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The Geological Society of Norfolk exists to promote the study and understanding of geology in East Anglia, and holds meetings throughout the year.



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**THE FIRST APPEARANCE OF SCANDINAVIAN INDICATORS IN EAST
ANGLIA'S GLACIAL RECORD**

P.G. Hoare^{1,*} and *E.R. Connell*²

¹ School of Geosciences,

University of Sydney, Sydney, New South Wales 2006, Australia.

² Department of Geography and Environment, GeoSciences School,

University of Aberdeen, St Mary's, Elphinstone Road, Aberdeen, AB24 3UF, UK.

*email: pgh@ventifact.co.uk

ABSTRACT

Lee et al.'s, (2004a) claim that Scandinavian indicators do not occur in the earliest (Middle Pleistocene) part of the glacial succession of coastal East Anglia is shown to be mistaken. Norwegian rhomb porphyry clasts may be found with relative ease in the Happisburgh Till Member, the oldest till in the region and, indeed, in the whole of Britain. Lee et al.'s, (2004a) failure to discover such material during field and laboratory work is thought to be due to the sparse gravel component of many of the tills, the rarity of Scandinavian rock-types within that gravel fraction and the size distribution of these exotic clasts. Rhomboporphyry erratics may have been introduced afresh into the glacial sequence during the deposition of the Briton's Lane Sand and Gravel Member. The significance of the little-studied East Anglia-wide distribution of Scandinavian material is briefly discussed.



**FIRST RECORD OF PHRAGMOcone AND ALVEOLAR CAVITY OF THE
CHALK BELEMNITE *GONIOTEUTHIS***

Paul S. Whittlesea

8 Eaton Old Hall, Hurd Road, Eaton,
Norwich, Norfolk, NR4 7BE, UK.

ABSTRACT

*Two variably complete belemnite guards preserving the alveolar cavity (alveolus) and phragmocone believed to belong to the Chalk belemnite **Goniot euthis** Bayle, 1879 were discovered in Chalk-derived flint cobbles collected from glacial sediments at Whitlingham gravel pits, near Norwich, Norfolk. These specimens provide the first data on the alveolus and phragmocone of this belemnite genus and contradict some earlier speculations on their possible composition.*



EVIDENCE FOR LOWER MAASTRICHTIAN BRYOZOAN PACKSTONES AND WACKESTONES IN THE NORFOLK CHALK

Paul S. Whittlesea

8 Eaton Old Hall, Hurd Road, Eaton,
Norwich, Norfolk, NR4 7BE, UK.

INTRODUCTION AND MATERIAL

Chalk-derived, rounded flint and chert pebbles and cobbles containing silicified or partially silicified fossils and matrix of a former bryozoan limestone, have recently been collected from the north Norfolk coast between Sheringham (NGR TG 159 445) and Cromer (NGR TG 219 424) and from the southern shore of recently closed gravel pits at Whitlingham (NGR TG 257079), 2 km ESE of Norwich. The pebbles and cobbles are typically of oblate-irregular shape (<10 cm across), usually with a distinctive grey or white core and yellow, orange, ruddy or brown cortex (usually the latter). Almost pure white angular chert pebbles are much less common. While not rare at these two localities the fossiliferous pebbles constitute <0.01% of the clasts present.

In some specimens both the former limestone matrix and fossils have been silicified. In other specimens just the matrix is silicified while former calcitic or aragonitic skeletal elements have been partially or completely dissolved leaving voids or moulds. Favourably orientated, unworn external moulds of fossils can be cast using modelling clay or silicone rubber to enable species level identification, although in many cases it is not possible to identify them below family taxonomic level.

No formal abstract available for this paper.

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UPPER CRETACEOUS CONIFER TWIG PRESERVED IN FLINT FROM WHITLINGHAM GREAT BROAD, NORWICH

Paul S. Whittlesea

8 Eaton Old Hall, Hurd Road, Eaton,
Norwich, Norfolk, NR4 7BE, UK.

INTRODUCTION

A flint pebble collected from a beach of glacially-derived gravels at Whitlingham Great Broad, near Norwich (NGR TG 255 079) contains a distinctive blue-white opalescent fossil. Initially, it was thought the fossil was a fragment of fish skeleton, as fish scales, teeth and bones are known to occur in these types of flints. However, examination with a binocular microscope revealed clearly the grain of wood together with alternating leaf insertion scars. Scanning electron microscopy (SEM) further revealed the presence of possible parenchymal cells, i.e. thin-walled cells of variable size and form. SEM examination of a modern larch twig, first with the bark removed to reveal the outer surface, and then of the inside of the bark from the same twig provided reference images. Comparison with the modern larch twig confirms that the flint fossil represents the inside of the woody part of a twig immediately below its junction with the bark. The individual leaf scars are 1.75 - 2.00 mm long and 0.55 - 0.8 mm wide.

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**PATHOLOGICAL BELEMNITE GUARDS FROM THE UPPERMOST
CAMPANIAN CHALK OF NORFOLK**

Paul S. Whittlesea

8 Eaton Old Hall, Hurd Road, Eaton,
Norwich, Norfolk, NR4 7BE, UK.

ABSTRACT

Although pathological belemnites are rare in the uppermost Campanian Chalk of Norfolk they are described here from two localities near Norwich. The commonest pathology is interpreted as a congenital growth defect and provides insight into tissue growth and repair mechanisms. A scarcer pathology is attributed to non-fatal predation, rare examples of which enable estimates to be made of the thickness of tissue enveloping the guard. These pathologies also inform debate on possible feeding strategies used by some belemnite predators. Evidence of intra-specific interactions is also discussed.



**TEMPORARY EXPOSURE OF NORWICH CHALK AT THE UNIVERSITY OF
EAST ANGLIA CAMPUS, WEST NORWICH**

P.S. Whittlesea¹, J.E. Andrews², and M.R. Leeder²

¹ 8 Eaton Old Hall, Hurd Road, Eaton,
Norwich, Norfolk, NR4 7BE, UK.

² School of Environmental Sciences,
University of East Anglia, Norwich, NR4 7TJ, UK.

INTRODUCTION

During the last few years a number of temporary exposures of Chalk and Quaternary sediments have been created by building work on the University of East Anglia campus in west Norwich. One of the largest of these was created during excavation of the footings for the ZICER (Zuckerman Institute for Connective Environmental Research) building (NGR TG 194 075) in 2001/2, where about 3 metres of Chalk were exposed, overlain by a further 2-3 metres of Quaternary sands and gravels. This short note records 1) the likely stratigraphic context of the exposure 2) the fossils recovered and 3) the contact between the Chalk and Quaternary sediments.

No formal abstract available for this paper.

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**THE CONTENTS OF A CARDBOARD BOX
(MINUTES OF THE PARAMOUDRA CLUB 1950 - 1967)**

Roger Dixon

The White House,
7 Chapel Street, Woodbridge, Suffolk, IP12 4NF, UK.

*email: rocdoc@osb.uk.net

INTRODUCTION

This article was prompted by finding the second minutes book of the Paramoudra Club in a cardboard box kept in store by the Castle Museum, combined with interest in the early years of the Society aroused by its 50th anniversary. The minutes book covers the period from 22nd January 1951 to 30th November 1968.

The minutes book contains many of the usual, and still familiar, grumbles that all societies of this type have. On the other hand, much is of interest and entertaining.

No formal abstract available for this paper. (Minutes of the Paramoudra Club 1950-1967)

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