

A Registered Charity
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Circular 519



YORKSHIRE GEOLOGICAL SOCIETY

President: Professor Pete Rawson

GLACIAL LANDFORMS

JOINT MEETING WITH HULL GEOLOGICAL SOCIETY



*Sewerby, East Yorkshire,
Ipswichian Interglacial cliff
and beach, exposed*

September 1976

SATURDAY 6th NOVEMBER 2004 From 1400 - 1650

SPEAKERS: PROFESSOR JOHN CATT, JOHN CAREY,
SIMON PRICE & JON FORD

DEPARTMENT OF GEOGRAPHY, UNIVERSITY OF HULL,
COTTINGHAM ROAD, HULL

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YGS 2004

GLACIAL LANDFORMS

- 1400-1650 SATURDAY 6TH NOVEMBER 2004
- 1400-1410 Introduction and Society announcements
Dr Neil Aitkenhead (Vice President)
- 1405-1445 A Review of the Pleistocene Glaciations of eastern Yorkshire
Professor John Catt (University College London)
- 1445 - 1525 Landslide Geomorphology of Cayton Bay, North Yorkshire
John Carey, Dr Paul Fish and Dr Roger Moore (Halcrow Ltd., Birmingham)
- 1525 - 1600 Tea and Coffee
- 1600-1645 Three-Dimensional Visualisation and Modelling of the
Glacial Landforms of the Vale of York
Simon Price and Jon Ford (British Geological Survey, Keyworth)
- 1645 - 1650 Closing Remarks

From 1330-1400 and from 1525-1600 there will be displays of specimens by members of Hull Geological Society.

Front cover picture: In the foreground is the marine erosion surface (about 125,000 BP) about 1m above present sea level. The solid chalk of the fossil cliff is seen on the right, with the chalk cobbles of the raised beach piled against it. The beach is covered by chalky rainwash and blown sand (120,000 BP). Across the upper part of the photo is the Late Devensian Skipsea Till (18,000 BP).

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.

A REVIEW OF THE PLEISTOCENE GLACIATIONS OF EASTERN YORKSHIRE

Professor John A. Catt

Department of Geography, University College London, Gower Street, London WC1E 6BT

Because of its continuous coastal exposures of glacial deposits, most of which are now fairly well dated, Holderness is regarded as the type area for the later Pleistocene sequence of Yorkshire. The oldest glacial deposit in this area is the Basement Till, which underlies the Ipswichian (MIS 5e) Interglacial marine beach at Sewerby. Likely correlatives of the Basement Till underlie the pre-Ipswichian Calcethorpe Till at Welton-le-Wold (east Lincolnshire), and at Warren House Gill (Durham) contain crystalline erratics which were weathered during an interglacial. At Dimlington the Basement Till is overlain by the Dimlington Silts and Sands, which contain an arctic fauna and flora and have been dated by the radiocarbon method to 18,500 and 18,240 BP. These deposits are in turn overlain by the Skipsea and Withernsea Tills, which were probably deposited by a single ice advance in the Late Devensian between 18,000 and 13,000 BP. The Skipsea Till is correlated with the Lower Till Series exposed in Filey Bay and other coastal areas of North Yorkshire and with the Blackhall Till of eastern Durham. In Holderness the Withernsea Till is restricted to an arcuate coastal area between Hornsea and Easington, but reappears north of Flamborough Head as the Upper Till Series of Filey Bay. It can probably be traced northwards as far as the Lower Tees Valley, but has no equivalent further north. Its erratic suite suggests it was deposited by ice that originated mainly in the southern Lake District and crossed the Pennines by the Stainmore Gap. In the Darlington area the Stainmore ice stream divided against the northwestern flank of the North York Moors, one portion overriding the Blackhall/Skipsea ice in Lower Teesdale and the North Sea Basin, and the other forming the Vale of York trunk glacier.

LANDSLIDE GEOMORPHOLOGY OF CAYTON BAY, NORTH YORKSHIRE

Jon Carey, Dr Paul Fish and Dr Roger Moore

Halcrow Group Ltd, Lyndon House, 62 Hagley Road, Edgbaston, Birmingham B16 8PE

This paper describes the geomorphology of a large coastal landslide complex at Cayton Bay, North Yorkshire. The area inland of the landslide is occupied by a strategically important road and a number of properties, and knowledge of current landslide behaviour and possible future scenarios is therefore important for future planning and risk. Instability at the site is associated with a series of faults which bring argillaceous Upper Jurassic rocks to sea-level. These soft rocks are overlain by more resistant sandstones. The sequence is capped by a thick and variable series of glacial sediments, that comprise tills with inter-bedded sand and gravel lenses, deposited during the Dimlington Stadial of the Late Devensian. In connection with the development of a future coastal strategy for Cayton Bay, detailed geomorphological field mapping was conducted which identified two major landslide systems. These include a periodically active mudslide complex at Cayton Cliff, recognised by a series of shallow scarps and benches with occasional back-tilted blocks, and an area of dormant deep-seated landslides at Tenants' Cliffs, that includes a series of graben and horst structures. The origins of the landslides are unclear, but probably involved a variety of processes that led to a reduction in material shear strength or increases in pore water pressures. The timing of original failure may relate to deglaciation following the Dimlington Stadial, or periods of wet climate in the Holocene. Since sea-levels were not higher than present in the Holocene along this stretch of the coast, coastal erosion is not thought to have been a factor. The causes of the contemporary instability are likely to be due to the combined effects of coastal erosion and of groundwater, both of which are predicted to increase in future years due to the impacts of climate change. The implications include increasing risks to coastal assets and a need to manage and mitigate such risks.

THREE-DIMENSIONAL VISUALISATION AND MODELLING OF THE GLACIAL LANDFORMS OF THE VALE OF YORK

Simon Price and Jonathan Ford

British Geological Survey, Keyworth, Nottingham, NG12 5GG).

The Vale of York occupies a topographic depression between the Pennines in the west and the Yorkshire Wolds in the east. In contrast to the high-relief landscapes associated with the surrounding upland areas, this lowland region is characterised by a landscape of flat plains, low ridges, and broad fluvial systems. This landscape has evolved as a direct result of glacial and post-glacial processes and their associated deposits. Appreciating the nature and spatial relationship of these deposits is fundamental in understanding the local glacial history. Recent advances in computing geoscience have contributed to a range of tools and methodologies that allow these spatial relationships to be modelled and visualised. Ongoing geological mapping by the British Geological Survey in the Vale of York is employing these techniques to improve the accuracy of the geological map. By integrating over 2000 digital borehole records, historical topographical data, Digital Elevation Models and field observations, we are able to represent and visualise the glacial landforms and deposits in 3-dimensions. The effective integration of these datasets is facilitated by modern Geographical Information Systems and 3-dimensional modelling software. This approach allows us to improve on the conventional 2-dimensional geological map by representing the full spatial distribution of the glacial sequence. The 3-dimensional modelling has revealed a concealed, and previously poorly understood, sequence of up to 35 metres of Quaternary deposits. A complex succession of pro-glacial lake sediments, tills and glaciofluvial deposits is shown to overlie deeply eroded and weathered Mesozoic strata. Three-dimensional modelling and visualisation allows us to generate a product that increasingly satisfies modern user requirements. Through appropriate attribution, enhanced 3-dimensional modelling of the glacial deposits can be applied to flood prediction, hydrogeological modelling, and development support.

DISPLAYS OF SPECIMENS BY MEMBERS OF HULL GEOLOGICAL SOCIETY

Display - Stefan Ramsden - "Recent acquisitions at Hornsea Museum include two excellent pieces of mammoth (or elephant?), a tooth and a tusk, found on the beach near Mappleton by Christopher Brogden. The tooth was found in the sand after a storm in July 2004, and the tusk section was found in the same spot in September. The museum hopes that members of the society may be able to tell us more about these remains. (Hornsea Museum is currently closed for the winter, but will open for a week at schools' half term. Phone 01964 533443 for more information.)"

Display - erratic fossils from Holderness found by Stuart Jones

Display - The distribution of glacial erratics on the Holderness Coast, by Mike Horne. For nearly twenty years members of the Hull Geological Society have been recording erratics seen on field trips as an informal revival of the East Riding Boulder Committee. Some of the results are presented in this display showing the distribution of certain rocks and fossils on maps of the coast. Certain rocks and minerals can be found almost everywhere along the coast for example Larvikite and Black flint. Others seem to have definite distribution patterns - Kimmeridge Clay, Speeton Clay fossils and lias fossils being more common in the stretch between Hornsea and Withernsea; Brockram and Rhomb Porphyry being common everywhere but that stretch; and Gryphea being common in most places except Flamborough Headland and Dimlington/Easington.

Display - Bones, shells and erratics from Keyingham Gravel Pits by Stephen Whitaker

A WORD FROM THE PRESIDENT

Our 'winter' indoor programme started with an excellent meeting at the University of Hull's Scarborough campus on 16-17 October - possibly the first time that our Society has ever held a general meeting in Scarborough. Unusually, the event had been advertised in advance by an article in the local evening paper, and this helped to bring in about 100 attendees for Saturday's talks, dedicated to the theme of 'William Smith and early geologists on the Yorkshire coast'. Hugh Torrens and Simon Knell together provided a fascinating insight into the considerable influence that William Smith had on the development of geology in Yorkshire. Smith also played an important role in the building of Scarborough's Rotunda Museum, and Lord Derwent described both the history of the museum and the current proposals for its redevelopment as a major geological centre. He also brought along his William Smith maps of the Hackness Hills which were received with great enthusiasm.

On Sunday morning about 30 members and guests visited the Rotunda under the guidance of one of our Council members, Will Watts, before being led by Peter Robinson, another Council member, on an excursion over the adjacent Middle Jurassic strata of South Bay. Here the highlight was the discovery of several dinosaur footprints exposed in recently fallen blocks from the Scalby Formation.

Before these public meetings the Programme Sub-Committee and Council met. Next year's programme is almost finalised and the first three meetings are listed elsewhere in this circular. The full 2005 programme of indoor and field meetings will be issued as usual in January. Among the items considered by Council were a preliminary report from Noel Worley on the meeting of northern geological societies that he attended on our behalf and which had been called to consider issues common to us all, such as raising the public awareness of geology, recruitment, and field safety. Many of the points raised are covered in our Forward Plan and will be considered further as the plan is followed through. Our editors reported an encouraging increase in the number of papers submitted for consideration for publication in the Proceedings after a rather fallow period.

Now we look forward to another joint meeting with our many friends in the Hull Geological Society.

Pete Rawson

ANNUAL DINNER

The annual dinner will be held on Saturday 4th December 2004 at 6.00 pm for 6.30 pm after the AGM. As usual, it will be at the King's Manor, York . The cost of the tickets will be £18.00 and should be booked with, and cheques made payable to, Dr Trevor Morse; for address & telephone number, see back of Circular. Please tell Trevor at the time of booking if you wish to have a vegetarian meal or have other dietary needs. Dress is smart informal and guests are welcome to the dinner. The closing date for booking is 19th November 2004.

MENU

*Ballantine of Salmon and Herbs
with a Dill and Tomato Dressing*

*Dartoise of Chicken with Mushrooms
with a Selection of Fresh Seasonal Vegetables*

*Tiramisu with
Caramelised Banana*

*Fresh Filtered Coffee
with Continental Chocolates*

Please note, reviews of books and publications reflect the view of the individual reviewer and in no way necessarily reflect the view of Council or the Society as a whole.

British Lower Carboniferous Stratigraphy.

P J Cossey, A E Adams, M A Purnell, M J Whiteley, M A Whyte and V P Wright. Geological Conservation Review Series, No 29, Joint Nature Conservation Committee, Peterborough. 617p. ISBN 1 86 107 499 9

Lower Carboniferous rocks are responsible for some of the most spectacular Pennine scenery that has attracted geologists, mostly from the north of England, who have established a long and distinguished heritage of research work. These studies have yielded important ideas about contemporary concepts in basin evolution, metallogenesis, the development of evolutionary theory, the understanding of ancient marine tropical environments, and development of Karst landscapes. The Lower Carboniferous is believed to provide some of the finest examples of cyclical carbonate ramp sequences in the World.

Many of the finest classic exposure localities are described in the latest 29th volume in the Geological Conservation Review Series. The aim of this series is to provide a public record of the features of interest in geological sites that have been notified or are being considered for notification as Sites of Special Scientific Interest. The Review identifies over 140 sites in England Wales and Scotland and provides a description and interpretation of the merits of each with the emphasis on the contribution to the development of scientific understanding. The sites are grouped into nine areas of classic Lower Carboniferous Stratigraphy over half of which are located within the north of England.

This book contains a wealth of detail and its reference section is so extensive that it must represent an almost complete bibliography of academic work on the British Lower Carboniferous. Each account commences by tracing the history of geological research for each area. The stratigraphical nomenclature is dealt with clearly and with a good range of illustrations and annotated black and white photographs, most of which have been well reproduced. The descriptions are extensively

illustrated with helpful diagrams, however they would of have perhaps benefited from the more frequent use of geological maps for each locality to augment the generalised maps used to introduce each area.

Lower Carboniferous rocks are characterised by geologically interesting mineral deposits considered to be a fluoritic variety of the Mississippi Valley Type. No suitable localities seem to have merited inclusion in the Review and this seems to be an omission.

Nevertheless the book represents a valuable work of reference and important resource for researchers and those with an interest in the British Lower Carboniferous and should be in the geological shelves of every institutional library.

Noel Worley

YGS WEB SITE

Patrick Boylan, our Web Editor, has been busy working on the YGS web site, building on the already excellent work of his predecessor Paul Kabrna. The site features a new web-links page, which has a lot of additional information about the geology of our region, local, national and international organisations, and about geological topics in general. I am sure Patrick would be pleased to hear from you if you have a link that could be added to the site. Please take a minute to have a look at www.yorksgeolsoc.org.uk. Again I am sure Patrick would like to have your comments and ideas.

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 the month.

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

FORTHCOMING MEETINGS OF THE YGS

York, Saturday 4th December 2004

AGM and Presidential Address :
Professor Pete Rawson
The Speeton Clay in its global setting.

167th SESSION

Leeds, Saturday 22nd January 2005

England's north-west: new views on old rocks

Sheffield, Saturday 19th February 2005

Joint meeting with the Sorby Society,
Clastic Sedimentology - Red-bed sediments

BGS Keyworth, Saturday 19th March 2005

Joint meeting with the East Midlands Geological
Society.
Topic to be announced.

CORRESPONDING SOCIETIES

Contact society representatives for the latest information.

CRAVEN & PENDLE GEOLOGICAL SOCIETY

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

Life in the Precambrian - Evidence from Down Under

Friday, 19th November

Speaker: John Nudds Ph.D., University of Manchester

Anatomy of a Crisis: the Montserrat Volcanic Emergency 1995-99

Friday, 10th December

Speaker: Peter Kokelaar Ph.D., University of Liverpool

CUMBERLAND GEOLOGICAL SOCIETY

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

The Burgess Shale Fossil Fauna: New Light on the Mysteries of Evolution

10th November

Speaker: Prof. Simon Conway Morris, University of Cambridge

Westlakes Institute, Whitehaven. This is a public lecture and

it is necessary to book a seat. Contact Wendy McBain 01946 514112 or

email: wendy.mcbain@westlakes.ac.uk

Members Evening - Short presentations by members of the Society

10th December

The Friends Meeting House, Keswick

EAST MIDLANDS GEOLOGICAL SOCIETY

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

The Building Stones of Northamptonshire

Saturday, 13th November

Speaker: Dr. Diana Sutherland, Honorary Visiting Fellow,

University of Leicester

Extension Tectonics in the Afar Triangle

Saturday, 11th December

Speaker: Dr Tony Waltham (Nottingham Trent University)

EAST MIDLANDS REGIONAL GROUP OF THE GEOLOGICAL SOCIETY

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

Geoconservation - RIGS and LGAPs explained.

Tuesday, 7th December

Speaker: Dr Cynthia Burek.

Please confirm if you are attending as numbers are required for refreshments.

HUDDERSFIELD GEOLOGY GROUP

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

The End-Permian mass Extinction - New Developments Monday, 8th November
 Speaker: Paul Wignall. Greenhead College, Room F8. Start: 7.15pm

Silurian and Carboniferous Rocks in Ribblesdale Sunday, 14th November
 Leader: Phil Robinson. From 10.00 - 4.00pm, meet at pub car park in Helwith Bridge on B6279, N of Settle (SD 811695).
 Bring waterproofs, packed lunch and walking boots.

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

Geological Wanderings Around the World Thursday 18th November
 Speaker: Barrie Heaton

Confessions of a Chalkoholic Thursday, 9th December
 Speaker: Paul Hildreth

LANCASHIRE GROUP OF THE GEOLOGISTS' ASSOCIATION

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

LEEDS GEOLOGICAL ASSOCIATION - 130th ANNIVERSARY PROGRAMME 2004

Anthea Brigstocke (General Secretary). Tel: 01904 626 013.
 E-mail: abrigstocke@hotmail.com or www.leedsgeolassoc.freeserve.co.uk

The Antiquity of Human Behaviour Thursday 11th November
 Speaker: Dr. Laura Bishop, John Moores University, Liverpool

AGM and Conversazione - short talks and displays by members Thursday 9th December

LEICESTER LITERARY & PHILOSOPHICAL SOCIETY

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

Aspects of New Zealand Geology

Speaker: Dr Ian Sutton

(School of Continuing Education, University of Nottingham)

Wednesday, 17th November

Carboniferous Coal Swamp Extinction:**An Alternative Hypothesis from China**

Speaker: Dr Jason Hilton (School of Geography,

Earth and Environmental Sciences, University of Birmingham)

Wednesday, 1st December

MANCHESTER GEOLOGICAL ASSOCIATION

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

Life in the Precambrian - Evidence from Down Under

Speaker: Dr. John Nudds, University of Manchester

Wednesday, 17th November

Mineral Deposits and Environmental Mineralogy

Speaker: Dr Linda Campbell, University of Salford

Wednesday 8th December

NORTH EASTERN GEOLOGICAL SOCIETY

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

Investigating NE England Geology Using New Digital Fieldwork and Visualisation Methods

Speaker: Dr. Ken McCaffrey. Joint meeting with the Russell Society.

19th November

Members' Night Topics:**Mount Etna - Tectonic Background and Recent History**

Speaker: Mike Simmons

10th December

Geology of the Taupo Volcanic Zone, New Zealand

Speaker: Gordon Wilkinson

SORBY NATURAL HISTORY SOCIETY

Ken J Dorning, e-mail: geology@sorby.org.uk
or www.shef.ac.uk/~es/

WESTMORLAND GEOLOGICAL SOCIETY

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

Drying Out of the Mediterranean:

A Six Million Year Story of Climate and Tectonics

Speaker: Dr. Rob Butler, University of Leeds

Wednesday 17th November

Members' Evening and Jacob's Join

An opportunity for members to share current projects,
display samples, air their queries or give a short presentation

Wednesday 15th December

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 1, May 2004).

Publication of manuscripts may be expected in the next, or next but one part, following acceptance. As a result of the change in publishing arrangements 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

Copy deadline for Circular 520 is the 6th November. The next indoor meeting will be held on the 4th December 2004 at the University of York. AGM and Presidential Address.

Copy deadline for Circular 521 is the 4th December 2004.

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