

Newsletter of the Geological Society of Norfolk

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Edited by the General Secretary



A mid-Pleistocene mammalian fossil being excavated by Nigel Larkin a few years ago at Norton Subcourse. Nigel says he will be returning to Norfolk this year

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Nigel Larkin & **David Waterhouse** (Norfolk Museums Service).

Currently we have the following lectures lined up for the 2009-10 lecture season

Thursday 8th October:

'The Dead Parrot Society: the fossil record of parrots', by Dr David M Waterhouse, Assistant Curator of Natural History, Norfolk Museums and Archaeology Service

Parrots are one of the most instantly recognizable groups of modern birds. Today, parrots can be found in most tropical parts of the world, although most species are found in the southern hemisphere – Australasia and South America.

Surprisingly, the few early fossil parrots that have been discovered so far are all from the northern hemisphere (Walton-on-the-Naze, England; Messel, Germany, Isle of Mors, Denmark; *etc.*), with only a few, relatively recent parrot remains being found within their present range.

Parrots are a group of birds with a complicated and elusive past, with fossils remaining very rare. Those fossils that have been identified are often the subject of much debate.

Quaternary landscape evolution of the Thetford district - Helen Burke & Jonathan Lee.
October 29th

Deglaciation of the British Ice Sheet in northern East Anglia during the Middle Pleistocene - Hannah Evans & Emrys Phillips. November 12th

Prof Rose will update us on recent research in January 2010

& **Peter Riches** will discuss Pleistocene sea level changes in early 2010.

The Paul Whittlesea Memorial Lecture in 2010 will be given by Prof Marcus Key on Bryozoans, Paul's favourite subject.

Saturday 27th June at the Forum in Norwich – a chalk fossil display and identification event.

I think we have the title as 'Chalks Away'. There will be posters and some hands on things like looking at chalk fossils and possibly some give away objects (belemnites). GSN people will be on hand to help identify finds and explain the chalk etc. Not sure too many other details have been finalised but I think it's an all day event, although again exact time have not been finalised.

Papers Published Recently

Geochemical constraints on the origin of enigmatic cemented chalks, Norfolk, UK, G Woolhouse, J E Andrews, A Marca-Bell, & P F Dennis, *Geol. Mag.* **146**(2), 2009, pp 291-299

Back in 2001 Paul Whittlesea showed me this photograph that he had previously taken of a hollow chalk structure on the North Norfolk coast after a storm had removed the surrounding beach. At about that time there was a query about it in *Geology Today*. So we submitted a reply (Thurston E & Whittlesea P, 2002, "Norfolk Mystery explained." *Geology Today*, **18**, pp15-16) in which we explained this curious structure as being the remnants of a sink-hole in the chalk lined with very hard cemented chalk that is resistant to erosion. We speculated that the original sink-hole had been formed under cold conditions because of the relatively high solubility of calcium carbonate in water at low temperatures.



We also attempted, without thinking very deeply, to explain subsequent deposition of calcite on the walls of the sinkhole to restricted access of carbon dioxide when the area was completely covered by an ice cap (although we did not attribute this to the last glaciation *per se* as attributed to us by Woolhouse et al. in this paper).

However we neglected to imagine the involvement of an interglacial in which, as now seems obvious from this paper (!), if land levels were high enough, the water table would have dropped, encouraging evaporation, consequent release of carbon dioxide from percolating water within the sinkhole, and deposition of calcite onto the walls.

In a well-written paper that is well worth reading, Woolhouse et al agree that sinkholes like this formed under cold conditions. But from analysis of carbon isotope ratios of the chalk cements, they have shown that the percolating water that deposited the calcite on the walls of the sinkhole had passed through biologically active soils, consistent with temperate conditions. Moreover the oxygen isotope composition of the cement precludes the presence of glacier-derived water during deposition. Taken together, the isotope data suggest that cementation occurred under interglacial conditions with a climate similar to that of the present. The calcite deposited is attributed to dissolution of reworked chalk in overlying MIS 12 glacial tills.

Some of the cementation contains Wroxham Crag material, consistent with deposition in the late Pleistocene. Thus previous explanations such as that involving formation of a karstic surface before deposition of the Wroxham Crag, which overlies the chalk under the tills, are not supported.

Elvin Thurston

Can you review a paper that you have read that is relevant in any way to East Anglian Geology? Please submit a review to the Editor, or at least draw it to his attention!

Micro-tephra in the West Runton Freshwater Bed: Preliminary results

S Brough, J Barclay, J E Andrews, and D Bescoby, accepted for publication in Quaternary International in 2008.

Avid readers of our Bulletin will have noted that, although rocks containing a relatively high ratio of metals to silica such as basic volcanic rocks weather to produce smectic clay, the relative abundance of this type of clay in the West Runton Freshwater Bed is instead best attributed to diagenetic alteration of illite clays, probably in a marshland environment (S. Brough & J Andrews, (2008) *Bull. Geol. Soc. Norfolk*, 58, pp 63-78). But, in spite of this finding, the authors of this paper have investigated further.....

Abstract

A volcanic mineral assemblage is present throughout the 20–120 µm size fraction of the Middle Pleistocene West Runton Freshwater Bed, Norfolk, UK. Glass shards are extremely rare but are present mainly at one horizon. This micro-tephra assemblage is indicative of a potassic mineral suite, possibly from an evolved phonolitic or trachytic melt. Mineralogical and electron microprobe data are inconsistent with a tephra source from mid Atlantic ridge sites and the amphibole and alkali feldspar components are more evolved than early Quaternary mineral assemblages from West Eifel volcanism in Germany. The mineral assemblage and geochemical compositions are most similar to those from the Mont Dore area (Massif Central, France) and the Italian volcanic complex of Mount Vulture in the southern Apennines. Taken alone these preliminary data are not strong enough to infer a deposit age. However, the age ranges for volcanism at both Mont Dore and Mount Vulture are similar (500–800 ka); the presence of micro-tephra from either of these sources is wholly consistent with other age estimates for the West Runton Freshwater Bed (>500 ka and <780 ka) supporting deposition during either the interglacials of marine isotope stages 15 or 17.

Field Trips

Hunstanton – a joint meeting with the Beds & Luton Group: The date set is **Saturday 4th of July**. We will meet at 10.30, at the cafe at the top of the cliffs (TF6729.4127). Aim to arrive early in order to find somewhere to park; it may be necessary to park quite a long way back from the sea front. Mike Hurn will also be in attendance, to demonstrate his techniques for extracting microfossils from the Red Chalk, and to share his expertise on the palaeontology.

We are invited to join our friends in Suffolk on:-

Sat 11 July - visit to Sutton Knoll SSSI to see recent conservation work, the new information board and the first Pliocene 'forest' in Suffolk for over 3 million years. There is also Coralline Crag and Red Crag, and an exhumed Pliocene island to be seen! Meet at Sutton picnic site on the B1083 Woodbridge to Bawdsey road TM 306475 at 10.30am. Bring a packed lunch, and we'll take you to another site in the afternoon.

& Sat 10 October - Ipswich walk, to see sarsen stones, septaria and pudding stone within the town. Meet at Ipswich Museum at 2pm. (Recommend park & ride or train.) This is a joint meeting with the local Open University Geology Society.

THE VALUE OF OLD RECORDS

Many geological exposures are, even on human timescales, fairly ephemeral. Pits and quarries, road cuttings, etc., are all liable to change quite drastically, often within years and certainly within decades. And, unless accurately recorded, valuable geological information may be lost forever. Even if accurate records are made they may remain hidden in private notebooks, which may later be lost or destroyed. The introduction into legislation of the concept of Geodiversity, with its strengthening of the possibilities for protecting sites, plus a growing interest in developing sites for educational and touristic purposes, has led to the present involvement of the Society with the Geodiversity Partnership, and in evaluating the present condition of known key sites.

Figure 1. *North Creake Parish Pit, July 2008.*



Recently Mike Hurn took a small group to Whin Hill Quarry, North Creake (North Creake Parish Pit (TF872380) to evaluate its present condition – best summed up as ‘not brilliant’. However, he also showed us photographs and field notes which he had made back in March 1989. These showed, very dramatically, the amount of information that can be lost in less than twenty years.

Figure 1 shows the main face at the western end of the pit, as it exists today, whilst Figure 2 shows it back in 1989.



Figure 2. *North Creake Parish Pit, March 1989.*

As Figure 2 shows, that is all trace of the chalk gravel which formed the lower part of the exposure has been lost.

Figure 3 shows a close up of part of the face, which reveals a more detailed picture of the complex inter-digitations between the flint and chalk gravels.

The stratigraphy recorded was:

UNIT THICKNESS	
Top soil	0.4m
Sand with large flints	1.3m
Dark grey loam	0.3m
Orange-brown sand	2.0m
Chalk gravel	3.0m
Obscured base	1.0m

Whilst this is, perhaps, not the most sophisticated or technically accurate record of the section which could have been made, nonetheless it is a record which – in the possible absence of others – is very valuable in helping us make decisions about the conservation value of sites.

Figure 3. *North Creake Parish Pit, showing coarse bedding in both chalk and flint gravels, plus the complex relationships between the two lithologies. Mike's notes also record the presence of fragments of Red Chalk, indicating transport over a distance of about 19km from the west, whilst his records of the fossils in the chalk clasts may provide further detail about transport distances. How large must the clasts have been originally, to survive transport over these distances? And what does that tell us about the energy levels involved?*



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The present interest in Geodiversity should alert us all to the importance of preserving old site records, and ensuring that our notes and photographs are properly archived and stored. Digital photography makes it much cheaper to take, and store, multiple photographs of sites, whilst hand-held GPS devices make it easier to record exactly where a photograph was taken, though it is still necessary to record separately the direction the camera was pointing!

This is another field in which members of the Geodiversity Partnership need to become active: the collection, curation, collation, preservation and dissemination of old records. This will, of course, require resources – of time, space, and money. Once these have been found, then all of us who hold records of the local geology, whether as notebooks, photographs or collections, need to make provision in our

wills (or whatever) to ensure that they go to the relevant body.

Mike's original records have been scanned and edited slightly, and are available as an e-mail attachment to anyone who would like a copy – please send a request to crs111@talktalk.net as Mike is not on e-mail. Please bear in mind, however, that these are records made by an amateur without any formal training in geology, or access to professional literature; a professional would obviously make more informed interpretations, and (perhaps) be able to make more accurate identifications. All the specimens he describes are housed in the Castle Museum in Norwich.

Robin Stevenson

Further to Jenny Gladstone's article in the last newsletter about exotic stones in Norfolk churches Martin Warren has sent in the following:-

I have noticed sandstones with flint in North Norfolk churches too.

On the foreshore at Sidestrand, the eroded glaciotectionic chalk rafts occasionally have fairly solid ferruginous sandstone blocks in close association, where the chalk rafts also carry the Lower Pleistocene sediments piggy-back. These are indurated lenses that occur in the Sidestrand Sands (=Norwich Crag, =Wroxham Crag). As well as occurring on north Norfolk beaches, it is very possible that they have been elevated by glaciotectionism and may occur at or close to the surface inland. I am sure they would have been avidly collected for building material.

EVENT ANNOUNCEMENT.....

Chalk's Away *Saturday 27th June 2009 9am till 5pm*



A public event organised by the Geological Society of Norfolk, in conjunction with Norfolk Museums and Archaeology Service and the Norfolk Geodiversity Partnership.

A Chalk East project supported by Natural England.

Chalk fossils from the Cretaceous period lurk in Norfolk cliffs, fields and beaches. But how many are really fossils and how many are just 'rum owd stones'? Can you tell chalk from cheese? Bring your specimens and find out more.

Contact 07730581363 forumchalkevent@alfa44.freemove.co.uk

Web site open soon www.geo-east.org.uk

If there are any GSN members willing to help at this event we would be very glad. Please contact Clare Horn on the above contact details.

Notice

Normally this newsletter would have included the Minutes of the AGM but since it is quite large enough already I have decided to wait until the September issue.

Editor

Norfolk Geodiversity Partnership. A short report to GSN members for the year 2008/09

In 2006, the Norfolk RIGS group reconvened with additional members. Changes in government policies and the promotion of Local Geodiversity Action Plans by Natural England encouraged the group to widen its remit. In 2007 it grew into Norfolk Geodiversity Partnership and formally started a Geodiversity Action Plan process for Norfolk.

The Partnership is currently drawn from a number of interested organisations including: the Geological Society of Norfolk; Natural England; Norfolk Wildlife Trust; UK RIGS; the British Geological Survey; Norfolk County Council; Norfolk Biodiversity Partnership; Breckland Council; South Norfolk Council; The Landscape Partnership; University of East Anglia.

Its aims are to record, conserve and promote appreciation of the county's geological and geomorphological diversity. The preparation and implementation of a Norfolk Geodiversity Action Plan is vital to this process.

Ongoing and Completed Work for 2008/2009

We have read and responded to 22 Local Development Framework planning documents during the last year. The aim is to get geodiversity written into the forward planning process so that existing geological sites and features will be protected and new ones created. There are many more district plans in production so this work will be ongoing for a year or two yet.

2008 saw Tim Holt-Wilson complete the Geodiversity Database of known Norfolk geological sites. We hope to assess the condition of Norfolk's four RIGS in the coming year and to set up two more.

In Feb 2008 we produced a geodiversity edition of the GSN Newsletter and have included updates in subsequent GSN Newsletters. There will be a geological edition of North Norfolk AONB's summer newsletter with contributions by members of NGP.

In March 2008 we ran a Norfolk GAP meeting to sample geologists' and planners' ideas for the future. Thanks to all who attended. And in February 2009 we organised a Breckland Geodiversity Awareness day in co-operation with Breckland council officers. Tim Holt-Wilson and Gilbert Addison put on morning lectures and led afternoon site visits. We hope to run a similar day for another council soon.

We are still working on the Draft Norfolk Geodiversity Action Plan.

Future Plans include organising Norfolk's contribution to Chalk East (a Geo-East initiative). GSN and NGP are running a public chalk fossil ID day at the Forum in Norwich on Sat 27th June. Other events at the planning stage include a Chalk Box for schools, and a lime burning event at Whitlingham Country park in autumn 2009 or spring 2010.

Jenny Gladstone
Convenor Norfolk Geodiversity Partnership