinhardtii*, and its use as a model organism in a huge range of fields from flagella to biofuels, and from chloroplasts to circadian rhythms. The conference also covered a range of species related to *C. reinhardtii*, primarily the mesmerising *Volvocales*, but also my area of study on the obscure alga *Lobomonas rostrata*, which I am investigating as a model organism for algal-bacterial interactions. This alga forms a symbiotic interaction with the rhizobial bacterium *Mesorhizobium loti*, in which the alga provides fixed carbon in exchange for cobalamin (vitamin B12) from the bacterium. My research focuses on the issues

associated with scale up and commercialisation of algal biotechnology, and so I have in the past attended applied conferences; this was my first purely scientific conference.

Over five days we heard about the extremely diverse range of Chlomy research, through seminars and the all-important poster sessions, where I presented my work. Through this medium, and the extremely frequent and well-stocked coffee and snack breaks, I was able to network with other researchers, which have led to some exciting new directions to take my research! The meeting was very well organised, and in particular the organisers ensured that there was a broad mix of students and early-career researchers giving talks, which were of excellent quality. The conference really demonstrated to me the diversity of the *Chlamydomonas* community, and the extent to which it has grown in recent years thanks to an explosion of interest and investment in algal biotechnology. In particular I took away the message that no matter how applied your work may be, you still have to understand the fundamental biology at play.

I very much enjoyed my first taste of the Chlomy conference; it was an invaluable experience for me to listen to and interact with the key figures in my field of study, and I returned home ready to dive back in to my research. Of course, it helped to be in such an incredible location on the California coast, and I took the opportunity to visit Monterey Aquarium and Steinbeck's famous Cannery Row. I would like to express my deep gratitude to the British Phycological Society, alongside the Cambridge Philosophical Society, Magdalene College Cambridge and my supervisor Prof. Alison Smith for enabling my attendance at this fantastic conference.

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The 4th International Conference on Algal Biomass, Biofuels and Bioproducts



In July I was fortunate enough to be able to attend a GordonThe 4th ABBB conference took place in the artisan city of Santa Fe, New Mexico under the shadow of the renowned Los Alamos National Laboratory. Famous as the birthplace of the nuclear bomb, the region is now becoming central in another field of research that may rock the world; algal biotechnology.

The event brought together over 300 academics, industrial delegates and young researchers from 43 countries. Approximately 100 talks and 150 posters were presented on topics ranging from metabolic regulation of microalgae to techno-economic analysis of algae-derived biofuels and bioproducts. I was impressed by the breath of topics but also the extremely high quality of the talks and posters. I was particularly astounded with the research summary of the flagship National Alliance for Advanced Biofuels

and Bioproducts (NAABB) consortia, presented by Dr José Olivares (LANL). Through a number of independent technological developments, the group of over 40 universities, national laboratories and companies announced a 32 fold decrease in the estimated production cost of algal biocrude, from \$240 a gallon to \$7.50. In particular I found the metabolic engineering developments fascinating. Another personal highlight was a presentation by Prof. Goodenough (Washington State University), who described her group's extensive transcriptomic work with the model algae species *Chlamydomonas reinhardtii*.

On the second day I had the opportunity to present my poster "Synergistic carbon metabolism in a fast growing mixotrophic freshwater microalgal species *Micractinium inermum*". After nearly 2 years of hard work on my PhD project I was both excited at the opportunity to share my results but also anxious about having to defend my work from critical peers. I was surprised and relieved by the positive feedback and encouragement given from specialists in the field. At the poster session I discovered some ingenious novel methodologies for biochemical analysis which I now plan to use in my future work. Later that evening I attended a fantastic conference dinner reception where I had the opportunity to discuss all things algae while being serenaded by a Mexican mariachi band.

The meeting was a fantastic experience which gave me the opportunity to network with experts from around the world and left me with an increased optimism on the feasibility of sustainable algal biofuel production and the progress of algal biotechnology in general. I'd like to express my sincere gratitude to the BPS for providing me with a student bursary to finance the trip. Without their generous support I would not have been able to attend the meeting.

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Summer Sampling; collections of algae around the annual BPS meeting in Galway (June 2014)

The charming city of Galway was the chosen venue for the 62nd British Phycological Society, a city known for its music and craic, it was obvious this was a meeting not to be missed! Indeed it was most enjoyable, giving the chance to catch up with old friends from previous meetings, while also making new friends and contacts. The added bonus of course was being able to do so, with a backdrop of broad range of talks and posters, from students through to more established experts in their respective

fields. Truly the British Phycological Society is a meeting that I would encourage any budding phycologist to attend.

The city also gave me the opportunity to sample the coastal flora in search for eukaryotic pathogens of algae. Arriving two days before the conference began, I was forced out of my bed at the break of dawn on both mornings, due to the early low tide times. I put on my Wellingtons and took my collection trays down to the beach. Though I was expecting to find brown algae I was not expecting

it quite in such abundance. Compared to the beach in Aberdeen there seemed to be a limitless supply so I was very hopeful that I would find pathogens. Wondering along the beach behind South Park towards Salt Hill I picked tufts of brown algae on both mornings. I could clearly identify *Ectocarpus* and *Pyliella* in abundance and I was careful to avoid the invasive *Sargassum* species found closer towards the advancing sea front. At low tide I was not the only person out picking seaweeds and I ran in to other collectors each morning, and each morning it was commented on how amazing the weather was (unfortunate that for the three days of the meeting that the weather would turn so drastically).

Having each day collected over 100 samples I was very fortunate to have access to a microscope. I must thank Dr Dagmar Stengel (Ryan Institute, NUI, Galway), for leaving me a key to her lab and allowing me to use the microscope throughout the day. So the hunt began, each day for approximately 8-10 hours I was behind this microscope inspecting these collected algae, not only identifying the host and any potential intracellular pathogens but also the epiphytic content and fertility of these samples. After two days of searching I was not fortunate enough to locate any pathogens, but I had observed that the filamentous brown algae along the beach of Galway were very fertile and commonly epiphyte free. This to me would suggest that the population was still expanding, and therefore it is likely that I was too early in my timing as often these pathogens are found during a population decline. Indeed had I been back one month later who knows what outbreaks may have been present!

Fortunately, this was not the only opportunity to sample. Thanks to Dr Svenja Heesch and Dr Maeve Edwards (both Ryan Institute, NUI, Galway) a fieldtrip to the very scenic beaches of Connemara with a handful of the meeting participants was or-



ganised. Thankfully the weather had reverted to how it was at the start of the week. After a very informative meeting, this allowed everyone some much needed down time, and people, like myself, chose to wonder along the rocks and shores picking up algae, or brave the waters, snorkelling in the North Atlantic. Again I had in mind to analyse some of these specimens in search for intracellular pathogens and the opportunity arose at the NUI field station, where microscopes were provided. Time was running short, though with a modest 30 samples I thought I might be able to get some surveying done. Analysing the 5th specimen I stopped and refocused. I had found something. The basal cell of an *Ectocarpus* sporangia didn't look right. It wasn't brown. It was grey. No internal structures could be seen. Instead the cell appeared granulated and full, though not inflamed. Svenja next to me noticed my excitement and asked to see, "it's definitely something", she said. Indeed something it was, but what we don't know yet. Unfortunately our time in Connemara ran out and the bus was waiting to go. I retained this sample and the other 25 I had

not looked at. Back to Aberdeen with these! What this pathogen was, I cannot tell you yet, but watch this space...

These collections would not have been possible without the award of a travel grant from the BPS which I obtained to attend the 62nd BPS meeting at NUI, Galway. I therefore would like to thank the society for this award and look forward to attending the future annual meetings and meeting friends old and new.

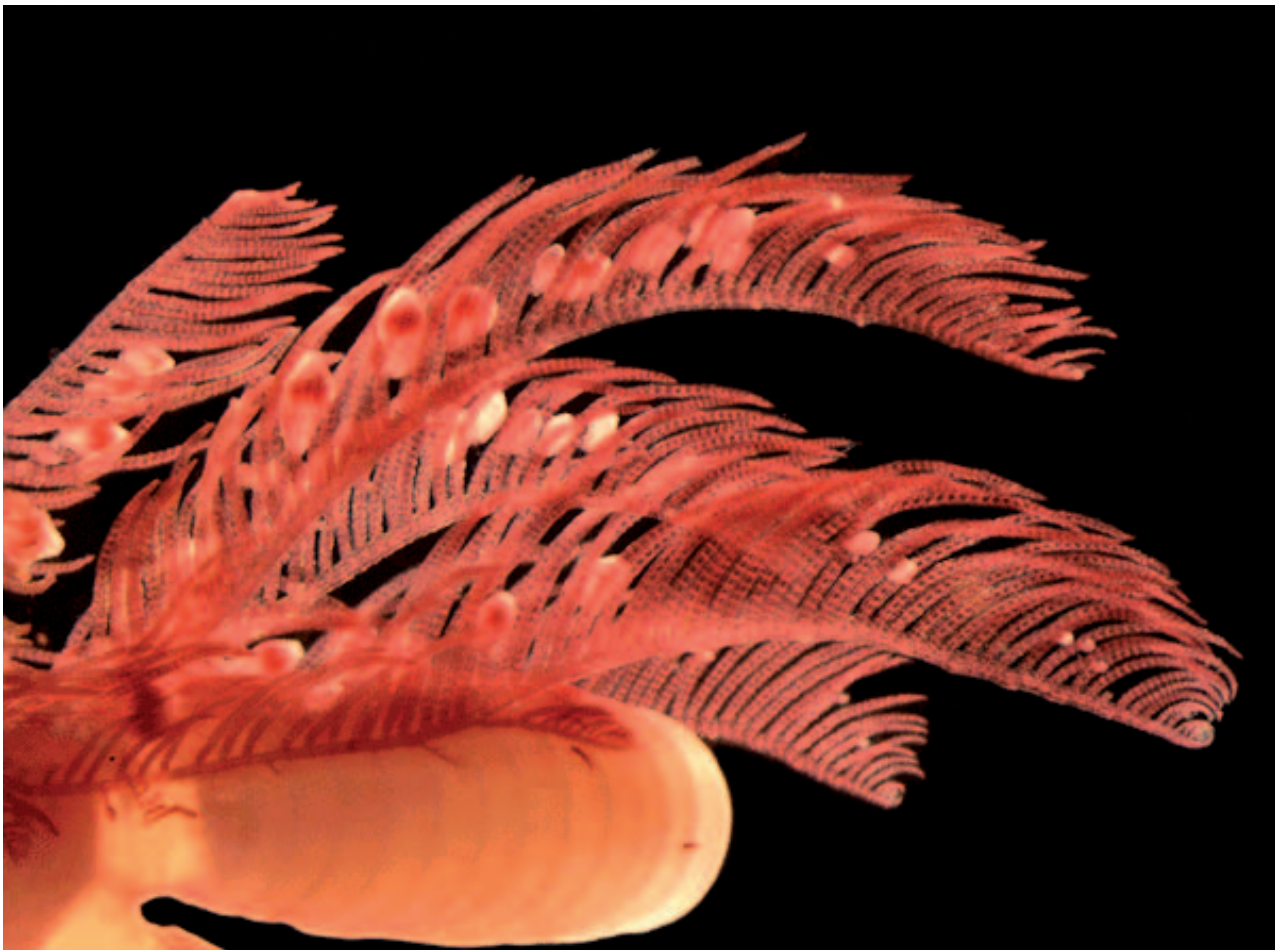
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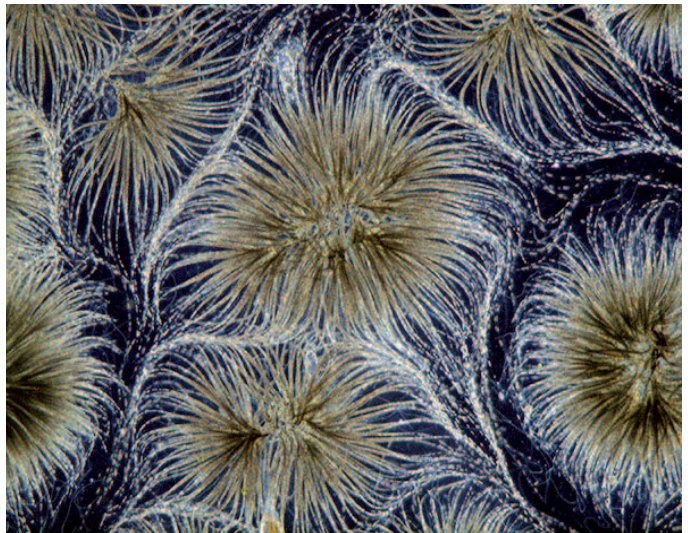
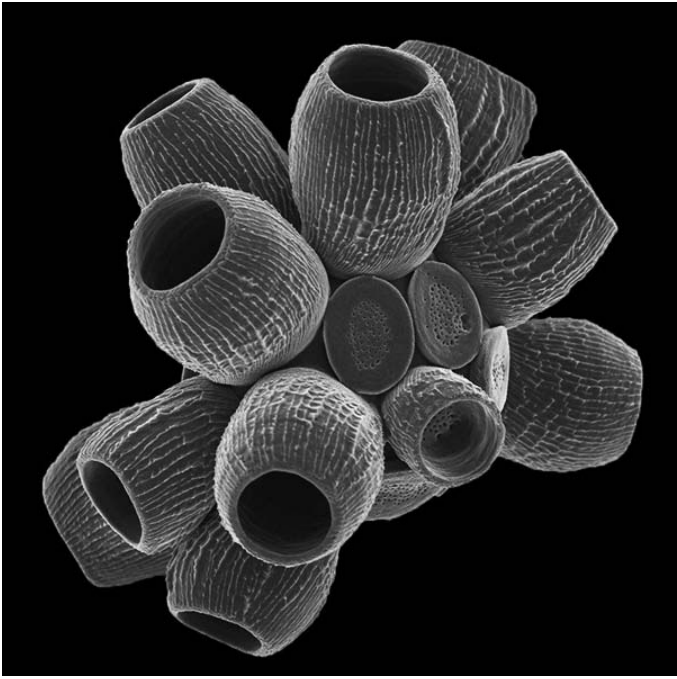
Hilda Canter-Lund Photo Award Winner 2014

The winner of the 2014 Hilda Canter-Lund competition is John Huisman, of Murdoch University and the Western Australian Herbarium. His stunning image of the red algal genus *Herposiphonia* fought off strong competition from the other shortlisted images to claim the prize. He collected the specimen himself from Cape Peron, near Perth in Western Australia, and photographed it live using a stereo microscope.

Congratulations John!

The other shortlisted candidate's images are shown below (Alison Taylor and Ben Kramer: Coccolithophore (*Scyphosphaera apsteinii*); Shinya Sato: diatom fans; Gary Saunders: Translucent Pipe Cleaner; Gordon Beakes: Algal galaxies; Erasmo Macaya Horta: Yellow Pile).





Chrysymenia wrightii (Wrights golden membrane weed) a new non-native to southwest England

Francis Bunker

Marine macroalgae are abundant along the western coast of England. In September 2013, while working on a DEFRA sponsored project in marinas in SW England the team encountered conspicuous large growths of a lubricious, hollow red seaweed species in Falmouth. The plants looked familiar, but unlike anything I knew from Britain and Ireland.

Later, I realised that the specimens from Falmouth resembled *Chrysymenia wrightii* that had been shown to me by Ignacio Barbara (University of La Coruña) while diving in the Ria de Arosa, Galicia in 2011. Ignacio Barbara confirmed that the photographs resembled *Chrysymenia wrightii* and I am currently awaiting the sequencing of material for final confirmation.

C. wrightii is a Japanese species first recorded in Europe from the Thau lagoon in 1986 and then in Galicia by Barbara et al (2008). (Further information is also available on Algaebase (Guiry and Guiry, 2013)). Now established in two marinas in Falmouth, it is possible that this species may well spread elsewhere, joining the ever growing list of non-native species in our waters.

I have drafted a description of *C. wrightii* in the same style as the Seasearch Guide to Seaweeds (Bunker et al, 2010) in order to assist in its identification:

DESCRIPTION Plants grow to 40 cm and consist of a hollow axis with branches up to 3 mm in diameter. Axes and branches are generally terete but frequently distorted due to their hollow nature. The branches are variously arranged on the main axis; often irregularly opposite, sometimes alternate, sometimes secund. There are up to three orders of branching with branches narrowing at the base and ultimate branches (up to 1.5 cm in length) narrowing to a point. Plants attach via a discoid holdfast.

TEXTURE AND COLOUR Plants are soft and lubricious. The colour ranges from a glistening light pinky brown to dark red brown.

REPRODUCTION Sexes are separate but male plants are unknown. Female plants have conspicuous hemispherical cystocarps up to 1.2 mm in diameter which may be visible to the naked eye and certainly with a hand lens. Cystocarps are generally distributed on mature axes and branches and are dome-shaped without a protruding ostiole. Short adventitious branches may grow from senescent cystocarps. Tetrasporangia develop in the cortex and are microscopic.

IDENTITY CONFUSIONS Confusion could occur with *Lomentaria clavelosa* which is also hollow, but is generally smaller, can be soft but not lubricious and female plants bear cystocarps with a conspicuous ostiole. There is possible confusion with *Agardhiella subulata* which bears branches that taper to a point but this species is neither hollow nor lubricious.

HABITAT A subtidal species favouring sheltered inlets and bays. This is a non-native species; the first record in Europe being from the Thau lagoon (Mediterranean) in 1987. It was introduced via imports of the oyster *Crassostrea gigas* from Japan. The first record from the NE Atlantic was Galicia, Spain in 2005. In September 2013 *C. wrightii* was recorded on and around marina pontoons in Falmouth.

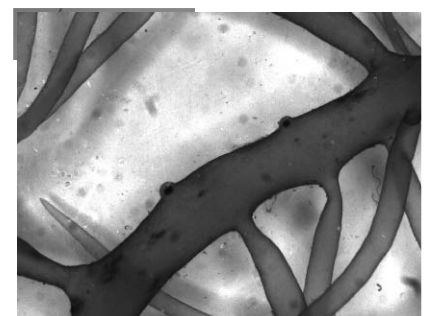
The growing season is uncertain. In Galicia *C. wrightii* was originally collected only in September and October, but during recent years it has been found in January and also May to July.

DISTRIBUTION Falmouth, Cornwall but likely to spread.

Thank you to John Bishop and Christine Wood (Marine Biological Association of the United Kingdom, Plymouth) and Lisa Rennocks (Cornish Wildlife Trust) for including me on their fieldwork team and commenting on this article. Also to Ignacio Barbara (University of La Coruña) for his help with initial identification and Olivier DeClerk (University of Gent) for offering to sequence a sample.

References:

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- Guiry, M.D. & Guiry, G.M. 2013. *AlgaeBase*. World-wide electronic publication, National University of Ireland, Galway. <http://www.algaebase.org>; searched on 25 October 2013.
- Riouall, C.-F., R. & Lauret, M. (1987). The algal flora of the Etang du Thau (Mediterranean coast of France): on the occurrence of a Japanese member of the Rhodymeniales, *Chrysymenia wrightii* (Rhodophyta). *Botanica Marina* 30: 357-364.



Freshwater Algal Flora of the British Isles – Update 3 CORRECTIONS AND ADDITIONS

This update of the 2nd edition of The Freshwater Algal Flora of the British Isles (October 2011: D.M. John, B.A. Whitton & A.J. Brook, eds) includes information overlooked, incorrect or published since the book and two previous post-publication updates (John & Whitton 2012, 2013). All future updates will be published in The Phycologist and numbered. The latest changes, which are listed below, are included in a consolidated list sent to the Centre for Ecology and Hydrology, with the new online version of A Coded List of Freshwater Algae of the British Isles Second Edition available before the end of 2014: http://www.ceh.ac.uk/data/algae/algae_index.html. All taxonomic and nomenclatural changes between the first and second editions of the Flora are included. Information compiled for the new version of the Coded List will be used to revise the ‘Species Inventory’ for the freshwater algae in the National Biodiversity Network as the current inventory is based upon the 2003 version of the Coded List.

Two taxonomic works published in the past year need special consideration. One is the revision by Coesel & Meesters (2013) of the taxonomically complicated desmid genus *Staurodesmus* and a group of monosporous forms that were placed in *Staurodesmus* by Teiling (1948). Although Coesel and Meesters state that they retain traditional species and varieties wherever possible, many changes are proposed, including placing many subspecies under the synonymy of the nominal form, since they considered them not worthy of recognition. Most of these proposed changes are based on the ‘best professional judgement’ of the authors. Very few detailed investigations of desmid genera have been undertaken to date and some studies (Ichimura & Kasai 1984, Ohtani 1990, Štátný et al. 2013) have shown that some forms and varieties are reproductively isolated or phylogenetically distinct and should be recognized as species. We have listed separately the taxonomic changes proposed by Coesel and Meesters (op. cit.) and have generated new code numbers. It remains to be seen whether these changes become widely accepted and future genomic investigations may result in some being reversed or modified, such as reinstatement of subspecific taxa and recognition of new species.

The other recent major work is the third volume in the series on cyanobacteria by J. Komárek (2013). This assembles all the taxonomic literature on heterocystous cyanobacteria and provides an important source of information for everyone studying these organisms. Some of the more recent nomenclatural changes have already been included in the 2nd edition of The Freshwater Algal Flora of the British Isles and subsequent updates. It was decided not to include others here, because many recent decisions in cya-

nobacterial taxonomy need to be considered much more critically before being accepted for general use (Whitton & Potts 2012). Some will, however, probably be included in the next update.

We are especially grateful to Michael Guiry who kindly checked the entries in the 2nd edition of the Flora against those in AlgaeBase and discovered errors and inconsistencies. Some of the inconsistencies are due to differences in opinion over currently accepted names. All the references relating to these changes are in AlgaeBase (Guiry & Guiry 2014).

p. 62 *Gloeocapsa magma* (Brébisson) Kützing to *Gloeocapsopsis magma* (Brébisson) Komárek et Anagnostidis (01890010).

p. 167 *Balbiania investiens* (Lenormandi ex Kützing) Sirodot to *Pseudochantransia investiens* (Lenormand ex Kützing) F.D. Ott (03160010).

p. 171 *Batrachospermum arcuatum* Kylin to *Sheathia arcuata* (Kylin) Salomaki et Vis (03150010).

p. 171 *Batrachospermum boryanum* Sirodot to *Sheathia boryana* (Sirodot) Salomaki et Vis (03150020).

p.187 *Euglena agilis* H.J. Carter to *Euglena pisciformis* G.A. Klebs (04020030).

p. 187 *Euglena anabaena* Mainx to *Euglenaria anabaena* (Mainx) Karnkowska et E.W. Linton (04140030).

p. 187 *Euglena caudata* K. Hübner to *Euglenaria caudate* (K. Hüber) A. Karnowska-Ishikawa, E. Linton et Kwiatowski (04140010).

p. 189 *Euglena clavata* Skuja to *Euglenaria clavata* (Skuja) Karnkowska et E.W. Linton (04140020).

p. 189 *Euglena communis* Gojdics to *Euglena granulata* (G.A. Klebs) F. Schmitz (04020160).

p. 194 *Euglena limnophila* Lemmermann to *Phacus limnophila* (Lemmermann) E.W.Linton et Karnkowska (04020180).

p. 194 *Euglena magnifica* E.G. Pringsheim to *Euglena sanguinea* Ehrenberg (04020270).

p. 195 *Euglena obtusa* Van Goor/F. Schmitz to *Euglena van-goori* Deflandre (04020400).

p. 195 *Euglena polymorpha* P.A. Dangeard to *Euglena gra-*

- nulata* (G.A. Klebs) F. Schmitz (04020160).
- p. 195 *Euglena proxima* P.A. Dangeard to *Euglenafornis proxima* (P.A. Dangeard) M.S. Bennett et Triemer (04150010).
- p. 196 *Euglena spathirhyncha* Skuja to *Discoplastis spathirhyncha* (Skuja) Triemer (04130010).
- p. 200 *Lepocinclis ovum* (Ehrenberg) Lemmermann to *Lepocinclis globulus* Perty (04020190).
- p. 203 *Lepocinclis tripteris*. Change 040400180 to 04040180.
- p. 206 *Phacus alatus* G.A. Klebs to *Phacus pusillus* Lemmermann (04070240).
- p. 210 *Phacus orbicularis* K. Hübner to *Phacus circulatus* Pochmann (04070400).
- p. 213 *Phacus triqueter* (Ehrenberg) Dujardin to *Phacus triquetra* (Ehrenberg) Dujardin.
- p. 212 *Phacus smulkowskianus* Change 04070380 to 04070390.
- p. 222 *Trachelomonas playfairii* Change 01400050 to 01400500.
- p. 229 *Astasia longa* E.G. Pringsheim to *Euglena longa* (E.G. Pringsheim) Marin et Melkonian.
- p. 226 Change position of var. *punctata* by placing under *Trachelomonas volvocina*.
- p. 244 *Chilomonas paramaecium* Ehrenberg to *Cryptomonas paramaecium* (Ehrenberg) Hoef-Emden et Melkonian.
- p. 238 *Peranema trichophorum* (Ehrenberg) F. Stein to *Peranemopsis trichophora* (Ehrenberg) L. Péterfi.
- p. 256 *Gymnodinium inversum* Nygaardh to *Woloszynskia pascheri* (Suchlandt) von Stosch (06140050).
- p. 257 *Katodinium campylops* (T.M. Harris) A.R. Loeblich III to *Opisthoaulax campylos* (T.M. Harris) Calado (06210010).
- p. 259 *Katodinium tetragonops* (T.M. Harris) A.R. Loeblich III to *Opisthoaulax tetragonops* (T.M. Harris) Calado (06210020).
- p. 259 *Katodinium vorticellum* (F. Stein) A.R. Loeblich III to *Opisthoaulax vorticella* (F. Stein) Calado (06210030).
- p. 270 *Peridinium lomnickii* Wołoszyńska to *Chimonodinium lomnickii* (Wołoszyńska) S.C. Craveiro, A.J. Calado, N. Daugbjerg, Gert Hansen et Ø. Moestrup (06220010).
- p. 270 *Peridinium umbonatum* F. Stein to *Parvodinium umbonatum* (F. Stein) Carty (06120030).
- p. 264 *Glenodinium cinctum* Ehrenberg to *Glenodiniopsis steinii* (Lemmermann) Wołoszyńska (06060010).
- p. 328 *Heterococcus chodatii* Vischer to *Heterococcus viridis* Chodat (10230020).
- p. 329 *Nephrodiella lunaris* Pascher to *Monoraphidium nanum* (Pascher) Hindák (17580140).
- p. 321 *Botrydiopsis arrhiza* to *Botrydiopsis arrhiza*.
- p. 344 *Vaucheria clavata* (Vaucher) A.P. de Candolle to *Vaucheria fontinalis* (Linnaeus) T.A. Christensen (10210030).
- p. 344 *Vaucheria uncinata* Kützing to *Vaucheria arrhyncha* Heidinger (10210240).
- p. 347 *Monodus subterraneus* J.B. Petersen to *Monodopsis subterranea* (J.B. Petersen) D.J. Hibberd (11070010).
- p. 347 *Polyedriella helvetica* Vischer et Pascher to *Vischeria helveticum* (Vischer et Pascher) D.J. Hibberd (11060010).
- p. 383 *Carteria globosa* Korshikov to *Carteria pseudoglobosa* Ettl (16060150).
- p. 383 *Carteria micronucleolata* Korshikov to *Pseudagloë micronucleolata* (Korshikov) K.I. Meyer (16800010).
- p. 386 *Chlamydomonas braunii* Gorozhankin to *Microglena braunii* (Goroschankin) Demchenko, Mikhailyuk et Pröschold (09320020).
- p. 386 *Chlamydomonas britannica* J.W.G. Lund to *Chlamydomonas eustigma* Ettl (16181270).
- p. 390 *Chlamydomonas monadina* F. Stein to *Microglena monadina* Ehrenberg (09320030).
- p. 393 *Chlorogonium fusiforme* Marvienko to *Rusalka fusiformis* (Matvienko) T. Nakada (16684010).
- p. 395 *Chlorogonium tetragamum* (Bohlin) Wille to *Chlamydomonas tetragama* Bohlin (16181300).
- p. 399 *Gonium sociale* (Dujardin) Warming to *Tetrabaena socialis* (Dujardin) H. Nozaki et M. Itoh (16830010).
- p. 400 *Haematococcus droebakensis* Wollenweber to *Balticola droebakensis* (Wollenweber) Droop (16850010).
- p. 406 *Sphaerellopsis lefevrei* Bourrelly to *Vitreochlamys lefevrei* (Bourrelly) Menezes et C.E.M. Bicudo (16860010).
- p. 407 *Sphaerellopsis velata* (Korshikov) Gerloff to *Vitreochlamys velata* (Korshikov) Menezes et C.E.M. Bicudo (16860020).
- p. 417 *Pseudodictyosphaerium scoticum* Hindák to *Mychonastes scoticus* (Hindák) Krienitz, C. Bock, Dadheech et Pröschold (17740010).
- p. 419 *Acanthococcus aciculiferus* Lagerheim to *Glochio-*

- coccus aciculiferus* (Lagerheim) P.C. Silva (18280010).
- p. 423 *Characiopsis minuta* (A. Braun) Lemmermann to *Pseudocharaciopsis minuta* (A. Braun) D.J. Hibberd (11050020).
- p. 426 *Characium sieboldii* A. Braun to *Chlamydropodium sieboldii* (A. Braun) Tsarenko (18270010).
- p. 434 *Coenococcus polycoccus* (Korshikov) Hindák to *Radiococcus polycoccus* (Korshikov) I. Kostikov, T. Darienko, A. Lukesová et L. Hoffmann (17790030).
- p. 434 *Coenocystis obtusa* Korshikov to *Pseudoquadrigula obtusa* (Korshikov) Tsarenko (17750020).
- p. 469 *Scenedesmus arcuatus* (Lemmermann) Lemmermann var. *platydiscus* G.M. Smith to *Comasiella arcuata* (Lemmermann) E. Hegewald, M. Wolf, Al. Keller, Friedl et Krienitz var. *platydiscus* (G.M. Smith) E. Hegewald et M. Wolf (18160012).
- p. 470 *Schroederia robusta* Korshikov to *Pseudoschroederia robusta* (Korshikov) E. Hegewald et E. Schnepfrobusta (18210010).
- p. 473 *Tetraedron regulare* Kützing in part to *Tetraedriella regularis* (Kützing) Fott (10180030).
- p. 474 *Tetrastrum komarekii* Hindák to *Lemmermannia komarekii* (Hindák) C. Bock et Krienitz (18290010).
- p. 476 *Chlorella ellipsoidea* Gerneck to *Chloroidium ellipsoideum* (Gerneck) Darienko, Gustavs, Mudimu, Menendez, Schumann, Karsten, Friedl et Pröschold (18260010).
- p. 476 *Chlorella saccharophila* (W. Krüger) Migula to *Chloroidium saccharophilum* (W. Krüger) Darienko, Gustavs, Mudimu, Menendez, Schumann, Karsten, Friedl et Pröschold (18260020).
- p. 479 *Crucigeniella apiculata* (Lemmermann) Komárek to *Willea apiculatum* (Lemmermann) D.M. John, M. Wynne et Tsarenko (18300010).
- p. 479 *Crucigeniella crucifera* (Wolle) Komárek to *Willea cruciferum* (Lemmermann) D.M. John, M. Wynne et Tsarenko (18300020).
- p. 479 *Crucigeniella irregularis* (Wille) Tsarenko et D.M. John to *Willea irregularis* (Wille) D.M. John, M. Wynne et Tsarenko (18300030).
- p. 479 *Crucigeniella rectangularis* (Nägeli) Komárek to *Willea rectangularis* (Nägeli) D.M. John, M. Wynne et Tsarenko (18300040).
- p. 479 *Crucigeniella truncata* (G.M. Smith) Komárek to *Willea truncata* (G.M. Smith) D.M. John, M. Wynne et Tsarenko (18300050).
- p. 479. *Crucigeniella wilhelmii* (Fott) D.M. John et Tsarenko to *Willea wilhelmii* (Fott) D.M. John, M. Wynne et Tsarenko (18300060).
- p. 481 *Dictyosphaerium pulchellum* H.C. Wood to *Mucidosphaerium pulchellum* (H.C. Wood) C. Bock, Pröschold et Krienitz (18310010).
- p. 481 *Dictyosphaerium tetrachotomum* Printz to *Hindakia tetrachotoma* (Printz) C. Bock, Pröschold et Krienitz (18170010).
- p. 490. *Neglectella asterifera* (Skuja) Fott to *Skujaster asteriferus* (B. Fott) D.G.Vodenicarov (18230010).
- p. 518 *Oedogonium platygynum* Wittrock to *Oedogonium itzigsohnii* De Bary ex Hirn.
- p. 577 *Debarya glyptosperma* (De Bary) Wittrock to *Transeauina glyptosperma* (De Bary) Guiry (27490010).
- p. 595 *Spirogyra longata* (Vaucher) Kützing to *Spirogyra elongata* (Vaucher) Kützing (27340420).
- p. 598 *Spirogyra reflexa* Transeau to *Temnogyra reflexa* (Transeau) Yamagishi (27500010).
- p. 613 *Netrium interruptum* (Ralfs) Lütkemüller to *Planotaenium interruptum* (Brébisson ex Ralfs) Petlovany et Palamar-Mordvintseva (27480010).
- p. 615 *Spirotaenia acuta* Change 2735010 to 27350010.
- p. 655 *Cosmarium klebsii* Gutwinski to *Cosmarium nitidulum* De Notaris (27051190).
- p. 661. *Cosmarium portianum* W. Archer to *Cosmarium porteanum* W. Archer since named after a Mr Porte of Dublin (M.Guiry, pers.comm.).
- p. 666 *Cosmarium quadrifarium* var. *octastichum*: 27051735 to 27051734.
- p. 731 *Xanthidium cristatum* Ralfs var. *uncinatum* Ralfs to *Xanthidium uncinatum* (B. Eichler et Raciborski) Stastrý, Skaloud et Neustupa (27430190).

Changes proposed by Coesel and Meester (2013)

- p. 694, Pl. 170I. Change *Staurastrum clepsydra* Nordstedt var. *undulatum* D.B. Williamson et D.M. John to *Staurastrum subpygmaeum* West var. *undulatum* (D.B. Williamson et D.M. John) Coesel et Meesters (27381923).
- p. 707, Pl. 171H. *Staurastrum productum* (West et G.S. West) Coesel to *Staurastrum manfeldtii* Delponte var. *productum* (West et G.S. West) Coesel et Meesters (27380884)
- p. 708, Pl. 172G. Change *Staurastrum punctulatum* Ralfs vars *kjellmanii* Wille, *pygmaeum* (Ralfs) West et G.S. West and *subproductum* West et G.S. West to *Staurastrum*

punctulatum Ralfs; Pl. 172T. *Staurastrum brasiliense* Nordstedt var. *lundellii* West et G.S. West to *Staurastrum brasiliense* Nordstedt.

p. 711, Pl. 174E. Change *Staurastrum inflexum* Brébisson to *Staurastrum cyrtocerum* Ralfs, var. *inflexum* Coesel et Meesters (27380434); Pl. 174I. *Staurastrum planctonicum* Teiling to *S. pingue* Teiling var. *planctonicum* (Teiling) Coesel et Meesters (27381112).

p. 712. Change *Staurastrum lunatum* Ralfs var. *planctonicum* West et G.S. West to *Staurastrum avicula* Ralfs var. *planctonicum* (West et G.S. West) Coesel et Meesters (27380134); *Staurastrum lunatum* Ralfs to *Staurastrum avicula* Ralfs var. *lunatum* (Ralfs) Coesel et Meesters (27380133).

p. 717, Pl. 175I. Change *Staurodesmus tumidus* (Ralfs) Teiling to *Staurastrum tumidum* Ralfs (27381910).

p. 719. Change *Staurastrum anatinum* Cooke et Wills var. *aculeatum* (Ralfs) Brook to *Staurastrum aculeatum* (Ehrenberg) Ralfs; *Staurastrum anatinum* Cooke et Wills var. *biradiatum* West, *grande* West et G.S. West, *paradoxum* Brook and *truncatum* West to *Staurastrum anatinum* Cooke et Wills; *Staurastrum anatinum* Cooke et Wills var. *controversum* (Ralfs) Brook to *Staurastrum controversum* Brébisson ex Ralfs; *Staurastrum anatinum* Cooke et Wills f. *vestitum* (Ralfs) Brook to *Staurastrum vestitum* Ralfs; *Staurastrum acarides* Nordstedt var. *eboracence* West to *Staurastrum granulosum* Ralfs; *Staurastrum arachne* Ralfs var. *arachnoides* West et G.S. West to *Staurastrum arachne* Ralfs; *Staurastrum arcuatum* Nordstedt var. *guitanense* West to *Staurastrum arcuatum* Nordstedt; *Staurastrum arnelli* Boldt var. *spiniferum* West et G.S. West to *Staurastrum simonyi* Heimerl; *Staurastrum brachiatum* Ralfs forma *minus* (=minor) Lütkemüller to *Staurastrum brachiatum* Ralfs; *Staurastrum brachycerum* Brébisson to *Staurastrum cyrtocerum* Ralfs var. *brachycerum* (Brébisson) Coesel et Meesters (27381592); *Staurastrum capitulatum* Ralfs var. *dimidio-minus* Croasdale et Grönblad to *Staurastrum capitulatum* Ralfs; *Staurastrum capitulum* Brébisson ex Ralfs var. *spetsbergense* (Nordstedt) Cooke (= *Staurastrum capitulum* var. *amoenum* f. *spetsbergensis* Nordstedt) to *Staurastrum spetsbergense* (Nordstedt) Coesel et Meesters (27381870); *Staurastrum cerastes* P. Lundell var. *triradiatum* G.M. Smith to *Staurastrum cerastes* P. Lundell; *Staurastrum cingulum* (West et G.S. West) G.M. Smith var. *affine* (West et G.S. West) Brook to *Staurastrum cingulum* (West et G.S. West) G.M. Smith; *Staurastrum cyrtocerum* Ralfs var. *compactum* W. et G.S. West to *Staurastrum cyrtocerum* Ralfs; *Staurastrum dilatatum* Ralfs var. *hibernicum* West et G.S. West to *Staurastrum dilatatum* Ralfs; *Staurastrum disputatum* West et G.S. West to *Staurastrum sinense* Lütkemüller var. *insigne* (Raciborski) Compère (27381862); *Staurastrum erasum* Brébisson to *Staurastrum brasiliense* Nordstedt var. *ordinatum* Schmidle (27380263); *Staurastrum furcatum* (Ralfs) Brébisson var. *subsenarium* West et G.S. West to *Staurastrum for-*

ficulatum P. Lundell var. *subsenarium* (West et G.S. West) Coesel et Meesters (27380592); *Staurastrum furcigerum* (Ralfs) W. Archer var. *eustephanum* Ralfs and *reductum* West et G.S. West to *Staurastrum furcigerum* (Ralfs) W. Archer (27380620); *Staurastrum gladiusum* W.B. Turner and its var. *delicatulum* West et G.S. West to *Staurastrum teliferum* Ralfs var. *gladiusum* (W.B. Turner) Coesel et Meesters (27381452); *Staurastrum hexacerum* (Ehrenberg) Wittrock var. *semicirculare* Wittrock to *Staurastrum dispar* Brébisson; *Staurastrum inconspicuum* Nordstedt var. *crassum* Gay and *planctonicum* G.M. Smith to *Staurastrum inconspicuum* Nordstedt; *Staurastrum inflatum* West et G.S. West to *Staurastrum punctulatoides* (West et G.S. West) Coesel et Meesters (27381820); *Staurastrum inflexum* Brébisson var. *brachycerum* Brébisson to *Staurastrum cyrtocerum* Ralfs var. *brachycerum* (Brébisson) Coesel et Meesters (27381592); *Staurastrum kaiseri* Růžička to *Staurastrum crassangulatum* Coesel (27381740); *Staurastrum longispinum* (Bailey) W. Archer var. *bidentatum* (Wittrock) West et G.S. West to *Staurastrum longispinum* (Bailey) W. Archer; *Staurastrum margaritaceum* Ralfs var. *coronulatum* West and *subcontortum* West et G.S. West to *Staurastrum margaritaceum* Ralfs; *Staurastrum monticulosum* Ralfs var. *groenlandicum* Grönblad to *Staurastrum monticulosum* Ralfs; *Staurastrum muticum* Ralfs var. *depressum* Nordstedt to *Staurastrum muticum* Ralfs; *Staurastrum oligacanthum* Brébisson ex W. Archer to *Staurastrum cristatum* (Nägeli) W. Archer var. *oligacanthum* (Brébisson ex W. Archer) Coesel et Meesters (27380402); *Staurastrum ophiura* P. Lundell var. *cambricum* West et G.S. West to *Staurastrum ophiura* P. Lundell; *Staurastrum orbiculare* Ralfs var. *depressum* J. Roy et Bisset to *Staurastrum ralfsii* (West et G.S. West) Coesel et Meesters var. *depressum* (J. Roy et Bisset) Coesel et Meesters (27381832); *Staurastrum orbiculare* Ralfs var. *hibernicum* (West) West et G.S. West to *Staurastrum hibernicum* West (27381760); *Staurastrum orbiculare* Ralfs var. *extensum* Nordstedt to *Staurastrum extensum* (Nordstedt) Coesel et Meesters (27381750); *Staurastrum orbiculare* Ralfs var. *ralfsii* West et G.S. West to *Staurastrum ralfsii* (West et G.S. West) Coesel et Meesters (27381830); *Staurastrum pileolatum* Ralfs var. *cristatum* Lütkemüller to *Staurastrum pileolatum* Ralfs; *Staurastrum pendulum* Nygaard var. *pinguiforme* Croasdale to *Staurastrum saltator* Grönblad var. *pendulum* (Nygaard) Coesel et Meesters (27381842); *Staurastrum polymorphum* Ralfs var. *pygmaeum* Grönblad West to *Staurastrum polymorphum* Ralfs; *Staurastrum pseudosebaldii* Wille and var. *simplicius* West to *S. manfeldtii* Delponte var. *pseudosebaldii* (Wille) Coesel et Meesters (27380885); *Staurastrum punctulatum* Ralfs var. *striatum* West et G.S. West to *Staurastrum striatum* (West et G.S. West) Růžička (27381880); *Staurastrum pygmaeum* Ralfs to *Staurastrum punctulatum* Ralfs.

p. 720. *Staurastrum uhtense*, should read *uhtuense*.

p. 720. Change *Staurastrum sexcostatum* Ralfs subsp./var. *productum* to *Staurastrum sexcostatum* Ralfs; *Stau-*

rastrum retusum W.B. Turner var. *boreale* West et G.S. West to *Staurastrum retusum* W.B. Turner; *Staurastrum sexcostatum* Ralfs subspecies/var. *productum* West to *Staurastrum sexcostatum* Ralfs; *Staurastrum spongiosum* Ralfs vars *griffithsianum* (Nägeli) Lagerheim and *perbifidum* West to *Staurastrum spongiosum* Ralfs; *Staurastrum subavicula* (West) West et G.S. West to *Staurastrum arcuatum* Nordstedt var. *subavicula* (West) Coesel et Meesters (27380103); *Staurastrum tetracerum* Ralfs var. *evolutum* West et G.S. West to *Staurastrum tetracerum* Ralfs; *Staurastrum tohopekaligense* Wolle var. *trifurcata* West et G.S. West to *Staurastrum tohopekaligense* Wolle; *Staurastrum vestitum* Ralfs var. *subanatinum* West et G.S. West to *Staurastrum anatinum* Cooke et Wills var. *subanatinum* (West et G.S. West) Coesel et Meesters (27381557).

p. 724, Pl. 175F. Change *Stauroidesmus phimus* (W.B. Turner) Thomasson var. *hebridarus* (West et G.S. West) Teiling to *Stauroidesmus hebridarus* (West et G.S. West) Kurt Förster (27390500).

p. 725, Pl. 176C. *Stauroidesmus brevispinus* (Ralfs) Croasdale to *Staurastrum brevispinum* Ralfs (27381710); Pl. 176D. *Stauroidesmus aversus* (P. Lundell) S. Lillieroth to *Staurastrum aversum* P. Lundell (27381930); Pl. 176I. *Stauroidesmus crassus* (West et G.S. West) M. Florin to *Stauroidesmus connatus* (P. Lundell) Thomasson var. *crassus* (West et G.S. West) Coesel et Meesters (27390062); Pl. 176J. *Stauroidesmus mamillatus* (Nordstedt) Teiling to *Stauroidesmus cuspidatus* (Brébisson) Teiling; Pl. 176Q. *Stauroidesmus indentatus* (West et G.S. West) Teiling to *Stauroidesmus incus* (Ralfs) Teiling var. *indentatus* (West et G.S. West) Coesel et Meesters (27390193).

p. 726. Change *Stauroidesmus angulatus* (West) Teiling to *Staurastrum angulatum* West (27381700); *Stauroidesmus angulatus* (West) Teiling var. *planctonicum* (West et G.S. West) Teiling to *Staurastrum angulatum* West var. *planctonicum* West et G.S. West (27381702); *Stauroidesmus brevispinus* Ralfs vars *altum* West et G.S. West and *retusum* (Borge) Brook to *Staurastrum brevispina* Ralfs var. *boldtii* Lagerheim (27381712); *Stauroidesmus brevispinus* (Ralfs) Croasdale var. *obversus* (West et G.S. West) Croasdale to *Staurastrum brevispina* Ralfs var. *obversum* West et G.S. West (27381713); *Stauroidesmus bulnheimii* var. *subincus* (West et G.S. West) Thomasson to *Stauroidesmus validus* (West et G.S. West) Thomasson var. *subincus* (West et G.S. West) Coesel et Meesters (27390462); *Stauroidesmus conspicuus* (West et G.S. West) Teiling to *Staurastrum conspicuum* West et G.S. West (27381730); *Stauroidesmus convergens* (Ralfs) S. Lillieroth vars *laportei* Teiling, *pumilus* (Nordstedt) Teiling and *ralfsii* Teiling to *Stauroidesmus convergens* (Ralfs) S. Lillieroth; *Stauroidesmus cuspidatus* (Brébisson ex Ralfs) Teiling var. *canadense* G.M. Smith to *Stauroidesmus cuspidatus* (Brébisson ex Ralfs) Teiling; *Stauroidesmus cuspidatus* (Brébisson ex Ralfs) Teiling var. *curvatus* (G.S. West) Teiling to *Stauroidesmus cuspidicurvatus* Coesel et Meesters (27390490); *Stauroidesmus jaculiferus* (W. West) Teiling to *Stauroidesmus incus*

(Ralfs) Teiling var. *jaculiferus* (W. West) Coesel et Meesters (27390194); *Stauroidesmus inelegans* (West et G.S. West) Teiling to *Staurastrum inelegans* West et G.S. West (27381780); *Stauroidesmus grandis* (Bulnheim) Teiling var. *parvus* (West et G.S. West) Teiling (= *Staurastrum grande* Bulnheim var. *parvum* West et G.S. West) to *Staurastrum grande* Bulnheim; *Stauroidesmus extensus* var. *longispinus* (West et G.S. West) Teiling to *Stauroidesmus longispinus* (West et G.S. West) Coesel et Meesters (27380850); *Stauroidesmus lanceolatus* (W. Archer) Croasdale to *Staurastrum lanceolatum* W. Archer (27381790); *Stauroidesmus lanceolatus* (W. Archer) Croasdale var. *compressus* (West et G.S. West) Teiling to *Staurastrum compressum* West et G.S. West (27381720); *Stauroidesmus joshuae* (Gutwinski) Teiling to *Stauroidesmus extensus* (Andersson) Teiling var. *joshuae* (Gutwinski) Teiling; *Stauroidesmus minutissimus* (Reinsch) Teiling to *Staurastrum minutissimum* Reinsch (27381800); *Staurastrum omearae* (W. Archer) Teiling var. *minutus* (West) Teiling to *Stauroidesmus omearae* (W. Archer) Teiling; *Stauroidesmus pachyrhynchum* (Nordstedt) Teiling to *Staurastrum pachyrhynchum* Nordstedt (27381810); *Stauroidesmus phimus* (W.B. Turner) Thomasson var. *occidentalis* (West et G.S. West) Teiling to *Stauroidesmus phimus* (W.B. Turner) Thomasson (27390330); *Stauroidesmus sibiricus* (Borge) Croasdale to *Staurastrum sibiricus* Borge (27381850); *Stauroidesmus spetsbergensis* (Nordstedt) Teiling to *Staurastrum spetsbergense* (Nordstedt) Coesel et Meesters (27381870); *Stauroidesmus subpygmaeus* (West) Croasdale var. *subangulatus* (West et G.S. West) Teiling to *Staurastrum subpygmaeum* West var. *subangulatum* West et G.S. West (27381922).

p. 727. *Stauroidesmus subulatus* (Kützing) Thomasson var. *subaequalis* (West et G.S. West) Thomasson to *Stauroidesmus subulatus* (Kützing) Thomasson; *Stauroidesmus triangularis* (Lagerheim) Teiling var. *subhexagonus* (West et G.S. West) Teiling to *Stauroidesmus subhexagonus* (West et G.S. West) Coesel (27390530).

Additional Taxa

Anabaena azollae Strasburger (01290250) *Azolla* was mentioned in the freshwater algal flora of the British Isles, but not its cyanobacterial symbiont. As *Azolla* is widespread in southern England and occasional in some other regions, the symbiont is added now. The name most used in the past is retained, even though this probably does not reflect its true relationship.

Asterocapsa S.P. Chu (01860000) The Burren, Co. Clare. Reported by P. Doddy and C. M. Rohen and, based on images, confirmed by B. A. Whitton.

Gloeocapsa bituminosa (Bory) Kützing (01290090) On limestone at Haverbrack, Cumbria; 2009, A. Pentecost.

Gloeocapsa rupicola Kützing (01290110) Beesley Falls, Ingleton, Yorkshire, and elsewhere; 2009, A. Pentecost.

Gloeotheca abiskoensis (Skuja) Komárek et Anagnostidis (01300090) Littoral of Knipe Tarn, Cumbria; 2010, A. Pentecost.

Lynghya perelegans Lemmermann (01430300) Sprinkling Tarn, Cumbria; 2008, A. Pentecost.

Phormidium ingrediens Backhaus (01550250) Wansfell, Cumbria; 2012, A. Pentecost.

Phacus obolus Pochmann (04070400) Collected from Sand Spinney Quarry, near Cranford, Northamptonshire by Rachel Carter: March 2012, identified by K. Wołowski.

Dinobryon faculiferum (Willén) Willén (09230100): see Lang & Krokowski (2013b).

Ollicola vangoorii (W. Conrad) Vørs (09590010): see Lang & Krokowski (2013c).

Pseudostaurastrum limneticum (Borge) Chodat (10160030): see Lang et al. (2013).

Gloeochloris smithiana Pascher (10300010) Yardley Chase, Northamptonshire: April 2013, C.F. Carter.

Pandorina morum (O.F. Müller) Bory f. *major* Iyengar (16470012) Collected at Barton-under Needwood Quarry: June 2014, determined by C. F. Carter, R. J. Flower and D. Ryves.

Provasoliella lobata (Pascher) Ettl (16580010) Tarn Hows bogs, Cumbria; 2010, A. Pentecost.

Saturnella saturnus (Steinecke) Fott (18250010) Collected in Upper Teesdale by Jennie Beadle: April 2014, determined by Jeannie Beadle and C.F. Carter; see Beadle (2014).

Vitreochlamys ordinata (H. Skuja) A. Nakazawa in Nakazawa, Krienitz et Nozaki (16860030). Bryan Tarn, Cumbria: 2011 by A. Pentecost.

Desmatriactum spyrii Nicholls (17270020): see Lang & Krokowski (2013a).

Cosmarium laeve Rabenhorst var. *distentum* G.S. West (27051002) Collected near Chichester by H. Matcham and C.F. Carter: April 2014, determined by D. B. Williamson.

Oedogonium pachydermum Wittrock et P.Lundell ex Hirn (19020620) Collected near Chichester by H. Matcham: May 2014, determined by C.F. Carter.

Staurastrum anatinum Cooke et Wills var. *longibractiatum* West et G.S. West: reported from various sites in Scotland by West & West (1905, p. 504).

Staurastrum arcuatum Nordstedt var. *subavacula* (West) Coesel et Meesters (27380103): described by West (1892b, p. 732; as *Staurastrum arcuatum* ssp. *subavacula* West) from Harrop Tarn in the English Lake District.

Staurastrum avicula Ralfs var. *lunatum* (Ralfs) Coesel et Meesters (27380133): recorded by West & West (1894, p. 10; as *Staurastrum lunatum* Ralfs var. *subarmatum* West et G.S. West) from Derryclare Lough in Ireland.

Staurastrum bacillare Ralfs var. *undulatum* West et G.S. West (27380143): described by West et al. (1923) from Rhiconich, Sutherland, Scotland; according to Coesel & Meesters (2013, p. 69), 'an anomalous form of some other species'.

Staurastrum chavesii Bohlin var. *latiusculum* (West et G.S. West) Coesel et Meesters (27390540): described by West & West (1902, p. 53; as *Staurastrum latiusculum* West et G.S. West) from 'near Glenties', County Donegal in Ireland (see John et al. 2012).

Staurastrum controversum Ralfs var. *semivestitum* (West) Coesel (27381602); the basionym is described from Loughrigg in the English Lake District by West (1892, p. 732; as *Staurastrum vestitum* var. *semivestitum* West).

Staurastrum punctulatoides (West et G.S. West) Coesel et Meesters (27381820): basionym is from northern England (West & West, 1896, p. 158; as *Staurastrum kjellmanii* Wille var. *rotundatum* West et G.S. West).

Staurastrum tortum (Lagerheim et Nordstedt) West et G.S. West (27381900): originally reported by West & West (1912, p. 161) from a few sites in the British Isles while West's f. *trigona* is a synonym of the type according to Coesel & Meesters (2013, p. 160).

Stauroidesmus patens (Nordstedt) Croasdale var. *inflatus* (West) Coesel et Meesters: reported by West (1892a, p. 170; as *Staurastrum dejectum* Brébisson ex Ralfs var. *inflatum* West) from 'Derryclare Lough, Ballynahich (Co. Galway), Ireland'.

Stauroidesmus patens (Nordstedt) Croasdale var. *maximus* Teiling (27390324): doubt attaches to this variety.

Stauroidesmus patens var. *inflatus* is considered by John et al. (2013, p. 68) to be a synonym of the nominal variety unlike Coesel & Meesters (2013, p. 32), who recognize var. *inflatus* and exclude var. *maximus* believing the latter to be 'cf. *Std. patens* var. *inflatus*'.

Stauroidesmus subquadratus (West et G.S. West) Coesel et Meesters (27390540): basionym *Arthrodesmus incus* var. *subquadratus* West et G.S. West is reported by West & West (1897, p. 496) from Chobham Common in Surrey.

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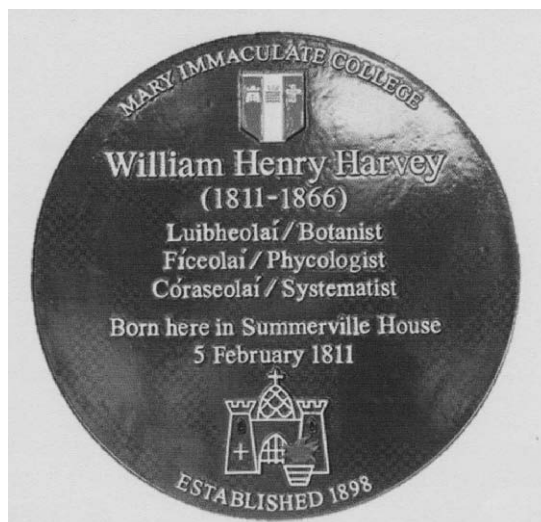
Limerick Birthplace of William Henry Harvey

A plaque was recently erected to commemorate the birth place of William Henry Harvey (1811-1866) at Summerville House, Mary Immaculate College, Limerick, Ireland. Harvey, the distinguished botanist and phycologist described 750 newly discovered species of plants and in excess of 75 genera of algae. He held many positions throughout his career including the position of Colonial Treasurer, Accountant General and Registrar of Deeds in the Cape Colony from 1835 to 1842. The plaque unveiling event was jointly hosted by the Geography and History Department at Mary Immaculate College, as Summerville House now forms part of the Limerick college campus.

Harvey was born on the 5th of February 1811, at Summerville House. His father, Joseph Massey Harvey and mother Rebecca Mark were members of the Religious Society of Friends, commonly known as Quakers. The Quakers played a significant role in Limerick's business and mercantile history in the eighteenth and nineteenth century. The Quakers arrived in Ireland from c. 1654 onwards following the Cromwellian Wars in England. They were a religious sect who objected to a hierarchical church and its taxes. They championed charitable causes and set up famine soup kitchens (c. 1841-1852) and campaigned for prison reform and the abolition of slavery. By the end of the seventeenth century it is estimated that there were approximately 3000 Quakers in Ireland predominantly located in Dublin, in Queen's County (Laois), King's County (Offaly), Wexford, Waterford, Cork, Limerick and in parts of Ulster. Detailed accounts were recorded of all Quaker activities, including, births, marriages and deaths as well as penalties imposed for non-payment of taxes and for other transgressions. Meetings were convened at local, provincial and national level and representatives were sent to annual meetings of Quakers in London. These structures and systems provided regular contact and promoted solidarity for members of the Quaker community from widely dispersed locations throughout Ireland.

The desire for denominational teaching led to the establishment of three provincial schools, Newtown (Munster), Mountmellick (Leinster) and Lisburn (Ulster). Many Quakers were particularly interested in the study of science and botany and many people associated with the gardens at Kew in London (Peter Collinson, John Bartram) and Glasnevin in Dublin (Lydia Shakelton) were of the Quaker faith. Members of the Harvey family were schooled at Newtown in Waterford where pupils were encouraged to pursue such practical scientific studies. Among its students in 1823 was William Harvey of Limerick who had assembled 'a collection of minerals, shells, and other curiosities'. This awareness of the value of scientific study was evident too in a petition to Parliament seeking funding for a University in Limerick drawn up by James Fisher and James Harvey (William's brother) and Limerick Chamber of Commerce in 1845.

From the middle of the eighteenth century in Limerick, Quakers were very active in the professional life of the city with business dealings and contacts with commercial



Plaque unveiled by Mr. Vukile Mdlalo, Chargé d'affaires with the South African Embassy to William Henry Harvey (1811-1866) Summerville House, Mary Immaculate College Limerick

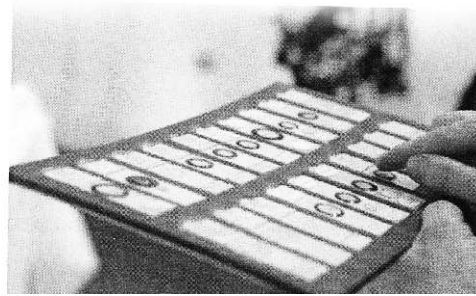
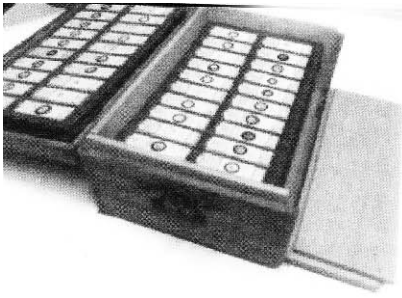
bodies such as the Chamber of Commerce and the Harbour Board. Evidence of their geographical impact on the city is demonstrated in an Ordnance Survey Map from c. 1840, which shows 'Harvey's Quay' while another map from 1870 records a large tract of land in Limerick named 'Quaker Fields'. A mark of Quaker achievements is evidenced by the acquisition of substantial houses, despite warnings on the dangers of attachment to worldly goods. Summerville House (Harvey's birthplace) is a Georgian country house built in 1786 on 'seven Irish plantation acres' on the banks of the River Shannon in County Limerick. The house was one of a number of substantial Quaker properties in the Quaker Fields area. The other houses included Richmond (owned by the Fisher family) and Laurel Hill (owned by Newsoms). Original Census of Ireland forms from 1901 have survived in their entirety and contain a wealth of information about Irish households. The 1901 Census Returns lists Summerville house as having 43 rooms. Enumerators, typically local police constables, went from house to house collecting the census forms from literate families, and filled in the required information for those heads of household who could not read and write. The number of windows (as there was a window tax) were also listed by census takers. Summerville is listed as having 20 windows.

Summerville was sold in 1879 to James Fitzgerald Bannatyne for £3000. In 1901 the house was purchased by Gerald E. Goodbody, an Offaly Quaker for £1900. It was eventually bought by the Catholic Sisters of Mercy in 1952 from the widow of James Goodbody. The Sisters of Mercy had established an institution dedicated to the professional training of female teachers for the Catholic national school system in 1898 in the 'Quaker Fields' area.

Summerville house remains relatively intact and includes three-sided canted bay windows, a tripartite round-arched window, with the added interest of some fine in-



Side view and rear elevation



Joshua microscope slide collection

terior detailing including many rooms with decorative plasterwork and cornicing, chimney pieces and embossed anaglypta/lincrusta paper frieze and ceiling panelling. Substantial modifications during its use for teaching purposes have included the division of the drawing room and the parlour as well as the removal of many fine fireplaces. The historic sash windows have been replaced with modern uPVC copies. The internal layout has greatly changed, for example a large reception area has been reconfigured to allow for extra rooms.

Following the death of his wife, Joseph Massey donated a portion of the 'Quaker Fields' land as a graveyard for the Quaker Society. It is here that he, his wife and several of their children are interred. William Harvey died in 1866 and is buried in Torquay, Devon, England. His grave was lost and only rediscovered in March 2009 (see Phycologist Newsletter No. 79 William Henry Harvey's grave rediscovered).

In 2000, a historical microscope slide collection of mosses, lichens and algae was discovered in the Geography Department of Mary Immaculate College along with a range of antique brass microscopes. The slide collection was assembled by William Joshua (1828-1898) a contemporary of Harvey. The collection contains 350+ microscope slides composed of 150 algae, 100 lichens, 40 marine algae and 26 fungi. Joshua is a less well known phycologist whose work has largely been forgotten. He worked on the geographical distribution of desmids, particularly in South East Asia. The pinnacle of his work came between 1882-1886, in a collection of papers based mostly on British and Asian desmids. In these essays he described 142 rare or news species, 11 of which were sent to him from foreign correspondents. The last of these papers was the

most significant, describing some 38 new desmid species and 8 new varieties in Asia, demonstrating his influence on desmid taxonomy. The provenance of the Joshua slide collection has not been determined and this poses the intriguing question as to whether Harvey and Joshua were acquainted with each other. Summerville House is still extant and as the birthplace of Harvey it presents us with a physical reminder of the distinguished scientist. It is fitting that the house continues to be a location that fosters and encourages academic inquiry. Additionally the Joshua microscope slide collection provides a tangible insight of the research of a nineteenth-century scientist. Together they constitute Limerick's links with the historical age of scientific discovery.

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Ralph Lewin

Ralph's two poetry books are now available online on Internet Archive. There is also a compilation of his verses on various topics put online in 2008, shortly before he passed away.



Links to the Internet Archive are below:

1. The Biology of Women (1983)
https://archive.org/details/LewinBiologyOfWomen_201306
 2. The Biology of Algae and Diverse Other Verses (1987)
<http://archive.org/details/LewinBiologyOfAlgae>
 3. Collection of hitherto unpublished verses (2008)
http://www.archive.org/details/Verses_260
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Book Review

Freshwater Dinoflagellates of North America by Susan Carty, published 2014 by Comstock Publishing Associates, Cornell University Press, Ithaca and London

This book is a taxonomic guide to the freshwater dinoflagellates of North America and is a valuable compilation of Susan Carty's dedicated fieldwork across America researching the group, brought together with their scattered literature. She sets out in her preface that her aspiration for the work is to '*make dinoflagellates less intimidating*' and to '*make their identification easier for people looking at water samples*'. Her hope is that in doing this she will encourage research on freshwater dinoflagellates to fill some of the many gaps in our knowledge. The introduction starts by highlighting those gaps in our knowledge, then reviews North American research on the group and finishes with summaries of dinoflagellate biology, collection, observation and culture methods and an introduction to their taxonomic features. Three keys to the genera begin the taxonomic section followed by generic and species descriptions. She notes that 'higher levels of classification above genus are too uncertain' and so the organisation of the book is confined to genera and species. Descriptions are divided into athecate/naked taxa and thecate/armored taxa, genera being organised in alphabetical order in each section. Appendices cover documentation of taxa by location, geographic references by location and latin diagnoses and other technical issues. A glossary completes the volume.

Of the introductory material, I found the initial taxonomic summary particularly helpful – with the burgeoning reclassification of freshwater species through molecular and detailed ultrastructural investigations there has been a large amount of change in nomenclature in the last ten years or so and here the author clearly states which conventions she is following and why.

The keys to genera start with a 'classic' key, laid out traditionally using straightforward, clearly articulated morphological features (previously explained in the introduction). I found the key simple to use and the genera I tested keyed out easily and accurately. The second key started less traditionally with habitat, I liked this approach and this key also worked well for me but sadly it did not include *Ceratium*. The final

key to 'common or easy-to-identify freshwater species' (15 species in total) was an over simplification for my taste and although preceded by a warning to the reader I imagine might lead the unwary to overlook some possibilities. In summary the keys should straightforwardly lead even those unfamiliar with the group to the descriptions they require.

So to the meat of the book. Each genus includes a key (where required). Species descriptions include morphological (internal and external), ecological and geographical details, illustrations from the literature, author's sketches and where available light (back and white and colour images) and scanning electron micrographs and this richness of information in one place I found extremely helpful. Terms I checked were included in the glossary and so I imagine descriptions would be accessible to all and notably without the need for compiling obscure additional reference material. The geographical information included with each species is also particularly valuable. I struggled with the acronyms for locations (I imagine this would not be a problem for North American colleagues) and I have found it easier to annotate my copy to clarify this for myself. I do hope this database will act as encouragement to phycologists working in America to record and expand knowledge of species distributions. A legitimate question might be: does the geographic focus of the book limit the relevance to those not on that continent? I think not, with the dearth of literature on freshwater dinoflagellates, I anticipate this book will be a useful reference for phycologists from around the world.

So has the author achieved her aim of making dinoflagellates more accessible? I believe she has, but the final judgement on that has to be from those less familiar with the group than I. I would certainly recommend the book to any with an interest in identifying freshwater dinoflagellates and I join with the author in encouraging you to find out more about them!

Jane Lewis
The University of Westminster

Algaculture for Biotechnology CPD Course

Course Leader: Dr John Day; a leading international authority on algal biotechnology. Curator of CCAP since 1990; he has particular interests in algal biotechnology, biofuels and bioinformatics.

Dates:

27th-28th October 2015

Debatably the most diverse group of organisms on earth and responsible for the oxygen in every second breath you take; algae are still relatively untapped in terms of biotechnology. If you're currently working in algaculture, biotechnology or biofuels, or you require an understanding of the incredible potential of algae and phytoplankton, this two-day course provides a solid introduction for you.

Who is it for?

It's been designed particularly for early career researchers and PhD students wanting to get the most from their projects. It's also perfectly suited to laboratory technicians and experienced researchers moving into algal biotechnology.

What will I learn?

- Algal biodiversity, nutrition and photosynthesis. This will cover both micro and macro-algae.
- The afternoon of Day 1 will be spent in the laboratory with CCAP; with practical algaculture sessions on isolating, maintaining and enumerating algae.

- An introduction into algaculture for biotechnology and what the future may hold.
- Phycology and genomics, followed by a session specifically looking at biofuels.
- The whole afternoon of Day 2 will be spent in the laboratory and will finish with a session on mass algaculture.

The course is recognised by the Institute of Marine Engineering, Science and Technology (IMarEST). Attendance counts towards your Continuing Professional Development for both the IMarEST and The Science Council's accolade of Chartered Scientist (CSci).

Price:

£395 (VAT exempt) including all course materials and lunch on both days.

Booking Information & Contact Details:

Course Outline: <http://www.sams.ac.uk/education/short-courses/algaculture-for-biotechnology>

Online Booking: https://payments.sams.ac.uk/index.php?route=product/product&path=59&product_id=61

Email: SAMScourses@sams.ac.uk

Call: 01631 559000

Introduction to Molecular Methods for Algae Research CPD Course

Course Leader: Dr David Green who has extensive experience in molecular microbial ecology and bioinformatic analysis.

Dates:

29th-30th October 2015

Focusing on laboratory and bioinformatics skills relevant to algal research, this two-day course introduces up-to-date molecular approaches to investigate the biology and ecology of algae in coastal and ocean habitats from the tropics to the poles. The course addresses practical information and modifications to standard molecular protocols required to achieve success with algal material.

Who is it for?

It is ideally suited to PhD students, laboratory workers and researchers wanting to start applying molecular methods in their algal research.

What will I learn?

- Comprehensive introduction to theory "how, what and when" of DNA extraction with a specific focus on the unique challenges of working with algae, and consolidated with 4.5 hour hands-on laboratory practice.
- Comprehensive introduction to the theory and practice of the Polymerase Chain Reaction (PCR) and protocols for PCR cloning, and the power of quantitative PCR for relative and absolute quantitation of genes or gene expression.

- Comprehensive introduction to bioinformatics emphasising available software and databases, coupled with a 3 hour hands-on exercise assembling and manipulating algal DNA sequence data and phylogenetic analysis.

The course is recognised by the Institute of Marine Engineering, Science and Technology (IMarEST). Attendance counts towards your Continuing Professional Development for both the IMarEST and The Science Council's accolade of Chartered Scientist (CSci).

Price:

£540 (VAT exempt) including all course materials, laboratory equipment and lunch on both days.

Booking Information & Contact Details:

Course Outline: <http://www.sams.ac.uk/education/short-courses/algae-research>

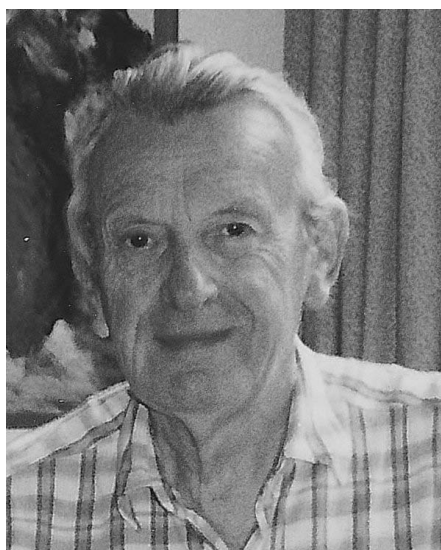
Online Booking: https://payments.sams.ac.uk/index.php?route=product/product&path=59&product_id=62

Email: SAMScourses@sams.ac.uk

Call: 01631 559000

Obituary

George W. Lawson 1926-2014



George Lawson, who died on the 18th August in London aged 88, spent almost 35 years in Africa before retiring in 1987 and settling in London. During his years in Africa George held four professorial appointments, pioneered research on West African shore ecology and was a leading authority on the taxonomy, ecology and biogeography of West African seaweeds. He co-published three books on West African seaweeds and in the 1960s began work on a critical assessment of the taxonomy and distribution of West African seaweeds that took almost 40 years to complete. His interest in terrestrial plant communities led to him to co-author papers on savannah and forest ecology and to write a popular book on plant life in West Africa. Shortly before returning to the UK George used his considerable knowledge and many contacts to compile 'Plant Ecology in West Africa Systems and Processes', this book was the first authoritative account of the region's aquatic and terrestrial communities along with processes occurring within them. After leaving Africa George spent over 20 years in the Department of Botany at the Natural History Museum (NHM) in London where he continued working on African seaweeds as a Scientific Associate and Honorary Research Fellow. In recognition of his contribution to African botany George was awarded a DSc in 1988 by London University.

George was born on the 18th of April, 1926 at Sunderland in the North East of England. During the Second World War he worked in the office of a shipyard and from there went to work in the office at a local coal mine during which time he undertook intermediate exams in order to gain admission into a university. At the age of eighteen George joined the army and in 1948 went to King's College, London after completing his National Service and from where he obtained a BSc in Botany/Biology. After graduating in 1951 he travelled to West Africa to take up

a lectureship in botany at the newly established University of the Gold Coast (now Ghana). Over the next three years George undertook the first comprehensive investigations of intertidal ecology in West Africa and for which he was awarded a PhD at the University of London. There followed visits to other West African countries (Cameroon, Sierra Leone) to carry out further shore studies and in 1957 George spent several months as a visiting professor at Cape Town University in South Africa. George published in 1966 a review of the littoral ecology in West Africa that firmly established his reputation as one of the leading authorities on shore ecology in the regions.

George became Professor of Botany in 1962 and so began a particularly active period in his life, co-authoring several papers with his staff including ones on savannah and forest communities. His knowledge of terrestrial plants and travels to other parts of Africa were put to good use when he wrote 'Plant Life in West Africa', published by OUP in 1968 and essential reading for anyone requiring a general introduction to the flora of the region. It proved so successful that a revised edition was published 20 years later by Ghana Universities Press. George held several important appointments, including chief examiner in biology for the West African Exams Council (1957-1963), Vice Master of Commonwealth Hall (1961-1964), Chairman of the Terrestrial Division of the International Biological Program (1967-1972), Chairman of the Volta Basin Research Project (1963-1969) and was external examiner for several African universities (Fourah Bay College, University of Sierra Leone; Makerere University, Uganda; University of Tanzania, Dar es Salaam; Ibadan, Calabar, Jos and other universities in Nigeria). George did much to build up the national herbarium in his department and began in 1968 a project to monitor tree growth at an agricultural research station at Kade, now one of the longest monitoring projects on tropical forest trees in the world.

I first met George in 1968 at Durham University when completing my PhD and trying to decide whether to accept a lectureship in his department. George turned up unexpectedly and his very engaging manner, personal charm and persuasive arguments soon dispelled my doubts and misgivings. The two of us undertook shore surveys in Togo and Benin (formerly Dahomey) just prior to George leaving Ghana in 1971 to become Professor of Botany at the University of Nairobi in Kenya. Before departing he was able to secure funding from UNESCO that enabled us to spend the next 10 years surveying the shores of countries lying between Western Sahara (formerly Spanish Sahara) in the north and Namibia in the south along with some of the island lying off the West African coast. George was a good companion in the field and enjoyed spending long days clambering over rocky shores never before visited by intrepid marine botanists only provided the day began with a hearty breakfast washed down by several cups of tea!. He was not discouraged visiting countries considered to be 'war zones' if they were known to have rocky shores.

On one occasion we were captured by the Polisario Front guerrilla's when in Spanish Sahara, but George was able to persuade our captors to allow us collect on the shore under armed guard until they decided what to do with us. On another occasion we were left suspended in our car over a ravine in Gabon when a bridge collapsed, but George persuaded local people to retrieve the car and take us to Cape Shilling to continue our survey. Our expeditions resulted in many publications and led to the writing of 'The Marine Algae and Coastal Environment of Tropical West Africa', the first edition of which was published in 1982.

George spent two years at the University of Nairobi in Kenya (1971-1972), followed by a short time as a visiting professor at the University of Tanzania and a year on an Inter-University Council Resettlement Fellowship at the University College of North Wales in Bangor. He returned to Africa to become Professor of Biology (1976-1979) and Head of Biological Sciences (1979-1982) at the University of Lagos in Nigeria, followed by a 5-year appointment as Professor of Biological Sciences at Bayero University in Nigeria. George retired from university life in 1987, settled in London the following year and became a Scientific Associate in the Department of Botany at the NHM.

We collaborated for the next two decades on several major projects, including completing a critical assessment of the taxonomy and distribution of West Africa seaweeds that had been begun by George in the 1960s in collaboration with Jim Price who at the time was the Head of the Algae Section at the NHM. The series would not have been completed but for George deciding to become computer-literate and spend the years following Jim Price's retirement in 1992 transferring all hard copy entries into an electronic form. He was largely responsible for seeking the assistance of other specialists hence parts of the West African seaweed project were co-authored by William Woelkerling, Willem Prud'homme van Reine, Christine Maggs and T.B. Kosterman. George pioneered the use of detrended correspondence programme to analyse distribution patterns of West African seaweeds and those in the Southern Oceans. He also co-supervised the work of the Darwin Initiative Fellow (Dr Gabriel Ameka) from Ghana who co-authored 'The Marine Macroalgae of the Tropical West Africa Sub-region'. Over wrote or co-authored more than 70 publications including research papers, books and review articles dealing primarily with the shore ecology and seaweeds of Western Africa and offshore islands. One new genus (*Basispora*) and seven species were described by George and the following algae were named after him: *Botryocladia lawsonii*, *Eunotia lawsonii*, *Navicula lawsonii* and *Pinnularia lawsonii*.

George was charming, courteous, had a well-developed sense of humour, possessed a sharp intellect and a gift for writing clearly and concisely, often put to good use when we were writing review articles and books. One of George's great strengths was his understanding of the importance of both passing on knowledge and encouraging a new generation of researchers. He was an excellent teacher and much respected by his students, especially his postgraduates to whom he devoted a great deal of time. In his youth George was very active and enjoyed walking, cricket and climbing, liked classical music and acting, was interested in art, enjoyed travelling and even wrote a

collection of what he termed 'Variegated Verse and Ribald Rhymes'. During his time in the NHM George was a popular member of the botany department which he visited at least two days a week until his health began to fail. George enjoyed joining in all staff activities, including social events and regularly attending seminars. He developed vascular dementia and moved into a nursing home in 2011 and sadly died in Charing Cross Hospital a few days after suffering a stroke.

George is survived by Norma Peacock, his partner of almost 30 years, and son Lawrence and daughter Penny Dravers.

Some Key Publications

Books

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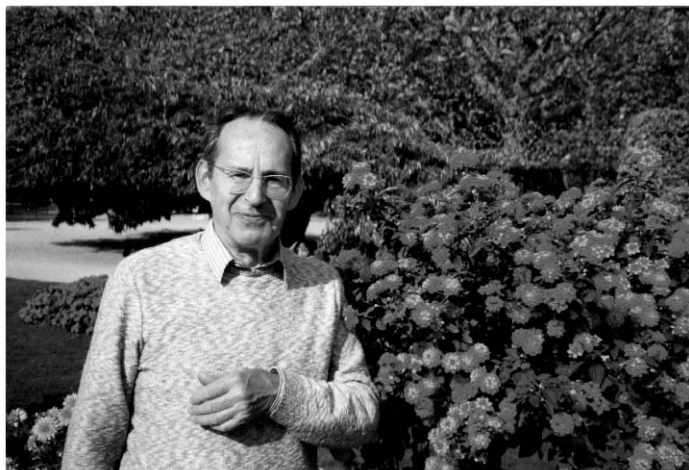
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Professor Francis Magne



Taken from Algae-L

Professor Francis Magne passed away on 22 May 2014 in Yerres aged 91; he was born on January 19, 1924 in Paris. He ended his career as a faculty member (teacher & researcher) in 1992 at the University P. & M. Curie, directing the laboratory “Marine Plant Biology “[Biologie Végétale Marine, “BVM”], created by Professor Jean Feldmann.

Francis Magne had an exemplary career having participated in the three French educational levels: primary school, secondary school and university, during a particularly difficult period of history. After being awarded the diploma of primary school teacher (1943), he obtained his degrees at the Sorbonne (1945) while monitoring externship Turgot high school, where he met Marius Chade-faud; the two became fast friends and Chade-faud helped him throughout his scientific life. Francis then obtained a Diplôme d’Etudes Supérieures, the gateway to sit the tests of aggregation. He was brilliantly received (1948) in this contest, the royal road to teaching in high schools and, therefore, he was assigned as a high school teacher at Colmar and Sceaux. By October 1951, he began his career in higher education being appointed assistant at the Sorbonne, where Jean Feldmann already taught.

Shortly after his appointment, Francis Magne began to frequent the Biological Station of Roscoff to carry out his research. He was appointed there, in October 1954, because, the director of the station, Georges Teissier, although a zoologist, wanted to encourage studies on marine algae. Francis Magne was therefore involved in teaching botanical courses while also assuming the functions of effective and rigorous manager! In 1956, he collaborated with J. Feldmann to launch the organization of specialised courses marine biology. His personal research on algae, resulting in a remarkable thesis at national and international level.

In October 1965, he was appointed at the Faculty of Rennes-Beaulieu and then, in October 1971, at the University of Paris VI-Jussieu (later the University P. & M. Curie). In the latter, he was responsible for coordinating the

teaching of botany while continuing his research. In 1976, F. Magne succeeded J. Feldmann and became the Head of the laboratory “BVM” until his retirement in 1992. Unfortunately he had the sad duty, following new research policies, of closing the “BVM” which had been internationally recognized for having renewed phycology in France for over than 40 years.

Francis Magne was a world-renowned researcher especially for his contribution to the knowledge on life cycles of red algae. His thorough observations followed by rigorous analysis, led to conclusions that have revolutionised concepts conventionally accepted before him.

An overview of the main themes he explored was provided by Professor Michael Wynne to accompany the publications dedicated to F. Magne on the occasion of his 75th birthday (*). A complete list of publications of Francis Magne is being compiled at the National Museum of Natural History in Paris by D. Lamy & L. Le Gall together with a more complete evocation of his career by R. Delépine & L. Le Gall to be published in *Cryptogamie Algologie*

His qualities as a teacher have always been appreciated. With a clear mind and strong teaching skills, he motivated many generations of students on botany and phycology. He handled the French language with extreme precision, continually seeking the right word and thus had a recognisable diction.

Everything he conducted was thoughtful and completed in the best way. He was a talented handyman and had a passion for doing things well. Numerous practical achievements demonstrate his skills such as his homemade “camper van” so useful for phycological surveys or for some “gourmet” picnics with friends, or the instrument development in his own lab or those given as gifts to colleagues or even his interest and success in the maintenance of a large garden and plant nature in general. His passion for fishing and deep knowledge of trout rivers in Brittany is well known as was his taste and proven expertise in the kitchen that he loved to share; he also had a great address book of places of good cheer. In daily life, he showed the same qualities of rigour and detail, which often led to defend his ideas with great tenacity.

These human aspects of his personality conferred him a great popularity among colleagues, students, employees, even non-scientific neighbors around his residence.

Naturally generous, he was involved in the Secours Catholique to help the most deprived. He was an active member of the Société Phycologique de France of which he was President for several years.

(*) Wynne M. J. Francis Magne : a tribute. *Cryptogamie Algologie* 2000. 21(2) p 93-95

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