

Newsletter of Micropalaeontology



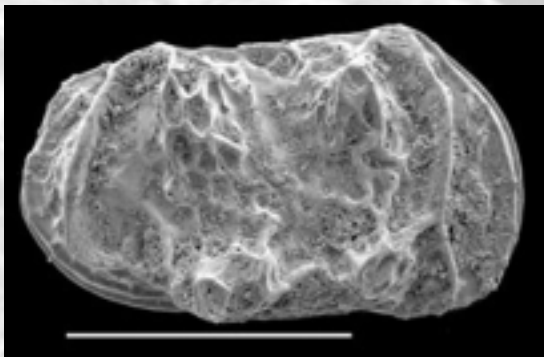
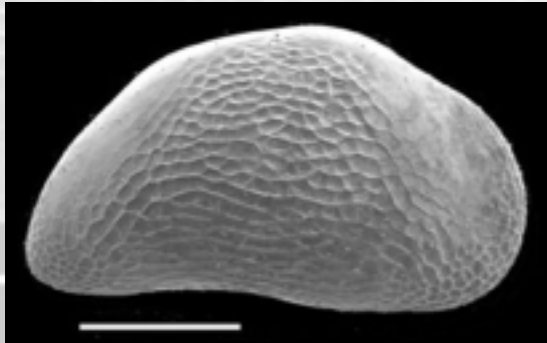
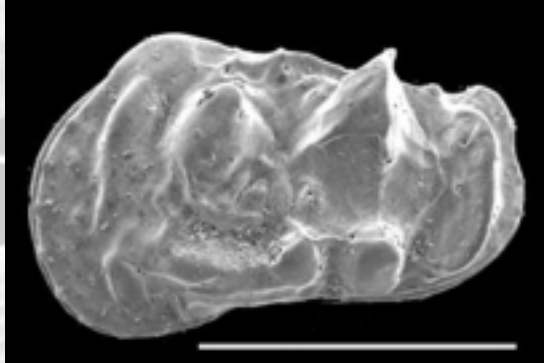
July 2002
Number 66

Edited by Jennifer Pike

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The Micropalaeontological Society

<http://www.tmsoc.org>

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Palytech is a partnership between Rae Jones (MSc & PhD Palynology, Sheffield), 10 years processing experience, international presentations, publications and reviewing regarding palynological processing, and Plastok (30 years experience in meshes, filtration design and fabrication).

Notes from the Chair

Haydon Bailey
<hwb20@aol.com>

It seems appropriate to start this note from where I left off in December, when I expressed concerns about the lack of “new blood” coming into Micropalaeontology. It seems that I was not alone. In February, Martin Farley and John Armentrout published an article in “The Oilman” (Vol. 62, No.2) entitled “*Biostratigraphy becoming a lost art in rush to find new exploration tools.*” It is subtitled “*In search of biostratigraphers*” and I recommend it to you as a review of the dilemma that our science faces (I can provide extra copies if you find it difficult to locate).

We are the victims of our own lack of “high tech” in a world where it would appear that 3D visualisation of computer generated models is preferred to hard data. Perhaps, I’m becoming more of a Luddite as I get older (by the time this is published I will have cracked my first half century!), but I’m afraid I still regard the best “high tech” gadgetry a scientist can use is positioned between the ears.

I shall digress at this point with a short story. A colleague of mine realised that he could produce a sketch monitoring the path of a horizontal production well by simply using a normal A3 microfossil distribution chart. The names of all his ‘bugs’ were along the top of the page and the resulting zonation scheme down the left hand margin. He marked the sample depths from the well along the bottom edge of the chart and simply by cross-plotting the sample depth against the appropriate zone assigned to the sample he could shade in the grid square on the distribution chart at the intersection point. As more samples were analysed he shaded in more squares and the wellpath was plotted against the zonal model for the field - simple!

Did anyone take any notice of this easy to produce method of illustrating a complicated wellpath? Not a chance. It was on a piece of paper and who uses those nowadays. However, the advent of laptops was not far away and it was an easy task next time offshore to produce exactly the same diagram, with exactly the same database as a simple spreadsheet on his

computer screen. This time he could use different colours for the zones and he could represent each section of the wellpath in the corresponding hue. Now he had all manner of people coming in to the logging unit to see this major technological breakthrough. The data was the same, the way it had been used and interpreted was the same but, the way it was presented was a whole new world - it was on a screen!

If there has to be a moral to this story I guess it’s a matter of recognising how we go about communicating with the end users of our science. It’s no good producing some of the best results around and not being able to communicate them. I don’t mean to your co-workers and other specialists in your chosen field, I mean being able to present viable information to your potential end-users. If they don’t get the message, then they won’t see the implications of what you’re telling them. So our biggest job is getting our message across. Farley & Armentrout point out that the average age of biostratigraphers working in the petroleum industry is currently 48 and there has been a 15 year gap in hiring and training new ones. Perhaps, the world will not need biostratigraphers in future - I doubt it and I think not. The maths is simple - in the time that ‘15 year gap’ could be bridged most of us will have retired and decided it’s someone else’s problem. However, currently it’s ours and we should all be thinking hard about how we solve it.

I’m beginning to sound like Alastair Cooke.....what a dismal thought! See you in September.

The cover photos for this issue are supplied by Ian Boomer.....

Top: *Callistocythere suzini* (Schneider)
External, left lateral view. Holecene, Caspian Sea (Scale bar 200um)

Middle: *Bacuniella dorsoarcuata* (Zalanyi)
External, right lateral view. Holecene, Caspian Sea (Scale bar 200um)

Bottom: *Callistocythere praeacuana*
(Livental) External, right lateral view.
Holecene, Caspian Sea (Scale bar 200um)

Copy deadline for next Newsletter is 1st November 2002.

TMS FOUNDATION

The Micropalaeontological Society Foundation is a sponsorship scheme to help support the *Journal of Micropalaeontology*. The Foundation is made up of members, non-members and institutions who wish to support the science of micropalaeontology via the production of the *Journal*. Any level of subscription is welcome. A minimum annual donation of £25 is suggested; donors of £25 or more will be acknowledged in the *Journal* and the *Newsletter*.

Subscription is welcome at any time. Please send donations to James B. Riding, Treasurer, The Micropalaeontological Society, British Geological Survey, Keyworth, Nottingham, Nottinghamshire, NG12 5GG, UK. Please make cheques/money orders/bankers drafts payable to “**The Micropalaeontological Society Foundation**”. If you wish to pay by Visa or Mastercard, please include amount you wish to donate, the card number, expiry date and cardholders address. If you wish to pay by Switch, please include the amount you wish to donate, the Switch Number, card issue number, expiry date and cardholders address.

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Society News

Constitutional changes

It has become apparent over the last twelve months that the “Constitution and Rules of the Society” as currently written are inadequate and fail to meet the needs of the Society in its new role as a leading international body. The “Constitution” itself probably needs little, if any, amendment, however the “Rules” governing the “Constitution” were constructed over thirty years ago and have been altered little since. They were simply not designed for an age when electronic ballots were a probability.

The committee has decided that an updating of the “Rules” is necessary, although such changes should be kept to a minimum in order to maintain the relatively simple constitutional structure of the Society. These changes should not be rushed and will require a positive vote at a General Meeting of the Society before they can be put into place. For this reason, it seems appropriate to invite members to bring forward suggestions for any areas of the “Constitution and Rules” where they recognise potential need for amendments to be made.

The overall timetable for this is to have a fully revised document available for discussion by this time next year so that it can be voted on at the November AGM in 2003. If you have the time, please examine the existing “Constitution and Rules” critically and contact the Society Chairman Haydon Bailey <hwb20@aol.com> who will co-ordinate this revision. Please make any initial suggestions by this year’s AGM, so that we have time to discuss them fully and to bring any potential changes to the attention of the Charities Commission.

Subscription Charges

After remaining at a constant level for many years, the Committee has decided that it is timely to increase subscription charges for Ordinary Members from £25 to £30 pounds per year. Student and retired membership costs will remain unchanged. A members vote on this increase will be held at the forthcoming AGM, 20th November 2002, in the Gustave Tuck Lecture Theatre at University College London.

Secretary’s Report

James Powell

<ajp@dinosystems.co.uk>

Annual General Meeting

The 2002 Annual General Meeting will be held at University College London in the Gustave Tuck Lecture Theatre on Wednesday 20th November, commencing 2:00pm (to be confirmed). Items for the agenda should be presented to the Secretary <ajp@dinosystems.co.uk> by Wednesday 23rd October 2002.

The agenda for the AGM will be displayed on the Society’s website <www.tmsoc.org> by Wednesday 30th October.

Following Society business, two talks will be presented:

Professor Felix Gradstein (Geological Museum, University of Oslo) will speak on ‘International Commission on Stratigraphy on Stage’ and Professor Sarah Metcalfe (Department of Geography, University of Edinburgh) on ‘Freshwater diatoms as monitors of environmental change in the tropical Americas’.

Following the AGM, a wine reception will be held in the South Cloisters at UCL together with a display of posters.

Members wishing to contribute a poster should contact the Secretary <ajp@dinosystems.co.uk> by Wednesday

30th October to ensure that adequate space is reserved. Poster boards have dimensions of 1m x 2m.

AGM Talk Abstracts

ICS on Stage

Prof. Felix M. Gradstein
Chairman of the International Commission on Stratigraphy (ICS); Geological Museum, University of Oslo, Norway

The most important issue presently on the agenda of the International Commission on Stratigraphy (ICS) is the completion of the definition of stages; the author will outline the concept in its historical and its actual context. Special challenges exist with the definition of Precambrian and Quaternary stratigraphic units. However, ICS is not only about standards, but more about geological process oriented and dynamic stratigraphy, with IGCP-style and -type projects the favoured trend.

A newly created Stratigraphic Information System (SIS) will make important stratigraphic information easily available world-wide and also plans to offer assistance with teaching of stratigraphy in the earth science curriculum of universities and high-schools. The URL stratigraphy.org is the official website of ICS and SIS. The website serves as the official platform for stratigraphic discussions and news and also links to all other sites maintained by individual ICS units, by IUGS and its major commissions, and by national stratigraphic commissions. It is now possible to find key stratigraphic information at one spot, instead of in 50 different publications scattered over many libraries; PDF-type figures and outcrop pictures are constantly added also. The new web increases the relevance and awareness of ICS work in the field of educational and applied stratigraphy. Among the most commonly used products

of ICS are the International Stratigraphic Guide and the Standard Stratigraphic Chart. Both can be obtained from the ICS website. Two simple colour coding schemes are presented for units of the Chart and geologic time scale. One is compatible with the units of the Geological Map of the World and particularly popular in Europe, and the other, a spectral colour scheme, is popular in North America and Australia.

Freshwater diatoms as monitors of environmental change in the tropical Americas

Prof. Sarah Metcalfe
Department of Geography, University of Edinburgh, UK

The impact on the environment of both climatic change and human activities is of growing concern. It is clear that tropical areas are particularly vulnerable to both, but usually lack the long term monitoring data which can provide some form of baseline assessment of natural variability and sensitivity to disturbance. Freshwater diatoms can provide alternative archives of change over a variety of timescales. Results from Mexico and Belize are used to illustrate applications of diatoms to issues of climate change and human disturbance over timescales from millennia to sub-decadal. Increasingly, such reconstructions exploit not only the diatom assemblages *per se*, but the isotopic signatures preserved in the diatom frustules. Whilst offering many advantages for reconstructing environmental change there are conditions which hamper diatom studies and some of these are also discussed in the Central American context.

Changes to the Committee

The terms of office of the following Officers of the Committee come to an end at the 2002 AGM: Treasurer, Newsletter

JOINT MEETING OF AASP-TMS-NAMS
11TH-13TH SEPTEMBER 2002
UNIVERSITY COLLEGE LONDON

Full programme of 80 presentations with sessions on
EXPLORATION BIOSTRATIGRAPHY

Including:

- *Forging a path for biostratigraphy*: M. Farley (University of North Carolina at Pembroke)
- *Data integration: key to robust reservoir models*: C. Denison & R. Preece (ChevronTexaco)
- *Janice Field: palynostratigraphic & geological setting*: L. Riley & P. Ware (Kerr McGee)
- *Biostratigraphic impact on Orme Lange Gas Field*: M. Charnock (Norsk Hydro) *et al.*
- *Morphostratigraphy of Maureen Formation, Fleming Field*: E. Monteil (*ex* BG Group)
- *Forties Field: applications of biostratigraphy to mature field*: G. Williams & S. Payne (BP)
- *Mungo Field: bugs, dose of salts & reservoir development*: S. Payne (BP) *et al.*
- *Early Eocene Hasdrubal Field, offshore Tunisia*: H. Bailey *et al.* & A. Racey (BG Group)
- *Sequence biostratigraphy Haima Supergroup, Oman*: S. Molyneux, P. Osterloff (PDO) *et al.*
- *Devonian maturity studies in Bolivia*: J. Marshall, A. Racey (BG Group) *et al.*
- *Glacigenic Al Khilata Formation, Oman*: R. Penney & P. Osterloff (PDO)
- *Permian palynology & isotopes, Oman*: M. Stephenson, M. Leng & P. Osterloff (PDO)
- *Ravenscar Group: Middle Jurassic analogue*: N. Butler & M. Charnock (Norsk Hydro) *et al.*
- *Early Cretaceous palynology, North Slope Alaska*: R. Davey (Robertson Research Int.).
- *Cretaceous biostratigraphy of Fiqa Formation, Oman*: S. Packer, P. Osterloff (PDO) *et al.*
- *Late Cretaceous depositional environments, Norwegian Sea*: P. Milner (BP Norge) *et al.*
- *Mid Norway Late Cretaceous sequences*: M. Charnock (Norsk Hydro) & S. Crittenden
- *Palynofacies of Gurpi Formation, Iran*: E. Ghasemi-Nejad & M. Hadi Hobbi (Tehran Univ.)
- *Paleogene palynology of Llanos Foothills, Colombia*: C. Jaramillo *et al.* (Ecopetrol).
- *Sequence boundaries in Mackenzie Delta region*: M. Parsons & G. Norris (Toronto Univ.)
- *Miocene biotic signals, Central Sumatra Basin*: C. Denison (ChevronTexaco) *et al.*
- *Neogene sea level changes of Niger Delta*: R. Morley & O. Ulu (ChevronTexaco)
- *Neogene ancient shelf margins, northern Gulf of Mexico*: G. Jones (Unocal) *et al.*
- *Upper Neogene sequence biostratigraphy, Trinidad*: L. de Verteuil (Latinum) *et al.*

Full programme and registration details can be found at TMS website (www.tmsoc.org) or by contacting TMS Secretary, Jamie Powell (ajp@dinosystems.co.uk)

CHARLES DOWNIE AWARD

The late Charles Downie was one of the pioneers of palynology in the U.K. and a mentor who guided the thinking and development of a large number of postgraduate students who passed through the University of Sheffield. Through the efforts of former colleagues at Sheffield, a permanent memorial has now been established to recognize Charles' contribution to micropalaeontology. An annual award will be made to The Micropalaeontological Society member, who in the opinion of The Micropalaeontological Society Committee, has published the most significant paper, in any journal, based upon his or her postgraduate research.

The second award of £200 will be made for the best paper published during 2001 and will be presented at The Micropalaeontological Society AGM in November 2002. Nominations for the best paper published in 2002 should be submitted either to the appropriate TMS Specialist Group, or The Micropalaeontological Society Secretary by 28th February 2003.

Dr James Powell, TMS Secretary,
Dinosystems, 105 Albert Road, Richmond, Surrey TW10 6DJ, England, UK
Tel: +44 20 8948 6443; Fax: +44 20 89405917; Email: ajp@dinosystems.co.uk

Charles Downie Memorial Award Contributors (July 2002)

R. L. Austin	W.A.M. Jenkins
G. A. Booth	J. K. Lentin
B. Braham	R. S. W. Neville
J. P. Bujak	B. Owens
G. Clayton	T. L. Potter
M. D. Crane	A. J. Powell
S. Duxbury	S. M. Rasul
G. L. Eaton	M. Razzo
G. A. Forbes	J. B. Riding
K. J. Gueinn	W. A. S. Sarjeant
A. M. Harding	J. E. Thomas
R. Harland	J. Utting
K. Higgs	D. Wall
P. J. Hill	M. J. Whiteley
A. Hossein Zahiri	G. L. Williams

Editor, Publicity Officer and Webmaster. Nominations for these positions should be submitted to the Secretary <ajp@dinosystems.co.uk> by Wednesday 30th October 2002. Nominees, proposers and seconders should all be members of the Society.

The Secretary, Journal Editor and Special Publications Editor will stand down at the 2003 AGM, and the incumbents are ineligible for re-election. If you wish to consider standing for these positions, please contact the Secretary <ajp@dinosystems.co.uk> for information about the duties and responsibilities entailed.

Charles Downie Award 2002

The Charles Downie Award is an annual award made to the member of the Society who, in the opinion of the Committee, has published the most significant paper, in any journal, based upon his or her postgraduate research. The Committee has awarded the 2002 Charles Downie Award (best paper published in 2001) to Gary Mullins for his paper entitled 'Acritarchs and prasinophyte algae of the Elton Group, Ludlow Series, of the type area'.

Monograph of the Palaeontographical Society London: 1-154, pls 1-18. (Publ. No. 616, part of Vol. 155 for 2001). The Committee had a very difficult decision to make and all nominees are to be thanked. Gary will receive his award at the 2002 AGM

Charles Downie Award 2003

Nominations for the best paper published in 2002 should be submitted either to the appropriate specialist group or the Secretary <ajp@dinosystems.co.uk> by 28th February 2003. Nominated papers can be either single or multiple authorship, as long as the nominee is the senior author.



Paul Dodsworth receiving the 2001 Charles Downie Award from Bernard Owens at the AGM

Grants-in-Aid 2002

The Committee has decided to extend the deadline for Grants-in-Aid to 30th October 2002. These grants are designed to help student members of the Society in their fieldwork, conference attendance or any other activity related to their research. A maximum of £200 can be awarded to each successful applicant, and a total of £600 is available annually. Please note, grants will not be awarded retrospectively. Application forms may be obtained from the Secretary <ajp@dinosystems.co.uk>.

Membership Database

The Society's database currently comprises 426 (447) individual members, of which 225 (241) are resident in the UK, 99 (105) in Europe, and 102 (101) in the Rest of the World (2001 figures in brackets). Your address label indicates whether or not you have renewed for 2002 (and whether or not you pay by Direct Debit). Members who do not renew their subscriptions by the AGM (20th November 2002) will be struck off the database and will receive neither *Newsletter of Micropalaeontology* No. 67 nor Part 2 of Volume 21 of the *Journal of Micropalaeontology*.

Missing Members

The Secretary does not have current addresses or other contacts for the following paid-up members who pay by Direct Debit:

I.P. Evans

C.O. Jones

P.N. Leary

S.J. Tull

Dr & Mrs A. Williams

D.B. De Hauteville-Bell

If you know of their whereabouts contact:

Dr James Powell

<ajp@dinosystems.co.uk>.

Directory of Members

A new edition of *The Directory of Members* is being compiled and will be issued with the next edition of the *Newsletter of Micropalaeontology*. The new Directory will include email addresses, telephone and fax numbers, as well as specialist group affiliations. It is the intention of the Committee that The Directory will also be made accessible through the website. Members who do not wish to have their details included on the website should let the Secretary know <ajp@dinosystems.co.uk>.

AASP-TMS-NAMS Meeting 2002

The conveners have received approximately 100 abstracts for this exciting international conference, scheduled for 11th-13th September 2002 at University College London. The vision of the meeting is to encourage trans-Atlantic exchange of ideas, ultimately to seed new research initiatives. In particular, we aim to develop an integrated multidisciplinary approach in both the academic and industrial realms. The following sessions are planned (in no particular order):
Faeces Symposium (one whole day).
Oman Papers (1/4 day).
Sequence Biostratigraphy (3/4 day).

Methods Session (1/2 day).

Reservoir/Development Studies (1/2 day).

Open Palynology Session (two whole days).

Open Micropaleontology Session (1/2 day).

The final circular is displayed elsewhere in the *Newsletter*.

Treasurer's Report

James B. Riding

<j.riding@bgs.ac.uk>

I am delighted to report that the financial health of the Society is presently good and we should achieve a balanced budget this year. This is, however, contingent on the September Meeting breaking even. A large conference such as this one is a slight risk financially, however I am confident that it will be financially (and scientifically) successful.

There are some members who have not paid their subscriptions for 2002. Please check if you have paid the 2002 invoice, which was mailed out last January to all members who do not have direct debits. If you have not paid for this year, please pay your 2002 subscription to me as soon as possible.

New Members

We welcome the following new members to the Society:

P. Henning E. Blom

Kevin Brown

Ivo Grigorov

David Hicks

Dindin Nurhayadiu

Suzanne A. G. Leroy

Maria Rose Petrizzo

Leon Rosa

Barry A. Taylor

Eko Wahyuningtiyas

Benedictus Widiyanto

Paul Williams

2002 Membership Renewal

The Secretary has updated the Society's membership database. It is correct as of 15th May 2002. If your address label is marked with 'BMS: 2001' our records indicate that you have not renewed your TMS membership for 2002. If you do not renew before the 2002 AGM (20th November) your details will be deleted from the database and you will receive neither *Newsletter of Micropalaeontology* No.67 nor *Journal of Micropalaeontology* Volume 21, Part 2. The Society needs your support. Please send your subscriptions to Dr James Riding (TMS Treasurer)

Journal Editor's Report

Malcolm B. Hart

<mhart@plymouth.ac.uk>

Journal of Micropalaeontology

Volume 21, Part 1, May 2002

CONTENTS

1. Classification of the meridionally costellate Cretaceous planktonic foraminifera
H. A. El-Nakhal

2. Ontogeny and sexual dimorphism in the Middle/Late Devonian rhomboentomozoid ostracod *Franklinella*
E. Olempska

3. *Cribratina hoeverensis* Steffahn & Helm sp. nov.: a new 'larger' agglutinated foraminiferal species from the Upper Cretaceous (Lower Campanian) of Hannover, NW Germany
J. Steffahn & C. Helm

4. Taxonomy and ecology of *Cornucoquimba ramosae* sp. nov. (Ostracoda, Crustacea) on the Brazilian Equatorial Shelf
J. C. Coimbra & D. A. Do Carmo

5. Early Palaeogene planktic foraminiferal and carbon isotope stratigraphy, Hole 762C, Exmouth Plateau, northwest Australian margin
H. J. L. Hancock, G. C. Chaproniere, G. R. Dickens & R. A. Henderson

6. *Eodinia poulsenii* sp. nov., a dinoflagellate cyst from the Middle Jurassic of Central Poland
M. Barski

7. Biostratigraphy and palaeoecological interpretation of the Miocene–Pleistocene sequence at El-Dabaa, northwestern Egypt
M. I. A. Ibrahim & A. M. S. Mansour

8. Foraminiferal zonation of early Oligocene deposits (Selztal Group, Latdorfian, Rupelian) in the Mainz Basin, Germany
K. I. Grimm

9. Two new Early Cretaceous dinocyst species from the Central North Sea Basin
S. Duxbury

10. Testing of palynological processing techniques: an example using Silurian palynomorphs from Gotland
D. N. Gelsthorpe

11. Revision of acritarchs and prasinophyte algae from the lower Silurian of Belgium
G. L. Mullins

MICROPALAEONTOLOGY

NOTEBOOKS

1. *Paulanoblella*, nomen novum (Radiolaria) replaces *Noblella* Kozur, Mostler & Repetski, 1996, a homonym of *Noblella* Barbour, 1930 (Amphibia)
H. W. Kozur & J. E. Repetski

2. Resting stage in benthic foraminiferal propagules: a key feature for dispersal? Evidence from two shallow-water species
E. Alve & S. T. Goldstein

Long-Standing Members

The Society is grateful for the support given by the following individuals who have all been members since 1980:

R.J. Aldridge	G.L. Eaton	J.E.A. Marshall
J. Athersuch	J. Elliott	P.R. Marshall
R.A.K. Attewell	J.P.G. Fenton	S.G. Molyneux
R.L. Austin	B.N. Fletcher	P.H. Morris
H.W. Bailey	N.G. Fuller	J.W. Murray
R.H. Bate	R. Harland	J.W. Neale
D.J. Batten	D. Harrison	C.J. Peat
G.A. Booth	M.B. Hart	S.M. Rasul
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M.D. Brasier	G.W. Hughes	L.A. Riley
J.P. Colin	C.O. Hunt	W.A.S. Sarjeant
P. Copestake	G.L. Jones	D.J. Shipp
J.A. Crux	C. King	D.J. Siveter
C. Denison	J.H.A. van Konijnenburg	G. Warrington
K.J. Dorning	J.F. Laing	J.F. Weston
G.R. Dyer	A.R. Lord	J.E. Whittaker
		I.P. Wilkinson
		R. Woollam

Grants-in-Aid **2002**

The Committee has decided to extend the deadline for **Grants-in-Aid** to 30th October 2002. These grants are designed to help student members of the Society in their fieldwork, conference attendance or any other activity related to their research.

A maximum of £200 can be awarded to each successful applicant, and a total of £600 is available annually. Please note, grants will not be awarded retrospectively. Application forms may be obtained from the Secretary <ajp@dinosystems.co.uk>

Specialist Group News

Foraminifera Group

Andrew Henderson

Foraminifera Group Chair

<a.henderson@nhm.ac.uk>

The Foraminifera group had a very successful Spring meeting on Friday 3rd of May at the Natural History Museum, London. Just under 40 micropalaeontologists attended. The 14 talks were extremely well presented with the majority from postgraduate students. The standard of illustration was also excellent with PowerPoint presentations now much more commonplace (providing an organisational headache as there were 5 different laptops in use!). Three posters were also displayed.

The success of the meeting again prompted another discussion as to whether the group could sustain two meetings a year, but there seemed to be as many people for the idea as against. Another suggestion was that we hold a meeting in Europe next year, perhaps increasing the duration to two days with fieldtrips. I would be interested in receiving feedback on this issue.

Foraminifera Group Meeting Abstracts Oral Presentations

Seasonality and Benthic Foraminifera

Bill Austin

School of Geography & Geosciences,
University of St Andrews, UK

Seasonal changes in the mid- to high-latitudes have a major influence on the physical, chemical, and biological systems

of shelf seas. The seasonal response of benthic Foraminifera to such changes are explored in terms of both changing species abundance and stable isotope incorporation into the Foraminiferal test. Preliminary results, tracing the changing abundance and population age-structure of living *Stainforthia fusiformis*, reveals a marked seasonality in the recruitment of this species into the foraminiferal fauna of the Celtic Sea. Such patterns of seasonal recruitment have major implications for the interpretation of stable isotope records based on fossil Foraminiferal assemblages. The potential of using benthic Foraminifera to record “seasonality” will be evaluated.

Keywords: Celtic Sea, seasonality, benthic Foraminifera, stable isotopes

The relative uptake of ¹³C by intertidal benthic Foraminifera feeding on ¹³C-enriched benthic diatoms

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Supervisor: Professor David M. Paterson

The numerical significance of benthic foraminifera and their contribution to benthic biomass has been demonstrated from deep-sea to intertidal environments. Despite this fact, Foraminifera are frequently overlooked in ecological studies of the coastal zone. Within estuarine environments, microphytobenthos (e.g. diatoms) have been shown to contribute up to 45% of the gross primary production, compared to 52% by phytoplankton. These figures highlight the potential importance of microphytobenthos as a mediator in the carbon budget of an estuary. If benthic Foraminifera have the ability to respond quickly to increases in microphytobenthos biomass (“blooms”), this would make them an important link in the lower benthic food web.

A laboratory experiment was performed on intact intertidal sediment cores to quantify the relative uptake/ingestion of ^{13}C -enriched benthic diatoms (*Cylindrotheca closterium* (Ehrenberg)) by benthic Foraminifera (and ostracoda) over a five day period. Mean specific uptake of ^{13}C over a five day period was significantly different among the genera examined. However, no significant difference was seen in the specific uptake of individual genera between day 1 and day 5. Background $\delta^{13}\text{C}$ measurements were conducted on three genera of calcareous Foraminifera, one group atestate Foraminifera and one group of ostracoda. Comparisons were also made between two treatments of the samples prior to measurement (fresh frozen and rose Bengal-Formalin preserved). All taxa investigated responded quickly (within 1 day) to a simulated benthic diatom bloom, further highlighting the importance of benthic Foraminifera in the benthic food web of intertidal environments. Keywords: Benthic Foraminifera, intertidal environments, benthic diatoms, stable isotopes.

Palaeoecology of some extreme 'clavate' planktonic foraminifera from the Cretaceous to Recent

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Extreme clavate shell morphologies in planktonic foraminifera have evolved iteratively during successive evolutionary radiations in the Cretaceous and Cenozoic. Multispecies stable isotope analysis of foraminiferal assemblages from four time slices in which clavate taxa occur (Late Cretaceous (Turonian), middle Eocene, middle Micoene and Recent), reveal that

each of the homeomorphs investigated (*Clavibergella watersi*, *Clavigerinella* spp, *Clavatorella bermudezi* and *Globigerinella adamsi*) have similar isotopic signatures, i.e. light $\delta^{13}\text{C}$ and heavy $\delta^{18}\text{O}$ values relative to a suite of co-occurring planktonic and benthic species, indicating life in a similar cool, probably deep-water habitat. Anomalously light $\delta^{13}\text{C}$ values (comparable to benthics), suggests either that this habitat was enriched in ^{12}C , e.g. subthermocline or upwelled water, or that some unknown 'vital effect' caused fractionation of carbon isotopes.

Geochemical indications of palaeo depth habit for modern clavate species *G. adamsi* are consistent with data from plankton tows and field observations, which record this and other modern clavate species, i.e. *Hastigerinopsis digitiformans* and *Beella*, living at significantly greater depths compared to other planktonic species (100-1000m). This case is one of the few among planktonic foraminifera where there appears to be a consistent link between morphology and life habit during different geological periods and suggests that the clavate body-plan conveyed particular adaptive advantages to life in a deep, nutrient rich but food poor environment.

Miocene deep water Agglutinated foraminifera from the Gulf of Mexico

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An exploration well from the Gulf of Mexico, Amoco LA V.K. 915, has been studied in order to record the foraminiferal assemblages present in the Neogene. Amoco V.K. 915 yielded a diverse assemblage of agglutinated and calcareous benthic foraminifera with 2940m of ditch cutting recovery. Three significant species

associations can be identified down the well; the stratigraphical location of these associations is evident when total agglutinated species abundance for each sampling interval is plotted. In this study the authors have utilised a combination of morphotype habitat preference (Jones and Charnock, 1985) and test functional morphology to indicate depositional environments. The associations indicate a progression from a ventilated water column, through to the development of an oxygen minimum zone dominated by alveolar foraminifera. The species composition of the lowermost association suggests a depositional environment dominated by overbank fines and channel levee deposits; this is reinforced by sedimentological data.

The second section of the presentation serves to clarify several taxonomic discrepancies that have arisen through the study of this material. The authors propose that the genus *Alveovalvulinella* be reinstated as a valid separate genera according to the definition of Lobleich and Tappen (1964), removing it from the genus *Guppyiella*.

Images of key species are presented; created using digital image manipulation techniques (Palaeovision technique).

Jones, R.W. & Charnock, M.A., 1985: 'Morphogroups' of agglutinated foraminifera. Their life positions and feeding habitats and potential applicability in (paleo-)ecological studies. *Revue de Paleobiology*, 4(2), 311-320.
Loeblich, A.R. & Tappan, H.; 1964. *Treatise on Invertebrate Paleontology; Sarcodina; Protista 2*. The Geological Society of America and The University of Kansas Press.

The Distribution of the Xenophyophore *Syringammina fragilissima* in the Northeast Atlantic and its Influence on the Diversity of Bathyal Foraminiferal Assemblages

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Xenophyophores, giant, agglutinated rhizopods, are an important component of deep-sea assemblages. The first xenophyophore to be described, *Syringammina fragilissima*, has been recovered only rarely, however, due to the delicate nature of its test, although it appears to be common at bathyal depths in the NE Atlantic. Here, we discuss its distribution and ecology around the Darwin Mounds, an area of carbonate mounds at approximately 1000m depth in the northern Rockall Trough. From sea-floor video footage it is evident that *S. fragilissima* was particularly abundant downstream of the mounds, where it reaches abundances of up to approximately 7 individuals m⁻², although it is not apparent what proportion of these were alive.

We investigated the role of *Syringammina fragilissima* in providing microhabitats for other foraminifera by staining and then carefully dissecting four dead tests. The abundance and species richness of foraminiferal assemblages associated with the xenophyophores were much higher than in the surrounding sediment, suggesting that *S. fragilissima* tests substantially enhance the biodiversity of benthic assemblages in the area, although the distribution of species between xenophyophores was very variable. Several foraminiferal species were particularly abundant inside the tubular branches of the xenophyophore tests. Live specimens of the rotaliid *Chilostomella*

elongata were common in one test, although it was absent from the surrounding sediments. Similarly, very high numbers of a small allogromiid (?*Cylindrogullmia* sp.) occurred within another test. In both these cases, the foraminifera were associated with dark grey, fine-grained sediment that may represent the decayed remains of stercomata. In addition, several species of allogromiids and saccamminids lived within the remains of the xenophyophore granellare system, where they may have been grazing on bacteria associated with decayed protoplasmic remnants. For certain species the *Syringammina* tests therefore offer a protected infaunal microhabitat.

Keywords: NE Atlantic, Xenophyophore, *Chilostomella*, allogromiids, biodiversity

Holocene History of an Enclosed Basin on the Shelf West of Scotland

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Muck Deep is an enclosed basin (maximum depth 210 m) surrounded by shelf (depth ~80 m) close to the island of Muck on the shelf W of Scotland. In this deep, the living and dead benthic foraminiferal assemblages are quite distinct. The living are dominated by infaunal taxa whereas the dead assemblages have almost equal proportions of infaunal and epifaunal taxa. It seems likely that the dead assemblages include a high proportion of tests transported in from the surrounding shelf. Winter storm waves >10 m in height are thought to be responsible for mobilising sand and foraminiferal tests and transporting them into Muck Deep.

A 70 cm core from 170 m water depth has a fauna composed entirely of contemporary foraminifera consistent with water temperatures of >6°C and salinity of 35 psu as occurs at present. This, together with the absence of cold water taxa, suggests that the entire core is of Holocene age (<10 kyr). Whereas the upper half of the core represents modern conditions, the lower half has muddy sediment and a mainly indigenous fauna with few transported foraminifera. It is interpreted as representing a much lower energy environment than now. This could be either a sheltered inlet/fjord or an enclosed shelf deep with a much lower wave climate. Because sea level rise has been nearly matched by isostatic rebound of the crust following deglaciation, relative sea level has remained almost unchanged over the past 10 kyr. Thus the inlet hypothesis seems unlikely. However, the modern wave climate is controlled by the North Atlantic Oscillation which is particularly strong at present. A lower wave climate in the past may be the best explanation for the interpreted lower energy conditions. We plan to date the core so that this finding can be put into a palaeoclimate context.

Climatic Influence on Sediment Transport in the Mediterranean Outflow Current (Gulf of Cadiz, Spain)

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Sedimentation in the Gulf of Cadiz is dominated by the presence of two strong bottom currents, the Atlantic Inflow Water (AIW) and the deeper Mediterranean Outflow Water (MOW). These currents are a consequence of the density contrast between the enclosed Mediterranean basin

and the Atlantic Ocean. The MOW is a density current that flows out of the Mediterranean and turns into the Gulf of Cadiz as it leaves the Strait of Gibraltar. Several downslope channels peel off from the main flow body, one of which is the Gil Eanes channel.

Core D13900, taken during the RVS *Discovery* cruise of 2000, is situated at the mouth of the Gil Eanes channel (35.49(N, 7.31(W)). An initial assessment of this core indicates that at least the last glacial cycle is recorded. Planktonic foraminiferal assemblages have been recorded for samples at 20cm intervals. In addition, grainsize and chemical analyses have been conducted on sub-samples from each depth interval.

The core shows a downcore alternation of warm and cool sea surface temperatures, based on the SIMMAX modern analogue technique for planktonic foraminifera, and also of sand-rich and sand-poor layers. Cool sea surface temperatures are found to correspond to high sand content. Of the two cool SST layers present, the upper is considered to represent oxygen isotope stages 2, 3 and 4 and the lower to represent stage 5b.

This indicates that cool climatic periods are characterised by increased sand transportation down the Gil Eanes channel, and therefore by increased flow in the lower part of the MOW.

In addition to the general trend, several short-lived events depositing relatively coarse sediment occurred during cold events that are comparable to the Younger Dryas and the Heinrich events as recorded elsewhere on the Iberian margin.

Size in Planktic Foraminiferal Assemblages

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Since their origin 140 million years ago, planktic foraminifers have undergone several periods of diversification, each of which is thought to have involved increases in test size. In this study, macro-evolutionary changes in the test size of entire planktic foraminiferal assemblages, the impacts of physical factors on morphological diversity and the biotic response to environmental perturbations have been investigated in the Holocene, the Quaternary and the entire Cenozoic. In the Holocene, geographical variations in the size distribution are related to environmental gradients. Temperature-related effects are the main driving force, resulting in an increase in size from poles to tropics. This increase is not linear, and deviations are the result of secondary environmental factors such as primary productivity and frontal dynamics. The size response to temporal environmental changes during glacial-interglacial cycles in the late Quaternary mimics the geographic Holocene size variations. The amplitude of size variation is directly related to the amplitude of the climatic fluctuations.

The size record in the Cenozoic can be divided into three different intervals, a time of dwarfs from the K/T boundary up to the late Eocene, a transition period from the late Eocene to the Mid-Miocene and a time of giants from the Mid-Miocene to Recent. A pronounced size increase in the Neogene is observable at all warm-water sites studied, whereas high-latitude records display stability. This suggests that this increase in size is a reaction to the intensification of vertical and latitudinal temperature gradients.

At times of low species richness, such as the Paleocene and the Oligocene, the fertility of the surface oceans seems more closely correlated to planktic foraminiferal size. This suggests a dependency of foraminifers on fertility after the breakdown in food chains following the K/T mass extinction, and during the dominance of a “global upwelling “ fauna in the Oligocene.

Keywords: Plankton, Foraminifers, Evolution, Paleoceanography, Cenozoic.

Benthic Foraminifera Scaling Flux and Decomposition of Organic Material in Slope to Deep-Sea Sediments from the Northeastern Atlantic.

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The flux of particulate organic matter (FPOM) to the sea floor is related to the intensity of surface ocean primary production. Flux rates covary with accumulation rates of benthic foraminiferal tests (BFAR) and organic carbon (FCorg). Formulae describing the FPOM - BFAR and FCorg relationships were tested at several sites on the European continental margin. The recent organic carbon flux was reckoned by using biotic and geochemical proxies, and compared with remote sensing primary productivity data. At the southern Portuguese Margin and Gulf of Cadiz, the pelagic flux rates are slightly higher than estimates obtained from diffusive oxygen uptake at the sediment-water interface under the near-bottom current of the Mediterranean Outflow Water. Flux estimates from BFAR are in good agreement with oxygen profiling results, but organic carbon burial rates amount 15% of the pelagic flux only. At the Goban Spur and under the influence of substantial downslope transport, pelagic

flux rates are generally less than those revealed by oxygen profiling are. The values are similar again on the continental rise and adjacent Porcupine abyssal plain, but FCorg rates are only 1 to 5 % of the pelagic flux. BFAR estimates at stations from the adjacent American Margin are much lower than pelagic flux rates and approach values obtained from FCorg. Local sedimentary processes as winnowing or lateral advection may halve or double the FPOM off western Iberia. Downslope transport may adduce up to one third of old refractory components to the total organic fraction in near-surface sediments at the Goban Spur. The accumulation of benthic foraminifera is considered to be coupled with the actual FPOM. Though this relationship is generally valid, the linkages of FPOM and benthic foraminiferal assemblages living at the sea floor, their test production, postmortal loss and accumulation of foraminiferal tests are not yet fully understood.

Keywords: benthic taxa; foraminifera; organic matter; paleoproductivity; East Atlantic

Orbital Control of Late Pliocene Planktonic Foraminiferal Biogeographic Patterns

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A paradox in pelagic biogeography is that high rates of dispersal imply taxa should be widely distributed and therefore relatively unaffected by speciation and extinction. But these evolutionary processes exhibit some of their highest rates in pelagic taxa. We show that certain Pliocene planktonic foraminiferal species do not have global, or even whole-ocean, distributions at any one time and speculate that orbitally-forced hydrography controls these biogeographies. *Globorotalia*

miocenica peaks in its abundance during interglacials in the eastern subtropical Atlantic but during glacials in the western subtropical Atlantic. Orbitally-tuned stratigraphies indicate that this Atlantic endemic species became extinct at 2.38 Ma in the East but that it only disappeared from the West some 40 kyr later, implying an earlier breach of this species' tolerance levels in the eastern basin.

Globorotalia exilis, another Atlantic endemic from the *Globorotalia menardii* plexus, becomes extinct at 2.27 Ma synchronously across the Atlantic. This event then coincides with the beginning of a series of apparently orbitally-forced punctuated reappearances back into the Atlantic of two taxa that had been restricted to the Pacific for the previous ~800 kyr - *Pulleniatina primalis* and *Globorotalia menardii*. This suggests that these events represent a shift away from the hydrographically distinct Atlantic regime that ushered in the Atlantic endemics, to conditions more favourable for the survival of Pacific taxa. The evidence for more localised populations could act to make speciation and extinction easier, thereby reconciling the aforementioned pelagic biogeographic paradox. The results also have biostratigraphic implications. The idea of continuous stratigraphic ranges may be misleading as First and Last Appearance Datums (FADs, LADs) appear to be time-transgressive, 'punctuated' events, rather than discrete global datums.

Biodiversity Unmasked: Cryptic Species of *Globigerinella siphonifera* can be Reliably Discriminated in the Fossil Record.

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Planktic foraminifera have long been considered to exhibit an unusually high level of intra-specific variation, considered by many the product of a plastic phenotype exposed to variable environmental conditions. However, recent studies indicate that traditional morphospecies in fact represent packages of divergent genotypes, distinguished by subtle (but consistently expressed) morphological, geochemical and ecological differences. If these types can be detected in the fossil record, then the precision of both geochemical and census-based foraminiferal palaeoproxy data may be increased considerably.

G. siphonifera is perhaps the most widely known example of such 'Cryptic' speciation, and certain characters (most notably test pore diameter) have been demonstrably proven to tally with genetic and ecological differentiation within modern plankton samples. This pilot study has applied similar techniques to a sample of ~600 *G. siphonifera* specimens from ODP core 926A (Ceara Rise). Two morphotypes can be clearly distinguished, bracketed around average pore diameters of ~2.5 and ~4 μm. Future work is planned to isolate the first occurrence of the two forms and test the efficacy of pore size as a stable taxonomic character. Current molecular clock estimates date the divergence at around 7.32ma (calibrated on *Orbulina universa*). Further sampling will enable a lineage-specific calibration using the currently unavailable *Globigerinella calida*. The relative abundance of the morphotypes ('Types I and II') fluctuates through the core, suggesting that their distribution may be controlled by ambient hydrography. Unfortunately, morphotype differentiation requires dissection of the

test (little correlation is seen between external and internal pore diameters, probably due to gametogenic calcification or post-mortem overgrowth), limiting the technique's application. This pilot study clearly demonstrates that morphological discriminators *can* reliably distinguish 'Cryptic' species in the fossil record and, when refined, will provide a valuable new tool for oceanographers as well as a wealth of new data for evolutionary palaeobiologists.

Keywords: Cryptic species, *Globigerinella siphonifera*, Morphometrics, DNA, Porosity, Molecular Clock.

Selective Feeding by Benthic Foraminifera on Labile Phytodetritus on the Western Antarctic Peninsula Shelf (500m Water Depth): Evidence from Fatty Acid Biomarker Analysis.

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High nutrient concentrations in seasonally ice covered Antarctic coastal waters lead to an intense phytoplankton bloom following the melting of the ice sheet in spring and early summer. A major part of this particulate organic material is deposited on the seafloor, where it is available as food for the benthos. This study presents the first direct evidence, based on biochemical analysis of fresh material, that benthic foraminifera feed on such seasonally deposited phytodetritus in their natural environment.

Lipids, and particularly fatty acids, can be used as biomarkers for marine micro-organisms, i.e. they can indicate what the studied organism has been feeding on at the time of capture. Lipid analyses were carried out on three abundant species

collected at a shelf site (500m water depth) west of the Antarctic Peninsula after the deposition of phytoplankton bloom material in March 2001. This revealed that they fed selectively on fresh phytodetritus. Fatty acid profiles of the calcareous species *Globocassidulina subglobosa* and *Quinqueloculina seminula* as well as the agglutinated species *Thurammina* sp. were significantly different from those of the surrounding phytodetritus, with the two calcareous species containing significantly higher amounts of polyunsaturated fatty acids (PUFAs) than were found in their phytodetrital food source. Moreover, the PUFA content of *G. subglobosa* and *Q. seminula* from samples taken in October 2000 before the phytoplankton bloom was substantially lower than that of the post-depositional samples (March 2001), significantly so in case of *Globocassidulina subglobosa* ($P < 0.001$). This suggests that *G. subglobosa* katabolizes polyunsaturated fatty acids instead of preserving them. Thus, some species of foraminifera may play a central role in the benthic carbon cycle by degrading this important component of deposited organic matter and rendering it unavailable to other organisms.

Keywords: foraminifera, benthic carbon cycle, selective feeding, polyunsaturated fatty acids, benthos, Antarctic Peninsula

An Experiment to Determine if the Foraminiferan *Haynesina germanica* Consumes Sewage-Derived Organic Matter, Using Fatty Acid and Sterol (Coprostanol) Biomarkers.

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Foraminiferal ecology at sewage outfalls has been investigated in numerous field

studies over the last 30 years. Foraminifera have been frequently used as biomonitors of sewage pollution since they are both abundant and ubiquitous. Sewage outfalls have been demonstrated to have both positive and negative effects on adjacent foraminiferal populations, but it has never been shown conclusively why sewage affects foraminifera in these ways. Such information on the impact mechanisms of sewage pollution is essential if foraminifera are to be used as sewage pollution biomonitors, and also to understand the ecology of these important protists. One possible cause of a positive effect is the direct consumption of sewage-derived particulate organic matter (POM) by the foraminifera themselves. However this hypothesis has never been tested experimentally. Here, lipid (fatty acid and sterol) biomarker techniques were applied to study the ingestion of two potential food items by the foraminiferan *Haynesina germanica*. In a laboratory experiment, the foraminifera were fed sewage. Lipid biomarker analysis indicated that *H. germanica* did not consume secondary treated sewage-derived POM. Neither fatty acid profiles in the sewage nor coprostanol, the diagnostic human faecal sterol, were detected in foraminifera after exposure to the potential sewage food source. A separate experiment was conducted to confirm that the laboratory conditions were conducive to the survival and feeding of the foraminifera. In this experiment, foraminifera were provided with the pennate diatom *Phaeodactylum tricorutum*, which was considered to be a suitable food source. After two weeks, a four-fold increase in the levels of the diatom fatty acid biomarker, 20:5 (n-3), in the foraminifera suggested that they had fed actively on the diatoms and survived under the experimental conditions. The next stage in the investigation into how sewage affects foraminiferal ecology, and the validity of the use of these ecologically significant protists as sewage pollution

biomonitors, is the identification of an indirect effect of sewage on foraminifera, via DOC/bacteria from sewage improving algal growth around outfalls.

On the Stratigraphic and Palaeobiogeographic Significance of *Borelis melo* (Fichtel & Moll, 1798) and its Subspecies (Foraminifera, Miliolida, Alveolinidae)

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The taxonomy of the type-species of *Borelis*, *B. melo* (Fichtel & Moll, 1798) and its subspecies *B. melo curdica* (Reichel, 1937) and *B. melo haueri* (d'Orbigny, 1846) is reviewed, and, in the light of this review its stratigraphic and palaeobiogeographic significance is reassessed.

The subspecies are shown to be distinguishable from one another essentially on the basis of the level of development of their internal chamberlets and external apertures.

Borelis melo melo is shown to have a stratigraphic range at least throughout the Miocene. *B. melo curdica* and *B. melo haueri* are restricted to the Middle-Late Miocene.

Borelis melo melo is shown to have a palaeobiogeographic range at least throughout the Mediterranean and Indo-Pacific Provinces. *B. melo curdica* is restricted to the Mediterranean and Middle East. *B. melo haueri* is restricted to

Central Paratethys. The occurrence of *B. melo curdica* in the Middle Miocene in the Mediterranean and Middle East indicates a marine connection between the two provinces at this time.

Posters

Using ODP Cores to study “Background” Extinction Events 1: The Death of *Dentoglobigerina altispira*

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The fossil record shows us that organisms have continually undergone extinction. These extinctions can occur in isolation, in small clusters or as part of mass extinction events. In palaeontology much work is conducted on mass extinction events. This is done in order to assess how ecosystems react following large-scale upheaval. The majority of isolated or ‘background’ extinction events have been left unstudied and accepted as a fact of life.

The work presented in here is to form the first in a series of studies aimed at constraining the rapidity and synchronicity of background extinctions in different ocean basins, identifying the factors that may cause a species to become extinct, and assessing the ecological response (if any) to background events in contemporaneous species.

The chosen extinctions are the near simultaneous disappearances of *Dentoglobigerina altispira* and *Menardella multicamerata*, two species of planktonic foraminifera. Both events are calibrated at 3.0 Ma on the timescale of Berggren *et al.* (1995), and are global events.

Dentoglobigerina altispira was a massively successful shallow dwelling species throughout the Miocene and early

Pliocene. The apparently sudden loss of this species coupled with the loss *Menardella multicamerata* seems to be beyond chance. High resolution (10 cm) abundance counts of all planktonic foraminifera have been conducted at ODP Site 926A (Leg 154) and will be conducted at Site 846D (Leg 138), which were chosen for their excellent orbitally tuned timescales.

Preliminary results show that the extinction of *Dentoglobigerina altispira* (dated at 3.0 Ma) was very rapid with the species usually representing 20 % of the total assemblage until 7 kyr prior to the extinction. The extinction of *Menardella multicamerata* is dated at 2.96 Ma and appears gradual, although this is likely to be an artefact of the low abundance of the species.

Keywords. Foraminifera, *Dentoglobigerina altispira*, “background” extinctions, ODP

Role of Panama Uplift on Ocean Circulation and Climate: Did the Caribbean Warm Pool Develop During the Late Miocene (5.5 Ma)?

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Reconstructing the evolution of warm water pools is a major key to understand Neogene climate history, because they are major players in regulating the global heat budget. Today, warm water pools occupy western tropical regions of the Pacific and Atlantic/Caribbean. A typical feature of warm water pools is the westward deepening of the thermocline. Reconstructions of the SST gradient within the upper water column will characterize the thermocline depth and thus, the strength of warm pools. $\delta^{18}\text{O}$ records for two planktic species (*Globigerinoides sacculifer*, living in a

water depth of 30 - 40m and *Globorotalia menardii*, a deeper dwelling species) have been measured for ODP Site 1000, (located in the Pedro Channel between Nicaragua and Jamaica). The profound change to lighter $\delta^{18}\text{O}$ -values of *G. menardii* related to a decreasing abundance (from 90% to about 30%) at about 5.5 Ma could possibly be interpreted as a temperature change. This shift of 1‰ in $\delta^{18}\text{O}$ equals a warming of 4°C for watermasses in the habitat depth of *G. menardii*. If this warming of subsurface watermasses is taken as an evidence for the deepening of the thermocline and therefore as the onset of the West Atlantic Warm Pool formation, the formation of the WAWP started about 1 Ma before the restriction of surface water exchange between the Atlantic and Pacific Ocean at 4.6 - 4.2 Ma (sill depth of about 100m). This scenario might have been comparable to the modern West Pacific Warm Pool. Key words: West Atlantic Warm Pool; Isthmus of Panama; sea surface temperature; planktic foraminifera

Palaeoceanography and Climate change – ODP Leg 194

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ODP Leg 194 (January-March 2001) drilled into the Marion Plateau in the Coral Sea (offshore northeast Australia). The main objective was to establish the magnitude of the major Cenozoic sea level fluctuations, more specifically the late Middle Miocene (Biozone N12-N14) eustatic sea level fall. Additional Leg objectives included: investigating the development of carbonate platforms in a current-dominated depositional environment, analysis of sedimentary facies change relative to sea level

variations, modelling the fluid flow within the platform and slope edifice and the influence of climatic and paleoceanographic changes on carbonate platform development. Age dating was provided by planktonic foraminifera biostratigraphy in conjunction with calcareous nannoplankton, benthic foraminifera, and palaeomagnetic data. Eight sites (1192-1199) were drilled, of which five yielded abundant planktonic foraminiferal assemblages. Preliminary planktonic foraminifera biozonations for the sites are presented. The poster primarily summarises the scientific objectives and findings of Leg 194, and demonstrates how the chronostratigraphic results apply to the overall model of the development of the Marion Plateau throughout the Neogene. It also details intended isotopic, morphologic and taxonomic postcruise research into the menardellid planktonic foraminifera. Keywords: ODP, planktonic foraminifera, sea level, Miocene, biostratigraphy.

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Members of the Microvertebrate Group are currently gearing up for their summer research. Henning Blom reports that, although *Ichthyostega* work takes up most of his time, he is continuing his work on anaspids with a description of an odd type from Skåne, Sweden and is reviewing the inter-relationship within the Anaspida on the basis of new dermal characters (in collaboration with Giles Miller and Tiitu Märss). Henning and Phil Donoghue are also reviewing anaspid histology and the overall phylogenetic position of anaspids, and a large amount of Silurian rock from Gotland has been processed in the hunt looking for *Andreolepis* scales and fragments (in collaboration with Per

Ahlberg and Philippe Janvier). Dick Aldridge has recently returned from another visit to sunny South Africa, where he discovered an additional non-Promissum bedding plane assemblage in the Soom Shale. Maintaining the globetrotting theme, Giles Miller is off to Sykytkvar in the Urals to attend a Devonian conference, where he will speak on some multielemental reconstructions based on material from the Domanik Formation, Frasnian of the Urals, and Howard Armstrong is currently busy with the Late Ordovician glacial deposits of Jordan.

As I write this, the majority of the conodont gang are gearing up for the European Conodont Symposium (ECOS) in Toulouse and Albi where, in addition to the general sessions, Phil Donoghue and Mark Purnell are organising a thematic symposium on Bias and Completeness in the Conodont Fossil Record.

As ever, the group will hold its annual one day meeting in conjunction with the Palaeontological Association Annual Meeting. This year the PalAss meeting is in Cambridge – not an area of great renown for its microvertebrate faunas, but the plan is to spend half a day looking for vertebrate bits in the Oxford Clay around Peterborough followed by a half day of looking at museum collections in Cambridge. In between these will be the traditional evening of anarchy which is the lecture programme – venue to be decided, but probably in the vicinity of Stamford.

Nannofossil Group

Jackie Lees
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The Nannofossil Group have a busy summer ahead of them and will be reporting all their news and gossip in the next *Newletter of Micropalaeontology*.

Ostracod Group

Mick Frogley
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It is a pleasure to report that this year, in the absence of foot and mouth, the customary Spring Meeting of the Ostracod Group was able to go ahead without too many upsets. Indeed, the gathering at Newcastle (organised by Ian Boomer) was deemed to be a resounding (though intimate) success (further details below). Flushed with this apparent return to form, we are proposing a further meeting later this year during September (details to be circulated shortly) examining the Jurassic, Quaternary and Recent faunas of Somerset (local secretaries: Dave Horne and Alan Lord). And one *really* advanced date for your diary: the next Spring Meeting will be at the University of Leicester (local secretary: David Siveter), probably at the beginning of March 2003 (again, we will circulate details in due course).

One other item that may be of interest to Group members is the recent publication of a new monograph that resulted from the special ostracod session held at the 1999 Spring AGU Meeting in Boston. Although international in scope and participation, the UK was robustly represented at this session, a fact reflected by the number of UK researchers who have contributed to the book. Edited by Jonathan Holmes and Allan Chivas, *The Ostracoda: Applications in Quaternary Research* comprises 16 chapters that explore many facets of things ostracoddy, including: biology; taxonomy; marine, marginal-marine, and non-marine (palaeo)ecology; shell geochemistry; and the links between living and fossil faunas. The volume (Geophysical Monograph 131) is now available via the AGU website (www.agu.org) for \$78.00 (AGU members: \$54.60), plus postage.

As ever, if Ostracod Group members have any newsworthy items for inclusion in the

next report, please don't hesitate to get in touch.

Spring Ostracod Group

Meeting

2-3 March 2002, Department of Geography,
University of Newcastle-upon-Tyne

Alan Lord

University College London

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The Spring Meeting was both unusually small and unusually good this year. The small numbers were in part due to automotive unreliability, a function of the kind of vehicles affordable by young University lecturers. Thus, a core of veterans in the shape of Ian Boomer, Dave Horne, Alan Lord and David Siveter (aka the *'Stereo-Atlas'* Editors) gathered at the *'Collingwood Arms'* on the evening of Friday 1 March.

On the following day we met in the Department of Geography and heard a number of excellent presentations by veterans, by ecologist Mike Jefferies (University of Northumbria) and by Newcastle students working with Ian Boomer:

'Ostracods as indicators of pollution in the Ouseburn, a rural-urban catchment in Tyneside'

Frances Attwood and Ian Boomer
(University of Newcastle)

'Ostracods – the key to the Black Sea drowning event?'

Ian Boomer (University of Newcastle)

'Functional morphology of ostracod limbs –High Resolution Video Microscopy of living freshwater ostracods'

Dave Horne (University of Greenwich)

'I have never knowingly identified an Ostracod.....'

Mike Jeffries (University of Northumbria)

'Ostracods and habitat diversity in Dune Slacks from Formby, Merseyside'

Lucy Lindup and Ian Boomer (University of Newcastle)

'Modern ostracods from Spanish lakes; their role in reconstructing past climatic changes'

Anna Wallace and Ian Boomer (University of Newcastle)

'Lower Cambrian Crustacea with soft parts from the Welsh Borderland'

David Siveter (University of Leicester)

A thoroughly enjoyable day included a picnic lunch (indoors unfortunately), dinner in the evening, followed by a retreat to the *'Collingwood Arms'* (Ostracod Group recommended!).

On Sunday 3 March (a rather gloomy day if you remember), a very select party of Ian Boomer, Dave Horne and Alan Lord went to Gormire Lake, a glacial spillway lake on the edge of the North York Moors, to collect living ostracods. To be precise, Boomer and Horne did the collecting while Alan Lord encouraged them! The season was perhaps a little early, but the intrepid water-dippers sampled five sites with pH 5 and temperature 5°C. Nothing was observed in the field, but subsequently they did find:

Cryptocandona vavrai Kaufmann 1900
(new record for Gormire)



Alan Lord oversees David Horne's sample collection !

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Candona candida (Müller 1785)
Cypridopsis vidua (Müller 1776)

After a brief lunch the party dispersed. Many thanks to Ian Boomer for organising a thoroughly enjoyable and varied meeting, and to his students and colleagues in Newcastle Geography for their warm welcome.

Other Ostracod News

In March 2002 Robin J. Smith returned to the UK after two years at Kanazawa University, Japan, working with Takahiro Kamiya. This was part of a four year JSPS/Royal Society post doctoral fellowship, and Robin is now embarking on the second part of his fellowship. He is presently working with David Horne and Ian Slipper at Greenwich University, Chatham Maritime, Kent. Their project is based on the ontogeny and phylogeny of Podocopina ostracods; the development of particular features of ostracods are proving to be very useful in determining the phylogenetic relationships between superfamilies. The ontogeny of the appendages and carapace, including the pore systems, of the Bairdioidea, Cytheroidea, Darwinuloidea and Terresticysteroidea are currently underway or in press. Additionally, Robin is working on the biodiversity and biogeography of living brackish and freshwater ostracods from Japan.

Palynology Group

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TMS Palynology Group Meeting

13th March 2002, Natural History Museum, London

The Palynology Group of TMS held its annual meeting at the Natural History

Museum, London, on Wednesday, 13th March. Susanne Feist-Burkhardt and colleagues hosted this successful event that was attended by more than forty members. Abstracts are printed below and also available on the Palynology Group page of the TMS website, www.tmsoc.org.

The meeting began with a guided tour showing the Museum's palynological facilities (Feist-Burkhardt, Henderson, Williams, Chitolie & Jones), including the collections, palynological laboratory, microscopes, John Williams library and reference collection, and the Confocal Laser Scanning Microscopy (CLSM) equipment. Tim Potter chaired a Cenozoic and Mesozoic lecture session. This began with invited speaker Madeline Harley who gave an overview of palynological work on modern pollen at Kew Gardens during the past thirty years. Fabienne Marret (Marret, Scourse, Versteegh & Jansen) discussed implications from marine and terrestrial palynomorph studies for climate changes in the Congo Basin and adjacent ocean during the last 30,000 years.

Suzanne Leroy (Leroy & Marret) reported palynological analyses of Late glacial and Holocene sediments from South and Central Caspian Sea basins, including new dinoflagellate cyst species from brackish water deposits. Polina Pavlishina (Sofia University), who was a research guest at the Museum during March, gave an overview of her studies on the Turonian (Late Cretaceous) sediments in Bulgaria. She discussed the biostratigraphy of dinoflagellate cysts and Normapolles pollen. Jim Riding summarised his work comparing the Jurassic palynomorph record in the Northern and Southern hemispheres and its implications for wider scale correlations. Geoff Warrington reviewed the palynology of the Late Triassic and earliest Jurassic succession on the Dorset-East Devon Coast World Heritage Site.

Duncan McLean chaired a Palaeozoic lecture session. John Marshall (Marshall & Hemsley) documented a functionally bisexual seed-megaspore from mid Devonian deposits in East Greenland and discussed its significance in understanding the origin of seed plants. Dave Gelsthorpe, who spoke about the early Silurian Ireviken mass extinction event at the 2001 Palynology Group meeting, gave an update of his research on microplankton changes across the interval. Gary Mullins (Mullins, Aldridge & Siveter) discussed acritarch and prasinophyte recurrent assemblages, biofacies and the palaeoenvironmental interpretation of the lower Ludlow Series (Silurian) in the Welsh Basin. Tim Potter presented photographs of remarkably well-preserved Early Cambrian acritarchs from the Hollybush Sandstone, Malvern Hills, England, and discussed detailed acritarch morphology and the occurrence of two distinct acritarch assemblages in sandstone and shale lithologies. A cheese and wine reception followed, sponsored by TMS. The next annual meeting of the Palynology Group will be held at Leicester University in Spring 2003. Gary Mullins, the organiser, will send further information closer to the event.

Palynology Group Meeting Abstracts

30 years of pollen studies at RBG

Kew: How do they do it?

Madeline Harley
Palynology Unit, The Herbarium, Royal Botanic Gardens, Kew, UK

A thumbnail sketch of some of the work of the Palynology Unit at the Royal Botanic Gardens, Kew is presented. The Unit, which was set up in 1972-3, has the specific purpose of examining pollen morphology with particular emphasis on

the taxonomy, systematics and phylogeny of flowering plants, Kew's major research thrust, and so 'Palynology Unit' is a somewhat ambiguous title. However, the Unit has become so well known over the years as the Palynology Unit, that changing the name has been largely ignored.

The Herbarium at Kew contains almost 10 000 000 specimens of (mainly) flowering plants, gymnosperms and pteridophytes - a pollen morphologists dream! Among the families for which pollen has been examined in depth are Cornaceae, Menispermaceae, Sapotaceae, Leguminosae, Burseraceae, Lamiaceae, Acanthaceae, Commelinaceae, and Palmae. Research on a number of these families is still active, and recently we have been focussing on distribution of pollen characteristics within the monocots and the 'primitive dicots'.

The wealth of pollen morphological data that has accumulated contributes to combined phylogenetic analyses, and also to comparative fossil pollen studies. It also means we are well equipped to deal with the numerous enquiries we receive. Our extensive collection of microscope slides reflects not only our own research interests, but also includes thousands of exchange slides from other researchers who have requested pollen material from the Kew Herbarium.

Currently the Unit has three core staff, and a steady flow of students and visitors. However, a recent research management initiative has sought to strengthen Palynology and Anatomy by combining them within the 'Micromorphology Group'.

Palynological analyses of Lateglacial and Holocene sediments from the South and Central Caspian Sea basins, including new dinoflagellate cyst species

Suzanne Leroy¹ and Fabienne Marret²

¹ Department of Geography and Earth Sciences, Brunel University, UK

² School of Ocean Sciences, University of Wales Bangor, UK

Palynological investigations have been undertaken on Lateglacial and Holocene sediment from Caspian Sea cores collected from the south and the central basins during a French-Russian expedition in 1994 (CNRS-INSU and EU-INCO-COPERNICUS funded). The modern water salinity at the core sites is about 11-13. The modern vegetation around the Caspian Sea is semi-desertic to desertic, with the exception of the two forested mountains ranges (Caucasus and Elburz).

We analysed three pilot core sequences. The sediment consists of fine-grained carbonated mudstone, with alternating black and grey layers throughout the sequences. The establishment of a consistent chronology is difficult owing to the mix origin of the sediment.

The pollen diagrams of the three sequences indicate that terrestrial vegetation is relatively stable during the Holocene: very open steppic to semi-desertic landscapes dominated by *Chenopodiaceae* and *Artemisia*. The arboreal component is small and seems to originate from the mountains (presence of some indicator pollen grains such as *Parrotia persica*). In the bottom 40 cm of core CP 14 (on board core number SR-9406-CP16 or Museum d'Histoire Naturelle de Paris core collection number SR01-GS9414CP), from the south basin, the pollen concentration is much lower and percentages of *Pinus*,

Compositae and spores are higher. These assemblages are attributed to the Lateglacial period.

New organic-walled dinoflagellate cyst species *Impagidinium caspiensis* sp. nov. and *Impagidinium rugosum* sp. nov. (with *Impagidinium rugosum* var. *rugosum*) and three morphotypes species of *Spiniferites cruciformis* are described. Owing to brackish water conditions and isolation from other seas, a total of only six species of dinoflagellate cysts was identified. A major change in the south basin core at the same depth as in the pollen diagram (40 cm from the bottom in CP 14) has been interpreted as a change from freshwater to brackish waters.

Changing palaeoenvironmental conditions that resulted in the development of different Lateglacial and Holocene palynological assemblages are tentatively discussed based on comparison to the Black Sea glacial meltwater history.

Marine palynology in the Tropics: Evidence of abrupt climate changes in the Congo Basin and adjacent ocean during the last 30,000 years

Fabienne Marret¹, James Scourse¹, Gerard Versteegh², and J.H. Fred Jansen²

¹ School of Ocean Sciences, University of Wales Bangor, UK

² Netherlands Institute of Sea Research (NIOZ), Texel, The Netherlands

We present a high-resolution reconstruction of tropical palaeoenvironmental changes for the last deglacial transition based on integrated oceanic (dinoflagellate cysts, foraminifera, alkenones) and terrestrial (pollen, spores, grass cuticles) proxies from a well-dated Congo Fan core. This highlights the significance of abrupt changes in Congo

river palaeodischarge, vegetation composition of the Congo drainage basin and regional hydrography set within precessional forcing of the monsoon. These changes strongly implicate latitudinal migration of the inter-tropical convergence zone (ITCZ), which controls precipitation in west-central Africa, during deglaciation. The data demonstrate the significance of Congo discharge in driving upwelling/productivity, and constrain the extension of the coastal mangrove ecosystem during peak rates of transgression. Detailed high-resolution records (sampling interval c. 100-200 years) for selected marine and terrestrial proxies for the period 24 to 9 cal ka BP from core T89-16 (824 m water depth) provide a coherent record of Congo river palaeodischarge that are interpreted as reflecting a continental-scale precipitation signal driven by migration of the ITCZ. During glacial stages this is assumed to adopt a more southerly mean-annual position than at present. Discharge pulses, registered by flushes of penecontemporaneous pollen, cuticle and freshwater algae to the fan, record passage of the ITCZ over the Congo Basin around started 16.5 cal kyr BP and culminate around 13 cal. kyr BP. Enhanced freshwater runoff stimulated river-induced upwelling cells in which nutrient-rich water stimulates primary production and hence dinocyst flux. Passage of the ITCZ to the north or south results in a return to lower Congo river discharges.

A mid Devonian seed-megaspore and its significance in understanding the origin of the seed plants

John E. A. Marshall¹ and Alan R. Hemsley²

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The late Mid Devonian seed-megaspore from East Greenland is described. Ultrastructural study of the megaspore wall confirms that it is a progymnosperm. Comparable but younger forms include *Spermasporites devonicus* and the seed-megaspore isolated from *Archaeosperma arnoldii*. Rare specimens of the Greenland seed-megaspores are found with near complete sporangial contents. Also present are many specimens showing proximally adhering microspores. These specimens show that the seed-megaspore was contained within a sporangium exhibiting extreme anisospory and interpreted here as functionally bisexual. This is a key element in understanding its reproductive function. The megaspore being shed with some accompanying microspores giving it potential for both cross and self-fertilization. This confers the advantages of heterospory without the high risk evolutionary pathway of separate micro and mega sporangia. It provides a more likely mechanism for seed plant origin than that of the archaeopteridalean sporangium reduction model.

Acritarch and prasinophyte recurrent assemblages, biofacies and the palaeoenvironmental interpretation of the lower Ludlow Series (Silurian) of the Welsh Basin

Gary L. Mullins, Richard J. Aldridge and David J. Siveter

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The acritarchs and prasinophyte algae of the Goggin Road section, which is situated in the type area of the Ludlow Series, Ludlow, Shropshire, have been examined. The Goggin Road section exposes sediments of the uppermost Wenlock Series and the lower part of the Ludlow Series (Silurian). The Much Wenlock

Limestone Formation (Wenlock Series) has a fauna dominated by corals and large brachiopods. Above this the olive, calcareous silty mudstones of the Lower Elton Formation (Ludlow Series) contain small brachiopods and occasional corals. The Middle Elton Formation is recognisable by the change to a light olive-grey, conchoidally fractured, shaly siltstone, with graptolites and orthoconic cephalopods. The Upper Elton Formation also contains graptolites and orthoconic cephalopods in olive-grey, interbedded sandy and calcareous siltstones. The development of shell and limestone bands and thick olive-grey, calcareous siltstones marks the base of the Lower Bringewood Formation. In total, 124 samples were collected, and 76 acritarch and 25 prasinophyte algal taxa were identified. The temporal distribution of the acritarchs and prasinophytes has been examined using cluster analysis and correspondence analysis. The statistical analyses have allowed ten recurrent associations of acritarchs and prasinophytes to be recognized. These associations are considered to include those taxa that had similar environmental preferences. Association 1 contains taxa that are abundant throughout the section (e.g. *Diexallophasis remota*, *Micrhystridium stellatum*, *Pterospermella foveolata*) and these are considered to be the most environmentally tolerant species. Species assigned to associations 2a-c are most common in the Much Wenlock Limestone and Lower Elton formations. Moreover, association 2a contains all of the species of *Leptobrachion* analysed, indicating that these species had similar environmental preferences. Taxa assigned to association 4a-c are most common in the middle part of the Middle Elton Formation and species of association 3 and 6 are common in the uppermost part of the Middle Elton, Upper Elton and Lower Bringewood formations. *Cymbosphaeridium* sp. A, *M. arbusculum*

forma A and *P. ludlowense* of association 5 are generally abundant in the middle part of the Lower Elton Formation, at a level where most other taxa are less abundant. Statistical analyses have also enabled the identification of nine biofacies, which have allowed eight distinct periods of environmental change to be identified. These periods include peaks and troughs in the abundance of the acritarchs and prasinophytes, which may be related to regular fluctuations in the rate of sedimentation or plankton productivity. The distribution of the acritarchs and prasinophytes through the Goggin Road section support aspects of the sea-level model and Jeppsson's oceanic model, although both models (as currently formulated) do not adequately explain all of the fluctuations.

Palynostratigraphy of the Turonian sediments in Bulgaria

Polina Pavlishina

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Turonian sediments crop out in different parts of the Bulgarian territory. They display considerable facies diversity, being represented by glauconite sandstones, limestones with glauconite, clayey limestones and marls. These sediments have been sampled for palynological investigation in different sections in Northeast and Southwest Bulgaria. The obtained palynofloras comprise marine dinoflagellate cysts and terrestrial miospores, represented mainly by the Normapolles group.

The aim of this study is to summarize data from all sections, to give an overview of the research and to produce an integrated Turonian palynostratigraphic zonation, based on dinoflagellate cysts and sporomorphs. Age control has been considered to be very important for this study. All samples for palynomorphs have

been calibrated to the ammonite finds in the outcrops. So, the here established palyno units are directly correlated to the ammonite zones, recognized in some of the studied sections.

The studied samples were taken from five sections. Three of them are situated in the region of Breznik, southwestern Bulgaria. Two others (Komounari and Dobrinski dol) are in the Fore-Balkan, northeastern Bulgaria.

The dinocyst and sporomorph assemblages have been mainly qualitatively analysed. Their successions will be considered separately. Both schemes share mutual control, which increases the accuracy of the chronostratigraphical interpretations especially in those sections where ammonites are lacking. This control is once more important when selecting biostratigraphic events from their successions.

All sections yielded comparatively rich and well-preserved dinocyst assemblages. Two biostratigraphic events with correlation value are registered in their successions. The species *Gonyaulacysta cassidata*, *Epelidosphaeridia spinosa* and *Litosphaeridium siphoniphorum* make their last occurrence in the upper part of the Lower Turonian (*Mammites nodosoides* ammonite zone), together with the well documented first occurrence of *Senoniasphaera rotundata*, *Subtilisphaera pontis-mariae* and *Isabelidium cooksoniae*. Both facts are of high stratigraphic significance outside the studied region and give ground for the recognition of two dinocyst zones in the sections.

Three main Normapolles assemblages are recognized. The lowermost is denominated as association of *Atlantopollis microreticulatus* and *Complexiopollis christae*. It is defined in the scope of the Early Turonian *Mammites nodosoides* ammonite zone. The successive assemblage is characterized by the concurrent presence of *Complexiopollis*

christae and *C. complicatus*. The former species is restricted only within the Turonian stage (*Collignoniceras woollgari* and *Subprionocyclus neptuni* ammonite zones). *Complexiopollis complicatus* is a new element for the Turonian palynoflora and ranges also in the overlaying Coniacian sediments in association with the representatives of varied Normapolles genera as *Vacuopollis*, *Extratripopollenites* and *Trudopollis*.

Early Cambrian acritarchs from the Hollybush Sandstone, Malvern Hills, England

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The Hollybush Sandstone outcrops towards the southern extremity of the Malvern Hills on the borders of Herefordshire and Worcestershire. The sequence is underlain by the Early Cambrian Malvern Quartzite or may rest directly on the Precambrian Malvernian metamorphic complex. The sequence is overlain by the Late Cambrian Whiteleaved Oak Shales, possibly with a faulted contact. Exposures are generally poor. The glauconite rich Hollybush Sandstone was probably deposited under shallow marine conditions and finer grained sections generally yield well preserved acritarchs except where in proximity to igneous intrusives. The rather good state of preservation of the Hollybush microflora provides an opportunity for undertaking detailed morphological studies.

Two distinct acritarch assemblages are recognised. The first, recovered from sandstones, is characterised by a dominance of species of the genus *Skiagia*, principally *S. orbiculare*. The second, recovered from shales, is characterised by *Archaeodiscina* cf. *umbonulata*, and a *Baltisphaeridium cerinum* /

Comasphaeridium molliculum complex. Many elements including *Cymatiosphaera* sp., *Comasphaeridium* spp., *Granomarginata squamacea* and cyanobacterial sheaths are common to both.

Work on dating the assemblages is still in progress but at this stage a Tommotian, possibly Atdabanian age is indicated based primarily on a comparison of the Hollybush assemblages with those from the East European Platform, Poland and Scandinavia, published by various authors. The assemblages differ considerably from those typical of the latest Early Cambrian Protolenid – Strenuellid Zone of England and Wales. This dating is in general agreement with the age suggested by the sparse shelly fauna.

A comparison of the Jurassic palynomorph record in the Northern and Southern hemispheres and implications for wide scale correlations

James B. Riding

British Geological Survey, Keyworth, UK

The Jurassic dinoflagellate cyst record in the Northern Hemisphere (largely based on European studies) and Australasia appears to exhibit marked incoherence. The ranges of selected cosmopolitan species are apparently markedly different. For example, the range tops of *Nannoceratopsis pellucida* and *Rigaudella aemula* are significantly younger than in Europe. Reworking may not explain any of these disparate ranges. It is possible that palaeogeographical and/or palaeolatitudinal factors may explain some of the incoherence.

The principal areas of similarity and disparity are analysed in this preliminary assessment of existing literature.

Macrofaunal correlations are significantly more problematic than palynological ones

as molluscs exhibit more endemism than palynomorphs. Approaches other than standard species range analysis may prove useful to long distance palynological correlation. These include generic ranges and statistical methods of assemblage characterisation.

Palynology of the Late Triassic and earliest Jurassic succession on the Dorset-East Devon Coast World Heritage Site

Geoffrey Warrington

British Geological Survey, Keyworth, UK

Results of palynological studies of outcrop sections of the upper Mercia Mudstone Group (MMG) east of Seaton, and of the Penarth Group (PG) and basal Lias Group in a borehole at Charmouth, supplement those previously available from outcrops between Sidmouth and Branscombe and from the Lyme Regis and other boreholes. Palynomorphs have not been recovered from the lower c.155m of the MMG but miospores of Carnian age occur in the succeeding c.75m of that group. No significant assemblages are known from the succeeding c.130m of the MMG. Miospores of Norian(?) age are recorded from c.37m and c.25m below the Blue Anchor Formation (BAF). Marine palynomorphs (acritarchs) and remains of foraminifera appear in the BAF, c.27m below its top, and miospores from the upper c.17m of that formation are indicative of a Rhaetian age. The miospore assemblages diversify upwards through the upper part of the BAF and the succeeding PG. Marine dinoflagellate cyst associations of the Rr and Dp biozones appear, respectively, at the base of the PG and near its top, in the upper part of the Lillstock Formation. Miospore associations of limited diversity, and acritarch-dominated marine microplankton associations, occur in the Lias Group.

Silicofossil Group

Alex Mitlehner

Silicofossil Group Secretary

<alex.mitlehner@millenniallimited.com>

Although no meeting has been formally organised for the Silicofossil Group as yet (negotiations are currently at a preliminary stage for a possible joint meeting later in the year, see below), the theme for this year's AGM is the applications of siliceous microfossils in palaeoenvironmental analysis. It is therefore with much pleasure that we welcome Professor Sarah Metcalfe of the Department of Geography, Edinburgh University and Dr Felix Gradstein of the University of Oslo, as guest speakers. Sarah Metcalfe has gained much renown in the field of Quaternary palaeoenvironmental analysis of lake sequences in Mexico and links with human settlement phases, and I worked with her on a NERC Fellowship at Edinburgh on the Holocene Evolution of the Humber Estuary, part of the major LOIS initiative (amongst others, a certain Dr Ian Boomer was also involved with this study!). Felix Gradstein will be well known to many members, as he often visits UCL to lecture and work on research projects. He is a renowned stratigrapher, being a member of the IUGS International Commission on Stratigraphy. I am sure he will be presenting a talk which will therefore be of interest beyond the siliceous members of the TMS! This notwithstanding, other members (and non-members!) are encouraged to present posters, preferably with a siliceous theme, during the wine reception in the North Cloisters at UCL after the talks. Regarding a specialist group meeting, anybody who has a suggestion for a joint theme for siliceous microfossils in conjunction with another specialist group is encouraged to contact me at the above email address. To get the ball rolling, one possible theme which springs to mind is of interest to the Palynology Group: "The possible relationship of peridinioid

dinoflagellate cyst distribution to intervals of increased siliceous production". Any takers? I look forward to contributions and/or email discussions on this or any other theme with which members may have common interests.

Micropalaeontology News

Micropalaeontological Tourism

Guillem Colom i Casanovas

Next time you're migrating through Mallorca, in search of Eleanora's Falcon perhaps, reserve a little time and stop off at Museu Balear de Ciències Naturals in Sóller. This fascinating little museum houses the micropalaeontological collection of Guillem Colom (1900-1993), and is accessible to anyone interested. The website is www.sollernet.com/jardi/museum.html and Email address musbcn@teleine.es. Well worth a visit.

Jamie Powell

<ajp@dinosystems.co.uk>

Short Courses in Environmental Palaeoecology 2002/2003

Gail Crick

<g.crick@ucl.ac.uk>

The Environmental Change Research Centre (ECRC) have been running these successful short courses, which are suitable for MSc and PhD students, for over 10 years. Five of these courses (marked by *) are currently NERC-recognised and NERC-funded students can apply for support to attend these courses.

All course dates and content are subject to change. For further details and up-to-date information on any of the courses offered at

ECRC, please see our website:
<http://www.geog.ucl.ac.uk/ecrc/teaching.stm>.

**INTRODUCTION TO POLLEN
ANALYSIS***

Prof. H.J.B. Birks & Dr. S.M. Peglar
25th November - 29th November 2002
Course Tuition Fee: £300

**INTRODUCTION TO PLANT
MACROFOSSIL ANALYSIS***

Dr. H.H. Birks
2nd - 6th December 2002
Course Tuition Fee: £300

OSTRACOD ANALYSIS*

Dr. J.A. Holmes & D. Horne (Univ.
Greenwich)
13th-17th January 2003
Course Tuition Fee: £300

**CHIRONOMIDS: WATER QUALITY
AND CLIMATE CHANGE**

S.J. Brooks (Natural History Museum) &
Dr. L. Ruse (Environment Agency)
20th - 24th January 2003
Course Tuition Fee: £270

**INTRODUCTION TO DIATOM
ANALYSIS***

Dr. V.J. Jones & Prof. R.W. Battarbee
3rd - 7th February 2003
Course Tuition Fee: £300

**INTRODUCTION TO
DENDROCHRONOLOGY &
DENDROCLIMATOLOGY**

Dr. M. Bridge (Inst. Archaeology)
13th - 14th February 2003 - TO BE
CONFIRMED
Course Tuition Fee: £120

**INTRODUCTION TO
PALAEOCEANOGRAPHY**

Dr. M. Maslin
24th - 28th February 2003
Course Tuition Fee: £300

**NUMERICAL ANALYSIS OF
BIOLOGICAL & ENVIRONMENTAL
DATA***

Prof. H.J.B. Birks & Dr. M. Kernan
3rd - 14th March 2003
Course Tuition Fee: £650

**STABLE ISOTOPES IN THE
LACUSTRINE & MARINE
ENVIRONMENT**

Dr. M. Leng (NERC Keyworth) & Dr. M.
Maslin
17th - 21st March 2003
Course Tuition Fee: £240 plus Keyworth
visit costs

**International School on
Planktonic Foraminifera**

Dipartimento di Scienze della Terra,
University of Perugia (Italy)

2^o Course: Paleocene and Eocene
Planktonic Foraminifera
Perugia, 17-21 February 2003
Prof. Isabella Premoli Silva (Univ. Milano)

The course will include lectures
(taxonomy, biostratigraphy and
palaeoceanography) on Paleocene and
Eocene planktonic foraminifera and
practical sessions studying washed
assemblages and thin sections.
Max number of participants: 30
Registration dead line: 15th December
2002

Correspondence and information:
Dr. Roberto Rettori
Dipartimento di Scienze della Terra
Piazza Università, 1
I-06100 Perugia, Italy
E-mail: rrettori@unipg.it
Fax: 00390755852603
<http://www.unipg.it/~denz/>

Rogues Gallery

Ever wondered what your Officers and Group Representatives looked like??



Haydon Bailey
Chair



James Powell
Secretary



James Riding
Treasurer



Malcolm Hart
Journal Editor
Special Publications Editor



Jenny Pike
Newsletter Editor



Rachel Preece
Publicity Officer



Ian Boomer
Webmaster



Andrew Henderson
Foraminifera Group Chair



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Mark Purnell
Microvertebrate Group Chair



Paul Smith
Microvertebrate Group
Secretary



Jackie Lees
Nannofossil Group Chair



TBA
Nannofossil Group Secretary



Ian Slipper
Ostracod Group Chair



Mick Frogley
Ostracod Group Secretary



Susanne Feist-Burkhardt
Palynology Group Chair



Paul Dodsworth
Palynology Group Secretary



John Gregory
Silicofossil Group Chair



Alex Mitlehner
Silicofossil Group Secretary

Photo Gallery

The Photo Gallery for this Newsletter has been provided by Andy Henderson (Natural History Museum, London) and features images of foraminifera taken using the Natural History Museum PalaeoVision system. The images formed part of a project examining deep-sea benthic foraminifera likely to be recovered during ODP or IODP drilling cruises, the results of which were recently published in *Palaeontologia Electronica*.
Holbourn, Ann E. and Andrew S. Henderson, 2002. Re-Illustration and Revised Taxonomy for Selected Deep-Sea Benthic Foraminifers. *Palaeontologia*

Electronica, vol. 4, issue 2, art. 3: 36pp., 1.3MB.
http://www-odp.tamu.edu/paleo/2001_2/foram/issue2_01.htm

If you have any micropalaeontological images that you would like to see in the Photo Gallery, to publicise a recent or on-going project ... or just because you like them ... please send them to the Editor <pikej@cardiff.ac.uk> with some words of micropalaeontological wisdom to accompany them.



Paratrochammina challengeri Brönnimann and Whittaker, 1988. Recent. Challenger Station 323, South Atlantic Ocean (1900 fm). Natural History Museum, London. NHM ZF1538. Scale Bar = 291 microns



Uvigerina basicordata Cushman and Renz, 1941. Holotype. Early Miocene. From the Lower Agua Salada Formation, Tocuyo, 18.7 km S (202°45') of San Juan de los Cayos, District of Acosta, State Falcon, Venezuela. Smithsonian Collection. CC 35924. Scale Bar = 114 microns.

Forthcoming Conferences



FINAL CIRCULAR: JOINT MEETING OF AASP-BMS-NAMS 11TH-13TH SEPTEMBER 2002 UNIVERSITY COLLEGE LONDON

This is the final circular for the American Association of Stratigraphic Palynologists (AASP), the British Micropalaeontological Society (BMS) and the North American Micropaleontology Section (NAMS) of SEPM joint meeting in September 2002 at University College London, UK

**SPONSORS:
CHEVRONTEXACO
CONOCO INC.
ROBERTSON RESEARCH INTERNATIONAL LIMITED
SHELL EXPLORATION AND PRODUCTION UK
STRATADATA LIMITED
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UNOCAL DEEP WATER USA**

The theme of this international meeting will be 'recent developments in applied biostratigraphy' based on four principal themes:

- Sequence biostratigraphy
- Deep-water exploration
- Reservoir/Development studies
- Outcrop analogue studies

There will also be an open session with the emphasis on post-Palaeozoic palynology including a symposium on the palynology of coprolites. The scientific programme has not yet been finalised.

This meeting is aimed at encouraging trans-Atlantic exchange of ideas to seed new research initiatives. In particular, we aim to encourage an integrated multidisciplinary approach in both the academic and industrial realms. There is no taxonomic or geographical restriction on contributions. Posters have been invited on any micropalaeontological, nannopalaeontological, palynological or biostratigraphical theme.

A post-meeting field excursion will visit the Cretaceous succession of the Isle of Wight led by Drs Iain Prince, Bruce Tocher (Statoil, Norway) and Ian Jarvis (University of Kingston) on September 13th to 15th. See the registration form and separate text for details.

A workshop on the biostratigraphy and sequence stratigraphy of the Gulf of Mexico will be held at University College London on Saturday 14th September led by Garry Jones (Unocal) and Brian O'Neill (Shell).

The conference conveners are:

A. James Powell (Dinosystems): Contact Convener

Chris Denison (ChevronTexaco): representing AASP

Tom Dignes (Exxon/Mobil): representing NAMS

Alan R. Lord (UCL): Local Secretary

Susan Matthews (UCL): Local Support

Rachel Preece (ChevronTexaco): representing BMS

James B. Riding (British Geological Survey): Treasurer

GENERAL

All registrants will be sent joining instructions, travel details, maps etc. by email before the conference. This information will also be placed on the respective society websites. The University College London website is: www.ucl.ac.uk. The most useful page for visitors is: www.ucl.ac.uk/UCL-Info/AboutUCL/wherweare.html. This page includes maps.

The first event will be the icebreaker, a reception with drinks and nibbles, which will be held in the South Cloisters (ground floor) at University College London, Gower Street, London WC1E 6BT on the evening of Tuesday 10th September 2002 from 7.30pm onwards. Delegates will be able to register at the icebreaker. Registration will also be possible prior to the first technical session on Wednesday 11th September. All oral presentations will take place in Lecture Theatre 1, Cruciform Building, University College London on Gower Street.

Posters will be displayed in the refreshments area in the South Cloisters.

Please note that the two AASP Board meetings will be held at UCL on the evenings of 11th September and 13th September.

REGISTRATION FORM

This is the registration form for the AASP-BMS-NAMS Meeting at University College London, UK. Please fill in the appropriate blanks below, and submit your form to the address below. Please do not submit your details by Email or Fax. The conveners all hope you enjoy contributing to the meeting, and take advantage of the attractions that London has to offer. Registration deadline is 26th July 2002.

1 REGISTRATION: (all costs are in GB£)

AASP, BMS and NAMS Members:	£90
Student AASP, BMS and NAMS Members:	£30
Non-members of AASP, BMS and NAMS:	£150
*AASP Business Luncheon (13 th September 2002)	£20

Total:.....

*Please note that delegates are most welcome to attend this event if they are not AASP members.

The registration cost includes: Registration Packet, Abstracts and Programme Volume, Icebreaker, coffees/teas etc. and the Social Evening.

I am a member of:

AASP: BMS: NAMS:

I am a student:

Supervisor's countersignature:

2 ACCOMMODATION

Accommodation has been arranged at one of University College London's student facilities, Ramsey Hall of Residence, 20 Maple Street, London W1P 5GB (tel. +44 (0)20 7387 4537). The Hall is located close to Tottenham Court Road and is a five minute walk from the main University College London campus on Gower Street. It comprises single occupancy bed and breakfast accommodation at £23.75 per night for the three nights of 10th to 12th September 2002. Therefore, three nights bed and breakfast will be £71.25. Please note that, because of returning students, we cannot offer accommodation here for the night of 13th September and beyond. Accommodation will be allocated on demand on a first-come-first-served basis. Delegates will, of course, be free to stay in nearby hotels, but are responsible for their own booking. Delegates wishing to select their own accommodation may be interested to peruse: www.londontouristboard.com. You should select hotels in the Bloomsbury area. A list of geographically suitable hotels will be placed on the society's websites.

I wish to reserve a room in Ramsey Hall for:

10th September @ £23.75:
11th September @ £23.75:
12th September @ £23.75:
TOTAL:

3 **SOCIAL EVENT ON THE EVENING OF THURSDAY 12TH OF SEPTEMBER**

Because of the lack of sponsorship funding earlier in 2002, we reluctantly had to abandon the London Eye/Royal Festival Hall social evening. However, in its place we have booked the headquarters of the Geological Society, Burlington House, Piccadilly, London W1J 0BG (opposite the famous Fortnum & Masons store). On the evening of September 12th there will be a guest lecture (Martin Farley, Univ North Carolina at Pembroke: "Forging a path for biostratigraphy") followed by a reception in the Lower Library. Delegates will be able to tour the historic building and see exhibits including William Smith's first geological map. Attendance of this event is included in the registration fee, however additional tickets may be purchased at £9.95.

4 **ISLE OF WIGHT FIELDTRIP**

Drs Iain Prince, Bruce Tocher (Statoil) and Ian Jarvis (University of Kingston) will lead a fieldtrip to the Isle of Wight to examine the Cretaceous succession. More details are given in the separate text on this. The field party will depart London after lunch on Friday 13th of September and return to central London on the late afternoon/evening of Sunday 15th September. Please note that non-UK participants are strongly advised to book their return flights for Monday 16th September because we cannot guarantee a specific time by which you will be returned to central London.

The cost of the fieldtrip is £250 per person assuming each person occupies a double room. If you are prepared to share a room, the price is £210 per person. 28 places are available on a first-come-first-served basis. The cost of this fieldtrip includes a guidebook, all travel costs to and from the Isle of Wight, two nights bed and breakfast accommodation, two evening meals, two packed lunches and a cream tea.

I wish to attend the Isle of Wight fieldtrip and will take a double room (£250):.....

I wish to attend the Isle of Wight fieldtrip and will share a double room (£210):.....

5 **GULF OF MEXICO WORKSHOP - SATURDAY 14TH SEPTEMBER**

Drs Garry Jones of Unocal, Sugar Land, Texas and Brian J. O'Neill of Shell International Exploration and Production Incorporated, New Orleans, Louisiana have kindly offered to run a seminar style workshop/short course on 'Applied Biostratigraphy in the Petroleum Industry with Special Reference to Gulf of Mexico Deep Water Exploration and

Development' on Saturday 14th September at University College London. This will be an informal workshop including paper exercises with modern seismic and biologs using IPS which all delegates are welcome to attend up to a maximum of 25 on a first-come-first-served basis. There is no separate charge for this workshop and neither formal catering nor accomodation has been arranged by the conference organisers. A seminar room has been arranged at UCL. Delegates wishing to attend this event should register with Garry Jones (garry.jones@unocal.com) and Brian O'Neill (boneill@shell.com).

6 PAYMENT SUMMARY

I	Registration (see above):	.....
II	Additional Icebreaker tickets (£8.50):	.....
III	AASP Business Luncheon @ £20 (13 th September 2002):	.....
IV	Additional tickets for the AASP Business Luncheon @ £20:	.....
V	Accommodation at Ramsey Hall (see above):	.....
VI	Additional Abstracts/Programme volume @ £7.00:	.....
VII	Additional social evening tickets @£9.95:	.....
VIII	Isle of Wight fieldtrip - double room @ £250:	.....
IX	Isle of Wight fieldtrip - will share a double room @ £210:	.....
	TOTAL:	.....

Personal Information:

Name:

Address:

.....

.....

Tel:.....

Fax:.....

Email:

Payments by cheque (made payable to the British Micropalaeontological Society please) or credit card, both in GB£:

Credit Card Information:

Visa:..... Master Card:.....

Credit Card Number:..... Expiry date:

Name on card:

Signature:

Send completed registration forms by 26th July 2002 to:
 Dr James B. Riding, British Geological Survey, Keyworth, Nottingham NG12 5GG, UK.
 For more information contact: jbri@bgs.ac.uk

Joint AASP-BMS-NAMS Meeting on Exploration Biostratigraphy Field Trip: The Cretaceous of the Isle of Wight

Leaders : Iain Prince¹, Ian Jarvis² and Bruce Tocher¹

¹Statoil, Forushagen, Forus, 4035, NORWAY.

²School of Earth Sciences and Geography, CEESR, Kingston University, Penrhyn Road, Kingston upon Thames, Surrey KT1 2EE, UK.

Itinerary :

FRIDAY 13TH SEPTEMBER 2002

Depart conference venue (University College London) c.13.00h. in one or two minibuses. Arrive Isle of Wight, staying in a hotel in Ryde (evening meal in hotel). If you are willing to share a hotel room, this will help the organisers (a block of 23 rooms have been reserved).

(Please note the field trip must leave early Friday afternoon due to traffic conditions. If we leave at 17.00h, we would miss the ferry crossing).

SATURDAY 14TH SEPTEMBER 2002

Sandown to Culver Cliff: examine the Barremian to Turonian interval (i.e. Wealden, Lower Greensand, Gault, Upper Greensand, Lower and Middle Chalk up to Chalk Rock). St. Catherines Point: examine the Albian-Cenomanian interval (i.e. Upper Greensand, Glauconitic Marl and Lower Chalk). Also a chance to collect ammonites from fallen blocks on the beach. Packed lunch will be provided; evening meal at the hotel.

SUNDAY 15TH SEPTEMBER 2002

Whitecliff Bay: examine the Turonian/Coniacian boundary to the Upper Campanian (i.e. Middle and Upper Chalk).

Depart c. 15.00h, arriving central London during the evening. The arrival time depends on traffic conditions.

We very strongly suggest that participants with flights arrange these for Monday 16th, and book hotel accommodation for the evening of Sunday the 15th. Traffic into Central London is particularly bad on Sunday evenings and we can not guarantee our return time.

The field trip will concentrate on sedimentology and biostratigraphy (palynology and micropalaeontology) and will include discussion of depositional and palaeoceanographic models based on our current understanding/knowledge. For those interested in the Tertiary, Day 2 involves walking past the classic Palaeocene-Eocene (Reading Formation, London Clay, Bracklesham Group) section at Whitecliff Bay. While no formal talks will be given on the Tertiary, it will be possible for individuals to remain and examine this section while others continued on to study the Chalk. Guidebooks will be provided in detail for the Cretaceous and in general for the Tertiary. Good walking shoes/boots and waterproofs will be essential, as we will be away from the vehicles for long periods. Please note that the number of places is restricted to 28. To register for the trip, fill out the registration form accordingly. For more information, please contact the Field Trip convenor, Iain Prince on: IPRI@statoil.com, with copy to jbri@bgs.ac.uk. Iain Prince and Jim Riding will compile an email mailing list and you will be kept fully informed.

Conference Reports

When you go to micropalaeontology-related conferences consider writing a conference report for the *Newsletter*. Send conference reports to the Editor <pikej@cardiff.ac.uk>.

FORAMS 2002 – International Conference on Foraminifera

Malcolm B. Hart
University of Plymouth
<mhart@plymouth.ac.uk>

The four-yearly gathering of the great and the good in the world of Foraminifera was held at the University of Western Australia, Perth, in February 2002. The meeting was ably organised by Prof. David Haig and Dr Stefan Revets with support from Marjorie Apthorpe, Kate Trinajstic, Justin Parker, Rob Campbell, Barry Taylor, Matt Dixon, John Williamson and Jenney Beavan. The location of the meeting, on the beautiful campus of the University, was ideal as it provided good facilities and a wonderful place to meet in the sun between sessions. A large number of the participants also lived in St George's College that was located just across the road overlooking Matilda Bay. There were 160+ attendees from a wide range of countries, although UK attendance was relatively low. Each day of the conference began with a plenary session with invited presentations. These ranged from taxonomy to palaeoecology and from genetics to industrial applications. All provided an interesting insight into the key issues facing the science and discussions on these lectures often continued later in the day. The "working sessions" gave presenters 20 minute slots and while there were three

parallel sessions I heard few grumbles about the organisation of this programme. There were the inevitable overlaps. Many contributors used "powerpoint" presentations and the organisers made certain that this worked effectively and efficiently. The postgraduate students came to each session with a laptop on which every talk had been stored on the hard drive, thereby ensuring that the delays and problems faced by other meetings I have attended (dare I mention the Palaeontological Association Annual Conference in Copenhagen last December!) did not occur. The last session on each day was run as a workshop on a series of themes. Again there were generally three parallel discussion sessions and these ran as either full discussions or presentations by the coordinators followed by general discussion. Some of these worked very well while others were less successful – though the concept was good. I have, deliberately, not highlighted particular presentations but I must mention a talk by Marie-Thérèse Vénec-Peyré on the work and life of Alcide d'Orbigny. The year 2002 is the bi-centenary of his birth and the illustrated story of his life and work was truly fascinating. The social programme was very good and few can forget the Conference Dinner, especially when a James Bond look-alike jumped over a balcony and ran through the bar area pretending to shoot everyone on sight. This was arranged for another event in the Yacht Club, but we still heard the whole charade.

The mid-Conference field excursions went to Rottneest Island and Penguin Island. I was on the Penguin Island excursion that was led by Marjorie Apthorpe but I visited Rottneest Island at a later date. Both were very successful although it was the hottest day of the conference period. Highlight of the Penguin Island trip must be the thrombolites in Lake Clifton, though by

that time the temperature was in the high thirties!

The post-Conference field excursion was a wonderful experience for those that were able to find the funds to attend but who also booked early enough to get in the limited list of those able to attend. This week-long excursion travelled north from Perth through the Perth Basin and the Carnarvon Basin. The distances were long and the weather was warm (not as hot as it might have been!) but everyone was delighted with the programme, the coach and the accommodation arranged en-route. Everyone would have their own highlights, depending on their interests, but I would imagine that for many the most memorable morning was that spent at Carbla Point on Hamelin Pool in the Shark Bay World Heritage Site. The stromatolites at this location are reportedly the best in the world and we were fortunate that the trip organisers had managed to gain access to what is normally a closed locality (it is on private land). Prof. Di Walker, an expert on sea-grass, had kindly come on the excursion and helped with the collection of a wide range of living material. Almost all participants left the area with bags of beautiful peneroplids and other Recent foraminifera. I was particularly interested in some of the Cretaceous sections (surprise) of the Gingin Chalk and the Toolonga Calcilutite, though I have to admit to sheer amazement over the trace fossils in the Tumblagooda Sandstone (Ordovician) seen on the coast near Kalbarri. A most beautiful sunset was enjoyed in the Pinnacles National Park, though the scenery was fascinating throughout. Anyone visiting Western Australia should try and get a copy of the field guide as the locations are all worthy of a visit. The guide was beautifully presented, well-illustrated and with a wealth of detail on the foraminifera that could be collected at all locations.

FORAMS 2002, though quite expensive for most participants, was well worth every £, \$ and €. The scientific content was very good and the social interaction was excellent. The meeting was large enough for a range of attendees but not that large that one was overwhelmed. The organisation was excellent, although this was not an accident. All the local team worked hard and the signs of wear-and-tear were evident, though it did not affect the meeting at all. All are to be congratulated on the success of the Conference. During the meeting there was a debate on the location of the next FORAMS 2006 meeting. Two presentations were given; on Kiel (Germany) and Natal (Brazil). In a very close vote it was decided that Eduardo Koutsoukos will organise the next meeting in Brazil. I am sure Eduardo will make this a Conference to remember but the challenge to improve on FORAMS 2002 is enormous.

The Book Shelf

Thanks to all of you who have suggested books for review over the past 6 months. The fact that many of the reviews do not appear here is due to my absence (cruising with the British Antarctica Survey in Antarctica) and tardiness in procuring the books. However, please keep sending in your suggestions <pikej@cardiff.ac.uk>. We should have a good range of reviews for the next issue.

Book Reviews

Ecology and Palaeoecology of Benthic Foraminifera

John W. Murray

Pearson Education, 416pp, ISBN 0-582-05122-3 (Pb), Price £49.99/ US\$76.99

<www.pearsoneduc.com>

It will be of interest to many of you to know that John Murray's excellent book has been brought back into print. This authoritative review of foraminiferal ecology relates ecological information on living forms to the palaeoecology of fossil species. In brief, introductory chapters summarise life processes (Chapter 2), stable isotope studies, (Chapter 3) population dynamics (Chapter 4), and the relationship between living and dead assemblages (Chapter 5). A major part of the book is devoted to a regional synthesis of their distribution and environments ranging from tropical to high latitude oceans and from supratidal marshes to the deepest part of the ocean (Chapters 6-17). From this base, general features of the distribution pattern are drawn (Chapter 18) and ecological controls discussed (Chapter 19). Detailed methods and ecological data for individual genera are given in the comprehensive appendices.

Many of you will already be familiar with this wide-ranging volume and if you are new to the field of benthic foraminiferal palaeoecology, you didn't buy yourself a copy first time around or lent yours to someone and never saw it again, this re-issue is your chance to get a new one.

Jenny Pike
<pikej@cardiff.ac.uk>

Environmental Micropalaeontology

R. E. Martin
Kluwer Academic/ Plenum Publishers,
459pp, ISBN 0-306-46232-X(hb),
Price £90 / \$ 129.50

This book comprises nineteen chapters which together illustrate the changing role of micropalaeontology within the earth sciences over recent years. Many micropalaeontologists will have noticed the shift in research funding from

hydrocarbon exploration and the understanding of earth's geological history to investigations of 'recent' climate change, pollution and associated anthropogenic impacts. As such, this volume points the way forward for many (but not all) within our discipline. It is interesting to note that despite the focus on modern processes in this work the results of many of these studies may have implications for our understanding and interpretation of the fossil record. The book is divided into five sections: *Baseline Studies of Foraminifera*; *Water Quality in Modern Marine, Marginal Marine and Freshwater ecosystems*; *Physiological Responses of Foraminifera to Pollution*; *Disturbance and Recovery Through Time*; and *Aquifers and Engineering*. These comprise a good mix of general papers and specific examples. The first paper (by John Murray), although using foraminifera as an example, provides an illuminating introduction to environmental change and the response of biological organisms to both physical and chemical variability.

The nineteen chapters vary in their scientific approach, geographical and environmental context and in the microfossil groups chosen for study. In this respect the book does not provide a balanced picture. The choice of subject matter is probably a reflection of the papers offered rather than the true scale and breadth of environmental micropalaeontology being undertaken today. This does not detract from the quality of the papers presented. The book is strongly focussed on marine systems, and predominantly foraminiferal projects. Most studies are in some way related to anthropogenic impacts. Fifteen chapters are based on studies of marine and marginal marine ecosystems (twelve on the applications of foraminifera) while only four concentrate on non-marine

environments. There is a wide range of research currently addressing the acidification and eutrophication of non-marine waters (especially through the use of diatoms and testate amoebae) which are only briefly covered here. In addition to the fifteen foraminiferal chapters, ostracods (3 papers), thecamoebians (1 paper), chrysophytes & diatoms (1 paper), dinoflagellates (1 paper) and pollen (1 paper) are also dealt with. Geographically, the book mainly takes its examples from Europe and North America with additional chapters covering work in the Pacific and the Middle East.

This book provides an important step between the geological and environmental sciences. However, it is not an all encompassing review of current environmental micropalaeontology, but it does give an indication of the direction in which the discipline is moving. As such it is an important resource. At £90 the book is very over-priced for a series of case studies and I imagine will only find its

way on to a few private shelves. At such a high cost one would have also expected a higher quality of paper and image reproduction. Many of the grey-scale images are low contrast with the result that monotone areas often range from light to dark. Image resolution is also quite poor on some SEM and line drawings, detracting from the feel of the book. A useful index is provided at the end. With subject matter ranging from the Chemical Ecology of Foraminifera to the Construction of the Thames Barrier and a range of pollution impact studies the book should at least be browsed by those seeking an introduction to the use of microfossils in monitoring recent environmental change.

This review was originally prepared for the Palaeontological Association Newsletter

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