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January 2008 / Circular 542

YORKSHIRE GEOLOGICAL SOCIETY

President: Martin Whyte Ph.D

RESEARCH IN PROGRESS: REPORTS FROM DOCTORAL STUDENTS

14.00 - 16.45 Saturday 19th January 2008

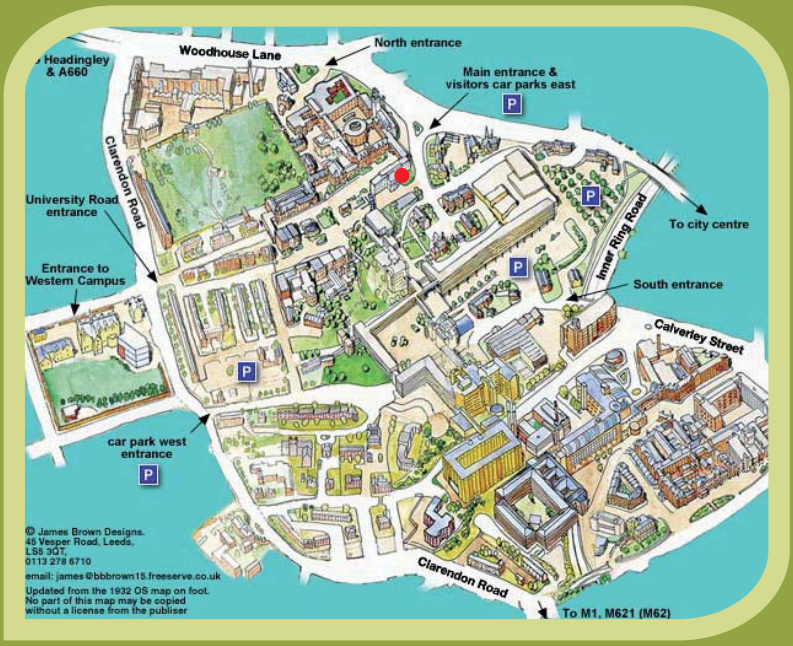
Rupert Beckett Lecture Theatre, University of Leeds
(Joint meeting with the Leeds Geological Association)

Research in Progress:
Reports from Doctoral Students

14.00 - 16.45 Saturday 19th January 2008

Speakers: Alison Parker, Jonathon Poulter, Joris Eggenhuisen, Tom Challands
Also Patrick Boylan: Demonstration of YGS web services.

Rupert Beckett Lecture Theatre, University of Leeds
(Joint meeting with the Leeds Geological Association)



● Meeting venue.

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Front cover: caption

RESEARCH IN PROGRESS: REPORTS FROM DOCTORAL STUDENTS

14.00 - 16.45 Saturday 19th January 2008

14.00 - 14.05 **Society Business**
Martin Whyte, President

14.05 - 14.30 **Recent Research Work**
Alison Parker
No abstract summary provided.

14.30 - 14.55 **Tertiary floras of Svalbard**
Jonathan Poulter

14.55 - 15.10 **YGS Web Services**
Patrick Boylan

15.10 - 15.50 **Tea**

15.50 - 16.15 **Turbidity flow - Substrate Interaction**
Jorgis Eggenhuisen

16.15 - 16.35 **Geosphere and Biosphere Dymanics During end-Ordovician Climate Change**
Tom Challands

16.35 - 16.45 **Closing remarks**

TERTIARY FLORAS OF SVALBARD

Jonathon Poulter

Polar environments have changed significantly over last 100 million years, at present the poles are cold hostile environments were only the most hardy and specialised plants can survive. During the Palaeocene and Eocene the poles were much warmer, largely due to the strong greenhouse conditions prevalent during that time. Temperate forest, crocodiles and turtles extended far into the high Artic, which suggests freezing conditions were rare or altogether absent.

The Palaeocene-Eocene boundary marks the opening of the North Atlantic and a sharp rise in atmospheric carbon dioxide and methane. This intense warming episode generated a strong greenhouse climate, which persisted well into the Eocene. Paratropical forest extended as far as southern England, and temperate vegetation covered the poles. These polar forests formed a unique ecosystem, which have no modern analogues, as they were subject to three months of constant light during the summer and three months of winter darkness. The majority of Eocene high Artic floras had a deciduous habit, which represents an adaptation to the seasonal oscillations in light and growth. Svalbard's Eocene floras are no exception and are dominated by deciduous broadleaved angiosperms and conifers.

Fossil leaves from the Longyearbreen glacier, Longyeardalen (Aspelintoppen Formation) are relatively well preserved and contain ferns, equisetum, conifers and angiosperms. The plant megafossil assemblage is dominated by angiosperm leaves mainly from the family Fagaceae (Beech and Oak). The majority of the leaf specimens collected are partially preserved, but it is apparent that many would have been large leaves. The leaves range from microphyll-mesophyll and some are potentially megaphyll; however, their complete size can only be speculated. These "giant" leaves are not absent from the Cenozoic but they are quite rare from the Artic; the high concentration of these leaves in this formation is unusual. Large leaves indicate that conditions must have been relatively warm and wet, as their size makes them susceptible to frost and desiccation. The significance of the large leaves is not clear, they may represent large shade leaves/morphotypes or it may be a taphonomic bias. It is possible that these floras may have evolved large lamina sizes to maximise growth during the short growing season, thus representing an adaptation to polar conditions. Further investigation and collection will have to be carried out to ascertain the origins, and extent of these large leaves on Svalbard.

TURBIDITY FLOW - SUBSTRATE INTERACTION

Joris Eggenhuisen

Turbidity flows transport vast amounts of sediment upto hundreds of kilometres into marine basins. This presentation describes how small scale (cm's-dm's) erosional substrate topography, created by a turbidity flow, influences the turbulent velocity structure of that flow. Firstly, evidence from sedimentary deposits in the field is discussed, which shows that over horizontal distances of few meters, the flow direction at the base of flow may be changed by upto 10-15 degrees by interaction with small erosional steps. More detailed understanding of effects on velocity fields cannot be obtained from deposits in the field. In order to shed further light on the effect topography has on turbulence intensity and structure of turbidity currents, a set of gravity current experiments is performed under controlled laboratory conditions. High resolution flow velocity data are obtained with Ultrasonic Velocity Profilers. Results show that small substrate topography may greatly enhance the turbulence budget of the turbidity flows, counteracting density stratification and thereby possibly delaying the onset of sedimentation and enhancing transport distance.

GEOSPHERE AND BIOSPHERE DYNAMICS DURING END-ORDOVICIAN CLIMATE CHANGE

Tom Challands, Durham University

The Upper Ordovician (460.5-443 Ma) is a well documented and studied period of time with dramatic climatic changes from greenhouse to icehouse climate. But the mechanisms for these changes are still rather poorly understood. Using the Welsh Basin as a 'natural laboratory' I have collected high resolution geochemical and biological records from marine rocks to test some of the currently contended hypotheses of Upper Ordovician climate change. For example, there is a growing body of evidence that the onset of the massive glaciation at the end of the Ordovician was preceded by a short intense warming event. Can this hypothesis be tested for the Welsh Basin?

The ensuing period of glacial maximum is associated with a distinctive geochemical perturbation in the carbon cycle that is documented the world over but has not been recorded from mid-latitudes where the Welsh Basin lay during this time. I present a record of this perturbation from the mid-Latitudes and also demonstrate how it can be modelled numerically and tied in with changes in the ecology of ocean zooplankton during this period of abrupt climatic overhaul. Though changes in global climate can be recognized in different climate zones, the effect of regional processes adds difficulty in recognition and interpretation of individual Upper Ordovician climatic records.

A WORD FROM THE PRESIDENT

Martin Whyte Ph.D

I hope that you all had a very good Festive Season and wish you all the very best for the New Year.

As this Circular goes to press I will be away on a walking holiday with my son which should make sure that any excesses of the Christmas break don't have a lasting effect. However, I will be back for the Leeds Meeting and I am very much looking forward to this meeting as it is always interesting to hear of new research from the people who are at its forefront. I am also looking forward to the rest of what promises to be an interesting and varied Programme for the coming Session. I hope that you agree and that you are all putting the dates in your diaries. I look forward to seeing you and chatting with you at meetings.

I am also looking forward to working with the new Council and I am pleased to welcome both new and returning members to it. There are some important issues coming up in this session and I am sure that our meetings will be lively affairs. One subject that we will need to review is the format of the AGM and Annual Dinner and comments on the questionnaires have given us some useful suggestions to consider. The questionnaires also showed very clearly how highly members value the Proceedings. In the new session Council will be considering proposals which will be of benefit to the Society and which will lead to improvements in the production of the Proceedings and to establishing an on-line presence. This latter is vital if we are to continue to attract a wide range of quality papers. We are also now more than half way through the current Five-Year Plan and Council will be striving to ensure that we meet its objectives.

There is still a vacant place on Council and we will be seeking to fill this early in the New Year. If any members are interested in serving on Council and playing a part in some very important decisions for the Society then please by all means contact me or any other member of Council.

FIELD MEETING TO THE PLEISTOCENE DIMLINGTON CLIFF AND SEWERBY CLIFF SECTIONS ON THE HOLDERNESS COAST - THE BEST FOR FORTY YEARS!

John Powell

YGS Field Excursion Report: 28th October 2007
Leader: Professor John Catt, Geography Department, University College London

Figure 1

Figure 2

Following on from the Hull meeting on the Local Heroes of East Yorkshire Quaternary Geology, we were treated, on the Sunday, to an excellent excursion to type localities of the Quaternary succession in East Yorkshire. Led by a modern-day hero of Quaternary geology, John Catt, the party of 20 first traversed the cliff section from Easington Gas Terminal (TA 399 205) northwards towards Dimlington High Land [TA 391 218] (Catt & Penny, 1966; Figure 25). Despite recent cliff engineering works and landslides, there were sufficient exposures of the Quaternary succession to unravel the fascinating history of these glacigenic deposits (see Catt, 2007 for an extensive review). Near the base of the cliff and on the foreshore, the lowermost unit, the Basement Till, comprises dark grey diamicton with a wide range of erratics derived from north-east England, Scotland and Scandinavia, together with arctic marine Pleistocene shells. The party were encouraged to collect samples of the till in order to compare with other tills to be seen later in the day. The Basement Till is regarded as the oldest till in the Holderness area, and at Dimlington it has been proved to rest directly on fairly level Chalk bedrock. The boundary with the overlying Skipsea Till is generally sharp (Figures 1, 2). The Skipsea Till is readily distinguished by its grey-brown matrix; it is less consolidated than the underlying till, and has a higher percentage of chalk, flint and shale clasts. Other, less common, erratics suggest that the ice-sheet invaded the North Sea basin from Southern Scotland, the Cheviots, Northumberland and Durham, with pebble orientations in Holderness and Filey Bay indicating ice moving in a NNE-SSW direction. Further north, exposures of laminated lacustrine silt and fine-grained sand (Figures 3, 4) were seen between the Basement and Skipsea tills. Professor Catt explained the origin of these Dimlington Silts and Sands as isolated glaciotectonic basins resting on the deformed upper surface of the Basement Till. The laminated silts have yielded delicate moss and beetles typical of arctic regions. Radiocarbon dates suggest an approximate age of 18,500 and 18,240 BP, i.e. Late Devensian (Last Glacial Maximum) showing that the overlying Skipsea and Withernsea Tills were both deposited in MIS 2 (the Dimlington Stadial). Returning back along the foreshore, the party were able to

Figure 3

Figure 4

Figure 5

inspect the uppermost Withernsea Till near the top of the cliff and in slipped blocks. Clearly distinguished by its dark brown, red weathering matrix with abundant Carboniferous, Triassic and Lower Jurassic erratics along with chalk and occasional Lake District granite clasts, the till is interpreted as being deposited by Lake District ice, part of the same two-tiered ice-sheet that deposited the underlying Skipsea Till. Professor Catt drew attention to a lens of sand and gravel between the Skipsea and Withernsea tills high in the cliff. Upward fining, pebble-rich sand and gravel exhibiting low-angle cross bedding suggests deposition from subglacial streams.

Thanks to a 'tip off' from Mike Horne that the classic Ipswichian buried cliff at Sewerby had recently been exposed to reveal the best section to be seen for at least 40 years, the party travelled north after lunch. Indeed, the Sewerby section [TA 199 686] was a revelation in the late afternoon sunshine (Figure 5). Professor Catt explained the relationship south-west of Sewerby Steps where the flint-less Flamborough Chalk was eroded in Ipswichian times to produce a wave-cut platform and palaeo-cliff just above the modern-day beach level (Figure 6). A beach deposit of Ipswichian age, comprising rounded pebbles and cobbles of chalk rests on, and is banked against, the palaeo-cliff; this in turn is overlain by angular chalk 'rainwash head' or colluvium interdigitating with yellow-brown sand also deposited against the palaeo-cliff, the latter exposed as an oblique section. The sand is a wind blown dune deposit, probably derived from nearby beach sands when the sea had receded a short distance. The leader outlined the age relationships and palaeoenvironments: the uncemented beach deposit has yielded temperate marine molluscs, hippopotamus, elephant, rhinoceros and water vole suggesting correlation with the Ipswichian Stage (MIS 5e); this age is confirmed by thermoluminescence and optically stimulated luminescence dating of blown sand close to the palaeo-cliff indicating an age of about 120,000 years BP (Bateman & Catt, 1996). The aeolian

Figure 6

Figure 7

Figure 8

sand has also yielded a mammalian fauna similar to the beach deposit, but lacking hippopotamus, perhaps indicating a slightly cooler climate during deposition. As the party proceeded south westwards the blown sand was well exposed, showing aeolian cross-bedding (Figure 7). Within a few hundred metres it is overlain by an unusual deposit of 'chalk rubble' comprising small sub-rounded granules and pebbles of chalk with a silty matrix, the latter similar to loess. The 'chalk rubble' unit is interpreted as a gelifluction deposit that formed in periglacial conditions shortly before the arrival of the Late Devensian glacier. Thermoluminescence dating of the loess matrix suggests that the 'chalk rubble' is Late Devensian in age, suggesting that the time interval between the Ipswichian wind-blown sand and the 'chalk rubble' gelifluction deposit is about 100,000 years. A till unit is present above the 'chalk rubble' (Figure 8); here the reason for collecting samples of the Basement Till and Skipsea Till earlier in the day was revealed by the leader. We compared our dark grey Basement Till samples with the exposed till and it was concluded that the till exposed between Sewerby and Bridlington is the Skipsea Till, and not the stratigraphically earlier Basement Till as Lamplugh claimed in a revision of his earlier researches, possibly because he became a 'monoglacial-ist'. Professor Catt explained the significance of this, suggesting that foreshore exposures, previously seen in 1964, showed that dark grey Basement Till including rafts of shelly Bridlington Crag (Early or early Mid Pleistocene), underlies and pre-dates the Ipswichian interglacial beach deposit, suggesting deposition of the Basement Till during MIS 6 or an earlier cold stage.

After a vote of thanks, the party reflected on the magnificent sunset illuminating the Chalk cliffs at Flamborough Head, and on the highly illuminating and interesting excursion to these classic outcrops. I strongly recommend the excellent review of Pleistocene

glaciation of eastern Yorkshire in the PYGS (Catt, 2007).

References:

Catt, J. A. 2007. The Pleistocene glaciations of eastern Yorkshire: a review. *Proceedings of the Yorkshire Geological Society*, **56**, 177-207.

Catt, J. A. & Penny, L. F. 1966. The Pleistocene deposits of Holderness, East Yorkshire. *Proceedings of the Yorkshire Geological Society*, **35**, 375-420.

Bateman, M.D. & Catt, J.A. 1996. An absolute chronology for the raised beach and associated deposits at Sewerby, East Yorkshire, England. *Journal of Quaternary Science*, **11**, 389-395.

Figure Captions:

Figure 1: Basement Till, dark grey, at the foot of the cliff, overlain by paler, brown Skipsea Till, overlain, in turn, by red-brown Withernsea Till at the top of the cliff. The Withernsea Till is also present as a landslip block above a shear plane on the left of the photograph. © John Powell.

Figure 2: The contact between the Basement Till and the overlying paler Skipsea Till; note the higher content of erratics in Skipsea Till. Hammer for scale. © John Powell.

Figure 3: Professor John Catt (green hat) explaining the succession near Dimlington High Land. The leader is standing on the Basement Till which is overlain by a thin unit of laminated Dimlington Silts and Sands (to about ankle height). The Skipsea Till (slipped in places) forms the middle cliff with the Withernsea Till above. © John Powell.

Figure 4: Laminated Dimlington Silts and Sands overlain by red-brown Skipsea Till. Hammer for scale. © John Powell.

Figure 5: Some of the party inspecting the Ipswichian wave-cut platform, overlain by Ipswichian deposits comprising rounded, pebbles forming a beach deposit, overlain by more angular colluvium that passes up to, and interdigitates, with blown sand. Sewerby Cliff. © John Powell.

Figure 6: Detail of the stepped palaeo-cliff (Flamborough Chalk) overlain by the Ipswichian beach deposit (rounded chalk pebbles). Hammer for scale. © John Powell.

Figure 7: Ipswichian beach deposit (rounded chalk pebbles) overlain by wind blown sand (above head height) all Ipswichian in age, in turn overlain by Chalk Rubble gelifluction deposit, of probable Late Devensian age, forming the overhang and above. About 100 m southwest of the Ipswichian palaeo-cliff exposure. © John Powell.

Figure 8: Detail of the Chalk Rubble overlain sharply by laminated silt, which passes up to red-brown till (Skipsea Till). Note the colour similarity to the Skipsea Till in Figure 2. Hammer for scale. © John Powell.

W.D. CONYBEARE AND THE DEVELOPMENT OF THE GEOLOGICAL SCIENCES: SYMPOSIUM REPORT

John Knight

William Daniel Conybeare (1787-1857) was the subject of a One-day Symposium at the Humanities Research Institute, University of Leeds on 19th October (see YGS Circular 539), coinciding with the 150th anniversary of his death. This was a unique opportunity to hear and meet some of the leading authorities on the history of the earth sciences at an accessible location in our area and was also long overdue recognition of one of the leading lights of the early decades of the subject in Britain. For many of us working in or enjoying geology today it is very easy to overlook those who helped develop the science and particularly those who have not been loudly celebrated by biographers. Conybeare gave us the name of the Carboniferous System and coined the generic name Plesiosaurus, terms today in regular use, but the considerable volume of work and publications, and his important influence and correspondence with geological giants of the period, are much less recognised.

The symposium was split into three formal sessions, covering Conybeare's Geological Career, Coneybeare's Influence on his Contemporaries and thirdly, Tests and Trials in Coneybeare's Britain. Leucha Veneer (University of Leeds) set the scene with the essential facts of his life, born into a family of clerics, educated at Oxford where he formed a life-long friendship with William Buckland, elected to fellowship of the Geological Society in 1811, a family man who inherited a considerable fortune but was nevertheless committed to his church career, ultimately becoming Dean of Llandaff. Leucha developed this alongside an analysis of the objectives and composition of the Geological Society, in which Conybeare exemplifies the predominant group of gentlemen, university men and clerics, whose growing influence accompanied a change in direction from an early focus on mineralogy and applied geology to increasing interest in organic remains and earth history.

Martin Rudwick (University of Cambridge) further developed the theme of Conybeare's geological work. It is important to recognise the amount of field work performed by Conybeare, because his later profile comes through as a theorist. Long summer field seasons were spent on work which contributed to Greenough's map of the Geology of England and Wales. Numerous contributions were published in the Transactions of the Geological Society, in many cases with Buckland. In the context of the period his work showed an important shift in the interpretation of the organic remains in rocks, from a "Smithian" approach of only cataloguing the fossils of specific strata, to attempting to interpret the conditions of life, thus incorporating comparative anatomy as led by Cuvier. Conybeare's most important and influential publication was as the lead author of "Outlines of the Geology of England and Wales" (Conybeare & Phillips 1822). It is possible to dilate on the significance of this book, but personally I think I can best quote from the preface of Woodward's The Geology of England and Wales (1876)- "No work has proved more useful to the field-geologist than that of Conybeare and Phillips; and , on account of its being essentially a record of facts, it is much appreciated and valued at the present day". Other key facets highlighted by Martin Rudwick

included his supranational approach, with fieldwork on the Continent and in Ireland, and also his appreciation that climate had changed through earth history.

Jack Morrell (University of Leeds) led us through Conybeare's influence and relationships with many of the leading geologists of the day, including Buckland, de la Beche, Sedgwick and Lyell, but most important for us in YGS, was an appreciation of his stimulus to the early years of Yorkshire geology. In 1822 William Vernon Harcourt, President of the Yorkshire Philosophical Society (YPS) had been in correspondence both with Buckland and Conybeare regarding the future direction and objectives of the society. Conybeare, an honorary member, was generous with his advice, which guided the next few years of the YPS geological programme, in particular suggesting concentration on the mapping and stratigraphical geology of the Secondary strata and correlation of the Oolitic Series to the sequence in southern England; he identified key sites for further work in North and South Cave and at North Grimston. It would appear that Conybeare was familiar with the area from personal experience, although unfortunately there appear to be no records of his visits and field work in this region. In summary the case was strongly made that Conybeare was a seminal influence and mentor for the work of many colleagues.

Jon Hodge (University of Leeds) addressed the philosophical issue of Conybeare's beliefs with respect to earth history by assessing the fundamental divergences with the views of Charles Lyell. Conybeare adhered to what could be considered the Oxford view, seeking to accommodate Biblical interpretation, in which the culmination of the act of creation was the appearance of mankind on earth; all stages before were purely preparatory and thereafter the earth continued in a steady state and no new species appeared. In contrast Lyell's views, developed post 1828, became strongly opposed to this and required an actively evolving present based on continuity of the processes recognised in the geological past. The debate, in which Conybeare was a leading proponent, became acrimonious through the 1830s, exemplified by Sedgwick's denouncement of the atheism of Lyell and his views.

Hugh Torrens (Keele University) highlighted the importance of an understanding of the background and social fabric against which Conybeare and his peers grasped the lead in presenting the advance of geological science. In the depression following the Napoleonic Wars there was no formal Government encouragement of the science, in contrast to other European countries. There were a considerable number of practical men claiming the expertise of mineral surveying akin to that of William Smith, although perhaps without the stratigraphical vision, the majority of whom failed to leave any published record and in many cases were condemned to the debtor's prison. The cost of any publication, or of attracting a viable subscription list, was prohibitive except for those of independent means moving in a privileged social stratum. Conybeare was certainly in the latter category. There are numerous examples in this period in which the contribution of the practical mineral surveyor and

map-maker (William Smith) and fossil collectors (e.g. Mary Anning) were simply ignored by those who were in a position to publish. In the case of Conybeare, however, it can be said that in time he acknowledged specifically the contribution of both the above.

Ralph O'Connor (University of Aberdeen) dealt head on with the issue which was never far below the surface of geological debate in the mid-19th century, the vociferous opposition to geological interpretation represented by biblical literalism. What is now surprising is the range of belief and posture within the literalist camp, ranging from "new-earth creationists" (Earth was created in six days) through to scriptural geologists who believed that ancient life forms existed in time-gaps between the discrete acts of creation defined in the Bible. To a primary question, as to whether there was a coherent literalist opposition movement to geological interpretation, the answer is almost certainly not. A second question is the significance of this opposition and the extent to which individual geologists became involved. The debate was very much a battle for middle class hearts and minds, fuelled by the popularising mission of some authors. Conybeare certainly exerted and expressed himself as an opponent of the "new-earth creationist" view and defender of inferential geology.

Final discussion high-lighted the numerous facets of the man, family man, churchman, university man, published author, intellectual giant able to take on the likes of Lyell. However, for an attendee with a geological background, as opposed to one of the history and philosophy of science, there still feel to be important gaps. The records of his field work appeared relatively sparse, although, as Hugh Torrens points out, the documentary record is scant; it is rumoured that a Conybeare archive was held in a London bank at least until 1938. Tantalising to speculate if it can be located. The contention that his geological work, punctuated by personal tragedy in the late 1820s, tailed off after that does not seem to be entirely borne out by the award of the Geological Society Wollaston Medal in 1844. In conclusion, he was a major figure, an equal in his time with Buckland, Sedgwick and Lyell, for whom overdue biographical treatment would undoubtedly add to our understanding of the formative years of the science. More of such symposia please.

NEW COUNCIL MEMBER

Paul Hildreth

Following Novembers' AGM we now have a couple of new Council members, Paul Hildreth is the first one to tell us a bit about himself.

Graduated BSc.(Hons) in Geology from Birkbeck College, London University 1970.

Part-time degree whilst employed by Institute of Geological Sciences (now BGS) 1966 - 1970, firstly in the Petrology Department (under P.A. Sabine) at Exhibition Road, then in the South East England Field Unit (under S.C.A. Holmes) at Princes Gate.

One paper published in the 1970 edition of the Bulletin of the Geological Survey (Upper Cretaceous and Tertiary Strata from boreholes near Epping, Essex 1970).

1970 - 1975 employed in offshore oil exploration well logging, mainly for Shell. Worked in North Sea (Norwegian and UK sectors), Spain, Greece, Japan and South Korea.

Completed a PGCE (teacher training) course for 11-18 Geography at Hull University in 1976.

Spent 29 years in secondary school teaching before retirement from full-time employment as Assistant Headteacher in 2005.

'Coaxed' into part-time teaching of Geography and Geology at Advanced Level at Wyke Sixth Form College, Hull in September 2005 and continuing to enjoy my teaching.

Currently President of Hull Geological Society.

Assistant Diving Officer of Scunthorpe (BSAC) Divers and a qualified Assistant Diving Instuctor.

Interests: The Chalk of north Lincolnshire; the Ingleton inlier; bird watching; travel (next venue is Trinidad and Tobago - July 2008).

NEW MEMBERS

Mr Paul D. Luty	Yeadon, Leeds	Ordinary membership
Mr D. C. Teasdale	Hexham, Northumberland	Ordinary membership
Ms I. Lexartza-Artza	Sheffield University	Ordinary membership

THE DONALD INSALL ASSOCIATES CHALLENGE

Gestingthorpe Hall

YGS Members may wish to take up the challenge set by Donald Insall Associates who are looking for the exact quarry the stone for Gestingthorpe Hall, Gestingthorpe Suffolk originated from. If you have any suggestions please forward straight on to Donald Install and Associates, though if you do successful identify the stone and its original quarry we would be more than happy to publish your report in the circular. If you are up to the challenge please see the following clues from Install's and the BGS.

Repairs to Entrance Hall floor
Sourcing of replacement paving stone

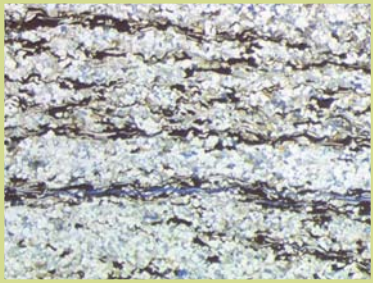
We are attempting to identify the source of the stone used for the Entrance Hall floor at the Grade II listed Gestingthorpe Hall in Suffolk in order to obtain a supply of replacement stone for use in repairs.

Petrographic examination of the stone from the British Geological Survey, extracts of which follow. The BGS are unable to suggest the quarry that matches the colour, which is grey - white, the mica layers are also incorrectly spaced. The original stone is fragile and wears very unevenly. It is not a good paving flag, but was probably selected for its unusually light colour.

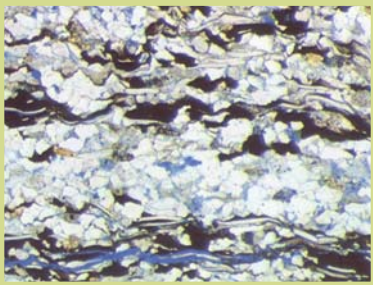
The BGS describe the stone as:

Sample Paving Stone: Sandstone, white with brown ferruginous and micaceous laminae, fine to medium grained, micaceous, non-calcareous.

Although the mineralogy of the sample is consistent with a Carboniferous source its well developed, finely laminated structure suggests that it is likely to split easily when used a paving stone.



Photomicrograph
(field of view 8mm left to right)



Photomicrograph
(field of view 3mm left to right)

Thin Section Description

Framework grains

Dominated by fine to medium grained with subordinate feldspar, sparce rock fragments and abundant micra grains forming a low porosity, finely laminated fabric. The quartz grains are dominated by monocrystalline varieties showing ragged, irregular outlines fron the growth of syntaxial silica cements. The feldspar grains include both twinned and untwined potassic and sodic/calcic varieties. Some feldspar grains show signs of extensive corrosion and dissolution to skeletal remnants and occupy oversized pore spaces. The rock fragment includes micromicaceous mudstones and polycrystalline chert fragments.

The mica grains are concentrated in laminae and include both white (musconvite) and brown (biotite) varieties and are commonly squeezed, deformed and fractures. The ferruginous biotite grains are often seen to be undergoing alteration and are commonly associated with the development of opaque ferruginous, laminar layers in the fabric. Finely crystalline aggregates of the clay mineral kaolinite commonly fill the intergranular pore spaces.

Cementation

Silica is the principal cement in the sandstone occurring as pervasive narrow, irregular, syntaxial quartz overgrowths around each quartz framework grain.

These silica overgrowths commonly coalesce to form cemented patches in the fabric. Crystal (rhombs) of ferroan carbonate occur sparsely in the framework but are not common enough to form significant cemented patches.

Macroporosity

Low primary intergranular porosity, enhanced by dissoulution of the feldspar grains to form secondary pore spaces. However these secondary pore spaces are commonly partially filled by a later kaolinite cement.

Sourcing the flagstone

Petrographically the sandstone is consistent with a source in the Carboniferous succession of the Pennine area. There were a large number of sources of riven sandstone paving from quarries in Derbyshire, Yorkshire and Lancashire. However, not all had easy access to the market in the south-east of England. The white colouration of the sandstone is not typical of much of the Carboniferous sandstones, which show a range if olive-green, brown-grey or occasionally yellow-brown colours depending on the amount and tye of iron minerals dispersed through the rock fabric.

If you have any information that could help to identify the above stone, its source or other examples of its use please contact **Matthew Seaborn** at Donald Insall Associates in Cambridge:

Donald Install Associates
Historical Building & Planning Consultants
48 SIDNEY STREET
48 Sidney Street
Cambridge CB2 3HX
Tel: 01223 303111
E-mail architects@insall-camb.co.uk
Website www.insall-camb.co.uk

CORRESPONDING SOCIETIES

Contact society representatives for the latest information.

CRAVEN & PENDLE GEOLOGICAL SOCIETY

Contact: Paul Kabrna e-mail: paul_kabrna@hotmail.com or www.cpgs.org.uk/
Venue: Rainhall Centre, Barnoldswick.

The last glacial stage (the Devensian) in NW England — **Friday 8th February**
Catherine Delaney Ph.D., Manchester Metropolitan University

CUMBERLAND GEOLOGICAL SOCIETY

Contact: Nigel Courtman, tel. 01229 861 478 or www.cumberland-geol-soc.org.uk

The Green River Formation of Wyoming and Utah — **Wednesday16th January**
Dr John Nudds, University of Manchester
Newton Rigg Campus, Penrith

EAST MIDLANDS GEOLOGICAL SOCIETY

Janet Slatter, tel. 01509-843.297; e-mail: sec@emgs.org.uk or www.emgs.org.uk
Venue: Lecture Theatre B3, Biological Sciences Building, University of Nottingham

Foundation Lecture - Looking for Life on Mars — **Saturday 16th February**
Prof Monica M. Grady, Open University
Start: 6.00pm

HUDDERSFIELD GEOLOGY GROUP

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

Geoconservation in West Yorkshire: making sure that our best rocks and fossils are protected and understood — **Wednesday 5th March**
Alison Quarterman

HULL GEOLOGICAL SOCIETY

Mike Horne. Tel: 01482 346 784 or e-mail: m.j.horne@hull.ac.uk or www.go.to/hullgeolsoc
Venue: Department of Geography, University of Hull, at 7.30pm.

Scarborough South Bay - not all coastal management problems are erosion based. — **Thursday 21st February**
Brian Sweeney of University of Hull
Evening lecture

LEEDS GEOLOGICAL ASSOCIATION

Anthea Brigstocke (General Secretary). Tel: 01904 626 013: E-mail: abrigstocke@hotmail.com or www.leedsgeolassoc.freeserve.co.uk Venue: Mathematics & Earth Sciences, University of Leeds)

Geology & Disease — **Thursday 24th January**
Professor Gerry Slavin (formerly Barts Hospital - London)
Roger Stevens lecture theatre No 9 University of Leeds 7.00pm

CORRESPONDING SOCIETIES

Contact society representatives for the latest information.

LEICESTER LITERARY & PHILOSOPHICAL SOCIETY SECTION C (GEOLOGY)

Chairman: Dr, Joanne Norris. Tel: 0116 283 3127, e-mail: j.e.norris@ntlworld.com, www.charnia.org.uk/
Venue: Ken Edwards Building, University of Leicester

The earliest Britons, their landscapes and climates **Wednesday 16th January**
Finding their way into the East Midlands
Dr Ian Candy, Department of Geography, Royal Holloway, University of London

MANCHESTER GEOLOGICAL ASSOCIATION

Jane Michael. Tel: 0161 366 0595, e-mail: outdoor@mangeolassoc.org.uk or www.mangeolassoc.org.uk
Venue: Williamson Building, Department of Geology, University of Manchester

Fast Ice and Shifting Ice Sheets: **Wednesday 12th March**
What Glacial Features in the British Isles tell us about
Ice Sheet Behaviour during Global Warming
Dr. Catherine Delaney, Manchester Metropolitan University
Mansfield Cooper Building, 6.30pm

NORTH EASTERN GEOLOGICAL SOCIETY

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

History of Scafell caldera; a dramatisation **Friday 22nd February**
Dr. Peter Kokelaar, University of Liverpool

OTHER SOCIETIES OF INTEREST

WESTMORLAND GEOLOGICAL SOCIETY

E-mail: mail@westmorlandgeolsoc.org.uk , westmorlandgeolsoc.org.uk/
Venue: Shakespeare Centre, Kendal

EAST MIDLANDS REGIONAL GROUP OF THE GEOLOGICAL SOCIETY

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

SORBY NATURAL HISTORY SOCIETY

Sorby Geological Group Secretary Ken J. Dorning: geology@sorby.org.uk
www.sorby.org.uk/grpgeo.shtml www.sorby.org.uk

YORKSHIRE REGIONAL GROUP OF THE GEOLOGICAL SOCIETY

Isla Smail. Tel: 0113 242 8498 or 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 56 Part 3, May 2007).

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

Copy deadline for Circular 543 is the 23rd January 2008

NEXT YGS MEETINGS

The next Indoor Meetings
23rd February 2008 - Ice Sheets: Past, Present and Future. Sheffield University

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