

GEOLOGICAL SOCIETY



HISTORY
OF
GEOLOGY
GROUP
NEWSLETTER

No.15.....February 2002

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"THE AMATEUR IN BRITISH GEOLOGY"

A HOGG two-day meeting to be held on Thursday and Friday, **14 and 15 March 2002** at the Geological Society of London, Piccadilly.

There will be a registration charge of **£10** for attendees. Cheques should be made payable to HOGG and sent to S.Baldwin, Fossil Hall, Boars Tye Road, Silver End, Witham, Essex, CM8 3QA. Tel: 01376 583502. E-mail: sbaldwin@fossilbooks.co.uk

Programme:
THURSDAY 14TH

10.00
10.25

REGISTRATION & COFFEE INTRODUCTION

SESSION 1 Chair: Susan Brown (GA)

10.30 Stuart Baldwin, Witham

Little and Large, or The Amateur in Science from Microscopy to Astronomy.

11.00 Eric Robinson, Watchet

The Amateur and The Geologists' Association.

11.30 Stephen K Donovan, Leiden

C. T. Trechmann, D.Sc, and the development of Caribbean Geology between the Wars.

12.00 Jake Hancock, Shaftesbury

Dennis Curry - A Modest Polymath.

12.30-1.25

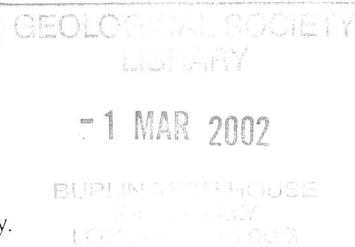
LUNCH (not provided)

SESSION 2 Chair: Hugh Torrens (HOGG)

1.30 Caroline Buttler and Tom Sharpe, Cardiff, Patrick N Wyse Jackson, Dublin

George Robert Vine (1825-1893), staymaker, bryozoologist and fossil dealer.

2.00 Cynthia Burek, Chester



Women in Geology - are they Amateurs or Professionals?

- 2.30 Geoff Tresise, Merseyside
George Morton, Henry Beasley and Triassic Footprint Classification.

3.00-3.25 **TEA**

- 3.30 Andrew Smith, London
C. W. Wright and the Palaeontology of the Chalk.
- 4.00 Martina Kolbl-Ebert, Munich
G. B. Greenough and "Elevation" - private background of a geological debate.
- 4.30 Ralph O'Connor, Cambridge
Thomas Hawkins, the Glastonbury eccentric-collector-writer-lunatic.

FRIDAY 15TH

9.30 **REGISTRATION**

SESSION 3 **Chair: John Martin (HOGG & GA)**

- 10.00 Anne O'Connor, Durham
S. H. Warren: The contribution of an amateur geologist towards Palaeolithic Archaeology.
- 10.30 David Bone, Chichester and Neville Haile, Oxford
E. M. Venables (1901-1990), Bognor Regis Geologist: Golden Beetles from the London Clay.

11.00-11.25 **COFFEE**

- 11.30 Alan Smith, Keswick
The Amateur in Lake District Geology.
- 12.00 Stuart Baldwin, Witham
W. S. Bisat FRS: Civil Engineer, Carboniferous Palaeontologist and Stratigrapher.
- 12.30 Patrick J Boylan, Leicester
W. S. Bisat FRS and Quaternary Geology.

1.00-1.55 **LUNCH (not provided)**

SESSION 4 **Chair: Richard Howarth (HOGG and GA)**

- 2.00 Hugh Torrens, Keele
A Chemist on the Rocks: The work of John Hannes Callomon.
- 2.30 David Freeman, Helston
The Contribution of Amateur Members of the Royal Geological Society of Cornwall.
- 3.00 Peter Tandy, London
William Barlow, FRS, speculative builder, man of leisure & crystallographic genius.

3.30-3.55 **TEA**

- 4.00 Bob Davidson, Aberdeen
James Powrie, 19th Century Chronicler of the Scottish Lower Devonian.
- 4.10 Wendy Simkiss and Alan Bowden, Liverpool
H. H. Higgins and F. P. Marrat and Amateur Palaeobotany in the North West.
- 4.20 Richard Wilding, Twickenham
Osmond Fisher (1817-1914): Parson Geologist; Pioneer Geophysicist.

4.30 **Hugh Torrens, Keele** **SUMMARY & DISCUSSION**

And the previous HOGG meeting...

History of Palaeobotany"

This joint HOGG and Linnean Society meeting took place on 24th October 2001 in the Linnean Society. About 25 members attended. The following are abstracts of the many talks given:

"Federico Cesi (1585 – 1630) and Francesco Stelluti (1577 – 1653) – The First palaeobotanists?" (Andrew C. Scott) (Royal Holloway).

In 1603 Federico Cesi founded, with four of his friends, the first Scientific Academy in Europe which he called the Accademia dei Lincei (of which Galileo Galilei was a member). Between 1611 and 1630 Cesi undertook an ambitious project to collect and record fossils from his lands around Acquasparta in Umbria. He had drawings and descriptions made of all the fossils, wood fossils and their sites of origin. He died before his work could be published and it was left to his friend Francesco Stelluti to publish a monograph where he claimed the evidence demonstrated that the fossil woods were formed from stone and were 'not once living'. The corpus of drawings, now in the Royal Collection at Windsor, has allowed the project to be reconstructed and fieldwork in Italy has shown that the complex nature of the fossil preservation could easily have confused the researchers and have led to the misinterpretation of the fossils. This research by Cesi is the first to combine field and specimen data to interpret the origin of fossils and has been widely neglected by historians of Science.

"Henry Steinhauer and the first scientific description of fossil plants." (Hugh Torrens.) (Keele)

Steinhauer (born 28.2.1782, Haverfordwest – died Bethlehem, Pennsylvania, 22 July, 1818.) was the son of a Moravian minister and teacher. He attended the Fulbeck School from 1789 and then trained for their ministry in Germany. He returned to teach at Fulbeck School 1801 – 1811. Moravians particularly encouraged the study of, and participation in music and natural history and Fulbeck School had a museum for the latter by 1801. At Fulbeck Steinhauer came across the abundant fossil plants available there from local coal mines. By 1811 he was suffering from the blight of consumption. To improve his health he moved temporarily to London where he encouraged James Sowerby to undertake a 'Mineral Botany' project to parallel his well known one on fossil shells. Sadly this failed to come to fruition. 1812 and 1813 Steinhauer spent in Bath where he became another disciple of the stratigraphic methods of William Smith. In 1814 he received the call to go and teach at the new world Moravian settlement of Bethlehem. He set off in 1815 and presented his only palaeobotanical paper to the American Philosophical Society in May 1817. This gave scientific descriptions of English coal plants and introduced valid binomial nomenclature for fossil plants for the first time. His large collection of stratigraphically arranged fossils from all over England, and its detailed MSS catalogue all predating his 1815 departure, survives in Philadelphia. His work has been lost sight of because of his early death and the tragic separation of this fine collection from its place of origin. He deserves to be better known.

"Brogniart, Renault and a Yorkshire Naturalist: the Anglo-Franco Battle of the Bois." (Nick Rowe and Jean Galtier.) (Montpellier.)

"The fight was always the same: was Brogniart right or wrong, when he uttered his dogma, that if the stem of a fossil plant contained a secondary growth of wood, the product of a cambium layer, it could not possibly belong to the cryptogramic division of the vegetable kingdom." Thus spoke a reminiscent Williamson in recounting, rather gloatingly – it has to be said – the climax of one of the big botanical debates of the 19th century. The controversy is an intricate one of back-pedalled and surprising discoveries made from rocks cut on foot-tredden saws. The major players included the French side of the "Father figure" of Brogniart and his "flag-hauling followers, Renault and Grand'Eury and of course the British side apparently single handedly defended by the gallant "broadside-firing", "bombshell – flinging" Williamson. The effects on systematics of new technologies and new data sources (including fossils) combined with the annoying effects of convergence has always caused heated controversy. One is mindful of the fact that perhaps things haven't changed much since Brogniart and Williamson's day.

“John Lindley – the reluctant palaeobotanist.” (Bill Chaloner) (Royal Holloway).

In the Fossil Flora of Great Britain (1831 – 37) Lindley and Hutton set out to illustrate and describe all the fossil plants occurring in Britain, largely as a service to geologists; it was a kind of botanical *noblesse oblige*. A major impediment in achieving this was the fact that Lindley rejected the idea that there had been any major (evolutionary) changes in plant life in the course of geological time. As a result he attempted to interpret all the plant fossils described in terms of living groups, rather than accepting the evidence they presented of innovation and extinction. None the less, the work contains important pioneering items – the first cuticle preparation of fossil plants, and an account of some of the earliest experimental taphonomy.

“Illustration and Illustrators from the Golden Age of Palaeobotany; 1800 – 1840.” (Christopher J. Cleal, Maureen Lazarus and Annette Townsend.) (National Museums and Galleries of Wales.)

Three works from the early 19th century stand out as having influenced the development of scientific palaeobotany, Schlotheim's *Burschreibungen merkwürdiger Krauter-Abdrucke*, Sternberg's *Flora der Vorwelt* and Brogniart's *Histoire des vegetaux fossile*. The text of all these works contains important insights into the nature of plant fossils and how they relate to modern-day vegetation. Significantly, however, they are also among the first published works to include accurate images of plant fossils, and thus raised the awareness of the scientific community as to the importance of such fossils. The images remain of great scientific importance as they include the types of many common species found in Palaeozoic and Mesozoic floras, and must still be referred to today when systematic revisions of these taxa are being undertaken. Schlotheim's illustrations were based on Schlotheim's own drawings and were reproduced as etchings by the well-known botanical illustrator Johann Capiex of Leipzig. Sternberg's illustrations were based on original artwork prepared by various artists, most of whom were essentially landscape and portrait artists. The final illustrations were again reproduced as etchings, prepared by another eminent botanical illustrator Jacob Stern of Nuremberg. Brogniart's illustrations were quite different, being lithographs, prepared variously by Mme Ve Noel, L. Houloup and “Thierry freres”. They were based on drawings by various artists, although most were in effect copies of originals prepared by Brogniart.

“The palaeobotanical beginnings of geological conservation.” Barry A. Thomas (Aberystwyth.)

Although fossils and minerals have been collected and described since the late 17th Century and large and private and museum collections were established, no thought was given to site conservation until the latter part of the 19th Century. In Britain such site conservation started with two small areas of Carboniferous *in situ* stumps of arborescent lycophytes, one of them even prior to Williamson's purchase and description of the well known Manchester Museum specimens. Even so, their survival depended on action by individuals rather than the State and no real advances were made in legislation until the 1949 National Parks and Access to the Countryside Act. Until then, landowners had no check at all on their actions.

Britain certainly lagged behind the USA in conservation legislation, but this was a reflection of two very different societies. On the other side of the Atlantic, the expansion westwards led to the discovery of tracts of ‘uninhabited’ land that the US Government believed worth saving from land speculators and developers. It could prohibit entry into certain areas and created National Monuments and National Parks. Notable among these was the Arizona Petrified Forest, which was discovered long before the British Carboniferous lycophyte sites. Nevertheless, the freedom for development meant that the site was effectively ‘open’ to all. Collectors removed vast numbers of logs and the whole forest was only saved at the last minute from being turned into ‘sand paper’ by Congressional action.

“150 Years of Palaeobotany in Manchester.” Joan Watson (Manchester.)

2001 marks the 150th anniversary of the appointment of William Crawford Williamson to the Chair of Natural History at Owens College, the institute which eventually spawned the Victoria University of Manchester. During the past 150 years a palaeobotanical presence in Manchester has been virtually continuous, apart from 1940 – 1950 following the retirement of Lang and 1964 – 66 following the retirement of Calder. There have been only seven incumbents in academic posts but four of them (Williamson, Weiss, Lang and Watson) have a combined service totalling 145 years. Of the other three Stopes stayed in Manchester for only 8 years, and though of course legendary, she left little of a palaeobotanical legacy. Other well-known palaeobotanists associated with Manchester were

incumbents of various ancillary appointments or were distinguished visitors. The total number of students gaining higher degrees is remarkably few, eight out of the dozen or so studying with Watson. The research output from Manchester encompasses most notable British Floras and much international involvement. But here has also been an impressive attention to devising and improving laboratory techniques, starting with Williamson whom it is well documented instructed Sorby in the making of thin sections. Despite this apparently golden past, palaeobotany in Manchester has long been considered an anachronism and a target for demise. 2005 will almost certainly see its extinction.

“Palaeobotanical Studies and collecting in the Nineteenth Century with particular reference to the Ravenhead Collection and Henry Hugh Higgins.”

Alan J. Bowden and Wendy Simkiss (Liverpool Museum.)

Palaeobotanical studies in the North-West of England could perhaps be said to originate with Mr. William Barton and Charles Leigh in the latter part of the seventeenth century. These individuals merely noted the existence of fossil plant remains in the coal measure deposits around Lancashire. However we had to wait until the nineteenth century before any real studies were carried out on the flora found within the Lancashire coalfield.

The Ravenhead collection is primarily made up of Upper Carboniferous plants, fish and bivalves with some insect remains. The collector was Liverpool Museum volunteer Reverend Henry Hugh Higgins and the collection was made from a railway construction site in 1870. The site exposed two coal seams known as the Upper and Lower Ravenhead Coals. Higgins trained the railway construction workers in the art of finding specimens from which he selected items. Higgins used his limited botanical knowledge to select specimens which showed a full range of plant structures. In particular he was interested in those structures which showed attachments.

The collection was exhibited at the British Association meeting held in Liverpool in 1870 and at once created a deal of interest. W. Carruthers remarked upon the fine preservation and the importance of having material where separate components can now with certainty be shown to be part of the same plant.

The first paper on the Ravenhead collection was published by Higgins in 1871. A year later, Museum Assistant Frederick Price Marrat (a conchologist) produced an extensive paper for the Liverpool Geological Society in which he attempted a more detailed description of the Ravenhead flora. However he was hampered by the lack of publications to assist in identification, the state of plant taxonomy and the fact that he could only use external features. This paper described 58 true and seed fern specimens with variations, nine types which included five holotypes and two syntypes. However, Marrat admitted he found identification of plant remains by relying on external features extremely difficult and Williamson's methods of examining the microstructures of fossilised material were not yet in use. He published a further paper in 1872, listing the Sphenopsids found at the Ravenhead site. Marrat's work was not without criticism although, despite the deficiencies in the niceties of taxonomic description, these papers did alert the scientific world to the importance of the collection. The bulk of the Ravenhead collection, including most of the types, survived the May 1941 blitz which virtually destroyed the Museum. Unfortunately all of the Ravenhead display material was lost in the fire.

“Arthur Raistrick: Britain's Premier Palynologist”. John Marshall (Southampton)

The palynological researches of Arthur Raistrick were made at the very start of the systematic study of fossil pollen and spores. At that time his research interests in geology lay in both glaciation and coal geology. His contribution was to unite the approach of pollen profiling in peats to coal seams. The first step involved much experimentation to develop a robust method for the routine extraction of palynomorphs from coal. He then developed a binomial style combination of letters/numbers to name the palynomorphs. Initially his approach was to palynologically profile the coal seams followed by characterizing the entire seam by use of a channel sample. This gave him the ability to show that the same coal seam had the same palynological content but which was different from other coal seams. He tested these methods on a number of coal seams at a large number of collieries in northern England. This gave palynology both a scientific basis and an immediate commercial application. Arthur Raistrick was a dedicated pacifist and with the outbreak of the second world war withdrew from palynological research never to return. The influence of his strongly held beliefs on the development of his scientific career will be discussed.

“Fifty years of palynology at the University of Sheffield” Charles H. Wellman (Sheffield).

Leslie Moore was appointed Sorby Professor of Geology at the University of Sheffield in 1949. He soon initiated a research programme in the fledgling discipline of palynology, a subject he had recently become interested in following pioneering studies of *in situ* spores from Carboniferous plants. Since these early beginnings palynology has thrived in Sheffield, and the discipline of palynology has been explored in all its aspects and for all geological ages. There have been many different staff involved and numerous students. The students of palynology have to date generated 104 Ph.D. theses and 194 M.Sc. dissertations, the latter deriving from the world renowned and highly successful M.Sc. course which has continuously since 1967. The evolution of palynology at Sheffield will be explored, particularly in its interrelationship with the scientific interests of individual staff members and the changing industrial and academic environment. The fate of the many Sheffield students will be considered and their influence on the international palynological scene highlighted.

"The history of coal ball research in China." Wang Shi-Jun and Zhu Wei-Qing. (Beijing.)

In this presentation the history of coal balls research within China is comprehensively reviewed. Coal balls were first discovered within the Taiyuan Formation in Shanxi Province, Northern China in 1973, and since then coal balls have been found at several other Palaeozoic stratigraphic levels throughout China. The majority of research on coal balls has been undertaken by a research group led by Tian Bao Lin in Beijing, and this work as well as that by other Chinese researchers will be summarised. The oldest coal ball assemblages occur in the Namurian C deposits at Jingyuan in Gansu Province. These are the least comprehensively known of all the Chinese coal ball assemblages and are currently under investigation, but appear to be dominated by a rooting system of calamitean plants. Coal ball assemblages in the Taiyuan Formation were initially considered to be of Stephanian (Late Carboniferous) age but more recent research has shown this to be of Asselian-Sakmarian age (Early Permian) based on micro-fauna. In addition to those known from Shanxi Province, the Taiyuan Formation also has coal ball horizons in Shandong Province. Taiyuan coal ball assemblages are diverse and are generally comparable to Late Carboniferous coal swamp floras from Euramerica, and are typically dominated by Lycopods and Cordaitacean seed plants. The youngest coal ball assemblages in China occur in the Wangjiashai Formation in Guizhou Province in southern China that are latest Permian in age. This assemblage contains several lycopods, sphenophytes, marattialean ferns, and also large numbers of giantopterid and other seed plants.

THREE SHORT PAPERS:

"Richard Brookes M.D. – Keeping up appearances." Richard Wilding (HOGG.)

Richard Brookes, M.D. was a physician working in South-East England in the later part of the 18th Century. He had travelled extensively in Europe, Africa and America. He was a very prolific writer and translator, but many of his works were compilations produced with the help of other writers. This is particularly true of his six volume publication on Natural History which was compiled with the active help of one of the great names of English Literature. In the fifth volume of this devoted to fossils, although he paid some attention to the work of Linnaeus, his labelling and descriptions were based more on appearances than on scientific accuracy. Nevertheless, this early example of 'pop' science writing probably did much to increase interest in Nature, past and present.

"A palaeobotanical design by Thomaas Wedgwood." Barry Thomas (Aberystwyth.)

Wedgwood pottery is well known for its moulded relief patterns of people and leaves and there is even a commonly found pattern with ferns and lycopods. There is another relief design of Carboniferous plants with vein patterns that are so accurate I suspect the original moulds were made from real fossils. The likely source was from clay-ironstone nodules in which plants are preserved three-dimensionally.

"The palaeobotanical work of Marie Stopes." Bill Chaloner (Royal Holloway.)

Marie Stopes (1880 – 1958) was unquestionably one of the most remarkable women of the twentieth century. The importance of her work in pioneering the defence of women's rights, and in urging the acceptance of contraception far outweighs her contributions to palaeobotany. None the less, her work on the earliest angiosperms, on coal ball formation and on the composition and terminology of coal made her one of the leading palaeobotanists of her time.

It is intended that the papers are written up as a special publication, and will also include

Dr A.Rajanikanth (India) "History of Palaeobotany in India"
 Dr Jason Hilton (Edinburgh) "The Life & work of Albert Long" (and perhaps "The life & work of Hugh Miller")
 Hugh Pearson (Dr E.G.Ottone (Argentina) "Palaeobotany in Argentina in the 18th and 20th Centuries Ipswich) "A.de Zigno and E.G. Massalongo"
 Dr Qi-gao Sun (Beijing) "History of Palaeobotany in China"
 Joan Watson & Susie Lydon (Manchester) "The Development of Laboratory Techniques in Palaeobotany"
 Pete Hayes (Manchester) "Paleobotany in Manchester Museum"
 John Pollard (Manchester) "The Williamson vs. Binney Disputes"

In addition, papers are wanted on the following people:

A.C.Seward and D.H.Scott

Can anyone oblige???

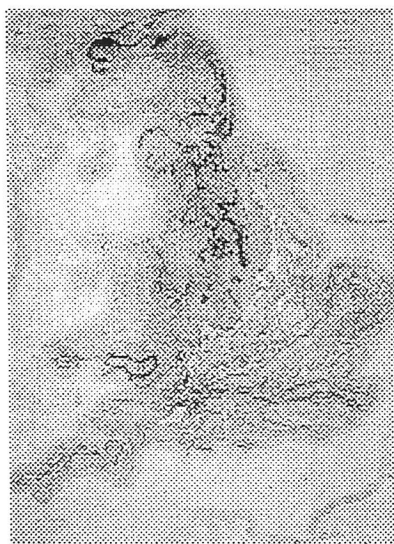
HOGG in 2002....

"200 years of British Hydrogeology"

HOGG and the Hydrogeological Group of the Geological Society are organising a joint meeting on the history of hydrogeology which will be held on Thursday 12th December at Burlington House. With a working title of *"200 years of British Hydrogeology"* the meeting will include papers on the development of hydrogeology and on the individuals who contributed to this development. The work of British hydrogeologists overseas, ideas on the chemistry and origins of mineral waters and the contributions of mining and civil engineers will also be included. Individuals interested in contributing should contact the convenor **John Mather at 7 Bearton Avenue, Hitchin, Herts, SG5 1NZ** or preferably by email at mather@jjgeology.demon.co.uk

HISTORY OF GEOLOGY FIELD TRIP

Saturday 13 – Sunday 14 July 2002



The Industrial Basis of Stratigraphy:

A geological tour in the neighbourhood of Bath celebrating the work of John Strachey (1671-1743) and William Smith (1769-1839)

Leaders: Professor Hugh Torrens and Dr. John Fuller

1719 saw the beginning of an extraordinary chain of events that directly links a coal-mining lease by John Strachey to the geological achievements of William Smith, between 1791 and 1796. This fascinating detective story will be revealed as we visit Sutton Court where Strachey lived and an estate at High Littleton, four miles to the west of Sutton and then owned by Strachey's niece, where William Smith gained his first coal-mining experiences. Although many key sites in the area remain, some parts of the story may not have been lost accidentally!

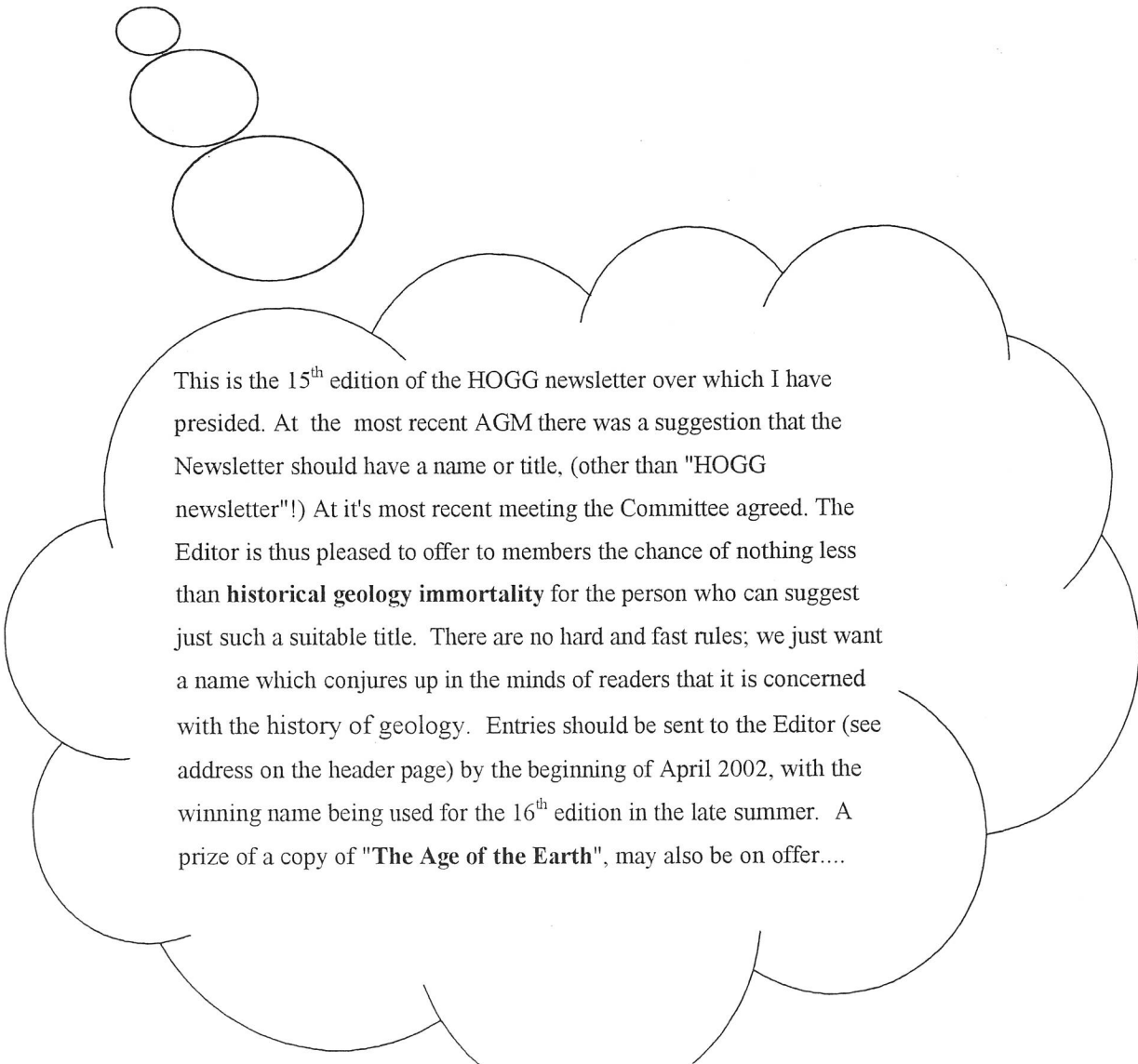
Saturday 14th: Meet at 12.00 (details to be arranged)
 A tour of Bath's 'Smith' sites

Overnight stay in Bath

Sunday 15th: Minibus trip to key 'Smith' sites in the area

For further information telephone John Fuller on: 01892 534955 or email: clelewis@aol.com

What's in a name?.....



This is the 15th edition of the HOGG newsletter over which I have presided. At the most recent AGM there was a suggestion that the Newsletter should have a name or title, (other than "HOGG newsletter"!)

At it's most recent meeting the Committee agreed. The Editor is thus pleased to offer to members the chance of nothing less than **historical geology immortality** for the person who can suggest just such a suitable title. There are no hard and fast rules; we just want a name which conjures up in the minds of readers that it is concerned with the history of geology. Entries should be sent to the Editor (see address on the header page) by the beginning of April 2002, with the winning name being used for the 16th edition in the late summer. A prize of a copy of "**The Age of the Earth**", may also be on offer....

Worth a visit?...

"Heroes & Villains in the Early history of Geology"

A day school to be held at the Hunterian Museum of the Royal College of Surgeons, 35-43 Lincoln's Inn Fields, London WC2 (nearest Underground: Holborn) on Saturday 9th March 2002, 10.30am-5.00pm

The early history of geology is replete with larger than life characters. These often eccentric polymaths took the science to new limits with their skilled observation, incisive insight, and indefatigable spirits. The 18th century German medical Professor Johann Beringer is notorious for describing faked fossils. William Buckland (1784-1846) was the first Professor of Geology & pioneered many aspects of geology & palaeontology. The Swiss natural historian Louis Agassiz (1807-1873) elucidated fossil fish and his glacial studies gave us the Ice Age. Richard Owen, one time curator of the Hunterian Museum & opponent of Darwinism, introduced the dinosaurs. While each man could be viewed as hero or villain, there is never any doubt over the fascination attended by their lives.

Organised as part of Science Week by the London District of the Workers' Educational Association, in association with the Hunterian Museum of the Royal College of Surgeons. **Cost £6** (£5 for WEA members & Friends of the Hunterian Museum). Contact Mike Howgate, WEA, 4 Luke St., London EC2A 4XW (tel: 020-7613-7573)

Lead Miners' Library faces closure.

In 1788, members of the local mining community in the Westgate area of Weardale, Co.Durham, established a library to satisfy the miner's increasing thirst for knowledge. The first library rotated around miners' cottages, but in 1839 it was housed in a cottage, bought for the purpose by public subscription, at Front Street, Westgate, Weardale. Today the library houses 3000 books, and has been looked after for the past 55 years by librarian Florence Hodgson (79), opening to the public every fourth Sunday at 2.00pm. Visitors once peaked at 149, but now no-one comes, and the Trustees are poised to close the building, and perhaps sell the volumes.

[abstracted from a report in The Daily Telegraph, 21 June 2001, with due acknowledgement]

Whereabouts of Sir Walter Raleigh's Samples of Ore from Guiana

In connection with current research on Raleigh's "lost" gold mine along the Orinoco, I wonder if anyone knows whether any of the samples of ore still exist that he supposedly brought back to England in 1595? Where might they be located?

Judging from the prefatory material and text of Raleigh's DISCOVERIE (1596), the ore he claims to have had assayed in England was evidently chunks of white, gold laced quartz obtained from a wide vein of "white sparre" he found in the igneous rock of the Guayana Shield.

According to Raleigh's Epistle to the Reader prefacing the DISCOVERIE (1596) and his letters, the following persons had samples of it:



1. The first assay was by "Master Westwood, a refiner dwelling in "wood-street" ("it held after the rate of 12000 or 13000 pounds a tunne").
2. Another "sort" was "afterward tried by Master Bulmar and Master Dimoke assay master" ("it helde after 26,900 pounds a tunne").
3. "Some of it" was "again tried by Master Palmer comptroller of the minte, and Master Dimoke in golde smiths hall" ("it helde after 16,900 pounds a tunne").
4. The same persons made a "triall" of the "dust of the said myne" (it "held 8. pound 6. ounces weight of gold in the hundred").
5. There were also "divers trialls made in the countrey, and by others in London."
6. According to his letter to the Privy Council in 1611, Raleigh also gave a sample of "that slate gold ore to my Lord Knevett" (identified by Latham as Thomas, Lord Knyvet of Escrick in Yorkshire, Warden of the Mint.
7. As a hitherto unknown document supposedly deriving from Buckingham states that eight ounces of the ore yielded one ounce of gold ("ex octo matris sive metalli puluerosi unciis, unae resultat auri"),

Villiers may have acquired samples of the ore in connection either with his helping secure Raleigh's release in 1616 in order to go back to Guiana, or upon Sir Walter's arrest and execution when he returned in 1618.

8. As Raleigh named "the master refiner" (identified as John Fowler of London) as one of the notables who perished on the voyage out in 1617-1618, one presumes that Fowler had also had access to samples of the ore.

I would greatly appreciate any information about the whereabouts of any quartz or "dust" samples deriving from Raleigh himself, Westwood, Bulmar, Dimoke, Palmer, Knyvet, Villiers, or Fowler that may survive in family archives or in institutions such as the Mint or the Goldsmiths' Hall with which they were associated.

Note added in Proof:

The strata in connection with Raleigh constitute the northernmost outcropping of the Imataca complex of the Guyana shield before it dives under the Orinoco delta and emerges as the mountains in north Trinidad, and that this formation does contain white quartz veins--albeit mostly ferruginous, though with other metals mixed in (but in not very great quantities).

Paul R. Sellin, Department of English, University of California at Los Angeles,
Los Angeles, California 90095-1530 (e-mail: psellin@ucla.edu; tel. (1) (818) 340-4988)

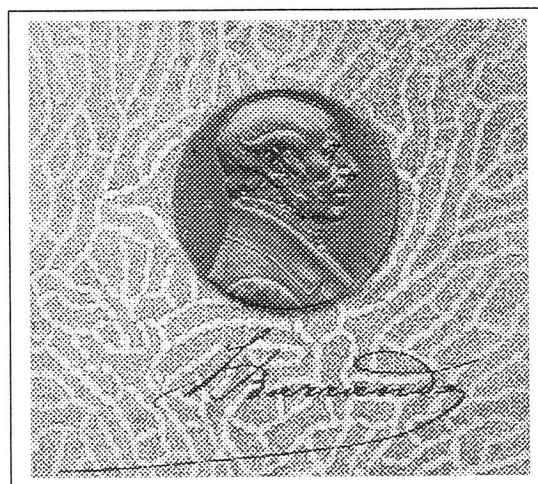
For your bookshelf.....?

"Joachim Barrande (1799-1883): His Life, Work and Heritage to World

Palaeontology", by Radvan Horny and Vojtech Turek, pub: Narodni Muzeum, Praha (Prague), 1999. (In Czech and English)

1999 was the 200th anniversary of the birth of Joachim Barrande. Though French by birth, he settled in Bohemia, and was the first to study the Lower Palaeozoic fauna of central Bohemia; in fact he wanted to do the same sort of job which Murchison had done in England in 1839. He was strongly influenced by Cuvier in France and had access to the highest strata of society via the

Bourbon royal family. Barrande is honoured in having a mineral species (barrandite) named after him (not bad for a palaeontologist!) , a city quarter (Barrandov) and a



bridge (Barrandov bridge) in Prague, not to mention several tens of fossil species and a host of genera .

This little book of 56 pages is splendidly produced on fine glossy paper with many colour plates; it should appeal to all historians of geology.

"From False Starts to Firm Beginnings: Early Colour Printing of Geological Maps", by Karen Severud Cook, in IMAGO MUNDI, The International Journal for the History of Cartography, UK, vol.47, 1995

Geological information was first printed in colour on a map in 1820 but serious efforts to print geological maps in multiple colours began in Europe only in the 1840s. Increased geological mapping activity created the need to print more maps by cheaper methods, while general advances in lithographic colour printing provided the means. better colour registration, transparency, range, permanence, and distinctiveness were attained in the 1840s and 1850s by technical innovations and also by new design strategies. Consequently, as printed colour replaced hand colour as the norm, it also influenced the look of the geological map.

"The Practice of British Geology, 1750-1850", Hugh Torrens, University of Keele, Variorum Collected Studies Series: CS736, pub: Dec 2001, c.350 pages, ISBN 0 86078 876 8, £57.50

Geology is the most historical of all sciences. yet its own history remains neglected, especially the many aspects of how geology was practised in the past. This volume analyses the careers of some important practical figures in English, Welsh, Scottish & Irish geology between 1750 and 1850. These include people who would have regarded themselves more as mining engineers (or 'coal viewers' as they were then called in the vital coal industry) or 'mineral surveyors' as today's mineral prospectors were first called (from 1808), or even inventors. Their expertise, in the land which lead the industrial revolution, took them all over the world. Those included here went to Italy, and South (Peru) and North America (Virginia & Canada). The practise of geology, through the search for mines and minerals has been much less attended to by historians than the geology which was undertaken by leisured amateurs - even though practical geology was as important in the past as the oil industry is today.

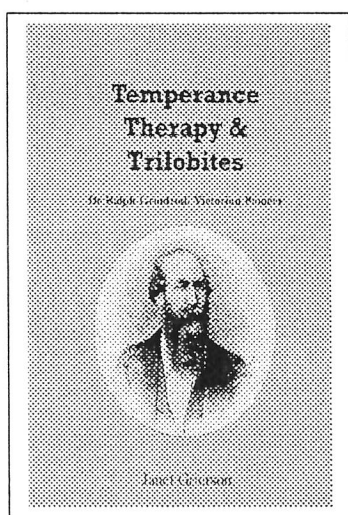
The "Snowflake Man, A Biography of Wilson A. Bentley" by Duncan C. Blanchard
 pub: The McDonald & Woodward Publishing Co., Blacksburg, Virginia, ISBN 0-939923-71-8.



The Snowflake Man is a biography of Wilson Bentley, a farmer from Jericho, Vermont, who spent a lifetime (1865-1931) studying the beauty & science of snow crystals. While still in his teens he taught himself how to photograph the intricate but transient crystals, and then he endured years of indifference and scorn as others around him derided his fascination before the artistic & scientific value became known to scientists and the general public. Bentley was the originator of the well-known saying "no two snowflakes are alike", and his more than 5000 photographs of snow crystals are widely recognised and admired for their enduring beauty and quality.

(abstracted from the dust jacket information)

"Temperance, Therapy & Trilobites. Dr Ralph Grindrod: Victorian Pioneer", by Janet Grierson, pub: Cora Weaver, Malvern, Worcestershire, 2001, ISBN 1 873809 42 5



At a time when we think about public houses being granted rights to remain open for 48 hours over the New Year, or for other festivals, we might also stop to think just how much our Victorian ancestors fought to warn of the evils of 'the demon drink'. One such tireless campaigner was Dr Ralph Grindrod, who was born on 19th May 1811 in the little Cheshire village of Kermincham. His parents farmed land there, but also had business interests in Chorlton Row, Manchester. It was not long before he and his family swapped the rural Cheshire countryside for the relative squalor of Chorlton-upon-Medlock. Ralph Grindrod's elder brother Thomas became a

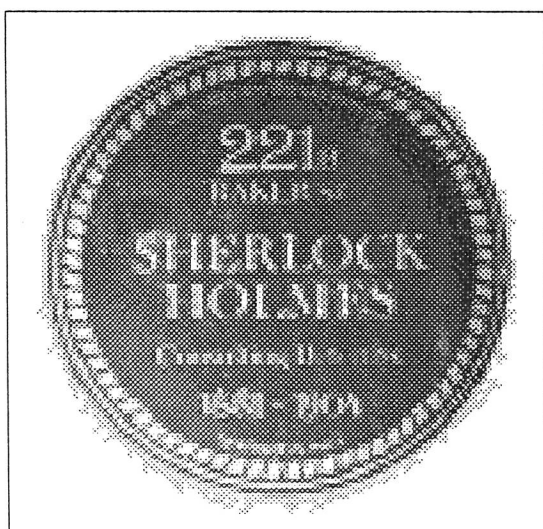
practising apothecary, and Ralph who wanted to become a doctor, was apprenticed to him. In 1830 eventually qualified for the licentiateship of the Society of Apothecaries. Ralph then moved to Runcorn to set up a practice, and it was here that he became acutely aware of the perils of alcohol; from this time on he would work tirelessly to educate the population whom he met in his medical duties. After moving back to Manchester, in 1838 he won a prize for the best essay on *"The Benefits of Total Abstinence from all Intoxicating Drinks"*. His 'essay'

stretched to an astonishing 330,000 words, and 10,000 copies were printed initially. In the following years he toured the country giving talks and demonstrations to large audiences. At the age of 39 he settled in Malvern Here he set up another practice, and espoused various water cures, and eventually a hyperbaric compressed air cure in a specially constructed chamber attached to his residence; this was unique in England at the time. Whilst there he also established a museum which not only had items he could use in medicinal lectures and demonstrations, but items of the flora & fauna and geology of Worcestershire. He also established *The Malvern Advertiser*, with himself as proprietor & editor , the better to communicate his temperance beliefs to the populace. Ralph Grindrod died in 1883, much loved by the people of Malvern & Worcester, and the many thousands he had helped during his career.

This book of 160 pages, is a delightful story of a local pioneer and Victorian values. It is easily readable and well produced on filled white paper. If there is a criticism of the layout it would be that the many quotations from original sources are hard to differentiate from the normal type; the use of italics, or some indentation would have been advisable. For those interested in medical history or the Temperance movement, it offers much. For the historian of geology, it doesn't live up to its title; trilobites, and indeed any mention of geological interests are not met until page 116, and then dealt with briefly. Do acquire this book if you have any interest in medical history, local heroes or the temperance movement, but if your interest is solely the history of geology, you might be disappointed.

(Peter Tandy)

MEMBER'S HELP WANTED...

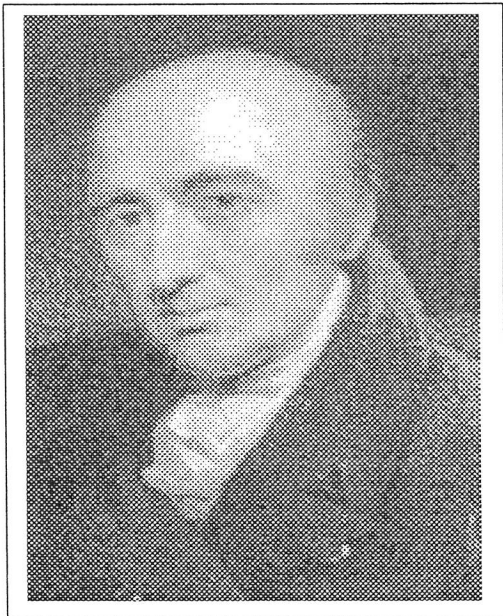


For some time now the HOGG Committee has discussed the possibility of arranging more "Blue Plaques" to be set up in the London area, or anywhere else, on houses or buildings associated with notable past geologists as part of an effort to make the general public more aware of our science. Before new projects are contemplated there are two previous attempts of establishing plaques

that need to be re-visited and put to rights if possible.

The first is getting the plaque to William Smith put on the correct house that belonged to him at Tucking Mill, Somerset. Smith's house still stands and while the present owner of that may be willing to accept a plaque the owner of the house which currently carries a plaque may not be so eager to see it removed and given to his neighbour.

Secondly, The Society has in its possession a large ceramic plaque to William Wollaston. This was placed on the wall of the appropriate house in Buckingham



WILLIAM HYDE WOLLASTON

St., W1 in 1935. War damage and rebuilding has meant that Wollaston's house no longer exists but the owners of the present building on the site may be willing to have the plaque re-installed.

All this will require a certain amount of secretarial effort. In this day and age of bureaucratic rule, planning approval is bound to be needed which will undoubtedly generate correspondence together with other ancillary correspondence dealing with

owners etc.

The Committee is contemplating setting up a small working party to establish whether such a project as outlined is viable. A secretary for such a working party is needed and therefore if there is any HOGG member who is willing to take on this job would he or she please make themselves known to the Secretary, Cherry Lewis.

INHIGEO Meeting, 'Geological Resources and History', 24 June–1 July 2001, Lisbon and Aveiro, Portugal

The meeting was ably organised by a committee under the leadership of Prof. Manuel Serrano Pinto (University of Aveiro), which included Prof. Luis Aires-Barros (President of the Geographical Society of Lisbon, and Technical University of Lisbon) and Prof. Miguel Telles-Antunes (Lisbon Academy of Sciences and New University of Lisbon), who represented between them the three sites at which the technical sessions were held; other members of the committee were David Oldroyd (INHIGEO Secretary-General); M. Portugal Ferreira; Prof. João Luis Cardoso; and Prof. António A. Soares de Andrade.

The principal themes of the meeting, chosen on account of their relevance to Portuguese geology, were: the use of stone in building, dinosaurs, and mining. As might be expected, the largest

number of participants came from Portugal (but only two persons from Spain), and from North America; Australia, other European countries, Russia and Czechoslovakia. All the talks were delivered in either English or French. While many found it slightly irritating that all the oral sessions (the first held at the Geographical Society of Lisbon, the second at the University of Aveiro) each consisted of a day of two parallel sessions, which meant that it was impossible to hear all the papers delivered, the splendid weather, which held throughout, made the field trips particularly enjoyable and any ruffled feathers were soon smoothed out.

Following registration, the meeting essentially began on the afternoon of Sunday 24 June, with a visit led by Prof. João Luis Cardoso to the Leceia archaeological site (near Lisbon), which was excavated in a programme lasting from 1983 to 1999. This was a most impressive hill fort complex (probably housing 200–300 people), first begun c. 2900 BC. Of particular interest in the context of the ‘mining’ theme of the meeting, the site has yielded evidence of copper-working and artefacts, such as parts of axe heads, awls, chisels and punches, produced between c. 2600 BC and 2200 BC. The presence of amphibolitic rocks, which make up the bulk of the building stones at the site, and copper ores indicate a thriving trade in imported material existed at that time.

The following day, the first oral session was held in the august surroundings of the Geographical Society of Lisbon, housed in a magnificent building dating from 1897. We listened to a plenary address by Prof. Aires-Barros (Portugal; airesbarros@popserv.ist.utl.pt), *Stones, Monuments and History* in the Algarve Room, looked down on by statues of Vasco da Gama and Henry the Navigator, and illuminated by a world map showing the routes taken by Portuguese navigators between 1482 and 1660. Unfortunately, the sound quality in this historic room left something to be desired, but half the subsequent talks were given elsewhere in the building, in a modern lecture theatre with good audio-visual facilities. The presentations consisted of the following papers:

Session 1 (am): David Branagan (Australia; dbranaga@mail.usyd.edu.au) – *Rock and stone on canvas: Fifteenth century images - real or imagined?*; Ezio Vaccari (Italy; ezio.vaccari@lettere.unige.it) & Ettore Curi (Italy) – *Quarrying and Geology in early 18th century Italy: the lithological column of Gregorio Piccoli (1739)*; Barry J. Cooper (Australia; bjcooper@dindoblue.net.au) – *The use of stone in South Australia*; João Luis Cardoso (Portugal; arqueolo@univ-ab.pt) – *L'utilisation de roches dures dans le Chalcolithique de l'Estremadura portugaise: le cas de Leceia (Oeiras)*; Session 2 (am): Miguel Telles-Antunes (Portugal; mta@mail.fct.unl.pt) and Philippe Taquet (France; taquet@cimrs1.mnhn.fr) – *Le roi Dom D. Pedro V [1837–1861], Alcide d'Orbigny [1802–1857] et la paléontologie – un exemple de rapports scientifiques entre la France et le Portugal*; Léo F. Laporte (USA; laporte@cats.ucsc.edu) – *Size and hypertely: [George Gaylord] Simpson's [1902–1984] exemplars for the evolutionary synthesis*; F. Amador (Portugal) – *Analyse comparative des textes scolaires et scientifiques portugais, centralisée dans l'étude des dinosaures et d'autre megafaune*; Maria das Dores Areias (Portugal; mariaareias@netc.pt) – *'Rocks 'n roll:*

the contributions to African geology of the Portuguese travellers [Lourenço] Malheiro [1842–1890] and [Freire d'] Andrade [1859–1929].

Following an excellent lunch in a splendidly Victorian ‘Members Common Room’, we resumed, to listen to: Session 1 (pm): Miguel Telles-Antunes (Portugal) – *The earliest illustration [1740] of dinosaur footprints*; Jesus I. Catalá Gorgues (Spain; jesus.i.catala@uv.es) – *Between dinosaurs and turtles: José Royo Gomez (1895 – 1961) and the study of fossil vertebrates in contemporary Spain*; Goulven Laurent (France; goulvenn@aol.com) – *Le catastrophisme chez [Baron Georges] Cuvier [1769–1832] et son disciple Élie de Beaumont*; E. E. Milanovsky (Russia; mvk@geol.msu.ru) – *The development of ideas on the great extinctions, their causes and relations with global cyclicity of the Earth’s geological evolution*; David Oldroyd (Australia; d.oldroyd@unsw.edu.au) – *The extinction of the Australian megafauna debate*; and David A. E. Spalding (Canada; brandywine@gulfislands.com) – *Friendly rivalry or bitter feelings? The Canadian dinosaur rush*. Session 2 (pm): Ana Carneiro (Portugal; amoc@mail.telepac.pt) – *“God has forsaken this land” – The anonymous and forgotten work of collecting rocks and fossils [for the Geological Survey of Portugal, 1869–1900s]*; Vanda Leitão (Portugal; vandamvsl@mail.telepac.pt) – *Bringing rocks into state bureaucracy: the Portuguese Geological Survey*; Teresa Salomé Mota (Portugal; tsalome@geopor.pt) – *The teaching of geology [in Portugal] through textbooks during the Estado Novo [the years of the dictatorship, 1926–1974]: dealing with some stones in some old fashioned way*; Luís Teixeira Pinto (Portugal; lpinto.ctorres@mail.telepac.pt) – *Paul Choffat’s (1849 – 1919) early contribution to Portuguese geology*; L. Povoas (Portugal) – *Dinosaures au Musée National d’Histoire Naturelle (Lisboa). Histoire d’un processus de communication*; António A. Soares de Andrade (Portugal; asandrade@geo.ua.pt) – *André Schneider [fl. 1947]: pioneering mobilistic ideas about the Iberian segment of the Variscan orogen*. Fortunately, owing to the cancellation of a couple of papers, all the participants were able to combine to hear the last two talks: Philippe Taquet (France; taquet@cimrsl.mnhn.fr) – *Les dinosaures dans le tunnel* [the discovery of the first dinosaur eggs in the history of paleontology by Philippe Matheron in the railway tunnel of de la Nerthe, near Marseille, in 1846]; and Hugh S. Torrens (UK; h.s.torrens@esci.keele.ac.uk) – *Rev. Joseph Townsend (1739–1816) and his Journey through Spain in the years 1788 to 1787*.

Continuing with the theme of building stones, we spent the next day under the guidance of Prof. Aries-Barros, firstly looking at examples in the construction of Lisbon Cathedral (where Prof. Aries-Barros and his students are conducting an on-going study of their rate of corrosion as a result of air-pollution), and their conservation. This building was founded in 1147, but has undergone much subsequent revision and reconstruction, particularly following damage caused by the earthquake of 1755 and restoration in the 19th

and 20th centuries. The results of successful conservation were also demonstrated in the even more splendid surroundings of the beautiful former Monastery of Jerónimos, completed c. 1517. This escaped extensive damage from the earthquake as a result of its foundation on limestone bedrock.

Wednesday began in the Academy of Sciences of Lisbon (once everyone managed to get to the building from the nearest metro station, a task which proved more difficult than it sounds, owing to generalisations on the roadmaps!). The Academy was founded in 1779 and is now housed in the former Convent of Jesus, to which it moved in 1838. 'Bill' [W.A.] Sarjeant (Canada; william.sarjeant@usask.ca) set the scene with a most interesting, and copiously illustrated, plenary address – *Footprints Before the Flood: Incidents in the Study of British Vertebrate Footprints in 19th-Century Britain*. This talk was given in the Main Hall of the Academy, an impressive, balconied, two-tier room whose walls were lined with glass cases containing part of the former library of the Convent which includes a priceless collection of manuscripts and books of the 14th–17th centuries. Following coffee, we visited the galleries of the museum of the Institute of Geology and Mining (housed in the same building as the Academy) devoted to geology and archaeology. The serried ranks of the mainly rather dimly-lit wooden display cases had a wonderfully Victorian air. Curiously, the labelling at the tops of a series of wall cabinets in one room, whose contents are apparently arranged in chronological order, began 'Precambrian', 'Cambrian', 'Silurian' In the afternoon, under the guidance of Prof. Telles-Antunes, we visited exposures at Lagosteiros Bay (just north of Cabo [Cape] Espichel, c. 20 mi south of Lisbon), where a variety of Sauropod trackways of Lower Cretaceous, Hauterivian, age are visible on bedding-planes exposed in the sea-cliffs. Some had to be examined through binoculars, while others were on surfaces we could walk over, all helpfully lit by late-afternoon sunlight. The footprints referred to in Prof. Antunes talk are depicted in tile panels inside a small chapel at Cabo Espichel. They were formerly believed to have marked the footprints of the mule on which, according to fishermans legends, Our Lady disembarked from the sea at the Perda da Mua cliffs and ascended to the plateau which overlies them. It is believed that the site was associated with cults dating back to before Roman times. It became a place of pilgrimage in c. 1250 AD and this tradition is continued today.

The following day, we travelled by coach to Aveiro which lies on the coast some 125 mi north of Lisbon, making a detour en route to visit the new dinosaur museum at Lourinhã (c. 37 mi north of Lisbon). Here we were able to admire a number of new species found in the Upper Kimmeridgian/Lower Tithonian (Upper Jurassic) rocks of the area, and a clutch of 34 eggs (laid c. 140 million years ago), one of which contains an embryo Theropod. Following an excellent lunch, laid on by courtesy of the town council in the cloisters of the local church, we were taken to see the coastal site at which the eggs were discovered by the Mateus family in 1993 (their son, Octávio, is currently

undertaking a PhD on the dinosaurs of the region; and his parents are assisting in running the museum). Miguel Telles-Antunes and Phillipe Taquet, among others, are providing regular scientific advice to the museum and to the teams who regularly search the cliffs of the area for new material. The day was rounded off by a visit to another spectacular former monastery at Batalha (built between 1386 and 1517), now also the site of a national war memorial, and on arrival at Aveiro a reception, courtesy of the city council, at the Congress Centre.

Friday, found us in the Department of Mechanical Engineering of the University of Aveiro. The day began with a richly illustrated plenary address by Prof. Octavio Puche Riart (Spain; opuche@dinge.upm.es) – *Historical mining exploitations in Spain and Portugal*, which set the scene for the two parallel sessions, largely devoted to the theme of mining history:

Session 1 (am): Claudine Cohen (France; cohen@chess.fr) – *Practices, images and metaphors for mining in Leibniz's Protogaea* [probably written between 1691 and 1693 and first published in 1749]; Martina Kölbl-Ebert (Germany; martina.koelbl@iaag.geo.uni-muenchen.de) – *The Cardinal, the witch and the truth: the strange posthumous life of alchemist and mining engineer Martine de Berterau* [c. 1580–1645?]; and Nicoletta Morello (Italy; nicolmo@unige.it) – *The “republic of miners”. The organisation of mining from De re metallica [1556] of Agricola*. Session 2 (am): Frederik R. van Veen (Netherlands; fr.vanveen@wolmail.nl) – *Ideas about salt – tectonics in Europe and the USA in the early 20th century*; Zoya Bessudnova (Russia; zoya@sgm.ru) – *The Museum of Natural History of Moscow University and the development of the history of geology in 19th century Russia*; N. P. Yushkin (Russia; yushkin@geo.komisc.ru) – *Mineralogy in Russia: main stages, factors and regularities of development*; and Richard J. Howarth (UK; r.howarth@ucl.ac.uk) – *Not just a petrologist: the life and work of Frederick Henry Hatch (1864 – 1932)*. Session 1 (pm): Renato P. Milheiro Ribeiro (Portugal) – *The growing interest in Mining in Portugal by the end of the 18th century*; Ana Cardoso de Matos (Portugal; acmatos@mail.telepac.pt) – *Adding value to the history of mining and to the mining heritage: the case of the Lousal [pyrite] mine (Portugal)* [discovered in 1882; closed in 1988 and now a mining museum]; and M. Portugal Ferreira (Portugal; conselhodirectivo@fct.uc.pt) – *A contribution to the history of metallurgy in Portugal: Metallurgiae elementa of M. J. Barjona* ([University of Coimbra] 1798), [a facsimile of the original Latin textbook and a Portuguese translation are now in press]. Session 2 (pm): Sally Newcomb (USA; senewcomb@earthlink.net) – *Geology: a balancing act?* [the early impact of the use of the balance in geology through determination of the specific gravity of minerals and enabling the determination of the chemical composition of rocks and minerals, so that theories of their origin might be tested]; Ursula B. Marvin, (USA; umarvin@cfa.harvard.edu) – *The meteorite fall at E'vora, Portugal, 1796*; and Manuel Serrano Pinto (Portugal; mpinto@geo.ua.pt) – *Mining in Transylvania in the 18th century: a memoir by the Brazilian naturalist Manoel Ferreira da Camara (1762 – 1835)*.

There were also a small number of poster presentations: Filomena Amador (Portugal; famad@univ-ab.pt) – *Abductive reasoning and representation of megafauna in the history of Geology*; D. Branagan, (Australia) – *2001 rocks celebrating Australia's century*; Jan T. Kozak (Czechoslovakia; jkozak@ig.cas.cz). & (the late) S. Moreira (Portugal) – *The 1755 Lisbon earthquake: damage to Lisbon constructions as related to rock building materials used* [for contemporary images see also:

www.eerc.berkeley.edu/lisbon]; and Luís Filipe Mazadiego Martinez (Spain; lmazadiego@dermos.upm.es) & Octavio Puche Riart (Spain; opuche@dinge.upm.es) – *Histoire de la fabrication de la chaux à Valdemorillo, Madrid, Espagne*.

The Aveiro session was concluded with an open-participation round-table, organised by Prof. David Oldroyd (Australia), on the theme *Why Study the History of Geology?*. The lively discussion which ensued was recorded with a view to subsequent publication.

With regard to future meetings, the two days of talks (Lisbon and Aveiro) showed that one should try to avoid having parallel sessions, as everyone ended up missing talks that they would have liked to hear. Regretably, in common with meetings in general, some speakers would do well: (1) to avoid the temptation to present overheads of text which they then proceed to read from to the audience (it is far less irritating merely to listen without any 'visual aid', since the eye assimilates on-screen text much faster than the speaker can read it aloud, and it then becomes boring to have its substance repeated) and (2) to check their overheads, well prior to presentation, for legibility when projected at a distance in a lecture theatre (and your rapporteur must plead 'guilty' to having inadvertently loaded his own set of slides so that they projected as mirror images!). Conversely, a few talks could well have done with more illustrations. On the whole, though, standards were high, the content was almost always interesting, and nearly everyone managed to keep to time.

At the end of the conference, there was an opportunity to visit the old city of Porto, where people either wandered round and admired the architecture, or went hunting for bargain rare books and maps (with some success). The final weekend was spent in visits to a Roman mine site in the Dúrico-Beirão gold-antimony district, which lies just east of Porto (which is itself c. 37 mi N of Aveiro), not far from Rio Tinto, led by Prof. Helena Couto (University of Porto); and to the Roman ruins at Conimbriga, with the added bonus of the conference dinner on the Saturday night. The conference closed with the briefest of visits to Coimbra University (the oldest in Europe), which unfortunately turned out to be 'closed' as it was a Sunday. Never-the-less, Professor Pinto's efforts in organising the conference (and whose proceedings he will be seeing through to publication) were rewarded with a rendition of 'For He's a Jolly Good Fellow' in the bus, as the participants left for the station to begin their journeys home.

Everyone who took part in the meeting, including partners and children of some of the participants, appeared to enjoy it tremendously, and we were all most appreciative of the efforts to which the organising committee (and the sponsors) who had all clearly gone to considerable effort to make the meeting such a success.

Richard J. Howarth, Department of Geological Sciences, University College, London

For your diary....

HOOKE 2003 CONFERENCE

To take place at The Royal Society, London from 7-9th July 2003. Papers will be presented on the 7th-8th and an optional guided tour to see examples of Robert Hooke's buildings at Ragley Hall, Warwickshire, and St Mary Magdalene Church, Willen, is being arranged for the 9th. The conference will include an evening reception and dinner. Further details, as they become available can be found at www.gresham.ac.uk/hooke , as well as the opportunity to register on-line.

Future HOGG programme...

For the Spring of 2003, HOGG is looking to hold a meeting devoted to the "History of Volcanology", and beyond that, in 2004 meetings on the "History of Geophysics" and "History of Conservation". Further details will appear nearer the time.

Rock Stars (2)

Model Survey Geologist: G.K. Gilbert by Joanne Bourgeois

University of Washington, Seattle, WA 98195

Reprinted from *GSA Today*, February 1998



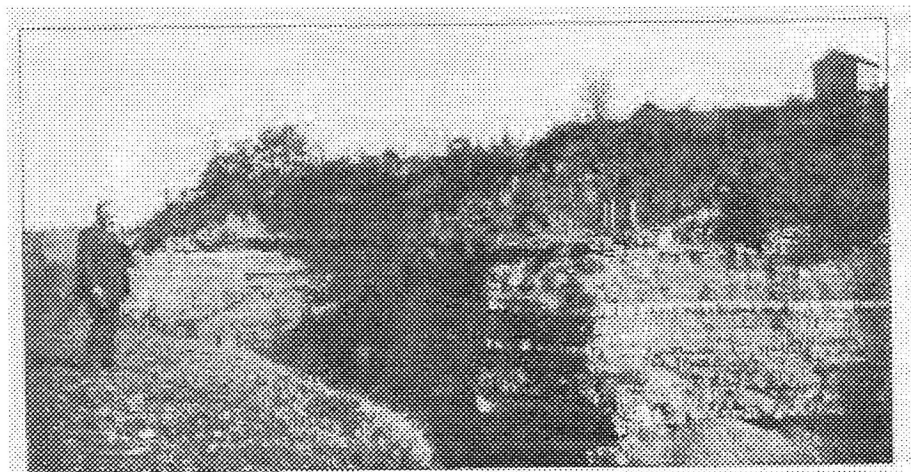
Karl Gilbert at age 19 (from Davis, 1926).

It would have been hard to predict that a rather sickly, quiet boy from Rochester, New York, would become one of the most famous geologists to explore the American West, crossing Death Valley by foot and mule, fighting upstream through the Grand Canyon, crisscrossing the basins and ranges of Utah, Arizona, and New Mexico. Not

only did G.K. Gilbert survive these many adventures (as well as the 1906 San Francisco earthquake), but his scientific reports based on this and other field work are some of the best geologic papers ever written. It seems that Gilbert's geologic career started as a series of fortuitous events, but a look at his early life reveals certain qualities that may have inclined him toward the profession.

Grove Karl Gilbert, called Karl, was born in 1843 into a tightly knit family who loved to spend the evening solving puzzles and riddles, and doing other mental gymnastics. His father was something of a family maverick, a self-taught portrait painter who barely eked out a living; thus Karl's family was too poor to afford much in the way of entertainment outside the home, which they called the "Nutshell." Karl seems to have had no problem entertaining himself, though--in addition to puzzle-solving, he liked to read, including popular magazines, and was particularly fond of boating; with a friend, he built several small boats, which they took on the Genesee River near Rochester. A quiet, intelligent child, Karl was very curious, and early on, he developed excellent powers of observation. His superb physical intuition is evident in this recollection of childhood boating experiences:

When I was a boy I noticed that by rocking a skiff I gave it a forward motion. That led to the trial of other impulses, and I found that by standing near the stern and alternately bending and straightening my legs so as to make the skiff rock endwise, I could produce a forward velocity of several yards a minute. If I stood on one side of the medial line, the skiff moved in a curve. The motions I caused directly were strictly reciprocal, the departures from initial position being equaled by the returns. The indirect result of translation was connected with reactions between the water and the oblique surfaces of the boat.



Gilbert along the Genesee River near Rochester, New York. (Photo published in Yochelson, 1980, courtesy of USGS Photographic Library).

Karl finished high school at the age of 15 and, because he showed academic promise, went on to the University of Rochester, with some financial sacrifice from his family. His clothes were quite shabby and his social life restricted, but he seems to have borne cheerfully and with an even temper whatever hardships came his way. He enrolled in the classical curriculum, centering on mathematics, Greek and Latin, and rhetoric and logic. Because he was fairly frail, a condition set by his father for his attending college was a program of regular outdoor exercise, and this may have inclined Karl toward geology, which was one of the minor subjects he took. His professor was Henry A. Ward, founder of Ward's Natural Science Establishment, which at that time

was called Cosmos Hall. Ward collected geological and zoological specimens and supplied them primarily to museums and schools.

Karl graduated from college in 1862. Probably because he was physically weak and also perhaps because he was disinclined toward conflict, he did not enlist for military duty in the Civil War, nor was he drafted, though his name came up twice. He had debts to pay off from college, so he took a job teaching public school in Jackson, Michigan, where his older sister lived. But Gilbert had so much trouble handling unruly schoolboys that he quit even before the school year ended!

Age 19, out of a job, and with no particular idea of what to do, Karl returned to the family home in Rochester. Soon he found work at Ward's Cosmos Hall, where for the next five years (1863-1868) he catalogued samples, and, as he gained experience, collected specimens and helped mount exhibits in museums. He was left in charge of a mastodon excavation on the Mohawk River when the excavation director, James Hall, wrenched his hip. Because the skeleton was incomplete, in addition to directing the excavation, Gilbert had the opportunity to visit and study other mastodon skeletons in Boston; later he studied other fossil exhibits in New York. On these trips he had opportunity to meet with professional geologists. Also during this time, he studied mathematics, anatomy, and geology at home in the evenings.

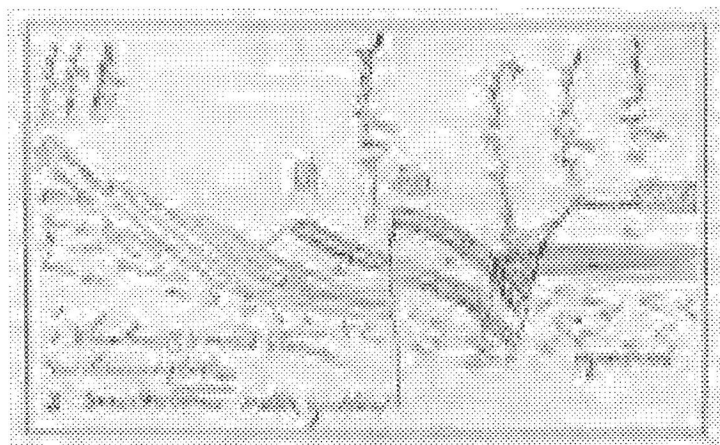
Although much of his Cosmos Hall work involved fossils, Gilbert was more interested in physical geology than in paleontology. In general, he was more attracted to processes and principles than to "facts" and catalogues. But he realized that careful, detailed description of physical evidence and a creative imagination were necessary to solve the geologic puzzles that confronted him. While excavating the mastodon, he became fascinated with potholes in the river bed, and conducted a detailed survey of 350 of them in order to determine their origin and the rate of retreat of the associated waterfall. He published both a popular account of the mastodon excavation and a technical report on the potholes, his first two publications. Gilbert later recalled that his potholes study was what attracted him to further work in geology.

Gilbert learned in the spring of 1869 that a second geological survey of Ohio was being organized, and, quite boldly, decided to go in person to ask then-governor Rutherford B. Hayes for a survey job. Upon being told that only Ohioans would be hired, he persisted by visiting J.S. Newberry, director of the survey (and a professor at Columbia School of Mines), who told Gilbert the same thing, but offered him a volunteer position, at \$50/month expenses. Gilbert accepted this excellent opportunity in July 1869 and was an impressive enough worker that the next year he was offered a salaried job. His duties included conducting field work, drawing fossil plants and fish (at which he excelled), and writing reports. Newberry also employed Gilbert to help him prepare college lectures, and introduced him to several eminent geologists.

Newberry had experience on some early western surveys, so in 1871 Lieutenant G.M. Wheeler asked him to recommend a geologist for a geographical survey west of the 100th meridian; Gilbert was a natural choice. This survey was one of four competing surveys (Hayden, King, Powell, Wheeler) conducted in the early 1870s, which eventually were merged into the U.S. Geological Survey (USGS) in 1879. The Wheeler survey was ambitious, focused on military and engineering goals, and full of adventures and mishaps; Gilbert gladly moved to the Powell survey in late 1874. Gilbert had met John Wesley Powell in Washington, D.C., while working on the

Wheeler reports. Gilbert and Powell became close intellectual comrades, freely exchanging ideas and support over the course of their careers. They were two of the six geologists originally hired onto the USGS, and Powell became its second director (1881-1894).

Gilbert's detailed field notebooks indicate that he was in general good-natured and even-tempered in the field, putting up with many hardships; for example: "Today my mule gave out with hunger & fatigue & I had to walk several miles, but she finally recovered so as to bring me into camp at nine o'clock, which was but an hour later than the rest." Gilbert drew cartoon sketches of his mule and of his observations, later redrawing certain views to use in scientific publications. He even put a sketch of his mule in one of his reports from the Powell expedition.



Gilbert's 1871 field sketch of geology at the mouth of Colorado Canyon, near the Arizona-Nevada border (reproduced in Davis, 1926, from Gilbert's notebook).

Gilbert's years on the Wheeler and Powell surveys resulted in several classic studies. He recognized the block-fault nature of the Basin Range (his term) and laccolithic structure of the Henry Mountains. The latter study also includes an essay on land sculpture emphasizing dynamic equilibrium among various parameters--slope, runoff, bedrock, etc. Then, as head of the Great Basin Division of the USGS, Gilbert studied Lake Bonneville, producing a synthesis of physiography, structure, paleoclimatology, sedimentology, and geophysics. Subsequently, after some time as head of the Appalachian Division and in other administrative duties, Gilbert returned to the West to study problems caused by hydraulic gold mining in the Sierras. This work resulted in two more classic studies--one of sediment transport, and another we would today call an "environmental impact" analysis.

Best known for applying quantitative techniques to physiographic problems, his well-written and well-reasoned publications show insight into a broad range of fields--survey techniques, glacial geology, lunar studies, earthquakes, method and philosophy of science. An extremely generous man, he was influential from individual to administrative levels; quite self-effacing, he was eager to give others credit. Nevertheless, he is the only person to have been appointed president of the Geological Society of America *twice* (1892 and 1909), one measure of his esteem.

Puzzle-solving, curiosity, keen observation, drawing skills, creativity, ability to get by on a low budget--these were family-established traits that set G.K. Gilbert on the road

to a career in geology. Add to those his physical intuition, classical and mathematical training, cheerfulness and generosity, and a stamina that went beyond his natural condition, probably driven by his developed interest in geology. The result was a long and distinguished career of a man who was well respected--and perhaps more important, well liked--by those who knew him.

For Further Reading:

Davis, William Morris, 1926, Biographical Memoir Grove Karl Gilbert, 1843-1918:

National Academy of Sciences Memoirs, v. XXI, 303 p.

Pyne, Stephen J., 1980, Grove Karl Gilbert, a great engine of research: Austin, University of Texas Press, 306 p.

Yochelson, Ellis L., editor, 1980, The scientific ideas of G.K. Gilbert: Geological Society of America Special Paper 183, 148 p.

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A Note About Membership Fees

Along with this newsletter you should receive a request for HOGG Membership Fees for 2002. If you pay by standing order and the amount of your SO is now £10 (following the change last year), then you need do nothing.

If you pay by standing order but the amount is at the old rate of £7, then you need to update your SO using the form on the sheet.

If you pay by cheque, but have not yet done so for 2002, then you **must do so soon**. If you do not, your membership will be deemed to have expired, and this will be the last communication that HOGG will send to you.

For those who have paid for 2002 (and maybe beyond) we apologise for taking your time with this note and the attached sheet. You may disregard it!

