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News from the Membership

Björn Berning would just like you to tell you a little anecdote from his new home in Linz. As I mentioned in the last bulletin, the permanent exhibition on the natural history of Upper Austria will be in the new wing of the Linzer Schlossmuseum, which is still under construction at the moment. During the presentation of the concept for the exhibition and specific placements of the exhibits, which will, among others, include an almost complete fossil of a huge sunfish (*Mola*), a natural size model of the largest shark ever (*Carcharocles megalodon*) and a large reef aquarium, one of the architects said (honestly!): „And right up front in the entrance we will place the bryozoan as an eye-catcher...“! What he meant with “the bryozoan” was, of course, not just any ordinary colony of any common cheilostome species but the 2 m tall model of a phylactolaemate zooid that was created for the bryozoan exhibition “Neptunschleier & Co.”, organised by Emmy Wöss in the Biology Centre Linz in 2005 (see also Bulletin 1(1), June 2005). So, both Emmy and I are extremely happy that the phylac will have a new public home at a very exposed location for the next 20 or so years!

Jean Loup d'Hondt recently hosted two IBA members at the Museum of Natural History in Paris. Javier Souto spent several weeks in May and June studying ctenostome type material from Spain. Tim Wood visited for two days following the Larwood meeting to examine phylactolaemate specimens from the collection of Jules Jullien, most of them dated from the mid-1880's.

Lais V. Ramalho. I have a new position in the Museu Nacional, Rio de Janeiro. I am a visiting Teacher and will stay there for the next two years working in the Bryozoan Collection. My work consists of identifying and describing Bryozoan specimens in this collection, enlarging the collection with new material (collect and grant) and making permanent displays in the museum (open to visitation). So, if anyone is interested in donating or examining specimens at my institutional collection, it will be a pleasure to work with you. Contact me by email at: laiscanabarro@yahoo.com.br or laiscs@uol.com.br). The results of my studies will be published in journals and conference proceedings. Thanks everyone.

Leandro Manzoni Vieira. Working from the Marine Biology Center at the University of São Paulo, I have placed on the internet some high resolution copies of Savigny plates 6-13. These can be accessed at the following URL's:

http://www.4shared.com/file/52819330/bd594f5/Prancha_06.html

http://www.4shared.com/file/52819443/d8d2450d/Prancha_07.html

http://www.4shared.com/file/52819551/2e057f57/Prancha_08.html

http://www.4shared.com/file/52819646/ab3c65ec/Prancha_09.html

http://www.4shared.com/file/52819743/da94fb54/Prancha_10.html

http://www.4shared.com/file/52819868/742c0763/Prancha_11.html

http://www.4shared.com/file/52819980/e5b6c8e8/Prancha_12.html

http://www.4shared.com/file/52820013/98042cce/Prancha_13.html

Judy Winston. I met with Abby Smith in Cambridge, Mass. recently to go over a draft report of the IBA Fellowship Committee (Okamura, Porter, Smith & Winston) appointed by the Council last July. The report will be presented to Council members shortly. Abby had never met Robert Woollacott, who is a professor in the Harvard University's Department of Organismic and Evolutionary Biology, so I was happy to introduce them. Bob and I have been working on research projects involving the MCZ's historically valuable bryozoan collections for a number of years, and I make a couple of trips a year to Cambridge to continue our joint work (Thank you, Harvard !).



Robert Woollacott and Abby Smith.

Kamil Zagorsek. This year is the last of the project about bryozoan event in Miocene of Moravia (joint project with Prof. Vávra, Doc. Holcová and me). We found the massive and isochronous occurrences of Bryozoa in five Miocene localities in Moravia, and few in surrounding countries (Slovakia, Hungary, Austria). We supposed, that the bryozoan event in Miocene of Central Paratethys depending perhaps more on availability of food than on temperature. It seems that Bryozoans flourished when other organisms are overfed by organic detritus. We used only biological paleoecological indicator, but in future (new project) we would like to add some information also from geochemical analysis. I would be very glad if anybody could help us with interpretations and usage of geochemical data. Thanks in advance.



New Members

Rory Milne. Prior to my retirement I worked for a multinational Construction Company on sites in Saudi Arabia, Norway, India, China and Indonesia and before that in what are now Zambia and Zimbabwe (at that time Northern and Southern Rhodesia)

Following my retirement I decided to take the opportunity to follow up a long time interest in Geology (I was at one time a prospector in Zambia) and started a BSc course at Birkbeck College here in London, which I am completing this year. It has been very interesting especially as the course has a heavy bias to field work.

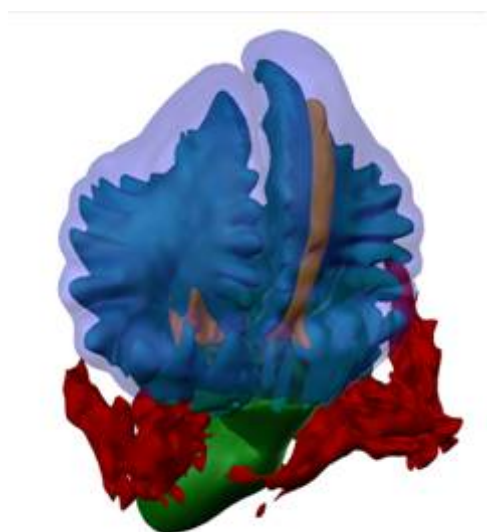
While at Birkbeck my interest focused on Palaeo, with a bias towards micropalaeo, in particular forams. I had very limited exposure to Bryozoa until the end of last year when I got the chance to work as volunteer helper for Paul Taylor at the N.H.M. a chance I was very glad to take. I am currently working one or two days a week on the Museum's collection of Coralline crag bryozoa and enjoying it very much.

I live in North London with my wife, two daughters and two dogs.

Thomas Schwaha. Dear colleagues, I'm a PhD student at the University of Vienna working on freshwater bryozoans. My PhD thesis, entitled "On the ultrastructure, development and phylogeny of freshwater bryozoans," is supervised by Prof. Manfred Walzl. My research focuses on obtaining new morphological characters that can be used for phylogenetic considerations. For that purpose I apply modern methods to investigate several ultrastructural and developmental aspects. The first step of my research will be to analyse the interrelationships among phylactolaemates and to try to identify the most basal or primitive representative for comparisons with other phyla and bryozoan classes. The next step will be to analyse developmental and morphological characters of freshwater ctenostomes and as a consequence compare it with bryozoans. In the end I hope to come to some conclusions regarding the phylogenetic position of bryozoans.

Among other things I'm currently busy collecting and processing sexually active phylactolaemates for sectioning as well as studying the budding process of *Cristatella mucedo* and *Paludicella articulata*. I'm not doing everything on my own here and I want to mention my colleagues from Vienna, Stephan Handschuh and Emanuel Redl. Here on the right I have inserted a little picture from one of my unfinished 3d-models of a *Cristatella* bud as an example of some of the things I'm doing.

I always have a tight schedule, but if anyone needs some help with visualisation or 3d-reconstruction, contact me and I'll gladly help.



8th Larwood Meeting, Univ. of Vienna, 23-24 May 2008

Mary Spencer Jones

Paul D Taylor

Thirty-three bryozoologists from 13 different countries converged on Vienna this May for the 8th Larwood Meeting. It was fitting that the Vienna meeting occurred exactly 25 years after the International Conference of the IBA was held in the same city. Like the IBA conference, our genial host was Norbert Vávra, with co-host Andrew Ostrovsky who is currently a postdoctoral fellow in Vienna. Norbert and Andrew were ably assisted by Norbert's wife, Jutta, and Kamil Zágorsék.

In the time-honoured tradition of Larwood meetings, and indeed their antipodean offsprings, Australolarwood meetings, a day of lectures was followed by a day in the field. The impressive but almost deserted Geozentrum was the venue for the day of talks and posters. Andrew and Norbert had arranged for copious quantities of coffee and confectionaries to be available at the rear of the lecture room, and for frequent breaks to enjoy these delights in what otherwise might have seemed to be a gruelling programme of 19 lectures and one video presentation. The abstracts of the papers and posters can be found on the IBA website and Bryozoa Home Page. Hence this report will mention the name of only the presenting author, describing the papers in the order that they were read.

Norbert Vávra got the proceedings off to a fitting start with a review of bryozoan studies in Austria, starting with A.E. Reuss (1811-1873) one of the founders of micropalaeontology. Ironically, Reuss died in the same year that the geological institute of the University of Vienna was founded, by which time he had become von Reuss. Reuss's knighthood entitled him to his own coat-of-arms featuring an ammonite and a coral but, unfortunately, no bryozoans. Norbert also told us about the work of Bobies, Kühn, David and Pouyet, and Larwood in Austria, and directed us to a small exhibition that he had set up at the back of our lecture room.



Norbert talking about Reuss.

Next, **Andrej Ernst** summarized some of the findings of his thorough study of Middle Devonian bryozoans from the Rhenish Slate Massif. So far he has identified 41 species, 23 of which are new, and has recognized 5 bryozoan communities. The most remarkable of the bryozoans present is a new genus of Fenestrata with an entirely encrusting colony. Some of the genera present in Late Devonian deposits in Europe seem to have originated during Middle Devonian time in North America and to have migrated eastwards.

Hans Arne Nakrem also touched on palaeobiogeography in his talk about Permian bryozoans from the Canadian Arctic. This is a particularly interesting region for studying the change in bryozoan faunas during a period of climatic deterioration, from the warm water of

the earliest Permian to the very cold water of the latest Permian. Forty-five bryozoan genera have been identified, mainly in thin sections cut primarily for sedimentological purposes. Interestingly, the study was unable to detect much difference between the bryozoan genera present in nearshore carbonates and offshore silica-rich sediments.

The first of two visitors from the USA, **Steve Hageman**, turned our focus towards factors influencing zooid size in cheilostome bryozoans. Working with laboratory cultured *Electra pilosa*, Steve posed the question of whether food concentration impacts zooid size in addition to temperature. Maximum zooid size (and also variance) in cultured *E. pilosa* colonies was found to occur at concentrations of 4000-5000 cells ml⁻¹, which matches the typical concentration estimated from natural habitats for *E. pilosa*.

The penultimate talk of the first session was given by **Maggie Amui-Vedel** who has been looking at the variation in tentacle number of *Membranipora membranacea* colonies according to temperature, salinity and food concentration. Preliminary results show no straightforward relationship between tentacle number and temperature but increasing tentacle numbers from salinities of 25 to 30 to 35 ppt, and maximum tentacle numbers at 5000 cells ml⁻¹, the latter suggesting a similar optimal food concentration in the *E. pilosa* studied by Steve Hageman and *M. membranacea*. A note of caution must be sounded with regard to results from laboratory cultured bryozoans – higher mean numbers of tentacles were found by Maggie to occur in natural than laboratory colonies, and the latter failed to develop the excurrent chimneys or tower cells seen in natural populations.

Alexander Gruhl told us about the origin and development of the mesoderm in *M. membranacea*. There are four methods of mesoderm formation among metazoans, three endomesodermal and one ectomesodermal. Most previous studies involving bryozoans have used species with lecithotrophic larvae, whereas *M. membranacea* has planktotrophic larvae (cyphonautes) generally regarded as more primitive. The TEM sections prepared by Alex from embryos at different stages of development show clearly that the mesoderm in this species originates from cells ingressing from the ectoderm. This ectomesodermal origin resembles some spiralian but, perhaps significantly, differs from both brachiopods and phoronids.

Three talks on phylactolaemates began with **Maria Taticchi**'s description of *Plumatella viganoi*, a new species from Italy's 4th largest lake, Lake Trasimeno, named in honour of Antonio Viganò who collected samples there during the 1960s. Differences between this species and *P. repens* are evident in statoblast morphology and have been confirmed by DNA analysis.

Bryo Technologies is a company established by **Tim Wood** to cope with the increasing number of fouling problems caused by phylactolaemates. Under-reported to avoid adverse publicity and falling stocks, these problems have been afflicting chemical plants, nuclear power stations, domestic water supplies and, most alarmingly, nuclear powerplants where cooling water intake pipes have been blocked by bryozoan growths reaching up to a metre in thickness. Tim estimated that about 20% of wastewater treatment plants are adversely affected by bryozoans, with *Plumatella vaihiriaie* being the most virulent of several phylactolaemate species involved.

Emmy Wöss told of us her aim to compile details of the morphologies of statoblasts in the 74 phylactolaemate species known to science. She illustrated her progress in this quest using scanning electron micrographs of statoblast exteriors and interiors. Surprisingly, about 53% of phylactolaemate species have been collected only once, making Emmy's task all the more challenging.

Another Vienna-based biologist, **Thomas Schwaha**, was also in search of characters that could be used to refine bryozoan phylogeny. Thomas noted that the position of the phylum within Bilateria remained unclear. He went on to show us some wonderful video clips of polypide retraction taken with a high speed camera, and equally striking micro-CT images of *Cristatella* zooids. These new technologies, together with SEM and molecular sequencing, promise to contribute greatly during the coming decades to our understanding of both the phylogenetic position of bryozoans and inter-relationships between bryozoan taxa.

Unknowns abound within bryozoology, none more than those relating to cheilostome avicularia. However, as **Chiara Lombardi** showed with *Pentapora*, these polymorphs can furnish critical characters for recognizing species. Fossil species of *Pentapora* are difficult to tell apart unless giant avicularia are developed: these enlarged suboral structures permitted Chiara to recognize that, in both the Coralline Crag of Suffolk, England and Pliocene

sediments of Monte Padova, Italy, two species of *Pentapora* are present.



Conversation during a coffee break.

Kamil Zágorsěk talked about a dual 'bryozoan event' in the Miocene of the Carpathian foredeep of the Czech Republic. The first pulse brought in up to 10 species of bryozoans dominated by cyclostomes, the second introduced over 50 species of mainly cheilostomes. Depositional depths for the first pulse were estimated as 100-200 m, whereas the second pulse is thought to have been much shallower. Explanations for the bryozoan event could include climatic cooling or increase in nutrient levels.

Paul Taylor next introduced the X-ray microcamera, a device fitted to an SEM that utilizes the electron beam of the microscope to generate X-rays. These are fired at a specimen to reveal its internal morphology at submicron resolution, rotation of the specimen allowing three-dimensional tomograms to be computed. Preliminary results from branches of some modern and a fossil cyclostome have demonstrated the potential of this technique to generate dynamic images showing the positions of zoecial budding loci within branches, the distribution of interzooidal pores and the origins of kenozooids and cancelli.

Some astonishing results have been obtained by **Andrea Waeschenbach** at the beginning of her project on cyclostome molecular phylogeny. Perhaps the most remarkable is the grouping of Articulata (crisiids) with Cerioporina (heteroporids), a pairing totally unsuspected based on skeletal morphology and soft part anatomy. However, two molecules (18S and 28S) both

yielded this sister-group relationship and the robustness of Andrea's trees is supported by the close grouping of congeneric species. A radical rethink of cyclostome phylogeny, and of the adequacy of skeletal characters in their taxonomy, may well be needed in the future.

Bjorn Berning showed us the little-known bryozoans from the Middle Miocene of Tanzania which have importance with respect to evolutionary events following closure of the Tethys. Twenty-five species of cheilostomes have been recorded, the majority with rooted colony-forms. Bjorn drew attention to the problems of fossil bryozoan preservation in coral reefs caused by dissolution or neomorphism of the coral aragonite. Only when reefs are rapidly drowned by fine-grained sediment is preservation of the bryozoans likely to be adequate.

Continuing with the Miocene, **Urszula Hára** described her research on Upper Badenian and Lower Sarmatian bryozoans from Poland and Ukraine. The Sarmatian is especially interesting because of controversies about its environmental interpretation – were the sediments deposited in a brackish, normal marine or even a hypersaline sea? Some of the *Schizoporella* colonies in the Sarmatian have over 100 layers of zooids and functioned as framebuilders in some reefs.

Masato Hirose, the first Japanese bryozoologist to participate in a Larwood meeting, talked about bryozoan diversity in Sagami Bay south of Tokyo. This bay has immense historical significance as it has been a focus of marine biological investigations for well over a century and is located on a tectonic plate boundary and also the junction between boreal and subtropical water masses. A succession of marine biologists, including the Showa Emperor Hirohito, have sampled bryozoans from Sagami Bay over the years. Masato's task is to document the species present in these collections.

The tsunami of late 2004 caused great human suffering and also impacted nearshore bryozoans, as described by **Antonietta Rosso** who has been studying samples from Phuket in Thailand. From 144 samples, Antonietta was able to identify 95 bryozoan species. Interestingly, pre- and post-tsunami communities were found to contain a similar range of species. Shallow water communities devastated by the tsunami appear to have been recolonized by bryozoans living at depths of more than 8 metres where the effects of the tsunami were minimal.

Taking a break from covert digital photography, **Joachim Scholz** talked about bryozoans from the Jordanian coast of the Gulf of Aqaba. More than one hundred species are thought to be present here but these are in need of documentation before industrialization makes this task too late.

A stimulating day of talks ended with a movie of **Andrei Ostrovsky's** recent collecting trip to the Maldives. The growth of ecotourism in the Maldives has fuelled an interest by resort owners in the diversity of the marine biota. Andrei was filmed collecting bryozoans by diving and also giving lectures to some of the more enlightened tourists.

Ten posters were also presented during the day, which participants were able to view at lunchtime and during coffee breaks. They were set up in the department's foyer amongst the dinosaur skeletons and fossil slabs.

Chiara Lombardi and colleagues showed that by mapping minor elements, such as magnesium and strontium, and undertaking morphological analysis, two distinct layers can be

confirmed within the walls of *Pentapora*. Results revealed that the content of magnesium increases from the outer to the inner layer and that strontium increases from the inner to the outer layer.

Another poster on *Pentapora* by **Mary Spencer Jones** *et al.* looked at the history of *Pentapora fascialis/foliacea* and their origins with Bauhin and Imperato. Debate rages at the moment as to whether the *fascialis* and *foliacea* forms are actually distinct species and whether a third species is also present. It is hoped that genetics studies currently underway will solve this issue.

Rory Milne and **Paul Taylor** presented an overview of a curatorial project that has been re-assessing material from the Pliocene Coralline Crag of Suffolk. This famous type locality is well known for the work done by Lyell, Busk and Searles Wood, amongst others. Recent work has added a further sixteen species bringing the total bryozoan diversity to 133 taxa.

Heather Moore and colleagues focused on the use of microbiological and biochemical techniques to identify the chemical constituents of *Alcyondium diaphanum* and *Flustra foliacea*, and determine whether they contain bioactive compounds. Their work has shown that the bioluminescent response increases, indicating the possible presence of quorum sensing signals.

Elena Nikulina *et al.* looked at the electrids of the Plio-Pleistocene Crags of East Anglia. Five species were identified amongst the collections at the NHM, including one that will become a new genus and the preservation modes of the electrids from the Red Crag and Norwich Crag were discussed.

Maja Novosel's poster concerned a recent survey of hard bottom bryozoans along the Adriatic coast of Croatia. Of the 211 species recorded, 43 were new for the Adriatic. The survey also looked at the similarity of faunas within the Adriatic and their depth distributions.

Antonietta Rosso looked at the Holocene bryozoans of Sicily and reviewed the species data that has built up over the past 150 years. When the fauna on the three sides of the island were compared, bryozoan diversity was highest in the Ionian Sea area with approximately 240 species recorded. Antonietta attributes this to a larger research effort on this side of the island and better habitat distribution.

Andrea Rubini and colleagues discussed a new protocol that has been developed to look at DNA from phylactolaemates. They have designed primers that allow the selective amplification of the Internal Transcribed Spacer (ITS) region of nuclear rDNA, which they used on seven species. Their results revealed a high level of genetic polymorphism.

Francesco Toscano and **Emma Taddei-Ruggiero** reported on the first record of *Manzonella exilis* from the Pleistocene of southern Italy. The significant features of the species were described, including the distinctive arrow-shaped vicarious avicularia.

Finally, **Katarína Holcová** and **Kamil Zágoršek** presented a poster on the use of foraminiferans, calcareous nanoplankton and, oxygen and carbon isotope data to improve the reliability of using bryozoans as palaeoenvironmental indicators.

The day rounded off with the conference dinner which was held at a restaurant close to the university, where they served a diverse mixture of Austrian, Italian and Mexican food.

Early on the Saturday morning we gathered for the fieldtrip. On a wonderful sunny day, we headed out from Vienna in the bus to our first site in Baden on the western border of the Vienna Basin. Norbert, acting as our guide, pointed out all the attractions as we left.

Baden is a very old city and Stone Age settlements have been recorded in the area. Since Roman times, it has been important as a spa town; for its production of wine; and for its theatres and casinos. Up a small leafy lane, the old quarry site is now a bit overgrown in places but enough is exposed to sample. Our first outcrop has yielded fossil faunas since the 19th century and many bryozoans have been collected from the “Bryozoa-marls”. As well as bryozoans, foraminiferans, bivalves, sea urchins, brachiopods and crustaceans can be found. After an introductory talk by Norbert, the geologists rushed towards the site while the zoologists took a more leisurely stroll.

Our next stop lay about half an hour from Baden. The small city of Eisenstadt is, amongst other things, famous for its connections with the composer, Joseph Haydn. For many years he was employed by the Esterházy family at the castle. We visited two outcrops in the area. The first was Hartl-lucke, an “extend cave”, for which Norbert had obtained special permissions for us to collect. This site is now regarded as a national monument.

The second site was a few minutes further on, where the outcrop is exposed at the side of the road and specimens could be picked up from the ground.

A short drive away was the town of Rust where we stopped for lunch at the *Haydnkeller*, which was built in 1633. Lunch was served down in the old cellar, where it was nice and cool.

The town is famous for its colonies of storks, which seem to occupy every available chimney. The rest of lunch time was spent looking around the town or indulging in a spot of retail therapy at a small outside market.

Our final site was at St. Margarethen, where there are a number of limestone quarries still open. The bryozoan faunas of this site have been studied by Udin (1964) but much of the area is now overgrown and inaccessible. Many famous Viennese landmarks, such as St. Stephen’s Cathedral, are constructed from this limestone and material is still needed for restoration of these buildings. An open-air theatre has also been constructed in one of the quarries, which is now used mainly for operatic events.

Most of the group took a short walk up to the top of the hill, to search for material near a cross. Walking up through a series of large sculptures, gave wonderful views of the whole area. However, a few of the geologists went off in search of material from a quarry on the other side of the road and returned with some excellent finds. The day rounded off with a group photograph at the site.



. The Symposium photograph (may be enlarged for greater detail)

Participants, back row, from left: Urszula Hara, Antonia Concetta Elia, Emmy Wöss, Rory Milne, Norbert Vávra, Thomas Schwaha; Stephan Handschuh; Hans Arne Nakrem, Jutta Vavra, Matthias Obst, Alexander Gruhl, Tim Wood, Andrea Waeschenbach,

Middle row: Maria Illuminata Taticchi, Judith Fuchs, Antonietta Rosso, Mary Spencer Jones, Masato Hirose, Steve Hageman, Paul Taylor,

Front row (sitting): Heather Moore, Francesco Toscano, Andrei Ostrovsky, Björn Berning, Maja Novosel, Kamil Zágoršek

On the Sunday, Norbert provided an extra activity for those members who felt like getting up early. After meeting at the statue of Anubis, which is promoting an Egyptian exhibition, Norbert took us on a fascinating tour around the central area in Vienna.

On the evidence of the Vienna meeting, Larwood symposia continue to provide a profitable and enjoyable forum for bryozoologists between the triennial conferences of the IBA.

Hans Arne Nakrem adds:

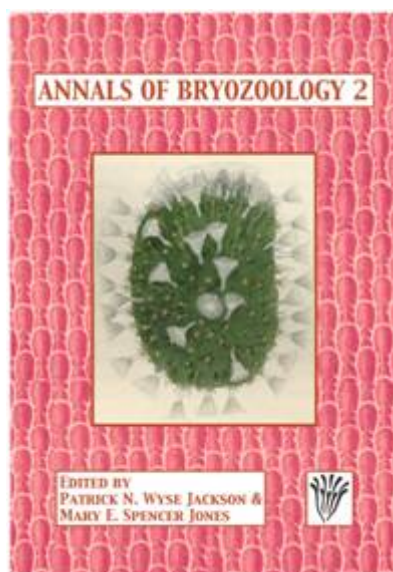
The Natural History Museum, University of Oslo will host the 2009 Larwood Meeting in Oslo, Norway. Meeting agenda will most probably follow recent meetings' programme. Perhaps the programme will be extended to include 1,5 days with scientific presentations, and there will be possibilities for "special interest" groups to have meetings in connection with this meeting. An excursion to collect Silurian bryozoans is planned - an excursion that will also include some touristic stops. The fossil hunt will take place inland near Oslo, in a fresh-water lake area, and snow permitting (!) might reveal fresh-water bryozoans as well. The University of Oslo also has a marine station (Drøbak) which also handles (student-) excursions and dredging. Hans Arne will check out possibilities to have a day-trip to Drøbak. The meeting is planned to take place in May or early June 2009.

The exact dates for the meeting is open – suggestions are welcome!

New from the IBA: *Annals of Bryozoology* 2

Patrick Wyse Jackson (wysjcknp@tcd.ie)

Mary Spencer Jones (m.spencer-jones@nhm.ac.uk)



This volume contains a collection of nineteen papers that reflect the diversity of topics in the study of fossil and living Bryozoa. It is the second in a series that began with the publication of the first volume by the International Bryozoology Association in 2002. A number of papers published in *Annals 2* were presented at the conferences of the International Bryozoology Association held in Chile in 2004 and Boone, North Carolina 2007.

The volume begins and ends with two papers on thin-sections. Richard Boardman, the foremost authority on the complexities of trepostome bryozoan taxonomy, discusses the history of thin-section manufacture in the USA while Patrick Wyse Jackson concludes the volume with an account of the earliest known thin-section of a bryozoan which was produced in the 1840s.

The work of women bryozoologists is highlighted in several papers. Abigail Smith recalls the role of women in the IBA from its foundation up until 2001; Mary Sears and Robert Woollacott provide a scholarly account of the labours and life of Alice Robertson who was one of the earliest researchers of modern Pacific bryozoan faunas. Susan Turner provides insights into the career of the Australian Joan Crockford who published a large volume of work on Carboniferous and Permian bryozoans mainly in the 1940s.

The antipodean theme is carried on by June and Charles Ross who have compiled a comprehensive listing of papers on Australian bryozoan studies and discussed the significance of the major players. Elizabeth Campbell and Yvonne Bone describe a number of the early oceanographic voyages made to Antarctica by Douglas Mawson amongst others. The material collected in the early decades of the 1900s remains a valuable research resource. From the opposite pole Hans Arne Nakrem tells the story of some early explorers to Svalbard, in whose footsteps he has followed to collect and study Carboniferous and Permian faunas. Nina Denisenko and Piotr Kiklinski continue the high latitude theme in outlining

some studies of research into Recent bryozoans in the Chukchi Sea and they go on to document our present knowledge of the diversity of taxa found there.

Andrew Ostrovsky has contributed three papers: on fertilization in Bryozoa, on sexual reproduction in gymnolaemates (co-authored with Norbert Vávra and Joanne Porter) and on parental care in cheilostomes. These comprehensive papers should remain essential reviews for students of bryozoology for many years to come.

In Russia bryozoans have been studied since the early 1800s but major advances were made with the establishment of research centres in St Petersburg and in Moscow. These are the subject of the contribution by Ernest Gilmour, Ariunchimeg Yarinpil and Patrick Wyse Jackson. Valuable contributions to our understanding of fenestrate taxa were made by V.P. Nekhoroshev and by his wife A.I. Nikiforova who died tragically young. Their daughter Lyudmila Nekhorosheva, herself a respected bryozoologist, has written a personal account of her parents' lives and work.

Taxonomic studies are not absent from this volume: Abigail Smith, Paul Taylor and Hamish Spencer have tabulated all that is known of the status of species within the Horneridae. The difficulties surrounding the taxonomic status of an *Alcyonidium* species are unpicked and clarified by Joanne Porter, John Ryland and Mary Spencer Jones. The author of the genus *Alcyonidium* was Jean-Vincent-Félix Lamouroux who is just one of many naturalists whose collections in the French National Collections are described by Jean-Loup d'Hondt.

Finally two papers describe examples of trans-Atlantic exchange of material. In the first paper Mary Spencer Jones, JoAnn Sanner and Carmen Thomas highlight the friendship of Ray Smith Bassler of the United States National Museum in Washington, DC and Anna Hastings of the British Museum (Natural History) in London. Over a period of many years the two corresponded and exchanged specimens. Patrick Wyse Jackson recently discovered a book in an academic library in Pennsylvania which he has shown once belonged to John Ellis the noted naturalist.

We hope that all the members of the IBA will order this volume, and if you don't have *Annals* I that you order it too! Delegates who attended the Boone meeting will be mailed a prepaid copy shortly as part of their registration package. **Please** encourage your institution library to purchase a copy even if you purchase one. A separate Order Form has been sent to you and is also available as a downloadable pdf from Patrick Wyse Jackson or from the IBA homepage.

We are in the process of editing *Annals* 3 which will comprise a Biographical Index of Bryozoologists which is being compiled by Jean-Loup d'Hondt, Christian Bange and the Editors. If you know of obituaries of bryozoologists published in obscure journals we (the editors) would be pleased to hear of them or receive copies, and we are also looking for photographic portraits of bryozoologists (please scan these at 300 dpi).

We are in addition planning *Annals* 4 and welcome offers of papers relating to the history of research on bryozoans. We hope that this volume will be published to coincide with the Kiel meeting.

NEW FROM THE IBA



THIS VOLUME CONTAINS NINETEEN PAPERS RELATING TO THE HISTORY OF RESEARCH ON BRYOZOA. A NUMBER OF THESE PAPERS WERE PRESENTED AT MEETINGS OF THE INTERNATIONAL BRYOZOOLOGY ASSOCIATION IN CHILE (2004) AND THE USA (2007).

P.N. WYSE JACKSON & M.E. SPENCER JONES (EDS)
ANNALS OF BRYOZOOLOGY 2: ASPECTS OF THE HISTORY OF RESEARCH ON BRYOZOANS
INTERNATIONAL BRYOZOOLOGY ASSOCIATION, 2008,
VIII+442PP. ISBN 0-9543644-1-4.
PRICE: £25/€32/\$48 INCLUDING POST & PACKAGING

ANNALS OF BRYOZOOLOGY 2: 19 PAPERS, 442 PAGES



THIS VOLUME CONTAINS TWENTY PAPERS WHICH WERE PRESENTED AT A JOINT MEETING OF THE SOCIETY FOR THE HISTORY OF NATURAL HISTORY AND THE INTERNATIONAL BRYOZOOLOGY ASSOCIATION IN DUBLIN IN JULY 2001.

P.N. WYSE JACKSON & M.E. SPENCER JONES (EDS)
ANNALS OF BRYOZOOLOGY: ASPECTS OF THE HISTORY OF RESEARCH ON BRYOZOANS
INTERNATIONAL BRYOZOOLOGY ASSOCIATION 2002,
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- RECENT BRYOZOA IN THE FRENCH NATIONAL COLLECTIONS
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- VASILY P. NEKHOROSHEV & ALEXANDRA I. NIKIFOROVA
- FERTILIZATION IN BRYOZOA
- SEXUAL REPRODUCTION IN GYMNOLAEMATE BRYOZOA
- THE PARENTAL CARE IN CHEILOSTOME BRYOZOANS
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- RESOLUTION OF TAXONOMIC ISSUES IN THE HORNERIIDAE
- BRYOZOAN EXCHANGE: BASSLER AND HASTINGS
- JOAN CROCKFORD-BEATTIE D.SC.
- A BOOK FROM THE COLLECTION OF JOHN ELLIS NOW IN THE USA
- WILLIAM LONSDALE & FIRST THIN-SECTION OF A FOSSIL BRYOZOAN

- GEORGE ROBERT VINE: STAYMAKER AND BRYOZOOLOGIST
- EARLY BRYOZOAN STUDIES IN THE NETHERLANDS
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- FRESHWATER BRYOZOOLOGY IN BELGIUM AND LUXEMBOURG
- HISTORY OF SOUTH-EASTERN PACIFIC BRYOZOANS
- COLONIAL BEHAVIOUR AND ZOOIDAL REACTIONS IN BRYOZOA
- INDIVIDUAL AUTOZOOIDAL BEHAVIOUR AND FEEDING MECHANISMS
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- THE I.B.A. INTERNATIONAL CONFERENCES 1968-2001
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- W.D. LANG, ORTHOGENESIS AND CRIBRIMORPH BRYOZOANS
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[ENQUIRIES: 353-1-8961477 (TEL); WYSJCKNP@TCD.IE]

Working on collections: News from Frankfurt, Germany (Senckenberg Research Institute)

Joachim Scholz

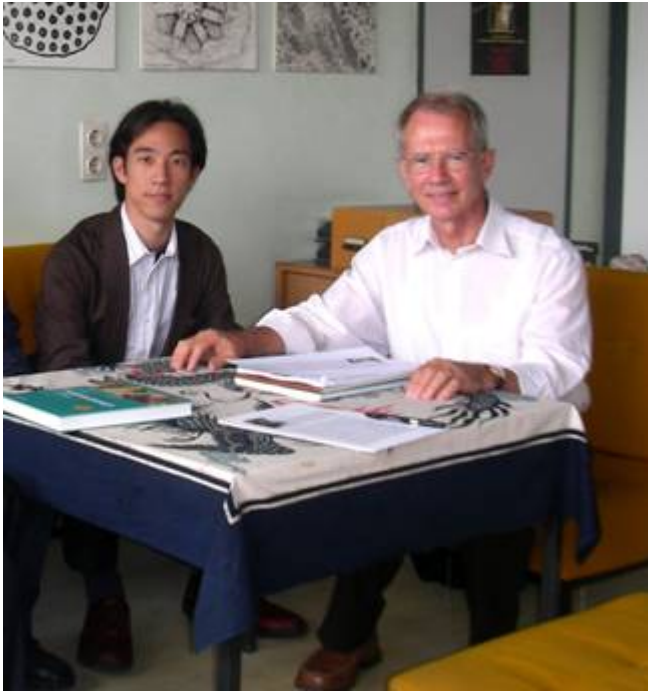


Figure 1. Masato Hirose-san discussing his Sagami Bay activities with Professor Volker Storch at the Dept. of Zoology, University Heidelberg (June 12, 2008, photo: J. Scholz).

Japanese Bryozoans

Within the months of May and June, two colleagues arrived in Frankfurt to work in our collections. For a period of altogether 10 months (May to December 2008), Masato Hirose-san (Hokkaido University, Sapporo) will be preparing his PhD thesis on Diversity and Short-term changes of the Bryozoan Fauna in Sagami Bay, Japan. The visit is funded by the JSPS (Japan Society for the promotion of science) and supervised by Professor Shunsuke F. Mawatari (Sapporo). Our colleagues Dr. Bernhard Ruthensteiner (Bavarian State Collection of Zoology in Munich) and Professor Volker Storch (University of Heidelberg, Department of Zoology) are furthermore supporting Hirose-san in his research.

Hirose-san is studying the rich collections of bryozoans and bryozoan-encrusted sponges collected by Haberer (1903/04) and Doflein (1904/1905) from

Munich. While the Doederlein collection has survived two world wars in Strasbourg, France (as pointed out by Shun Mawatari for the first time), large parts of the Doflein collection and some types of Buchner (1924) were lost during the Second World War. Therefore, Hirose's work will focus on both the revision of the Ortmann types in the Doederlein collection, and the definition of neotypes from the Doflein collection. As a small part of Hirose's comprehensive research, we are jointly working together on some reteporid samples from the collection mentioned before. As already pointed out by Peter Hayward, the Ortmann and Buchner descriptions and illustrations of their reteporid types need to be re-illustrated and there is also a demand for additional descriptions of features not readily accessible in times prior to invention of the SEM (like the primary orifice in reteporids, for example).

In June and July, Hirose-san is staying in Munich and will return to Frankfurt in August, where he is making good use of the very extensive E. Voigt library of books and offprints, and of the many separata given to us by Gero Hillmer and Heinrich Ristedt.

The Gosau Cretaceous

Directly involved in safeguarding the legacy of E. Voigt is another visit from abroad. For the

first two weeks of June, Professor Norbert Vávra and his wife Jutta from the University of Vienna (Dept. of Paleontology) studied the Voigt collection of the Gosau Group, Santonian, Easter Alps. This visit turned out to be very successful - Norbert and Jutta were able to reconstruct the respective manuscript that was left unfinished when E. Voigt died in November 2004. The manuscript was found to be in a far advanced stage - like a manuscript before co-authored with Gilbert Larwood on the Maastrichtian genus *Ubaghsia*, and to be published this year. However, the study on the Gosau Cretaceous is a far larger enterprise. As Norbert has pointed out, there are only 4 Studies on the Bryozoans of the Gosau Group, one done by Reuss, one by Zágoršek & Kroh, and two by the late E. Voigt himself, including the unfinished one under preparation.



Figure 2. Profesor Norbert Vávra and his wife Jutta in the bryozoology section of the Senckenberg Research Institute (June 13, 2008, photo: J. Scholz)

Norbert and Jutta also identified and sorted out Gosau originals and samples from the E. Voigt collection. This brought us a considerable step forward in promoting the collection as a research infrastructure for future generations. On the other hand, and at the current stage of our development, only about one third of the collection have been arranged. There are still about 120 large carton boxes full of E. Voigt bryozoans, literature, manuscripts and correspondence. The task will keep us occupied for years.

There is a good chance that the two posthumus manuscripts mentioned shall not be the last E. Voigt publications coming out. All IBA colleagues are cordially invited to help with this international cultural heritage.

Ordinal Names in Bryozoan Taxonomy

Dennis P. Gordon

Editor's note: The following paragraph by Dennis Gordon is based on his response to a question from Judy Winston: How should we treat ordinal names in bryozoan taxonomy? For example, both Chilostomatida and Cheilostomata are in common use. Should we not be consistent with this and other orders?

Dennis writes: Noting that -ida is a common ending for ordinal names and also rather preferring standardization insofar as it conveys meaning for those unfamiliar with bryozoan taxa, I started using -ida as an ordinal ending in my 1989 memoir (unless it was 1986 but I'm currently in Beijing and can't quickly check). Cheilostomida is at least phonetically very similar to Cheilostomata. I continued doing this, most conspicuously in the 1996 Wellington IBA conference volume. But Jonathan Todd complained at Panama that there was no definitive phylogenetic analysis confirming our treatment of the conventional orders as orders and until there was I should stick to the old names. I think Paul Taylor was of the same mind and so I capitulated and have been using the ole names ever since. I still like the ending -ida but there are two flies in the ointment. First, John Ryland pointed out that the correct rendition of the ordinal name should be, say, Cheilostomatida, not Cheilostomida, and to me that is a bit of a mouthful. Second, many bryozoan ecologists have been using the adjectival form cheilostomatid instead of cheilostome or, as in the 1983 Treatise volume, cheilostomate. That is very unfortunate as -id is a family expressed adjectivally, whereas -ide is an order expressed adjectivally. On balance I vote we stick with the old names. There is the issue of inconsistency, however, if we use cheilostome instead of cheilostomate as in the 1983 Treatise.

Bryozoa on *Calyplogena* sp. Shells: A Scientific Note

Hugo I. Moyano G.

In the great depths of the world ocean both along the continental slope and following the middle ocean submarine ridges have evolved ecosystems fueled by SH_2 and CH_4 which are metabolized by chemioautotrophic bacteria. Among these prokaryotic cells stand up large *Thioploca* bacterial threads. Nested in these bacterial mats develops an ecosystem composed of the small and large invertebrates.

Besides the huge *Riftia* tubes measuring more than one metre length also thrive large bivalves of the genus *Calyplogena*. Off Concepción, Chile, in September 2006, at $36^\circ 22'S$ and $73^\circ 73'W$, there is a place at 850 m depth where methane is flowing out. In this site during the SeepOx cruise on board of the R/V Vidal Gormaz using an Agassiz trawl were collected several disarticulated valves of *Calyplogena* sp. Growing on them two bryozoan species were found: *Ogilvalia elegans* and *Chaperiopsis* sp.

Chaperiopsis is represented by a small and severely worn zoarium impeding a specific determination. *Ogilvalia*, on the other hand, is represented by the basal zoarial part of several colonies. These specimens consist of encrusting zoarial sheets that keep in part the frontal membrane and operculum and that show the beginning of the erect colonial part. Previously *O. elegans*, was known to live at a similar latitude but at lesser depth, 538 m. (Moyano 2005, figs A-C).



Figure 2. Agassiz dredge with a haul from 1000 m depth off the Concepción seep area, (Photo from COPAS Newsletter, March 2007).



Figure 2. *Calyplogena* left valve with encrusting zoaria in light tan color. Photo by H. Moyano G.

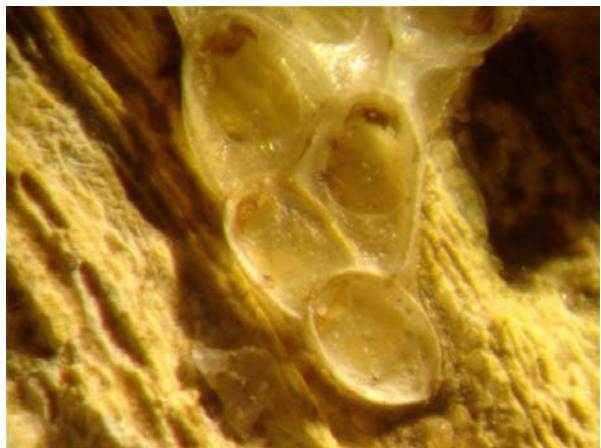


Figure 3. Ancestrula and several postancestrulae autozooids of *Ogilvalia elegans*. Photo by H. Moyano G.

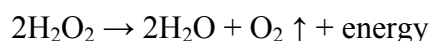
A Fast Cleaning Preparation for Living and Fossil Bryozoa

Francesco Toscano, Naples

This report documents a method for cleaning bryozoans in preparation for SEM and to share using two oxidant reagents: namely hydrogen peroxide (H₂O₂) solution 40% m/v in water (130 volumes) and sodium hypochlorite 5% (NaClO, the domestic bleach). This method is simple, rapid, inexpensive and does not require special facilities or reagents n. Apart from the reagents mentioned above, all that is needed are glass or plastic beakers of , a workbench and distilled water to rinse the final samples. The method may be used independently of the composition and preservation stages of the managed samples to remove organic matter, partly lithified sediments, and soft-bodied fouling organisms.

Safety notice. The method is not particularly hazardous. It is important to avoid any contact between H₂O₂ and the skin by using latex gloves, as this reagent is able to burn or bleach the hands and skin. In the case of contact with the hands wash them for a couple of minutes and use a common cold cream. The gases and vapours produced are not abundant or dangerous.

Hydrogen peroxide solution 40% m/v in water (130 volumes) is an unstable liquid that produces molecular O₂ and generates heat as follows:



This reaction removes organic matter from living samples and is able to weaken the partly lithified sediments in the fossil samples, disaggregating them by the mechanical pressure exerted by the rapid production of O₂ bubbles. Leave the sample to clean in hydrogen peroxide for 15–60 minutes (on average 30 minutes) depending on the size, porosity and the kind of matter to be removed. After the sample is sufficiently saturated with hydrogen peroxide, transfer it to the sodium hypochlorite solution. This produces a more vigorous reaction, combining the spontaneous redox reaction of two oxidizing agents to generate additional gas:



The reaction removes organic matter from living samples and is able to weaken partly lithified sediments in fossil samples, disaggregating them by the mechanical pressure exerted by the rapid production of O₂ bubbles. Eventually the reaction slows down and small bubbles appear on the surface of the beaker. These stages may be repeated as many times as is necessary. When the procedure is finished samples should be rinsed two or three times in distilled water. They may then be cleaned ultrasonically prior to SEM.

The procedure has been tested successfully on three different kinds of samples:

1. Lower Pleistocene fossil bryozoan colonies associated with brachiopods and partly covered by lithified sand, gravel, and mica;
2. Living bryozoan colonies on fouled substrata;
3. Dead bivalve shells overgrown by bryozoans and stained black by iron minerals.

Tests using the second type of material showed the best results to be obtained using colonies which were collected alive and dried in air prior to being immersed in H₂O₂ (depending on the size of the sample an unpleasant smell may be produced). Small samples may float on the

surface of the liquid due to the gas bubbles. The method proved to be very effective in eliminating sea grasses, small ascidians, and other soft bodied fouling organisms, while preserving and cleaning any calcareous parts. In addition, it worked well on species encrusting mussel valves, destroying the periostracum and making a separation of the bryozoan colonies from them easy. Note that colonies of *Electra pilosa* and *E. posidoniae* remained intact in peroxide but were destroyed in sodium hypochlorite.

The third type of material produced a very strong reaction in H_2O_2 as iron and other metallic ions act as catalysts for the reaction producing much gas to form foam which may spill over the edge of the beaker. Furthermore, this is the most exothermic reaction and it is important to be careful when touching the beaker as it can become quite hot.

This cleaning methods has the following advantages:

- a) it is not time-consuming and requires no special facilities;
- b) it employs inexpensive reagents which may be used many times over;
- c) it works on large and small samples of both living and fossil bryozoans and preserves other calcareous invertebrates occurring in association;
- d) it can isolate colonies from organic substrata such as mussel valves, sea grass blades and marine phanerogam leaves;
- e) it is possible to sieve the sediments and sort them for foraminifers, ostracods and small bryozoan fragments.

Intoxicated Bryozoan

Paul D. Taylor

While looking through a box of reprints recently I came across a 1925 paper by the famous Japanese bryozoologist Yaichiro Okada describing a new subgenus and species of ctenostome bryozoan. Okada was spot-on in describing *Alcyonidium* (*Paralcyonidium*) *vermiculare* as 'curious' (see the first paragraph of his paper) - colonies consist of 2-3 mm wide strings strongly resembling worms (see figure). Despite the aberrant appearance of *Paralcyonidium*, Okada's statement about the bryozoan being 'alcoholic' was surely a mistranslation referring to the preservation of the material in alcohol and not the fact that the bryozoan was addicted to alcohol.

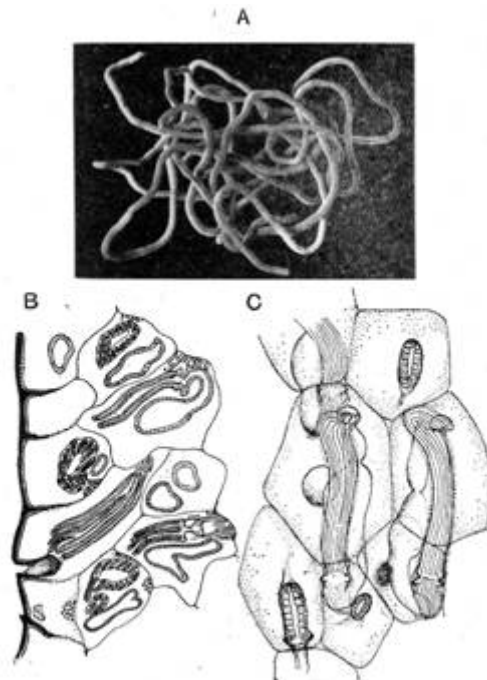
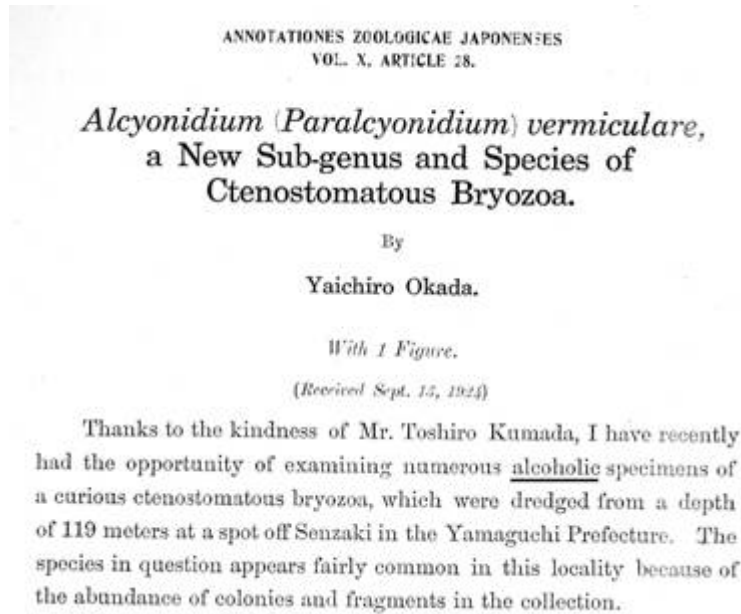


Fig. 1. *Paralcyonidium vermiculare*, n. sp.
A. A portion of zoarium. \times ca. $\frac{1}{2}$
B. Longitudinal section of zoarium. \times 45
C. Optical section of a few zoecia with young and old polypides within. \times 45

Bryozoan Bookshelf

Duplicate reprints for disposal

Mary Spencer Jones has two copies of: -

Brood, K., 1972. Cyclostomatous Bryozoa from the Upper Cretaceous and Danian in Scandinavia. *Stockholm Contributions in Geology* 26: 1-464.

Cook, P. L., 1968. Bryozoa (Polyzoa) from the coasts of tropical West Africa. *Atlantide Report* 10: 115-262.

and five copies of:-

McKinney, F. K., 1971. Trepostomatous Ectoprocta (Bryozoa) from the lower Chickamauga Group (Middle Ordovician), Wills Valley, Alabama. *Bulletins of American Paleontology* 60: 195-337.

These are available free, as long as the recipient is prepared to pay the postage. Interested IBAers may contact Mary at m.spencer-jones@nhm.ac.uk

Cheetham and Boardman papers available online

JoAnn Sanner alerts *Bulletin* readers that two papers by Alan Cheetham and three papers by Rich Boardman, published in the *Smithsonian Contributions to Paleobiology* series, are now available on line. They can be downloaded at www.sil.si.edu/smithsoniancontributions .
Titles are:

Functional Morphology and Biofacies Distribution of Cheilostome Bryozoa in the Danian Stage (Paleocene) of Southern Scandinavia

Alan H. Cheetham

87 pages, 29 figures, 17 plates, 10 tables

1971 (Date of Issue: 27 September 1971)

Number 6, Smithsonian Contributions to Paleobiology

A Vector Approach to Size and Shape Comparisons among Zooids in Cheilostome Bryozoans

Alan H. Cheetham and Douglas M. Lorenz

55 pages, 37 figures, 19 tables

1976 (Date of Issue: 8 July 1976)

Number 29, Smithsonian Contributions to Paleobiology

Mode of Growth and Functional Morphology of Autozooids in Some Recent and Paleozoic Tubular Bryozoa

Richard S. Boardman

51 pages, 6 figures, 11 plates
1971 (Date of Issue: 23 August 1971)
Number 8, Smithsonian Contributions to Paleobiology

Morphology, Anatomy, and Systematics of the Cinctiporidae, New Family (Bryozoa: Stenolaemata)

Richard S. Boardman, Frank K. McKinney and Paul D. Taylor
81 pages, 137 figures
1992 (Date of Issue: 14 April 1992)
Number 70, Smithsonian Contributions to Paleobiology

Reflections on the Morphology, Anatomy, Evolution, and Classification of the Class Stenolaemata (Bryozoa)

Richard S. Boardman
59 pages, 129 figures
1998 (Date of Issue: 26 August 1998)
Number 86, Smithsonian Contributions to Paleobiology

Balloon bryozoan

Abby Smith

At a recent Marine Science social function, one of our teaching fellows was making balloon animals. The challenge was given to him, could he make a balloon bryozoan? And the answer was, he could. Ladies and Gentlemen, Brian Paavo presents his balloon bryozoan. I hope you're impressed.



Cover Feature: Cheetham & Jackson, 1990

Editor's Note: Acting on an idea from Ken McKinney, the IBA Bulletin now begins a series highlighting covers of journals or magazines that feature bryozoans. Readers are encouraged to submit their own suggestions to me: tim.wood@wright.edu. To be clear, we are looking for publications that are issued at timed intervals and contain multiple articles (in other words, no bryozoan-specific monographs). I have no idea how many of these to expect, but we may find out!



COVER DESCRIPTION:

Skeleton of a colony of the cheilostome bryozoan *Steginorella magnilabris*. Features of individual modules (zooids, each about 1 millimeter long) that are preservable in the fossil record are sufficient to discriminate between morphospecies that breed true and are genetically distinct. Thus paleontologists can study evolutionary patterns at the species level in this group. See page 579. [Scanning electron micrograph by Susan Braden, National Museum of Natural History SEM Lab, Smithsonian Institution]

CORRESPONDING ARTICLE: Jackson, J.B.C. and Cheetham, A. H. 1990. Evolutionary significance of morphospecies: a test with cheilostome Bryozoa. *Science* 248:579-582.

Upcoming Meetings and Conferences

Bryozoa

International Bryozoology Association
25-30 July 2010, Kiel, Germany
Contact Priska Schäfer, ps@gpi.uni-kiel.de

9th Annual Larwood Meeting
May or June, 2009 (specific dates not yet set)
Natural History Museum, University of Oslo
Contact Hans Arne Nakrem, h.a.nakrem@nhm.uio.no

Paleontology

North American Paleontological Convention
21-27 June, 2009 in Cincinnati, Ohio (USA)
<http://www.vertpaleo.org/news/permalinks/2008/04/15/9th-North-American-Paleontological-Convention/>

Biology

Ecological Society of America
3-8 August 2008 in Milwaukee, Wisconsin(USA)
<http://www.esa.org/milwaukee/>

International Association for Ecology
16-21 August 2009, Brisbane (Australia)
http://www.intecol.net/info-esk/X-INTECOL/10th_INTECOL_Congress-3.htm

International Congress on Invertebrate Morphology
17-21 August 2008, Copenhagen, Denmark
<http://www.icim-1.dk/> (See information in the *IBA Bulletin 4(1)*)

International Congress of Zoology
26-29 August 2008, Paris, France
<http://icz2008.snv.jussieu.fr/> (See information in the *IBA Bulletin 4(1)*)

International Coral Reef Symposium
7-11 July 2008, Fort Lauderdale, Florida USA
<http://www.nova.edu/ncri/11icrs/>

International Society of Limnology
August, 2010, Capetown, South Africa
<http://www.limnology.org/news/circular2008.pdf>

Recent Publications

The following list includes works either published since the previous issue of the *IBA Bulletin* or else missed by previous issues. As always, members are encouraged to support future compilations by continuing to send complete citations to the IBA secretary at any time. Reprints will be gratefully received by the IBA archivist, Mary Spencer Jones.

- Ariunchimeg, Y., G. A. Afanasjeva, M. F. Bogoslovskaya, O. B. Weiss, L. A. Viskova, A. V. Vinogradov, E. I. Vorob'eva, V. I. Gontar, R. V. Gorjunova, A. V. Grishchenko, N. V. Denisenko, L. B. Iljina, V. D. Lavrentjeva, T. B. Leonova, D. V. Lisitsyn, A. V. Lopatin, I. N. Manankov, O. P. Mezentseva, L. A. Nevesskaja, L. V. Nekhorosheva, E. A. Nikulina, S. V. Nikolaeva, I. V. Novikov, A. N. Ostrovskii, V. P. Ozhgibesov, A. G. Plamenskaya, L. I. Popeko, V. I. Pushkin, A. P. Rasnitsyn, I. O. Renga, S. V. Rozhnov, A. Y. Rozanov, A. N. Solovjev, I. D. Sukacheva, N. P. Schastlivtseva, T. A. Favorskaya and A. Ernst (2008). Iraida Pavlovna Morozova (1919-2007). *Paleontological Journal* 42(2): 218-220.
- Braga, G. (2008). Atlas of Cenozoic Bryozoa of North Eastern Italy (Venetia region). *Lavori-Società veneziana di Scienze Naturali*, 33: 71-92.
- Dalal, A. and M. P. Arora (2008). Limnological study of *Plumatella* species of river Hindon. *Journal of Experimental Zoology India* 11(1): 99-108.
- Ernst, A. and C. F. Winkler Prins (2008). Pennsylvanian bryozoans from the Cantabrian Mountains (northwestern Spain). *Scripta Geologica* 137: 1-123.
- Fordinál, K., K. Zágoršek and A. Zlínská (2006). Early Sarmatian biota in the northern part of the Danube Basin (Slovakia). *Geologica Carpathica* 57(2): 123-130.
- Gordon, D. P., M. M. M. Hosain and T. Wood (2007). The known and anticipated bryozoan diversity of Bangladesh. *Journal of Taxonomy and Biodiversity Research* 1(2): 45-58.
- Gordon, D. P. and P. D. Taylor (2008). Systematics of the bryozoan genus *Macropora* (Cheilostomata). *Zoological Journal of the Linnean Society*. 153: 115-146.
- Green, A. J., K. M. Jenkins, D. Bell, P. J. Morris and R. T. Kingsford (2008). The potential role of waterbirds in dispersing invertebrates and plants in arid Australia. *Freshwater Biology* 53(2): 380-392.
- Hehnkamp, M., I. Bruchhaus and B. Hausdorf (2008). Multigene analysis of lophophorate and chaetognath phylogenetic relationships. *Molecular Phylogenetics and Evolution* 46(1): 206-214.
- Heindl, H., J. Wiese and J. F. Imhoff (2008). *Tenacibaculum adriaticum* sp. nov., from a bryozoan in the Adriatic Sea. *International Journal of Systematic and Evolutionary Microbiology* 58(Part 3): 542-547.
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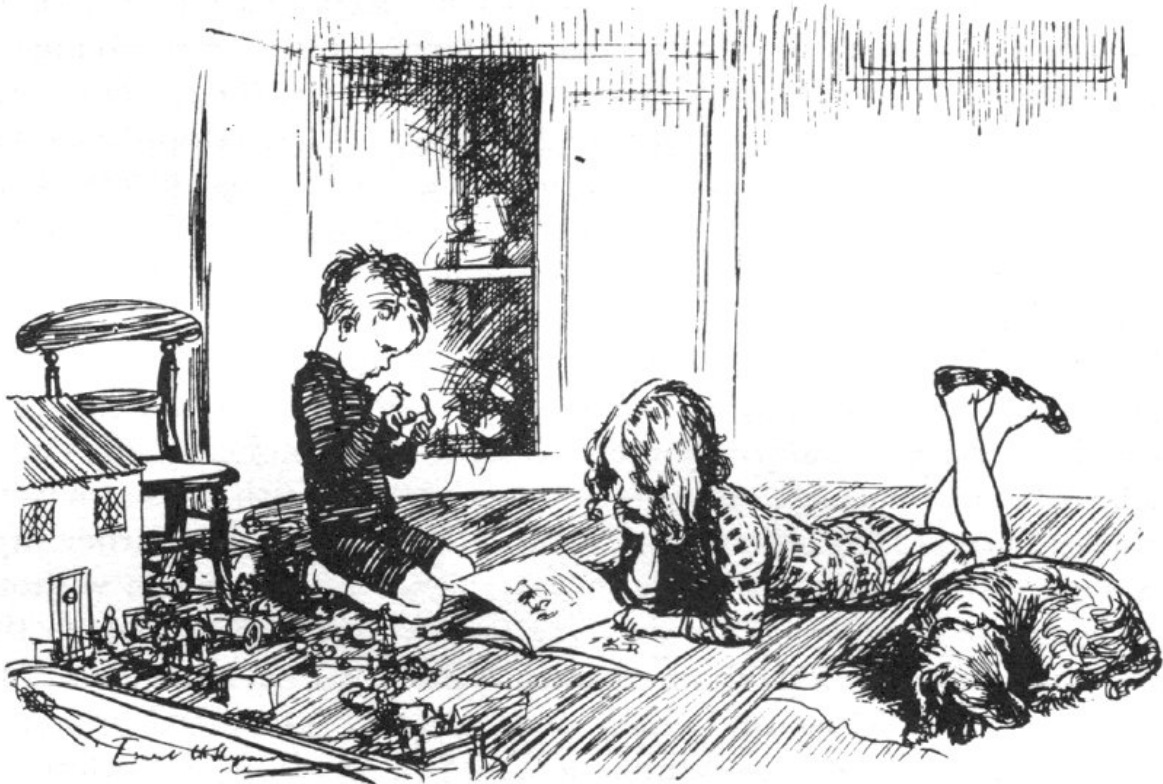
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Cartoon

(Thanks to Mary Spencer Jones)



He. "Where do animals go when they die?"

She. "All good animals go to Heaven, but the bad ones go to the Natural History Museum."