

A Registered Charity
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Circular 522



YORKSHIRE GEOLOGICAL SOCIETY

President: John Powell Ph.D.

RED-BED SEDIMENTS



*Namib dune-interdune
architecture
Photo: N. Mountney*

A JOINT MEETING WITH
SORBY NATURAL HISTORY SOCIETY, SHEFFIELD

SPEAKERS: OLIVER JORDAN, BERNARD BESLY and
NIGEL P. MOUNTNEY

14.00 to 16.50 SATURDAY 19th FEBRUARY 2005

DAINTON BUILDING, BROOK HILL, SHEFFIELD UNIVERSITY

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NON MEMBERS WELCOME

YGS 2005

RED-BED SEDIMENTS

- 1400-1650 **SATURDAY 19th FEBRUARY 2005**
- 1400-1410 **Introduction and Society Announcements**
John Powell Ph.D.
- 1410-1450 **Shallow Marine Shoreline Fluctuations along a Coastal Desert System, Permian Lower Cutler Beds, Utah, USA**
Oliver Jordan (School of Earth Sciences and Geography, Keele University)
- 1450 - 1530 **Humid tropical red-beds in the British Westphalian**
Bernard Besly (School of Earth Sciences and Geography, Keele University)
- 1530 - 1600 **Tea and Coffee**
There will be exhibits on display during the afternoon refreshments, including:
- Recent developments in research on dinosaur footprints from the Middle Jurassic of Yorkshire**
Martin A. Whyte, Mike Romano, Simon Jackson and Daniel J. Elvidge, (Dinosaur Track Research Group, University of Sheffield).
- Preservation of fossil plants**
Ken J. Dorning, (Pallab Research, Sheffield and Palynology Research, University of Sheffield), and others.
- Offers of additional exhibits will be welcome.
Contact Ken J. Dorning, k.j.dorning@sheffield.ac.uk
- 1600-1640 **Dynamic aeolian desert systems and their response to climatic and environmental change**
Nigel P. Mountney (School of Earth Sciences and Geography, Keele University)
- 1640-1650 **Closing Remarks**

The Society would like to thank Independent Paper, Wakefield for sponsoring the paper for this publication, therefore allowing it to be produced in colour at no extra cost to the YGS.

SHALLOW MARINE SHORELINE FLUCTUATIONS ALONG A COASTAL DESERT SYSTEM, PERMIAN LOWER CUTLER BEDS, UTAH, USA

Oliver Jordan and Nigel Mountney, School of Earth Sciences and Geography,
Keele University, Keele, Staffordshire, ST5 5BG, UK. o.d.jordan@keele.ac.uk

The Lower Cutler Beds are a Wolfcampian age (Permian) mixed shallow marine-shoreline succession, within the Canyonlands region of SE Utah, USA. They record a series of at least six complex transgressive-regressive events across a coastal desert system consisting of alternation between continental aeolian dune and fluvial strata and marine sediments composed of limestones and calcarenites. Whilst the succession was clearly influenced by a series of relative sea level cycles, the preserved stratal architecture is highly complex and sedimentation in the non-marine parts of the succession is considered to have been controlled additionally by climatic variations.

A key aspect of this project has been the collection of a series of 1D vertical logs and 2D architectural panels and correlating them into 3D correlation panels. Due to the excellent continuous exposure of the Lower Cutler Beds, key stratal surfaces (marine flooding surfaces) have been traced into time equivalent continental strata. Allocyclic bounding surfaces generated by changes in external controlling factors such as tectonics and climate, have been distinguished from autocyclic surfaces generated by intrinsic processes such as bedform migration. This has enabled shallow marine strata and marginal- to non-marine aeolian and arid fluvial elements to be directly related to episodes of alternating sea level.

The relation of episodic shallow marine incursions to associated changes in coastal aeolian and fluvial behaviour is interpreted to have occurred as a result of a linked relationship between alternations in relative sea level and regional climate. Regional studies indicate that sea level cycles were at least partly eustatically-driven, with periods of sea level fall being linked with increased wind velocities due to the expansion of the Polar atmospheric cell and the corresponding compression of the tropical Hadley Cell. At these times, aeolian dunes prograded over marine strata. In contrast, during periods of rising sea level, which are considered to equate to a more humid climate, the availability of sediment for aeolian transport was reduced, as was the transport capacity of the wind,

resulting in dune stabilization and erg shutdown. Rapid transgression occurred for distances up to 100 km across this low relief basin. The Lower Cutler Beds record a series of lateral shifts in both marine and shoreline architectural elements arranged into a progradational stacking pattern. The succession demonstrates complex relationships between climate and relative sea level, possibly as a result of glacial oscillations driven by Milankovitch-style cyclicity.

HUMID TROPICAL RED-BEDS IN THE BRITISH WESTPHALIAN

Bernard Besly, School of Earth Sciences and Geography, University of Keele

Correspondance address: 5 The Village, Keele, Newcastle-under-Lyme, Staffordshire ST5 5AD;
bernard@besly.co.uk

Throughout the period of deposition of the Productive Coal Measures in the UK Pennine Basin contemporaneous red-bed facies were deposited elsewhere. Initially these were restricted to the extreme margins of the basin (South Midlands and Northern Ireland). The extent of the facies expanded from mid Westphalian B times, and by late Westphalian C almost all of the area was the site of red-bed deposition, giving rise to the stratigraphically poorly defined Etruria Formation. Another red-bed unit - the Ketch Formation - is present in the offshore areas of the Southern North Sea. This comprises similar, but not identical, facies but has a different provenance.

Palaeomagnetic results for the Etruria Formation indicate deposition in an equatorial palaeolatitude. The close stratigraphic association with the Coal Measures, and the evidence from a scant flora within the formation, combine to imply a humid tropical palaeoclimate. It is clear that, in such a climatic setting, the commonly accepted models for the genesis of continental red-beds are inapplicable. It has instead been suggested that the Etruria Formation represents the accumulation of the denudation products of a lateritic weathering mantle developed in contemporaneous sediment source areas flanking the depositional area.

This presentation will review the stratigraphic and palaeogeographic evolution of these red-bed formations. The evidence for the inferred lateritic origin will be outlined in more detail, and the role of the geomorphology of the depositional landforms and the nature of contemporaneous soil formation will be examined in order to develop a model for continental red-bed deposition in a humid tropical setting.

DYNAMIC AEOLIAN DESERT SYSTEMS AND THEIR RESPONSE TO CLIMATIC AND ENVIRONMENTAL CHANGE

Nigel P. Mountney, School of Earth Sciences and Geography, Keele University,
Keele, Staffordshire, ST5 5BG, UK n.p.mountney@keele.ac.uk

Although aeolian facies models have been developed since the 1970's, only recently have they become sufficiently sophisticated to enable the effects of external climatic and tectonic controls to be expressed in terms of resultant facies architecture. By adopting a joint conceptual and process-based approach, the response of aeolian systems to changes in controlling parameters such as sediment supply, sediment availability, water table and wind regime is now well understood. Dynamic models are able to account for spatial and temporal variations in these controlling parameters and predict likely stratigraphic responses. Large-scale, quantitative stratigraphic data sets from outcrop are being applied to unequivocally demonstrate relationships between preserved aeolian architecture and original bedform morphology and migratory behaviour.

In dry aeolian systems, the key to developing predictive models has been an appreciation of the paleoenvironmental significance of the 3D geometry and hierarchical nature of bounding surfaces, which has enabled the products of external (allocyclic) controls such as climate change be discerned from the complex mechanics of intrinsic (autocyclic) bedform migratory behavior. In wet aeolian systems, subtle variations in interdune architecture provide the basis for a spectrum of predictive models that explain preserved aeolian architecture in terms of interactions between water table level, sediment availability, dune size and dune migration rate, parameters which in turn are a function of sediment distribution pathways, climate and basin setting.

The development of aeolian facies models is important for understanding the likely response of desert systems to climatic and environmental change. Additionally predictive models remain important for hydrocarbon exploration, particularly in mature provinces, where good well control allows the employment of sophisticated models in the search for small plays based on subtle stratigraphic traps.

A WORD FROM THE PRESIDENT

The YGS 2005 programme (167th Session) kicked off with an excellent and well attended meeting at the University of Leeds on the subject of 'England's North-West: New Views on Old Rocks'. Fred Dunning, Jack Soper, Nigel Woodcock and Dick Merriman presented exciting new research on the Ingletton Group (the oldest rocks at outcrop in Yorkshire) and on the Acadian and Variscan deformation in the region. Stewart Molyneux gave an impromptu update on new biostratigraphical data that strongly supports an Arenig age for the Ingletton Group. We look forward to a field excursion to the area sometime next year.

Earlier that day, Council considered, among many topics, publication of a revised third edition of 'Yorkshire Rocks and Landscape: A Field Guide', to follow on from the successful publication of the second edition of Northumbrian guide. The final decision will follow discussions with the printer and a drive for potential sponsorship. We were delighted to welcome new members of Council: Dr Martin Whyte, University of Sheffield, and known to many of you for his research on Jurassic dinosaur tracks; Jon Ford, BGS Keyworth, who is currently working on a revision of the Quaternary deposits and Jurassic rocks of the Vale of York; Dr John Gregory, consultant micropalaeontologist and associate of the Natural History Museum; and Teresa Graham, Open University, whose main interest is geochemistry.

The shocking events that have unfolded following the Indian Ocean earthquake and tsunami on 26 December, reminded us all of our restless planet and the often tragic impact on human life. The Society will be discussing geohazards and marine geology, including tsunamis, at our Durham meeting on 5 November. Meanwhile, scientific information about the Northern Sumatra earthquake and associated seismic activity in the region can be found on the BGS web site at www.earthquakes.bgs.ac.uk and the USGS web site at earthquake.usgs.gov/eqinthenews/2004/.

The Annual Programme flyer, included with this Circular outlines our varied and interesting indoor meeting and field programme for 2005, so please add them to your diaries. Our next meeting, at Sheffield, held jointly with the Sorby Society, promises to be very interesting. The subject, red-bed sediments, is a fitting tribute to Henry Clifton Sorby (Sheffield), probably the first clastic sedimentary petrologist in Britain, and will include a talk by Dr Bernard Besly one of the leading researchers in this field.

I hope you are finding the Council profiles of interest - four more this month!

John Powell

YGS COUNCIL MEMBERS

Mike Allderidge, Vice President

On graduating from Cambridge University in 1957 under Professors Bill King and Bulman, I spent the summer in Spitsbergen on one of the expeditions organised by W.B. Harland and Peter Friend. Later that year I joined the Geological Survey of British Guiana, where the first three items on the kit list were still "Dinner Jacket, white linen suit and oval tin bath!" The Survey was at that time producing a provisional geological (and in some areas cartographic) map of the mainly Precambrian metamorphic and igneous rocks of the Guiana Shield. Latterly I was also involved with pegmatites, aplites and some areas of chromium and copper mineralisation. In 1964, after a brief period with the Opencast Executive of the Coal Board, I joined the Iraq Petroleum Company, initially in the Exploration Department in Abu Dhabi where we discovered several new oilfields. Later, after spells in government liaison in Syria and Lebanon, I was in charge of the planning department in onshore Qatar dealing with oilfield development. I joined the YGS in 1956 (there were a lot of YGS members on the University staff then) and in the summer of 1991 took over as Treasurer until the end of 2004.



Dr. Trevor Morse, General Secretary

I came late to the profession as a geologist. After spending 24 years in the engineering industry, which also included a 6 years spell in the brewing industry, I joined the Department of Geology at the University of Durham in 1988. I gained a BSc (Hons) in Geology and was awarded a PhD for my research based in Cyprus, entitled 'Biostratigraphical Constraints (Calcareous Nannofossils) on the Late Cretaceous to Late Miocene Evolution of Cyprus'. I am currently self employed as a geological consultant, with contracts in academia and industry. I have been a member of the Society since 1987 and been a Council member since 1998 as your General Secretary.



Will Watts, Treasurer

I am currently employed as the Dinosaur Coast Project Officer at Scarborough Borough Council where my job involves running the Dinosaur Coast project and providing the geological input into the redevelopment of the Rotunda Museum. I did a geology degree at Leeds University and then worked briefly on the Burgess Shale in Canada before working at the Yorkshire Museum in York and then moving to Scarborough three years ago.



Having lived in North Yorkshire most of my life (I was born in Scarborough) I consider myself very lucky to be able to work in such a beautiful area using my geological training on a daily basis. The fantastic geology of the area combined with some great museums and people makes for a great office!

During my time at York I joined the YGS council and more recently took on the role of Treasurer, a role I am looking forward to tackling!

Pete Rawson, Vice President

My geological career started at the University of Hull, where I graduated in Geology in 1963. Then I completed a PhD there on the ammonites of the Lower Cretaceous Speeton Clay. That initial research has led me to some fascinating parts of the world, from Spitsbergen in the Arctic to as far south as Argentina - where most of my research has been concentrated over the last 11 years. On leaving Hull in 1966 I began an almost 40 year career in the University of London, initially lecturing at Queen Mary College then moving to University College London (UCL) in 1983, where I became a Professor of Geology. I took early retirement in 2003 to concentrate on my research and avoid yet another round of assessment paperwork, and am now an Emeritus Professor. During my career I have served as chair of the IUGS' International Subcommittee on the Cretaceous (1994-2004) and on the councils or committees of various learned societies. But the YGS remains my first love - I joined it when still at school in 1960, have served as editor of the Proceedings, and have been honoured to receive the Phillips Medal and to spend a thoroughly enjoyable two years as your just-retired President.



BACK NUMBERS OF PERIODICALS

Peter Kennett has sent a plea with regard to surplus YGS Proceedings and G S Journals. If you can help, please contact Peter directly.

Can anyone help relieve the weight on my floor joists? The following are free to any good home, so long as the person who wants them can collect them from Sheffield, or arrange a convenient delivery when I am passing their way.

Contact Peter Kennett. Tel 0114 2361271. Email: peter.kennett@tiscali.co.uk

Quarterly Journal of the Geological Society

Complete set from No: 448 (1956) to No: 495 (1968)

Proceedings of the Yorkshire Geological Society

Complete set from Vol.41.4 (1978) to Vol. 54.3 (2003)

CALENDAR

Although it is only just February it is time to start thinking about the YGS 2006 calendar. The 2005 calendar was a complete sell out, so don't be disappointed by missing out on your copy, register your interest with me as soon as possible at k-park@bigfoot.com. Why not get your camera out and make a name for yourself by winning one of the 12 coveted spots on the YGS 2006 calendar?

YGS member David Land has provided the following tips for all those wishing to take photographs for the calendar competition.

1. Use a tripod
2. Use a high f number for the aperture - f22 - to sharpen the image.
3. Set the aperture for the dark area, light areas look after themselves.

HELP REQUIRED

If you want to help your Society why not volunteer your services for one of the Working Groups or even a Committee? You can have your say and help guide the Society on various topics including Web, Circular, Science, Finance, Membership, External Affairs. For more details contact a Council member, or Trevor - (General Secretary) details on the back of this circular.

YORKSHIRE GEOLOGY MONTH - MAY 2005

The simple aim of this 'Yorkshire Geology Month' is to ask geologists, geology groups and people with interests related to geology to run one or more local geological events for the public in Yorkshire and the surrounding areas in May (or early June) 2005. If you or your organisation/company are interested in taking part please contact Mike Horne initially or visit www.horne28.freeserve.co.uk/ygm.htm for further details. It is also hoped that as a result of the month's activities an informal network of Yorkshire geologists will be created and those taking part will be invited to a 'gathering' during July 2005.

e-mail - m.j.horne@hull.ac.uk or write to 28 Salisbury Street, Hull, HU5 3HA.

FORTHCOMING YGS MEETING: 167th SESSION

BGS Keyworth, Saturday 19th March 2005 Joint meeting with the
East Midlands Geological Society.

Geology and climate: recent BGS research

LEICESTER LITERARY & PHILOSOPHICAL SOCIETY PUBLIC MEETING

Each year, the Geology Section of the Leicester Literary and Philosophical Society organises a one-day meeting that brings together expert speakers to address subjects of broad interest in a way that is accessible to the general public. This year's subject is:

EARTH, LIFE AND CLIMATE: 3 BILLION YEARS OF INTERACTION

Organised by Leicester Literary and Philosophical Society Section C (Geology), Saturday School, 5 March 2005 9.30 am - 5.00 pm Ken Edwards Building, University of Leicester

Speakers: Professor Mike Benton, Bristol University
 Dr Nick Butterfield, Cambridge University
 Dr Gavin Foster, Bristol University
 Dr Peter Skelton, Open University
 Professor Bob Spicer, Open University
 Dr Mark Williams, British Antarctic Survey

Talks will address the first three billion years of earth - life interactions, the evolution of carbonate skeletons and the effects on global climate, the emergence of the terrestrial flora, and the effects on weathering and geochemical cycles, new evidence of catastrophic environmental change during the end Permian Mass Extinction, geological processes, mountain building and climate change, and the past, present and future of global climate change.

For more details and a booking form see the website: www.le.ac.uk/gl/map2/ELC/

CORRESPONDING SOCIETIES

Contact society representatives for the latest information.

CRAVEN & PENDLE GEOLOGICAL SOCIETY

Yvonne James. Tel: 01282 813 772 or www.cpgs.org.uk

The Geology of Nova Scotia, Canada

Friday, 11th March

Speaker: Alison Quarterman BSc. (Hons), Huddersfield Geology Group

CUMBERLAND GEOLOGICAL SOCIETY

Nigel Courtman. Tel: 01229 861 478 or www.cumberland-geol-soc.org.uk

AGM & "Presidential Address"

Wednesday, 23rd February

Speaker: Angela Marchant - Title to be announced

The Friends Meeting House, COCKERMOUTH

Palaeodontology - Probing the Teeth of the Earliest Vertebrates

Wednesday, 16th March

Speaker: Dr Howard Armstrong, University of Durham

Tullie House Museum, Carlisle

EAST MIDLANDS GEOLOGICAL SOCIETY

John Wolf e-mail: sec@cmgs.org.uk or www.emgs.org.uk.

The dating Game - One man's search for the age of the Earth

Saturday, 5th March

Speaker: Dr Cherry Lewis, University of Bristol

HUDDERSFIELD GEOLOGY GROUP

Julie Earnshaw (Secretary). Telephone: 01484 311 662 or e-mail: earniehome@ntlworld.com

Frambooidal Pyrite in Sediment

Monday, 7th March

Speaker: Leonard Love

Greenhead College, Room F8, Startt 7.15pm

The Wakefield gate and other tracks over Southowram to link the geology and history of the area

Sunday, 13th March

Leader: David Shore

10.00am - 4.00pm. Meet at car park near Hipperholme lights (SE 125255)

between A58 and A649. Walk to Halifax and back (6-7 miles).

Bring waterproofs, packed lunch, walking boots. Walking sticks/poles needed for steep, slippery setted footpaths.

HULL GEOLOGICAL SOCIETY

Mike Horne. Tel: 01482 346 784 (after 7.30 pm)

or e-mail: m.j.horne@hull.ac.uk or www.go.to/hullgeolsoc

Quaternary Wetlands: the muddy time machine

Thursday, 17th February

Speaker: Dr. Jane Bunting, University of Hull

The Oil Industry and AGM

Thursday, 17th March

Speaker: David Hall

LEEDS GEOLOGICAL ASSOCIATION

Anthea Brigstocke (General Secretary). Tel: 01904 626 013.

E-mail: abrigstocke@hotmail.com or www.leedsgeolassoc.freeserve.co.uk

National Science Week

Thursday, 17th March

The Extraordinary Life and Work of Alfred Wegener

Speaker: Dr Clare Dudman, University College, Chester.

Author of "Wegener's Jigsaw".

LEICESTER LITERARY & PHILOSOPHICAL SOCIETY

Chairman: Andrew Swift. Tel: 0116 252 3646 or e-mail: as48@le.ac.uk

Parent Body Lecture

Monday, 21st February

The Ancient Human Occupation of Britain (AHOB) Project

Speaker: Professor Chris Stinger, Natural History Museum, London

To be held at New Walk Museum, Leicester

Volcanism, impact and mass extinctions:

Wednesday, 23rd February

incredible or credible coincidences?

Speaker: Dr Rosalind White, University of Leicester

MANCHESTER GEOLOGICAL ASSOCIATION

Jane Michael. Tel: 0161 366 0595, e-mail: jammymjane@aol.com or www.mangeolassoc.org.uk

Afternoon Seminar - Living with Volcanoes

Saturday, 19th March

Anatomy of a crisis: the Montserrat Volcanic Emergency 1995-1999

Speaker: Dr Peter Kokelaar, University of Liverpool

Emplacement and Environmental Impact of Flood Basalt Volcanism

Speaker: Professor Steve Self, The Open University

Listening to Volcanoes

Speaker: Dr Jurgen Neuberg, University of Leeds

The use of remote sensing and other techniques to improve our understanding of how volcanoes work

Speaker: Professor Harry Pinkerton, University of Lancaster

NORTH EASTERN GEOLOGICAL SOCIETY

Frank Trowbridge. Tel: 01642 582 786, e-mail: frank.trowbridge@care4free.net
or www.northeast-geolsoc.50meps.com

A new look at old dates: the age and significance of the
Outer Hebrides Fault Sone, Scotland
Speaker: Dr Jonathan Imber

Friday, 18th February

AGM

Probably some considerable discussion about the future of N.E.G.S.
Therefore, if time permits, some geological videos will be shown

Friday, 18th March

NORTH EAST YORKSHIRE GEOLOGY TRUST

Mike Windle. Tel: 01947 881000, e-mail: contact@neyorksgeologytrust.com

Scarborough Library Concert Room Lecture
Start: 7.30pm

Tuesday, 15th February

Scarborough Rotunda Museum Guided Walk - William Smith Trail
Start: 11.00am

Sunday, 27th February

Scarborough Library Concert Room Lecture
Start: 7.30pm

Tuesday, 8th March

WESTMORLAND GEOLOGICAL SOCIETY

Mrs P. M. Wilson. Tel: 01539 533 198 or www.wgso.fsnet.co.uk

AGM & Presidential Address
Speaker: Dr. Stuart K. Munro
Start: 7.45pm

Wednesday, 16th March

OTHER SOCIETIES OF INTEREST

EAST MIDLANDS REGIONAL GROUP OF THE GEOLOGICAL SOCIETY

Ed Hough e-mail: eh@bgs.ac.uk

LANCASHIRE GROUP OF THE GEOLOGISTS' ASSOCIATION

Norman Catlow. Tel: 01772 727 577 or e-mail: norman@catlow4736.freemove.co.uk

SORBY NATURAL HISTORY SOCIETY

Ken J Dorning. www.shu.ac.uk/city/community/sorby/secgeo.shtml

YORKSHIRE REGIONAL GROUP OF THE GEOLOGICAL SOCIETY

Isla Smail. Tel: 0113 242 8498, e-mail: isla.smail@arup.com

SUBMISSION OF PAPERS

Manuscripts for publication in the Proceedings should be submitted to *'The Editors, Proceedings of the Yorkshire Geological Society, Geological Society Publishing House, Unit 7, Brassmill Lane Enterprise Centre, Brassmill Lane, BATH, BA1 3JN'*. Typescripts should be prepared using the updated instructions for authors given on the inside back cover of the latest issue (Volume 55 Part 2, November 2004).

Publication of manuscripts may be expected in the next, or next but one part, following acceptance. The proceedings will be abstracted and/or indexed in, *GeoArchive, GeoRef, Geobase, Geological Abstracts and Mineralogical Abstracts, Research Alert and Science Citation Index Expanded (SCIE)*.

COPY FOR CIRCULAR

The next indoor meeting will be a joint meeting with the East Midlands Geological Society. Held on 19th March 2005, BGS Keyworth. Recent BGS Research. Copy deadline for Circular 523 is the 19th February 2005.

GENERAL SECRETARY

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