International Bryozoology Association

Bulletin

Volume 13 Number 3 December 2017

Tim Wood, President
Catherine Reid, Secretary
Abigail Smith, Treasurer
ISSN 1941-7918

Comments regarding this Bulletin should be addressed to the IBA Secretary: catherine.reid@canterbury.ac.nz
Copies of the Bulletin are archived at the Natural History Museum London.

Further information at http://www.bryozoa.net/iba/index.html

NEW MEMBERS

Jaap Eyzenga – I was I recommended to join the IBA by Dr Caroline Buttler after contacting her about *Sceptropora*. I am a collector of fossils, especially material from Estonia and surroundings, because we find this material nearby. I would like to know whether there are people in your group that have any knowledge of this type of bryozoan (*Sceptropora* by Ulrich, 1888).

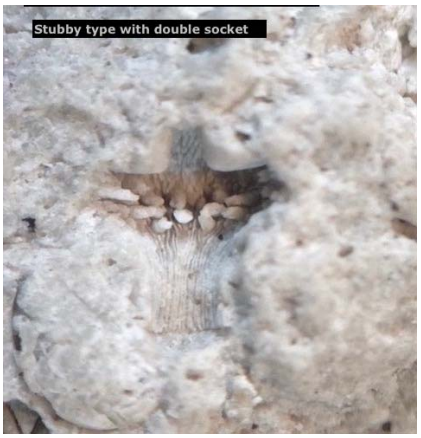
I am trying to write an article about *Sceptropora* findings in erratic boulders from a location in Holland. Mostly Ojlemyr flint, but also other types of Ordovician material from Baltoscandian origin. (Pirgu F1c - Haljala D1, C3 material from Estonia probably Eridanos transport to Holland). My first finding of *Sceptropora* facula (Ulrich, 1888) was in a small boulder, type; hard ground-Ordovician 'baksteenkalk'. with 7 specimens in a row and two of them with the joint still in the socket. Later I also found specimens with two sockets. According to several studies, *Sceptropora* has about 8 similar types and forms. Others differ enough like *S. spinoza* and *S. florida,* found and described by Kiepura, in Poland.

My problem is, that I find in the same boulders, several types of *Sceptropora*, I would like to know more about the difference between the *alata, accepta, humilus, orientalis* and others found and described by Gorjunova, 1985 and Premik,1924. The type I find the most is the slender model looking like an umbrella. Others are far more stubby and have a larger joint and a deep socket. Some are straight and have less apertures on the top.

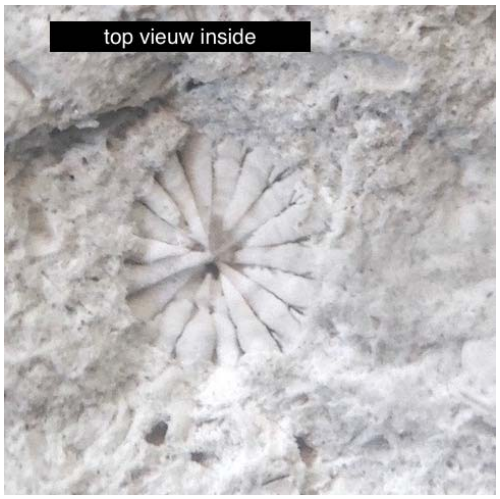
I studied several writings like:
Bolton & Ross (Sceptropora from Upper Ordovician rocks of Mackinzie), Ray S. Bassler (Early Paleozoic Bryozoa of Baltic provinces), K. Brood (Norsk Geologisk Tiidskrift), M. Kiepura (Acta Palaeontologica Poland), R. Schallreuter (Geschiebekunde Aktuell 1986 Heft 2).
I already had contact with: Dr Paul Taylor, Jan Ove Ebbestad and Dr. Andrej Ernst. Dr. Ernst did send me a translation from Gorjunova (985) but the images/discriptions are not much of a help.

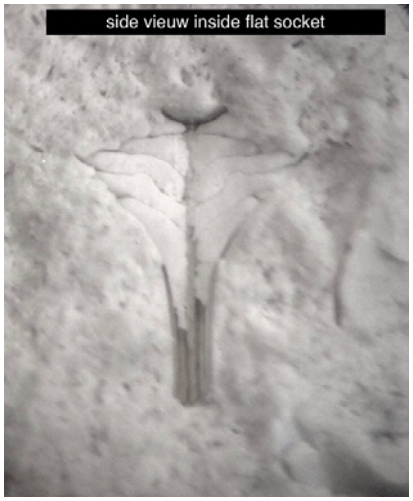
If any IBA members have any knowledge of these other types or give me direction to where I can find descriptions or bring me in contact with people, I would be very interested to hear from you.
Below are some pictures of my findings. All specimens from my own collection. New findings on *Sceptropora* in material I collected last week (Brown Pirgu hornstone) include *S. facula, S. spinoza* and *S. estoniensis* all in the same boulder.

Jaap Eyzenga
rjeyzengazielhuis@chello.nl



8 specimens (mould) of *S.facula* in a row.





Editors note – Text and images supplied by Jaap Eyzenga and complied, edited and images arranged by newsletter editor.

NEWS FROM THE MEMBERSHIP

Blanca Figuerola. I am really pleased to inform you that I started a postdoc at the Smithsonian Tropical Research Institute under the supervision of Dr Aaron O'Dea (odealab.com). During these first weeks, I immersed in the world of paleontology and I enjoyed time and interesting meetings with Aaron and other members of his great team, Brigida de Gracia, Dr Chien-Hsiang Lin, Dr Michele Pierotti and Abhy Verdurmen. Now we selected a Panamanian student, Ramiro Solís, who will help us in this project and a new lab manager will be selected in the next weeks. So the O'Dea team is growing fast and I am really happy to be on board as the lab environment is excellent. During one year and a half, I will be focusing in a project that aims to use microgastropod (<5 mm in size) assemblages as proxies for environmental change. Microgastropods are useful indices of reef health because they possess a wide range of feeding modes and life habits, their remains persist in the sediment for long periods of time, and they small and abundant components of many marine benthic communities. They are also generally short-lived animals with fast turnover, meaning they respond to rapid and short-lived environmental changes.
Although I will be working on microgastropods, I will also be finishing several pending studies on bryozoans and hopefully I will convince Aaron to start working on bryozoans again. Exciting times are coming!

Lee Hsiang Liow - Oslo BLEED (Bryozoan Lab for Ecology, Evolution and Development) updates: Arthur Porto from Brazil joined Kjetil Voje this September on a 2-year postdoctoral project on bryozoan phenotypic evolution. Emanuela Di Martino visited us for a couple of days in October to work with us on overgrowth interactions while Andrea Waeschenbach stayed with us for a week to work on a phylogeny paper in November with me and Russell Orr. Russell is official new BLEEDer-on-the-block, funded by the European Research Council (ERC). Welcome to the bryozoan-side (from the protist-side)! I finally received my shiny new Desktop SEM (the new Hitachi TM4000PLUS), and it is operational! Please visit us to try it out! If you are thinking of visiting and would like to bring BLEED some presents, we really love Microporella, Parasmittina and Steginoporella, dead or alive, wet or dry, in all quantities. If you don't have time to visit us soon, please do get in touch if you have material for us. In the meanwhile, since Andrea and I are working on building a cheilostome family backbone phylogeny, weird genera are welcome as well, please get in touch with Andrea or myself. Check out our new lab website: https://bryozoanlableed.wordpress.com and logo.

Andrea and Russell working at Lee Hsiang's humble abode on a forthcoming phylogeny.

– Lee Hsiang Liow (l.h.liow@ibv.uio.no)

Abby Smith - BRYOZOANS ON NZ TV! The respected natural history documentary series "Coast" has been filming its second season in New Zealand recently, and it looks like Bryozoans will have their 15-minutes-of-fame soon. Abby Smith and Katerina Achilleos were busy explaining the wonders of bryozoans to film-makers for several days in November. When it comes out, we'll let you know!

Seabourne Rust welcomed a visit from Dennis Gordon earlier in the month, relishing the chance to get into the field and show him the Early Miocene fossil locality near Taita Stream in Hokianga, northern New Zealand; that has been yielding a diverse bryozoan fauna. Dennis and Seabourne have been working on this collected material for some time and presented some findings at the last Australarwood meeting in Wellington last February. Also, they are planning to revisit and continue detailed study of Late Eocene bryozoans from Oamaru, North Otago, NZ, together with Daphne Lee from the University of Otago.

Zoya Tolokonnikova - During 15-22 August with great pleasure I took part in International conference and field trip to the Upper Devonian and Carboniferous reef buildups and boundary stratotypes in Bolshoi Karatau Mountains (Kazakhstan) (Fig. A). The various and numerous bryozoans were collected in several cuts of Famennian-Visean deposits (Figs. B, C). All of the collected material went to Krasnodar for further study. Also for participants of field trip were organized excursion on cultural objects of South Kazakhstan (Fig. D).

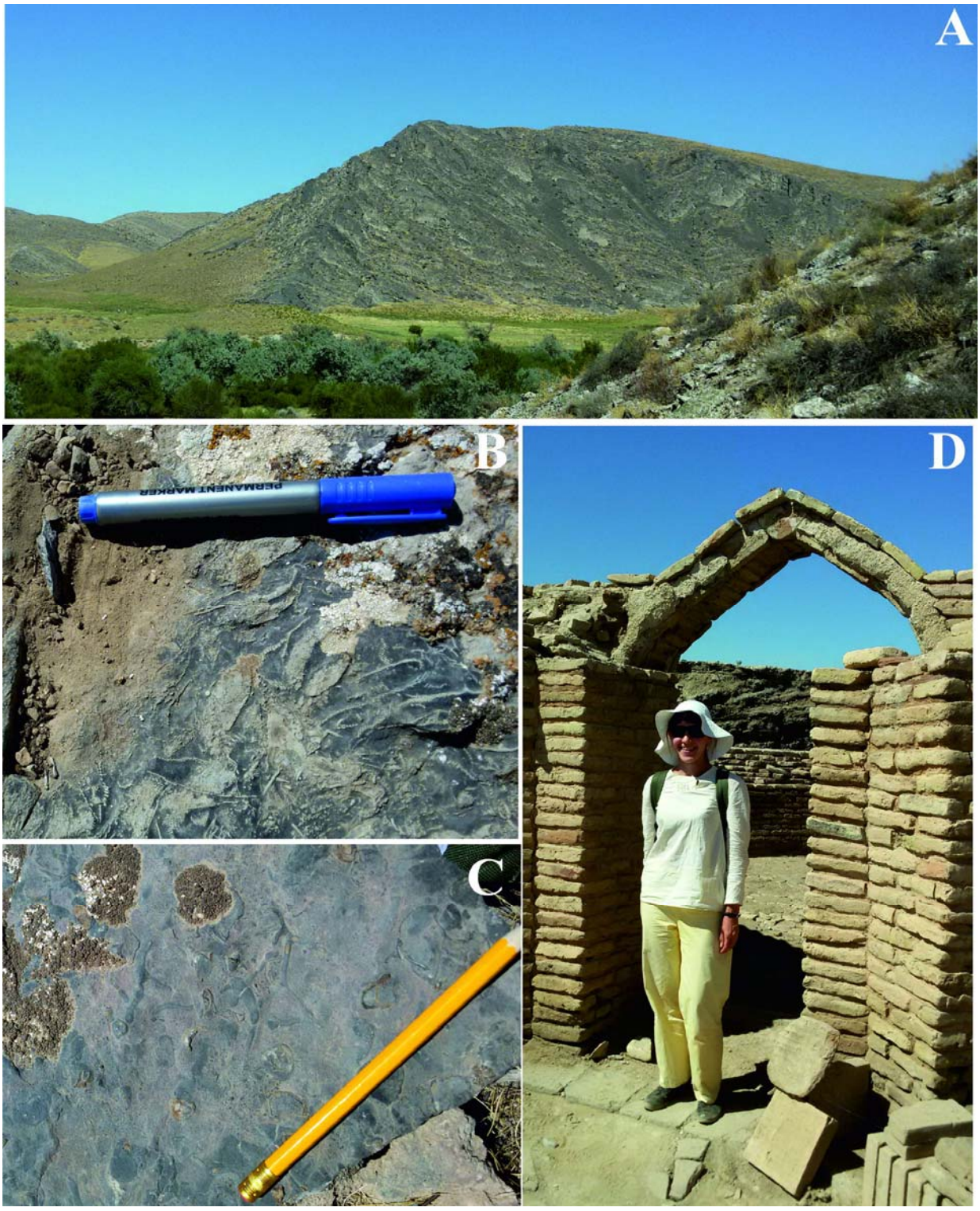


Figure captions:
A – view on the Tournaisian-Visean deposits in surroundings of Akuyuk cut, B – Fenestrate bryozoans in Akuyuk reef (Visean), C – Trepostome bryozoans in Zhanakorgan cut (Famennian), D – Sauran settlement

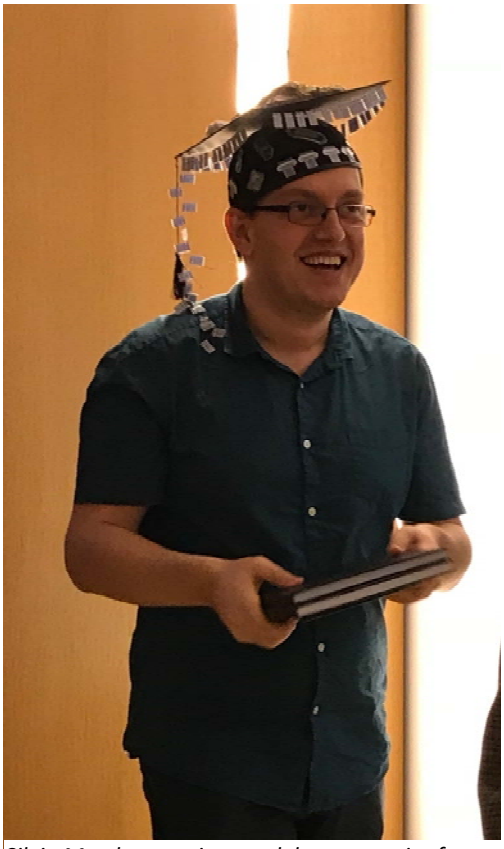
NEWS FROM NHM BRYOEVOL

Andrea Waeschenbach

The first six months of the Leverhulme Trust-funded project *Molecules meet fossils – an integrated approach to studying palaeodiversity* by **NHM BryoEvol** have been eventful, productive, and not least fun, thanks to the support and collaboration we have enjoyed from the IBA community. Below is a recap of what's been happening:

Dr Silviu Martha

We are happy to announce that **Silviu Martha** successfully defended his PhD thesis on the *Tectonometamorphic and magmatic evolution of the Uppermost Unit in the southern Aegean (Cyclades and Crete)* at the University of Frankfurt. This now makes him officially a post**doc** at the NHM!



Silviu Martha wearing a celebratory attire for the happy occasion of his PhD defence.

Fieldwork and museum collections visits

One of the main goals of our project is the production of a time-calibrated family-level molecular phylogeny of cheilostome bryozoans, for which we need either fresh or ethanol-preserved specimens. Our thanks goes to all who already provided us with material: **Piotr Kuklinski** generously made available for us brilliantly preserved material from Antarctica and the Arctic; **Gosia (Malgorzata) Krzeminska** subsampled the Icelandic BIOICE fauna for molecular specimens, which were identified by **Peter Hayward** some 20 years ago and are held at the Icelandic Institute of Natural History – thanks also to **Guðmundur Guðmundsson**, Deputy Director of the Icelandic Institute of Natural History and Curator of Marine Invertebrates, for making available this material; **Dennis Gordon** and **Abby Smith** have provided specimens from New Zealand; **Joanne Porter** braved the cold waters of Western Scotland to collected specimens; **Jean-Georges Harmelin**, the IBA's very own 'Jacques Cousteau', collected specimens from the Mediterreanean; **Blanca Figuerola** and **Conxita Avila** (University of Barcelona) are making available specimens from Antarctica**, Björn Berning** will be providing specimens from the Portugal, Azores, Croatia and other places, and **Andrey Ostrovsky** will be collecting specimens during his upcoming trip to the Philippines.

But no project is complete without getting your hands dirty, which is why we were delighted to conduct **fieldwork** in **Brazil** and **South Africa**. In July **Joanne Porter** and **Andrea Waeschenbach** were hosted by **Leandro Vieira** and his students **Carol (Ana Carolina) Almeida** (and her students **Jamile Farias** and **Alisson Santana**)**, Adelia Alliz, Francisco das Chagas Silva Neto** and **Gustavo Barbosa**. The first part of the trip, led by **Carol Almeida**, was conducted on intertidal shores around Salvador, Bahia State, and the second part was done in Pernambuco State, around Recife, which is **Leandro's** territory. In addition to freshly collected material, Carol kindly made available specimens that she had collected previously at Casco Reef and Leandro provided us with samples he had collected previously in Paraiba, Alagoas and Espirito Santo States. Thanks to the amazing and tireless effort of everyone involved, and to the remarkable taxonomic expertise of Leandro and Carol, we assembled for DNA sequencing 242 specimens of an astonishing ~120 bryozoan species!

Collecting localities in Brazil. Localities in italics had previously been collected by Leandro and Carol.

The Brazilian Bryozoan Bonanza team ready is to roll. From left: Alisson Santana, Andrea Waeschenbach, Joanne Porter, Leandro Vieira, Carol Almeida, Adelia Alliz, Jamile Farias.

The team is getting ready.

A brief moment of rest for Carol.

'It's behind you, Jo!'

Reptadeonella brasiliensis *covering a rock at Itapuã beach.*

More encrusters on Itapuã beach.

A nice mix of sponges, hydrozoans and bryozoans.

The team at work in the Salvador lab.

Our fearless leader Leandro doesn't lose his sense of humour even after simultaneously injuring his knee and right thumb!

A great find for the phylogeny: Arbocuspis bellula *from Itapuã beach; arrow indicates the intertentacular organ!*

A new species of Amathia *with non-constant tentacle numbers - a first for this genus.*

Another fantastic find for the phylogeny: Pasythea tulipifera - *the only representative of Pasytheidae in our tissue collection for DNA sequencing.*

The first in a trio of seminars at the Universidade Federal da Bahia, Salvador: Jo talking about biofouling on marine renewable energy infrastructure.

A lively and engaging bryozoan lecture in Portuguese by Leandro.

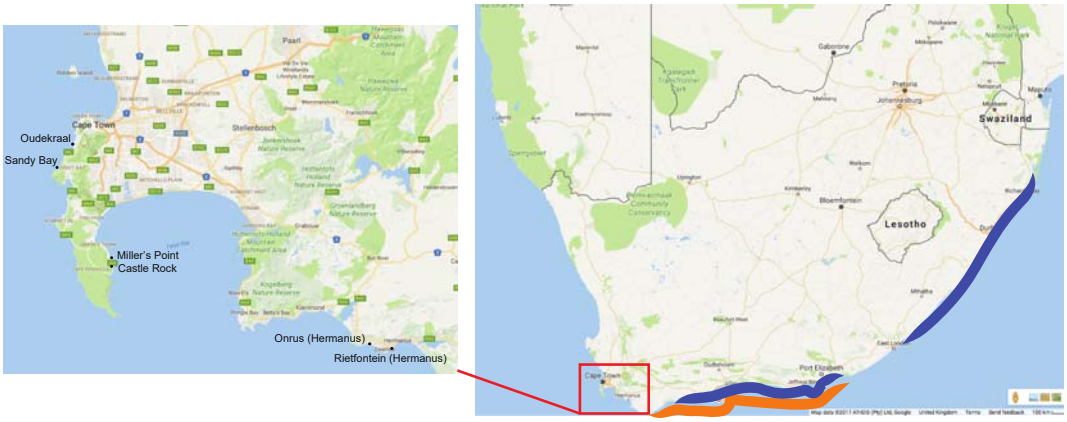
And to finish off, Andrea talking about building the bryozoan tree of life.

Getting ready for fieldwork in Pernambuco. From left: Joanne Porter, Carol Almeida, Gustavo Barbosa, Leandro Vieira, Andrea Waeschenbach, Adelia Alliz.

The end of a great trip!

The best hotel in town! A big 'Thank you' to Leandro and his wife Leila for hosting Jo and Andrea

Moving continent… A couple of months later during September, **Helen Jenkins** and **Andrea** were fortunate enough to be hosted in **South Africa**, by **Wayne Florence** and **Albé Bosman** (Marine Invertebrates Collections Manager, Iziko Museum), spending two weeks collecting bryozoans on and around the Cape Peninsula. They were aided in their quest for a bryozoan bounty to rival that from Brazil by diver **Delphine Thibault**, a cnidarian researcher associated with Aix-Marseille Université in Marseille, and skipper, **Chris Wilkinson** from the Whale Unit, University of Pretoria. Utilizing a combination of boat and shore dives, intertidal collecting and snorkelling, bryozoans were collected from both the warm waters of False Bay and the cool waters of the Table Bay-side of the Peninsula, as well as south-east of Cape Town around Hermanus. In addition, Wayne allowed us to subsample his 70% ethanol collection from the shallow waters (<30m) off the south & east coasts and his frozen collection of deep sea samples collected off the south coast. **Helen** is currently testing the DNA quality in these samples and it's looking promising.

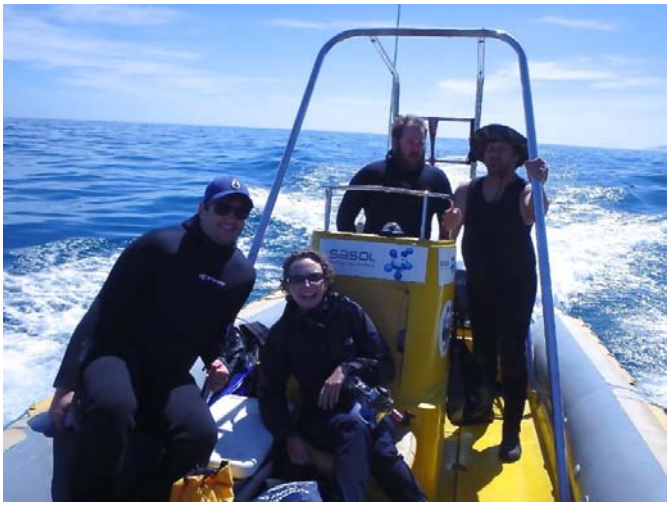


Collecting localities in South Africa. The blue and orange lines in the right figure indicate shallow <30m waters and deeper waters, respectively, previously sampled by Wayne Florence and colleagues. These samples were subsampled for DNA sequencing.

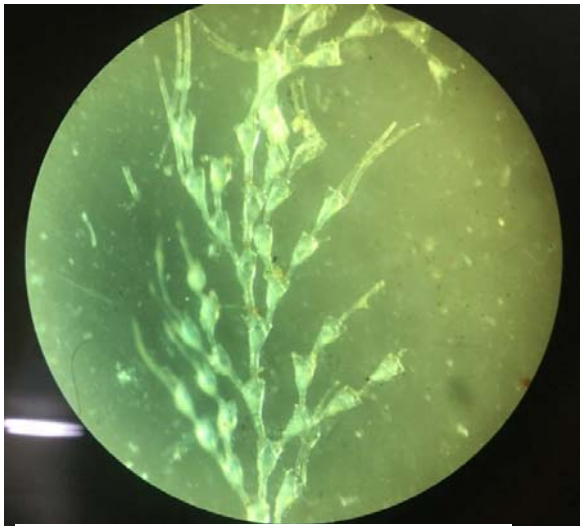
Wayne, Albe & Chris laid on quite a marine spectacle on our first day's sampling with the cooperation of the local wildlife - fur seals, a large pod of dusky dolphins and penguins!

And the bryozoans didn't disappoint either. A beautiful array of Schizoretepora tessellata, Chaperiopsis, Laminopora jellyae, Calyptotheca porelliforms and Menipea.

… making one happy PI!

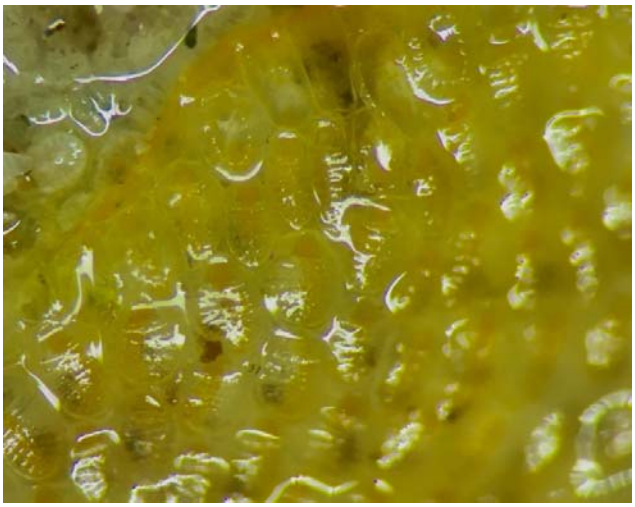


Action shot! From left: Albe Bosman, Helen Jenkins, Chris Wilkinson, Wayne Florence.



A lucky find amongst the frozen material: Catenicula corbulifera.

A great find for our ctenostome phylogeny: Elzerina.



And one can never have enough cribrilinids!

Helen having a riotous time keying out bryozoans in Wayne's lab!

The transformation from luxury hotel veranda to lab was effortless.

The moment when Wayne discovered a new species of Bugula *for Leandro.*

Wayne knows how to show pescetarian Helen a good time: Put her in front of a fabulously juicy array of freshly barbequed meats. There was fish, too – lots of it ☺! Thanks to Wayne and his lovely family for welcoming us so warmly on National Braai Day.

A happy ending! From left: Chris Wilkinson, Albe Bosman, Wayne Florence, Dylan Clarke, Helen Jenkins, Andrea Waeschenbach.

Fieldwork selfies are the best.

Helen and Andrea would like to thank the South African team, and Wayne and Albé in particular, for being such fantastic and fun hosts. In total, we assembled for sequencing 302 specimens of at least 73 species (no doubt the remaining 99 unidentified specimens will yield a number of additional species)! Having got a taste of the rich bryo-fauna that South Africa has to offer and having learned how little there is known about it, we'd like to say: we'll be back!

We will continue our collecting Odyssey in January 2018 when **Joanne Porter** and **Andrea Waeschenbach** will travel to **Australia** to collect on **Heron Island** and in **Tasmania**. Meanwhile, **Paul Taylor** and **Silviu Martha** are planning, together with **Eckart Håkansson,** a field trip to **Western Australia** to collect Late Cretaceous bryozoans. Furthermore, **Helen** and **Andrea** will travel to the **Muséum National d'Histoire Naturelle, Paris** in February to subsample their ethanol-preserved deep-sea Pacific invertebrate collection under the guidance of **Pierre Lozouet**. The goal is to fill some of the gaps in our molecular tissue collection for difficult to collect deep sea families. **Silviu** and **Paul**, too, will travel to the **Muséum National d'Histoire Naturelle, Paris**, to study the d'Orbigny collection of Late Cretaceous cheilostome bryozoans. This will be in collaboration with **Sylvain Charbonnier** and **Loïc Villier**.

Brigitte Lotz in her new office at the Senckenberg

Recently, **Silviu Martha** visited the Senckenberg Forschungsinstitut und Naturmuseum in Frankfurt for one week to study material from the famous Voigt Collection. During this week **Joachim Scholz** and **Brigitte Lotz** hosted him in the new building, into which the Bryozoa Section moved just shortly after Silviu's departure from the Senckenberg. Silviu took over 100 specimens of fossil bryozoans as a loan and will SEM them at the NHM as part of our project. Furthermore, ethanol-preserved bryozoan specimens collected by **Karen Gowlett-Holmes**, **Piotr Kuklinski**, **Andrey Ostrovsky** and **Joanne Porter** at the Eaglehawk Dive Centre during the Tasmania pre-conference field trip have been loaned and will be used for molecular analysis by **Helen Jenkins**. Furthermore, Silviu gave a talk on the Voigt Collection - Current and Future Perspectives - during a symposium of the Marine Zoology Department at the Senckenberg. Silviu wants to take the opportunity to thank Joachim and Brigitte for a fantastic week at his previous work place. Further visits to the Senckenberg are currently in preparation.

Integrating molecules and fossils – a pilot study

A critical product of our project is a time-calibrated phylogeny of cheilostome bryozoans. A recently-developed approach of producing such trees (total-evidence dating), simultaneously analyses molecular and morphological data; it uses morphological data for both fossils and Recent taxa to help place the fossils into the phylogeny. Anyone who has attempted to build phylogenetic trees of bryozoans using morphological data will be familiar with the difficulties of dealing with convergent traits and non-applicable character states. Although the development of models for morphological evolution is somewhat lagging behind those that have been developed for molecular data, there is currently a surge of new methods and models being developed for morphological data. In order to get a feel for the data and the various analytical methods, we are conducting a pilot study for a select set of Recent and fossil taxa. **Silviu** and **Paul** (with input from **Dennis Gordon** and **Leandro Vieira**) have assembled a morphological character list for the production of a matrix. **Silviu** has now coded the morphology of 36 Recent and 36 fossil taxa. **Helen** will be leading on the time-calibration analyses and the results will be presented as a poster at the upcoming meeting of the **Palaeontological Association (PalAss) meeting** at Imperial College, London, 17th – 19th December 2017.

The project's first paper

Silviu and **Paul** have produced the first paper of the project, which is a description of the oldest known cheilostome with erect growth: *Jablonskipora kidwellae* named in honour of the University of Chicago professors David Jablonksi and Susan Kidwell. (dx.doi.org/10.1002/spp2.1097)

[Papers in Palaeontology, 2017, pp. 1–12]

THE OLDEST ERECT CHEILOSTOME BRYOZOAN: *JABLONSKIPORA* GEN. NOV. FROM THE UPPER ALBIAN OF SOUTH-WEST ENGLAND

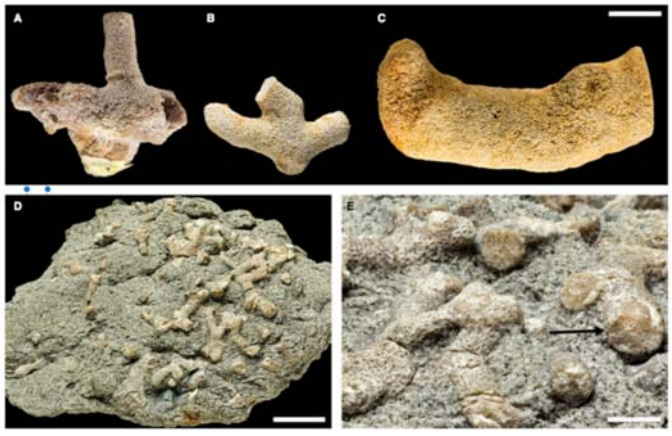
by SILVIU O. MARTHA[1,*] and PAUL D. TAYLOR[2,*]

[1]Department of Life Sciences, Natural History Museum, Cromwell Road, London, SW7 5BD, UK; s.martha@nhm.ac.uk
[2]Department of Earth Sciences, Natural History Museum, Cromwell Road, London, SW7 5BD, UK; p.taylor@nhm.ac.uk
*Corresponding author

Typescript received 5 August 2017; accepted in revised form 16 September 2017

Abstract: Although dominant at the present day, the bryozoan order Cheilostomata did not appear until the Late Jurassic. For over 55 million years after their first appearance, cheilostomes remained low in diversity and disparity, exclusively encrusting and scant in the fossil record. During the late Albian, however, cheilostomes began an explosive diversification coinciding with the appearance of several key novelties. In this paper, we describe a new monospecific cheilostome genus, *Jablonskipora* gen. nov. (type species *Jablonskipora kidwellae* gen. et sp. nov.), of importance as the oldest known cheilostome with erect growth. *Jablonskipora kidwellae* is a malacostegine cheilostome characterized by rigidly erect colonies with cylindrical, bifurcating branches and is moderately common in sedimentary rocks of late Albian age in south-west England. Autozooids are dimorphic, with long tubular autozooids in the axial endozone covered by multiple layers of short, stacked, box-shaped autozooids in the surrounding exozone. It is assigned to Chiplonkarinidae, a family now containing five genera, a tabular key for the discrimination of which is provided. The morphology of *Jablonskipora* and the early evolution of erect growth in cheilostomes are discussed.

Key words: Cheilostomata, Bryozoa, Lower Cretaceous, Upper Greensand, taxonomy, evolution.



MRes student Heather Grant

Some of you may remember MRes student Heather Grant, who presented her molecular results on the independent evolution of brooding in cheilostome bryozoans at the Vienna Larwood Symposium. We are pleased to report that Heather got a distinction not only for her bryozoan project, but also for her other two projects on the evolution of colour in molluscs and supertree construction methods. She was also voted the best MRes student of the year. Although she has now moved on to do a PhD on HIV phylogenetics at Edinburgh University, she left with a soft spot for bryozoans in her heart!

Visit to the BLEED lab in Oslo

Coffee and chocolate always helps! From left: Andrea, Russell, Lee Hsiang.

Andrea visited **Lee Hsiang Liow**, **Russell Orr** and the rest of the **BLEED lab** for one week in November to help combine the molecular datasets of MSc students Jeroen Boeve and Emily Enevoldsen and Marianne Nilsen Haugen for a paper on the phylogenetic position of the Microporellidae.

For further news and updates, follow us on Twitter @BryoEvol!

ARTICLE

CYCLOSTOME BRYOZOANS: RESEARCH STRATEGY AND CALL FOR ACTION

Abigail M Smith[1], Paul D. Taylor[2], Andrea Waeschenbach[3], Lee Hsiang Liow[4], Joanne S. Porter[5], Andrew Ostrovsky[6], Helen Jenkins[3]

[1] *Department of Marine Science, University of Otago, Dunedin New Zealand*
[2] *Department of Earth Sciences, The Natural History Museum, London, UK*
[3] *Department of Life Sciences, The Natural History Museum, London, UK*
[4] *Department of Biosciences, Centre for Evolutionary and Ecological Synthesis, University of Oslo, Oslo, Norway*
[5] *International Centre for Island Technology, Heriot Watt University, Stromness, Orkney, UK*
[6] *Faculty of Biology, Department of Invertebrate Zoology, Faculty of Biology, Saint Petersburg State University, Saint Petersburg, Russia; Department of Palaeontology, Geozentrum, University of Vienna, Vienna, Austria*

On Sunday 10 April 2016, a group of 23 scientists and students from 13 countries gathered at the Melbourne Museum to take part in an International Bryozoology Association workshop entitled "Friends of the Cyclostomes". We met in order to consolidate our understanding of this taxon, to discuss information gaps, to develop an approach to research into cyclostomes, and to encourage scientists and science funders to support that research. It is appropriate that this workshop took place at a meeting in Australasia, where cyclostomes are especially large, abundant, and important ecologically and geologically.

Importance of Cyclostomes

The marine bryozoan class Stenolaemata first appeared in the Lower Ordovician, including five orders. Of these, Cyclostomata Busk, 1852 is the only order with living representatives. Paleontologists can test ideas about how fossil stenolaemates lived, grew, reproduced, and evolved using living cyclostomes (e.g., Pachut & Fisherkeller 2009). They are real survivors. Despite dramatic changes in Earth's climate and ocean chemistry over time, and the extensive radiation of cheilostome bryozoans in the Cretaceous, cyclostomes have persisted and even diversified in some places.

Cyclostome bryozoans are particularly well-represented on cool-cold continental shelves, in water depths of 50-150 m (Wood et al. 2012). In waters around New Zealand, they are abundant and provide 3-dimensional community structure, which is rare on the mid-shelf, sheltering a wide diversity of other marine organisms and, very probably, symbionts (Wood et al. 2013; Taylor & Gordon 2003).

Cyclostome bryozoans have unusual life-history features that merit investigation, for example, placentation and polyembryony (Jenkins et al. 2017). And yet, even the commonest cyclostomes are still largely unknown. For example, the extremely common cyclostome bryozoan *Cinctipora elegans* may be the best-studied living cyclostome species in the world (see, e.g., Boardman et al. 1992), and yet we do not know how or when it reproduces.

Because cyclostomes are hard to identify, and display extensive homoplasy (Waeschenbach et al. 2009), global cyclostome biodiversity and taxonomic relationships are largely unknown (Taylor 2000). Morphological (Taylor & Weedon 2000) and molecular (Taylor et al., 2015; Waeschenbach et al. 2012; Taylor et al. 2011) studies have, however, begun to elucidate cyclostome relationships. Thorough morphological and molecular study can be expected to reveal many novel species, and perhaps change our ideas about this "remnant" group of bryozoans.

Information Gaps and Proposed Research Strategy

The list of what we do not know about cyclostomes is long. We propose eight priorities for research:

- Collections and monographs on cyclostomes tend to be focussed around the UK, France and, to a lesser extent, New Zealand. Material should be collected for both molecular and morphological study from other parts of the world (e.g., California, Brazil, Mediterranean, Arctic). This is also true of fossil collections – a wider range of both space and time will be of great value.
- We should work to develop morphological characters that delineate taxa. We must apply careful observations and test ideas of cyclostome species concepts using a combination of molecular, morphological and ecological analyses. A combination of molecular and morphological analyses is needed to allow for robust species descriptions. Finding morphological characters that correlate with molecular clades is particularly important if we are to make the best use of fossils to make sense of the evolutionary history of cyclostomes.

- In order to achieve the two objectives above, we must encourage the recruitment and development of a new generation of taxonomists with an interest in bryozoans.
- Molecular systematists should further explore the higher phylogeny of the class, by complementing existing molecular data with data from genome skimming and/or transcriptomes.
- We should develop a clearer understanding of the life-histories of cyclostomes, including studies on widespread and common species that focus on reproduction, larval development, settlement and metamorphosis, and subsequent allocation of resources to colony growth and sexual reproduction.
- There should be large-scale studies of the ecology and biogeography of cyclostomes, incorporating cryptic habitats, variations with water depth and/or temperature, and long-distance transport on floating seaweeds and/or plastics.
- The dynamics of how cyclostomes survived and even thrived during the arrival of cheilostomes is critical to our understanding of the evolution of the phylum, perhaps also the evolutionary ecology of benthic marine ecosystems in general.
- The scant Late Palaeozoic fossil record and, in particular, the early Triassic gap, requires careful investigation of appropriate fossil localities, targeting well-preserved faunas and shells that could host small and inconspicuous encrusting bryozoans.

Recommendations and Call for Action

The 'Friends of the Cyclostomes' call for action on the part of scientists, science funders, and public educators to bring this group of marine survivors out of the shadows. In particular:

1. A review paper would be timely and helpful. It should be submitted for publication in an international journal with broad readership, including evolutionary biologists, ecologists, developmental biologists, sedimentologists, and palaeontologists, is in preparation highlighting the importance of cyclostome bryozoans and outlining the main questions that require investigation.
2. Benthic ecologists, palaeontologists and, of course, bryozoologists involved in education should add material about cyclostome bryozoans to their teaching, to develop and encourage new postgraduate students to take on research projects involving this fascinating taxon.
3. The International Bryozoology Association supports and encourages each other and other scientists in developing research projects and proposals that involve cyclostome research.

In April 2016, at its 17th Meeting in Melbourne, the International Bryozoology Association voted unanimously to endorse this research strategy to improve the study of cyclostome bryozoans.

References

Boardman RS, McKinney FK, Taylor PD. 1992. Morphology, anatomy, and systematics of the Cinctiporidae, new family (Bryozoa, Stenolaemata). Smithsonian Contribution to Paleobiology 70: 1–81.

Jenkins HL, Waeschenbach A, Okamura B, Hughes RN, Bishop JDD (2017) Phylogenetically widespread polyembryony in cyclostome bryozoans and the protracted asynchronous release of clonal brood-mates. PLoS ONE 12(1): e0170010. doi:10.1371/journal.pone.0170010

Pachut J, Fisherkeller, P. 2009. Inferring larval type in fossil bryozoans. Lethaia 43: 396-410. doi: 10.1111/j.1502-3931.2009.00200

Taylor PD. 2000. Cyclostome systematics: phylogeny, suborders and the problem of skeletal organization. In: Herrera Cubilla A, Jackson JBC (Eds.), Proceedings of the 11th International Bryozoology Association Conference. Smithsonian Tropical Research Institute, Balboa, Republic of Panama, pp. 87–103.

Taylor PD, Gordon DP. 2003. Endemic new cyclostome bryozoans from Spirits Bay, a New Zealand marine-biodiversity ''hotspot". Marine and Freshwater Research 37: 653–669.

Taylor PD, Weedon MJ. 2000. Skeletal ultrastructure and phylogeny of cyclostome bryozoans. Zool. J. Linn. Soc. 128, 337–399. doi:10.1016/j.jsb.2010.05.010

Taylor PD, Waeschenbach A, Florence WK. 2011. Phylogenetic position and systematics of the bryozoan *Tennysonia*: further evidence for convergence and plasticity in skeletal morphology among cyclostome bryozoans. Zootaxa 3010: 58-68.

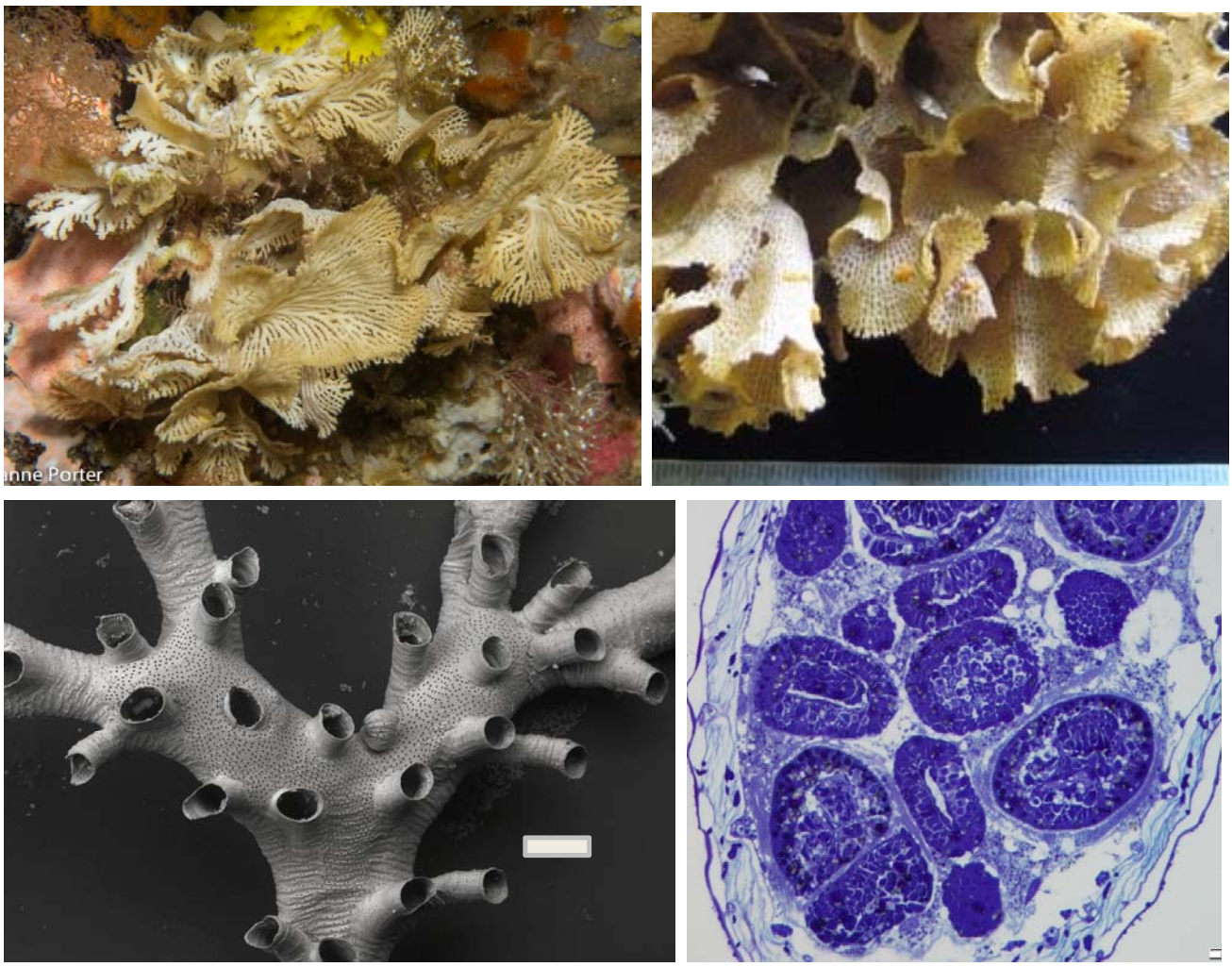
Taylor PD, Waeschenbach A, Smith AM, Gordon, DP. 2015. In search of phylogenetic congruence between molecular and morphological data in bryozoans with extreme adult skeletal heteromorphy. Systematics and Biodiversity 13: 525-544. doi: 10.1080/14772000.2015.1049673

Waeschenbach A., Cox CJ, Littlewood DTJ, Porter JS, Taylor PD. 2009. First molecular estimate of cyclostome bryozoan phylogeny confirms extensive homoplasy among skeletal characters used in traditional taxonomy. Molecular Phylogenetics and Evolution 52: 241–251. doi:10.1016/j.ympev.2009.02.002

Waeschenbach A., Taylor PD, Littlewood DTJ. 2012. A molecular phylogeny of bryozoans. Molecular Phylogenetics and Evolution 62: 718-735. doi:10.1016/j.ympev.2011.11.011

Wood ACL, Probert PK, Rowden AA, Smith AM. 2012. Complex habitat generated by marine bryozoans: a review of its distribution, structure, diversity, threats and conservation. Aquatic Conservation 22: 547-563. doi: 10.1002/aqc.2236.
Wood ACL, Rowden AA, Compton TJ, Gordon DP, Probert PK. 2013. Habitat-Forming Bryozoans in New Zealand: Their Known and Predicted Distribution in Relation to Broad-Scale Environmental Variables and Fishing Effort. PLoS ONE 8(9): e75160. doi: 10.1371/journal.pone.0075160

Cyclostome Bryozoans Photo Gallery



TOP LEFT - Underwater photo showing several cyclostomes (dominated by *Hornera robusta*), Cathedral Cave, Eaglehawk Neck, Eastern Tasmania. Photo: Joanne Porter.
TOP RIGHT - Deck photo of *Hornera foliacea* from southern New Zealand, showing orange gonozooids (larval chambers). Scale in mm. Photo: Abby Smith
BOTTOM LEFT - SEM of *Hornera ramosa* from Australia, showing typical cyclostome morphology with tubular zooids. Scale bar = 250 µm. Photo: Andrea Waeschenbach.
BOTTOM RIGHT - Histological section showing developing embryos and larvae together in an incubation chamber. Photo: Andrew Ostrovsky.

IN MEMORIUM

PHILLIP A SANDBERG

Dr Philip A. Sandberg died August 30, 2016. He did some early work (1970s) on ultrastructure and mineralogy of bryozoans and was one of the many coauthors on the 1983 treatise. Please see his obituary at http://www.legacy.com/obituaries/star-gazette/obituary.aspx?pid=181289701

Copy the link into your browser if clicking the link above is unsuccessful.

BRYOZOANS ON THE WEB

Sent in by Marcus Key, from colleague Joe Knauff.

I wanted to forward you a link to a bryozoan article that was recently posted on a pop culture website I sometimes browse. They have a little science section and it showed up there.
The article is here: https://nerdist.com/bryozoan-snot-monster-science-biology-nerdoween/

Eds note – the video is really good despite the spooky narration!
Copy the link into your browser if clicking the link above is unsuccessful.

FIRST CIRCULAR OF 18TH IBA CONFERENCE IN LIBEREC, CZECH REPUBLIC

Technical University in Liberec invites you to the 18th IBA Conference

16-22 June 2019

TUL campus

Host institution: Technical University in Liberec (TUL): Department of Geography. The Conference will be held under the auspices of rector.

Venue: The plenary meeting of the conference will take place in the room called “AULA” in Building G on the University campus. The separate meetings of the IBA Advisory Committee and workshops will be held in smaller rooms nearby.

meeting room

AULA

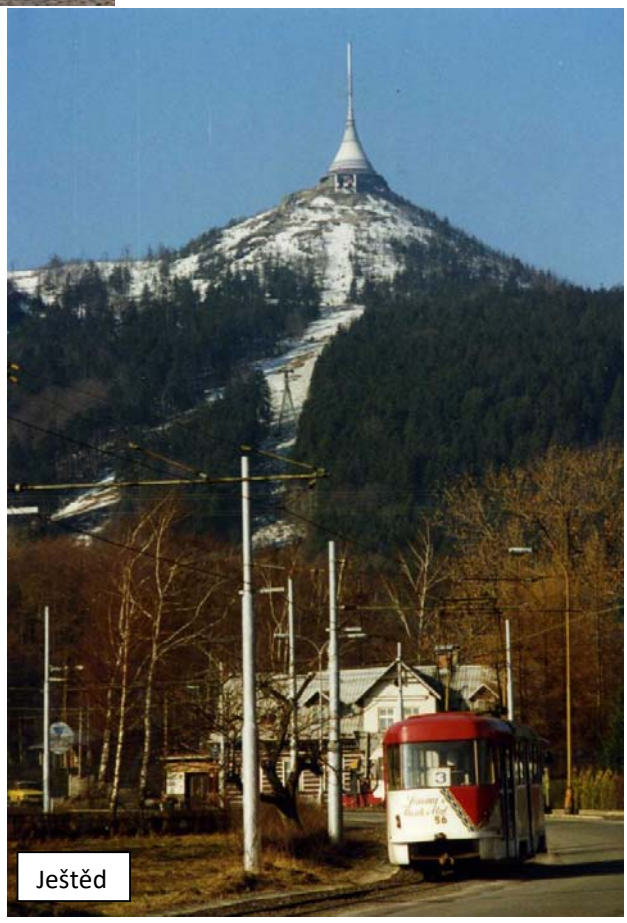
Liberec

Liberec is the district capital with about 100 000 inhabitants situated on the Lusatian Neisse and surrounded by the Jizera Mountains and Ještěd-Kozákov Ridge. It is the fifth-largest city in the Czech Republic. Liberec was once home to a thriving textile industry and hence nicknamed the "Manchester of Bohemia". Liberec's prominent buildings include the Town Hall (1893), the Liberec Castle (Liberecký zámek), built in the 16th century, and the Ještěd Tower (1968) upon the Ještěd Mountain, designed by architect Karel Hubáček, which has become a symbol of the city.

Main square and city hall

The zoo in Liberec was the first to be opened in Czechoslovakia in 1919. The zoo contains a wide variety of fauna (about 143 species on 13 ha), including large mammals like elephants, giraffes, sea lions and white tigers, which are a genetic anomaly and hence very rare. The zoo participates in breeding activities of endangered species to help preserve the gene pool.

The Botanical Garden in Liberec (completely rebuilt from Kučera 1995 to 2000) comprises nine glass houses for visitors (with a total area of 3,000 m2 (32,291.73 sq ft) and 13 exhibition themes), nine plantation glass houses and a large exterior terrain. It continues the legacy of a botanical garden established in 1876 by the Verein der Naturfreunde ("Society of Friends of Nature") on a nearby site and it is therefore considered the oldest one in the Czech Republic.



Ještěd

Tentative timetable:

- April 2018: By this date please email your intention to attend the conference;
- July 2018: Second circular;
- 1 September 2018: Online registration opens;
- 1 October 2018: Scholarship applications due;
- 30 October 2018: End of early registration;
- 30 January 2019: End of final registration, all fees and abstracts due;
- April 2019: Third circular;
- 9-15 June 2019: Pre-conference field trip – Fossil Bryozoa organized by Kamil Zágoršek: Bohemian Palaeozoic, Cretaceous and Moravian tertiary (bus - limited number of participants around 40, minimum 20). Price around 900 Euro;
- 16-22 June 2019: Conference including dinner and mid conference geological sightseeing tour. Price around 600 Euro
- 23-29 June 2019: Post conference trip – Recent Bryozoa organized by Maja Novosel: Adriatic sea (fly and ship - limited number of participants around 40, minimum 20) price around 1500 Euro
- 31 August 2019: Revised manuscripts due

Please express your preliminary interest to attend the conference before **1st May 2018** by sending email to kamil.zagorsek@gmail.com and providing:

Name:

Interest to attend:

- Pre-conference trip Y/N
- Conference Y/N
- Post conference trip Y/N
- Accompanying person Y/N

See you in Liberec in 2019!

Kamil Zágoršek and the Organizing Committee

15TH LARWOOD MEETING 6TH- 8TH JUNE 2018

Amgueddfa Cymru – National Museum Wales, Cardiff

The 15th Larwood meeting will be held in Wales next year at Amgueddfa Cymru – National Museum Wales located in the centre of Cardiff. We will have a day and a half of talks and posters followed by an afternoon excursion to the Glamorgan coast. On the third day there will be an optional trip to Blaenavon, a World Heritage Site, to visit Big Pit National Coal Museum with the opportunity to go 300 feet underground with a miner-guide.
The meeting is being sponsored by the Palaeontological Association who will be funding prizes for the best student talk and poster.
The Museum has the largest and most comprehensive Welsh geology, zoology and botany collections in the world, with over 3.5 million natural history specimens. During the meeting there will be the opportunity to look around the museum exhibitions and to have behind the scenes tours of the natural history collection areas.
Cardiff has a wide range of accommodation options and good transport links. The airport is approximately 12 miles from the city centre and there are rail and bus links to Cardiff from other airports such as Bristol, Heathrow and Gatwick.
The provisional itinerary for the meeting is:

Wednesday 6th June 2018	Talks and posters
Thursday 7th June 2018	Talks and posters - am
	Excursion (to the Glamorgan coast) - pm (included in registration)
Friday 8th June 2018	Museum collection tours - early am
	Excursion to Big Pit National Coal Mine Museum with an opportunity to go underground - late am & pm (extra charge)

Hope to be able to welcome you to Wales next year.
Caroline

If you plan to come to Cardiff next year please could you send back the following information to me (Caroline.Buttler@museumwales.ac.uk)
Name
Address
Email

I would like to:
☐ Attend the conference
☐ Give a talk
☐ Present a poster

I would like to attend:
☐ Afternoon excursion on 7th June
☐ Excursion 8th June

I would be interested in a collection tour of:
☐ Marine invertebrates
☐ Mollusca
☐ Palaeontology
☐ Mineralogy
☐ Botany
☐ Entomology

PROCEEDINGS OF THE 17TH INTERNATIONAL BRYOZOOLOGY ASSOCIATION CONFERENCE.

Final editing of the conference volume is completed and sent to the publishers in August. It is now being prepared for publication however owing to other publications in the same series being ahead of us in the queue the 17th IBA volume will be out in early 2018.

All papers are accepted and in press and your manuscripts can be referred to as

Author, year, title. IN *Bryozoan Studies 2016*. Proceedings of the Seventeenth International Bryozoology Association Conference, 10-15 April 2016, Melbourne, Australia. EDS Schmidt, R., Reid. C.M., Gordon, D.P., Walker-Smith, G., Martin, S. & Percival, I. Memoirs of the Australasian Association of Palaeontologists vol XX, pp. xx–xx. ISSN XXXX.

Rolf Schmidt, Catherine Reid, Dennis Gordon

RECENT PUBLICATIONS

The following list includes bryozoan related works either published since the previous issue of the *IBA Bulletin* as sent in to the editor. As always, members are encouraged to support future compilations by continuing to send complete citations to the IBA secretary at any time. Accuracy of your citation is assured if sent in bibliographic format, if re-drafting is required by the editor accuracy is not guaranteed! Reprints will be gratefully received by the IBA archivist, Mary Spencer Jones.

Abdelsalam, K. M., Taylor, P. D. & Dorgham, M. M. 2017. A new species of *Calyptotheca* (Bryozoa: Cheilostomata) from Alexandria, Egypt, southeastern Mediterranean. Zootaxa, 4276: 582–590.

Berning B., Harmelin J.-G., Bader B. 2017. New Cheilostomata (Bryozoa) from NE Atlantic seamounts, islands, and the continental slope: evidence for deep-sea endemism. European Journal of Taxonomy 347: 1-51. https://doi.org/10.5852/ejt.2017.347

Cahuzac, B. & J.-L. d'Hondt (2017).- D'abondantes populations de *Pectinatella magnifica* (Leidy, 1851) (Bryozoaires dulçaquicoles) dans les Landes, à Dax. Présentation illustrée de l'espèce. Bull. Soc. Linn. Bordeaux, 152, N.S. 45 (3) : 265-287.

Di Martino, E., Taylor, P. D., Gordon, D. P. & Liow, L. H. 2017. New bryozoan species from the Pleistocene of the Wanganui Basin, North Island, New Zealand. European Journal of Taxonomy, 345: 1–15.

Ernst, A., Bogolepova, O. K., Gubanov, A. P. (2017): Two bryozoan assemblages from the Ordovician of the Russian Arctic. – GFF, 139 (3): 205-215.

Ernst, A., Königshof, P., Bahrami, A., Yazdi, M., & Boncheva, I. A Late Devonian (Frasnian) bryozoan fauna from the Central Iran. – Palaeobiodiversity and Palaeoenvironments, 97: 541–552.

Ernst, A. & Vachard, D. (2017b): Middle Pennsylvanian bryozoans of Cerros de Tule, Sonora, Mexico. – Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, 285 (1): 11-38.

Ernst, A. & Vachard, D. (2017a): Cystoporate bryozoan *Glyptopora michelinia* (Prout, 1860) in the Viséan-Serpukhovian boundary interval of the Montagne Noire (southern France). – Paläontologische Zeitschrift, 91: 207–216.

Gontar, V.I. 2017. Bryozoa of the Southern Seas and its distribution under the influence of geological changes. In: Modern problem of ecology and evolution. Proceedings of the Russian scientific conference with international participation. Ulyanovsk, 2017. P. 294-300

Gordon, D.P., Voje, K.L. & Taylor, P.D. (2017) Living and fossil Steginoporellidae (Bryozoa: Cheilostomata) from New Zealand. Zootaxa 4350: 345-362.

Harmelin J.G., 2017. Bryozoan facies in the coralligenous community : two assemblages with contrasting features at Port-Cros Island (Port-Cros National Park, France, Mediterranean). Sci. Rep. Port-Cros natl. Park, Fr., 31: 105-123.

Harmelin J.G., 2017. *Pentapora fascialis*, a bryozoan under stress: condition on coastal hard bottoms at Port-Cros Island (Port-Cros national Park, France, Mediterranean) and other sites. Sci. Rep. Port-Cros natl. Park, Fr., 31: 125-133.

d'Hondt, J.-L. 2017. The novel of the Bryozoan Ctenostome of the "Astrolabe". Bull. Soc Linn. Bordeaux., 2017, 152, N. S. 45 (1): 119-125.

d'Hondt, J.-L. 2017. On some Indo-Pacific Bryozoa from the collections of the National Museum of Natural History in Paris. Genus description Temacheilonella, gen. Nov. Bull. Soc Linn. Bordeaux., 2017, 152, N. S. 45 (2): 143-153.

Jenkins, H. L. & Taylor, P. D. 2017. Ancestrular morphology in cyclostome bryozoans and the quest for phylogenetically informative skeletal characters. Journal of Natural History. DOI: 10.1080/00222933.2017.1388860

Jørgensen L.L., Archambault P., Blicher M., Denisenko N., Guðmundsson G., Iken K., Roy V., Sørensen J., Anisimova N., Behe C., Bluhm B. A., Denisenko S., Metcalf V., Olafsdóttir S., Schiøtte T., Tendal O., Ravelo A. M., Kędra M., Piepenburg D. 2017. Bentos. In: State of the Arctic Marine Biodiversity. Report. Publisher: Conservation of Arctic Flora and Fauna International Secretariat, Akureyri, Iceland., Editors: CAFF, pp.85-107. Available from: https://www.researchgate.net/publication

Kasaei, S. M., Nasrolahi, A., Abtahi, B. & Taylor, P. D. 2017. Bryozoa of the southern Caspian Sea, Iranian coast. Check List, 13: 305–313. https://doi.org/10.15560/13.4.305

Kröger, B., Desrochers, A. & Ernst, A. (2017): The reengineering of reef habitats during the Great Ordovician Biodiversification Event. – Palaois, 32: 584–599.

Liow L.H., Di Martino E., Krzeminska M, Ramsfjell M, Rust S., Taylor P.D. & Voje K. (2017) Relative size predicts competitive outcome through 2 million years. Ecology Letters 20: 981–988

Wood, T.S. & B. Okamura. 2017. New species, genera, families, and range extensions of freshwater bryozoans in Brazil: the tip of the iceberg? Zootaxa 4306(3) !7 Aug 2017. DOI:http://dx/doi/org/10.11646/zootaxa.4306.3.5.

Wyse Jackson, P.N., Ernst, A., and Suárez Andrés, J.L. (2017) Articulation in the Family Rhabdomesidae (Cryptostomata: Bryozoa) from the Mississippian of Ireland. Irish Journal of Earth Sciences 35, 35–44.