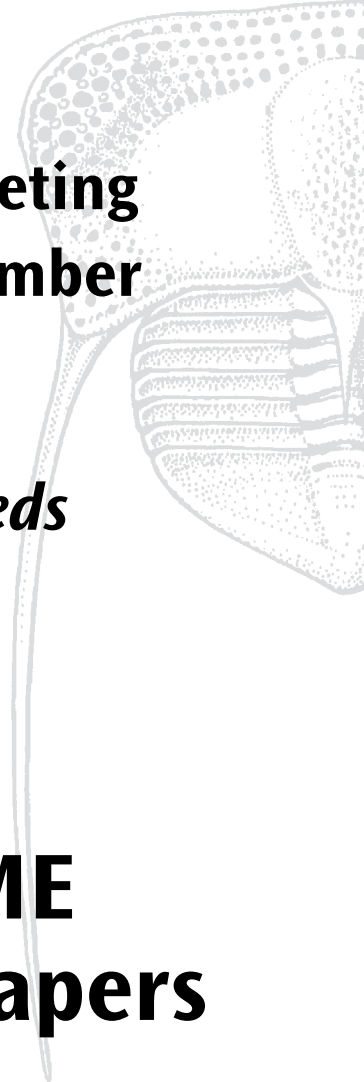


**The
Palaeontological
Association**

**58th Annual Meeting
16th–19th December
2014**

University of Leeds

**PROGRAMME
and AGM papers**





Public transport to the University of Leeds



UNIVERSITY OF LEEDS

BY TRAIN:

Leeds Train Station links regularly to all major UK cities. You can get from the station to the campus on foot, by taxi or by bus. A taxi ride will take about 10 minutes and it will cost approximately £5.

FROM TRAIN STATION BY BUS:

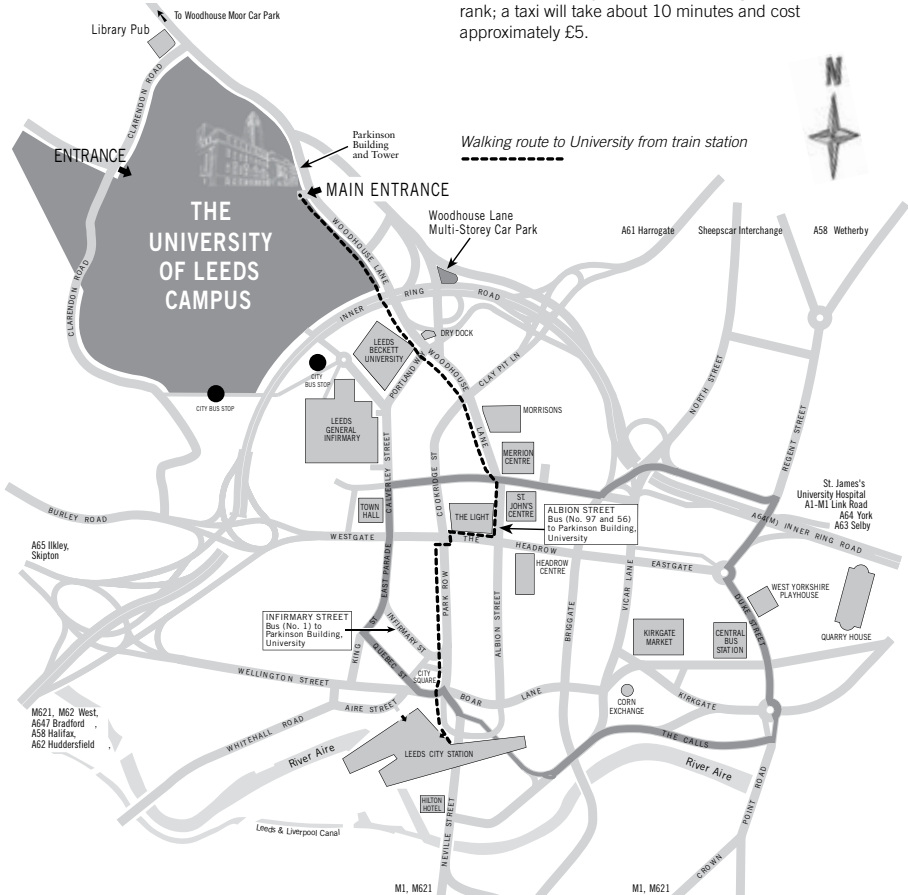
We advise you to take bus number 1 which departs from Infirmary Street. The bus runs approximately every 10 minutes and the journey takes 10 minutes. You should get off the bus just outside the Parkinson Building. (There is also the £1 Leeds City Bus which takes you from the train station to the lower end of campus but the journey time is much longer).

FROM TRAIN STATION ON FOOT:

The University campus is a 20 minute walk from the train station. The map below will help you find your way. Leave the station through the exit facing the main concourse. Turn left past the bus stops and walk down towards City Square. Keeping City Square on your left, walk straight up Park Row. At the top of the road turn right onto The Headrow, passing The Light shopping centre on your left. After The Light turn left onto Woodhouse Lane to continue uphill. Keep going, passing Morrisons, Leeds Metropolitan and the Dry Dock boat pub heading for the large white clock tower. This is the Parkinson building.

BY COACH:

If you arrive by coach you can catch bus numbers 6,28 or 97 to the University (Parkinson Building). There is also a taxi rank; a taxi will take about 10 minutes and cost approximately £5.





Leeds City Centre Map

Information

- S1 Leeds Festival Centre
- A3 Carragowlands
- C2 City Varieties
- C2 Grand Theatre & Opera House
- A3 Leeds Arts Centre
- A3 Leeds Arts Gallery
- A3 Leeds Central Library
- A3 Leeds City Museum
- A3 Leeds Town Hall
- Overleaf A3 M&S Company Archive
- A3 Millennium Square
- Overleaf C1 Victoria Gardens
- A2 Victoria Gardens
- A1 White Cloth Hall
- D2 Yorkshire Dance

Shopping

- C1 The Core
- C1 The Light
- B3 Merrion Centre
- A2 Peterston Unisex Shopping Area
- B3 St James Centre
- B3 Thorntons Arcade
- C2 Victoria Quarter
- C1 Victoria Quarter

Eating and Drinking

- C1 Brewery Wharf
- C1 The Cella area
- A2 City Exchange
- A2 Greek Street
- A3 The Light Street
- A3 Millennium Square

Public Transport

- D2 Bus Interchange
- A2, B1, C1 Bus and Coach Station
- D2 Overleaf B1 Leeds Station



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 12pm Monday
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Find us on the map
 overlaid at grid C1



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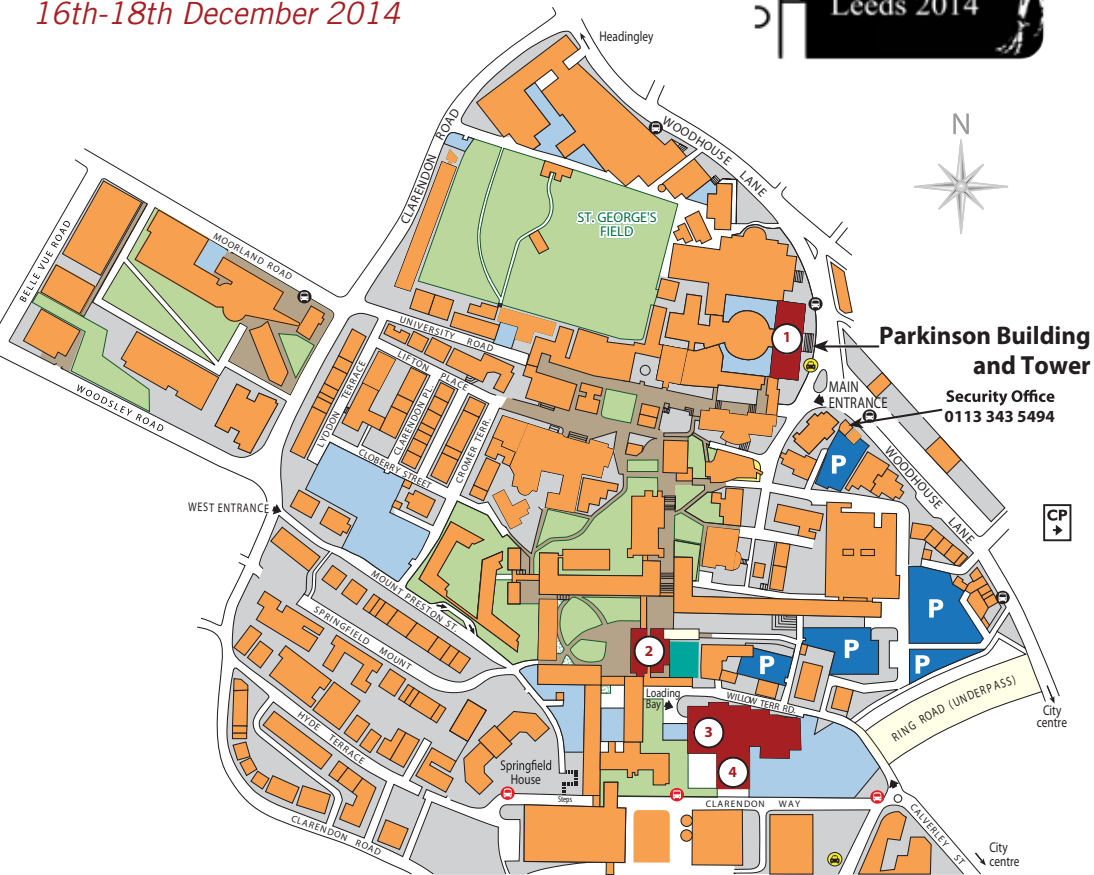
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PalAss Conference

16th-18th December 2014



Parkinson Building and Tower

Security Office
0113 343 5494

Key

Venue

- Parkinson Court 1
- Roger Stevens Building 2
- Sports Hall 2 3
- Conference Auditorium 2 4

Car parks

- University visitors' car parks (limited access) P
- Other university car parks P
- Public multi-storey car park CP

Other useful information

- CityBus Stop Bus Stop
- Taxi Rank
- Pedestrian Only Area
- Lawns



The Palaeontological Association

58th Annual Meeting

16th–19th December 2014

University of Leeds

The programme for the 58th Annual Meeting of the Palaeontological Association is provided after the following summary of the meeting.

Registration and booking

Registration, abstract submission and booking (including payment by credit card) commences on **Monday 14th July 2014**. Abstract submission closes at midnight on **Friday 19th September 2014**; abstracts submitted after this date will not be considered. Registration after **Friday 3rd October 2014** will incur an additional administration charge of £25.00. The final deadline for registration is **Friday 14th November 2014**. Registrations and bookings will be taken on a strictly first-come-first-served basis. No refunds will be available after the final deadline.

Registration, abstract submission, booking and payment (by credit card) will be through online forms available on the Palaeontological Association website (<<http://www.palass.org>>). Please note that all these transactions will be in sterling (£:GBP). Accommodation must be booked separately (see below). The cost of registration is the same as last year. Early registration is **£90.00** for ordinary and retired members; **£60.00** for students; and **£120.00** for non-members. Registration costs include sandwich lunches on Wednesday and Thursday, the icebreaker reception on Wednesday evening, full registration package and tea/coffee from Tuesday through to Thursday.

The Annual Dinner event costs **£45.00**. It will be held at the **Leeds City Museum**, which is five minutes' walk downtown from the University. The evening's festivities will include a drinks reception followed by a three-course meal including carvery and vegetarian option. Due to the size of the venue numbers are limited to 250.

Oral presentations

All speakers (apart from the symposium speakers) will be allocated 15 minutes. You should therefore prepare a 12 minute talk to allow time for questions and switching between presenters. On the second day of the meeting we are using a number of parallel sessions in adjacent theatres so timing will be especially important. All the lecture theatres will have a single A/V projector linked to a large screen (e.g. <http://www.teachingspace.leeds.ac.uk/room_details.asp?ID=1-01-086-2486-GM-GM01>, and <http://www.teachingspace.leeds.ac.uk/room_details.asp?ID=1-01-086-2810-10M-22>). All presentations should be submitted and checked the day before they are scheduled. The University of Leeds is PC-based, so Mac-based presentations may cause problems, particularly if animations are included. If you are using a Mac please make sure your presentation is PC compatible before you leave your institution.

Poster presentations

Poster boards will accommodate an A0-sized poster presented in **portrait** format. The boards will not be suitable for posters of this size in landscape format. Materials to fix the poster to the boards will be available at the meeting.



Venue and travel

The conference will take place in the campus of the University of Leeds, which is located just to the North of Leeds city centre. The venues for talks, posters, icebreaker reception, and Annual Dinner are all very close together. Campus maps are available online at <www.leeds.ac.uk/info/20014/about/157/how_to_find_us>; hard copies will also be included in the welcome pack.

Getting to Leeds

Car

There is limited parking around the University, and almost none on campus, so driving is not the best option. The closest large car park (which is expensive) is Woodhouse Lane Car Park (LS2 3AX).

Bus

Intercity buses arrive at the main bus station at the South side of Leeds city centre, about 30 minutes' walk from the University. Buses are usually cheaper than trains. See National Express Coaches (<www.nationalexpress.com>) and Megabus (<www.uk.megabus.com>). There are a number of buses that go from the bus station past the University (see <www.wymetro.com>).

Train

Leeds is on the main inter-city train network, so is easily accessible from anywhere in the UK and this is probably the best travel option. Booking early will get the best ticket prices, particularly if travelling from London on East Coast Trains (<www.eastcoast.co.uk>). From Leeds train station the University is 20 minute walk uphill to the North (see link above).

Plane

Leeds is served by Leeds-Bradford Airport (LBA), which has connections to many other European cities (<www.leedsbradfordairport.co.uk>). The airport is about 30 minutes' drive to the North of the city, depending on traffic. There are buses into Leeds bus station, or a taxi booking service. Alternatively, the much bigger Manchester Airport (MAN – <www.manchesterairport.co.uk>) is 1.5 hours away by train (<www.tpexpress.co.uk>) from Leeds. Another option is to fly into London airports and get the intercity trains to Leeds from London Kings Cross station (<www.eastcoast.co.uk>). These run every 30 minutes or so, and the journey takes about 2.5 hours.

Taxis

Leeds city taxis are black and white, and there a good number of designated stops around the city, including outside the train station and at the Parkinson Building of the University. There also lots of local hire taxis that have to be booked. One is Amber Cabs (0113 231 1366).

Accommodation

This needs to be booked separately. Leeds has a wide variety of hotels, hostels and guest-houses at a range of prices that can be booked through the usual online resources. The following list of hotels (that is by no means exhaustive) are all within 20 minutes' walking distance of the University. Booking in plenty of time will ensure the best prices.

Budget (around £50/night): Ibis.

Mid range (£50–£100/night): Radison Blu, Park Plaza, The Met, Premier Inn Leeds City Centre (Leeds Arena).

Expensive (£100 plus): Leeds Marriott, Hilton Leeds City, Queens Hotel.

Travel grants to student members

The Palaeontological Association runs a programme of travel grants to assist student members (doctoral and earlier) to attend the Annual Meeting in order to present a talk or poster. For the Leeds 2014 meeting, grants of less than £100 (or the € equivalent) will be available to student presenters who are travelling from outside the British Isles (UK and Ireland). The actual amount available will depend on the number of applicants and the distance travelled. Payment of these



awards is given as a disbursement at the Meeting, not as an advance payment. Students interested in applying for a PalAss travel grant should contact the Executive Officer, Dr Tim Palmer (e-mail <palass@palass.org>) once the organisers have confirmed that their presentation is accepted, and before 1st December 2014. Entitle the e-mail "Travel Grant Request". No awards can be made to those who have not followed this procedure.

Leeds and Yorkshire

Leeds and the famous Yorkshire Dales to the North featured internationally in July when the Tour de France started off in the city (<letour.yorkshire.com>). Why not visit some of the areas the tour visited? The Dales in particular are fantastic for walking, and have many picturesque towns and villages, many of them accessible from Leeds by train and bus (<www.yorkshire.com>). Alternatively, spend time exploring the Victorian industrial heritage of Leeds (<www.leeds.gov.uk/museumsandgalleries/Pages/Visit.aspx>), or go by train to nearby York, to see its medieval architecture (<www.visitork.org>).

Schedule

Tuesday 16th: Symposium and icebreaker reception

The meeting will begin on Tuesday at noon with the Symposium in **Conference Auditorium 2**, followed by the icebreaker reception in the **Parkinson Building**. Registration and tea/coffee will be available in **Sports Hall 2**.

The Symposium title is 'The photosynthesis revolution: how plants and photosynthetic micro-organisms have bioengineered the planet'.

Wednesday 17th to Thursday 18th: Conference and Association AGM

The conference will commence on Wednesday 17th December with a full day of talks in **Conference Auditorium 2**. The Association AGM will take place in the afternoon. In the evening there will be the Annual Dinner at the **Leeds City Museum**. Thursday 18th December will be a full day of posters and talks in parallel sessions in **Roger Stevens Lecture Theatres 22 and 25**. Posters will be displayed throughout the meeting in **Sports Hall 2**, the same place as registration, refreshments, buffet lunch and advertisers' stands.

Friday 19th: Tropical Yorkshire: field-trip to the Wolds

Price: **£30**, including transport and barbeque lunch. Starts at 08:00 from the **Parkinson Building** steps; returns 18:00 to Leeds Train Station and then *ca.* 18:20 at the Parkinson Building. The number of participants is limited to 45.

The field-trip will visit three inactive quarries in the Yorkshire Wolds, to the East of Leeds, to look at various facies of the Oxfordian (Upper Jurassic) Corallian sediments in the area. We will start at Betton Farm Quarry, a Site of Special Scientific Interest that has recently been cleared. Here there are metre-scale reef structures formed by the corals *Isastraea* and *Thamnasteria*, together with very fossiliferous inter-reef facies containing molluscs, echinoids and other fauna. Also in the quarry are examples of the surrounding oolitic facies of the Malton Oolite Member (Coralline Oolite Formation). After a BBQ lunch at the quarry we will move to Ravenswyke Quarry to look at tall quarry faces displaying weathered surfaces of the Malton Oolite, some beds of which are packed by gastropods, and the overlying Coral Rag Member, which contains in-situ *Rhabdophyllia phillipsi* corals and the characteristic echinoid spines of *Paracidaris florigemma*. We will then walk and/or drive a short way to Spaunton Quarry to look again at the Coral Rag, which here contains patch reefs and various inter-reef facies, and is overlain by the sandy sediments of the Newbridge and Spaunton Sandstone Members of the Upper Calcareous Grit Formation, from which ammonites can sometimes be collected. We will then return to Leeds. Please dress warmly as we will be exposed to the elements during the day. Stout footwear will be useful, although there will not be a lot of walking on the day. Hard hats will be provided.



Schedule of events and timetable of presentations

Tuesday 16th December

Thematic Symposium

“The photosynthesis revolution: how plants and photosynthetic micro-organisms have bioengineered the planet”

Conference Auditorium 2 (tea/coffee break in Sports Hall 2).

- 12:00–12:15 **Welcome and introductory remarks**
- 12:15–12:45 **Environmental instability following the rise of oxygenic photosynthesis**
Professor Simon Poulton
- 12:45–13:15 **Cyanobacteria and the Great Oxidation Event: Evidence from genes and fossils**
Dr Bettina E. Schirrmeister
- 13:15–13:45 **Evidence for terrestrial photosynthetic organisms in the Proterozoic: the land becomes vegetated**
Professor Charles H. Wellman
- 13:45–14:15 **Photosynthesis in Proterozoic oceans: evolutionary and ecological innovations**
Dr Nick J. Butterfield
- 14:15–14:45 **Cryptogamic covers and Lilliputian plants in the mid-Palaeozoic: aspects of early photosynthesising ecosystems on land**
Professor Dianne Edwards and Professor John A. Raven
- 14:45–15:15 **Tea/coffee break** – Sports Hall 2
- 15:15–15:45 **Trees and forests as geo-engineers of past and future global climates**
Professor David Beerling
- 15:45–16:15 **Distinctive characteristics of flowering plants and their importance**
Professor Margaret Collinson
- 16:15–16:45 **The evolutionary history of marine phytoplankton**
Dr James B. Riding

Annual Address

Conference Auditorium 2.

- 16:45–17:45 **Annual Address: Understanding ancient Earth climates and environments using models and data**
Alan M. Haywood

Reception

Parkinson Building, University of Leeds.

- 18:00–20:00 **Icebreaker reception, with drinks and regional food buffet.**
This event is kindly sponsored by Wiley.



Wednesday 17th December

* Candidates for the President's Prize are marked with an asterisk.

Underlined author denotes designated speaker.

Conference, Association AGM, and Annual Dinner

Conference Auditorium 2

- 08:45–09:00 **Opening of the Annual Meeting by the Vice-Chancellor of the University of Leeds, Sir Alan Langlands; followed by logistical information.**
- 09:00–09:15 **Life and death at high latitudes: a reassessment of the Cretaceous–Paleogene (K–Pg) mass extinction event in Antarctica**
*James D. Witts, Paul B. Wignall, Jane E. Francis, Robert J. Newton, J. Alistair Crame, Vanessa C. Bowman and Rowan J. Whittle
- 09:15–09:30 **Implications for the foraminifera over the Toarcian (Early Jurassic) Oceanic Anoxic Event (TOAE), following development of the freeze-thaw extraction technique**
*Alice E. Kennedy and Angela L. Coe
- 09:30–09:45 **Decoupling of the terrestrial and marine record during the Eocene–Oligocene transition**
*Matthew J. Pound and Ulrich Salzmann
- 09:45–10:00 **The role of microbial anaerobic respiration in the end-Permian mass extinction**
*Martin Schobben, Alan Stebbins, Abbas Ghaderi, Harald Strauss, Dieter Korn, Robyn Hannigan and Christoph Korte
- 10:00–10:15 **Palaeoecology of benthic marine communities in the wake of the Late Permian mass extinction event**
*William J. Foster, Richard J. Twitchett and Silvia Danise
- 10:15–10:30 **Post-Chicxulub radiation and dispersal of Worm Lizards (Amphisbaenia)**
*Nicholas R. Longrich, Jakob Vinther, Alexander Pyron, Davide Pisani and Jacques Gauthier
- 10:30–11:00 **Tea/coffee break and posters** – Sports Hall 2
- 11:00–11:15 **A quantitative comparison of dispersed spores/pollen and plant megafossil assemblages from a Middle Jurassic plant bed from Yorkshire, UK**
*Sam M. Slater and Charles H. Wellman
- 11:15–11:30 **Dark and disturbed or just disturbed? Modelling thermal tolerance to determine habitat preferences in early angiosperms**
*Alexandra P. Lee



- 11:30–11:45 **Global Dinoflagellate Diversity and Temperature Preference Compared to Neogene Climate Development**
*[Jamie L. Boyd](#), Matthew J. Pound, Jim B. Riding, Alan M. Haywood and Ruza F. Ivanovic
- 11:45–12:00 **An exceptional three-dimensionally preserved *Pararaucaria* (Cheirolepidiaceae) ovuliferous cone from the Late Jurassic of Southern England: non-destructive recovery of full anatomical and histological detail using Diamond Light Source synchrotron**
*[Alan R. T. Spencer](#), Paul Kenrick, Dave C. Steart, Russell J. Garwood, Jason Hilton, Martin Munt and John Needham
- 12:00–12:15 **Paleocene forests and climates of Antarctica: signals from fossil wood**
*[Laura Tilley](#), Jane E. Francis, Vanessa Bowman and J. Alistair Crame
- 12:15–12:30 **Fungal and fungal-like interactions with plants in early terrestrial ecosystems: state of the art and future direction**
*[Christine Strullu-Derrien](#) and Paul Kenrick
- 12:30–13:30 **Lunch and posters** – Sports Hall 2
- 13:30–13:45 **Extratropical peaks in Cretaceous terrestrial vertebrate diversity: the influence of primary producers on vertebrate species distribution**
*[Mark A. Bell](#), Paul Upchurch, Philip D. Mannion, Roger B. J. Benson and Anjali Goswami
- 13:45–14:00 **A Morphological Analysis of the Pectoral Girdle Skeleton of Soaring Birds**
*[Megan E. Williams](#)
- 14:00–14:15 **Craniodental biomechanical character evolution within the Sauropodomorpha, and the influence of dietary evolution on gigantism**
*[David J. Button](#)
- 14:15–14:30 **A 3D approach: investigating dietary evolution in Archaeocete whales (Cetacea: Archaeoceti) using tooth microtextures**
*[Robert H. Goodall](#), Mark A. Purnell, Julia M. Fahlke and Katharina A. Bastl
- 14:30–14:45 **Eccentric conodonts from extreme environments: specialized biota of late Wenlock (Silurian) sabkhas**
*[Emilia Jarochovska](#) and Axel Munnecke
- 14:45–15:00 **Turtle diversity in the Mesozoic**
*[David B. Nicholson](#), Roger B. J. Benson, Patricia A. Holroyd, Matthew T. Carrano and Paul M. Barrett
- 15:00–15:30 **Tea/coffee break and posters** – Sports Hall 2
- 15:30–15:45 **The curious case of chaetae in brachiopods from the Middle Cambrian Burgess Shale**
*[Timothy P. Topper](#), Lars E. Holmer, Luke Strotz, Noel Tait, Zhifei Zhang and Jean-Bernard Caron



- 15:45–16:00 **Deciphering brachiopod origins: The Cambrian Explosion, small shelly fossils and early evolutionary history of Lophotrochozoa**
**Aodhán D. Butler*, Michael Streng, Zhifei Zhang, Russell Garwood and Lars E. Holmer
- 16:00–16:15 **Minerals in the gut: Scoping a Cambrian digestive system**
**Katie M. Strang*, David A. T. Harper and Howard A. Armstrong
- 16:15–16:30 **Puckered, Woven and Grooved: the Importance of Substrate for Ediacara Paleocology, Paleoenvironment and Taphonomy**
**Lidya G. Tarhan*, Mary L. Droser and James G. Gehling
- 16:30–17:45 **Poster session with refreshments – Sports Hall 2**
- 17:45–18:15 **Annual General Meeting (AGM) – Conference Auditorium 2**
- 18:30–late **ANNUAL DINNER – Leeds City Museum**

Thursday 18th December

Conference (Parallel Sessions)

A: Roger Stevens Lecture Theatre 22 (RSLT22)

- 09:00–09:15 **An agglutinated Early Cambrian actinotroch-like phoronid from the Chengjiang Lagerstätten and its implications**
Zhifei Zhang and *Lars E. Holmer*
- 09:15–09:30 **Loriciferan SCFs from the Cambrian of Canada: the origins of a meiofaunal phylum**
Thomas H. P. Harvey and Nicholas J. Butterfield
- 09:30–09:45 **Burgess Shale-type preservation of ‘shelly’ metazoans**
Mónica Martí Mus
- 09:45–10:00 **A new problematic colonial organism from the Cambrian of Morocco**
Christian Skovsted and Sebastián Clausen
- 10:00–10:15 ***Thaumaptilon walcottii* and the early evolution of the Cnidaria**
Jonathan B. Antcliffe
- 10:15–10:30 **High-resolution of the Changhsingian succession in Iran and correlation with China**
Dieter Korn, Abbas Ghaderi, Lucyna Leda and Martin Schobben
- 10:30–11:00 **Tea/coffee break and posters – Sports Hall 2**
- 11:00–11:15 **Sediment permeability and exceptional preservation within concretions**
**Victoria E. McCoy*, Robert T. Young and Derek E. G. Briggs



- 11:15–11:30 **The Winneshiek Lagerstätte (Middle Ordovician, Darrivilian) of Iowa yields the oldest known eurypterids**
*[James C. Lamsdell](#), Derek E. G. Briggs and Huaibao P. Liu
- 11:30–11:45 **Systematic excavation in the Lower Ordovician Fezouata Lagerstätte (Zagora area, Morocco)**
*[Emmanuel L. O. Martin](#), Ninon Allaire, Abdelfattah Azizi, Khadija El Hariri, Khaoula Kouraiss, Juan Carlos Gutiérrez-Marco, Bertrand Lefebvre, Rudy Lerosey-Aubril, Ahmid Hafid, Moussa Masrour, Elise Nardin, Bernard Pittet, Abel Prieur, Emmanuel Robert, Peter Van Roy, Jean Vannier, Romain Vaucher, Muriel Vidal and Daniel Vizcaino
- 11:45–12:00 **Solving Darwin’s Dilemma? Differential taphonomy reveals tissue biochemistry dependence of mould/cast exceptional fossil preservation**
*[Breandán Anraoi MacGabhann](#), James D. Schiffbauer, James W. Hagadorn, Peter Van Roy, Edward P. Lynch, Liam Morrison and John Murray
- 12:00–12:15 **Favourable Impressions: Ammonoid Taxonomy and Biostratigraphy in the Carboniferous Shannon Basin, Western Ireland**
*[Anthea Lacchia](#)
- 12:15–12:30 **Modelling Functional Morphology and Extinction selectivity in Ammonites**
*[Timothy Astrop](#), Matthew Wills, Qilong Ren, Michael Carley, Sylvain Gerber and Stefan Angioni
- 12:30–13:30 **Lunch and posters** – Sports Hall 2
- 13:30–13:45 **Recognising the reproductive mode of *Fractofusus* through spatial analysis**
*[Emily G. Mitchell](#), Alex G. Liu, Charlotte G. Kenchington and Nicholas J. Butterfield
- 13:45–14:00 **Oxygen, age and facies controls on the appearance of Ediacaran and Cryogenian macroscopic fossils in the Mackenzie Mountains, Northwest Territories, Canada**
*[Erik A. Sperling](#), Calla Carbone, David T. Johnston, Guy M. Narbonne and Francis A. Macdonald
- 14:00–14:15 **A diverse Late Ediacaran skeletal fossil assemblage from central Spain**
*[Iván Cortijo Sánchez](#), Mónica Martí Mus, Sören Jensen and Teodoro Palacios
- 14:15–14:30 ***Hallucigenia*’s head and the Cycloneuralian ancestry of Panarthropoda**
*[Martin R. Smith](#) and Jean-Bernard Caron
- 14:30–14:45 **Non-actualistic Ediacaran conditions drove the formation of Salter’s (1856) Longmyndian discoidal fossils**
*[Latha R. Menon](#), Duncan McIlroy, Alexander G. Liu and Martin D. Brasier
- 14:45–15:00 **Using growth models to test the vendobiont hypothesis for the Ediacara Biota**
*[Renee S. Hoekzema](#) and Martin Brasier
- 15:00–15:30 **Tea/coffee break and posters** – Sports Hall 2



- 15:30–15:45 **The Middle Permian Mass Extinction in High Latitudes**
Paul B. Wignall and David P.G. Bond
- 15:45–16:00 **‘Death Metal’ in the Early Palaeozoic**
Thijs R. A. Vandenbroucke, Poul Emsbo and Axel Munnecke
- 16:00–16:15 **Evolving phytoplankton stoichiometry in response to marine-terrestrial interactions: the Late Palaeozoic “phytoplankton blackout”**
Ronald E. Martin, Thomas Servais and Alexander Nützel
- 16:15–16:30 **The cause of late Cenozoic mass extinction in the western Atlantic: insights from sclerochronology**
Andrew L. A. Johnson, Annemarie Valentine, Melanie J. Leng, Donna Surge and Mark Williams
- 16:30–16:45 **Aragonite / Calcite seas and the evolution of biomineralization**
Uwe B. Balthasar
- 16:45–17:00 **Disparity trends in the shell shape of non-heteromorph ammonoids (Cephalopoda)**
Matthew E. Clapham
- 17:00–17:30 **Presentation of President’s Awards** to oral and poster presenters; followed by closing remarks for the Leeds Annual Meeting.

B: Roger Stevens Lecture Theatre 25 (RSLT25)

- 09:00–09:15 **Morphology or environment: factors affecting preservation of the Middle Triassic actinopterygian *Saurichthys***
*Susan R. Beardmore and Heinz Furrer
- 09:15–09:30 **‘Fish’ (Actinopterygii and Elasmobranchii) diversification patterns through deep time**
*Guillaume Guinot and Lionel Cavin
- 09:30–09:45 **Denticle Déjà Vu, and the Evolution of Speed**
*Tom Merrick-Fletcher, John D. Altringham, Jeff Peakall, Paul B. Wignall, Robert M. Dorrell and Gareth M. Keevil
- 09:45–10:00 **A fight for survival: Megalodon vs the Great White shark**
*Laura McLennan and Mark Purnell
- 10:00–10:15 **Patterns of morpho-functional disparity during the explosive radiation of acanthomorph fishes**
*Roger A. Close, Matt Friedman, Zerina Johansen, Hermione Beckett and Dan Delbarre
- 10:15–10:30 **Exceptionally preserved Devonian actinopterygian skull presents a new model for early ray-fin evolution**
*Sam Giles, Laurent Darras, Gaël Clément and Matt Friedman



- 10:30–11:00 **Tea/coffee break and posters** – Sports Hall 2
- 11:00–11:15 **Derived ornithopod dinosaurs: a case of evolutionary parallelism and convergence**
David B. Norman
- 11:15–11:30 **Automated generation of large phylogenies and a probabilistically time-scaled 1,000-taxon phylogenetic hypothesis for Mesozoic dinosaurs: dating the origins of flight and crown-birds**
Graeme T. Lloyd, David W. Bapst, Katie E. Davis and Matt Friedman
- 11:30–11:45 **Function and evolution of theropod jaws**
Emily J. Rayfield, Roger B. J. Benson and Philip S. L. Anderson
- 11:45–12:00 **Unlocking geological and sea level biases reveals cryptic evolutionary history of early vertebrates**
Robert Sansom, Emma Randle and Philip C. J. Donoghue
- 12:00–12:15 **Dinosaur body size maxima driven by global temperature**
Roger Benson, Nicolas Campione, Philip Mannion and David Evans
- 12:15–12:30 **Use and misuse of cladistic matrices for morphospace analyses**
Sylvain Gerber
- 12:30–13:30 **Lunch and posters** – Sports Hall 2
- 13:30–13:45 **Chondrichthyan diversity and distribution in the Early Carboniferous: new evidence from the Tournaisian of northern Britain**
Timothy R. Smithson, Kelly R. Richards, Rebecca Bennion and Jennifer A. Clack
- 13:45–14:00 **Enameloid microstructure in sharks and bony fishes: What do we really know?**
Gilles Cuny, Sébastien Enault, Guillaume Guinot and Martha Koot
- 14:00–14:15 **Long snouted lungfish and the variable dipnoan endocranium**
Tom Challands and Alexey Pakhnevich
- 14:15–14:30 **Chitons of the Permian Capitan Reef, and the nature of late Palaeozoic Polyplacophora**
Michael J. Vendrasco, Richard D. Hoare, Gordon L. Bell and Jonena M. Hearst
- 14:30–14:45 **A surfeit of sponges: unexpected Ordovician diversity in central Wales, UK**
Joseph P. Botting and Lucy A. Muir
- 14:45–15:00 **Finding food efficiently: the origin and evolution of optimal foraging strategies**
Richard J. Twitchett, Andrew M. Reynolds, Nicolas E. Humphries, Emily J. Southall, Victoria J. Wearmouth, Brett Metcalfe and David W. Sims
- 15:00–15:30 **Tea/coffee break and posters** – Sports Hall 2
- 15:30–15:45 **Cladistic analysis of the enigmatic Polychelidan lobsters**
*Denis Audo, Sylvain Charbonnier and Jean-Paul Saint Martin



- 15:45–16:00 **Epibioses of fossil crustaceans: insights on specific palaeoecology and true palaeosymbioses**
**Ninon Robin*, Sylvain Charbonnier, Barry Van Bakel, Sylvain Bernard, Jennyfer Miot and Gilles Petit
- 16:00–16:15 **A global perspective of the Trigoniida (Bivalvia: Palaeoheterodonta), with a focus on their Mesozoic and Cenozoic representatives**
**Simon Schneider* and Simon R. A. Kelly
- 16:15–16:30 **Repeat colonisation of temporary water-bodies by Early Carboniferous invertebrates**
**Carys Bennett*, Peter Brand, Sarah Davies, Tim Kearsey, Dave Millward, Tim Smithson and Mark Williams
- 16:30–16:45 **Rudist myophores: constructional constraints and phylogenetic informativeness**
Peter W. Skelton
- 16:45–17:00 **Phylogeny of the barnacles – combining molecular and morphological approaches**
Andy Gale
- 17:00 Delegates in RSLT25 move to RSLT22.

The organisers of the Annual Meeting gratefully acknowledge the support of the sponsors:

WILEY





Abstract of Annual Address

Understanding Ancient Earth Climates and Environments using Models and Data

Professor Alan M. Haywood

School of Earth & Environment, Woodhouse Lane, University of Leeds, Leeds LS2 9JT, UK.

[<eamrah@leeds.ac.uk>](mailto:eamrah@leeds.ac.uk)

Geology and palaeontology have demonstrated that climate is not stable. We know that climate change occurs over a variety of timescales (*e.g.* tectonic, orbital, millennial, centennial, decadal, sub-decadal). The fossil record and advanced numerical models of climate, and increasingly the Earth system, are gradually lifting the veil on the mysteries of Earth's climatic and environmental evolution and variability. Studies have focused on understanding the drivers for changes in mean climate state as well as the causes and consequences of climatic transitions and rapid climate change. In this talk we will explore how models and data have been used successfully together to better understand three distinctly different intervals in Earth history, each presenting its own unique challenges, scientific questions and benefits.

The first case study is focused on the relative role of climate and environmental change versus human influence on the extinction of Late Quaternary megafauna. Despite decades of research, the roles of climate and humans in driving the dramatic extinctions of large-bodied mammals during the Late Quaternary Period remain contentious. Models and data have shown that climate has been a major driver of population change over the past 50,000 years. However, species respond differently to the effects of climatic shifts, habitat redistribution and human encroachment. Although climate change alone can explain the extinction of some species, such as Eurasian musk ox and woolly rhinoceros, a combination of climatic and anthropogenic effects appears to be responsible for the extinction of others.

The second case study focuses on quantifying the equilibrium response of global temperatures to an increase in atmospheric carbon dioxide concentrations, which is one of the cornerstones of climate research. Components of the Earth's climate system that vary over long timescales, such as ice sheets and vegetation, have an important effect on this temperature sensitivity, but are normally neglected. Climate models, using geological derived boundary conditions (vegetation and ice cover), have been used to simulate the climate of the mid-Pliocene warm period, and to analyse the forcing and feedbacks that contributed to the relatively warm temperatures. Estimates suggest that the response of the Earth system to elevated atmospheric carbon dioxide concentrations is 30% to 50% greater than the response based on those fast-adjusting components of the climate system that are used traditionally to estimate climate sensitivity. This suggests that targets for the long-term stabilization of atmospheric greenhouse-gas concentrations aimed at preventing a dangerous human interference with the climate system should take into account this higher sensitivity of the Earth system.

The final case study focuses on the Eocene to Oligocene transition and the shift between a greenhouse and ice house state *ca.*33 million years ago. The development of the Antarctic Circumpolar Current (ACC) has been linked to the thermal isolation and growth of the Antarctic Ice Sheet at the time, yet the development of the ACC during the Cenozoic is controversial in terms of timing and its role in major climate transitions. Climate model results show that a coherent ACC was not possible during the Oligocene due to Australasian palaeogeography, despite deep water connections through the Drake Passage and Tasman Gateway and the initiation of Antarctic glaciation. These simulations of ocean currents compare well to marine proxy records relating to the physical oceanography of the Oligocene, and provide a framework for understanding apparently contradictory dating of the initiation of the ACC.

**The
Palaeontological
Association**

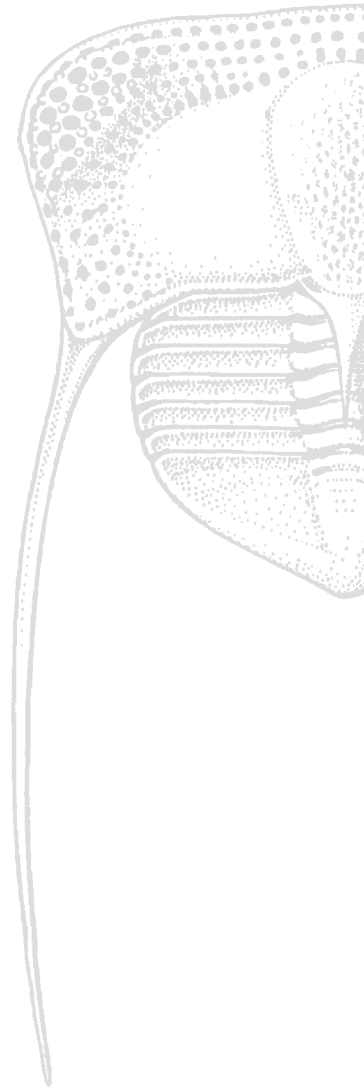
**Annual
General
Meeting**

17.45

Wednesday

17th December

Papers





Annual Meeting 2014

Notification is given of the 2014 Annual General Meeting

This will be held at the University of Leeds, UK, 17th December 2014, following the scientific sessions of the Annual Meeting.

AGENDA

1. Apologies for absence
2. Minutes of the 2013 AGM, University of Zurich
3. Trustees Annual Report for 2013
4. Accounts and Balance Sheet for 2013
5. Election of Council and vote of thanks to retiring members
6. Report on Council Awards
7. Annual Address

DRAFT AGM MINUTES 2013

Minutes of the Annual General Meeting held on Saturday 14th December 2013 at the University of Zurich, Switzerland.

- 1. Apologies for absence:** Prof. D. Donovan, Prof. J. Kennedy, Ms J. Lawrence, Dr A. McGowan, Dr P. Orr, Dr M. Sutton, Dr T. Vandenbroucke.
- 2. Minutes:** Proposed by Mr D. J. Ward and seconded by Mr A. Spencer, the minutes were agreed a correct record by unanimous vote of the meeting.
- 3. Trustees Annual Report for 2012:** Proposed by Prof. G. Sevastopulo and seconded by Dr H. A. Armstrong, the report was agreed by unanimous vote of the meeting.
- 4. Accounts and Balance Sheet for 2012:** Proposed by Dr C. T. S. Little and seconded by Prof. D. A. Harper, the accounts were agreed by unanimous vote of the meeting.
- 5. Proposed changes to the Constitution:** As proposed by Prof. M. P. Smith and seconded by Dr M. Munt, the members agreed by a unanimous vote to accept the following changes to the Constitution (new text in bold):
 - a. Paragraph 6: The business of the Association shall be undertaken by a Council and by committees of the Council. The Council shall consist of a maximum of twenty members. The Officers shall consist of a President, and, at least, two Vice-Presidents, a Treasurer, a Secretary, **an Editor-in-Chief**, and such other Officers as the Council may from time to time determine. At any meetings of the Council six members shall form a quorum which shall always include the President, or a Vice-President or the Secretary. The committees of the Council may co-opt members of the



Association as non-voting committee members. Committees of Council shall be open to all members of Council.

b. Paragraph 7: Periods of service for Officers shall be flexible but should normally not exceed two years for President and Vice-Presidents, and five years for Secretary, Editors, and Treasurer. Total consecutive service as an Officer (excluding service as President) should **normally** not exceed ten years. Other members of the Council shall be elected for a period of three years. All members of Council are Trustees of the Association in accordance with charity law.

6. Subscriptions: Following discussion, members agreed to Council's proposed changes to subscriptions. From 2015, the rates for retired and student members will be £15 (for online access to the journal only) or £36 (including a paper copy of the journal); the rates for ordinary members will be £30 (for online access only) or £45 (including a paper copy of the journal).

7. Election of Council and vote of thanks to retiring members

Prof. M. J. Benton extended a vote of thanks to the following members of Council who were retiring from their positions this year: Dr H. A. Armstrong, Dr C. Klug, Dr P. Upchurch. The following members were elected to serve on Council. *President:* Prof M. J. Benton; *Vice Presidents:* Dr M. Sutton and Dr A. B. Smith; *Treasurer:* Mr P. Winrow; *Secretary:* Prof R. J. Twitchett; *Editor-in-Chief:* Dr A. B. Smith; *Editor Trustees:* Prof C. H. Wellman, Dr M. Ruta; *Newsletter Editor:* Dr A. McGowan; *Book Review Editor:* Dr C. Jeffrey-Abt; *Publicity Officer:* Dr L. Herringshaw; *Education Officer:* Dr C. Buttler; *Outreach Officer:* Dr F. Gill; *Internet Officer:* Mr A. Spencer; *Meetings Coordinator:* Dr T. Vandenbroucke; *Ordinary Members:* Dr R. J. Butler, Dr C. T. S. Little, Dr M. Munt, Dr R. Owens and Mr D. Ward. Dr C. T. S. Little will organise the annual meeting in 2014 at the University of Leeds, UK.

8. Association Awards: The following awards were made: Lapworth Medal to Prof. D. Edwards (University of Cardiff); President's Medal to Prof. C. H. Wellman (University of Sheffield); Hodson Award to Dr M. Friedman (University of Oxford); and the Mary Anning award to Dr Hans Hess (Basel, Switzerland). Under the Small Grants Scheme, the following awards were announced: Sylvester-Bradley Awards to Dr M. Barham, N. Barling, L. Hauser, L. McLennan, and M. O'Sullivan; Callomon Award to E. Pape; and Whittington Award to Dr C. Apaldetti. Research Grants were awarded to Dr A. McGowan (University of Glasgow), Dr T. Challands (University of Edinburgh) and Dr S. Danise (Plymouth University). The President's Award was made to J. Clarke (University of Oxford) and the Council Poster Prize was presented to D. Button (University of Bristol).

9. Annual Address: The Annual Address entitled "Sharks and the deep origin of modern jawed vertebrates" was given by Prof. M. Coates (University of Chicago).



Trustees Annual Report 2013

Nature of the Association. The Palaeontological Association is a Charity registered in England and Wales, Charity Number 276369. Its Governing Instrument is the Constitution adopted on 27th February 1957, amended on subsequent occasions as recorded in the Council Minutes. The aim of the Association is to promote research in Palaeontology and its allied sciences by (a) holding public meetings for the reading of original papers and the delivery of lectures, (b) demonstration and publication, and (c) by such other means as the Council may determine. Trustees (Council Members) are elected by vote of the Membership at the Annual General Meeting. The contact address of the Association is c/o The Executive Officer, Dr T. J. Palmer, Institute of Geography and Earth Sciences, University of Aberystwyth, Aberystwyth, SY23 3DB, Wales, UK.

Trustees. The following members were elected to serve as trustees at the AGM on 18th December 2012: *President:* Prof. M.J. Benton; *Vice Presidents:* Dr A.B. Smith and Dr H.A. Armstrong; *Treasurer:* Mr P. Winrow; *Secretary:* Prof. R.J. Twitchett; *Chair of Publications Board:* Dr P.J. Orr; *Editor Trustees:* Dr P.C.J. Donoghue and Dr H.A. Armstrong; *Book Review Editor:* Dr C. Jeffrey-Abt; *Newsletter Reporter:* Dr L. Herringshaw; *Newsletter Editor:* Dr A. McGowan; *Web Officer:* Dr M. Sutton; *Meetings Coordinator:* Dr T. Vandenbroucke; *Ordinary Members:* Dr C. Klug, Dr R. Owens, Dr W. Renema, Dr P. Upchurch, Mr D. Ward. *The Executive Officer:* Dr T.J. Palmer and *Editor-in-Chief:* Dr S. Stouge continued to serve Council but are not Trustees. Dr C. Buttler, Dr F. Gill and Prof M.A. Purnell were co-opted onto Council but are not Trustees.

Membership. Membership on 31st December 2013 totalled 1,163 (1,182 at end 2012). Of these 660 were Ordinary Members, 147 Retired Members, 19 Honorary Members, 285 Student Members and 52 Institutional Members. There were 80 institutional subscribers to *Special Papers in Palaeontology*. Wiley Blackwell also separately manage further Institutional subscribers and distribute publications to these Institutional Members on behalf of the Association.

Professional Services. The Association's Bankers are NatWest Bank, 42 High Street, Sheffield, S1 1QF. The Association's Independent Examiner is G. R. Powell BSc FCA, Nether House, Great Bowden, Market Harborough, Leicestershire LE16 7HF. The Association's investment portfolio was managed by Quilter, St Helen's, 1 Undershaft, London EC3A 8BB.

Reserves. The Association holds reserves of £790,665 in General Funds, which enable the Association to generate additional revenue through investments, and thus to keep subscriptions to individuals at a low level, whilst still permitting a full programme of meetings to be held, publications produced and the award of research grants and grants-in-aid. They also act as a buffer to enable the normal programme to be followed in years in which expenditure exceeds income, and new initiatives to be pursued. The Association holds £64,246 in Designated Funds which contribute interest towards the funding of the Sylvester-Bradley, Hodson, Callomon, and Whittington Funds and towards the Jones-Fenleigh awards. Total funds carried forward to 2014 totalled £854,911.

Finance. Total charitable expenditure, through grants to support research, scientific meetings and workshops in 2013, was £295,456. Governance costs were £16,158. Total resources expended were £341,665. The Association continues its membership of the International Palaeontological Association and remains a Tier 1 sponsor of *Palaeontologia Electronica*, and the *Treatise on Invertebrate Paleontology*.



Risk. The Association is in a sound financial position. Succession planning for the Executive Officer remains a concern and will be considered as part of the Annual Review of Officers in 2014.

Charitable Activities. The Association continues to increase its range and investment in charitable activities. We have continued to provide funds to support student and speaker attendance at our own and international meetings.

Research Grants. Palaeontological Association Research Grants were awarded to Dr A. McGowan (University of Glasgow) for a project entitled 'Determining whether damming of the River Kerry (NW Scotland) produced a deleterious growth spurt in a threatened *Margaritifera margaritifera* population with high-precision dating methods'; to Dr T. Challands (University of Edinburgh) for 'Palaeoneurology and sensory systems in Devonian lungfish: morphological diversity or conservatism in the neurological system?'; and Dr S. Danise (Plymouth University) for 'Mesozoic marine reptile dead-falls: analogues of whale fall communities?'

Grants-in-aid. The Association provided funds to support the following meetings and workshops: 'Biological and Environmental Feedbacks in the Colonization of the Water Column' (GSA Annual Meeting 2013, Session T236, Denver, CO, USA); 'Konservat-Lagerstätten: Morphology, Ecology, and Taphonomy of Exceptionally Preserved Fossils' (GSA Annual Meeting 2013, Session T243); Stan Wood's Palaeontological Legacy meeting (National Museum of Scotland); 'Prehistoric colours in fossil insects and feathers' (Royal Society Summer Science Exhibition); a workshop entitled 'Introduction to Research Methods in Quantitative Palaeobiology' (University of Bristol); the 9th European Palaeobotany and Palynology Conference (Padova, Italy); the Arthur Smith Woodward 150th Anniversary Symposium (NHM, London); a workshop entitled 'Challenges in Macroecology – scaling the time barrier' (NHM, London); 'Dead organisms as data archives: Conservation and global change palaeobiology' (EGU session SSP4); the 2014 Society of Vertebrate Palaeontology and Comparative Anatomy meeting (York, UK); the 9th International Congress on Cephalopods Past and Present (Zurich, Switzerland); and a meeting entitled 'The Old Red Sandstone of the South-Western Province' (South Wales). In addition, funds were provided to support the following sessions at IPC4, to be held in Mendoza, Argentina: 'Cretaceous marine biotas and seaways in Gondwana'; 'Research and Management of Palaeontological UNESCO World Heritage Sites'; 'Rotten fossils? Experimental and analytical approaches to decay and exceptional preservation of soft tissues'; and 'Evolution of photosynthesizing organisms – from microbiota to plants'.

Small Grants Scheme. The scheme received eleven applications. Seven were recommended for funding in 2014, totalling £9,183.50. Sylvester-Bradley Awards were made to Dr Milo Barham, Nathan Barling, Luke Hauser, Laura McLennan, and Michael O'Sullivan. The Callomon Award was awarded to Edine Pape, and the Whittington Award to Dr Cecilia Apaldetti.

Online activities. The online activities of the Association continue to expand with investment in a larger, faster, and more secure server. The Association is now the sole host for the online-only journal *Palaeontologia Electronica*. The Association also continues to host websites for other societies (The Palaeontographical Society; International Organisation of Palaeobotany), palaeontological online resources (EDNA fossil insect database; the Kent Fossil Database), and online outreach projects (*Palaeontology* [Online]). The Association launched a Twitter account, @ThePalAss, which had c.500 followers by the end of the year.



Public meetings. Four public meetings were held in 2013, and the Association extends its thanks to the organisers and host institutions of these meetings.

57th Annual Meeting. This was held on 13th – 16th December at University of Zurich, Switzerland. Dr Klug with local support from colleagues and PhD students organised the meeting which included a symposium on “Fossilised ontogenies and evolution” and comprised a programme of internationally recognised speakers. There were 268 attendees. The Annual Address entitled “Sharks and the deep origin of modern jawed vertebrates” was given by Prof. Michael Coates (University of Chicago). The President’s Prize for best oral presentation from an early career researcher was made to John Clarke (University of Oxford). The Council Poster Prize was presented to David Button (University of Bristol). A choice of two post-conference field trips was offered: to the dinosaur museum at Aathal or to Monte San Giorgio.

British Science Festival, Palaeontological Association Symposium. This is an annual forum for presentations to the public and general scientists. The Symposium “Bodies of Evidence” was organised by Dr Liam Herringshaw at the Great North Museum, Newcastle. Funds were provided to support presentations by Prof. Mark Purnell and colleagues (University of Leicester), Dr Howard Armstrong, Prof. Dave Harper and Ms Katie Strang (Durham University), Dr Martin Ruecklin (Bristol/Leiden) and Mr Esben Horn (10 Tons, Copenhagen).

Progressive Palaeontology. The annual open meeting for presentations by research students was organised by T. Fletcher and a team of other colleagues, and was held at the University of Leeds.

Lyell Meeting. The Lyell Meeting in 2013 was held in London on the topic of “The Cambrian Explosion – understanding Earth systems at the origin of modern ecosystems”, organised by Prof. M.P. Smith (Oxford University Museum of Natural History) and Prof. D.A.T. Harper (Durham University).

Publications. Publication of *Palaeontology* and *Special Papers in Palaeontology* is managed by Wiley Blackwell. Volume 56 of *Palaeontology*, comprising six issues, was published. *Special Papers in Palaeontology* **89**, “Devonian spore assemblages from northwestern Gondwana: taxonomy and biostratigraphy”, by P. Breuer and P. Steemans; and *Special Papers in Palaeontology* **90**, “Latest Ordovician and earliest Silurian brachiopods succeeding the Hirnantia fauna in south-east China”, by Rong Jiayu *et al.*, were also published during the year. The Association is grateful to the National Museum of Wales and the Lapworth Museum (University of Birmingham) for providing storage facilities for publication back-stock and archives. Council is indebted to Meg and Nick Stroud for assistance with the publication and distribution of *Palaeontology Newsletter*.

Publicity. The Association continues to promote palaeontology and its allied sciences through press releases to the national media, radio and television. The Association had a stand at the Lyme Regis Fossil Festival, which was staffed by members of Council, the Executive Officer and volunteers.

Awards. The Lapworth Medal, awarded to people who have made a significant contribution to the science by means of a substantial body of research, was presented to Prof. D. Edwards (University of Cardiff). The President’s Medal for a palaeontologist in recognition of outstanding contributions in his/her earlier career, coupled with an expectation that they will continue to contribute significantly to the subject in their further work, was awarded to Prof. C.H. Wellman (University of Sheffield). The Hodson Award, for a palaeontologist under the age of 35 who has made an outstanding



achievement in contributing to the science through a portfolio of original published research, was awarded to Dr M. Friedman (University of Oxford). The Mary Anning award, for an outstanding contribution by an amateur palaeontologist, was made to Dr Hans Hess (Basel, Switzerland). Council also awards an undergraduate prize to each UK and Irish university department in which palaeontology is taught beyond Level 1.

Governance. The Association continues to improve its administration with further improvements to the *Newsletter* and website. Trustees were members of the Joint Committee for Palaeontology: Prof. M.J. Benton and Prof. R.J. Twitchett represented the Association. During the year, substantial changes were made to the post of Editor-in-Chief following the retirement of Dr Stouge, and a new post of Publications Officer was created. The post of Chair of the Publications Board ceased to exist and the duties were transferred to the new post of Editor-in-Chief. These changes required a minor change to the wording of the Constitution, which was approved by members at the AGM.

Forthcoming plans. Council will continue to make substantial donations, from both General and Designated funds, to permit individuals to promote the charitable aims of the Association. Resources will be made available from General Funds to support the Association Research Grant, Grants-in-Aid, provided to carry out research into palaeontological subjects, to disseminate findings in print and at conferences, and support the provision of palaeontological workshops. The Association will continue to recognise the contribution individuals have made to palaeontology and associated sciences through its awards. In 2014, a similar programme of public meetings and publications will be carried out. Funds will be made available to develop the website further, with the aim of encouraging outreach and to support other outreach, education and publicity initiatives. The Association will launch a new undergraduate research bursary scheme and a new fund to support outreach activities in 2014. The 58th Annual Meeting will be held at the University of Leeds. Progressive Palaeontology will be held at the University of Southampton. The Association will sponsor a symposium at the British Science Festival and will provide travel grants and symposium sponsorship for the Congress of the European Geosciences Union and the 4th International Palaeontological Congress.



THE PALAEOLOGICAL ASSOCIATION Registered Charity No. 276369
STATEMENT OF FINANCIAL ACTIVITIES for the YEAR ENDED 31st DECEMBER 2013

		General Funds	Designated Funds	TOTAL 2013	TOTAL 2012
Incoming Resources					
Generated Funds					
Voluntary income	Subscriptions	55,744		55,744	58,627
	Donations	<u>3,221</u>	<u>1,340</u>	<u>4,561</u>	<u>2,741</u>
		58,965	1,340	60,305	61,368
Charitable activities					
Sales	<i>Palaeontology</i>	257,385			
	<i>Special Papers</i>	13,677			
	Offprints	110			
	<i>Newsletter</i>	0			
	<i>Field Guides</i>	7,230			
	Distribution	<u>426</u>			
		278,828		278,828	230,050
Investment income		<u>13,932</u>	<u>75</u>	<u>14,007</u>	<u>15,050</u>
TOTAL INCOMING RESOURCES		<u>351,725</u>	<u>1,415</u>	<u>353,140</u>	<u>306,468</u>
Resources expended					
Costs of generating funds					
...for voluntary income	Admin.	26,514			27,805
Investment management	S'broker fees	<u>3,537</u>			<u>3,186</u>
		30,051	0	30,051	30,991
Charitable activities					
Publications	<i>Palaeontology</i>	113,470			
	<i>Special Papers</i>	6,485			
	Offprints	1,128			
	<i>Field Guides</i>	0			
	<i>Newsletters</i>	18,035			
	Distribution	752			
	Marketing	1,102			
	Editorial costs	<u>65,135</u>			
	Total Publications	206,107		206,107	158,458
Scientific Meetings & Costs		26,591		26,591	6,946
Grants and Awards		5,903	9,506	15,409	32,060
Research Grants		5,685		5,685	16,197
Administration of charitable activities		<u>41,664</u>		<u>41,664</u>	<u>34,756</u>
		206,107		295,456	248,417
Governance costs	Examiner's fee	500			
	Trustee expenses	8,083			
	Administration	<u>7,575</u>			
		16,158	0	16,158	15,555
TOTAL RESOURCES EXPENDED		<u>332,159</u>	<u>9,506</u>	<u>341,665</u>	<u>294,963</u>
NET INCOMING RESOURCES		<u>19,566</u>	<u>-8,091</u>	<u>11,475</u>	<u>11,505</u>
INVESTMENT GAINS/LOSSES					
Realised gain		1,993			
Unrealised gain		<u>59,222</u>			
		61,215		61,215	27,625
DEFICIT/(SURPLUS) FOR THE YEAR		<u>80,781</u>	<u>-8,091</u>	<u>72,690</u>	<u>39,130</u>
FUNDS BROUGHT FORWARD		<u>709,884</u>	<u>72,337</u>	<u>782,221</u>	<u>743,091</u>
FUNDS CARRIED FORWARD		<u>790,665</u>	<u>64,246</u>	<u>854,911</u>	<u>782,221</u>



THE PALAEOLOGICAL ASSOCIATION Registered Charity No. 276369

BALANCE SHEET as at 31st DECEMBER 2013

2012 £		Note	2013 £
	INVESTMENTS		
546,214	At market value	1.6	594,639
	CURRENT ASSETS		
166,901	Cash at Banks	162,483	
<u>119,767</u>	Sundry Debtors	6	<u>128,438</u>
<u>286,668</u>	Total Current Assets		290,921
	CURRENT LIABILITIES		
19,681	Subscriptions in Advance	21,010	
<u>30,980</u>	Sundry Creditors	7	<u>9,639</u>
50,661	Total Current Liabilities		30,649
<u>236,007</u>	NET CURRENT ASSETS		<u>260,272</u>
<u>782,221</u>	TOTAL ASSETS		<u>854,911</u>
	Represented by:		
709,884	GENERAL FUNDS		790,665
	DESIGNATED FUNDS	8	
11,230	Sylvester-Bradley Fund		5,052
23,286	Jones-Fenleigh Fund		23,720
10,386	Hodson Fund		9,152
8,599	Callomon Fund		7,573
<u>18,836</u>	Whittington Fund		<u>18,749</u>
72,337			64,246
<u>782,221</u>			<u>854,911</u>

Approved by the Board of Trustees 7th May 2014



THE PALAEOLOGICAL ASSOCIATION Registered Charity No. 276369

DESIGNATED FUNDS, Year ended 31st December 2013. Note 8 to the Accounts

	Sylvester- Bradley	Jones- Fenleigh	Hodson	Callomon	Whittington	TOTAL 2013	TOTAL 2012
Donations	270	410	0	207	453	1,340	2,566
Interest Received	<u>12</u>	<u>24</u>	<u>11</u>	<u>9</u>	<u>19</u>	<u>75</u>	<u>80</u>
TOTAL INCOMING RESOURCES	282	434	11	216	472	1,415	2,646
Grants made	<u>6,460</u>	<u>0</u>	<u>1,245</u>	<u>1,242</u>	<u>559</u>	<u>9,506</u>	<u>11,299</u>
NET SURPLUS/(DEFICIT)	-6,178	434	-1,234	-1,026	-87	-8,091	-8,653
TRANSFERS BETWEEN FUNDS	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
SURPLUS/(DEFICIT) FOR THE YEAR	-6,178	434	-1,234	-1,026	-87	-8,091	-8,653
FUNDS BROUGHT FORWARD	<u>11,230</u>	<u>23,286</u>	<u>10,386</u>	<u>8,599</u>	<u>18,836</u>	<u>72,337</u>	<u>80,990</u>
FUNDS CARRIED FORWARD	<u>5,052</u>	<u>23,720</u>	<u>9,152</u>	<u>7,573</u>	<u>18,749</u>	<u>64,246</u>	<u>72,337</u>



Notes to the Financial Statements for the year ended 31st December 2013

1. Accounting Policies

The principal accounting policies adopted in the preparation of the financial statements are set out below and have remained unchanged from the previous year and also have been consistently applied within the same financial statements.

1.1 Basis of preparation of financial statements

The accounts have been prepared in accordance with the Statement of Recommended Practice issued by the Charity Commission in 2011 and cover all the charity's operations, all of which are continuing.

The effect of events relating to the year ended 2013 which occurred before the date of approval of the statements by Council have been included to the extent required to show a true and fair state of affairs at 31st December 2013 and the results for the year ended on that date.

1.2 Fund Accounting

General Funds are unrestricted funds which are available for use at the discretion of the Council in furtherance of the general objectives of the charity and which have not been designated for other purposes.

Designated funds comprise unrestricted funds that have been set aside by Council for particular purposes. The aim of each designated fund is as follows:

Sylvester-Bradley Fund: Grants made to permit palaeontological research.

Jones Fenleigh Fund: Grants to permit one or more students annually to attend the meeting of the Society of Vertebrate Palaeontology and Comparative Anatomy (SVPCA).

Hodson Fund: Awards made in recognition of the palaeontological achievements of a worker under the age of 35.

Callomon Fund: Grants made to permit palaeontological research with a fieldwork element.

Whittington Fund: Grants made to permit palaeontological research with an element of study in museum collections.

1.3 Incoming Resources

The charity's income principally comprises subscriptions from individuals and institutions which relate to the period under review, and sales of scientific publications which are brought into account when due.

1.4 Resources Expended

All expenditure is accounted for on an accruals basis and has been classified under the appropriate headings.

Charitable expenditure is that which is incurred in furtherance of the charity's objectives.

Administrative costs have been allocated to the various cost headings based on estimates of the time and costs spent thereon.

1.5 Investments

Investments are stated at market value at the balance sheet date. The statement of financial activities includes net gains and losses arising on revaluations and disposals throughout the year of both investments and foreign cash balances.

1.6 SCHEDULE OF INVESTMENTS (per analysis sheet)

**2. Analysis of Financial Resources Expended**

	Staff costs £	Other costs £	Total 2013 £	Total 2012 £
Generating Funds	17,635	12,416	30,051	30,991
Charitable activities	61,865	233,591	295,456	248,417
Governance	<u>5,039</u>	<u>11,119</u>	<u>16,158</u>	<u>15,555</u>
	<u>84,539</u>	<u>257,126</u>	<u>341,665</u>	<u>294,963</u>

3. Staff Costs

	Salary £	National Insurance £	Pension Contributions £	Total 2013 £	Total 2012 £
Publications: 1 employee (2012 - 1)	29,323	1,539	3,290	34,152	38,987
Administration: 1 employee (2012 - 1)	<u>32,167</u>	<u>3,384</u>	<u>14,836</u>	<u>50,387</u>	<u>46,300</u>
	<u>61,490</u>	<u>4,923</u>	<u>18,126</u>	<u>84,539</u>	<u>85,287</u>

4. Trustees Remuneration and Expenses

Members of Council neither received nor waived any emoluments during the year (2012 – nil).

The total travelling expenses reimbursed to 17 Members of Council was £8,083 (2012 – £8,154).

5. Costs of Independent Examiner

	2013 (£)	2012 (£)
Examination of the accounts	500	450
Accountancy and payroll services	<u>1,500</u>	<u>1,450</u>
	<u>2,000</u>	<u>1,900</u>

6. Debtors

	2013 (£)	2012 (£)
Accrued income – receivable within one year	128,438	119,767

7. Creditors – falling due within one year

	2013 (£)	2012 (£)
Social Services costs	1,796	3,196
Accrued expenditure	<u>7,843</u>	<u>27,784</u>
	<u>9,639</u>	<u>30,980</u>

8. Designated Funds (per analysis sheet)



Independent Examiner's Report
on the Accounts of The Palaeontological Association
for the year ended 31st December 2013

Respective responsibilities of trustees and examiner

The charity's trustees are responsible for the preparation of the accounts. The charity's trustees consider that an audit is not required for this year under section 144 of the Charities Act 2011 (the Charities Act) and that an independent examination is needed.

It is my responsibility to:

examine the accounts under section 145 of the Charities Act,

follow the procedures laid down in the general Directions given by the Charity Commissioners (under section 145(5)(b) of the Charities Act), and

to state whether particular matters have come to my attention.

Basis of independent examiner's statement

My examination was carried out in accordance with the general Directions given by the Charity Commissioners. An examination includes a review of the accounting records kept by the charity and a comparison of the accounts presented with those records. It also includes consideration of any unusual items or disclosures in the accounts and seeking explanations from the trustees concerning such matters. The procedures undertaken do not provide all the evidence that would be required in an audit, and consequently no opinion is given as to whether the accounts present a "true and fair" view and the report is limited to those matters set out in the statement below.

Independent examiner's statement

In connection with my examination, no matter has come to my attention:

(1) which gives me reasonable cause to believe that in any material respect the requirements:

to keep accounting records in accordance with section 130 of the Charities Act;

to prepare accounts which accord with the accounting records and comply with the accounting requirements of the Charities Act

have not been met; or

(2) to which, in my opinion, attention should be drawn in order to enable a proper understanding of the accounts to be reached.

Dated: 2nd May 2014

G R Powell F.C.A.

Nether House, Nether Green,
Great Bowden,
Market Harborough
Leicestershire
LE16 7HF



Nominal	Holding	Cost (bought pre 2013)	Value end 2012
£18,000	UK 4.75% Stock 07/03/20 GBP 100	£ 18,145.87	£ 22,498.00
£20,000	UK 4.5% Gilt 07/03/19 GBP 0.01	£ 20,092.99	£ 24,352.00
£64,176.46	COIF Charities Fixed Interest Fund	£ 85,000.00	£ 86,477.78
	804 Royal Dutch Shell B shares	£ 12,432.00	£ 17,487.00
	1,425 BP Ord 25c shares	£ 5,047.35	£ 6,053.00
	600 BHP Billiton \$0.5 shares	£ 4,341.48	£ 12,777.00
	500 BG Group Ordinary 10p shares	£ 3,977.95	£ 5,063.00
	1,465 HSBC Holdings Ordinary 0.5 US Dollar shares	£ 4,425.44	£ 9,477.00
	1,800 Barclays 25p Ord shares	£ 4,034.84	£ 4,723.00
	450 Barclays 25p Ord shares rights issue		
	105 Next Ord 10p shares		
	230 Weir Group 12.5p shares	£ 5,064.75	£ 4,322.00
	1,000 3I Group Ordinary £0.738636 shares	£ 3,058.76	£ 2,172.00
	1,150 Tesco Ord GBP 0.05	£ 4,583.22	£ 3,864.00
	1,550 Kingfisher Ord GBP 0.157142857	£ 3,554.45	£ 4,404.00
	500 IMI Ord 25p shares	£ 4,905.57	£ 5,485.00
	175 Carnival Plc Ord USD 1.66	£ 3,996.49	£ 4,127.00
	650 Glaxo Smithkline Ordinary 25p shares	£ 10,232.42	£ 8,678.00
	220 Shire Ord 5p shares	£ 4,986.29	£ 4,151.00
	2,499 Bluecrest Allblue Ord Npv GBP shares	£ 3,020.28	£ 4,251.00
	550 Amec ord 50P	£ 6,133.62	£ 5,517.00
	2,200 Melrose Indust Ord 0.1p		
	4,175 Vodaphone Group Ord USD 0.11428571	£ 6,034.20	£ 6,448.00
	2,150 BT Group Ordinary 5p shares	£ 7,787.53	£ 4,969.00
	225 Brit Amer Tobacco Ord GBP 0.25	£ 4,991.81	£ 7,022.00
	300 Unilever PLC Ord GBP 0.031111	£ 4,326.21	£ 7,098.00
	460 Pearson Ordinary 25p shares	£ 8,069.00	£ 5,465.00
	490 Serco Group Ord 2P	£ 3,005.01	£ 2,622.00
	700 National Grid Ord GBP 0.113953	£ 3,648.26	£ 4,921.00
	420 Experian Ord 10C	£ 3,444.95	£ 4,116.00
	670 Blackrock World Mining Ord 5P	£ 4,019.09	£ 3,930.00
	400 Persimmon Ord 10p		
	650 RIT Capital Partners Ordinary £1 shares	£ 4,903.90	£ 7,352.00
	4,400 TR Property Ord 25p shares	£ 7,560.85	£ 7,612.00
	1,000 Balfour Beatty 50P	£ 2,913.17	£ 2,737.00
	1,225 Brown Advisory US Equity Value £B	£ 14,789.62	£ 14,945.00
	1,500 British Empire Sec & Gen Trust Ordinary 10p shares	£ 5,005.61	£ 7,110.00
	425 Findlay Park Partners US Smaller Companies	£ 6,158.47	£ 14,336.00
	2,825 Ishares S&P 500 GBP	£ 20,319.63	£ 24,263.00
	900 JPMorgan Am UK Ltd Emerging Markets I Instl	£ 5,043.10	£ 5,257.00
	8,000 Bny Mellon Glb Fds Erg Mkts Debt Loc Crr C	£ 10,776.59	£ 10,434.00
	425 Fidelity EUR Value Ordinary 25P shares	£ 4,059.07	£ 5,470.00
	3,900 Edinburgh Dragon Trust Ordinary £0.20 shares	£ 4,478.10	£ 10,452.00
	160 GLG Japan Corealpha Equity IT Acc	£ 11,330.79	£ 10,629.00
	5,194 Scottish Widows Property Trust B	£ 4,669.49	£ 4,451.00
	26 Veritas Asset Mgmt Veritas Asian A GBP	£ 8,182.27	£ 7,671.00
	65 Roche Hldgs Ag Genusscheine Nvp	£ 7,226.55	£ 8,040.00
	6,600 Henderson Gbl Invs European Special Sits I Inc	£ 7,037.91	£ 8,210.00
1,283.80	COIF Charities Investment Fund Acc Units	£ 75,000.00	£ 114,775.57
	Total	£ 451,814.95	£ 546,214.35



Proceeds (sold in 2013)	Cost (bought in 2013)	Gain realised during 2013	Value end 2013	Gain unrealised during 2013
			£ 20,813.00	-£ 1,685.00
			£ 22,688.00	-£ 1,664.00
			£ 80,836.67	-£ 5,641.11
			£ 18,331.00	£ 844.00
			£ 6,955.00	£ 902.00
			£ 11,214.00	-£ 1,563.00
			£ 6,488.00	£ 1,425.00
			£ 9,704.00	£ 227.00
			£ 4,895.00	£ 172.00
			£ 1,224.00	£ 391.50
			£ 5,723.00	£ 1,074.12
£ 4,838.85	£ 832.50	£ 516.85		
£ 3,124.67	£ 4,648.88	£ 952.67		
			£ 3,845.00	-£ 19.00
£ 4,687.62		£ 283.62		
			£ 7,625.00	£ 2,140.00
			£ 4,377.00	£ 250.00
			£ 10,475.00	£ 1,797.00
			£ 6,274.00	£ 2,123.00
			£ 4,378.00	£ 127.00
			£ 5,984.00	£ 467.00
	£ 7,039.88		£ 6,725.00	-£ 314.88
			£ 9,895.00	£ 3,447.00
			£ 8,157.00	£ 3,188.00
£ 8,317.58		£ 1,295.58		
			£ 7,446.00	£ 348.00
			£ 6,169.00	£ 704.00
			£ 2,446.00	-£ 176.00
			£ 5,516.00	£ 595.00
			£ 4,679.00	£ 563.00
			£ 3,116.00	-£ 814.00
	£ 5,035.71		£ 4,956.00	-£ 79.71
			£ 8,190.00	£ 838.00
			£ 9,966.00	£ 2,354.00
			£ 2,869.00	£ 132.00
			£ 19,931.00	£ 4,986.00
			£ 7,275.00	£ 165.00
			£ 18,322.00	£ 3,986.00
			£ 31,358.00	£ 7,095.00
			£ 4,946.00	-£ 311.00
£ 9,816.77		-£ 617.23		
			£ 6,481.00	£ 1,011.00
			£ 9,543.00	-£ 909.00
			£ 17,104.00	£ 6,475.00
			£ 4,780.00	£ 329.00
			£ 8,192.00	£ 521.00
			£ 10,994.00	£ 2,954.00
			£ 10,006.00	£ 1,796.00
			£ 133,747.44	£ 18,971.87
£ 30,785.49	£ 17,556.97	£ 2,431.49	£ 594,639.11	£ 59,221.79



Nominations for Council

At the AGM in December 2014, the following vacancies will occur on Council: Vice-President; Newsletter Editor; Book Review Editor; Meetings Coordinator; two Ordinary Members.

The following nominations have been received:

Vice President: Mr David J. Ward
Newsletter Editor: Dr Jo Hellawell
Meetings Coordinator: Dr Thijs Vandenbroucke (2nd term)
Book Review Editor: Dr Tom Challands

Ordinary Members (two vacancies): Prof. Andy Gale, Dr Maria McNamara, Dr Imran Rahman*

* More nominations have been received for the positions of Ordinary Member than are vacant and so as stipulated in the Association's constitution a ballot will be held at the AGM. All members of the Association are eligible to vote. Provision has been made for a postal vote for those members who are unable to attend the AGM. **A voting form is included with the Newsletter.** Personal statements from the candidates are copied over the page:

Prof. Andy Gale (Portsmouth): I am an enthusiastic stratigrapher and palaeontologist who has concentrated his research over 45 years on the Cretaceous Period, working also on the taxonomy, phylogeny and fossil record of starfish and more recently, barnacles. I have published extensively, including a *Special Paper in Palaeontology* and in *Palaeontology*. I have taught palaeontology to BSc students in various UK university departments, and supervised a succession of PhD students. On the committee, I offer the Association the benefits of long experience of teaching, administration and research in the academic world, together with an enthusiastic commitment to palaeontology. I give numerous lectures on palaeontological topics to regional geological societies and university student societies that may be used to promote the work of the Association. For example, I am lecturing to the Sedgwick Club in Cambridge in November, which provides an excellent opportunity to remind the audience of what the Association offers to students.

Dr Maria McNamara (Cork): Maria is a Lecturer in Geology at University College Cork in Ireland and has been a member of the Association for the past 12 years. Over this time she has contributed numerous oral and poster presentations at the Annual Meeting and published in *Palaeontology*, and has represented the Association at public outreach events. She now wishes to stand for the position of Ordinary Member on the Association Council as she is keen to make a more active contribution to the running of the Association. She hopes to assist with various Council activities, such as the review of grant applications and preparation of the Association Newsletter. In particular, she is keen to help develop and implement new initiatives to support palaeontological research, especially by early career researchers, and to help develop and deliver outreach activities to foster an enhanced appreciation and awareness of palaeontology in Europe and further afield. In doing so she aims to encourage and support researchers from all fields of palaeontology and to raise the profile of palaeontology in the public sphere.

Dr Imran Rahman (Bristol): I am a research fellow at the University of Bristol working on the palaeontology and evolution of early echinoderms. I have been a member of the Palaeontological Association since 2003 and have regularly attended Annual Meetings during this period. I am a scientific editor of the Association's flagship journal, *Palaeontology*, and co-founder and commissioning editor of *Palaeontology* [online], an outreach website sponsored by the Association. I wish to stand for election as an Ordinary Member of the Council so that I can contribute to the continued success of the Association, promoting the study of palaeontology and allied sciences within the UK and abroad. In particular, I am keen to support the activities of early-career researchers, and would like to ensure that the Association plays an important role in helping to develop their careers.