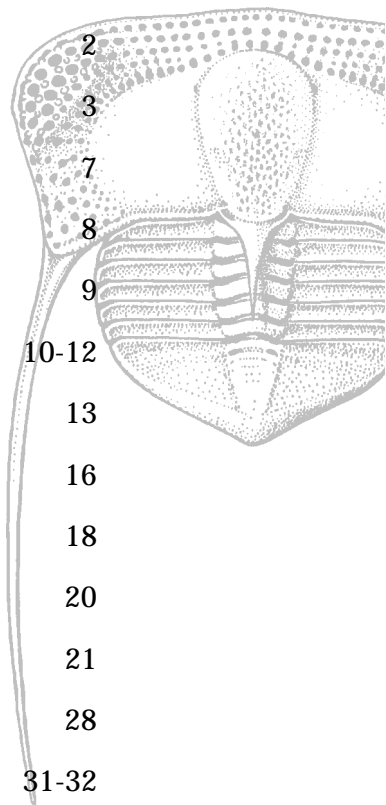


The Palaeontology Newsletter

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Reminder: The deadline for copy for Issue no 41 is 30th May 1999

On the Web: http://www.nhm.ac.uk/hosted_sites/paleonet/PalAss/PalAss.html



Editorial

I had a baby in January, and it has raised a series of questions which I would like a better palaeontologist than me to answer. Apart from obvious questions, like why have I done this, why weren't we more careful, why can't we all be marsupials, I have come up with a question I would really like to have answered. When in human evolution did such dependent babies evolve?

It seems to me, usually at four in the morning, that there are two constraints on this. The first is social. A baby takes a lot of resources to maintain, especially as it removes one member of the resource gathering unit from use for a period of time. So I presume that dependent babies rely on larger social groupings than babies that are independent soon after birth.

Secondly, a baby which is unable to attach itself to the mother needs to be attached, which necessitates the use of tools, in the broadest sense. I had previously thought of tools as being those durable materials that have a chance of fossilisation, or preservation, such as knives and arrowheads. However, without a sling of some kind, how could a dependent baby be managed? I know these type of materials would be unlikely to be preserved, but can we assume that the use of 'hard' and 'soft' tools go hand in hand, and that the acquisition of one implies the acquisition of the other?

If both of these constraints are valid, then were australopithecine babies less helpless than hominids, and is this a larger morphological transition than many of the mature skeletal attributes which are used in defining hominid species?

Please contribute to solving my problem, if you have any thoughts on the subject, or tell me which paper solved it many years ago. In the meantime, I will arrogantly suggest that there may be a gender bias in our assessments of human evolution, which may have prevented these questions from being asked before. And perhaps even suggest that this bias might apply to other fossil groups where gender was relevant to morphology or function.

Perhaps this is enough palaeontological Germaine Greer-ing: I will go and feed my baby.

Sue Rigby

University of Edinburgh

(Email: Sue.Rigby@ed.ac.uk)



news



Changes at the Association:

All Members please note

After over a year and a half of discussions, consultations, and deliberations amongst both Council and the wider membership, the Palaeontological Association has finally had the permission of the Charity Commissioners to appoint an Executive Officer. This is a half-time paid position, to handle the basic running activities such as membership and subscriptions, sales, day-to-day money matters, and the increasingly large amounts of correspondence and other paperwork that a mature, thriving organisation generates. Council's thinking was that this position should deal with those time-consuming and essential routine matters that were formerly shared out by Council members with full-time jobs, but which were also increasingly going to be seen by RAE- and publication-conscious Heads of Department as of no contribution to a department's academic profile. Jobs that require a high degree of expertise in our subject and to which some kudos attaches (such as editing and Newsletter management, and the major offices of Treasurer, Secretary and President) will continue to be handled by Council members on a voluntary basis.

Tim Palmer was appointed to this new position as from the first Council Meeting of 1999, having resigned as Treasurer. He is already hard at work – and full of admiration for the amount of time that has been devoted by his predecessors: Mike Barker (membership), Jane Francis (institutional membership), Andy King and his helpers (sales), and Mark Purnell (publicity). This means that there is a new contact procedure that all members need to make a note of when it comes to paying subscriptions, ordering Pal Ass publications at members' prices, and making other enquiries of a non-editorial nature. The relevant changes will be made to the details given in the *Newsletter* and on the inside cover of *Palaeontology* and *Special Papers in Palaeontology* in due course.

Council had originally hoped to make this appointment in the autumn of 1998. The delay has meant that the surge of work that is normally associated with the end of the year has been delayed to mid-January. The only change that most members are likely to notice is a slight delay in processing their subscription payments, or answering routine enquiries. We shall have caught up by the time this *Newsletter* is published.

Some members will also know that we have moved printing of both *Palaeontology* and *Special Papers in Palaeontology* to Blackwell's. By the time you are reading this, we expect that the first part of *Palaeontology* Vol. 42 will have been published and issued seamlessly. If any unforeseen problems have arisen, then please let us know. In the meanwhile, for action on any of the above, please contact:

Dr Tim Palmer, Executive Officer

The Palaeontological Association

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Palaeontology

Our journal, *Palaeontology*, is now accredited with the International Association for Plant Taxonomy for the purpose of registration of all fossil plants.

David Loydell

Portsmouth University

PalAss Web Site

The Association's Web site is settling down nicely at its new address, and thanks to a great deal of hard work by Mark Purnell it is a very attractive and accessible site, with a lot of new and useful information.

The URL is http://www.nhm.ac.uk/hosted_sites/paleonet/PalAss/PalAss.html

Tim Palmer

Coral Reef Slide Set

Marking the International Year of the Reef, a set of slides "Coral Reef Cities under the Sea" and a guide to introduce coral reefs to students and adults were prepared by R.N. Ginsburg (Professor of Marine Geology, Rosenstiel School of Marine and Atmospheric Science, University of Miami) with the assistance of S. Lutz, P. Kramer and B. Bischoff, and sponsored by Project Miami Reef, Awareness, Research, Education; the Hachette Filipacchi Foundation. The set of slides is an excellent way to introduce coral reefs to a variety of audiences ranging from middle-school students to senior citizens. The collection uses images to compare functional aspects of coral reefs and cities. For example, one slide has images of an apartment house and a colonial coral, another joins a water purification plant with sponges that filter sea water, and others compare hazards: fires in cities are like the bleaching of corals by unusually warm ocean temperatures.

You can see examples of these slides on the Web at <http://rsmas.miami.edu/groups/rare/cities>

The approximate price of the slide set (35 slides, 20 with combined images) and guide (text with explanations of each slide) is US\$ 75.00, including air mail postage and handling. You can request further information by sending e-mail to R.N. Ginsburg at rginsburg@rsmas.miami.edu.

Fernando Alvarez

Departamento de Geología

Universidad de Oviedo

Oviedo

news...



HOLOSTRAT launched

Imagine that you are interested in the carbon isotope stratigraphy of a particular section or interval. Or perhaps you want to learn about its bentonites, or graptolites, or geochronology, or any other aspect of stratigraphy. Where do you go for information? You might have a comprehensive and well-ordered collection of literature that you know thoroughly, or you might undertake a library search or talk to colleagues. But new and exciting possibilities for compiling and integrating stratigraphic information are created by the launch of HOLOSTRAT, a joint venture between the British Geological Survey (BGS) and the Stratigraphy Commission of the Geological Society of London. HOLOSTRAT establishes an area on the BGS Web site (<http://www.bgs.ac.uk>) for the geological community at large to obtain information on the stratigraphy of the UK, literally putting that information at your fingertips. (See the article by Peter Allen and Peter Rawson, *Geoscientist*, November 1998, p. 14).

The first contribution to HOLOSTRAT is now available on the BGS Web site, and is a compilation of files relating to the type Ludlow Series in the Welsh Borderland. You can reach it by clicking the Free Downloads button on the BGS Home Page, and then following the path through 'HOLOSTRAT'. The compilation contains a series of hyperlinked PDF (Portable Document Format) files, so you will need Adobe Acrobat Reader to view them, but Acrobat Reader is freely available as a download from the Adobe Web site, and we have provided plenty of opportunities for users of HOLOSTRAT to obtain it.

The PDF files may be viewed on-line in your Web browser, or if you prefer can be downloaded as either a self-extracting executable or a zipped file. Once you have opened the Ludlow volume, you can investigate any of the many aspects of Ludlow stratigraphy that it contains.

An introductory page contains links to files on chronostratigraphy, geochronology, lithostratigraphy, methods of correlation (biostratigraphy, bentonites, chemostratigraphy) and important sections, while additional links between files relate various aspects of Ludlow stratigraphy to each other, and to maps, vertical sections and other diagrams. A holostratigraphical chart shows the relationships between the various methods of correlation (mainly biostratigraphical), and contains links to a file that explains the relationships displayed. References are included for each section, but are also compiled in a bibliography.

The structure of HOLOSTRAT means that it can grow and develop as revised and/or additional information becomes available, and our hope is that, over time, HOLOSTRAT will become a major reference source for information on UK stratigraphy. The Ludlow volume is the first to be completed, but other compilations in preparation, dealing with aspects of Albian and Oxfordian stratigraphy, are likely to be put up later this year. The provision of stratigraphic information in this form is novel, and we would like as much feedback as possible. So please take a look at HOLOSTRAT, even if Upper Silurian stratigraphy is not your primary interest, and let us know what you think of it.

Stewart Molyneux

British Geological Survey

e-mail: s.molyneux@bgs.ac.uk



Palaeontology Camps for students in Russia

Ecologia Trust 1999 Summer School

Ecology and Palaeontology Field Research Camps in the Urals, Russia, are organised for American and European undergraduates and postgraduates. These camps have been sponsored and organised since 1990 by Ecologia Trust, Scotland, Centre for Human Ecology, Edinburgh, Scotland EcoInfo Ecology Centre, Ekaterinburg, Russia Urals Institute of Ecology, and Russian Academy of Sciences.

All camps run from 10th July to 3rd August 1999 and cost £875 (including return air fare from London to Moscow, internal travel in Russia, visits to Moscow and Ekaterinburg, tuition, accommodation and food. Travel insurance, visas and museum entrance cost extra.). For an optional extra four days in St Petersburg, from 4th to 7th August, add £145.

The three-week Camp provides a unique opportunity for Archaeology and Palaeontology students to join excavations in the Mid Urals, under the supervision of Dr Alexander Borodin, Senior Research Scientist, Dept. of Palaeontology, Urals Institute of Ecology, Russian Academy of Science, Ekaterinburg, Russia. The small group of students, and other Palaeontology and Archaeology research scientists, enjoy a unique experience of working in the field in a remote part of the mid-Urals in Russia. They live in a remotely situated camp working closely with the scientists and their teams on an ongoing cave excavation. The scientists offer lectures and an extensive practical teaching programme, and students will visit Ekaterinburg and Moscow.

For further information, contact Ecologia Trust, The Park, Forres, Moray IV36 3TZ Scotland (tel/ fax: +44-(0)1309-690995, e-mail: ecoliza@rmplc.co.uk, URL: <http://www.rmplc.co.uk/eduweb/sites/ecoliza>).

news



Association Meetings Programme

Progressive Palaeontology '99

University of Bristol; Wednesday 28 April 1999

This is an informal one-day conference in the Department of Earth Sciences, University of Bristol, mainly intended for research students (and supervisors) to get together and present short talks or posters about their work, but all are welcome to attend. First-year postgraduates are especially encouraged to tell us about their projects. Details are available from Trevor Cotton, Department of Earth Sciences, University of Bristol, Wills Memorial Building, Queen's Road, Bristol, BS8 1RJ (tel 0117 954 5411, fax 0117 925 3385, e-mail trevor.cotton@bristol.ac.uk), or on the conference Web site at <http://palaeo.gly.bris.ac.uk/PP99/home.htm>

Annual Address & AGM

University of Leeds; Wednesday 12 May 1999

Dr P. R. Crane FRS (Field Museum, Chicago)

Palaeontological evidence for the early evolution of flowers.



Association Business

Proposed subscription changes

Council has approved the following increased rates for subscription for *Palaeontology* and *Special Papers in Palaeontology* for the year 2000. These increases reflect the large size of some of the *Special Papers* in the production pipeline. The proposals will be put to the membership at the AGM.

Institutional Membership of the Palaeontological Association (delivers six parts of *Palaeontology* per year): £100 / US\$200.

Special Papers in Palaeontology (as an add-on subscription for individual members): £25 / US\$44.

Special Papers in Palaeontology (as an add-on subscription for Institutional members): £64 / US\$128.

Proposed Cover Price for individual parts of *Palaeontology*: £45.

There will be no changes to the subscription rates for Student, Ordinary, or Retired Members.

The Pal Ass and the Euro

At the moment, all our paperwork quotes costs in both Sterling and US Dollars. In future, we will also be happy to accept payment for sales, subscriptions, offprints, etc in Euros, and our invoices and subscription reminder forms will reflect the use of this third currency.

The Association will have to meet some additional banking costs making the conversion into Sterling, but this will be picked up in the conversion rate. Until further notice, we shall regard one Euro as being equal to one Dollar so that the nominal Dollar and Euro price figures will be the same.

Dr. Tim Palmer

Executive Officer, The Palaeontological Association

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Technical Editor Position

The Association is looking for someone to take over the position of Technical Editor from Dr D. Loydell of Portsmouth University.

The Technical Editor's position is an important one in the production of *Palaeontology*, *Special Papers in Palaeontology*, and *Field Guides to Fossils*. He or she will be responsible for preparing accepted manuscripts for submission to the printers (including press-marking); assembling *Palaeontology* (6 parts per year); proof-reading and marking, and communicating with authors over proofs; preparation of cover text and annual index (of *Palaeontology*); liaison with the team at the printers; and general nurturing of our publications during their production.

The Technical Editor is a member of the Editorial board of the Association and attends all Council Meetings, though (to comply with Charity Commission regulations) is not a Trustee.

The job would suit a well-organised person who is looking to supplement their income with some extra work. Currently, each part of *Palaeontology* receives about 60-80 hours of input from the Technical Editor, depending on number and condition of MSS. An ability to write clear scientific English would be a necessary condition, and experience in editing is preferable. Familiarity with electronic publishing and computer graphics packages would be an advantage, and access to E-mail and telephone are vital. We are looking for a Palaeontologist.

The job is paid on an hourly rate, by negotiation (currently £8/hr). Further enquiries should be made to The Executive Officer (palass@aber.ac.uk), and applications may be made via him. Closing date for applications: 30th May 1999.



THE PALAEOLOGICAL ASSOCIATION Registered Charity No. 276369

STATEMENT OF FINANCIAL ACTIVITIES FOR THE YEAR ENDED 31 DECEMBER 1998

	General Funds	Designated Funds	TOTAL FUNDS	TOTAL 1997
	£	£	£	£
INCOMING RESOURCES				
Subscriptions	47,449	0	47,449	50,309
Sales:				
Palaeontology	79,700			
Special Papers	4,403			
Offprints	4,175			
Field Guides	3,121			
Postage & Packing	<u>418</u>			
Total Sales	91,817	0	91,817	85,728
Investment Income & Interest	19,465	3,359	22,824	20,809
Donations	0	2,165	2,165	1,128
Sundry Income	<u>1,549</u>	<u>0</u>	<u>1,549</u>	<u>923</u>
Total	160,280	5,524	165,804	158,897
RESOURCES EXPENDED				
Publication:				
Palaeontology	106,658			
Special Papers	15,754			
Offprints	3,890			
Cumulative Index	695			
Field Guides	1,146			
Newsletters	7,495			
Carriage & Storage	2,255			
Scientific Meetings	1,332			
Grants	<u>1,594</u>	<u>2,071</u>		
Total Charitable Expenditure	140,819	2,071	142,890	132,502
Administrative Expenditure	<u>13,026</u>	<u>0</u>	<u>13,026</u>	<u>8,314</u>
Total	153,845	2,071	155,916	140,816
NET INCOMING RESOURCES				
BEFORE TRANSFERS	6,435	3,453	9,888	18,081
TRANSFER	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
NET INCOMING RESOURCES	6,435	3,453	9,888	18,081
INVESTMENT GAINS				
Realised	6,294			
Unrealised	<u>30,231</u>			
	<u>36,525</u>	<u>0</u>	<u>36,525</u>	<u>88,446</u>
NET MOVEMENT IN FUNDS	42,960	3,453	46,413	106,527
BROUGHT FORWARD	<u>330,996</u>	<u>44,647</u>	<u>375,643</u>	<u>269,116</u>
CARRIED FORWARD	<u>373,956</u>	<u>48,100</u>	<u>422,056</u>	<u>375,643</u>



THE PALAEOLOGICAL ASSOCIATION Registered Charity No. 276369
BALANCE SHEET AS AT 31st DECEMBER 1998

1997 £		1998 £
	INVESTMENTS	
206,613	At Market Valuation	267,718
	CURRENT ASSETS	
192,019	Cash at Banks	177,080
7,303	Field Guide Stocks at Valuation	6,157
<u>6,765</u>	Sundry Debtors	<u>10,417</u>
206,117	Total	193,654
	CURRENT LIABILITIES	
27,052	Publication Provisions	32,200
4,467	Subscriptions in Advance	512
<u>5,568</u>	Sundry Creditors	<u>6,604</u>
37,087	Total	<u>39,316</u>
<u>169,030</u>	NET CURRENT ASSETS	<u>154,338</u>
<u>375,643</u>		<u>422,056</u>
	Represented by:	
330,996	GENERAL FUNDS	373,956
	DESIGNATED FUNDS	
31,121	Sylvester Bradley Fund	31,866
7,355	Jones-Fenleigh Fund	9,599
<u>6,171</u>	Hodson Fund	<u>6,635</u>
<u>44,647</u>		<u>48,100</u>
<u>375,643</u>		<u>422,056</u>

These financial statements were approved by the Board of Trustees on January 20 1999.

E.N.K. Clarkson

M.P. Smith

T.J. Palmer

Independent Examiner's Report to the Members of the Palaeontological Association

Report on the accounts for the year ended 31 December 1998 set out on this page and the previous page.

The Charity's trustees are responsible for the preparation of the accounts. My work was conducted in accordance with the Statement of Standards for Reporting Accountants and my procedures consisted of comparing the accounts with the accounting records kept by the charity and making such limited enquiries of the trustees as I considered necessary for the purposes of this report.

In my opinion: a) The accounts are in agreement with the reporting records kept by the charity.
b) The accounts have been drawn up in a manner consistent with the requirements of the Charities Act 1993 and the charity is exempt from an audit for the period under review.

G.R.Powell
Chartered Accountant
Market Harborough

Dated 4 February 1999



THE PALAEOLOGICAL ASSOCIATION

Registered Charity No. 276369

SCHEDULE OF INVESTMENTS AND INVESTMENT INCOME for the year to 31st DECEMBER 1998

		Cost	Income for year
		£	£
£4,000	8% Treasury Loan Stock 2002/06	2,192	320
£6,765	7% Treasury Stock 2001	7,115	474
£7,000	8% Treasury Stock 2003	6,863	560
£37,000	6 1/4% Treasury Stock 2010	34,235	2,312
18,029.71	COIF Charities Fixed Interest Fund shares	25,000	469
5,270	M & G Charifund Units	4,073	2,667
2,700	S and P Group Japan Growth Fund	5,286	0
2,000	Gartmore European Fund	3,516	0
4,500	British Aerospace 7 ³ / ₄ % (N) Cumulative Convertible Redeemable Preference 25p shares	4,155	436
8,335	Rank Organisation 8 ¹ / ₄ % (N) Cumulative Convertible Redeemable Preference 20p shares (sold Jan 1998)	12,508	430
190	Cordiant Ordinary 25p shares	1,049	2
190	Saatchi and Saatchi Ordinary 10p shares	1,059	3
2,800	Shell Transport and Trading Ordinary 25p shares	4,671	372
2,000	Legal and General Ordinary 25p shares	2,965	445
2,000	Legal and General Ordinary 25p shares (sold Nov 1998)	2,965	218
1,200	Electrocomponents Ordinary 10p shares	2,817	135
525	Rio Tinto Ordinary 10p shares (sold Mar 1998)	5,248	0
1,400	Vodafone Group Ordinary 5p shares	3,442	97
700	Vodafone Group Ordinary 5p shares (sold Nov 1998)	1,721	48
1,000	Lloyds TSB Group Ordinary 25p shares	7,952	233
1,600	Unilever Ordinary 1.25p shares	7,751	171
600	Glaxo Wellcome Ordinary 25p shares	8,798	162
1,050	Powergen Ordinary 50p shares	9,426	525
650	Hays Ordinary 1p shares	6,048	0
1,000	Smithkline Beecham Ordinary 6.25p shares	7,810	0
875	Cable & Wireless Ordinary 25p shares	5,862	0
			10,079
	Bank and Building Society Interest Received		12,745
		184,487	22,824
	MARKET VALUE at 31st December 1998	£267,718	

(1997 £206,613)



Palaeo Reply

'Anti-American' isn't the point...

In his reply to my Comment (*Newsletter*, 38: 14-16, and 39: 15- 16), Richard Fortey declares himself "nonplussed". He is right to be mystified, since I communicated poorly the context in which I mentioned his name. Quoting more fully Graham Budd's opinion:

"In the final talks of the day, Richard Bettly gave a charming and considered discourse on the Ordovician of Wales – part of Richard Fortey's much to be applauded, if somewhat Quixotic 'Save the British Ordovician' campaign. The myriad of historical, aesthetic, and scientific reasons why one might wish to retain terms like Llanvirn seem sadly to be lost on certain of our colleagues across the Atlantic." (*Newsletter*, 37: 29-30, 1998).

Although I did not refer in my Comment to the 1995 *Geological Magazine* paper that Fortey and several colleagues authored, I agree with Fortey that neither he nor the paper is anti-American and agree that he and his co-authors were not unmindful of the need for precise international correlation of the traditional British series. I apologize if anything I said in my Comment suggested otherwise.

Concern about anti-American sentiment, however, was not what prompted my letter. My concern is whether sentiments similar to those expressed by Budd in his meeting report and P.M. Allen in his letter to the EuroGeoSurvey, might greatly reduce the value of much of the work of the ICS subcommissions. Since Budd is not directly involved in studies of Ordovician stratigraphy (as Fortey noted), and since Allen holds an influential position at the British Geological Survey, I feared that misinformation about the nature of the Subcommittee's work and the basis for changes in the Ordovician nomenclature might be widespread and disruptive of the kind of effective communication that science requires.

Using the specific example of the Darriwilian Stage, I tried to stress that the decision to choose a GSSP and name for the international standard stage that were different from those of the traditional British Llanvirn was based on sound and compelling scientific reasons rather than nationalistic prejudice. I also attempted to point out that IUGS decisions have no more force than is given them by the weight of the science behind them and the cooperation of the associated organizations in our countries. Thus, we have no reason to fear having unwanted changes in our regional stratigraphic nomenclatures forced upon us.

I am uncertain whether I achieved anything in my effort to discuss these issues. Certainly Fortey's reply was not very encouraging.

Dr. Charles E. Mitchell

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Palaeo Reply

The possible lifestyle of the eurypterid *Onychopterella augusti*

We welcome the contribution by Jeffrey Minicucci (*Newsletter 39*, pp. 12-13) on the late Ordovician eurypterid *Onychopterella augusti*, from the Soom Shale of South Africa (Braddy et al. 1995). Research into the taphonomy (Gabbott 1998), biomechanics and ichnology (Braddy 1998, Braddy and Almond, in press) and respiratory palaeobiology (Braddy et al., in press) of *O. augusti* has continued during recent years, and it is pleasing to see that our work is generating interest.

Minicucci's comments concern the mode of life of this animal: he would have us believe that *O. augusti*, unlike most of its clan, took to burrowing in the substrate where it gobbled sediment and sought soft-bodied worms. However, any morphological evidence adduced for this hypothesis is vague. Minicucci suggests that the 'flat, wide body seems appropriately shovel-like for plowing' and that the posteriorly directed spines on appendages II-IV could have been useful for pushing aside mud. Maybe, maybe not. Similarly, broad comparisons of opisthosomal outline with the carcinosomatids cannot alone justify exclusion of *Onychopterella* from a nektonic or nektobenthic lifestyle, and the proportions of the prosomal appendages, which are typical for members of the family *Erieopteridae*, hardly point exclusively to an infaunal mode of life. The spiral-shaped alimentary canal, again, does not necessarily represent evidence for detritus feeding and may equally have served to increase the absorptive area of this part of the gut.

Even if it were demonstrated that all these structures could have functioned as Minicucci suggests, it would, of course, not prove that they did. Analyses of functional morphology can provide constraints on ecological hypotheses, but the science of palaeoecology is potentially so tenuous that we must use all the evidence we can get. Therefore, we should look beyond morphology to any other available sources of information (e.g. associated organisms, taphonomic considerations and the sedimentary environment).

In the case of the Soom Shale, the enclosing sediment provides a ready first test of lifestyle hypotheses. The shale itself is laminated on a millimetric scale, with the laminae persistent over metres. None of us working on the Soom have ever seen any evidence of bioturbation (Aldridge et al. 1994), which in itself rules out a burrowing hypothesis for any of the animals in the fauna. Geochemical analyses further demonstrate that the sediment was anoxic-euxinic with low pH (Gabbott 1998), providing exceptionally inhospitable conditions for infaunal organisms. These features of the shale serve to refute any hypothesis based on functional morphological criteria alone.



It might be argued that the animals in the Soom were exotic, washed in from more hospitable regions, and that the local sedimentary conditions are relevant only to their preservation, not to their mode of life. However, the undisturbed fine laminae of the shale attest to a very low energy environment, and the strata extend in all directions for several tens of kilometres. There is no evidence at all of any currents that could have plucked infaunal organisms from marginal regions and carried them alive out into the Soom basin to be preserved with their soft tissues intact.

Palaeoecology is perhaps one of the least exact of sciences, but we are drawn into it because we naturally want to know how our favourite organisms lived. It is often difficult, however, to gather sufficient evidence to frame well-formulated, testable hypotheses, and there is a temptation to retreat into vague scenarios, based on pretty flimsy functional morphological reasoning, Rudwickian paradigms notwithstanding. We must be wary of this, because there is also a wider point here. Those who occasionally denigrate palaeontology as a discipline are prone to point to some of the 'weaknesses' that they perceive in the science, including the widespread publication of historical narratives and unconstrained speculations. We need to be careful not to conform to these caricatures. It is certainly possible to produce rigorous, testable hypotheses in all aspects of our work and we must show that we can do so. This means we cannot ignore potential sources of crucial evidence, and in this respect palaeontology cannot do without geology.

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Simon J. Braddy

Department of Earth Sciences

University of Bristol

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Meeting Reports



The Palaeontological Association Annual Meeting 1998

Portsmouth

December 1998

Our fossils may be dead but palaeontology is truly alive and kicking in the UK, as demonstrated at the 42nd Annual Meeting of the Palaeontological Association at the University of Portsmouth last year. Nearly 200 people attended, a considerable portion of whom were energetic young researchers, including postgrads, masters students and undergraduates from the various palaeontological courses now flourishing here. It was also a pleasure to meet more colleagues from overseas, including North America and continental Europe.

With over 50 talks and 26 poster presentations packed into two days it is impossible to mention them all individually, but nearly all aspects of palaeontology were discussed, including Palaeozoic algal reefs, Jurassic black smoker faunas, Triassic fish kills, conodont cladistics and the feathered fingers of raptors. Plankton blooms were related to volcanic events, evolutionary stasis was matched with unstable environments, and Gondwanan spore assemblages were linked to sea level and climate changes. We saw the microscopic eggs of mites on Cretaceous bird feathers, fractures in bones of a raptor dinosaur, Precambrian worm traces and spectacular crinoid fossils. The quality of the posters was also extremely high. It was good to see some spectacular displays on new faunas from the Rhynie Chert, the flavour of gingers in the Eocene, three-dimensional ornamentation of bryozoa, and loss of arms in crinoids, to mention a few.

Three President's awards were made this year (two for talks which were considered equally worthy). Kim Freedman (University of Leicester) brought the strange fossil *Jamoytius kerwoodi* to life, starting from a strange flattened shape with zig-zag markings and elegantly reconstructing it as an agnathan vertebrate with w-shaped scales and doughnut-shaped openings. And anyone who saw the talk by Michael Gudo (Forschungsinstitut Senckenberg) will never forget how slipper-shaped *Calceola* corals function, as he wonderfully demonstrated using an old slipper, a pump and a rubber glove! Peta Hayes (University of Leeds) won the poster prize for her excellent presentation of Cretaceous angiosperm leaf fossils from Antarctica, which are providing a new insight into forests which flourished near the South Pole during a former greenhouse climate.

The meeting had a definite maritime flavour this year. The organisers, Mike Barker and Dave Loydell from the University of Portsmouth, made the most of local history and treated us to a wealth of naval experiences. The annual dinner on H.M.S Warrior, the first



iron-clad warship, was an event not to be forgotten. We 'Spliced the Mainbrace' with a good slug of rum at the start of the dinner, which put everyone in a jolly mood for a great night out, exploring the nooks and crannies throughout the ship and enjoying a great feast in a very atmospheric setting. We were also treated to a special visit to the Mary Rose museum to see the spectacular artefacts recovered from this famous Tudor ship, and a civic reception hosted by the City of Portsmouth. The experience of staying on the naval base, H.M.S. Nelson, was certainly unusual, and an interesting place to be during the announcements of the recent bombings in the Gulf.

Mike Barker, David Loydell and their band of very efficient helpers certainly earned their rest during the Christmas break, since they had clearly worked extremely hard to organise this meeting, with all the security checks required for the accommodation, the sponsorship they obtained to supply free rum and support the receptions, panic buying of all towels in the city, and the excellent arrangements for the presentations. Congratulations and our thanks to them all for providing us with a very well run and memorable meeting.

Jane Francis & Richard Hunt

University of Leeds



How resilient is Life?

*For me, one of palaeontology's fascinations is best described as an eerie sensation I sometimes feel when handling a fossil. The creature existed so long ago that the elapsed time between us defies any comprehension – but it is evidently like a modern animal. I cannot help being impressed by the persistence of life through countless unseen generations – and inferring that whatever we do to the world, life must be here to stay, generation on generation, long in to the future. Darwin made the point in the *Origin of Species*:*

“As all the living forms of life are the lineal descendants of those which lived long before the Silurian [now we would say Cambrian] epoch, we may feel certain that ... no cataclysm has desolated the whole world. Hence we may look forward with some confidence to a secure future of equally unappreciable length.”

I shall call this the Resilient Life Argument. It is a comforting idea, insofar as any of us care what happens in the distant future, and it is undoubtedly the prevailing view among my colleagues in the Bristol palaeontology group, as a quick e-mail survey confirmed. Asked how long terrestrial life had left to run, answers ranged from “at least until I finish my thesis” to “the end of the universe”, but most think there are billions of years left to go, and we are waiting for the death of the sun.

However, as an attempt to stir up some millennial angst, I shall suggest that this thinking may be unsound, and consequently that the disappearance of all life on Earth may be on the cards at any time, and could even be caused by human activity in the near future.

At first sight the Resilient Life Argument seems unshakeable. Consider, for example, the unimaginably long history of microbial life in the Precambrian. Despite major long-term changes in the earth's atmospheric composition, life adapted and survived. We know that micro-organisms evolved a wide variety of strategies for harnessing energy and an impressive range of physical tolerances. Surely it must be concluded from this that the dominant pattern of life is its stability and adaptability. Cannot we infer that from some point in time soon after the origin of life, the Ultimate Mass Extinction was never a real possibility?

Then there is the long history of Phanerozoic time. Of course, there were some impressive climatic perturbations and cosmic cataclysms, but life bounced back every time. Some say that mass extinctions are a “good thing”, because they have been a stimulus for macroevolution. Few have suggested that any of these events came close to wiping out all the organisms on Earth.

It is possible, however, to look at the issue in a different light. In reality, the range of environmental conditions exploited by living micro-organisms is only impressive when contrasted with our own feeble tolerances. No creatures can survive temperatures of plus or minus several hundred degrees, and it seems entirely feasible that the world might freeze or fry, like Mars or Venus. For many researchers, the main puzzle of Earth history is to explain why this has not happened.

To account for the resilience of life, it is commonly held that there must be a system of “negative feedback” mechanisms in place, possibly involving life processes themselves. So when temperature, for example, goes up, something must respond to counteract it. This sort of thinking was popularised in James Lovelock's entirely romantic “Gaia hypothesis” in which the



Earth is envisaged as a superorganism, adapting itself to maintain the conditions necessary for life. It is also commonly encountered in the more mainstream literature on climate change. The basic premise is that the system must have checks and balances, simply because it has lasted so long. Those checks and balances usually involve the concentration of greenhouse gases in the atmosphere which keep out the chill of space.

The alternative is that the world has always been on a knife-edge, with the ultimate mass extinction always just round the corner. Perhaps there is no certain check to a runaway greenhouse or icehouse effect, and in fact life has simply fluked its way through all those billions of years. Maybe we have just been absurdly lucky.

How do we choose between these alternatives? The long odds against the latter view would seem to preclude it. But actually, I believe we cannot assess the odds at all, based solely on the fact that life has undoubtedly lasted a long time. Why not? Because for intelligent life (i.e. us) to evolve, a long history of prior survival is a prerequisite. If life had fizzled out in the Archaean, or at any time since, we would not be here to discuss the issue. So maybe life has evolved many times in the universe, but has generally become extinct. Only by a bizarre and fortuitous set of happy circumstances does the occasional planet remain habitable for long enough to evolve creatures who can look back and marvel at their long and apparently stable history, and forward with false optimism to a long and stable future.

*(N.B. this sort of argument is based on the so-called Anthropic Principle, which is defined as: "our location in the universe is necessarily privileged to the extent of being compatible with our existence as observers" (see, for example, J.D. Barrow and F.J. Tipler, *The Anthropic Cosmological Principle*, OUP). I think the reasoning is sound, and does present some problems in interpreting the past – in this case making us weigh the odds of life surviving for billions of years against our estimate of the number of times life may have originated in the universe, which is something we can hardly guess at. Another example where the principle comes in to play is the recent unexpected discovery from ice core climate records that there is a very marked contrast between the relative stability of global climate in the past 10,000 years compared to any similar interval previously, at least for a hundred thousand years. This leads researchers to ask: why is postglacial climate so stable? But maybe the apparent stability is just a chance aberration, because if it had not occurred, civilisation would not have emerged, and we would not be asking the question at this time.)*

Dr Paul Pearson

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Correspondence

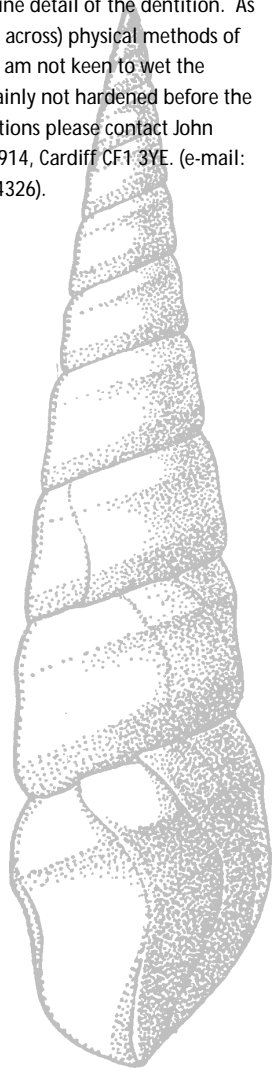
Removal of latex

I would appreciate hearing from anyone who can offer advice on how it might be possible to remove latex from the delicate dentition of fossil bivalve internal moulds. I hope to re-describe some important type material, but unfortunately a previous worker had applied latex to make casts and pulled it off leaving latex largely masking the fine detail of the dentition. As the material is very small (individual sockets being about 0.3 mm across) physical methods of removal do not seem possible. The matrix is a soft silty shale so I am not keen to wet the specimens with anything aqueous. The material was almost certainly not hardened before the latex was applied some years ago. If you have any helpful suggestions please contact John Cope at Department of Earth Sciences, Cardiff University, PO Box 914, Cardiff CF1 3YE. (e-mail: copejcw@cardiff.ac.uk, tel: 44 [0]1222 874327 fax: 44 [0]1222 874326).

John C.W. Cope

Department of Earth Sciences

Cardiff University





>> *Future Meetings of Other Bodies*



Major Events in Early Vertebrate Evolution – Phylogeny, Palaeontology and Development

Natural History Museum, London, England 8 – 9 April 1999

Our understanding of the origin and early evolution of vertebrates is advancing rapidly, not only due to new fossil discoveries and phylogenetic analyses, but also to discoveries in developmental genetics. This conference, sponsored by the Systematics Association and the Natural History Museum, will bring together leading workers from palaeontology, developmental biology and comparative anatomy to address the major questions in this field.

The story of vertebrate origins is the story of how the various vertebrate body plans, and the developmental cascades which generate them, were assembled by evolution. General problems include recognising homologous structures and gene expression patterns between groups, and understanding the steps by which major morphological transformations were accomplished.

Specific topics to be addressed by the meeting include the origin, patterning and early evolution of jaws, appendages and mineralised tissues, as well as the early diversification of vertebrates.

The meeting will be held at London's Natural History Museum, one of the foremost centres in the world for systematic and evolutionary research. All speakers are invited, but there will be an Open Poster Session allowing non-speaking delegates to present their work.

Provisional Speaker List

P.E. Ahlberg (Convenor), W.E. Bemis, J.A. Clack, M.I. Coates, P. Donoghue, P.L. Forey, H.E. Gee, J. Hanken, J.R. Hinchliffe, R. Hitchin, N. Holder, L.Z. Holland, P.W.H. Holland, P. Janvier, R.P.S. Jefferies, J. Joss, J. Mallatt, J.G. Maisey, B.D. Metscher, R.G. Northcutt, M.A. Purnell, I.J. Sansom, H.-P. Schultze, M.M. Smith, M.P. Smith.

If you are interested in the meeting and would like the second circular, please contact Dr Per Ahlberg, Department of Palaeontology, The Natural History Museum, Cromwell Road London SW7 5BD, UK (e-mail: p.ahlberg@nhm.ac.uk, fax: +44 (0)171 938 9277).

If you would like to present a poster, please mention this, with a note of its provisional title.



Geological-Mineralogical Associations of Canada Annual Meeting Sudbury, Ontario, Canada, 26 – 28 May 1999

Sessions, workshops and field trips of interest to palaeontologists-stratigraphers. Regular sessions/posters on palaeontology, sedimentology, stratigraphy.

SY5 Impact events and extinctions: [a special Session] in honour of Glen Caldwell, P. Copper



(Laurentian U.) , O.A. Dixon (U. of Ottawa), Jin Jisuo (U. Western Ontario).

Sponsors: GAC Paleontology Division

Sudbury, the site of a double extra-terrestrial impact, the 1.8 billion-year-old Sudbury Basin, and the 37 million-year-old Wanapitei crater, indenting the northeast margins of the older structure, is an appropriate host to a special symposium on the controversial relationship between meteorite impacts, mass extinctions, and the evolution of life. Did impacts alter the course of the history of life on Planet Earth? Are impacts a regular and periodic feature and component of planetary surface processes, like others? Or, are impacts extra-ordinary processes which dramatically change the global biota, and re-set the evolutionary clock? Contributors to this symposium, whether they be for or against impact origins of some or all mass extinctions, should reflect not only on the timing and chemical-stratigraphic signature of impacts, but also on any atmospheric and oceanic events which may, or may not, have changed life, particularly as recorded in the five best known mass extinctions, the Late Ordovician, Late Devonian, end-Permian, end-Triassic and end-Cretaceous. Those wishing to contribute a paper to a special Festschrift commemorating this symposium must submit their papers by 28th May 1999 for publication (contributors need not present an oral paper or poster at the sessions).

Workshop 1: Blackriverian-Trentonian (Upper Ordovician) strata of the St. Lawrence Platform: potential baseline correlations; [role of] tectonics; and palaeoenvironmental reconstruction, especially [concerning] warm and cooler water criteria.

M. Coniglio (U. Waterloo), G. Dix (Carleton U.) and D. Armstrong (Ontario Geological Survey).

Sponsors: Canadian Sedimentology Research Group; GAC Paleontology Division

Blackriverian and Trentonian (Caradoc: Upper Ordovician) strata outcrop widely in Ontario and Quebec. Equivalent strata in the subsurface of southwestern Ontario are reservoirs for oil and gas, and, regionally, these rocks are important sources for industrial mineral products. Despite over a century of study, their stratigraphy remains in a state of flux, due in part to varied interpretation of facies changes, effects of local tectonics, changing strata nomenclature, and overall lack of distinctive markers. These strata are suggested to offer a testing ground for the recognition of possible temperate water carbonates in ancient successions, where the most heated controversy dwells. The changing biotic landscape through geological time, and diagenesis, makes comparison of ancient carbonate successions with modern temperate carbonate shelves a challenging task, one in which palaeontologists and sedimentologists are forced to weigh the evidence for uniformitarianism.

Field excursion B2: Ordovician and Silurian fossils and strata of the Lake Timiskaming Outlier

P. Copper (Laurentian U.), Derek Armstrong (Ontario Geological Survey) 29-30 May 1999.

Sponsor: GAC Paleontology Division

Silurian and Ordovician strata and fossils, found in the Lake Timiskaming Outlier, are located 150 km northeast of Sudbury. The outlier, approximately 500 km² in area, is preserved in a graben structure which was probably already active during the mid-Palaeozoic and which continues to be the focus of earthquake activity. The succession preserved in the outlier features a locally condensed sequence of nearshore, tropical, shallow water carbonates and



minor siliciclastics, with regional disconformities and hiatuses, including a major one at the Ordovician/Silurian boundary. The setting is mid-continent, intracratonic, periodically flooded extensively during the Ordovician-Silurian, with partial faunal affinities to both the Michigan Basin and arctic Canada. New outcrops include a rich suite of fossils (corals, stromatoporoid sponges, calcimicrobes), and still undescribed small patch reefs. Excursion covers a range of roadcut outcrops and newly opened quarries exposing strata of Late Ordovician (Caradoc), to Early and Middle Silurian (Llandovery-Wenlock) age. Cost: \$130, includes taxes, transportation, one night (Saturday 29 May) accommodation, and dinner. Capacity: 15 participants.

Interested parties should contact Paul Copper (pcopper@nickel.laurentian.ca, or <http://www.laurentian.ca/www/geology/gacmac99.htm>).



Mary Anning and her Times: The Discovery of British Palaeontology

Lyme Regis Museum, UK 2 – 4 June 1999

Palaeontologists, historians of science, geologists, and social historians will number among the contributors to this symposium, which is intended to recognise the achievements of Mary Anning and the scientific importance and cultural context of her discoveries. The meeting will be held over three days in Lyme, which has many rich scientific, historical, and literary associations. Activities will include evening lectures by Hugh Torrens and Stephen Jay Gould; keynote addresses by noted author John Fowles and Sir Crispin Tickell, a descendant of Mary Anning; and a geological excursion in the environs of Lyme Regis.

There are a few open spots on the programme for contributors interested in exploring aspects of Mary Anning's life, times, and contributions.

For information on contributing to the programme please contact Kevin Padian, Museum of Paleontology, University of California, Berkeley CA 94720-4780, USA (e-mail kpadian@socrates.berkeley.edu). For all other inquiries about the meeting, including registration and housing, write to the Lyme Regis Museum, Lyme Regis, Dorset DT7 3QA, UK (fax +44 (0)1297 443370). The size of the meeting will be limited by the capacity of local facilities, so it is advisable to inquire early.



European Palaeontological Association Workshop

Lisboa, Portugal 15 – 18 July 1999

The links between fossil assemblages and sedimentary cycles and sequences.

To receive first circular contact CEPUNL - Rogerio Bordalo da Rocha, Quinta da Torre, P-2825 Monte de Caparica, Portugal (tel 351.1.2948573, e-mail cepunl@mail.fct.unl.pt). Online information is at <http://www.si.fct.unl.pt/~w3cepunl>



5th International Ichnofabric Workshop (IIW-5)

Scarborough and Manchester, UK 15 – 20 July 1999

As with the four previous, highly successful workshops, the purpose of this meeting is to bring together trace fossil workers to consider the applications of ichnofabric (trace fossil-sediment) analysis in facies recognition, event correlation, palaeoenvironmental and palaeoecological reconstruction. The workshop will be field-based on the rocks of the Yorkshire coast, and linked to a preceding conference "Ichnofabrics in Petroleum Geology 1999" at Aberdeen, 12 - 14 July 1999. This provides a unique opportunity to exchange and develop understanding and applications of ichnofabric analysis between academia and industry. The meeting terminates in Manchester, considering the educational and museum aspects of trace fossil studies.

To request further details please contact: J.E. Pollard, Dept. of Earth Sciences, University, Manchester, M13 9PL, UK (tel +44 (0)161 275 3817, fax +44 (0)161 275 3947, e-mail john.pollard@man.ac.uk) (IIW-5) or M.J.F. Lawrence, Z & S Geoscience, Campus 2, Balgownie Drive, Bridge of Don, Aberdeen, AB22 8GU, UK (tel +44 (0)1224 8222555, fax +44 (0)1224 823777, e-mail mark.lawrence@zands.com) (Ichnofabrics in Petroleum Geology).



Cephalopods – Present and Past

Vienna 6 – 9 September, 1999

To register or for information contact: Herbert Summesberger, Museum of Natural History, Vienna. Tel (0043) 1 52177/251, fax (0043) 1/52 177/459, e-mail herbert.summesberger@nhm-wien.ac.at.



47th Symposium of Vertebrate Palaeontology and Comparative Anatomy

Edinburgh, Scotland 8 – 11 September 1999

The Symposium will be preceded by the 8th Symposium of Palaeontological Preparators and Conservators, on 7th September 1999.

Both meetings will be hosted by the National Museums of Scotland in central Edinburgh, and organised by the staff of the Department of Geology and Zoology. There will be a reception in the new Museum of Scotland. The independent Dynamic Earth interpretive centre will be open by then; it is the provisional venue for the Conference Dinner. There will be the usual day field trip on the 11th.

These dates have been arranged to allow delegates to go on to the 'Secondary Adaptation to Life in Water II' meeting in Copenhagen the following week. Daily direct flights are available from Edinburgh to Copenhagen so that both meetings can be attended in entirety.

Enquiries to Mike Taylor, Department of Geology and Zoology, National Museums of Scotland, Chambers Street, Edinburgh EH1 1JF (fax 0131 220 4819, e-mail mat@nms.ac.uk).



The biology and evolution of bivalves

University of Cambridge, UK 14 – 17 September 1999

Organised on behalf of The Malacological Society of London by E.M. Harper, J.D. Taylor and J.A. Crame.

An international meeting to focus solely on the Bivalvia. The organisers welcome papers and posters on all aspects of the biology and palaeontology of bivalves, in particular studies of the ecology, phylogeny and palaeobiology of the class. The Society hopes that the proceedings of the meeting will be published as series of refereed papers.

The meeting is to be held over three days in the historic and picturesque city of Cambridge (UK) within the ancient university. This is a call for offers of papers and posters, for which the deadline is 31st May 1999. It will be possible to organise workshops and themed sessions to accommodate those with similar interests.

Registration Fee: £100 (sterling), £90 for members of The Malacological Society, £50 for students.

For offers of contributions and to request further details please contact: E.M. Harper, Dept. of Earth Sciences, Downing St, Cambridge, CB2 3EQ, UK (tel +44 (0)1223 332846, fax +44 (0)1223 333450, e-mail emh21@cus.cam.ac.uk), or J.D. Taylor, Dept. of Zoology, The Natural History Museum, Cromwell Rd, London, UK (e-mail J.Taylor@nhm.ac.uk), or J.A. Crame, The British Antarctic Survey, High Cross, Madingley Rd, Cambridge, UK (e-mail JACR@pcmail.nerc-bas.ac.uk).

The first circular is online at <http://www.sunderland.ac.uk/~es0mda/msl1.shtml>



VII International Symposium on Mesozoic Terrestrial Ecosystems

Buenos Aires, Argentina 26 September – 2 October 1999

A wide-ranging scientific programme and several field trips are planned; further information from the Secretary to the Symposium at Museo Argentino de Ciencias Naturales "B. Rivadavia", Avda. Angle Gallardo 470, 1405 Buenos Aires, Argentina (tel/fax 54-1 983 4151).



7th International Symposium on Fossil Algae

Nanjing, China 13 – 17 October 1999 + excursions

Themes cover a wide range of studies on benthic algae, cyanobacteria and stromatolites through time, including taxonomy, biostratigraphy, evolution, palaeoecology, sedimentology, ultrastructure, and biomineralization.

Pre- and post-symposium excursions will visit Jixian (Proterozoic), Jinan (Cambrian), and Guilin (Devonian).



For details contact: Xi-nan Mu, Nanjing Institute of Geology and Palaeontology, Academia Sinica, 39 East Beijing Road, Nanjing 210008, China (fax +86 25 335 7026, e-mail algae@pub.nj.jsinfo.net).



International Conference: Where Worlds Collide

UNE Asia Centre, 29 November – 1 December 1999

Where Worlds Collide: Faunal and floral migrations and evolution in SE Asia-Australasia to be held at The University of New England, Armidale, Australia.

The conference will be structured into themes. Some preliminary suggested themes are: Palaeozoic/Mesozoic geology and biogeography; Cenozoic geology and biogeography; Primate evolution and biogeography; Hominoid migration and dispersal; Plant evolution and dispersal in the region; Wallace's Line; and Human dispersals, cultural contacts and change.

Further details from A/Prof Ian Metcalfe, Convenor, Where Worlds Collide Conference Asia Centre, University of New England, Armidale NSW 2351, Australia.



5th International Meeting of the Society of Avian Palaeontology and Evolution

Beijing June 2000

For information contact: Huiling Wu or Yonghong Zhang, 2000 SAPE meeting, P.O. Box 643, Beijing 100044, China, fax 86-10-68337001.



Precambrian-Cambrian International Seminar – Field Meeting

NW Himalayas, 30 September – 9th October 2000

This meeting is being arranged under the co-convenorship of Dr O.N. Bhargava and Prof S.B. Bhatia, by Dr Arun D. Ahluwalia, Principal Investigator, DST Project Terminal Proterozoic-Early Cambrian (Krol Belt-Spiti Himalaya), Geology Department, Panjab University, # 2114, Sector 15-C, Chandigarh 160014, India (tel 541740, fax 541409, e-mail ada%phys@puniv.chd.nic.in).

Funding is expected from a number of sources once response is known. Your suggestions and good wishes are solicited. If you are interested please indicate by e-mail and in writing, as a document signed by you would be most helpful for obtaining support. Your passport details etc. will be required to get clearance.

An earlier National Meeting on Mega Events from Blaini to Tal was held from 7th to 10th August, 1998. A brief review of this meeting is published in *Journal of Geological Society of India*, January 1999 (author Vibhuti Rai). Dr O.N. Bhargava gave a keynote address. Other participants were S.V. Sriantia (Secretary, Geological Society of India); B.S. Tewari (President



of the Pal. Soc. India); S.S. Kanwar (Deputy Director General, Geological Survey of India); D.K. Bhatt (Director, Pal. Div, Geological Survey of India, Jaipur (India)); Arun Sharma and Jaitinder Sud Simla; Ravindra Kumar (GSI, Jaipur); Nawal Kishore Sharma; D. Ahluwalia (Convenor, RituRaj); Anjali Mehra (Chandigarh); K. Bassi, K.C. Prashra; InderSingh (GSI, Chandigarh).

Abundant help came from the Mine Owners' Association, Sirmaur (H.P.) to all participants and is also expected for this meeting.



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).



Book Reviews

The Origin of Animal Body Plans: A Study in Evolutionary Developmental Biology

Wallace Arthur, 1997, Cambridge University Press. 338 pp. ISBN 0-521-55014-9.

The Emperor in his new clothes casts a worrying shadow across the word processor of any reviewer attempting to weigh up and assess arguments that call into question much of conventional thought about the pattern and process of evolution. At the heart of this volume by Wallace Arthur lies what some biologists might consider the mother of all emperors, in the form of an argument that the neo-Darwinian view of the processes that led to the origins of the 35 or so living animal phyla and their body plans is incomplete and therefore wrong and lop-sided.

Why are things so awry? Because, he suggests, the emphasis throughout the development of the synthesis has been on understanding external selection without any real effort to understand the mutational and ontogenetic basis of the production of the variation on which selection operates. Such external selection, as a destructive force, cannot in the author's view have produced the basic body plans upon which subsequent selection has undoubtedly operated, and yet we rely on it in our models and scenarios to have done just that. We can only overcome this problem, Arthur argues, by taking account of the developmental biology of the phyla, and thereby understanding the processes of internal selection and co-evolution that have operated through mechanisms such as gene duplication and interaction to produce those basic body plans.

Arthur constructs his argument carefully over twelve chapters, taking us through discussions of the meaning of body plans, the Cambrian explosion, developmental mechanisms in cells and their genetics, the insights that follow the discovery of Hox genes, and so on to a prospectus for expanding the synthesis to include his own subject of Evolutionary Developmental Biology. Along the way he usefully deals with the problems of separating micro- from macro-mutations, and clearly highlights the way in which mutation has been somewhat edged to one side by what he terms selectionists' always to point to Goldschmidt's "hopeful monsters", as the absurd consequences of venturing too far down any alternative avenue of thought. He is perhaps a little too ready to accept ideas about "empty niches", and niche space in general, as one of the cues for adaptive radiation for my own taste, although he rightly cautions us that acceptance of any such environmental cue tends to overlook the morphogenic aspect of radiations and thus the internal selection processes in operation.

I have no problem in accepting that the neo-Darwinian synthesis as usually promulgated has deficiencies. It deals very badly with the genetic basis of species and the mechanism of speciation, unless one is prepared to ditch things such as isolation mechanisms and multiple speciation processes and go for a recognition concept-based approach that sees species as



merely effects of selection operating on components of the fertilisation system in allopatry. There has been enough difficulty getting that past the strict synthesists, who tend to reject out of hand arguments for a new, all-embracing recognition concept definition of biparental species and a single speciation process based, so far as one can make out, on the view that a simple scaling up of microevolutionary processes already offers a sufficiently clear model of speciation. I therefore have no problem in accepting that we might need to rethink our ideas about the origins of body plans from the perspective of a re-evaluation of the importance of selection.

The argument presented in this volume, based as it is on some of the more recent insights that we now have about the genetics of body structure, makes sense and points clearly to the need for a restructuring of our ideas. The Emperor is clearly clad in more than just his birthday suit.

Dr Alan Turner

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Correlation Chart and Biostratigraphy of the Silurian Rocks of Canada

International Union of Geological Sciences Publication No. 35, by B.S. Norford, 77 pp. ISBN 0-930423-18-6, U.S. \$14.00 (incl. postage) Available from the IUGS Secretariat, c/o Geological Survey of Norway, P.O. Box 3006, Lade, N-7002, Trondheim, Norway (Telefax: +47 3921620)

This publication represents exceedingly good value, comparing very favourably with the Geological Society's outrageously overpriced *A revised correlation of Silurian rocks in the British Isles*. It is undoubtedly a must for all working on the Silurian.

After brief introductory sections on palaeomagnetic data, sea-level changes, radiometric ages and the boundaries to the system, the main body of this work is a series of chapters discussing the faunas and biostratigraphy of the main invertebrate groups, chitinozoans (but not acritarchs) and conodonts. There are 609 references, up to and including 1996. Finally comes the correlation chart, more than 5 m long (but split into several sections) with 123 columns, summarizing sections from the Alaskan border to the far northern Arctic islands, to offshore eastern Canada. If you want to know the age of the Peasley Pond Conglomerate at Lake Memphremagog or of the Steel Argillite of Niddery Lake, or of any other lithostratigraphical division in the Silurian of Canada, this chart will tell you.

Typographical errors appear to be few and far between, although there has been an Ellis Island-style abandonment of accents for the names of authors and stratigraphical divisions of mid-European origin, and I was delighted to read (p. 22) of the high value placed on graptolites in China and Siberia. The quality of illustration and of the correlation chart is



generally excellent, although the replacement for Figure 7 (the published version has some errors) sent out with the publication is of a very poor standard. On a more positive note, I'm sure that the very useful coloured palaeogeographical reconstruction of Silurian Canada will feature in many future conference presentations.

Now on to two quibbles, the first on the description of the graptolite and conodont zones in Figure 3 as the 'Standard Zones'. This they are not – they are simply the biozones recommended for usage by authors who were to present at the James Hall Symposium in 1996. The second is that in the brachiopod section several taxa are included which one finds from the Appendix (p. 65) to be either erected in unpublished theses or to be 'in prep.' Surely, taxonomy, especially of brachiopods, is a difficult enough business without the further complication of erecting 20 *nomina nuda* in this manner.

Overall, however, this work will prove extremely valuable to all planning any research on the Silurian of Canada and at this asking price will be making its way on to many bookshelves the world over.

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TAXONOMIC/NOMENCLATORIAL DISCLAIMER

This publication is not deemed valid for taxonomic/nomenclatorial purposes [see article 8b in the International Code of Zoological Nomenclature 3rd Edition (1985) edited by W.D. Ride et al.]