The GEOLOGICAL Society of Norfolk
Newsletter
Number 79, 2010
www.norfolkgeology.co.uk

Front cover photograph by Steve Hardwick: GSN field trip to Hunstanton cliffs.

The Society

The Geological Society of Norfolk exists to promote the study of all aspects of the geology of Norfolk (and farther afield when appropriate). As an amateur society, special emphasis is placed on providing lectures and field trips that are designed to appeal to members of the public.

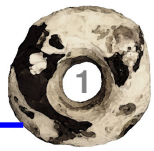
Membership fees:

Ordinary: £10
Student in full-time education: £5
Institutional (libraries, councils, businesses, colleges, universities, *etc.*): £28

Subscriptions are due annually on 1st February

Instructions for Authors

Material intended for publication in the *Newsletter* should be submitted electronically (either on a CD or by e-mail) to the Editor (Dr David Waterhouse, inside back cover for details). It should be in Times New Roman font size 12. A single-page article is typically around 650 words long. Please supply all images separately, not embedded in the document. Ideally, images should be as JPG or TIFF files, at 300 dpi. All references must be given in full. The Editor reserves the right to refuse or alter articles for publication.



Editorial

There have been a number of changes to the GSN committee lately (please see *Geological Society of Norfolk Officers* section, inside the back cover). After eight years of dedicated service to the GSN the former General Secretary, Elvin Thurston, has retired from major roles. I was formally elected to the positions of General Secretary and Newsletter Editor in a committee meeting on Wednesday 21st April 2010. I'd like to take this opportunity to thank Elvin for all his hard work – I'm sure over the coming months I'll be finding out just how much work he put into the job!

For those of you who don't know me, by way of introduction, I have written a short profile below:

I was born and raised in the village of Pontarddulais, near Swansea, South Wales, where my passion for natural history was nurtured. After completing A levels in Biology, Geology, Art and Graphic Design, I studied for a joint honours degree in Biology and Geology at the University of Bristol. I stayed on at Bristol to study for a Postgraduate Certificate in Education (teaching Science GCSE and A level Biology) and a Masters degree in Palaeobiology.

I then moved to Ireland where I gained a research scholarship for a PhD in Evolutionary Biology (The Evolutionary Relationships of Parrots [Aves: Psittaciformes] to be exact!). To pay my way through university, I had various jobs, including: student hall senior resident, head demonstrator, zookeeper, and freelance illustrator and designer. Whilst at University College Dublin, I was lucky enough to be invited on a *Tyrannosaurus* dig in Montana, USA. One of only 15 *T. rex* skeletons ever found, 'Thomas' the *T. rex* is now on display at the Natural History Museum of Los Angeles County, California.

I moved to Norfolk in 2007 to take up my current position as Assistant Curator of Natural History for Norfolk Museums and Archaeology Service (NMAS). I have been actively involved as a committee member of the GSN since 2007, and helped with events such as *Chalks Away!* at the Forum, Norwich, and *Norfolk Rocks!* at Norwich Castle Museum. Since Nigel Larkin (the former Curator of Geology at NMAS) left to go 'freelance', my work in the Natural History Department has increasingly included geological and palaeontological identifications.

I have also been involved in the Leverhulme-funded Ancient Human Occupation of Britain archaeological excavation at Happisburgh on the northeast Norfolk coast, for the past three years. The work being done there is a real crossover between the fields of: glacial geology, sedimentology, palaeontology and archaeology. Whilst no human fossils have been found at Happisburgh, there are cores, flakes and flake tools dating from the Lower Palaeolithic.

Selected publications:

Dyke, G.J. and Waterhouse, D.M. 2001. A mousebird (Aves, Coliiformes) from the Eocene of England. *Journal für Ornithologie* 141, 7–15.

Dyke, G.J., Waterhouse, D.M. and Kristoffersen, A.V. 2004. Three new landbirds from the early Paleogene of Denmark. *Bulletin of the Geological Society of Denmark* 51, 47–56.35.

van Tuinen, M., Waterhouse, D.M. and Dyke, G.J. 2004. Avian molecular systematics on the rebound: a fresh look at modern shorebird phylogenetic relationships. *Journal of Avian Biology* 35, 191–194.

Waterhouse, D.M. 2006. Parrots in a nutshell: The fossil record of Psittaciformes (Aves). *Historical Biology* 18(2), 223–234.

Waterhouse, D.M., Lindow, B.E.K., Zelenkov, N. and Dyke, G.J. 2008. Two new fossil parrots (Psittaciformes) from the Lower Eocene Fur Formation of Denmark. *Palaeontology* 51, 575–582.

Society membership:

The Geological Society of Norfolk
The Palaeontological Association
Society of Vertebrate Palaeontology and Comparative Anatomy
Natural Sciences Collections Association
The Wildfowl and Wetlands Trust
Arthritis Research UK

David Waterhouse
General Secretary and Newsletter Editor
The Geological Society of Norfolk

The Scandinavian legacy in the Quaternary record for eastern Britain (abstract)

Peter Hoare (The University of Sydney)

GSN Presidential Address (Thursday 1st April 2010)

Introduction

Scandinavian indicator erratics are widely regarded as appearing for the first time in the British Quaternary in the Happisburgh Till (NE Norfolk), the oldest undisputed till in Britain's Quaternary record, and in other members of the Happisburgh Formation. Since Scandinavian ice failed to reach East Anglia, these indicators must have been carried into the path of the British-based Happisburgh ice prior to its fullest development. We attempt to show how this exotic material assumed its present distribution throughout East Anglia and the east Midlands.

Invasion of the Scottish mainland and northern isles by Scandinavian ice

Scandinavian ice advancing S out of Oslo fjord was often compelled to follow the SE–NW aligned, 200–400 m deep, Norwegian Channel. As early as the Fedje Glaciation (MIS 34; 1.1 Ma ago), ice escaped the confines of the channel and approached the E coast of Scotland. Mega-scale glacial lineations beneath the North Sea bed record the path taken by Devensian ice, a 'modern' analogue for earlier events. The Hythie Till in Buchan, E Aberdeenshire, was deposited by ice flowing E in MIS 2. It contains rhomb porphyry erratics, firm evidence that Scandinavian ice advanced inland from the Buchan coast before the last interglacial. Scandinavian indicators were also dropped onto the North Sea bed for later entrainment by British ice.

The extent of the Happisburgh ice sheet in East Anglia

Several attempts have been made to determine the extent of Happisburgh ice in East Anglia from the outcrop and subcrop of the formation. The limit that coincides with the course of the Bytham River has been proposed most vigorously.

Much of East Anglia was covered by Lowestoft ice, increasing the dispersion of Scandinavian indicators

Scandinavian erratics lie far beyond even the most extravagant reconstruction of the extent of the Happisburgh ice sheet. This lack of correspondence must be due to the part played by Lowestoft ice in MIS 12, the most widespread glaciation of eastern England. This ice advanced over Happisburgh Formation sediments and was responsible for (i) a reduction in extent of the main body of the Happisburgh Formation, (ii) an increase in the number of Happisburgh Formation outliers, and (iii) the reworking of Scandinavian erratics into the Lowestoft Formation. The patterns of advance of the ice ([i] NW–SE; [ii] N–S) are adequate to resolve an alleged 'inexplicable distribution': the present extent of Scandinavian erratics in East Anglia and the east Midlands. Putative post-MIS 12 glaciations may also have re-worked these erratics.

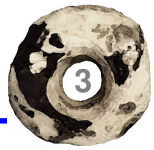
Evidence from new work in the northern North Sea and on ice-sheet modeling

Recent reconstructions of the Devensian glaciation of the northern North Sea Basin and computer simulations suggest convergence of British and Scandinavian ice on a number of occasions. The associated glacier flow paths may help to explain the incorporation of Scandinavian indicators into British ice.

Much has been made (by some) of a possible fresh introduction of Norwegian material to the Briton's Lane Formation, north-central Norfolk. The 'fresh influx' proposal is based on quite flimsy grounds. Once Scandinavian indicators reached eastern England they survived periodic reworking due, in no small part, to their durable nature.

For the future

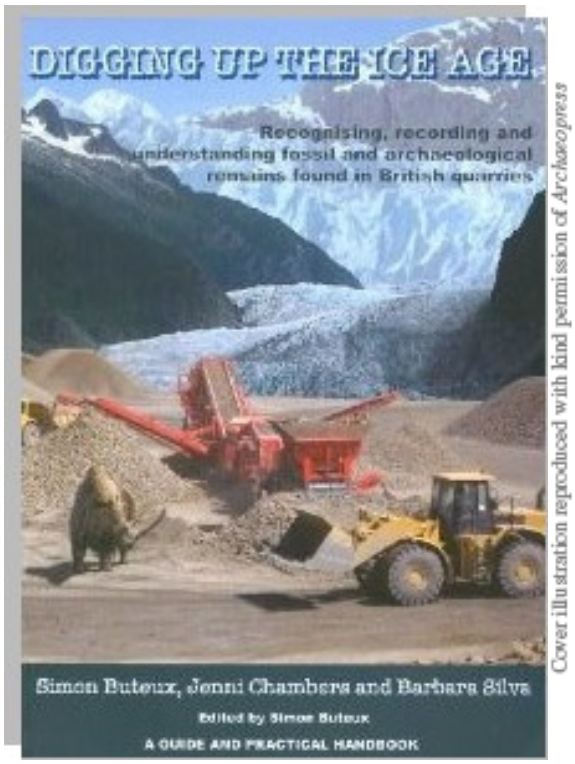
What we have failed to do, but hope to rectify (Hoare & Connell, forthcoming) includes (i) connecting rhomb porphyry erratics in East Anglia with particular lava flows in Oslo fjord, (ii) confirming the presence of erratics from Swedish and Finnish bedrock sources in the region (by this means, the dynamics and changing configurations of the Fennoscandian ice sheet might be better understood), and (iii) determining the relationship between the Happisburgh ice sheet and the Bytham River. Elsewhere, others are attempting to establish beyond reasonable doubt the number and timing of glacial events to have influenced the North Sea Basin and eastern England.



Book Review

Buteux, S (editor) 2009. *Digging up the Ice Age – recognising, recording and understanding fossil and archaeological remains found in British quarries.* Archaeopress, Oxford. [£16.49 including postage from www.archaeopress.com]

Review by Robin Stevenson



Cover illustration reproduced with kind permission of *Archaeopress*

The Quaternary is where archaeologists and geologists rub shoulders, and where there are huge opportunities for mutual co-operation. However, neither of them may be fully conversant with each other's techniques and concerns, nor able to recognise areas significant to the other. This book, which claims to be a 'Guide and Practical Handbook', seeks to address these issues. It is aimed at, "…geologists, archaeologists, those charged with caring for the natural and historical environment, anybody with an interest in our past and future, and not least those working in the quarry industry".

A brief opening chapter emphasises the importance of the quarrying industry in exposing the evidence that enables environmental reconstruction, before launching into a brief but lucid chapter on Quaternary science and climate change. This covers everything from the causes of glacial cycles to marine oxygen isotope stages and the significance of river terraces, and ought to be enough to get most people up to speed for what follows.

Human evolution and Ice Age Britain is the title of the next chapter, which sets out the main phases in human evolution, as seen from a UK perspective. The text, and the excellent maps and diagrams do, however, make clear the connections that existed with mainland Europe and beyond. This account is very up to date, including references to the Pakefield site.

Given that entire texts are devoted to sediments it is, perhaps, not too surprising that the next chapter, on Sediments, is rather weak. It starts by briefly outlining their classification, provides summary descriptions of some of the main types of lithology that might be encountered as clasts and provides photographs of some of them. These really are not very useful, and are liable to create more confusion than help. There are some nice photographs of sedimentary environments, such as braided rivers, but I can't help feeling it would have been better to have reduced these in size and offered more by way of explanatory text.

The next chapter, on Fossils, romps through vertebrates and hominids, before concluding with sections on equally important, if less spectacular, organisms like molluscs, beetles and plants.

The title of the next chapter: 'What remains? Archaeology' seems rather overstated since, in fact, it is mainly focussed on the production of stone tools. However, it is particularly useful in that it includes a series of photographs showing stages in tool working; these ought to make it easier for non-archaeologists to actually recognise worked material.

'Actually Dating the Ice Age' is the focus of the ensuing chapter: this covers relative dating methods before progressing to numerical methods, starting with an explanation of the theory behind, and uses of, radiocarbon dating, before progressing to deal with Optically Stimulated Luminescence & Amino Acid Racemisation. This is useful background for anyone reading around the Quaternary, but I am not convinced that it was worth devoting a whole page to photographs of equipment that most of

the intended readership will never see, let alone use.

The last chapter is, in some ways, the most important since it offers practical guidance on how to record Ice Age sites, focussing on Recognition, Recording, Recovery and Reporting. The chapter starts by outlining the advisory and policy context, moving swiftly on to H & S issues, before getting down to the real meat. The next sections, although succinct, cover all the main points. I would, however, have thought it useful to have included filled-in examples of the two recording forms that are tucked away in the appendices.

The book concludes with a very comprehensive glossary, guide to Further Reading, and list of Useful Organisations and Websites. The glossary could have usefully included cross-references to some of the previous illustrations, as well as some illustrations of its own – which would have been more useful than some of the pictures provided earlier. It was also slightly surprising that the reading guide to Glaciers and Glacial Environments did not include the very comprehensive texts by Benn & Evans (1998) or French (2007).

This book attempts a great deal, and, in general, it succeeds. As a geologist I felt it treated sediments rather weakly; however, I am sure that archaeologists will probably feel that 'their' bits were treated inadequately too. Nonetheless, if I were asked to recommend this as a text either to a complete beginner, or to guide a geologist with only a limited knowledge of archaeology, or to any of the other groups targeted by the authors, then I would recommend it unhesitatingly. It is clearly written, well illustrated, and offers useful and practical advice on how to become engaged with the field. If every quarry owner could be persuaded to leave a copy in their work canteen, then real progress in reporting finds might well result.

References

Benn, D.I. and Evans, D.J.A. 1998. *Glaciers and Glaciation*. Edward Arnold, London

French, H.M. 2007. *The Periglacial Environment (3rd edition).* John Wiley, Chichester.

Paper Abstract

Relevant article and paper abstracts are reproduced in this section of the *Newsletter*. GSN members are invited to submit suggestions of recent papers relating to Norfolk geology to the Editor.

Rose, J. 2010. The Quaternary of the British Isles: factors forcing environmental change. *Journal of Quaternary Science*, 25, 399–418.

This paper considers the processes that have controlled cool temperate latitude terrestrial environments over the last ca 3 Ma, with particular reference to the British Isles. A scheme is proposed that is based on the processes that act on the land over any given period of time and are the product of climate modulated by rock type (the resisting agent) and relief (determined by tectonics and antecedent relief-forming factors). Climate is generalised in terms of the range and rates of climate change determined by orbital forcing. During precession cycles climate change was small and insolation levels were forced by chemically and biologically driven processes. The period of obliquity cycles is characterised by patterns of climate change in which physical processes became effective and high-magnitude fluvial and slope processes were reinforced by periglaciation and glaciation in susceptible regions. Eccentricity cycles include climate extremes of longer duration, and glaciation and periglaciation were the major contributors to landscape change, sediment transfer and sediment mixing. These climate-forced processes produce distinctive landform, sediment and soil assemblages characteristic of particular episodes of Quaternary time. The lags between the successive systems are identified.

Norfolk Geodiversity Partnership Autumn News 2010

Jenny Gladstone

The aims of the Norfolk Geodiversity Partnership are to record, conserve and promote appreciation of the county's geological and geomorphological diversity.

Membership of the Partnership is still growing and we hope eventually to involve as many organisations and individuals whose work can help look after Norfolk's geodiversity as possible. If you or your organisation wants to join, please contact one of the following:
Secretary: John Hiskett, Norfolk Wildlife Trust
johnh@norfolkwildlifetrust.org.uk
Chairman: Ian Levett, Natural England
ian.levett@naturalengland.org.uk
Convenor: Jenny Gladstone, GSN
jennygladstone@aol.com

We continue to respond to public planning consultations and try and ensure that the planners have the geodiversity information that they need in order to draw up the new generation of strategic plans (LDFs). This planning work is achieving positive results for Norfolk's geodiversity and we are increasingly being consulted by planners and developers at the initial stages of development.

We expect the next consultation stage of the county Minerals Site Allocation within the next few months (for an account of the situation so far please see the article by Tim Holt-Wilson in the spring edition, N°. 77, of the GSN *Newsletter*). You may recall that most of our suggestions from an earlier stage in the consultation process had been accommodated within the preferred options stage, but that there were still a small number of site proposals that we thought needed more attention to development conditions, and just two areas that we thought ought not to be developed at all. These were at Earsham in the Waveney Valley and Ringland Hills to the north-west of Norwich. Our objections to these sites gaining further permissions for aggregate extraction were on the grounds of loss of special geomorphology.

Of course anyone has the right to object to a site development, and many other organisations have objected to the further destruction of the Ringland Hills, however geologists are in the delicate position of depending on the good will of quarry owners for access to quarries and so there is a balancing act to maintain. Some geologists think that we should only provide information and recommendations to the planners and never object to any site development, whilst those of us who are actually engaged in the planning work think that the whole point is to get the best deal for future geodiversity. Either way, our comments and objections are only as good as the reasoned arguments that we present to the planners, and it is the planners and the planning inspectors who will make the final decision on any site.

We would welcome GSN members' personal experiences and/or views on this stony problem. I think that this work on the Norfolk Mins and Waste plans will result in a greater recognition of what is geologically unique in Norfolk, as well as producing site restoration plans which will include retention of accessible faces rather than complete infill or re-grading.

The Norfolk Geodiversity Action Plan is about to be published. It has recently evolved into two documents: Norfolk's Earth Heritage is the main publication outlining Norfolk's geodiversity along with lots of very useful information; and the working GAP itself in the form of an easily updateable short insert. We anticipate that both sections will be made available to all GSN members in the form of a free CD, or a printed version at the subsidised price of £5 for those members who would like the document, but do not have access to a computer.

We anticipate that Norfolk RIGS will meet this autumn to consider site selection and designation. This group consists almost entirely of GSN geologists and two members have volunteered to be the named contacts for their local sites.

The Geo-East website should be visited at www.geoeast.org.uk and includes a photo gallery. Photographers are invited to add their favourite geological pictures.

Mystery Geology Object

As a bit of fun, in each issue of the *GSN Newsletter* there will be a mystery object for you to try to figure out! The answer will be published in the next issue along with the name of the first member to get the answer right.

If you think you recognise what this geological object is, send an e-mail to the Editor at:
david.waterhouse@norfolk.gov.uk
or, alternatively write to:
Dr David M Waterhouse
Assistant Curator of Natural History
Norfolk Museums and
Archaeology Service
The Shirehall, Market Avenue
Norwich NR1 3JQ

The *Bulletin* goes on-line

Peter Hoare

Abstracts of all the papers published in the *Bulletin of the Geological Society of Norfolk* between 1953 and 2009 are now available on-line (a small number of articles appeared without an accompanying abstract). Preparatory work was carried out by UEA student Richard Caplin with Julian Andrews (Julian acknowledges that Richard did 99.9 % of the task) over the summer of 2009, and Alister Cruickshanks, the Society's web site manager, was responsible for presenting the material on-line. Our sincere thanks go to them for their efforts and for the appearance of this most valuable resource. The on-line material may be found at http://www.norfolkgeology.co.uk/bulletin.htm.

Question for GSN members:

Does anyone know when the last traditional doughnut lime kiln was fired in Norfolk? If anyone has that information please send to jennygladstone@aol.com. For pictures of the recent field kiln burn at Whitlingham Country Park please go to: http://sgihosting.co.uk/gallery/Whitlingham_lime_burn.

GSN Treasurer, Jenny Gladstone at the lime kiln burn at Whitlingham, September 2010

Norfolk's own Mammillated Sarsen?

Russell Yeomans and Jenny Gladstone

This headless lady was found on the beach below the slumping cliffs at Sidestrand. After much head scratching and visits to Ipswich museum we are both pretty convinced that she is a mammillated sarsen. The stone is a crystalline quartzite with no evidence of toolmarks or obvious glacial striations. She has a pitted skin-like surface on her bubbly faces and is crystalline on her two flattish faces. She is smaller than some sarsens, being about 200 mm by 200 mm by 140 mm.

Mammillated sarsen on Sidestrand beach

Is she a first for Norfolk? If not, we would love to know of others, along with their find spots. Please contact Jenny Gladstone with your replies:
jennygladstone@aol.com

New Publication

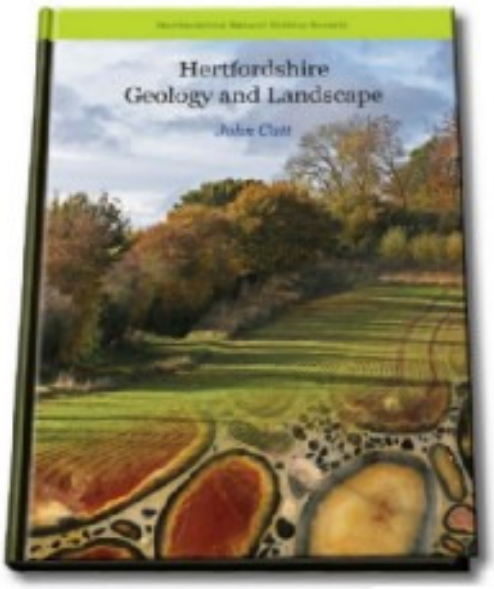
Catt, John (editor) 2010. *Hertfordshire Geology and Landscape*, Hertfordshire Natural History Society with Hertfordshire Geological Society, Welwyn Garden City.
[pre-publication price: £29 before November 15th 2010 from www.hnhs.org]

Publisher's description:

A major new work on Hertfordshire's earth heritage and its fundamental influence on geodiversity and biodiversity.

A4 format, hardbound, about 400 pages, illustrated in colour throughout with over 200 maps and photographs. The book gives a comprehensive and authoritative account of the basic geology of the county and its relationship with a wide range of topics, including soils, ecology, agriculture, prehistoric archaeology, hydrogeology, mineral resources and building stones.

The editor John Catt worked on soil research at Rothamsted and is Hon. Professor of Geography at University College London. The chapter authors include John Catt and local experts from the Hertfordshire Geological Society.
The ten chapters, illustrated by over 200 photographs, maps, diagrams and figures, cover:
• The character of Hertfordshire and an introduction to its geology
• Concealed bedrock geology – Chalk – Palaeogene deposits – Neogene period – The Quaternary and landscape development
• Soils, agriculture and plant ecology
• Prehistoric archaeology and human occupation
• Hydrogeology, water supply and waste disposal
• Mineral resources and church building stones.



This book is for everyone interested in the county and its natural history as well as professional geologists, physical geographers, soil scientists, archaeologists, ecologists and conservationists.

More details of this and Hertfordshire Natural History Society's other books are available on their website at www.hnhs.org
Enquiries to secretary@hnhs.org
Order and pay online or send your order and cheque to:
HNHS, 24 Mandeville Rise, Welwyn Garden City, AL8 7JU.

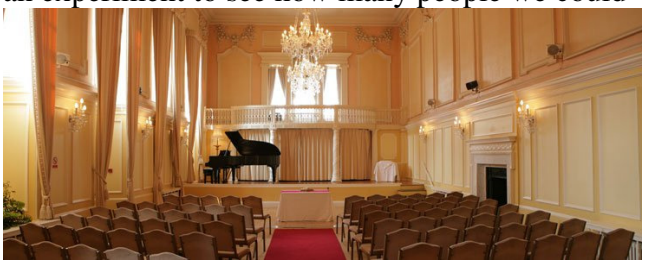
GSN Public Lecture: a mammoth success!

David M Waterhouse

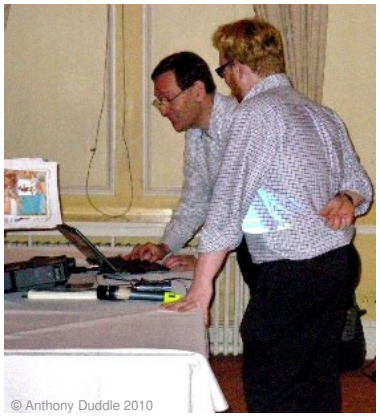
'Of Mammoths and Men' GSN Public Lecture (Thursday 28th October 2010)

We were up against 'late night shopping' (with only seven weeks left until Christmas!), not to mention Norwich Beer Festival! But, in the end the fascinating subject of mammoths won out (at least to over 100 people who made it to this season's first GSN lecture).

Of Mammoths and Men by world authority on mammoths, Professor Adrian Lister (Natural History Museum, London) turned out to be a wonderful evening of educational entertainment. The Music Room at the Assembly House was a suitably grand setting for such a big subject, and everything seemed to go without a hitch. Adrian split the lecture up into easy to understand sections, with topics like, mammoth biology, mammoths in pre-historic art, and mammoth extinction. His excellently presented lecture was an experiment to see how many people we could entice out to listen to a talk about geology. Luckily we weren't disappointed and extra seats had to be found as the room was filled to bursting 20 minutes before the talk was due to begin.



The wonderful setting of the Music Room at the Assembly House, Norwich



Adrian Lister and David Waterhouse checking the equipment prior to the talk

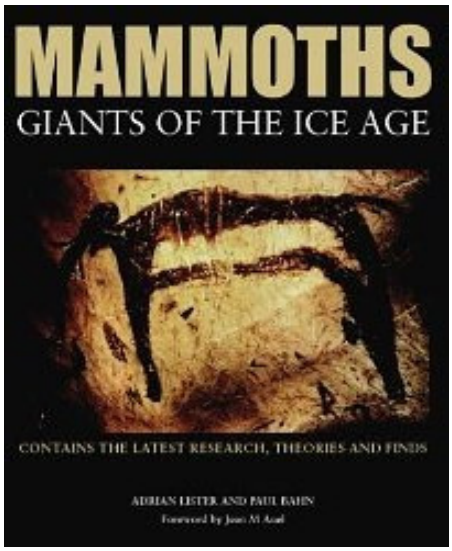
As well as the lecture, several GSN members and committee members helped out by talking to people as they arrived, giving out leaflets and membership forms and manning the handling table full of mammoth teeth and casts of West Runton Elephant bones. I would like to take this opportunity to thank everyone who helped out, both on the evening and in the lead-up to the event.

For those of you who were not able to make it to the lecture, details of Professor Lister's popular book are below (and, no we aren't on commission!).

Related Publication

Lister, Adrian and Bahn, Paul 2007. *Mammoths: Giants of the Ice Age,* Frances Lincoln, London. [£12.99 including postage from www.amazon.co.uk]

Publisher's description:



Vital to the survival of Ice Age man, mammoths developed almost in tandem with humans before dying out around 4,000 years ago. Cousins rather than ancestors of the elephant, they roamed the earth from Africa and North America to the frozen north, where their remains are now most commonly found.

A wealth of spectacular discoveries have shed new light on these Ice Age giants. This new edition includes the latest research and details of recent discoveries from California to Siberia. Lavish illustrations and copious photographs bring these astonishing creatures vividly to life.

Winter Lecture Series 2010

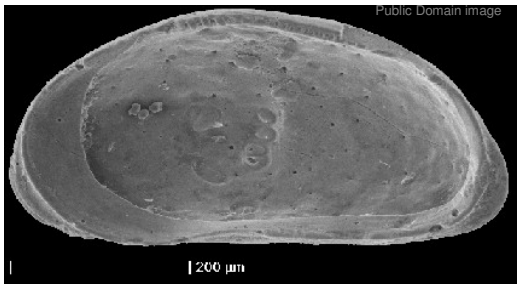
The age of the Middle Pleistocene glacial succession in Norfolk and its relevance for Palaeolithic archaeology

Dr Richard Preece (The University of Cambridge)
7.30pm, Thursday 18th November 2010
Zuckerman Institute for Connective Environmental Research (ZICER) Building
University of East Anglia, Norwich

New palaeoenvironmental insight into the Bramertonian and Baventian stages of the Norwich Crag using fossil and recent ostracods (Crustacea)

Dr Adrian Wood (University of Coventry)

7.30pm, Thursday 9th December 2010
Gallery, Friends' Meeting House, Upper Goat Lane, Norwich



Cyamocytheridea *sp. inside right valve. Eocene (about 49 million years ago) of Nederokkerzeel, Belgium*

Deglaciation of the British ice sheet in northern East Anglia

Dr Hannah Evans (British Geological Survey, Edinburgh)
7.30pm, Thursday 20th January 2011
Gallery, Friends' Meeting House, Upper Goat Lane, Norwich

The Paul Whittlesea Memorial Lecture: A Chalk revolution (with a Norfolk twist)

Professor Rory Mortimore (The University of Brighton)
7.30pm, Thursday 17th February 2011
Gallery, Friends' Meeting House, Upper Goat Lane, Norwich

Reconstruction of the Chalk Sea, some 90 million years ago, showing rays, belemnites, ammonites, coelacanth, sharks, sponges and a mosasaur

Public Notice:

Geological Society of Norfolk **members are invited to a public exhibition by**

EARSHAM GRAVELS LTD

Established 1949

For the proposed extraction site for sand and gravel at Manor Farm, Haddiscoe

On Tuesday 30th November 2010, 9am to 8pm
At Haddiscoe Village Hall

Members of the public will be able to view information about the proposals made by *Earsham Gravels Ltd*. Representatives of the company will be present throughout the day to answer questions.

The Geological Society of Norfolk Officers:

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Other Committee Members include:

Adrian Read (Quaternary research)
Clare Horne (Publicity)
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Nigel Larkin (Research Associate, Norfolk Museums Service)
Donna Cousins (Activities for young people)
Elvin Thurston

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