The Palaeontology Newsletter

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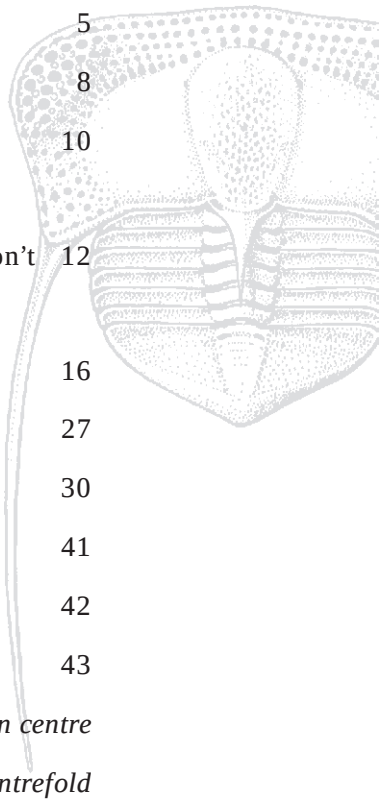

Reminder: The deadline for copy for Issue no 46 is 13th February 2001

On the Web: http://www.palass.org/

Association Business

Palaeontology goes on line

Starting with Volume 44, 'Palaeontology' will be produced in electronic format in addition to the normal paper copy. It is hoped that this service will be extended to earlier volumes in due course.

There will be no additional cost for this service. Access will be via the *Ingenta* site by use of a password that will be made available to members and which will be changed yearly. Details, including the password, will be given in the first Newsletter of next year (Number 46). The password will only be issued to members who have paid up for the year in question, and members will be asked, as a condition of membership, to sign a declaration that they will not disclose the password to non-members.

Tim Palmer
Executive officer
<palass@palass.org>

New email information server: palass-members@le.ac.uk

To register for email notification of upcoming Palaeontological Association events, deadlines and other activities, send an email containing only the message:

subscribe palass-members Xxxx Yyyyy

To: listserver@le.ac.uk

(N.B. *replace Xxxx Yyyyy with your name*)

As many of you know, we make use of a number of email listservers (such as PaleoNet and vrtpaleo) to announce upcoming Association meetings, abstract deadlines, new publications, award deadlines, updates to the website etc. These have the advantages of instant global communication, but many Association members do not subscribe to these lists and may miss announcements of interest. In order to improve direct communication, Council have set up an email listserver with which to make Association announcements to Association members. This is not intended as a forum for wide-ranging discussion of palaeontological topics and will not generate large volumes of email. To subscribe to the list and keep abreast of what's going on in your Association, follow the instructions above.

Mark Purnell
Publicity Officer and Webmaster
<map2@le.ac.uk>

Nominations for Council 2001-2002

At the AGM in May 2001, the following vacancies will occur on Council:

Vice-President, Secretary, Ordinary Member

Nominations are now invited for these posts. Please note that each candidate must be proposed by at least two members of the Association and that any individual may not propose more than two candidates. Nominations must be accompanied by the candidate's written agreement to stand for election and a single sentence describing his/her interests.

All potential Council Members are asked to consider that:

'Each Council Member needs to be aware that, since the Palaeontological Association is a Registered Charity, in the eyes of the law he/she becomes a Trustee of that Charity. Under the terms of the Charities Act 1992, legal responsibility for the proper management of the Palaeontological Association lies with each Member of Council.'

The closing date for nominations is Thursday 30 November 2000. They should be sent to the Secretary: Dr Paul Smith, School of Earth Sciences, University of Birmingham, Edgbaston, Birmingham B15 2TT.

Hodson Fund

The Hodson Fund is a new annual award made by Council to palaeontologists who are 35 or younger (in the year in which the award is to be presented) for outstanding achievement in contributing to the science through a portfolio of original published research. The award has been made possible by a charitable donation from Prof. F. Hodson to the Association. One award will normally be made each year at the AGM. The closing date for nominations is Wednesday 31st January and nominations should ideally be endorsed by several supporters to demonstrate wide support across the community. The nominator is asked to send a list of sponsors, with their signatures, together with a brief *curriculum vitae* and copies of the papers that comprise the portfolio. Recipients must be members of the Association. In 2001, the Hodson Fund will have a value of £1,000.

Sylvester-Bradley Awards 2001

In light of the recent financial success of the Association, Council has decided to increase the number of awards and their maximum value from 2001. Applications are now invited for the Sylvester-Bradley Awards, to assist palaeontological research (travel, visits to museums, fieldwork etc.), with each award having a maximum value of £1,000. No definite age limit is applied, although some preference may be given to younger applicants or those at the start of their careers. The award is open to both amateur and professional palaeontologists, but preference will be given to members of the Association.

Mary Anning Award 2000

Members are reminded that nominations for this year's award for amateur palaeontologists will close on Thursday 30 November 2000. The award is made annually to candidates who, in the opinion of Council, have made an outstanding contribution to the study of palaeontology from a non-professional perspective. Such contributions may range from the compilation of fossil collections to their study, care and conservation, and/or collaboration with professional palaeontologists.

The award will comprise a cash prize plus a framed scroll. It will be presented to the winner at the AGM in May 2001. Nominations should comprise a short statement (up to one page of A4) outlining the candidate's principal achievements. Members putting forward candidates should also be prepared, if requested, to write a profile in support of their nominee. Please send your nominations to the Secretary (address below).

The closing date for the 2001 award round is Thursday 30 November 2000. Applicants will be informed of the outcome of their applications in March. Application forms and further information may be obtained from the Association's Web site or from the Secretary: Dr Paul Smith, School of Earth Sciences, University of Birmingham, Edgbaston, Birmingham B15 2TT. Please send completed forms to the Secretary.

Grant Aid to attend the Annual Meeting

It has also been decided to introduce a programme of grant aid to assist overseas palaeontologists attending the Association's Annual Meeting. A total sum of up to £1,500 will be available annually for distribution to those travelling from outside the country hosting the Annual Meeting. (England, Scotland, Wales and Northern Ireland will be considered as constituent members of the UK for this purpose.) Awards will be limited to those applicants making an oral or poster presentation. Applications for grant aid to attend this year's meeting (no form necessary) should be made to the Executive Officer: Dr Tim Palmer, Institute of Geography & Earth Sciences, University of Wales Aberystwyth, Aberystwyth, Ceredigion SY23 3BD.

Meeting REPORT

Progressive Palaeontology 2000
Birmingham

Progressive Palaeontology is organised by postgraduates, for postgraduates. It provides the opportunity to talk about research in relaxed and informal surroundings and is an excellent stepping stone to larger conference talks.

This year the venue is the School of Earth Sciences, University of Birmingham. Delegates were welcomed in the Lapworth Museum, giving those of us who were not speaking a chance to peruse wonderful fossils, and speakers a chance to gather a few last-minute thoughts and to keep nerves under (…a certain amount of) control. Presentations this year included a series of ten extremely well and enthusiastically delivered talks, and one poster on a range of subjects from microfossils to big cats.

David Gelsthorpe (Leicester) opens with: *"Microplankton changes through a mass extinction: the early Silurian Ireviken Event"*. David is looking at the Llandovery-Wenlock boundary in Sweden to assess faunal changes across it. His main theme is acritach turnover in relation to sedimentary record and a known decline in conodont diversity. David hopes to pick cyclicity in acritarch abundance and to correlate with various causative models including, among others, Milankovitch cycles. Additional correlation will be made with Oxygen and Carbon isotopic data and sedimentary sequences in Estonia and the United Kingdom.

To Wales now with the famous Wenlock Limestone, as Liam Herringshaw (Birmingham) presents: *"The Palaeobiology of Silurian Problematica"*. Liam is working on two divisions of problematica; first, those that are poorly known or described but with known affinity; second, those which are entirely unresolved. He has begun with the former, focusing on the Asterozoans. The most recent of previous studies was conducted early in the first part of this century; Liam is attempting to undertake a major, and somewhat overdue, revision of the group and it is hoped that such a revision can shed some light on exactly why the problematica are, as their name suggests, problematic.

I am now taken to the Miocene, as George Iliopoulis (Leicester), talks about *"The Upper Miocene Mammal Fauna from Kerasia, Northern Euboea Island, Greece"*. He is studying taxonomy and taphonomy of vertebrate fossils, especially the known Bovidae and Giraffidae to place them stratigraphically with similar age Asian and European sites. George is currently conducting a taxonomic analysis of the excellently preserved specimens, as the first and major part of his project. After this he is hoping to look at sedimentology with pre- and post-burial fluvial transport to add a taphonomonic context to this Eastern Mediterranean fauna.

Hannah O'Regan (Liverpool John Moores) continues on the vertebrate theme and discusses: "Panthera gombaszogensis – *A little known Pliestocene cat"*. She begins with clearly emphasising her difficulties, including a poorly understood history and a relative lack of carnivores in the fossil record. Hannah is exploring the relationship of this extinct cat with extant members of *Panthera;* she has studied the majority of specimens first hand, using morphometric and morphological analyses to construct her well supported and much needed review of the position of *P. gombazogensis*.

The second session begins and I am taken to China for a talk entitled *"Lower Ordovician trilobite biofacies of the South China Plate"* from Samuel Turvey (Oxford). Samuel is investigating this well known group in the context of little understood effects of water depth on biofacies. After extensive fieldwork he has demonstrated palaeobathymetric controls in both stratigraphic and geological contexts, highlighting different biofacies in relatively shallow marine settings that allowed him to estimate relative water depth. From this, Samuel hopes to produce a more accurate picture of Lower Ordovician biogeographical affinities to Gondwana & Baltica.

I am now taken to Carboniferous Limestone of Great Shunner Fell, North Yorkshire as Abigail Brown (Edinburgh) talks about *"Cuticular sensory structures in trilobites"*, in particular, those of *Paladin eichwaldi shunnerensis.* Abigail is comparing structures in *shunnerensis* to those of previously described animals, including cuticular perforations, pits, canals and granules. Abigail's preliminary investigations have revealed pits and possible pore canals by the use of techniques such as EDTA etching and SEM, and she is hoping to investigate these in further detail.

To spiders now with the next presentation, *"Tertiary Spiders: Systematics and Biogeography"* from Richard Cutts (Manchester). Rich is revising the last, most thorough review of fossil spiders from 1955. Instead of concentrating on popular specimens, preserved in amber, he is studying those from rock matrices. To date these may have been overlooked or even wrongly classified because animals are exceedingly difficult to identify after preservation in rock. By looking at specimens from North American and Western European Lagerstätten, he is extending the knowledge of spider palaeobiogeography during the Tertiary.

I am now *"Exploring the Palaeozoic Plateau"* with Abigail Lane (Bristol). In recognising compelling evidence for plateaus, she suggests fixed biological carrying capacity through time that is only overcome by major events, *e.g.* mass extinction. Abby is testing several hypotheses to explain this in relation to marine familial diversity, by assessing individual family stratigraphic range. She is both using large existing databases, and creating her own so she can present some possible tests for the existence of plateaus.

Now, Lucy Muir (Edinburgh) talks about *"Graptolites and Extinction"*. Lucy is using graptolites' ideal nature to study Phanerozoic extinction. She is testing probability of extinction with relation to morphology and geographical distribution, asking if there's a systematic appearance of morphologies during recovery phases. Lucy hopes to accomplish this by the use of diversity, morphology and stratigraphic data that will take into account pseudoextinctions and incompleteness of the fossil record.

Melissa Oxford (Plymouth), now takes me on the final journey of the day to Jurassic seas with: *"Jurassic Planktonic Foraminiferida from Dorset, England; Initial Report"*. She has established the age of a possible three, poorly preserved planktonic genera, dated by presence of Mid-Jurassic to Late-Cretaceous coccoliths adhered to some surfaces. Melissa has also demonstrated an association with a rich benthic assemblage, taken to be characteristic of Oxfordian maximum flooding events.

As ever this event produced a high standard of talks in relaxed surroundings, given by postgrads at the beginning of their research careers. On behalf of everyone who attended, I would like to say thankyou to Joe Botting, Rosie Widdison, Nick Clack, Liam Herringshaw, Jo Snell and all at Birmingham for a great day of talks and fine hospitality. The field trip to Dudley the following day was enjoyed by everyone, because, after all, fieldwork is the best bit!

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Association Meetings Programme

Annual Meeting 2000

University of Edinburgh / National Museums of Scotland / British Geological Survey
17-20 December 2000

The 2000 Annual Meeting will be held at the Edinburgh Conference Centre, Heriot-Watt University, Riccarton Campus, Edinburgh, from Sunday 17th December to Wednesday 20th December 2000.

Talks will take place on Monday 18th and Tuesday 19th December; the programme is included with the abstracts in the centre of this Newsletter.

The Edinburgh Conference Centre is situated at the Riccarton Campus, Heriot-Watt University, some five miles west of Edinburgh City centre. Accommodation is in single-bedded rooms, some with en-suite facilities. All lectures and poster presentations will be given in the Conference Centre where there are excellent display and presentation facilities (including PowerPoint). Catering standards are renowned. The Annual Dinner will be held at the National Museums of Scotland, preceded by a wine reception. Delegates will be taken there and back again by coach.

A field trip has been arranged for Wednesday 20th to the classic Upper Devonian to Lower Carboniferous sections at Siccar Point, Pease Bay to Cove and Barns Ness (Catcraig), along the East Lothian shore. In view of the uncertainty of the Scottish mid-December climate, this has been chosen so that the field party will never be more than a short distance from the coach. Alternative half-day trips in the city will be arranged: (1) Building Stones of Edinburgh (morning); (2) Dynamic Earth Centre (afternoon).

Booking

The booking form is included with this *Newsletter*. Please return it with your payment no later than 15th November.

Organisers

Professor Euan Clarkson, Department of Geology and Geophysics, University of Edinburgh, West Mains Road, Edinburgh, Scotland EH9 3JW, e-mail euan.clarkson@ed.ac.uk, tel +44 (0)131 650 8514, fax +44 (0)131 668 3184.

Vicen Carrió-Lluesma, National Museums of Scotland, Chambers Street, Edinburgh EH1 1JF, e-mail: vc@nms.ac.uk, tel +44 (0)131 247 4254, fax +44 (0)131 247 4819.

Mark Dean (field excursions), British Geological Survey, Murchison House, West Mains Road, Edinburgh, e-mail m.dean@bgs.ac.uk, tel +44 (0)131 650 0354, fax +44 (0)131 668 2683.

Lyell Meeting 2001

21 February 2001, 10 a.m., Burlington House, London

The Lyell Meeting at the Geological Society of London will be on the theme of:

Palaeobiogeography and Biodiversity Change

Particular emphasis of this one-day meeting will be placed on the links between palaeobiogeography and biodiversity change during the Ordovician and Cretaceous-Tertiary as periods of marked provincialism, major continental break-up, sustained biodiversification and episodes of mass extinction.

Speakers include:

Martin Aberhan (Berlin), Howard Armstrong (Durham), Joe Botting (Cambridge), John Cope (Cardiff), Alistair Crame (BAS, Cambridge), Peter Doyle (Greenwich), Dave Harper (Copenhagen), Malcolm Hart (Plymouth), David Lazarus (Berlin), Paul Markwick (Robertson Research), Imogen Poole (Utrecht), Paul Smith (Birmingham) and Sam Turvey (Oxford).

The list of talks can be found on the Pal. Ass. (http://www.palass.org/) and Geol. Soc. (http://www.geolsoc.org.uk/) Web sites.

If you are interested in contributing a poster at the meeting, please let either of us know as soon as possible, giving its title. Admission to the meeting will be free to members of the Palaeontological Association, Geological Society of London or British Micropalaeontological Society. There will be a small registration fee (£10 or £7 for students) for non-members.

Alistair Crame
British Antarctic Survey, High Cross, Madingley Road, Cambridge CB3 0ET, UK
<A.Crame@bas.ac.uk>

Alan Owen
Division of Earth Sciences, University of Glasgow, Gregory Building, Lilybank Gardens, Glasgow G12 8QQ, UK
<a.owen@earthsci.gla.ac.uk>
Web: http://www.earthsci.gla.ac.uk/

news

Kimmeridge Clay RGGE cores available for sampling

The Natural Environment Research Council's Rapid Global Geological Events (RGGE) special topic "Anatomy of a Source Rock" is now in its penultimate year. The project is based on core material recovered from three boreholes drilled in the type area, at Swanworth Quarry (SY 9675 7823) and at Metherhills (SY 9112 7911). We would like to advertise the availability of the cores' sample half, stored at the Southampton Oceanographic Centre. These part cores will not be archived, and before they are disposed of they will be available for a limited period to anyone interested in taking samples – probably until the end of 2000. In time, the completion of an enlarged core store at the British Geological Survey will ease access to the archive half.

Together, the cores represent a section throughout the Kimmeridge Clay Formation, and have allowed a variety of analytical methods to be applied at high resolution to the full thickness of the formation. Research on the cores to date has resulted in various analytical data-sets including magnetic susceptibility, carbon isotope, trace element, wt% TOC, wt% carbonate, palynology and palynofacies. The project's Web site offers some background to the study: http://www.earth.ox.ac.uk/~rgge/. Detailed graphic logs have been recorded, and the cores are correlated with the type section exposed between Kimmeridge Bay and Chapman's Pool. The cores might be of particular interest to biostratigraphers, as ammonite remains are abundant in certain sections.

Interested parties should contact John Marshall, University of Southampton <John.E.Marshall@soc.soton.ac.uk> or Helen Morgans Bell, University of Oxford <Helen.Morgans-Bell@earth.ox.ac.uk>.

Helen Morgans-Bell
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Microfossils and Oceanic Environments

A. Moguilevsky & R. Whatley (eds) 1996. University of Wales Aberystwyth Press, 434 pp, ISBN 0 903 878 74 7.

This compilation of 25 papers in six sections by a wide range of international authors constitutes the proceedings of the 'ODP and the Marine Biosphere' Conference held in Aberystwyth, Wales in April 1994. There are sections on: Palaeoceanography – Benthos, Palaeoceanography – Plankton, Techniques & Applications, Ecology, Stratigraphy and Biostratigraphy, and Evolution. The original price was £25. Copies can be obtained from the Association at £8 (within the UK), £10 / $US18 overseas including post and packing. Orders with credit card authorisation, or cheques payable to 'Palaeontological Association' should be sent to the Executive Officer.

Tim Palmer
Executive officer
<palass@palass.org>

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From our Correspondent

Them and Us: Why biologists don't care about palaeontology

"Not long ago, paleontologists felt that a geneticist was a person who shut himself in a room, pulled down the shades, watched small flies disporting themselves in milk bottles, and thought that he was studying nature"

[Simpson 1944, p. xv]

Scott Peck's pop psychology classic '*The Road Less Travelled'* relates the interesting case history of a schizophrenic patient who, not being able to discern people's true motives, veers erratically between wild promiscuity and arid social isolation. *Mutatis mutandis*, this is how I eye biologists. Some of them think the fossil record is in some sense a Good Thing, but very few of them know what to do with it. One thus sees some papers accepting *anything* any palaeontologist has written, whilst others (perhaps more wisely) regard everything any palaeontologist has ever uttered merely as a blast of vain doctrine or a flatulence from the orifice of hell. I would temper this characterisation a little by excluding vertebrate biologists to a large extent.

Both of these attitudes are annoying, in that they fail to take seriously what palaeontology is all about, *i.e.* extracting secure data from the rock record and saying sensible things about them. As it is generally considered that more biologist/palaeontologist interaction would be desirable, I list some of the obvious barriers below. Astute observers will note that this is not an attempt at partitioning blame: the difficulties lie on both sides.

a) The particularity of specimens. Assuming a biologist is not working on coelocanths or calvaria trees, it is relatively easy for him or her to chop up the organism they want to study and simply look at what the morphology is. Palaeontologists hardly ever have this luxury – our material is very much specimen based, and one typically cannot manipulate it to reveal the missing details. Different specimens show different details, and it can be very hard to knit all the information together into a coherent picture. As an example: during my PhD studies, I worked on a difficult arthropod from the Sirius Passet fauna that was known from well over 1,000 specimens, The variety in preservation in the specimens was and is quite extraordinary, and for a long time I simply despaired of ever making sense of them all. I laboured over *camera lucida* drawings, the first ones very messy with every detail and grain filled in. Yet, after about a year and a half, at first without noticing it, I began to see that my recent drawings were much simpler than the older ones, and the last ones I did were almost abstract, being concentrated on only a few features (fig. 1). It was at that point that I realised I now knew what the morphology had to be, and that my brain had 'known' much longer than I had. This fascinating and poorly-understood exercise in complex pattern recognition lies, as I am sure many will recognise, at the heart of descriptive palaeontology.

But how can this information be satisfactorily conveyed? Show someone a specimen and they will see only the confusing jumble of noise and data that you originally did. Show them your reconstruction and they may still typically fail to see the connection between it and the fossil. It is thus easy for your reconstruction either to be dismissed as made up (which after all, it is) or seen uncritically as what the animal or plant was actually like.

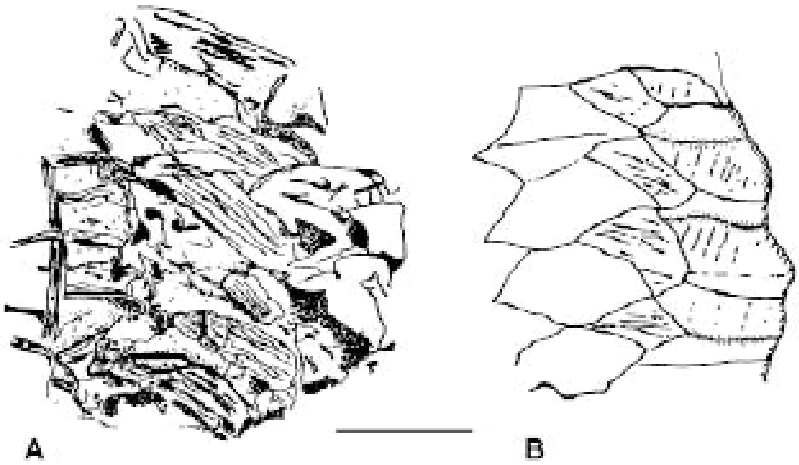

Figure 1: two camera lucida *drawings of approximately the same region of internal anatomy of an unnamed Sirius Passet arthropod. B was drawn 2.5 years after A: note its relative schematism, focusing on what are considered to be important structures (the actual structures involved are not central to the point – nevertheless scale bar = 5mm).*

It seems clear that the dragon guarding the portal of knowledge is taphonomy. Without at least *some* appreciation of the appalling things that can happen to an organism after its death and before the widely-grinning investigator clubs open the boulder containing it, fossils are going to remain curios for the drawing room. What is less clear, however, is how this can be overcome: perhaps someone could write (or has written?) a paper explicitly trying to explain these matters for a biological audience.

b) Systematics problems. Fascinating though extinct clades are, they do not thrill biologists anywhere near as much as living organisms. Therefore, in order to make extinct clades interesting, one must consider them in the context of living groups. As Andrew Smith has pointed out, this means recognising that *all* fossils fall into stem-groups to crown groups (Smith 1994). One does not need to be a bulging-eyed cladist, Bremer-support values at the ready, to appreciate this point. After all, dinosaurs are splendid organisms, but the recent fuss about them has been centred on the light they may shed on the origins of birds. This emphasis is going to involve the recognition that many palaeontological groups are paraphyletic. The failure to distinguish between monophyletic and paraphyletic groups has been a menace, leaving aside the taxonomic problems monophyletic groups cause. Now that the dust of time has begun to settle over it, let us cheerfully admit that this was the

main flaw of Gould's *Wonderful Life*. In retrospect, it stumbles into all the snares one would expect if one fails to spot that many of the 'oddballs' were in fact representatives of the stem-groups to extant high-level clades (Budd and Jensen 2000). If one failed to recognise or even consider this, then the following two propositions are going to appear inevitable: i) groups appear without precedent and persist unchanged (because anything that doesn't fit a preconceived notion of what the 'body plan' of a group is like is simply removed from it); ii) there are lots of high-level, 'unrelated' groups with a strange mix of characters as well as more familiar groups; therefore disparity must be much higher at the beginning of radiations than later.

Nebulous metaphysical angst about disparity, astounding developmental mechanisms and other specialities of the Cambrian *smörgåsbord* thus disappear in a puff of plesiomorphy. This is not just a chauvanistic problem of the Cambrian, but of many other radiations, where the same patterns appear. Pushing fossils into groups that do not have any apparent connections with living animals is clearly only ever going to appeal to a rather peculiar type of biologist.

c) Publication policy. This falls into two distinct categories. First, palaeontologists do not always think of their work as something that biologists might be interested in. As a result, biologically interesting sections of work are sometimes buried in long works full of material of admittedly lower (biological) interest. Another problem is what tiny impact palaeontological journals make on biologists (or at least, that is what it seems like). Even journals like *Paleobiology* and *Lethaia*, both of which are often packed with papers of direct biological interest, are hardly looked at by biologists. For example, I recently read a review of the origin and phylogeny of a major invertebrate group by a neontologist. It wasn't as if the author dismissed the fossil record; but the only palaeontological papers he cited were those published in 'biological' journals, giving his treatment a perverse, if startling, bias. Again, the pragmatic answer is clear: publish more papers in biological journals.

d) Education. The vast majority of biologists have hardly any palaeontological training, and indeed the only contact they have with the subject is often a gallop through 'Major Events In Earth History'. Morphology courses are often taught without any reference to the fossil record, for example. Similarly, palaeontologists are not always *au fait* with advances in biology and what implications they might have for their research. This is a long-term problem, but its unfortunate effects are widespread, as a glance through almost any biological textbook will show, where the references to the fossil record are, typically, toe-curlingly embarrassing. This is not always the biologist's fault: often, the most prominent palaeontological papers are of the 'Guinness Book of Records' variety, documenting the oldest, biggest, most feathered…giving little hint about what palaeontologists actually get up to most of the time. One might want to wave an excellent textbook such as Brenchley and Harper (1998) at one's biologist friends for an introduction to the current state of play.

Finally, one might ask the obvious question: why bother? Interdisciplinary interaction is often lauded, but does it actually get anywhere? To answer this, one might look at what happened in the 1960's and 1970's, where there can be little doubt the whole field of palaeontology was enlivened by successive *outside* influences, The most important was probably plate tectonics; but the wholescale import of the 'new ecology' into palaeontology, exemplified above all else by the wonderful *'Evolutionary paleoecology of the marine biosphere*' of Valentine in 1973, also

had a dramatic effect. In the last few years, I suppose that the impact of the 'new systematics' – for good or for bad - has been as important for palaeontology.

What next? Two obvious candidates stand out. First: the study of ecological response to disaster, where palaeontology can provide unique documentation of what happens after catastrophe (e.g. Erwin 1998). How successively this can be cross-fertilized by work on extant community dynamics may be a matter of scale: can we fit together the patterns of the fossil record with the inevitably smaller-scale processes that can be observed in the field?

Secondly, a quiet revolution: the study of morphology in its developmental and evolutionary aspects is becoming popular again amongst evolutionary biologists. In the New Synthesis of the middle years of the 20th century, the input of palaeontology was largely crafted around the neontological concepts of the biological species concept and allele frequency changes – an approach exemplified by G.G. Simpson, who largely looked to the fossil record to see how these concepts worked out in practice. However, the truly amazing evidence from the fossil record – how the mammalian middle ear evolved and how tetrapods made it onto land; the origins of body plans and the transformations required to make a bird from a dinosuar – were largely passed over. With data pouring in every day about the molecular basis of development, palaeontology has a real chance to make a substantial and unique input into any emerging 'new' New Synthesis. If so, then the response of biologists may finally rise above an online review I saw of Briggs et al. (1994), which ran in its totality: *"It makes you wonder what was out there millions of years ago*". Indeed so.

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References and further reading

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Briggs, D.E.G., Erwin, D.H. and Collier, F.J. (1994). *The fossils of the Burgess Shale*. Smithsonian Institution Press, Washington DC.

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>>*Future* Meetings of Other Bodies

British Micropalaeontological Society 2000 – Annual General Meeting
15 November 2000
Gustave Tuck Lecture Theatre, University College London.

The 2000 annual addresses are:

Listening to cysts – dinoflagellates of the late Cenozoic, by Dr Martin Head (Godwin Institute for Quaternary Research, University of Cambridge).

Molecular view on origin, macroevolution and speciation of Foraminifera, by Professor Jan Pawlowski (Station de Zoologie, Université de Genève).

Following the talks, a wine reception (sponsored by Robertson Research International Ltd) with poster presentations will be held in the South Cloisters at UCL. If you (students especially) wish to contribute a poster on any micropalaeontological topic, please contact Jamie Powell (see below).

Convenor: Dr James Powell, BMS Secretary, Dinosystems, 105 Albert Road, Richmond upon Thames, Surrey TW10 6DJ, England, UK, tel: +44 (0)181 948 6443, fax: +44 (0)181 940 5917, e-mail: ajp@dinosystems.co.uk, Web: http://www.bmsoc.org/

Society for Integrative and Comparative Biology: Chicago, Illinois
Chicago Hilton & Towers *3 – 7 January, 2001*

The Year 2001 Annual Meeting for the Society for Integrative and Comparative Biology (SICB) is an educational and research forum for scientists and students studying the biological sciences. The meeting will include many symposia, workshops and special programs in addition to hundreds of contributed papers in divisional and topical sessions. These sessions will feature current topics by researchers in their fields and expertise. Watch the Web site for Schedule of Events updates and the posting of abstracts after 6th November 2000

Opening Session

Join us for the Opening Session, featuring Paul Sereno, Professor in the Department of Organismal Biology & Anatomy and The Committee on Evolutionary Biology at The University of Chicago, on Wednesday, 3rd January, from 8:00-9:00 pm. The title of his talk will be "Major Patterns of Evolution in Dinosaurs."

During the past 15 years he has made seminal discoveries of dinosaur fossils that elucidate major features of dinosaur evolution, continental drift, and the origin of flight. This work has been featured on the covers of Science and Nature. Sereno has also been active in science outreach and education; he has written popular articles for Natural History and National Geographic, authored a children's book on dinosaurs, and co-founded Project Exploration, an initiative to promote interaction among scientists, educators, students, and the public. His

awards range from being named one of People Magazine's 50 most beautiful people to the Boston Museum of Science's Walker Prize for extraordinary contributions in paleontology.

Special Symposia

In addition to the numerous symposia on research in integrative and comparative biology, two symposia will be of special interest to science educators. They are "Developing and Restructuring Science Curricula: A 'How To' Symposium" and "Science, Entertainment, and Teaching: Bringing Cutting Edge Biology to the Public and Teaching Community".

Symposia

- Amphibian Metamorphosis (Sunday, 7 Jan) - *Organized by Jaishri Menon and Robert Denver for DCE* – A mini symposium focusing on the endocrine control of amphibian metamorphosis with Dr. Jamshed Tata invited to serve as chair.
- Developing and Restructuring Science Curricula: A "How To" Symposium (Saturday, 6 Jan) – *Organized by Ali Whitmer for the Education Council* – This symposium will provide a toolbox for those interested in science curriculum reform and development by identifying funding programs, making use of existing resources, and presenting outstanding examples.
- Integrative Aspects of Epithelial Structure and Function (Saturday, 6 Jan) – *Organized by Tim Bradley and Mary Chamberlin for DCPB* – This symposium will synthesize three themes: epithelial structure, ion transport, and endocrinology as a tribute to John E.. Phillips who did so much to bring them together.
- Lesser-known Protostome Taxa: Evolution, Development and Ecology – (Friday, 5 Jan) *Organized by James Garey for DIZ, AMS, DSEB, and DEDB* – A reintroduction of some 16 lesser-known "phyla", reviewing recent advances, phylogenetic status, and why they should be studied further.
- Living Together: The Dynamics of Symbiotic Interactions – (Saturday, 6 Jan and Sunday, 7 Jan) *Organized by Mary Beth Saffro for DIZ and DAB as a Society-widesymposium* – A two-day symposium bringing together researchers who work on diverse types of symbioses, from mutualistic to antagonistic in a broad range of organisms, including animals, plants, fungi, and bacteria.
- Molecules, Muscles and Macroevolution: Integrative Functional Morphology (Friday, 5 Jan) – *Organized by Miriam Ashley-Ross, Alice Gibb and Lara Ferry-Graham for DVM, DCPB, and DEDB* – This symposium brings together young researchers to combine "traditional" functional morphology with recent new experimental approaches quantifying animal behavior and muscle activity patterns.
- Motor Control of Vertebrate Feeding: Function and Evolution – (Thursday, 4 Jan) *Organized by Michael Alfaro and Anthony Herrel for DVM* – Recent studies of feeding motor patterns will be synthesized to reevaluate hypotheses on constraints and conservatism of such patterns during evolution.
- Ontogenetic Strategies of Invertebrates in Aquatic Environments – (Thursday, 4 Jan) *Organized by Guy Charmantier and Donna Wolcott for TCS, DEE and DIZ* – An overview of the ontogeny of physiological and behavioral processes in aquatic invertebrates, particularly crustaceans.

- Plant/Animal Physiology Symposium (Friday, 5 Jan) – *Organized by Martin Feder, Steve Hand, Jim Coleman, Vince Gutschick, and Arnold Bloomfor DCPB, DEE and PES/ ESA* – Plant and animal biologists will share their perspectives on climate change, sensing and signaling, seed and egg banks, and stress resistance in a major effort to bring plant biology to SICB.
- Science, Entertainment, and Teaching: Bringing Cutting Edge Biology to the Public Teaching Community – (Friday, 5 Jan) *Organized by Stuart Sumida and Elizabeth Rega for DVM* – Research biologists will come together with creative artists in the entertainment industry to highlight, in parallel, the biological content of entertainment vehicles, novel teaching techniques, and the use of primary scientific data in both the entertainment and teaching professions.
- Stability and Maneuverability – (Saturday, 6 Jan and Sunday AM, 7 Jan) *Organized by Frank Fish and Robert Full for DVM and DCPB* – A one-and-one-half day symposium to bring together physiologists, morphologists, engineers, and mathematicians to elucidate principles affecting animal movement and to seek common solutions for designing biologically inspired robots.
- Starting From Fins: Parallelism in the Evolution of Limbs and Genitalia (Thursday, 4 Jan) – *Organized by Eduardo Rosa-Molinar and Ann Burkefor DEDB* - A one-and-one-half day symposium examining two major evolutionary transitions: Paired fins-to-limbs and unpaired fin-to-genitalia as seen in a variety of metazoans.
- Stress: Is It More Than a Disease? A Comparative Look at Stress and Adaptations (Friday, 5 Jan and Saturday AM, 6 Jan) – *Organized by James Carr and Cliff Summers for DCE and DNB* – A one-and-one-half day symposium examining the phylogenetic diversity of endocrine stress response, chemical signaling during stress, and mechanisms of adaptation.
- Taking Physiology To The Field: Advances in Investigating Physiological Function in Free-living Vertebrates (Sunday, 7 Jan) – *Organized by David Goldstein and Berry Pinshow for DCPB* – A symposium exploring the ability to measure and interpret physiological function in the field using a variety of methodological approaches on various physiological systems in a wide range of vertebrate animals.
- Vibration as a Communication Channel (Thursday, 4 Jan) – *Organized by Peggy Hill for DNB and DAB* – Scientists and engineers will come together for the first time to compare communication via vibration in a broad array of animal taxa, from mole crickets to elephants, and the multiple roles played by vibrational signals.

Further details, including meeting abstracts: http://www.sicb.org/

Third International Conference on Trilobites and their relatives

Oxford, UK *2 – 6 April 2001*

There will be a pre-conference field trip to Scotland and Northern England, and a post-conference trip in Wales and the Welsh Borders. Organiser-in-chief: Derek Siveter (Oxford).

Further details can be obtained from http://www.ashmol.ox.ac.uk/oum/wwwtrilo.html

GAC/MAC 2001

St. John's, Newfoundland, Canada 27 – 30 May 2001

The Geological Association of Canada/Mineralogical Association of Canada will launch the new millennium by holding their Joint Annual Meeting in St. John's, Newfoundland, Canada, North America's oldest city. It lies at the eastern extremity of the North American Craton, facing the Atlantic Ocean. Visiting scientists will appreciate the St. John's trans-Atlantic link to exotic Gondwanaland and the trans-Appalachian link to the ancient Canadian shield of Laurentia. Four symposia and twenty special sessions are being organised including palaeontological-directed special sessions on the IUGS sponsored, Late Neoproterozoic evolution of the Earth and Life, and, Recent Developments in Early Palaeozoic Stratigraphic palaeontology of the North Atlantic Borderlands, Appalachian-Caledonide Orogen. Further details and registration information can be found at the conference website at http://www.geosurv.gov.nf.ca/stjohns2001/

Earth System Processes

Edinburgh International Conference Centre *24 – 28 June 2001*

The Problem

The plate tectonics paradigm developed in the mid-Twentieth Century provides a basic description of the dynamic behavior of the Earth's rigid surface layer. A great breakthrough, it nonetheless constitutes only a starting point for understanding of the Earth System that sustains humankind and all known life. Even in the present period of increased scientific specialization, geologists have come to realize that it is by working closely with scientists in other fields that they can best contribute to this exciting, but demanding task. The interactions among the lithosphere, hydrosphere, atmosphere and biosphere, in particular, require integrated interdisciplinary study and have social and economic implications.

The Geological Society of America (GSA) and the Geological Society, London (GSL), two of the world's oldest and largest organizations of earth scientists, are therefore combining their resources to co-convene a broad, interdisciplinary meeting to discuss the present state of knowledge of Earth System Processes.

The Themes

The Earth System Processes meeting will focus attention on the two major themes that are most critical for advancing understanding of the way the planet works:

- Earth System Linkages will explore the relationships between the solid Earth, the hydrosphere, atmosphere and biosphere;
- Earth System Evolution will examine the way in which the processes controlling the nature of the planet have changed over the 4.45 billion years since the birth of the solar system.

Both themes will involve comparison with other planetary systems in the Solar System and beyond. Both will take into account critical extraterrestrial influences.

The Venue

Teams of specialists with diverse backgrounds are already working together on interdisciplinary research seeking integrated solutions to the complex problems of Earth System science. These teams can be regarded as the modern embodiments of the solitary 'naturalists' of the 18th and 19th Centuries, such as James Hutton, Charles Darwin, James Dwight Dana, and John Wesley Powell. The GSA and GSL believe that it is fitting, therefore, that a meeting on Earth System Processes convened at the start of the 21st Century should take place in Edinburgh, Scotland. It was in that ancient city that James Hutton lived and studied, and Charles Darwin received his earliest education in the natural sciences as a medical student. In addition to oral and poster presentations, the meeting will include visits to localities of note in the history of the earth sciences such as Siccar Point, Salisbury Craigs, and the Moine thrust belt. It will step into the 21st Century with interdisciplinary workshops to be held at state of the art laboratories throughout Scotland and England.

Call for sessions

Earth System Processes will focus on two themes critical to the understanding of how our planet works. Earth System Linkages will explore the relationships between the solid Earth, the hydrosphere, atmosphere, cryosphere, and biosphere. Earth System Evolution will examine the way in which processes controlling the nature of the planet have changed since the birth of the solar system 4.5 billion years ago. The meeting will be limited to four parallel sessions so the number of oral presentations will be strictly limited to some of the topics of most general interest, but there will also be a major emphasis on poster presentations.

The detailed shape of the meeting will be determined by the Autumn by interaction between the Technical Committee and the Geoscience community. If you are interested in making a contribution, suggesting ideas, or organizing a session, please contact one of the co-chairs or members of the Technical Committee. The topics attached to each name refer to a broad area of interest, not the titles of specific sessions. They are listed to help you decide who might be the best person to contact with your ideas.

Technical Committee Co-chairs:

Ian Dalziel (University of Texas at Austin) <Ian@utig.ig.utexas.edu> Tectonics and Earth history

Ian Fairchild (Keele University) <i.j.fairchild@keele.ac.uk> Earth surface geochemical processes; climate change

Technical Committee Members:

Richard Alley (Penn State U.) <rba6@psu.edu> Cryosphere and Earth system Models.

Chris Barnes (U. Victoria) <Crbarnes@uvic.ca> Palaeoceanography and Palaeobiology.

Elly Brouwers (USGS, Denver) <brouwers@usgs.gov> Hydrology and catchment systems: interactions and impacts.

Julian Dowdeswell (U. Bristol) <j.a.dowdeswell@bristol.ac.uk> Cryosphere and oceans.

Mike Edmunds (BGS, Wallingford) <wme@bgs.ac.uk> Groundwater, hydrogeochemistry and palaeohydrology.

Jim Kasting (Penn State U.) <jfk4@psu.edu> Earth and planetary system sciences.

Andrew Knoll (Harvard U.) <aknoll@oeb.harvard.edu> Biology and the Earth System through time.

David Macdonald (U. Aberdeen) <d.macdonald@abdn.ac.uk> Petroleum geology, sedimentology and tectonics.

Richard O'Connell (Harvard U.) <oconnell@geophysics.harvard.edu> Geodynamics.

Kathy Campbell (U. Auckland) <ka.campbell@auckland.ac.nz> Hydrothermal systems.

Andrew Watson (UEA) <a.j.watson@uea.ac.uk> Atmosphere and ocean compositions through time.

Rob van der Voo, GSA annual program chair <Voo@umich.edu> Supercontinents: assemblies, evolution, break-up.

Edinburgh representatives

Roger Scrutton (U. Edinburgh) <Roger.Scrutton@glg.ed.ac.uk> Marine Geophysics.

Andrew McMillan (BGS, Edinburgh) <A.McMillan@bgs.ac.uk> Field excursions.

Meeting sponsors

Geological Society of America, Geological Society of London, British Geological Survey, U.S. Geological Survey, University of Edinburgh, Edinburgh Geological Society.

For more information and updates visit http://www.geosociety.org/ or http://www.geolsoc.org.uk/

North American Paleontological Convention 2001 (NAPC 7)

UC Museum of Paleontology, Berkeley, California *26 June – 1 July 2001*

NAPC 2001 continues a tradition begun in 1969 at Chicago and continued at five other sites since then. NAPC 2001 is the seventh meeting of North American paleontologists. In addition to our Mexican, Canadian, and American colleagues, we also welcome those from other countries. Sponsored by ANAPS, the Association of North American Paleontological Societies, and hosted by the Museum of Paleontology of the University of California at Berkeley, NAPC 2001 will be held in the beautiful San Francisco Bay area of northern California. The meeting will be organized into theme and volunteer sessions with workshops, field trips, special

programmes for K-16 educators, tourist excursions, and programmes for the general public planned to complement the meeting.

As we enter a new millennium the Organizing Committee anticipates a lively discussion on the role of paleontology in the future as well as reflections on past accomplishments. We are especially interested in the importance of integrative approaches that use multiple lines of evidence to test hypotheses and solve complex problems in the history of life, that apply paleontological information to other fields, and that use methods and data from other fields to answer questions in paleontology.

Further details are at http://www.ucmp.berkeley.edu/napc/general.html

6th International Congress of Vertebrate Morphology

University of Jena, Germany *21 – 26 July 2001*

The congress will be hosted by the Institut für Spezielle Zoologie und Evolutionsbiologie in the new convention centre of the Friedrich-Schiller-Universität in Jena, Germany. The congress is designed to make the most current research available to the international community of vertebrate morphologists, and to provide a basis for a synthesis between vertebrate morphology and other fields of biology. The scientific program of ICVM-6 includes ten half-day sessions with a variety of symposia and workshops, contributed oral and poster papers, and a plenary lecture by a distinguished scientist each day. In addition, the congress offers opportunities to present films, wet labs, imaging and computing facilities, and other demonstrations. A number of cultural events, excursions, and pre- and post-congress tours will be organised that introduce you to outstanding historical and cultural sites in the region, to the natural habitats around Jena, and to the internationally recognised centres of optical industry in Jena.

The second circular is available from http://icvm-6.zoo.uni-jena.de/

Third International Meeting on Mesozoic Fishes

Serpiano, Switzerland *August 2001*

Systematics, Palaeoenvironments and Biodiversity

We are pleased to host the third international meeting on Mesozoic Fishes in one of the most famous sites for these fossils, the Monte San Giorgio-Besano area. The organization of the meeting is supported by the Dipartimento di Scienze della Terra of the Milano University (Andrea Tintori), the Museo Cantonale di Storia Naturale in Lugano (Markus Felber), and the Palaeontologisches Institut und Museum der Universitaet Zuerich (Heinz Furrer).

Prof. Andrea Tintori, Dip. Scienze della Terra, Iniversità degli Studi di Milano, Via Mangiagalli, 34 I-20133 MILANO, tel: +39.02.23698202, fax: +39.02.70638261, e-mail: andrea.tintori@unimi.it, Web: http://www.soft.net.uk/richardforrest/svpca2000/otherconferences/mesozoicfishes.html

8th Congress of the European Society for Evolutionary Biology

Aarhus, Denmark *20 – 26 August 2001*

The eighth Congress of the European Society for Evolutionary Biology will be held in Aarhus, Denmark, from 20-26 August 2001. The structure of the congress will be similar to previous meetings, each day starting with a plenary keynote speaker, followed by parallel symposia. Besides, there will also be a few contributed paper sessions. The congress will cover the field of evolutionary biology in a wide sense but with emphasis on processes and mechanisms of evolutionary phenomena.

Details are at http://www.biology.au.dk/eseb/

Systematics 2001

London *3 – 7 September 2001*

The biennial conferences of the Systematics Association are intended to provide a forum for systematists from different disciplines to present and discuss their research. The Third Biennial Conference, to be held at Imperial College, London, will continue in the spirit of previous meetings by providing a mixture of open and focused thematic sessions. The organisers are keen to stress that the conference is open to everyone, and especially research students and younger post-doctoral fellows, whatever their chosen subject.

To encourage student participation the bursary scheme, introduced for the Second Biennial Meeting, will be operative again. Bursaries will contribute towards the costs of registration, accommodation, and subsistence for students (including recently graduated students) giving a paper on their own research work. Current research students and those who have graduated since 1st August 2000 are eligible to apply. Allocation of bursaries will be competitive, and based on an assessment of an abstract that must be submitted to the Systematics Association by 1st December 2000, for decisions in January 2001. Factual abstracts, giving details of your results and conclusions (in 200 words or less) complete with name, current position or date of graduation, address and contact e-mail address, should be sent to Chris Humphries by 1st December 2000 at <systematics.association@nhm.ac.uk>.

Thematic sessions currently under preparation include "*Milestones in Systematics*" (Organisers: Peter Forey & David Williams), "*Telling the evolutionary time: molecular clocks and the fossil record*", (Organisers: Paul Smith & Philip Donoghue), "*From macro to micro: the challenge of soil biodiversity*" (Organiser: Paul Eggleton), and "*Organelles, Genomes and Eukaryote Phylogeny*" (Organisers: Robert Hirt & David Horner). However, please remember that contributions can be on any topic whether submitted as talks or posters. Substantial prizes in the form of book tokens will be awarded to the best talk and poster by a student at the conference (please be sure to indicate whether you wish to be considered for either of these prizes when submitting your abstract).

Conference organising committee: Gordon Curry (Treasurer of the Society, University of Glasgow), Peter Forey (The NHM, London), Julie Hawkins (University of Reading), Chris

Humphries (Chairman of the Organising Committee, The NHM, London), Paul Kenrick (The NHM, London), Andrew Milner (Birkbeck, University of London), Russell Seymour (The Institute of Zoology, London), and David Williams (The NHM, London).

Timetable

Monday 3 September 2001

14.00-17.30 Registration – Mechanical Engineering Concourse, Level 2, Booking into accommodation at Linstead Hall.

Tuesday 4 September 2001

8.30-9.30 Welcome tea, coffee

9.30-17.30 Scientific presentations, including "Milestones"

19.00-21.00 Evening Reception at the Linnean Society of London (to be agreed and finalised)

Wednesday 5 September 2001

9.30-16.00 Scientific presentations, including "*From macro to micro: the challenge of soil biodiversity*" and "*Telling the evolutionary time: molecular clocks and the fossil record*"

19.00-21.00 Evening Reception at the Natural History Museum (to be agreed and finalised)

Thursday 6 September 2001

9.30- 17.30 Scientific presentations – including contributed papers

19.30 Conference Dinner (Venue to be arranged)

Friday 7 September 2001

9.00-12.00 Closing Scientific presentations – including "*Organelles, Genomes and Eukaryote Phylogeny*"

12.00 Award presentations

12.15 Concluding Remarks and Departure

Contact

For more information including registration and booking details see http://systass.org/biennial2001/, or email <systematics.association@nhm.ac.uk>, or fax +44 (0)20-7942-5529.

Two hundred years of Pterosaurs: a symposium on the anatomy, evolution, palaeobiology and environments of mesozoic flying reptiles
Toulouse, France *5 – 8 September 2001*

This occasion seems a good opportunity to take stock of recent developments in the study of pterosaurs and to discuss current problems concerning this group of extinct vertebrates. The symposium will deal with all aspects of pterosaur palaeontology: anatomy, phylogeny, palaeobiology, ichnology, palaeoecology and the history of pterosaur research. Papers are invited on all those topics, as well as on other extinct flying or gliding reptiles and on the

geological environments in which pterosaur remains are found.

Accommodation is available in numerous hotels with a large range of prices (details will be sent in the second circular).

Excursions to: The Late Jurassic 'Pterosaur Beach' at Crayssac (Lot), where both pterosaur footprints and bones have been found. The Esperaza Dinosaur Museum (Aude), which houses remains of Late Cretaceous pterosaur bones and to nearby pterosaur localities.

Organising committee: Jean-Michel Mazin (Poitiers), Jean-Paul Billon-Bruyat (Poitiers), Eric Buffetaut (Paris), Francis Duranthon (Toulouse), Michel Bilotte (Toulouse)

For more details and the second circular please contact: Jean Michel Mazin, Laboratoire de Geobiologie, Universite de Poitiers, 40 avenue du recteur Pineau, F-86022 Poitiers Cedex <jmmazin@univ-poitiers.fr>

Early Palaeozoic Palaeogeography and Palaeobiogeography of Western Europe and North Africa

Lille *22 – 29 September 2001*

After a very successful meeting on the topic *Palaeozoic Palaeogeography and Palaeobiogeography of western Europe*, held at Lille in 1992, the Laboratory of Palaeontology of Lille invites you to participate in and contribute to a conference on early Palaeozoic Palaeogeography which will take place at Lille in September 2001. A pre-conference field trip to visit the Lower Palaeozoic of Belgium and a post-conference field-trip to the southern Montagne Noire (Languedoc, southern France) will be organized.

The conference topics are designed to address various subjects related to the Lower Palaeozoic palaeogeography and palaeobiogeography of western Europe and north Africa, and include:

1- The geodynamic and tectonostratigraphic framework of western Europe and north Africa during early Palaeozoic times.

2- Relationships between the northwestern Gondwana margin and related terranes (Ossa-Morena, Armorica, Perunica, Avalonia, etc.).

3- Palaeomagnetic versus palaeobiogeographical data.

4- Biostratigraphic improvements of the Proterozoic-Cambrian transition and the Lower Palaeozoic (Cambrian to Silurian).

5- Lower Palaeozoic geochemical anomalies and palaeoclimatology.

6- Palaeogeographical controls on biodiversity patterns.

7- Volcanoclastic events and geochronological framework.

8- Evolutionary trends in early Palaeozoic ecosystems.

9- Event stratigraphy and radiation/extinction turnovers.

10- Sea-level changes, cyclicity and palaeoenvironments.

Dates:

Conference: (3 days) Université des Sciences et Technologies de Lille, Villeneuve d'Ascq, 24-26 September, 2001.

Pre-conference excursion: (2 days) Lower Palaeozoic of Belgium: 22-23 September, 2001.

Post-conference excursion: (3 days) Lower Palaeozoic of the southern Montagne Noire: 27-29 September, 2001.

Important Dates:

March 2000: first circular

October 2000: second circular – call for papers

May 2001: deadline for Abstracts and registration

July 2001: third circular, programme and final arrangements

Please send correspondence to: *José Javier Alvaro* or *Thomas Servais*, USTL – Sciences de la Terre, UPRESA 8014 CNRS, Cité Scientifique SN5, F-59655 Villeneuve d'Ascq cedex (France), tel: (+33) (0)3 20 33 72 20, (+33) (0)3 20 33 63 92, fax: (+33) (0)3 20 43 69 00, e-mail: <Jose-Javier.Alvaro@univ-lille1.fr>, <Thomas.Servais@univ-lille1.fr>.

Film Review: Dinosaur (PG)

Walt Disney Pictures. Opens 13th October 2000. Running time 82 minutes.

Disney have already done dinosaurs – haven't they? The original *Fantasia*, with its tableau on the evolution of life set to the crunching harmonies of the *Rite of Spring*, showed a defiant stegosaur meeting its fate at the hands of a rapacious theropod. *Baby: Story of the Lost Legend* told of living sauropods in the Congolese jungle with an eco-friendly message to boot. And who can forget all of those brave nannies fighting off the bungling Chinese secret agents in *One of Our Dinosaurs is Missing*?

Dinosaur, however, is something different. It is the latest, and perhaps most ambitious, blockbuster to leave the Disney stable, taking 6 years and over 3.2 million computer hours to make. Set in the final years of the Cretaceous Period, the film tells the story of Aladar, a young *Iguanodon*, and his companions as he grows up in a world on the brink of environmental disaster.

Aladar is separated from his own species as a hatchling (by the nefarious activities of an *Oviraptor* and a pterosaur) and is raised by a tribe of compassionate lemurs on an isolated offshore island. Raised as part of the clan, Aladar has an idyllic existence until a meteor impact changes the Earth forever. Aladar and his lemur family make it to the mainland where they join forces with a herd of displaced and desperate dinosaurs, under the leadership of the cold, dictatorial *Iguanodon* Kron, who are seeking the lost paradise of the breeding grounds.

Aladar soon falls in with a group of stragglers including a genteel *Brachiosaurus* (Baylene), an ageing *Styracosaurus* (Eema) and a rather moronic *Ankylosaurus* (Url). His sympathy for these dinosaurs, and for the other stragglers in the herd, soon brings him into conflict with Kron, whose main concern seems to be 'the survival of the fittest'. The herd is beset with problems, including lack of food and water, a menacing *Velociraptor* pack, and a truly vicious pair of *Carnotaurus* who are never far away. Without going into intricate detail, Aladar eventually leads the entire herd to the safety of the breeding grounds (after clashing with Kron and his cronies and being attacked by predators) and gets the girl (Kron's sister, Neera).

The cinematography is breathtaking, with backgrounds provided by digitally enhanced live-action photography of places as far flung as Venezuela and Jordan; the characters are computer-animated and blend seamlessly into the scenes.

Perhaps the most visually spectacular part of the film is the opening scene in which a pterosaur swoops over forests, rivers and cliffs while carrying the hapless Aladar (as yet unhatched) to its nest. The depiction of the meteorite strike is also fantastic and moderately scary. Most of the dinosaurs and the other animals in the film are rendered superbly and reflect the way in which palaeontological artists currently depict dinosaurs; they are dynamic and exciting. Indeed, two highly respected dinosaur artists, Doug Henderson and Mark Hallett, were included in the design team.

Thankfully, the animators fell shy of reconstructing all of the theropods with feathers, though perhaps they should have given that *Oviraptor* a few? The main speaking characters, however, are depicted in a more caricature-ish way, as they had to be given facial muscles to allow them speech and human expressions; but in terms of overall build and 'look' they are not too far removed from reality (of course it's perfectly respectable they all speak English *etc*.). The behaviours exhibited by the dinosaurs are, of course, heavily influenced by the story, but there is much input from current scientific thought, with nesting grounds and herd behaviour being integral parts of the plot (the usual acknowledgement to Jack Horner in the credits lends some gravitas).

However, although there are certainly many things in the film that will make palaeontologists clench their teeth (lemurs in the Cretaceous! Non-contemporaneous dinosaurs mixed together?!), it must be remembered that THIS IS A STORY FOR KIDS, not a documentary for the Palaeontological Association or the Society for Vertebrate Paleontology. Disney have not tried to dress this up as anything but well-tailored fantasy, something that cannot be said for certain 'factual' BBC productions that I could mention. The soundtrack is excellent and really adds to the atmosphere of the film; you will be relieved to discover that the dinosaurs do not sing.

The typical Disney themes of youthful idealism and teamwork triumphing over danger and tyranny extend throughout the film, but it manages to do this without becoming too saccharine. All of the major characters are likeable, and the baddies are suitably nasty. Indeed, the general nastiness of the baddies and the odd, tangential mention of sex (in a scene to do with the lemur breeding season) may be responsible for the PG certificate, rather than

the usual U. *Dinosaur* owes a lot to previous Disney classics such as *The Jungle Book* (orphaned boy makes good), but also gives the odd passing reference to *Walking with Dinosaurs* (notably the peeing *Iguanodon* and the brief appearance of a *Koolasuchus*-like animal) and to *Jurassic Park*. The most obvious parallel is with the Don Bluth's animated film *The Land Before Time* in which a group of orphaned dinosaurs make their way to the 'Valley' while being assailed by predators on every side.

However, *Dinosaur* is much more technically accomplished than any of these other offerings, and there is still enough originality in the plot to mark it out as distinctive from the other dinosaur films that have appeared over the past 15 years. I thought that it was a great piece of entertainment and one that can only do us good – after all, we need people to get interested in palaeontology somehow. I wonder if Disney would be interested in helping out us poor dinosaur workers? "*Disneysaurus,"* anyone?

Paul M. Barrett
University of Oxford
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Book Reviews

Trilobite! Eyewitness to Evolution

Richard Fortey. 2000. 269pp. Harper Collins ISBN 0-00-257012-2. £15.99

This is an enchanting book. It is a record of one man's thirty-five year love affair with trilobites, and it is a wonderful read. Richard Fortey's earlier popular books, 'Life, an unauthorised biography' and 'The Hidden Landscape' revealed a writing talent which would fascinate the neophyte and yet enthral the veteran. I think this book is even better. Fortey's writings are often quite personalised, and whereas he is one of the world's foremost authorities on trilobites, he is able to convey brilliantly to a general audience why they have captivated him so long. He writes fluently about the nature of the trilobites and their world, but also, most sympathetically, about the people, past and present, who discovered and studied them, and this is marvellous history.

In the Preface he sets out to "persuade the reader of the excitement of recreating vanished worlds, and of seeing the ancient seas through the eyes of the trilobite"; his book is intended as "an incitement to discovery". And so it is. The first chapter, indeed, is entitled 'Discovery', and we begin with a dramatic journey along the cliffs in north Cornwall in the fading light of a November day, where Thomas Hardy's hero Stephen Knight slipped down the cliff face to find the long-dead eyes of a trilobite regarding him. Then to South Wales, where the 14-year old Fortey found his first trilobite, a *Paradoxides* at Porth-y-rhaw, and he tells of the excitement it gave him. We can all understand this (I remember visiting the same locality in 1959, as an undergraduate, and searching for trilobites on the vertical ribs of hard black shale. Was it not the tip of a genal spine I could see on one surface? I attacked it vigorously with hammer and chisel, but was defeated by the inrushing tide. I could not extract my chisel, and it remained stuck in the rock. Five years later, I returned and there was the rusting stump thereof, marking the layer. The tide was falling. No less than seven fine specimens came out, and we still have them). But let me digress no further.

Chapter Two is entitled 'Shells'; we learn of Dr Lhwyd's (1698) discovery of the 'sceleton of some Flat-Fish', (actually *Ogyiocarella*), and we can admire a copy of the original figure. There follows a clearly presented section on the basic anatomy of trilobites, emphasising the immense contribution that the study of silicified faunas, begun by Harry Whittington, has made to our understanding of trilobite morphology. Chapter Three, 'Legs', gives an account of the history of discovery of trilobite appendages, a tale as fascinating as any other. There is an account of Walcott's early discovery of appendages in enrolled *Ceraurus*, the story of how the limbs of *Triarthrus* from the Utica Slate, and of *Phacops* in the Rhineland were investigated, and all is told with a freshness and clarity that delights. But why (and this is my only serious concern) is there no reference to the superb work of Müller & Walossek on the phosphatised limbs of *Agnostus*. Surely these, which are the most unequivocally perfect three-dimensional appendages ever described, deserve a prominent place in the literature.

I like Chapter Four, 'Crystal Eyes', especially, and not only because I find myself described therein as an 'amiable Scotsman' (perfectly true). It is a clear and succinct account of our present knowledge of the eyes of trilobites and how they worked. There are memorable phrases: the eyes of Phacops "large and crescentic, stand proud of the cheeks like the retractable headlamps that grace the front of a Porsche." We can read here of the enormous-eyed pelagic trilobites and the evidence on their mode of life. And finally we are advised that "there will be more to find out about trilobite eyes". Very true. We need much more data on their structure, but we also need to extend our understanding of their optics. Which is what Gàbor Horvàth and his team of biophysicists in Budapest are doing so competently at the present time. Chapter Five 'Exploding trilobites' is basically a discussion of what happened at the base of the Cambrian, but Fortey advises us that he does not intend to become embroiled in controversy. He does, however, engage in some fairly vigorous sniping, especially at Simon Conway Morris, but having got this over he then wisely concludes "Maybe it is time to pack away the dynamite, and let the explosive metaphor rest for a while. It's caused quite enough trouble!" On then to Chapter Six, 'Museum'. Here we have an extended symphony on the work which takes place in a museum, behind the scenes, away from the exhibitions. This explains what taxonomists do, and why they do it. This would be fascinating to the general public, who may not have greatly thought about such matters. But it so clearly sets out the role and importance of taxonomy that professional systematists can take heart from this engaging defence of their work.

Chapter Seven is 'A matter of life and death'. Here is explained the role of trilobite studies to our understanding of evolution; Niles Eldredge's researches on Devonian *Phacops* as an essential support to punctuated equilibria, Peter Sheldon "friendly, sempiternally youthful, and tirelessly optimistic", and his finely resolved studies of concerted gradualistic evolution in Ordovician trilobites from Wales. And here too is the tragic story of Rudolf Kaufmann, whose work on microevolutionary change in Swedish *Olenus* species was published just after Hitler came to power. Because he was a Jew he was imprisoned, exiled, and killed by the Nazis and his story was only pieced together from his letters to his Swedish lover, Ingeborg. Fortey relates his tale at length, and comments "Who knows what reputation he might have had if he had been permitted to follow his heart and mind?" Who indeed. Then there is a fine section on ontogeny, heterochrony, extinctions, deep and shallow-water trilobites, and the persistence of the proetids until the final whimpering out of the trilobites at the end of the Permian.

Chapter eight, 'Possible worlds'. This relates how trilobites are used in reconstructing ancient continental configurations, especially for the Ordovician, and in refining the models we already have. In Chapter Nine, 'Time', we return to ontogeny, with Joachim Barrande's contributions, and those of the late Sir James Stubblefield appropriately acknowledged. Then there comes a satisfying account of how trilobites are used in stratigraphy. But this chapter, like others in this book, is interspersed with stories of discovery, travel, and adventure. The author's story of being stung by a giant hornet in China while engaged on field work sounded acutely gruelling. And then finally Chapter Ten, 'Eyes to see', is a philosophical meditation on the nature of science, and the process of discovery; the hard labour as well as the excitement. And I am very glad to see in print, and so clearly expressed, what all palaeontologists know. Which is that although our science may seem to proceed slowly, especially in its descriptive element, individual contributions never become obsolete. They build on the works of predecessors, and remain an essential part of a growing knowledge. As Fortey notes, as palaeontologists, "we reinvent the past", though we don't fiddle it, except in unfortunate cases such as that of Jacques Duprat, who alleged that he had found a well-preserved fauna of trilobites in Indochina, when in fact they were specimens of well-known Bohemian species by reporting Bohemian trilobites in Indochina. What made him do it?

Altogether, this is an inspirational book, replete with marvellous descriptions, entertaining true stories, and witty phrases, my favourite being "it is better to grovel hopefully and survive". Profuse illustrations, both line drawings and plates of riveting photographs adorn the text, and production standards are high. It is remarkably cheap for what it is. And I only found two misprints. But one of these was regrettable. Ordovician indeed! (p 195) What would Charles Lapworth have said? But you can be sure he would have loved this book…

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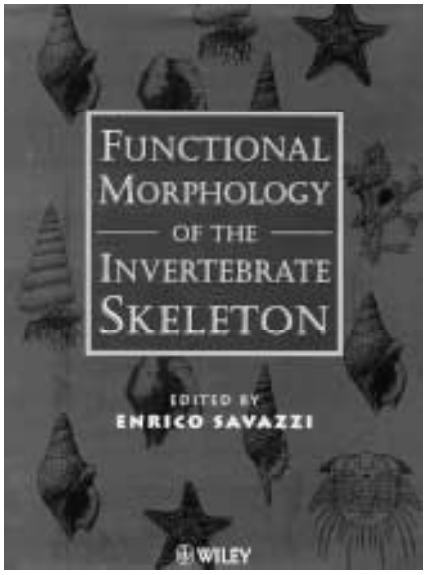
Functional Morphology of the Invertebrate Skeleton

Edited by E. Savazzi. 706pp Wiley & Sons, Chichester, New York, Weinheim, Brisbane, Singapore and Toronto. Hardcovers £150.
ISBN 0-471-97776-4

Enrico Savazzi, well known for his own elegant studies in this field, took on the highly ambitious task of editing a book on the functional morphology of invertebrate skeletons. Here the reader is presented essentially with a two-part book, the first section covering various methods of dealing with 'ideas, methods and tools' and the remainder of the book on taxon based studies. I detect a certain frustration in Savazzi's Preface which hints of missing chapters on molluscan topics for want of appropriate authors or tardiness in submission. Indeed the task of soliciting, organising and editing the 43 chapters with a list of contributors numbering 40 must have been mammoth indeed. Certainly the book appears to have been a long while in coming, a fact that may be gleaned from the fact that conodonts have sneaked in as invertebrates.



The first section is an eclectic mix ranging from a discussion of the definition of functional morphology, a discussion of means of documenting animal behaviour and methods of restoring collapsed skeletons. Many of these chapters will be extremely useful for anyone thinking of embarking on research on functional morphology. Some of these chapters, however, lack a little in detail: for example, what could be a very useful contribution on determining the mechanical property of skeletal materials by Vincent never quite tells us how to do it. Other chapters, for example on colour pigmentation, although useful for the specialist, will not be practically useful for many readers.

It is the second, larger part of the book that will be of most interest and use. Here the reader will find 30 chapters that deal with the functional morphology of most invertebrate taxa, each written by known specialists. Real highlights include Savazzi's own chapter on tube dwelling molluscs, Fortey & Owen on trilobites, Taylor on bryozoans and Rickards & Rigby on graptolites. In these contributions, readers will find excellent accounts for the non-specialist that will certainly assist both undergraduate lectures and a broader appreciation of issues which may be applicable for their own research. There are few of us who have ever given much thought to the functional morphology of serpulids, the Kazacharthra or scaphopods, but that may be rectified here.

The balance of chapters is rather perplexing. It is true that molluscs have been used extensively in functional morphological studies, but they do rather dominate the book – 16 of the 30 chapters. Although this is very exciting for those of us who have a major interest in the phylum, it may not make the book as attractive to others. Even in the treatment of molluscs the topics tackled may be rather specialised. Brachiopods also get a good airing, with interesting chapters by Alexander and McGhee, but I find it puzzling that so many of these could have been written as one for a more unified approach.

Some chapters jar slightly – for example Reyment's contribution on drilling gastropods – a topic that to many may not seem entirely related to functional morphology; others too slip occasionally into what appear to be realms of general palaeobiology. Reyment is derisive about much of the existing palaeoecological literature on the evidence of drilling predation, "superficially of easy access to the tyro" and this simplicity "has tended to promote amateurism and a lack of appreciation of what can be gleaned from an adequate study of the literature". Whilst these statements may be partly correct it is depressing that their forthrightness is followed by an extremely lacklustre account of the subject. He himself, it would appear, is rather hazy about the literature on drilling predation.

The real disappointment in this excellent and interesting book is the quality of the figures. I am told that the photographic figures were perfectly acceptable at the proof stage. However, this is certainly not the case in the final product where most of them are dire, dark rectangles with little detail evident. Certainly Kohn's illustration of how difficult it is to spot six cryptic acmaeid limpets amongst barnacles is extremely believable! It is unthinkable that such an expensive book should be so poorly illustrated. It is clearly the fault of the publishers and one can only imagine the disappointment of the authors and the editor, who would have worked hard on their illustrations, at seeing the final product.

This will be a highly useful, if idiosyncratic, book with something of interest to most palaeontologists. Unfortunately, it has been priced too high: I suspect that few individuals will find it in their wallets to fork out the £150, but institutional libraries should certainly bite the financial bullet and purchase.

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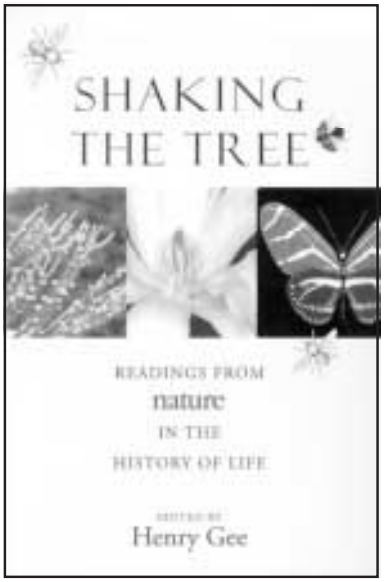
Shaking the tree

Henry Gee (editor) 2000. 411 pp. University of Chicago Press. ISBN 0-226-28496-4 (hbk) £49.50; ISBN 0-226-28497-2 (pbk) £17.50.



My long-standing interest in evolution is eloquently expressed by Darwin in his 'tangled bank' metaphor at the end of *The Origin of Species*. Given descent from a common ancestor, why is there such a huge biodiversity today, with its immense range of morphology, physiology and mode of life? I was never fully satisfied with the Neodarwinian Synthesis that emerged in the middle of the last century. To me natural selection (plus a succession of historical contingencies) is a necessary but not sufficient explanation. But what was the 'something else'? Evolutionists more interested in process than pattern tend to be rather dismissive of the anti-reductionist arguments of people like Steve Gould, who refers to them as ultradarwinians. While admittedly he goes on excessively about evolutionary contingency and the potential importance of species selection (about which I have grave doubts) I concur with him that he raises questions that have not been adequately answered by those who seek a solely adaptationist explanation for everything. I am reminded of one of the most brilliant sketches in that marvellous satirical

review of the 1960s, *Beyond the Fringe,* in which Alan Bennett presents a sermon from a rather diffident and apologetic Anglican vicar. He compares Life to a tin of sardines. When one has tried hard to empty the contents there is always a little left behind in the corner. That little bit is the parson's concern. This is of course a pathetic metaphor for affairs of the Spirit, but the anti-reductionist arguments of the likes of Steve Gould are not at all pathetic.

The big problem of course has been the lack of adequate understanding of morphogenesis, and the relationship of ontogeny to phylogeny. In recent years adequate tools have begun at last to emerge with the growth of the new discipline of developmental genetics, the most spectacular advance being the recognition of the commonality of homeotic genes in different phyla. A whole new research programme is starting to emerge, which should keep developmental biologists happily engaged for the next few decades. In conjunction with this, the emergence of a scientifically rigorous taxonomic method in cladistics, and the ever-increasing use of molecular biology in phylogenetic reconstruction in conjunction with continuing new fossil discoveries, have acted to shift the emphasis in studies of evolution from its previous dominance by population geneticists.

The book under review consists of 19 commissioned reviews from specialists distinguished in their field, published in *Nature* from 1991 to 1997 and hence substantially up-to-date. It takes its title from Michael Novacek's article on mammalian phylogeny, and illustrates the centrality of phylogenetic reconstructions in the final part of the book. There are reviews successively on the origin and diversification of land plants, angiosperms, agnathans and the origin of jawed vertebrates, tetrapods, birds and mammals, with finally two on hominoids and the genus *Homo.* Unfortunately the editor was unable to procure a review on the origin of modern humans, because of implacably hostile reviews from members of opposing camps, presumably the 'Out of Africa' group and their opponents. It is a pity that Gee could not have been able to obtain and publish reviews from both camps, say from Stringer and Wolpoff, and let us decide for ourselves.

The earlier parts of the book cover a range of relevant topics, including a 'coming of age' review of punctuated equilibria by Gould and Eldridge, an intellectually challenging article on major evolutionary transitions by Szathmáry and Maynard Smith, and one on homeotic genes and the evolution of arthropods and chordates. Others range widely, from latest Proterozoic stratigraphy and Earth history (Knoll and Walter) and the early evolution of the Metazoa (Conway Morris) to the evolution of animal limbs and the early development of terrestrial ecosystems.

It is pleasing to learn that new fossil discoveries continue to have an impact. One thinks in particular of the earliest tetrapods, early limbed cetaceans and Early Cretaceous birds. Feathered dinosaurs, and indeed any dinosaurs, are however virtually ignored, and the cutoff date of review publication is unfortunately too early to take adequate note of one of the most exciting recent controversies concerning the disparate times of origin of mammals, birds and Metazoa in general established from the fossil record on the one hand and molecular phylogenies on the other. The latter all suggest a much earlier origin. The solution I favour is that the molecular clocks are rather sloppy and tend to speed up at times of organic radiations. Thus the fossil record is substantially to be trusted. Gee offers his collection as a provocation not a panacea, which is just the right spirit to offer a book in a rapidly moving

field, which I recommend strongly to all those interested in the way development, evolution and Earth history have interacted.

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London Clay Fossils of the Isle of Sheppey

F. Clouter, T. Mitchell, D. Rayner & M. Rayner. 2000. 100pp. Medway Lapidary & Mineral Society. ISBN 0 9538243 0 6 (Paperback). £15.00.

Students of palaeontology may well be inspired into studying the lesser known classic site of the north coast of the Isle of Sheppey, Kent, after being seduced by the contents of this useful identification guide. Tertiary macro-fossils of the London Clay Formation (>2mm) are clearly and adeptly illustrated by over 140 black and white photographs and diagrams, accompanied by brief scientific descriptions of each species.

Fauna are grouped under headings, such as gastropods, fish, crabs, sharks, turtles etc. Each section has an easily recognisable symbol at the top outside corner of each page, for quick reference. This user-friendly format makes this publication valuable to collectors, students or indeed anyone requiring to identify Tertiary London Clay macro-fossils. Additionally, it is written in an understandable way, with terminology explained.

The geology of the Isle of Sheppey is dealt with adequately but simplistically, with a concise palaeo-environmental interpretation. However, detailed discussion is not the object here, as this book is designed primarily for identification purposes. Once your fossil species is determined, further details can be obtained elsewhere.

Many fossil fauna of the north Sheppey coast are not found *in-situ* and are often enclosed in septarian nodules which have already fallen from the cliff. Added to this, the occurrence of many rotational slips makes for a stratigrapher's nightmare. However, if one takes into account that the total age range of the London Clay at Sheppey only spans approximately six million years, this becomes less of a problem.

As this is an identification manual made with collecting in mind, a brief history of the 300 years or so of collecting at Sheppey is included, together with a guide to the techniques of

finding fossil specimens and preparing and preserving them in a scientific way.

This is not a reading text for academics, but an invaluable tool for students of the Tertiary London Clay Formation. This book highlights the importance of this classic geological site and achieves its intended criterion as an identification guide.

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Mitteilungen aus dem Museum für Naturkunde in Berlin, Geowissenschaftliche Reihe, Vol. 2.

H-P. Schultze (editor-in-chief). 1999. 205 pp. Wiley-VCH. ISSN 1435-1943 (pbk). $136.96.

Mitteilungen aus dem Museum für Naturkunde in Berlin, Geowissenschaftliche Reihe is a new journal printed under the auspices of one of Europe's greatest natural history museums. Edited by a variety of museum staff and other specialists, it aims to publish papers in the general fields of palaeontology, mineralogy and geology as related to materials and specimens held within the museum's collections.

Volume 2 is dedicated to papers concerning the palaeontology of Tendaguru, Tanzania, a site justly famous for its Late Jurassic dinosaur fauna. The Museum für Naturkunde holds the world's largest collection of material from this locality, largely as a result of a series of expeditions led by German palaeontologists E. Fraas and W. Janensch between 1907 and 1913. Tonnes of dinosaur material were brought back to Berlin and described in a series of papers by Fraas, Janensch and E. Hennig. Among the dinosaurs from Tendaguru are the sauropods *Brachiosaurus* (the museum's mounted skeleton is still the largest dinosaur mount anywhere in the world), *Dicraeosaurus* and *Janenschia*, the stegosaur *Kentrosaurus*, the small ornithopod *Dryosaurus* and the theropod *Elaphrosaurus*. Despite the importance of this material, few palaeontologists have attempted detailed studies of these specimens subsequent to the middle of the 20th Century. Perhaps more importantly, the associated fauna and flora were effectively ignored by the early workers and have remained neglected ever since. However, a new initiative, spearheaded by museum palaeontologists, is attempting to rectify this state of affairs. Along with the dinosaur material, the German expeditions brought back tonnes of matrix, which are currently being subjected to a painstaking process of screening for microvertebrate, invertebrate and plant material. Study of this material is adding greatly to our understanding of the faunistics and palaeoecology of this important Late Jurassic terrestrial ecosystem.

Seven of the papers in this thematic set deal with the taphonomy and palaeobiology of the Tendaguru dinosaurs, while the remainder cover other aspects of the vertebrate fauna and associated palynofloras. W-D. Heinrich provides an important overview of the taphonomy and field associations of the dinosaur specimens, drawing from the original expedition field notes and photographs. Two papers by Andreas Christian and others provide analyses of sauropod locomotion, and Martin Sander examines sauropod ontogeny from the perspective of bone histology. Papers on the application of photogrammetry to dinosaur skeletons, on the

possible structure of *Brachiosaurus* lungs, and on the body size and mass of sauropods complete the assortment of dinosaur papers. Although these comprise an eclectic collection of contributions, many of the papers dealing with palaeobiology seem to lack a wider perspective. Comparison with other sauropods is either limited or lacking, and in some cases the authors seem to have been unaware of other recent publications in the field on very similar topics. Such shortcomings limit the utility of these papers, though they do offer some novel perspectives on sauropod palaeobiology.

Other contributions to the volume provide additions to the Tendaguru fauna, many of which result from the programme of matrix screening mentioned above. These include descriptions of a new dsungaripteroid pterosaur (Unwin and Heinrich), a new semionotiform fish (Arratia and Schultze), additional lizard material (Broschinski) and a new haramiyid mammal (Heinrich). Each of these papers attempts to place the Tendaguru fauna into a wider context, with some discussion of phylogeny and biogeography. Papers on palynology (Schrank), palaeobotany (Kahlert and others) and charophytes (Schudack) present valuable new data on local climate, habitat type and vegetational composition. Integration of this information with the faunistic data should allow the development of a holistic overview of the Tendaguru biome, adding Tendaguru to the limited number of Jurassic terrestrial localities for which such information is available.

Although far too expensive and specialised to be on most people's bookshelves, this volume does mark an increase in our knowledge of Late Jurassic terrestrial faunas. Moreover, in the future the journal is likely to carry many important publications on the often spectacular fossils housed in the Humboldt Museum (including a great deal of important material from Solnhofen, Holzmaden *etc.* as well as Tendaguru) – so why not ask your library to subscribe?

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STRUVE FESTSCHRIFT

Weddige, K., Talent, J.A. & Ziegler, W. (eds), 1999/2000. In memoriam Dr Wolfgang Struve. *Senckenbergiana lethaea*, volume 79, part 1 (1999: pages 1-300) and part 2 (2000: pages 301-636). ISSN 0037 – 2110. Available from Schriftentausch der Senckenbergischen Naturforschenden Gesellschaft, Senckenberganlage 25, D-60325 Frankfurt am Main, Germany.
Price 49 DM per part plus *ca.* 15 DM postage.

This pair of elegant volumes is a vast contribution and a celebration of one of the most renowned, respected and revered palaeontological members of the fraternity of the Senckenberg Institute in Frankfurt, Germany: the late Dr. Wolfgang Struve. His personality was such as to attract a large circle of colleagues and friends who now come gladly to show their appreciation. As Professor Dr F.F. Steininger, the director of the Senckenberg Institute, asked in his Foreword to the volume, "How else could one explain why such an imposing group of colleagues and contemporaries, renowned scholars from around the world, among them conspicuously many of the younger generation, responded to the call for manuscripts?"

The two volumes were edited by Karsten Weddige, John Talent and Willi Ziegler, whose work on Devonian fossils had made them firm friends with Struve. Part I contains, in pages 1-300, 19 papers on "General Topics" (stratigraphy, sedimentology, ecology, diversity), Stromatoporoidea, Anthozoa, Brachiopoda, Mollusca "(?)". Part 2 contains, in pages 301-636, 13 papers on Trilobita, Ostracoda and a tribute to Struve's life's scientific work by two former colleagues from the Senckenberg, Dr Karsten Weddige and Director Emeritus Willi Ziegler.

Taking the latter tribute first, 160 publications by Struve are listed, from 1952-1998. Much of his research was directed towards Devonian trilobites, brachiopods and aspects of the stratigraphy of the Eifel region. In addition to his scientific research, Struve was a devoted curator in the Senckenberg. A contribution perhaps not fully appreciated is his huge, ongoing task as Editor of the house journal *Senckenbergiana lethaea* from October 1957 to June 1992 (jointly with Rudolf Richter from July 1956) and editing of relevant numbers (including the vast Gerhard Alberti volume) of the *Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft* monograph series. This devotion to his chosen discipline explains much of his personal aura that led to this voluminous festschrift. The volumes are rounded out very nicely by an index to his publications and a list of taxa he described. A further index in Part 2 lists all new taxa described in the whole Festschrift.

With some 32 research papers it is difficult to comment directly and fully on all. Most papers focus on Devonian topics and 23 of the 32 research papers are on brachiopods (8), trilobites (11) and corals (4). There are rare contributions to other topics, such as the Cambrian of the Frankenwald (Sdzuy); Bolivian Silurian trilobites (Fortey & Edgecombe); and the Lower Carboniferous trilobite genus *Xenadoche* (Hahn, Hahn & Müller), all in Part 2. Overall, 16 papers are written in English and 16 in German; strangely, all the coral papers and most of the trilobite papers are in German, and all the brachiopod papers are in English.

Several papers take up special research interests of Struve. Bultynck & Hollevoet investigate the detailed correlation of the Eifelian-Givetian boundary with the Couvinian-Givetian boundary. Pohler, Brhhl & Mestermann discuss the sedimentology and deposition of Struve's "mud-mound" from the Weinberg quarry in the Eifel.

In the opening section, on General Topics, there are the two papers mentioned above. In addition there are papers by: Ribbert, documenting temporary exposures in the Eifel between 1982 and 1984; Schöne, on dwarfism in late Eifelian faunas in the Eifel; and Harper, on population size and taxonomic diversity. Then follows a paper by Mistiaen & Weyer on a "Strunian" stromatoporoid from Poland.

The section on Anthozoa includes three papers on corals from the Eifel Devonian: Oekentorp & Brhhl on tabulates from the Lower/Middle Devonian boundary beds; Glinski on Middle Devonian Plerophyllidae; and Schröder and Lütte on the taxonomy of Middle Devonian "*Fasciphyllum varium*". Birenheide & Schröder describe new species of *Catactotoechus* from the Givetian of the Sahara.

Then follow eight papers on brachiopods, none of which (surprisingly) is on Eifel material. Alvarez discusses the brachio-jugal system of the retziidines; Mawson & Talent describe a silicified Lochkovian brachiopod fauna from Windellama, N.S.W., Australia; Jansen documents an Early Devonian fauna from Morocco; Blodgett & Boucot describe late Emsian eospiriferids from Alaska; Chen & Yao describe late Emsian faunas from Guangxi; Godefroid describes a

new Givetian atrypid from Morocco; Sartenaer describes a new Frasnian rhynchonellid genus from Belgium; and Brice describes Famennian spiriferids from Afghanistan and Iran. The final paper in this part is by Alberti, on a late Emsian tentaculite from Buchan, Victoria, Australia.

Part 2 contains mostly trilobite papers. The first is by Sdzuy, on the Cambrian faunas from the Lippertsgrhner Schichten of the Frankenwald; Fortey & Edgecombe describe Silurian faunas from Bolivia; Alberti reviews the biogeographic significance of the late Lower Devonian Hercynian facies *Struveaspis-Eopalpebralia* assemblage in North Africa and Europe; Schraut describes, in a very large paper, new late Early Devonian *Scabrella* material from Morocco; Basse & Müller describe a new Middle Devonian species, *Illaenula struvei*, from the "Rhenohercynicum"; Zhou, Siveter & Owens describe Devonian proetids from Inner Mongolia; Crônier & Feist provide a beautifully illustrated treatment of Late Devonian *Cryphops*; Feist, Lemke & Korn describe equally attractively illustrated latest Upper Devonian trilobites from the Sauerland; Weber documents a new occurrence of *Omegops cornelius* from Aachen; and Hahn, Hahn & Müller revise the Early Carboniferous *Xenadoche*.

Two papers on ostracodes round out the volume. These are by: Becker, who examines the biostratigraphic utility of Middle Devonian faunas from the Eifel; and Wang & McKenzie, who document the development of a group of large leperditiids in the Devonian of southern China.

The highlights of these two separate parts for me are the papers with exquisite illustrations (Schraut; Zhou, Siveter & Owens; two papers by Feist and co-authors: all on trilobites; and Mawson & Talent on brachiopods). Many other papers have high quality illustrations, present very interesting data, and all papers make available important new information.

Without doubt, Dr Struve would have been very gratified indeed to see that his colleagues have done him proud. This is a magnificent and important volume, produced with loving care. The high quality of the contributions guarantees that the volume is a must for all those libraries catering for the lovers of, especially, Devonian brachiopods, trilobites and biostratigraphy.

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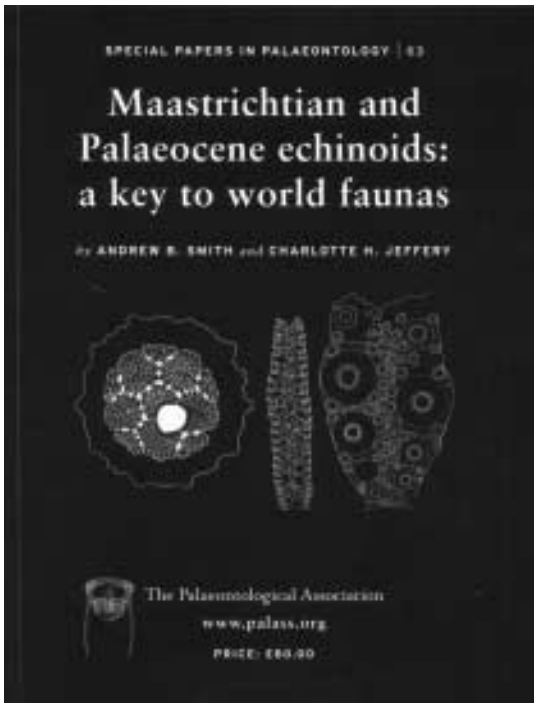
Special Papers in Palaeontology No. 63

Maastrichtian and Palaeocene echinoids: a key to world faunas

by Andrew B. Smith & Charlotte H. Jeffery (2000). pp. 1-406, 152 text-figures. £80/US$160 nonmembers, £40/US$80 members.

Abstract:

The taxonomy of Maastrichtian and Palaeocene echinoid faunas of the world has been revised, based on restudy of type and topotype material wherever possible. After revision we accept 395 species distributed amongst 140 genera as valid (out of 732 species and 196 genera encountered in the literature). A brief diagnosis is provided for each species, and plating is illustrated for at least one species in each genus. Dichotomous keys are provided as an aid to identification at all taxonomic levels. Stratigraphic ranges at species level are documented and tabulated. The importance of taxonomic standardization in palaeobiological studies using large data sets is emphasised. New taxa erected are the family Plesiolampididae, the subfamilies Circopletinae, Pseudoholasterinae and Cardiotaxinae, and the species Salenia (Salenia) vanbirgeleni, Salenocidaris gallemi, Diplotagma snellingsi, Thylechinus vanderhami, Noetlingaster monotuberculatus and Petalobrissus platysternus.



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TAXONOMIC/NOMENCLATURAL DISCLAIMER

This publication is not deemed to be valid for taxonomic/nomenclatural purposes [see Article 8.2 of the International Code of Zoological Nomenclature (4th Edition, 1999)].