

# GEOLOGICAL CURATOR

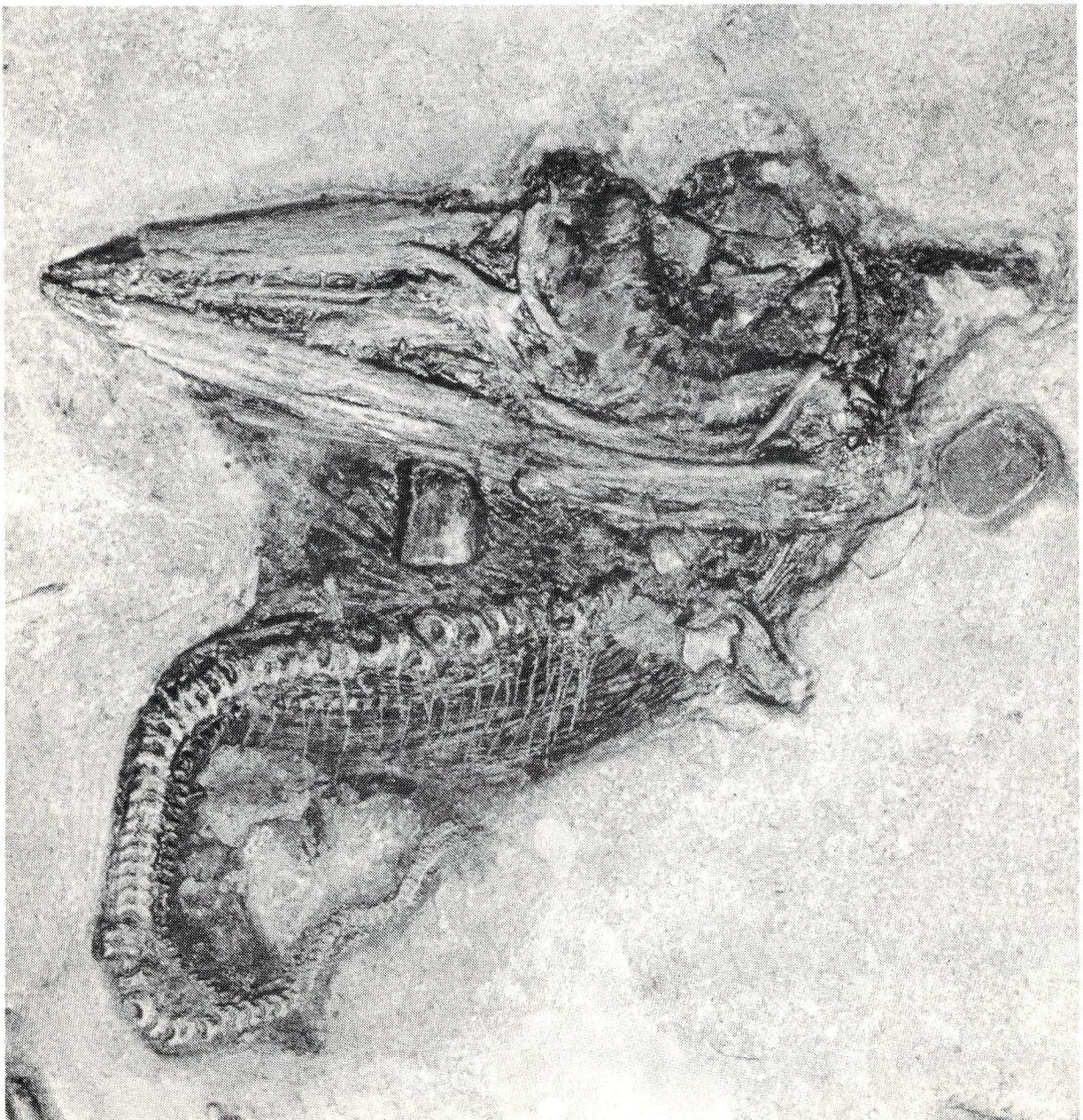


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## GEOLOGICAL CURATORS' GROUP

The Group is affiliated to the Geological Society of London. It was founded in 1974 to improve the status of geology in museums and similar institutions, and to improve the standard of geological curation in general by:

- holding meetings to promote the exchange of information
- providing information and advice on all matters relating to geology in museums
- the surveillance of collections of geological specimens and information with a view to ensuring their well being
- the preparation of a code of practice for the curation and deployment of collections
- the advancement of the documentation and conservation of geological sites
- initiating and conducting surveys relating to the aims of the Group.

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The views expressed by authors in the *Geological Curator* are entirely their own and do not represent those of either the Geological Curators' Group or the Geological Society of London unless otherwise stated.

Typed by Mrs Judy Marvin, Leicestershire Museums Service

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**Cover:** The smallest 'Sea Dragon'! A remarkable ichthyosaur embryo, discovered alongside its 2m long mother in the Lias of the Somerset coast by Robert and Peter Langham in 1985. The 'family' (BRSMG Ce16611) was purchased in March 1991 by Bristol City Museums and Art Gallery with the aid of grants from the Science Museum Preservation Fund, the National Heritage Memorial Fund and the Bristol Magpies. With a skull length of just 6.5cm, this embryo is smaller than any of the well known juvenile ichthyosaurs from the Lower Jurassic Posidonienschiefer of Holzmaden, Germany. [Photo. copyright Department of Geology, University of Bristol.]

# THE GEOLOGICAL CURATOR

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GEOLOGICAL CURATORS' GROUP

August 1991

## EDITORIAL

There is a new look to this issue - GCG meets DTP in the form of *Pagemaker* desk-top publishing software running on an Apple Mac at Oxford University Museum, all thanks to Committee member Monica Price. Wordprocessor output on diskette is now fed into *Pagemaker*, either from Judy Marvin in Leicester (who continues to do a splendid job for the Group) or direct from authors. Thanks to the disk translation service provided by Oxford University, Monica can deal with output from most wordprocessing packages. GCG is in her debt for arranging access to the University Museum's DTP facilities and for taking on page design - all in addition to her producing *Coprolite*.

The UK university sector's Earth Sciences Review appears to be drawing to a conclusion, with the release of resources for collection care by the Universities Funding Council. This tortuous saga has been summarised in three previous editorials (*Geol. Curator* 4, pp.2, 94, 134) and the conference review herein (pp.235-236). To remind you, the Review's National Committee, at its last gasp in mid-1989, established a Steering Committee of representatives from the five 'Collections Centres' designated in the Williams Report of 1988 (confused already?), i.e. Oxford, Cambridge, Birmingham, Manchester and Glasgow, under the chairmanship of Dr Jim Kennedy (Oxford University Museum). The Steering Committee's brief was to convince the UFC to fund and implement a scheme that would address the problems for university collections created by the Review. Directed by the National Committee to take as its starting point the Williams Report's recommendation that future resources for curation should be targeted at the five major centres, the Steering Committee submitted a 'bid' to the UFC in 1989 for funding to cover the extra storage facilities and staffing which they felt would result from the transfer of collections - and, importantly, which would also ensure higher standards of long-term care for existing collections at the five centres. The bid was quickly assessed for the UFC by two senior museum 'referees' from outside the university sector.

As I write (over two years later), the UFC have just released all the resources identified in the Steering Committee's preferred bid, to the tune of £1.7m. This will come as a particular relief to Cambridge and Glasgow, where local pressures saw large sums expended by the University authorities on much needed new storage, in advance of any commitment from the UFC to support such investment. No joy however for those established Departmental museums that were deemed to merit neither the title 'Collection Centre' nor the funding that accompanies this accolade - despite recommendations made by the UFC-appointed referees, who felt that additional money should be allocated to non-Collection Centre museums to help with much needed improvements in storage and documentation. So the Geology Departments at Bristol and Leicester, for example, with their major commitments to palaeobiology, will have to fund any future museum role without UFC help. At present, support in such departments remains strong for maintaining their museum collections, at least to present standards of collec-

tion care and staffing levels, but obviously departmental 'cakes' are limited and pressure is bound to grow on expenditures which are perceived as not 'paying their way'.

The £1.7m from the UFC comes two years too late to ensure the kind of orderly transfer of collections envisaged by Oxburgh and Williams. The problems of collection rescue had to be solved pragmatically at the time they arose, when the Review was implemented in 1989 and many departments were facing closure, amalgamation or downgrading. The uncoordinated and under-resourced actions which characterised the emergency measures taken at the time were of a kind that both Oxburgh and Williams had sought to avoid (heroic though such actions were, by those who had to face the reality of it all). Nevertheless, Jim Kennedy and his Steering Committee should be congratulated for the tenacity with which they have kept 'at' the UFC during the ensuing financial interregnum; they have achieved a major advance for collection care as it can now develop in the Collection Centres themselves.

The new UFC funding will create additional curator and conservator posts at the five centres - and I mean *real* curators and conservators, since the UFC (and their independent referees) intended that properly experienced and qualified museum professionals be engaged, so that this quite specifically targeted public money is not used cynically to supplement teaching and research staff. Job descriptions and profiles for the new posts will therefore properly reflect the full-time curatorial/conservatorial responsibilities of the new posts. As I write the omens look good: Birmingham has appointed a Curator with previous experience of curation in a university geology museum; Cambridge has advertised several posts and stresses the need for relevant practical museum experience; and Glasgow is even seeking candidates for curatorial posts in mineralogy and palaeontology who would benefit from possession of 'the Museums Diploma', no less. All this is a welcome change from the past attitudes of too many university departments, where the responsibilities of 'curator' were traditionally allocated to a member of staff appointed on teaching and/or research criteria alone. The current change of emphasis for the new posts is very welcome. Well done UFC - better late than never!

Closely involved with the arguments generated by the Earth Sciences Review, and a vigorous campaigner for geology in general, was the late Beverly Halstead. Bev was tragically killed in a car accident near Bath at the end of April. Bev was a good friend to many curators and their museums, not least through his involvement with the Curry Fund as President of the Geologists' Association. Geology in Britain needs such highly committed, vociferous, high-profile enthusiasts now more than ever, and Bev's unique contributions to current issues affecting geological science, particularly discussions in the public arena, will be much missed.

Peter R. Crowther  
6 July 1991

## THE F. A. PANETH COLLECTION OF EAST PRUSSIAN AMBER

by G. A. L. Johnson and D. L. Schofield

### Summary

The collection of East Prussian amber made by the late Professor F. A. Paneth has been placed in the collections of the Department of Geological Sciences, University of Durham and is on permanent display. A brief account of Professor Paneth's interest in amber is given together with notes on the occurrence of amber in East Prussia and some of the properties of the mineral. Lists of specimens of East Prussian amber and amber artifacts in the collection and lists of books and papers on East Prussian amber deposited in the University Library at Durham form appendices to the paper.

### F. A. Paneth (1887-1958)

Professor Friedrich Adolf Paneth was a notable chemist in the first half of the twentieth century and a pioneer of radio-chemistry. Born in Vienna in 1887, he was trained in organic chemistry but turned to the new field of radio-chemistry and worked in Vienna between 1910 and 1917 under Meyer. He came to Britain in 1913 to work in Glasgow with Soddy and in 1917 visited Rutherford in Manchester. Later he held posts in Prague, Hamburg, Berlin and at Cornell University, U.S.A. In 1929 he became Professor of Chemistry at Königsberg and remained there until 1933 when the Nazis came to power. At the time he was on a lecture tour of Britain; he stayed on and joined the staff of Imperial College, London. In 1939 he was appointed to the Chair of Chemistry at Durham where he set up the Londonderry Laboratory of radio-chemistry. When he had to retire from the Chair in 1953 on reaching the age limit he was invited to become Director of the Max Planck Institute for chemistry at Mainz where he remained until his death in 1958. This brief account of the life and work of Paneth is taken from biographical notes compiled by Emeleus (1960) and Burnett (1980) which give a much more detailed record of the travels and accomplishments of this remarkably versatile scientist.

A lasting interest in amber started when Paneth occupied the Chair of Chemistry at Königsberg in East Prussia (now Kaliningrad within the U.S.S.R.). In a letter to his brother, Dr Otto Paneth, he writes (in German translated by Miss Eva Paneth, his daughter):

".... Königsberg, as you perhaps know, is noteworthy for a number of things: marzipan, which is regarded as a speciality of the town and can be seen in all imaginable shapes, particularly at Xmas time; Kant, whose sayings invite you to contemplate the starry sky and the moral law at the most dangerous street crossings; elks, that are said to be roaming freely near Königsberg, but whom I know so far only from dreadful paintings in the art shops; and finally amber. Kant's works are nowadays no more confined to Königsberg, elks are not suitable for postal dispatch; marzipan we have already sent you as an Xmas greeting. There remains amber. One can find it oneself, without trouble, in innumerable little pieces if one walks along the beach on certain days after a storm and is lucky enough somewhere to have caught the 'amber vein' which often continues for several kilometers at the same distance from the water, a line of seaweed deposited by the storm with small points of amber sparkling golden in the sun. As a casual walker you rarely come across more considerable pieces and if you do, you are not really allowed to pick them up, as the state has, since the days of the Teutonic knights, reserved itself this monopoly. At present the state collects amber almost exclusively from mining: what it turns it into is less pleasant: Kant on a rock composed of amber fragments (apparently much in demand as it is obtainable in a variety of sizes!), elks decorated with amber, edelweiss flowers composed of amber petals etc. So far I have found only one single designer who has realized that it is best to modify the pieces found in the state mines as little as possible. As a sample I am sending you a signet stamp. In it one can distinguish among other things the layers which show that it is a resin which has solidified as it was exuded.

I like amber so much that I have decided to work on it scientifically as well, trying to determine the time of its solidification and thus the age of the included fauna and flora. If you have glanced at the most recent reprints sent to you, you will have noticed that the helium does not work even with glass meteorites. I am afraid that what applies to the moldavites will also prove true for the glass-like solidification of amber. But by the detour, via mineral inclusions,

which fortunately are occasionally found in amber, it will perhaps be possible to find out more about its age than one know so far ...”

As far as we know Paneth did not complete his chemical study of amber, or at any rate no account of this work has survived. His collection of amber and his books and papers on amber have been preserved by his family and they have recently been deposited at the University of Durham. The specimens of amber are in the Department of Geological Sciences (Appendix 1) and the collection of books and papers are in the University Library (Appendix 2).

Amber was only one of the many interests of the late Professor Paneth and his collections and papers on other subjects have also been preserved and presented as legacies to scientific foundations in Britain, Germany and the U.S.A. In particular, his extensive meteorite collection is in the Max-Planck Institute, Mainz, Germany and his meteorite literature is preserved in the National Museum of Natural Sciences, Smithsonian Institution, Washington DC, U.S.A. His scientific correspondence and a complete reprint set of his published work are kept in the Max-Planck Institute in Mainz and in Berlin. Extracts from his writings on a wide range of topics (from chemistry to philosophy) have been selected and published as a book (Dingle and Martin 1964).

### The collection

Paneth's collection of amber was assembled between 1929 and 1933 when he was resident in Königsberg, East Prussia. All his specimens come from this region and belong to the suite of fossil resins called Baltic amber. The larger specimens of limpid-clear and opaque amber are beautifully polished and were probably purchased from dealers in Königsberg. They may have come from amber collected at the shore-line or from adjacent mining operations. Similarly, the various carved and polished artefacts, such as games counters, medallions, playing card symbols, signet stamps, etc., were made from clear homogeneous Baltic amber, probably in East Prussia. The collection contains many small fragments of clear and opaque amber, some of which are well rolled and abraided. These fragments may well have been collected personally by Paneth on the beaches of the Baltic coast near to Königsberg, as mentioned in his letter above.

One of the strengths of the collection is the series of 21 specimens of amber with included insects, spiders, myriopods and plant remains (see Appendix 1). These biological inclusions have been studied by Dr Lewis Davies (Department of Zoology, University of Durham) who reports that many of the individual specimens are

well preserved and could be identified to lower taxa by experts in the various groups. A layer of oxidised amber on the outer surface of most of the specimens can make detailed study of the organic inclusions difficult. The large block of clear amber containing more than twenty termites (P.8828) is a particularly impressive and attractive specimen.

An interesting component of the collection is a set of 36 specimens of Baltic amber and associated rocks contained in a flat wooden box covered with black paper and divided internally into small compartments (P.8863). It is a set of small, but good specimens selected, boxed and sold in Königsberg; the original typed contents list, a catalogue dated 1920 and a price-list are still with the set. It includes specimens from an amber mine, from glacial drift and from the coastal beaches, amber droplets and examples showing flow, cream coloured or bone amber, contaminated or blue amber, melted, pressed and reconstituted amber. There were originally five specimens of insects in amber but one is now missing. There are also samples of wood, bark and plant debris associated with Baltic amber, small examples of the blue earth source rock, and crystalline succinic acid or amber acid.

### Origin of amber

Paneth's acquisition and appreciation of the beauty of amber continued an ancient tradition of the Prussian Baltic coast where amber has been collected from the shore-line beaches as it is cast up by the sea ever since prehistoric times. More recently it has been found by searching the sea floor using nets and divers.

About 1860 it was realized that the amber came from a series of strata exposed in the floor of the Baltic Sea. Marine currents eroded these soft rocks and separated the amber from its sand and clay matrix. Being of low density (1.05 to 1.096), amber almost floats in water and when freed from the rock it is widely distributed by marine currents. Baltic amber from the Prussian coast is found commonly on the beaches of Norway, Denmark and eastern England. After the discovery of the amber source rocks, successful mining for the mineral began on land in East Prussia. The rocks are of Tertiary age and consist of clay and sand with bands of lignite underlying a deposit of green sand about 20m thick. Amber is scattered through these beds, but is more concentrated in a dark coloured band of clay, sand and gravel which lies at the base of the green sand; this band has been named the blue earth. The blue earth has been dated as basal Oligocene (Saunoisian) and was laid down during a period of marine transgressions over a land surface. Wave and current action during these transgressions is believed to have re-worked and

concentrated the Upper Eocene lignite-bearing sands into the blue earth horizon. Amber is also found in the alluvial and glacial drift deposits of East Prussia.

### Composition of amber

Amber has attracted the attention of many previous workers and there is a considerable literature on the mineral and its use as an ornamental stone. The origin, properties and uses of amber have been summarised by Farrington (1923), Langerheim (1969) and Fraquet (1987). It is a resin or gum of coniferous trees that has fossilized and become altered with the loss of many of its volatile components. It occurs as irregular rounded pebbles and cobbles in sedimentary strata that originate from a terrestrial source. Much amber is of Tertiary age, but it is also found in Cretaceous, Jurassic and Carboniferous deposits. Tertiary amber from the Baltic coast of East Prussia is particularly celebrated but amber has also been discovered in England, U.S.A., Sicily, Switzerland, France, Rumania, Mexico and the Dominican Republic. Amber varies from limpid-clear and transparent to white and opaque and all colour gradations from light yellow to deep brown occur. With a hardness of 2-2.5 it is easily scratched with a knife. It is brittle and breaks with conchoidal fracture. In chemical composition amber is an oxygenated hydrocarbon of varying composition: mean values of carbon 78.86%, hydrogen 10.2%, oxygen 11.0% and carbon 78.60%, hydrogen 10.5%, oxygen 10.5%, sulphur 0.4% are quoted by Fraquet (1987, p.1). Infra-red spectroscopy gives analytical data for comparing resin types; for example, Baltic amber exhibits a spectral pattern distinct from other ambers (Beck *et al.* 1964). Amber burns readily at low temperature and from this property comes the German name Bernstein; one of its Latin names is *Lapis ardens*. Amber has celebrated electro-static properties and the word 'electricity' is derived from the Greek work for amber, 'elektron'.

### Classification of amber

Amber has been divided and classified in two ways: chemically and geographically. The chemical analysis of ambers and allied fossil resins dates back to the early part of the last century and more than 100 different varieties have been described. They are hydrocarbons containing oxygen and sulphur of highly varying composition. A property that has been used in the sub-division of amber is the quantity of succinic acid it yields on dry distillation. 3-8% of succinic acid (amber acid or succinellite,  $C_4H_{10}O_4$ ) is produced from Baltic amber which has the mineralogical name succinite. Hey (1962) listed six varieties of amber based on

succinic acid content, but only one of these varieties is identified in the Paneth collection - gedanite, a variety with little succinic acid (P.8863/93).

More recent work on the chemistry of amber has established that Baltic amber comes from resin produced by pine trees, but the exact genera and species of pines is still uncertain. It is now known that the soluble fraction of amber, including succinic acid, is formed during ageing or degradation after its formation. In particular, succinic acid does not occur free in amber; it is a normal oxidation product and its presence is not an indication of origin. With ageing, Baltic amber changes from gedanite, low in succinic acid, to succinite, high in succinic acid (Rotlander 1970). Thus many of the varieties of amber described on chemical grounds seem more related to the degree of ageing and alteration than biological origin.

Gemmologists are interested in relatively few of the fossil resins and they divide them geographically. Baltic amber (succinite) is high in succinic acid and low in sulphur; Rumanian amber (rumanite) contains succinic acid and up to 3% sulphur; Silician amber (simitite) contains little succinic acid, up to 2.5% sulphur and is high in oxygen (up to 20%); Burmese amber (burmite) has no succinic acid and no sulphur; ambers from Mexico and the Dominican Republic are also used for jewellery (Fraquet 1987; Hey 1962). To what extent these differing resin types reflect different biological origins is uncertain and there may be wide variation in the composition of some of the ambers. For example, according to Fraquet (1987), Dominican amber comprises at least three resins of different ages, possibly different botanical origins and with different properties.

### Acknowledgements

Dr Lewis Davies (Department of Zoology, University of Durham) kindly made a preliminary examination of biological inclusions in the Paneth amber collection. Miss Elizabeth M. Rainey (University Library, Durham) prepared the list of books and pamphlets on East Prussian amber (Appendix II). To these and others who have helped with this work we tender our grateful thanks.

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## Appendix 1. Inventory of F. A. Paneth Collection

List of specimens and their accession numbers in the Palaeontology collection of the Department of Geological Sciences, University of Durham.

- P.8815 glass topped box with analysed samples of amber.
- P.8816 glass phial labelled 'Karl W. Petersen'.
- P.8817 belemnite fragment.
- P.8818 amber fragments.
- P.8819 many amber fragments in black box.
- P.8820 rounded clear and cloudy amber block, internally in heaped drops form, 50x45x20mm.
- P.8821 rounded opaque amber fragment, 67x33x37mm.
- P.8822 oval specimen of cloudy amber, 80x45x15mm.
- P.8823 rounded fragment of clear and cloudy amber, 50x45x20mm.
- P.8824 rounded fragment of cloudy amber with inclusion, 60x30x5mm.
- P.8825 irregular and fractured specimen of clear amber, 110x60x30mm.
- P.8826 irregular fragment of clear amber, 55x20x20mm.
- P.8827 irregular light coloured transparent amber fragment, 70x45x30mm.
- P.8828 large specimen of clear amber containing more than twenty worker termites (Order Isoptera), 3-4mm body length (not *Kaloterme* that occurs in Europe today), 115x38x50mm.
- P.8829 beetle (Coleoptera) in amber, with well striated elytra, many setae, tarsi visible (similar to P.8842).
- P.8830 large (c.10mm) dipteran, probably a mosquito (Culicidae) but with some unusual features - it has the correct head, antennal and proboscis structures, and appears to be a long-palped Culicini female; small insect (Empididae, Diptera); still smaller insect, probably a parasitic micro-wasp (chalcidoid hymenopteron).
- P.8831 large centipede (Lithobiidae); caddis fly adult (Trichoptera), c.8mm long, with fine wing venation; small hymenopteron; adult fly (Sciaridae, Diptera); and a beetle, c.2mm long (?Anobiidae) with one wing extended.
- P.8832 insect, 3-4 mm long (male Dolichopodidae, Diptera); small fly, c.1.5mm long (probably Sciaridae, Diptera); and several branched hairs that may be plant trichomes.
- P.8833 ant (Formicoidea, Hymenoptera).
- P.8834 large bug, wing span c.15-18mm, wing venation and other features beautifully displayed (Hemiptera, probably super-family Fulgoromorpha).
- P.8835 large fly (Tachinidae = Larvaevoridae, Diptera), male with wing venation (cf. *Eriothrix*).
- P.8836 millipede (probably Julidae); small fly (Sciaridae, Diptera).
- P.8837 elongate, narrow-bodied beetle, c.10mm long (Coleoptera similar to Elateroidea, but the pronotum structure incorrect for Elateridae); several mite larvae (*Hypopus*) attached to beetle.

- P.8838 two well displayed flies (Mycetophilidae, Diptera) including wing venation; one wing venation correct for cf. *Mycomya*, the other within sub-family Ceroplatinae.
- P.8839 three small beetles (Coleoptera), two similar, one different.
- P.8840 large spider, female (probably Clubionidae, Araneida).
- P.8841 leaf, c.10mm long (Angiospermae), with plant bug (probably Psyllidae or Aphididae, Hemiptera) on one surface.
- P.8842 large beetle (Coleoptera), c.10mm long (similar to P.8829 but tarsi not visible).
- P.8843 lidded amber box.
- P.8844 signet stamp 'FP' in amber containing many small flies (Sciaridae, Diptera), males and females probably of at least two species (larger and smaller); and male spider (probably Clubionidae, Araneida).
- P.8845 amber signet stamp (unmarked).
- P.8846 magnifying glass, frame and lens of amber.
- P.8847 salt cellar, clear amber.
- P.8848 salt spoon, clear amber.
- P.8849 salt cellar, opaque amber.
- P.8850 salt spoon, opaque amber.
- P.8851 16 fish games counters in clear amber.
- P.8852 4 heart shaped amber counters in plastic frame.
- P.8853 2 amber medallions (ship and bird) in plastic frame.
- P.8854 2 amber medallions (human figure and bird) in plastic frame.
- P.8855 4 heart shaped amber counters in plastic frame.
- P.8856 2 amber medallions (dog and rose) in plastic frame.
- P.8857 4 rectangles of clear amber with playing card symbols.
- P.8858 amber with plant inclusions, mounted in brass (specimen now missing).
- P.8859 medium sized hymenopteron, probably a solitary bee.
- P.8860 irregular shaped specimen of blue amber, 66x42x36mm.
- P.8861 irregular shaped specimen of blue amber, 45x30x18mm.
- P.8862 irregular shaped specimen of blue amber, 58x42x27mm.
- P.8863 black box containing 36 specimens (numbered 1-93 with many gaps in sequence) of amber and associated rocks from East Prussia put together and sold in Königsberg; two specimens are missing according to the original contents list; the set includes 8 ambers with organic inclusions, as follows:

50, rolled wood, *Pinites succinifer* (general name for fossil wood associated with Baltic amber); 51, bark of amber tree; 6, small female fly (Sciaridae, Diptera); 65, small fly (Empididae, Diptera); 71, caddis fly (male), body c.3mm long, with wing venation (Trichoptera); 74, ant (Formicoidea, Hymenoptera) and indeterminate insects; 75, beetle (specimen missing); and 89, spider (Araneida).

## Appendix 2. Material deposited by Miss Eva Paneth in Durham University Library, 1986, relating to the F. A. Paneth Collection of amber

### Books

- Andrée, K. 1937. *Der Bernstein und seine Bedeutung in Natur und Geisteswissenschaften, Kunst und Kunstgewerke, Technik, Industrie und Handel*. Gräfe & Unzer Verlag, Königsberg, 219pp.
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1. Folder containing pencil notes for a lecture by Professor F. A. Paneth on 'Der Bernstein in Geschichte und Wissenschaft' given at Durham University, 21 August 1942, with typescript announcement of the lecture; notes (typescript and manuscript) on his reading about amber.
2. Folder of Professor F. A. Paneth's correspondence on amber play counters, January - September 1957, with: the Kunsthistorisches Museum, Vienna; Sir George Thomson, Corpus Christi College, Cambridge; Museum of the History of Science, Oxford; the British Optical Association, London; and Dr Karl Andréé, Göttingen. 19ff., 1 photograph.
3. Folder of Miss E. Paneth's correspondence on amber play counters, 1957-1979: extract from letter to E. P. from M. P. J., 14 January 1957; A. Barb. Warburg Institute, to E. P. 16 August 1965, enclosing pamphlet, with E. P.'s reply, 2ff, 1 October 1965; E. P. to Prof. Karl Höltgen, Erlangen, 31 October 1978 with his reply 6 November 1978; Warburg Institute to E. P. 31 October 1979). With envelope containing photographs of the counters.
4. Box of 26 glass negatives, 9 x 12cm., and 25 glass slides, 8.5 x 8.5cm., of amber artifacts

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3. Photocopy of letter to Professor Frederick Soddy, Oxford, from the secretary of the Swedish Royal Academy of Science, Nobel Committee for Chemistry, acknowledging his proposal of F. Paneth and G. von Hevesy for the Nobel Prize for Chemistry, 1939. 1f.
4. 'On the teaching of radiochemistry in Great Britain', memorandum to W. A. Akers from F. A. Paneth, Montreal, 20 March 1945, urging that government backing be given to the establishment of a school of radiochemistry at Durham University. Marked confidential, with copies to Dr J. D. Cockcroft and Dr J. Chadwick. 3ff.

# THE STORETON QUARRY DISCOVERIES OF TRIASSIC VERTEBRATE FOOTPRINTS, 1838 : JOHN CUNNINGHAM'S ACCOUNT

by Geoffrey R. Tresise

## Introduction

*Chirotherium* footprints were discovered at Storeton Quarry, near Birkenhead, in June 1838. The footprints were impressed into thin seams of clay within the Keuper Sandstone. The stone tended to split apart along the clay layers, exposing natural casts of the footprints on the underside of the overlying sandstone.

A previous paper (Tresise 1989) described the ways in which the Liverpool Natural History Society promulgated and publicised the finds. The present paper concentrates on the role played by John Cunningham, the Society member who first recognised the footprints.

## John Cunningham (1799 - 1873)

The son of a builder, John Cunningham was born at Leitholm in Berwickshire, now part of the Borders Region of Scotland. He was apprenticed to his father and then became a pupil of Thomas Brown, the Superintendent of City Works in Edinburgh. He worked as an architectural draughtsman in Edinburgh until 1833, when he married and emigrated to New York. However, he quickly decided that the American climate did not suit him and returned to Britain the following year. He then settled in Liverpool and built up an extensive practice as an architect and waterworks engineer. In the summer of 1873 he retired to Edinburgh, where he died on 2 October of that year.

These biographical details are taken from Colvin's (1978) *Dictionary of British architects*. His views on Cunningham's architectural works (p. 247) are also of interest: 'Cunningham's first considerable work, the Court House at Greenlaw, is a handsome building in the Scottish Greek Revival tradition. It is less easy to commend his later work. His Romanesque churches were considered 'laughable' by the *Ecclesiologist* and 'bizarre' by Professor Pevsner. Comments on his Gothic churches and Jacobethan houses are equally unenthusiastic. But his Sailor's Home at Liverpool was a striking if eccentric building of considerable character, and his Philharmonic Hall was regarded by Picton as 'one of the most successful of its kind ever erected'. Cunningham himself considered it 'joost perfect'.'

Perhaps arising from his work as an architect, Cunningham had a keen interest in geology, and was a Fellow of the Geological Society of London. When he first saw *Chirotherium* footprints at Storeton Quarry in June 1838, he immediately recognised them from the description of the German finds that had appeared in Buckland's *Bridgewater Treatise* (1836). He reported his discovery to the Liverpool Natural History Society and wrote a paper on the Society's behalf which was read to the Geological Society of London on 5 December 1838 ([Cunningham] 1838).

On 5 February 1839 Cunningham read a paper on 'Fossil Shower Marks' to the Natural History Society. The rain pitting was seen on the same thin seams of clay that had preserved the footprints, and Cunningham demonstrated that soft clay exposed to showers of rain today developed pitting of exactly the same kind.

Later that month, on 27 February, Cunningham's paper, now with the title 'An account of impressions and casts of drops of rain discovered in the quarries at Storeton Hill, Cheshire', was read to the Geological Society by Dean William Buckland of Oxford University (Cunningham 1839). There was one significant change in the text: the Liverpool version had postulated that the clay seams were laid down in 'a great fresh water lake or the delta of an immense river' which periodically flooded the Storeton area. In the Geological Society paper there is no mention of a freshwater origin for the clay; instead 'Dr Buckland has suggested... the rise and fall of tides over extensive sandbanks, the surface of which was between the level of high and low water'. Cunningham's own views on this suggestion are not recorded.

## The 1858 letter

Twenty years later, Richard Owen (Director of the British Museum (Natural History) in London) wrote to Cunningham for information to be included in an article he was preparing for the *Encyclopaedia Britannica*. Cunningham's reply, dated 13 December 1858, is among Owen's correspondence in the BM(NH) archives (N89: 148/53). It reads:

Liverpool  
5 Cook Street  
13th Decr. 1858

My Dear Sir,

I am much obliged by the receipt of your kind letter of yesterday regarding my discovery of the fossil showers of rain in Storton Quarry [1] and with much pleasure will give you an account of the whole of the circumstances connected with the discovery as far as my memory enables me to do so.

In the spring of 1838 I went across to Storton Quarry to select some blocks of stone I required for a building [2] I had the superintendence of. I pointed out to the Foreman [3] several beds or seams of clay between the strata and requested when he lifted up the strata reposing on the clay beds he would examine the under surfaces of the slabs that rested on the clay beds and if he found any impressions of vegetables or animals he would immediately communicate to me the circumstance. [4] In the course of 10 or 12 days after I had made that request he sent a person over to my office in hot haste with the intelligence that he had found the impressions of a "mans hands and knees". I of course lost no time in getting over to the Quarry and was much gratified with the spectacle presented on the slab which I at once saw were the impressions of the animal called by Professor Kaup the cheirotherium [5] similar to those found at Hilburghausen.

A considerable noise was made about the discovery at the time and several savants visited the quarry in consequence. Numerous footprints of other reptiles were subsequently found [6] on the surfaces of the slabs lying underneath the stratum on which the most perfect impressions of the Cheirotherium were found. These, however interesting, were soon superseded by an announcement [7] I made at one of the meetings of the Natural History Society (now defunct) of having discovered on the surfaces of the slabs the impressions of three distinct showers of rain. I was much laughed at and ridiculed for imagining such a thing could possibly exist or could take place. I however stuck to my text notwithstanding of the ridicule bestowed upon me "and my water marks".

In the month of July following or in August I forget which [8] I had the happiness of meeting in the Quarry the late Dr. Buckland. I directed his attention to the warty appearance on the slabs and communicated to him my notions as to the operating agents in producing these warty excrescences. He stood for several minutes looking earnestly at the impressions but said not a word. I was afraid I had subjected myself to his ridicule also and for some two or three weeks afterwards I was very *quiet* on the subject of my fossil showers. However

at the meeting of the British Association held that year at Newcastle the Dr. came out with the astounding facts in the Geological Section and then and there gave me the credit of the discovery. [9]

Subsequently to that he kept up a correspondence with me on many matters relating to Storton quarries and elsewhere [10] and urged me much to bring several facts (which I had collected) in papers before the Geological Society but, with the exception of my paper upon the fossil rain drops which he read [11], I do not think I have contributed to the Society anything of much importance.

My paper I think was read at one of the meetings of the Geological Society in 1840 or 41. At any rate I went up to London at the Dr's request to attend a meeting and dined previously with the Geological Club at I forget which Tavern [12] and was introduced by him to all the leading men of the Society. The following morning I had the pleasure and honor of being introduced to you at the Surgeons Hall in Lincoln Inn fields and that I think must have been in 1840 [13] and previous if I am not mistaken to the reading of my paper.

Unfortunately I am not in possession of the Geological Society Transactions before 1843 so that I cannot with certainty state the time my paper was read.

I may mention my paper was by Dr. Buckland [14] altered in several places and particularly in one point upon which we could not agree viz. I maintained the impressions i.e. the indentations made by the animals must have been filled up with wind-drifted sand whereas he stood out for the water transport. And as he had altered my views into his [15] I wrote to him to the effect that he had better take the credit of the paper entirely [16] as it was not a matter I attached much importance to. [17]

I have in the foregoing given you almost every circumstance connected with the discoveries in Storton Hill and, if you can out of that vast amount of verbiage extract what you require in the notice you propose to honour me with in the Encyclopaedia Brittanica, I shall be pleased with whatever you may think proper to say about the matter. [18] And beg to remain

Your much obliged and respectful servant

John Cunningham

### Critical assessment of the letter

The letter contains much interesting detail but needs to be read with great caution. The incidents that Cunningham believed took place between 1838 and '1840 or 1841' in fact all occurred between June 1838 and February 1839 - a period of 9 months.

On particular points annotated in the text :

1. 'Storton', 'Storeton' and 'Stourton' (see below) all appear in contemporary accounts of the 1838 discoveries; the second of these is now the accepted spelling.
2. The building in question is likely to have been the Apothecaries Hall in Colquitt Street, Liverpool, designed by Cunningham and A.H. Holme (his partner) in the years 1835 - 1840.
3. The quarry foreman was John Tomkinson.
4. This is surely the most surprising statement in the letter. The clay seams within the sandstone played an essential role in the preservation of the footprints, but for Cunningham to have foreseen and predicted this, as he seems to claim, would show a remarkable degree of prescience.

A different and, in some respects, more plausible account of the circumstances of the discovery was given by Francis Archer (President of the Liverpool Natural History Society) in his address at the Society AGM on 3 September 1839 (Archer 1840): 'Mr. Cunningham...being in the neighbourhood of Stourton happened to hear that there had been blocks of stone turned up in the quarry with the impressions of *men's hands* upon them; these had been ascribed in the simplicity of the workmen, to some antediluvian members of our race who, attempting to escape the influx of waters, thus left their track upon the rock; the smaller marks being ascribed to the hands of children.

Mr Cunningham immediately visited the spot... and gave such directions as secured the specimens from mutilation. Had it not been for his activity on this occasion, the probability is that these slabs would have shared the fate of many others which had been previously raised, and which were afterwards found built up in the stone fences of the neighbourhood.'

This, of course, implies that the quarry workmen had noticed the footprints (and explained them to their own satisfaction) before Cunningham's visit. Support for this view comes from Morton (1870, p.14): 'It is not desirable to introduce newspaper reports of scientific investigations. I must, however, refer to a lecture on 'The Geology and Water Supply of the Hundred of Wirral' by Mr. Cunningham, F.G.S., delivered several years ago in Birkenhead. I have no date attached to the printed slips cut from a local paper at the time, but it may be found somewhere about 1863, or perhaps rather later. In this lecture Mr Cunningham says...that the Storeton footprints had been exposed

to the gaze of the quarrymen and other people for 15 or 20 years before he gave publicity to them in 1837.' [1837 is an error: the year was 1838.]

It seems likely, therefore, that Cunningham heard the workmen's stories of the supposed hand-prints on one of his visits to the quarry, and left directions that he was to be informed immediately of the next such find.

5. Kaup's name was *Chirotherium*. The 'corrected' spelling was introduced by the Liverpool Natural History Society (see Tresise 1989).
6. 'Subsequently found': i.e. in July 1838. On 30 July, Henry Johnson (acting curator of the Royal Institution Museum in Liverpool) was sent over to Storeton to make arrangements for the transport of three sandstone slabs to the Museum. These slabs showed a wide variety of small prints; they were later to become Bootle Museum specimens 4, 8 and 9 (see Tresise 1989).
7. This announcement is not recorded in the Natural History Society minutes. There is no mention of rain-pitting until Cunningham gave his 'Fossil Shower Marks' paper on 5 February 1839. By then the discovery had been endorsed by Buckland since the minutes record: 'The shower marks at the Stourton Hill quarry were stated on the authority of Dr Buckland to be the first discovered in sedimentary strata.'
8. Buckland's visit to Storeton was made in the week beginning 13 August 1838. He reported the footprint finds to the British Association for the Advancement of Science at their meeting in Newcastle-upon-Tyne (20 - 25 August). The *Transactions* note: 'Dr Buckland, having visited the quarries last week, confirmed the accuracy of the statements'. It seems probable, therefore, that he visited Storeton on his way north.
9. Cunningham is here clearly confused. Buckland announced the discovery of the *Chirotherium* footprints at the British Association meeting in Newcastle, giving the credit jointly to John Cunningham and John Tomkinson. He made no mention of the fossil rain-pits at this meeting. Presumably the endorsement quoted in Cunningham's paper of 5 February 1839 was given later by letter.
10. Cunningham's letters to Buckland are preserved in the archives of Oxford University Museum; eleven of these were written between September 1838 and February 1839 (see notes 12, 16 and 17).
11. The paper of 27 February 1839.

12. John Thackray informs me that the tavern would have been the Crown and Anchor in the Strand. (Confirmed in Cunningham's letter to Buckland dated 12 December 1838.)
13. The Geological Society meeting that Cunningham attended as Buckland's guest was that held on 19 December 1838, two weeks after the meeting at which his *Chirotherium* paper was read. His visit to the capital was reported to the Liverpool Natural History Society when it next met on 8 January 1839. The minutes record: 'Mr C. mentioned that he had when in London examined the feet of an Iguana in the College of Surgeons, along with Dr Buckland and Mr Owen, but he could not see that they had any resemblance whatsoever to the impressions of the *Chirotherium*.' [A reference to a letter from Buckland suggesting that the footprints might be those of Iguanas - see Tresise 1989].
14. My suggestion (Tresise 1989) that Cunningham read the *Chirotherium* paper himself was obviously incorrect: the December 1838 and February 1839 papers to the Geological Society were both read by Buckland.
15. The relevant section, as reported in the *Proceedings* reads: 'The authors of the report are of opinion, that each of the thin seams of clay in which the sandstone casts were moulded, formed successively a dry surface, over which the *Chirotherium* and other animals walked, leaving impressions of their footsteps; and that each layer was submerged by a depression of the surface.'

As noted above, this is paralleled by another such change in the February 1839 papers where Cunningham's fresh-water lake in the Liverpool version became Buckland's inter-tidal flats in London.

16. 'I wrote...that he had better take the credit of the paper entirely...' This refers to the 'Fossil shower marks' paper. On 19 January 1839, having received Buckland's comments on his draft text, Cunningham wrote: 'I consider the whole very much improved in every respect. At the same time I humbly beg to state that my views do not coincide with yours as to the causes that operated in the preservation of the impressions but as I am a novice in such matters I must yield to your superior judgement. After all I do not consider myself entitled to the credit of the paper and would feel more gratified by your adopting it as your own (which it virtually is) than I do by having my name appended.'
17. Cunningham was consistently reluctant to claim credit for the discoveries at Storeton. On 5 September 1838, following Buckland's visit to

Storeton and subsequent report to the British Association on the Liverpool Natural History Society's behalf, Cunningham wrote: 'We will certainly avail ourselves of the honor of your proffered services to bring the subject in a more extended form before the Geological Society of London.... At the same time I trust you will excuse me for stating that I cannot consent to the communication being made a personal matter as it would be doing great injustice to my friends above mentioned [the Reverend Mr Dwyer and Dr Sutherland] and other members of the Society who have taken a lively interest in the discovery. I would therefore beg as a favour that you will bring it before the Geological Society of London as a communication from the Natural History Society of Liverpool.'

Cunningham's wish was respected, although he is credited with providing the illustrations (a series of measured sections of Storeton Quarry) which accompanied the report.

18. Owen's *Encyclopaedia Britannica* article (Owen 1859) appeared in volume 17 of the 8th edition. The relevant section (p.131) reads: 'The merit of having first discovered the nature and cause of the numerous small hemispheric pits and tubercular casts in relief on the surface of certain sandstone slabs, is due to John Cunningham Esq., F.G.S., architect, of Liverpool. Since that light was thrown on their nature, they have been recognised under various modifications, as impressions of soft rain, of the big-dropped thunder-shower, of rain driven obliquely by the gale and making impressions with the side of the cup highest opposite the point whence the wind blew, of frozen rain or hail, etc.'

## Conclusions

Although Cunningham was only 59 when the letter was written, his memory of the events described had become hazy and unreliable. He seems to have abandoned his geological interests completely at about this time. Thus he was never a member of the Liverpool Geological Society (founded 1859) nor, despite the Society's interest in Storeton and its footprints, did he ever address one of its meetings.

Nevertheless the letter confirms Cunningham as the original author of the 1838 paper - a role traditionally attributed to him by authors from Morton (1863) onwards. It is evident that the paper, as delivered by Buckland, differed in significant respects from Cunningham's text, although it is far from clear that the views thus imposed were in any way an improvement on the original. 150 years after the event, recognition

of the key role played by John Cunningham in relation to the Storeton discoveries is long overdue.

### Acknowledgements

I am indebted to John Thackray of the Geological Museum who originally informed me of the existence of Cunningham's 1858 letter, and to Philip Powell for access to the relevant letters in the Oxford University Museum archives.

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Geoffrey R. Tresise  
Liverpool Museum  
William Brown Street  
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## LETTER TO THE EDITOR

Dear Editor,

It was with mixed feelings that I read the obituary by David Price in the *Geological Curator* (5, 95-99) of A. G. Brighton (1900-1988). Sadness at the loss of such a distinguished and helpful colleague, mingled with a certain satisfaction of having had the privilege of being briefly associated with him in the early 1960s. This was in regard to the loan of and information about material in the Sedgwick Museum Collections, in connection with my revision of the British Lower Tertiary unionid bivalves (Woodward, F. R. 1965. Monograph of the British Lower Tertiary Unionidae, with descriptions of three new species. *J. Conch.* 25 (8), 316-330, pls. 22-27). Not only did he forward the material requested but drew my attention to further material under his charge as well as providing information on additional potential sources from his personal knowledge built up through the years. This generous and unsolicited help proved

invaluable and saved me from considerable effort in tracing early material for which I will always be grateful. Fellow researchers at the time reported similar experiences and in recognition of these invaluable contributions to geological science I had the good fortune of being able to name a new species, *Unio brightoni* (Woodward 1965, pl. 22, fig. 2), in his honour. Fittingly, the holotype upon which the description was based belongs to the collections of the Sedgwick Museum, Cambridge (C.9967) The material was from the Creechbarrow Beds of Creechbarrow Hill, 2.5 miles west of Corfe Castle in Dorset.

Yours faithfully,

Fred R. Woodward

Department of Natural History  
Glasgow Art Gallery and Museum  
Kelvingrove  
Glasgow G3 8AG

# LOST AND FOUND

Compiled by Peter R. Crowther and Hugh S. Torrens

Enquiries and information, please, to Peter Crowther (City of Bristol Museums and Art Gallery, Queens Road, Bristol BS8 1RL). Include full personal and institutional names and addresses, *full* biographical details of any publications mentioned, and credits for any illustrations submitted.

The latest index to 'Lost and Found' was published in *Geol. Curator* 5(2), 79-85.

## Abbreviations:

CLEEVELY - Cleevely, R. J. 1983. *World palaeontological collections*. British Museum (Natural History) and Mansell Publishing Company, London.

GCG - *Newsletter of the Geological Curators' Group*, continued as *Geological Curator*.

LF - 'Lost and Found' reference number in GCG.

## 164 Mary ANNING (1799-1847) of Lyme Regis

The following note by John Fowles (Lyme Regis) is quoted from Fowles and Bawden (1989, p.7) with permission:

'That the Museum was on the site of Mary Anning's birthplace had seemed very likely ever since the gift of the Drayton Survey of 1824, which I described in the 1985 [Lyme Regis Museum Curator's] Report. Yet the 'Fossil Shop' reference there was not absolutely certain. We have no old deeds, not even a picture or old photograph of the pre-Museum building. But there had been proof in Lyme all the time. By a happy coincidence Dr Hugh Torrens, the tireless researcher and authority on Mary Anning, was in Lyme in 1988 when we heard, appropriately enough through Liz-Anne [Bawden], of an 'interesting drawing' ... which, having seen, we almost snatched out of its owner's hands in our eagerness to get it copied.

It is no great work of art, and in poor condition; but it is unmistakably a pen and ink drawing of the house that once stood where the Museum is now - and as unmistakably it belonged to the Annings, because there is a Victorian note written on it. This was probably soon after Mary's death in 1847:

'The House in which the famous Mary Anning lived when she first sold Fossils. Sketched June, 1842 by W. H. Prideaux and Edward Liddon. The round table for

the fossils used to stand in front of the open cellar window, which was a workshop. Cockmoil Square'.

Liddon and Prideaux are well-known local names, and Liddon's elder brother, at least, was a pupil at George Roberts's school in Broad Street (on roughly the site of the present Post Office). Liz-Anne has had this precious fragment photographed and it is now safely with the Museum archives.

Fowles, J. and Bawden, L. A. 1989. *Lyme Regis Museum Curator's Report 1987-1988, with notes on recent discoveries, research and new acquisitions*. Lyme Regis Museum, Lyme Regis, Dorset.

## 202 Orford Castle Crag fossils, Suffolk

In reply to Philip Cambridge's request for information (*Geol. Curator*, 5, p.158) on collections from the Pleistocene Crag at Orford Castle, Suffolk, and Bridlington, Yorkshire, Tim Riley (Principal Keeper of Natural Sciences, City Museum, Weston Park, Sheffield S10 2TP) writes:

'We have Orford Castle specimens from two collections: 1, we purchased 38 specimen sets from Edward Charlesworth in 1875; 2, we have a few Orford Castle specimens in a collection from Sir S. F. Harmer. We have about 26 species sets from the Bridlington Crag in our H. C. Sorby fossil collection.'

Paul Ensom (Keeper of Geology, Yorkshire Museum, Museums Gardens, York YO1 2DR) has also written to say that the Yorkshire Museum holds a collection of material from the Bridlington Crag.

## 204 British Association's Collection of Photographs of Geological Interest

Phil Doughty (Ulster Museum, Botanic Gardens, Belfast BT9 5AB) writes:

'I can provide the information being sought by Peter James of the Birmingham Photographic Heritage Project on the whereabouts of the British Association's Collection of Photographs of Geological Interest.

The photographs were located by GCG - yes the *Group* - at a meeting held in the Geology Department of the University of Southampton during the Museums Association's Conference in south Hampshire in 1979.

Professor Frank Hodson was showing us round their basement store, where I located brown paper parcels labelled 'British Association Photographic Books'. Frank untied a few until I had located the Irish books which were subsequently lodged here, and a catalogue containing the bulk of the Irish material by the photographer R. J. Welch has been available since 1983 [reviewed in *Geol. Curator* 4, 100-101].

The B.A. Section C committee has negotiated the housing, curation and access rights to the books with the British Geological Survey and they are now in Keyworth, available to all *bona fide* enquirers. Incidentally, the books are only photographic records. In those cases where copyright still applies it does not reside with the British Association, nor did they ever hold negatives.

Our Welch catalogue is still available (now free to academic users on request) and includes details of all the Welch photographs in the Irish books.'

## 206 Cambridge Greensand vertebrate fossils

Paul Ensom (Keeper of Geology, Yorkshire Museum, Museum Gardens, York YO1 2DR) writes:

'The Yorkshire Museum has an extensive collection of material from this horizon running to several hundred specimens. Our collection contains the remains of fish and reptiles amongst which there is a considerable quantity of pterosaur material which is currently being worked on by David Unwin.'

## 210 Iguanodon claw bone and the former Ely Museums

Steve Hutt (Museum of Isle of Wight Geology, High Street, Sandown, Isle of Wight PO36 8AF) queries the identification of the purported *Iguanodon* claw bone, known only from the cast at Wisbech and Fenland Museum illustrated in a recent 'Lost and Found' (*Geol. Curator*, 5, p.161, fig.5). Steve writes:

'Figure 5 bears a very close resemblance to the claws of sauropod dinosaurs in the Museum of Isle of Wight Geology. Therefore, it may be that this specimen has been 'lost' because it has been subsequently recatalogued! Whatever the truth of the matter, the claw in figure 5, never originated from an *Iguanodon*.'

## 213 London Clay nautiloids

Dr Roger Hewitt (12 Fairfield Road, Eastwood, Leigh-on-Sea, Essex SS9 5SB) would like to hear from

museums with London Clay nautilid specimens. He is undertaking both taxonomic and taphonomic studies and is particularly keen to see material from known localities and old collections.

## 214 Jurassic ammonites from Gibraltar collected by Alan L. GREIG (d. 1988)

Dr Edward B. F. Rose (Geology Department, Royal Holloway and Bedford New College, Egham Hill, Egham, Surrey TW20 OEX) writes:

'I am trying to trace the whereabouts of about ten fossil ammonites from the Jurassic of the Rock of Gibraltar, sent by Alan L. Greig (when serving with the Royal Engineers on Gibraltar in about 1943) to E. B. Bailey (when Director of what is now the British Geological Survey). Bailey had them identified by L. F. Spath at the BM(NH), and quotes the identifications in a paper published in 1952 (p.166). The specimens did not go back to Greig (he died last year, but in correspondence says merely that he sent them to Bailey), were not retained in the BM(NH), nor by the BGS. The Gibraltar Museum also has no record of them. Can anyone help?'

Bailey, E. B. 1952. Notes on Gibraltar and the Northern Rif. *Q. Jl geol. Soc. Lond.* 108, 157-175.

## 215 Sauropod dinosaur remains

Paul Upchurch (University Museum of Zoology, Downing St., Cambridge CB2 3EJ) is currently undertaking a review of sauropod dinosaurs for his PhD project, beginning with British genera. He is trying to locate any material of which he may be unaware in museums around the country. If you have any material which may be of interest, please contact him at the above address, or on 0223 336650 or 336613. The material may be catalogued under the following genera, or may be masquerading as non-sauropod material:

1, sauropods found in Britain: *Bothriospondylus*, *Cardiodon*, *Cetiosauriscus*, *Cetiosaurus* (= *Ceteosaurus*), *Chondrosteosaurus*, *Dinodocus*, *Gigantosaurus*, *Hoplosaurus* (*Oplosaurus*), *Ischurosaurus* (*Ischyrosaurus*), *Macrurosaurus* (*Macrourosaurus*), *Marmarospondylus*, *Morosaurus* (*Camarasaurus*), *Ornithopsis* (*Eucamerotus*), *Pelorosaurus*, *Pleurocoelus*, *Regnosaurus?* and *Titanosaurus*.

2, sauropods brought to Britain from overseas: *Apatosaurus* (*Atlantosaurus*, *Brontosaurus*), *Brachiosaurus* and *Diplodocus*.

**216 Holotype of *Ichthyosaurus trigonus*  
Owen, 1840 and the Etheldred BENETT  
(1776-1845) Collection**

CLEEVELY, p.54

H. S. Torrens (Dept. of Geology, Keele University, Keele, Staffs. ST5 5BG) writes:

'In 1840 Richard Owen (1840, p.124) proposed a new species *Ichthyosaurus trigonus* on the basis of a single vertebra sent to him from the Kimmeridge Clay of Westbrooke, Bromham, Wiltshire, by Etheldred Benett (1776-1845) who lived at Norton House, Norton Bavant, Wilts. It was distinguished by 'the straightness of the sides below the transverse process, from which point they converged at an angle of 70 degrees'. In 1889, the holotype having completely disappeared, Richard Lydekker (1889, p.22) described the collections of the British Museum (Natural History) and selected the specimens figured in the meantime by John Phillips (1871, diagrams 126-128) and which are reproduced here as comprising what now amounts to a 'neotypic suite' for *I. trigonus*. They came from the Kimmeridge Clay of Shotover, near Oxford and Swindon.

The long-lost original Owen holotype has now turned up in the Benett collection at the Academy of Natural Sciences in Philadelphia, USA, amongst a mass of lost material which has recently been described in detail by Spamer *et al.* (1990). This discovery necessitates an appeal to the International Commission for Zoological Nomenclature, to overturn an invalid and now unneeded designation. To do this we have to establish where exactly the series of specimens figured by Phillips in 1871 is now. Philip Powell at Oxford University Museum tells me (*in lit.* 12 April 1989) 'we have a dozen [ichthyosaur] vertebrae labelled by Phillips but no *I. trigonus* specimens, except the one described by Phillips as the 45th or 50th vertebra on page 336 (=OUM J.12064) and none of the figured ones'.

Information is sought about the present location of these 'neotypic' specimens figured by John Phillips.

Lydekker, R. 1889. *Catalogue of fossil Reptilia and Amphibia in the British Museum (Natural History)*. BM(NH), London.

Owen, R. 1840. Report on British Fossil Reptiles, Part 1 - Enaliosauria. *Rep. Br. Ass. Advmt Sci.* 1839, 43-126.

Phillips, J. 1871. *Geology of Oxford and the Valley of the Thames*. Oxford.

Spamer, E. E., Bogan, A. E. and Torrens, H. S. 1990. Rediscovery of the Etheldred Benett Collection of fossils, mostly from Jurassic-Cretaceous strata of Wiltshire, England. *Proc. Acad. nat. Sci. Philadelphia*, 141, 115-180

**217 Bryce McMurdo WRIGHT Snr  
(c.1814-1874) and Jnr (1850-1895)**

Michael P. Cooper (41 Albany Road, Sherwood Rise, Nottingham NG7 7LX) writes:

'I am researching the Victorian natural history dealers Bryce McMurdo Wright, father and son (senior, c. 1814-1874; junior, 1850-1895). Both dealt in a wide range of material, including minerals, fossils, shells, corals and ethnological items. The elder Wright is well known for his discovery of the then-new mineral matlockite in 1851 (Greg 1851). Several new species of Recent and fossil mollusc (including *Caryocaris wrightii* Salter in Harkness, 1863, and *Spondylus wrightianus* Crosse, 1873) were also named from specimens supplied by him. My recent research has added a great deal of detail to the previously published biographies (e.g. Cleevly), which scanty information often confused the two men and has proved to be inaccurate in other respects, especially regarding business addresses and dates. However, there still remain some remarkable gaps in the story, some of which appear to be quite mysterious! A brief précis of their lives follows:

BMW Snr was born c.1814 in either Cumberland or Dumfries (see below) and was married in Liverpool in 1842. Nothing is known of the intermediate period of his life. He described himself as a 'painter' on his marriage certificate but began selling Cumbrian minerals to the British Museum the following year. By 1845 he was listed in Liverpool directories as a 'mineralogist & geologist'. BMW Jnr was born in Liverpool in 1850. In 1857-1858 the family moved to London and BMW Snr set up shop near the BM at 36 Great Russell Street, remaining on this street (he moved to no.90 in 1866) until his death in 1874. The business was willed to Wright's widow with the direction that it be offered for sale to BMW Jnr should Mrs Wright not wish to carry it on. Accordingly BMW Jnr took over the business soon after his father's death, dealing at first from Southampton Row but returning to 90 Great Russell Street in 1877. At first business went well; his distinguished clientele included John Ruskin (Evans and Whitehouse 1956-1959), Lord Justice Ford North (mineral collection now in Oxford University Museum) and the Earl of Derby (Wright 1894). A suggestion of problems comes in 1879-1880 when the Natural History departments of the BM moved to South Kensington: thereafter there are no records of purchases from him in the mineral and fossil departments of the BM(NH) while previously both Wrights had sold extensively to the BM. Did something happen to sour relations?

In 1882 Wright removed to 204 Regent Street and remained there until his bankruptcy in 1887-1888. His

stock was sold by J. C. Stevens in March 1888 (Chalmers-Hunt 1976, p.120). Does anyone have a copy of the sale catalogue? Why did he go bankrupt? What is the story behind Sir Arthur Russell's comment that Wright Jnr's business folded when 'he became involved in criminal [*sic*] proceedings over the appropriation of some jewels left in his care'? (Russell MSS). Wright was back dealing the following year, from Savile Row, and continued the business, moving to Wardour Street in 1893, until his death from gastro-enteritis and heart failure in 1895. There are no records of either a will or letters of probate, suggesting that he had already transferred all his assets - perhaps as a means of continuing in business although bankrupt?

BMW Snr's birthplace is a mystery: in the few contemporary publications that mention it (e.g. Wright in Sowerby 1851; Anon. 1875), his birth-place is given as Caldbeck (parish), Cumberland, but Wright's census entries for 1841-1871 all record his birthplace as Scotland or Dumfries. Wright certainly had strong ties with Caldbeck, selling many fine specimens from the mines there and, according to his will, owning property in Heskett Newmarket. However, there is no trace of the Wright family in the early nineteenth century Caldbeck parish records; indeed there is no mention of any of the Wright family through three generations in the English and Scottish parish records indexed by the Mormon Church (the *International Genealogical Index*).

The Victorian illustrator and satirist, Ernest Griset (1843-1907), provides us with the only known portraits of one or other Wright. In an undated pair of coloured drawings in the Victoria and Albert museum, Griset shows 'Bryce-Wright' presenting the skull of a new species of fossil bird, *Odontopteryx toliapicus* Owen, to [Sir] Richard Owen of the BM (see Lambourne 1979; Cooper and Stanley 1990). *Odontopteryx* was described by Owen in 1873, the year before BMW Snr's death, from a specimen supplied by BMW sometime previously. The precise acquisition date is impossible to ascertain as it appears that the fossil was developed in the museum from a specimen in a job lot of unidentified fossil-bearing nodules. Griset's pictures are, moreover, ambiguous: the sprightly, heavily bearded, and fashionable figure of 'Bryce-Wright' shown in them appears to be in his forties - certainly too young to be sure it is BMW Snr who was then 63 and was to die a year later of 'disease of the heart' after suffering from angina for seven years. On the other hand, BMW Jnr was only 23 in 1873. Artist's licence perhaps? Griset's use of the style 'Bryce-Wright' suggests the younger Wright - who had adopted this form of his name from about 1878; alternatively, Griset (perhaps making the drawings several years after the event) may not have known of the earlier style. Griset certainly had some association with the younger Wright

when, in 1883, Wright organised a display of corals etc. from the collections of Lady Annie Brassey of Hastings at the International Fisheries Exhibition in London. Wright's description of this display mentions drawings by Griset, that accompanied the exhibit (Wright 1883). The present whereabouts of these drawings is unknown (L. Lambourne, pers. comm.).

The Brassey exhibit mentioned above included specimens of several 'new' species of coral previously described by Wright Jnr (Wright 1882). These specimens provoked a critic to write a strong letter of complaint to *Nature* (Anon. 1883) concerning 'this travesty of science' and a heated argument developed between the unnamed critic and BMW Jnr in the letters pages of the journal. The matter was unresolved. Who was the critic?

The Wrights moved home and business addresses frequently. BMW Snr had seven business addresses in Liverpool (though in some cases he might have stayed put while the street numbers changed!) and two in London. BMW Jnr moved his London shop five or six times in 20 years. I have found no printed labels for the Liverpool addresses in the mineral collections of the Natural History Museum, London, or the University Museum, Oxford - both of which contain a great many Wright specimens. However, there are several variants for the London addresses, with the exception of 204 Regent Street (BMW Jnr's shop address from 1882-1888 of which no labels have been found). Unfortunately none of these labels accompany specimens of known date so the variations in label style within a given address cannot, generally, be dated. The BM(NH) mineral collection contains a great many dated BMW specimens but, curiously, none are accompanied by Wright's labels (although contemporary purchases from other London dealers *are* labelled) - a minor mystery.

Anyone who has any information relating to the gaps and problems obvious in the brief biographies above or who has Bryce Wright specimens, labels, publications, correspondence or other archive material is urged to contact the writer.'

Anon. 1875. Obituary notice. The late Mr Bryce M. Wright. *Canadian Naturalist*, 7, 431-432.

— 1883. Correspondence in *Nature* (London) concerning Brassey exhibits at the International Fisheries Exhibition, London, 1883. 28, 289-291 (26 July 1883; 'Zoology at the fisheries exhibition' by an anonymous critic); 344 (9 Aug 1883; reply by Bryce-Wright); 366 (16 Aug 1883; letter from D. Honeyman in general support of exhibits criticised by Anon.); 489 (20 Sept 1883; further comments by Anon. - 'The writer of the article' - restating and elaborating his previous comments); 589 (18 Oct 1883; final reply by Bryce-Wright).

Cooper, M.P. and Stanley, C. J. 1990. *Minerals of the Caldbeck Fells, English Lake District*. British Museum (Natural History), London. [Reproduces first of pair of cartoons of 'Bryce-Wright' by Griset.]

Crosse, H. 1873. Descriptions d'espèces nouvelles. *Journal de Conchyliologie*, 21, 248-254, pls. IX, XI.

Evans, J. and Whitehouse, J. H. (eds.). 1956-1959. *The diaries of John Ruskin, 1835-1889*, 3 vols. Clarendon Press, Oxford.

Greg, R. P. 1851. A description of matlockite, a new oxychloride of lead. *Phil. Mag.* 2 (Ser. 4), 120-121.

Harkness, R. 1863. On the Skiddaw Slate Series. *Q. Jl geol. Soc. Lond.* 19, 113-140 [with 'A note on the Skiddaw Slate fossils' by J. W. Salter, pp.135-140].

Lambourne, L. 1979. *Ernest Griset: the fantasies of a Victorian illustrator*. Thames and Hudson, London. [Reproduces second of pair of cartoons of 'Bryce-Wright' and Richard Owen, pl.I, p.17.]

Owen, R. 1873. Description of the skull of a dentigerous bird (*Odontopteryx toliapicus*, Ow.) from the London Clay of Sheppey. *Q. Jl geol. Soc. Lond.* 29, 511-522.

Russell, A. MSS. Notes on mineral dealers and collectors, Dept. of Mineralogy, Natural History Museum, London.

Sowerby, H. 1850. *Popular mineralogy; comprising an account of minerals and their uses*. London ['Collecting minerals' by B. M. Wright, pp.14-23.]

Wright, B. McM. 1882. On some new species of corals. *Ann. Mag nat. Hist.* 9 (Ser. 5), 73-78, pls.2-4 [Description of species *Brasseyia radians*, *Balanophyllia kalakawi*, *Distichopora brasseyi*, and *D. allnutti* brought from the Pacific by Lady Annie Brassey in the 'Sunbeam'.]

————— 1883. 'Sunbeam treasures.' *A description of the natural history and other objects lent by Lady Brassey to the International Fisheries Exhibition*, 40pp. William Clowes and Son, London.

————— 1894. *Native silica, a treatise upon a series of specimens of quartz, rock crystal, chalcedony, agates, and jaspers as well as other earthy and metalliferous minerals ... with a descriptive catalogue of the ... collection of the late Right Hon. the Earl of Derby, K. G., bequeathed by him to the Liverpool Free Museum*. Wyman and Sons, London.

## 218 The first Australian fossil of *Glossopteris browniana*

David T. Moore (formerly of the Department of Mineralogy, Natural History Museum, Cromwell Road, London SW7 5BD) is keen to find the type specimen of the fossil leaf *Glossopteris browniana* (Fig.1) and particularly keen to see the original label in an attempt to establish the provenance of the specimen. He writes:

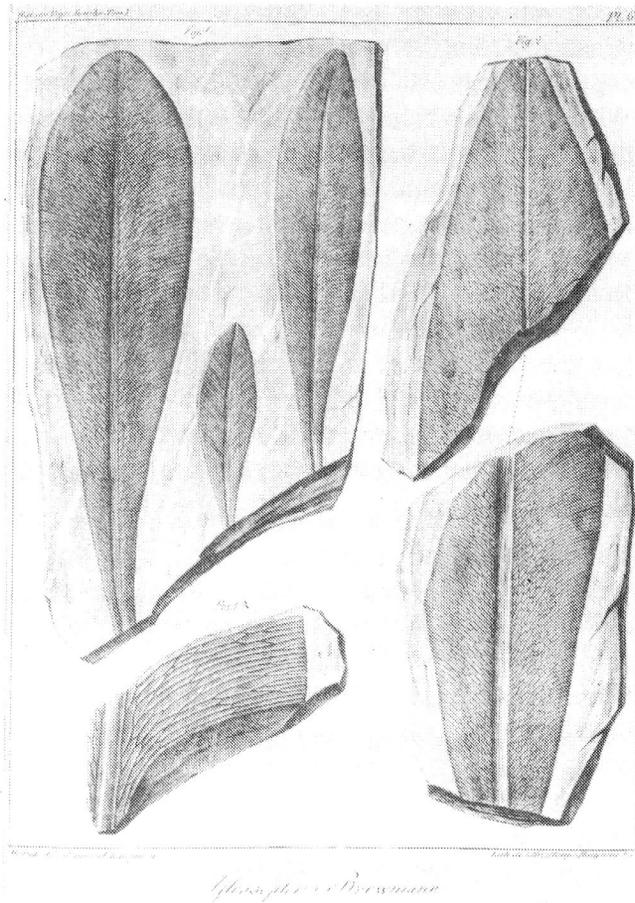


Fig.1 *Glossopteris browniana*, as illustrated by Brongniart (1828a, pl.62).

'*Glossopteris browniana* was established by Brongniart in honour of Robert Brown FRS (1773-1858) who was naturalist to the 1801-1805 *Investigator* expedition to Australia under Captain Matthew Flinders RN. Brongniart noted that *Glossopteris browniana* came from Australia and for the locality (Brongniart 1828a, p.223, pl.62) gave: 'Mines de houille de Hawkesbury-River, a dix milles au nord du Port-Jackson, Nouvelle-Galles du sud (Muséum de l'Université d'Oxford et de la Société géologique).'

However, there are no coal mines on the Hawkesbury River. The Hunter River on the other hand was a known coal producing area even in Brown's time. Also, according to Valance and Moore (1982, p.35), this is nearer a hundred miles from Sydney than the ten indicated by Brongniart.

William Buckland (1784-1856) never went to Australia but could have played the role of middle-man and Oxford link between Brown, who probably collected the specimen at the Hunter River, and the then young Ad.-Th. Brongniart who was to describe them. For Buckland (1821, p.481) wrote: 'It appears, however, from specimens imported by Mr Brown that there is a strong analogy between the coal formations of the Hunter's River and River Hawkesbury in New South

Wales, and that of England, which deserve to be accurately investigated. That illustrious botanist during his late scientific voyage with Capt. Flinders, collected specimens from Kingston in the district of Newcastle, on the Hunter's River, of the shale that accompanies that coal, which like English coal shale, is loaded with impressions of the leaves of ferns ...'

In my view Buckland's (*op. cit.*) quote of '... Hunter's River and River Hawkesbury ...' became shortened to the Hawkesbury River' in Brongniart's (1828a; 1828b, p.54) publications, and that Buckland was correct in stating the Hunter River. If 'Hawkesbury' is an error, it is now well entrenched in the literature as the 'Hawkesbury' is recognised as the locality for the similarly quoted *Phyllothea* (Andrews 1970).

Being described by Brongniart, it is reasonable to assume that the original material is in Paris. But was it, in fact, collected by Brown or by a later expedition? If by Brown, where did he get the specimen? Any help will be welcome.'

Andrews, H. N., Jnr. 1970. Index of generic names of fossil plants, 1820-1965. *U.S. geol. Surv. Bull.* 1300.

Brongniart, A. 1828a. *Histoire des Végétaux Fossiles, ou Recherches Botaniques et Géologiques ...* Dufour et D'Ocagne, Paris.

\_\_\_\_\_ 1828b. *Prodrome d'une histoire des végétaux fossiles.* F. G. Levrault, Paris.

Buckland, W. 1821. Notice on the geological structure of a part of the island of Madagascar, founded on a collection transmitted to the Rt. Hon. Earl Bathurst, by Governor Farquhar in the year 1819; with some specimens from the interior of New South Wales, collected during Mr Oxley's expedition to the River Maquarie, in the year 1818, and transmitted also to Earl Bathurst. *Trans. geol. Soc. Lond.* (1st Ser. 5, 476-481.

Vallance, T. G. and Moore, D. T. 1982. Geological aspects of the voyage of HMS *Investigator* in Australian Waters, 1801-5. *Bull. Br. Mus. nat. Hist.* (Hist.), 10, 1-43.

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## CONFERENCE REVIEW

### University museums and collections; what price the 1990 orogeny ?

GCG seminar, Thursday 7 September 1989, The Hancock Museum, Newcastle-upon-Tyne.

Those of you that have read Peter Crowther's editorials in *Geol. Curator*, Vol. 5, Nos. 3 and 4 will be aware of the great changes which have been imposed upon the provision of Earth Sciences in our universities and the implications this has for collections. The letter sent out by the Universities Funding Council in April 1989 divided the country into five areas, which were to be served by designated 'collection centres'; these would be funded in a realistic way. It was implied that important material (type, figured and cited specimens) would be moved to these centres from all other departments within the designated areas. The letter also proposed using well-equipped local authority museums as collection centres, in some cases. It does not take a genius to imagine the impact this had on the curators in departments that were not designated collection centres, yet were proud of the collections they were responsible for and felt strongly that the material belonged in their university. The UFC proposal implied that departments would lose their collections regardless of any local considerations. This was an exercise in bureaucratic megalomania on a scale which

few of us had experienced. The sense of outrage was real and was compounded by an almost total lack of extra information from the UFC. The result was that rumours developed and information (much of which turned out to be unfounded) spread on the 'grapevine'. It was in this atmosphere of uncertainty and considerable anger that a meeting was proposed to clear the air and find out what the UFC was really proposing to do.

The seminar attracted a wide range of delegates from the university and local authority sectors; with nearly forty attending, it illustrated the importance of the subject to the profession as a whole. The morning session was devoted to case studies, with speakers from Liverpool Museum, The Hunterian Museum in Glasgow and The Hancock Museum, Newcastle, and the afternoon to a representative of the UFC Earth Science Review.

The first speaker, Phil Phillips, described the transfer of collections from Liverpool University to Liverpool Museum, which had been going on for some years. These had been primarily departmental reserve collections. The rock collections were donated in 1984, minerals loaned in 1986 and fossils loaned in 1988. More recently, the teaching of vertebrate palaeontology had ceased, so these collections were also to be transferred. There was concern among many of the delegates about the status of collections held on long

term loan. The experience of The Hancock (the University of Newcastle-upon-Tyne sold the George Brown Collection of ethnographic material) shows how vulnerable such an arrangement is in a world of ever reducing budgets.

The second presentation described the transfer of collections to The Hunterian Museum in Glasgow. These consisted of 70,000 specimens from the University of Strathclyde and 30,000 from the University of Dundee. Much of this material was in real physical danger and to prevent loss it had to be moved quickly. The material was presently on loan, but title to it would be obtained before the considerable task of sorting it out was started. Graham Durant described the logistical problems of receiving such numbers of specimens and stated that the University of Glasgow will commit the money required for storage if the UFC will honour its pledge to fund the operation at a future date.

The last presentation of the morning was given by the author of this review who became rather emotional about the potential future problems for the Hancock Museum's collections. There is further concern in Newcastle because of the loss of the University of Newcastle-upon-Tyne's Department of Geology, and the future of curatorial cover for the geological collections formed over the years for Departmental teaching and as a result of research. It was explained that, although the Hancock Museum was administered by the University, the museum collections belonged to the Natural History Society of Northumbria. The legal agreement signed between the University and the Natural History Society in 1974 stressed the importance of the care of collections and could not be ignored. The speaker also felt extremely vexed about the minimal amount of information which flowed from the UFC and the difficulty in getting this august body to read anything sent to it, or even to answer the 'phone!!

The afternoon session was devoted to a keynote address on the UFC Earth Science Review. This was given by Jim Kennedy of Oxford University Museum, who chairs the Steering Committee which provides advice to Professor P. Allen, under whose direction the 'rationalization' of collections is to be carried out. Dr Kennedy explained that this committee was presented with a *fait accompli*. He stated that the decisions had been made, right or wrong, and his committee had to oversee their implementation. This, to some delegates

was a disappointment as they wanted to berate someone who was responsible!! Dr Kennedy said money would be available in the financial year beginning April 1990 and a sum had been set aside for the needs of non-collection centres. This was low on the list of priorities and may not survive. (Subsequently the author has learnt that the total funds being made available are, £1.75 million to cover one off costs and £260k recurrent funding. How and for what purpose the money is to be made available remains unclear.) He also stated that the 'rationalization' of collections plan was voluntary, so if departments did not wish to take part they did not have to. This, it appears, had been the original intention but was the first official confirmation in five months! He acknowledged the anguish that the April UFC letter had caused and stated that a further letter was in preparation which would put the record straight.

It was a useful meeting in that some misconceptions were cleared up, but it also raises serious questions about how the original decisions were made and the way they have been implemented. The logic behind the siting of the five collection centres is obscure. The obvious conclusion must be that decisions were made with little knowledge of the subject. This inadequate approach has been exacerbated by the insensitive way in which the process of change has been implemented. It remains to be seen what can be salvaged from the avoidable mess many of us are now in. Through a lack of imagination, an opportunity to safeguard the future of all collections in UK Earth Science Departments has been lost.

Andrew Newman  
The Hancock Museum  
The University  
Newcastle-upon-Tyne

20 December 1989

[*Editor's note.* The UFC was unable to fund the 'rationalization' of collections in 1990-1, but has subsequently funded the needs of the collections centres, as defined by the Steering Committee, in 1991-2. Funding bids from non-collection centres look unlikely to receive any support so their future remains uncertain. See Editorial, p.218.]

# NOTES AND NEWS

Compiled by Michael A. Taylor

## Historical sites for the Geological Conservation Review

Dr Bill Wimbleton (Editor-in-Chief, Geological Conservation Review, Nature Conservancy Council, Northminster House, Peterborough PE1 1UA) writes:

'In late 1989 and early 1990 short pieces appeared in *Geology Today*, the newsletter of the Geological Society of London and the Geologists' Association *Circular* on the subject of the conservation of historical Earth-science sites. I am now trying to round off the consultative process on the selection of such localities.

Since 1977 we few in NCC and many hundreds of geological, geomorphological and biological colleagues outside have been busy selecting and documenting more than 3,000 Geological Conservation Review sites. About half of these have already become Sites of Special Scientific Interest. The second phase of the project is the publication of the GCR Series, consisting of 51 volumes which will describe all the selected sites.

The one category which has only recently been considered is that of 'historical site'. That is, localities or areas where the science of geology (in its widest sense) took a leap forward; localities where new theories were propounded or ancient processes were related to their modern equivalents. To give a few examples, these could include sites where crustal upheavals were recognised in the rock record (Hutton's Arran unconformity), where a process was first described (Axmouth landslips), where particular controversies were resolved (Antrim, where the plutonists overcame the neptunists by demonstrating baking of sediments by volcanics), or where stratigraphic or geochronological methods were first applied (S. S. Buckman's hemeral classification of the Jurassic; the first British sites to yield geochemical age estimates). The examples one could cite are numerous. The problem is to choose the most important, because the resources to protect conserved sites are limited. Sites which are perhaps not eligible are those where ideas, which have already been well tried and tested elsewhere, were applied, belatedly, in Britain.

The list which follows is the result of previously published requests for help with the project and of consultations with specialists. I hope that readers will take the opportunity to participate in rounding off the largest conservation exercise ever undertaken in Europe by commenting on this list. Specific suggestions are welcomed on:

- 1, sites that demonstrate the topics described (e.g. where were Hooke's fossil sites?).
- 2, the suitability or otherwise of the sites listed (*are they the best?*).
- 3, sites not listed (with justification please).
- 4, documentation on any listed site.

Please send your suggestions to me at NCC.'

## Principles of geology

- 1, Hutton's first visited and described unconformity on Arran.
- 2, Jedburgh unconformity.
- 3, Glen Tilt; intrusive nature of igneous rocks.
- 4, Hutton's section, Salisbury Crags; Arthur's Seat area in general.
- 5, Dunkerton Middle Jurassic locality with William Smith associations.
- 6, De la Beche unconformity, Frome.
- 7, Axholm, Leland.?earliest reference to stratification.
- 8, Whitehurst's demonstration of nature of toadstone; site in ?Derwent Valley.
- 9, Dundry Hill sites on first Smith field trip.

## Stratigraphy

- 1, Emily Dix's floral biozone sites.
- 2, S. S. Buckman's sites associated with biozonal and hemeral classification of the Jurassic.
- 3, early biozonation of the Lias by Hunton at Whitby.
- 4, biozonation of Carboniferous Limestone by Vaughan.
- 5, Chalk by Rowe.
- 6, Lapworth's biostratigraphic sites at Galashiels and Moffat, Dobs Linn; Moffat facies and faunas.
- 7, bed by bed description following Smith by Etheldred Benett (*in Sowerby 1816*); ?first record of soft-part preservation.
- 8, stratigraphy and folding; Webster's demonstration of continuity between Isle of Wight and Isle of Purbeck.

## Palaeontological 'pops'

- 1, Kirkdale Cave.
- 2, Piltown.
- 3, Robert Hooke sites: London Clay fossil wood site? Inferior Oolite ammonite site?
- 4, Keynsham; one of earliest mentioned fossils (Lias).
- 5, John Woodward sites: Crag/London Clay sites, Harwich, and Reading.

- 6, Lyme Regis (Mary Anning) reptile sites.
- 7, Cromarty Fish beds.
- 8, Fossil Forest at Lulworth.
- 9, Stonesfield/Durlston/Holwell: first described pre-Cenozoic mammals and their dinosaur contemporaries.
- 10, Swanscombe and Marston.
- 11, oyster evolution demonstrated by Trueman at Southerndown.

#### Disputes/controversies

- 1, Silurian-Cambrian dispute: sites?
- 2, type Devonian of Devon; Devonian-Culm De la Beche etc. controversy.
- 3, Boswell and Jones (Keunen at Austwick).

#### Pleistocene/Landforms

- 1, glaciation: Agassiz.
- 2, Axmouth landslips: Coneybeare and Buckland 1840.
- 3, post-glacial raised beaches of Scotland: sites?
- 4, Kineel raised beach: Hutton locality.
- 5, high-level marine Pleistocene at St Agnes: Borlase, Hawkins and De la Beche.
- 6, first association of artefacts and extinct mammals at Kents Cavern; Buckland and biblical controversy.
- 7, Corton, ?first till on till: Gunn 1835.
- 8, Sidestrand glaciotectionics: Reid 1882.
- 9, Moel Tryfan high-level marine sediments: Trimmer etc.
- 10, Parallel Roads of Glen Roy.

#### Metallogenesis

- 1, De la Beche, SW England sites?
- 2, North Pennines, Dunham sites?

#### Structural and metamorphic geology

- 1, Sir James Hall's (1815) recognition of relationship/crustal shortening/folding at Siccar Point.
- 2, Great Glen Fault: site?
- 3, North Wales Slate Belt: first quantification of strain by Sorby 1850s.
- 4, cleavage: Sorby, Ramsay sites?
- 5, Bailey's (1930) first appreciation of significance of sedimentary structures in metamorphic terrains at Loch Leven, Ballachulish and Onich.
- 6, Shackleton's (1958) use of sedimentary structures to demonstrate downward-facing folds in the Dalradian at Dunkeld.
- 7, Moine Thrust: Peach and Home. Durness imbricate structure first recognised. Knockan Cliff overthrusting.
- 8, small-scale structures at Tintagel.
- 9, petrofabrics at Oykell Bridge mullions.

- 10, refolding sequences at Loch Monar and Schihallion.
- 11, time relationships at Scourian/Laxfordian sites?
- 12, Barrow's metamorphic zones and Buchan-type metamorphism: sites?
- 13, coal rank: sites?

#### Igneous geology

- 1, Loch Ba ring-dyke: first example.
- 2, Centre 3, Ardnamurchan: alleged ring-dyke complex.
- 3, Ben Klibreck migmatites.
- 4, Castle Rock, Edinburgh.
- 5, Glen Coe cauldron subsidence.
- 6, Staffa.
- 7, Tertiary volcanics: Geological Survey mapping on Mull, Ardnamurchan and Rhum.

#### Miscellaneous

- 1, first sites to yield 'absolute' dates?

#### Request for information on natural science collections

C. V. Horie (The Manchester Museum, The University, Oxford Road, Manchester M13 9PL) writes:

'As discussed in *Natural History Conservation*, 4 (1989), pp.3-5, planning for specimen conservation needs knowledge about the numbers, types and requirements of the material involved. There is little hard information to back up the scattered personal experiences of those caring for natural science collections. As a first step in addressing this question, I have gathered data on collections relating the category of specimen to the date of collection, i.e. the length of time it has been preserved. This may be correlated with the physical well being of the specimen, though the relationship has yet to be tested.

Information has been gathered from collections where data is available in machine readable form. Some collections have achieved nearly 100% data capture but most have far less. Data capture is only partial and idiosyncratic. The data have been amalgamated and summarised in Figs. 1 and 2 which show the considerable difference between collections (and presumably their problems) in contrasting countries - the United Kingdom and Australia respectively. No data has been gathered from North America and very little from the rest of the world.

I am therefore requesting help. If you have (or know of) specimen data that can be easily abstracted in the form of number of specimens per decade (e.g. 1900-1909), I should be pleased to add the information to the data

bank. For example, vertebrate data are divided into categories of reptiles, fish, mammals, etc., and study skin, mount, skeletal, spirit, etc. Similar subdivisions

are made in botany and earth sciences (including rocks, minerals and fossils).

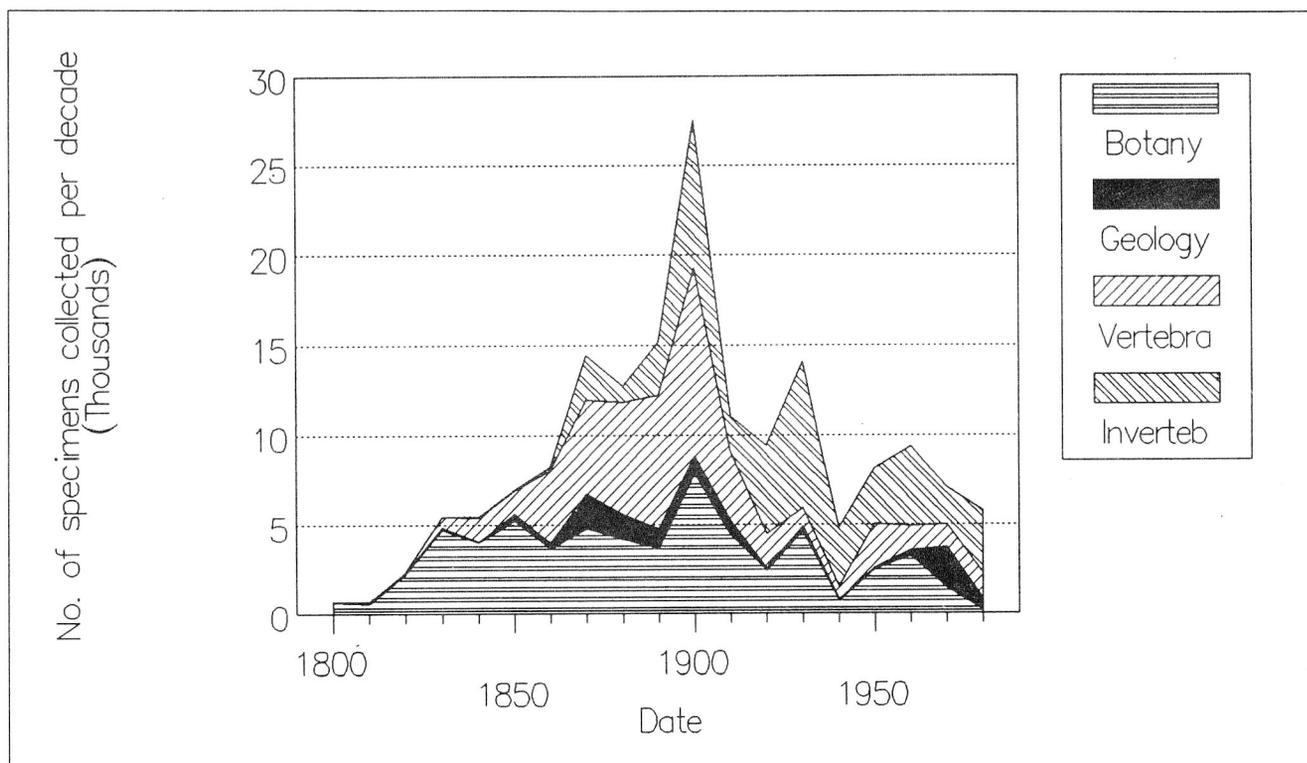


Fig. 1. Age profile of natural science collections in the UK, incorporating data from: Inverness Museum (Mr S. Moran); The Hancock Museum, Newcastle-upon-Tyne (Mr P. S. Davis); Ipswich Museum (Miss S. Dummer); The Manchester Museum (Mr C. W. Pettitt); and Liverpool Museum (Mr P. W. Phillips).

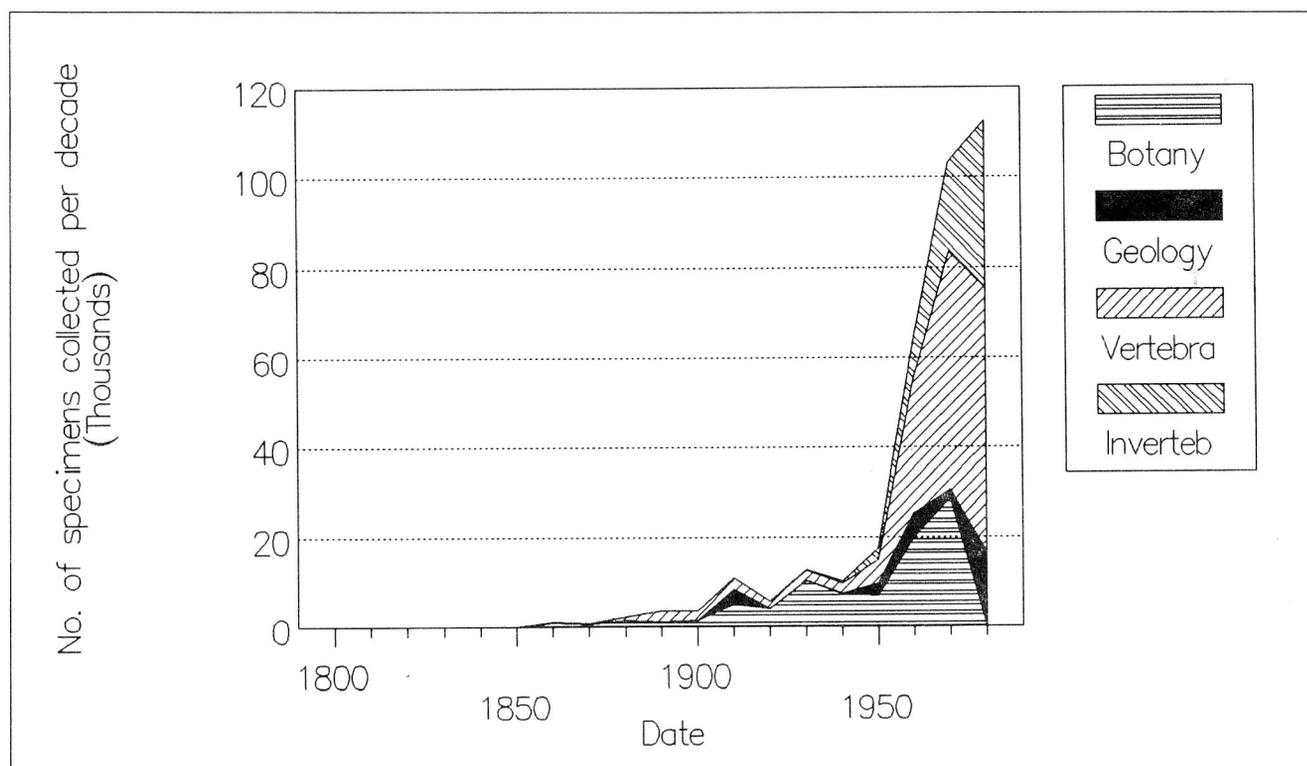


Fig. 2. Age profile of natural science collections in Australia, incorporating data from: Tasmanian Museum (Mr D. Greg); Queen Victoria Museum, Tasmania (Mrs L. Beck); South Australian Museum, Adelaide (Miss L. Queale); Queensland Herbarium (Mr R. W. Johnson); Queensland Museum (Dr P. Jell), Northern Territory Museum of Arts and Sciences (Mr C. Jack-Hinton).

## **Type mineral specimens**

Monica Price (Mineralogical Collections, University Museum, Oxford) points out an article by Peter Dunn (Smithsonian Institution) and Joseph Mandarino (Royal Ontario Museum) reporting the recent statements on the nomenclature and definition of type mineral specimens approved by the Commission on New Minerals and Mineral Names and the Commission on Museums, both of the International Mineralogical Association. Anyone concerned with the curation or designation of mineral species and types is urged to read it: Dunn, P. J. and Mandarino, J. A. 1988. Formal definitions of type mineral specimens. *Min. Mag.* **52**, 129-131.

## **Geology in and around Buckinghamshire**

Buckinghamshire County Museum has recently published an attractive little leaflet with the above title. It results from the site survey work undertaken for the Museum by Jon Radley in 1988 and attempts to explain the geological history of the county on a folded A4 sheet, printed both sides. Clear diagrams, drawings of fossils by Michael Oates, and simple design by Nick Jones help it succeed. The printed leaflet is supported by a longer, typed list of sites which more serious enquirers can ask for at the Museum's reception desk. Congratulations to the Curry Fund of the Geologists' Association, The Ernest Cook Trust and G. F. X. Hartigan Ltd for supporting this venture. Write to Kate Rowland (Keeper of Biology and Geology) for further information.

## **Greensand amber**

Alison Henwood (Department of Earth Sciences, University of Cambridge, Downing Street, Cambridge CB2 3EQ) would like to trace any occurrences of amber from Cretaceous greensand deposits. This is because information on the distribution in greensand might give some indication of the constraints acting on the formation of amber. She would therefore be very grateful to know of collections containing such material and, if it is known, the following information: 1, geographical location of each specimen; 2, age or any information about the stratigraphy of the deposit; and 3, size of each specimen, its colour and condition.

## **Export of natural history specimens**

The recent near-loss from this country of an outstandingly important fossil, the earliest known reptile

('Lizzie', discovered by Stan Wood), has clarified the position regarding the export of such material. Natural science material, and in particular geological specimens, are not covered by the Export of Goods (Control) Order 1987, and therefore all such material, no matter how significant, is free for sale abroad. This is markedly at variance with the position regarding the man-made heritage, where export controls have long been in force for outstanding artefacts.

Prompted by this current issue, the Export of Works of Art Committee has been asked by the Minister for the Arts to consider this problem and to make recommendations. It is anticipated that such outstanding natural heritage items would only rarely come before any such body for consideration, say perhaps once every ten years. It would help the Committee considerably to have case histories of previous losses of such specimens, or brief accounts of material saved from such loss, to inform the Committee's deliberations. Would anyone knowing of such cases therefore please send brief details to any of the following: Dr W. D. Ian Rolfe, Keeper of Geology, National Museums of Scotland, Chambers Street, Edinburgh EH1 1JF; Dr L. R. M. Cocks, Keeper of Palaeontology, Natural History Museum, Cromwell Road, London SW7 5BD; Dr Paul Henderson, Keeper of Mineralogy, Natural History Museum.

## **Hot rock**

Last year the *Sunday Correspondent* (remember that?) carried an intriguing piece:

'Argentina's national and geological heritage seems to be under threat from Americans. Robert Haag, a geologist from Arizona, is now cooling his heels in a Buenos Aires jail after trying to steal a 33-ton meteorite. Working at night, Mr Haag used a crane to lift the 4,000-year-old rock from its display. He was finally apprehended 630 miles north-west of Buenos Aires when the police noticed "the strange sight of a large convoy moving through the area". Haag's lawyer claims that he had a contract to buy the meteorite and ship it to the US.' Courtesy of Mike Crane (Bristol).

## ***Iguanodons* are not lemmings after all...**

Mike Taylor (Leicestershire Museums, Arts and Records Service, 96 New Walk, Leicester LE1 6TD) writes:

'Many curators who lecture on dinosaurs - and certainly those with the characteristic 'sit up and beg' plaster cast of *Iguanodon* - will be interested in a recent paper by David Norman on the famous herd of *Iguanodon* which

fell down a Belgian ravine in Wealden times - except that his analysis of the excavation records show that the fossils were in fact accumulated in 'a lacustrine or marshy environment which had undergone post-depositional collapse into a subterranean cavern' (Norman, D. B. 1987. On the history of the discovery of fossils at Bernissart in Belgium. *Ann. nat. Hist.* 14, 59-75)!

It also contains an Awful Warning about excessive reliance on uncritical use of recipes. Most of the bones were 'conserved' in a mix of hot glue, alcohol and (to combat pyrite decay) arsenic; when this cooled the excess had to be chipped off with a chisel! Furthermore, this seems to have encouraged chemical and physical decay to such a degree that untreated bone is today quite stable, if somewhat fragile, whereas 'consolidated' bone has suffered badly over the years and now cannot be cleaned of excess consolidant without collapsing. This has meant that many details (e.g. of the interior of the skull) could never be studied, until fresh material turned up on the Isle of Wight and elsewhere.

### **The Eleanor Miles mineral collection**

The Department of Geology, University College, Galway, Ireland has received a significant collection of mineral specimens from Frau Ellen Bruecke (n[FF]e Eleanor Miles), Bodenkirchen, Germany. Eleanor Miles' mother came from Cappaquinn, Co. Kilkenny and it is for this reason that she was keen for her collection to be housed in Ireland. The collection will be named the Eleanor Miles Mineral Collection; it will be housed and displayed in the James Mitchell Museum at UCG (described by Mavis Fewtrell and P. D. Ryan in 1979: *Newsl. geol. Curators Gp.* 2, 173-181). A full list of the 120 specimens in the collection is available on request from its compilers, Martin Feely and Geraldine Naughton at UCG.

### **Rescue collecting on the Isle of Lewes**

In March 1988 the National Museums of Scotland (NMS) undertook a rescue collecting operation at an important monchiquite dyke of Tertiary age, near Loch Roag, Isle of Lewis, Scotland. According to Brian Jackson of the NMS Geology Department:

'Rescue collecting was necessary as the dyke is slowly being removed by contractors digging into it to obtain gravel and hardcore for rough track building purposes. The dyke intrudes almost vertically through rocks of the Lewisian basement complex and is characterised by diverse suites of mafic and ultramafic xenoliths and

megacryst assemblages. The major xenolithic lithologies are mafic granulites, peridotites, pyroxenites, and wehrlites, whilst the megacrysts comprise clinopyroxene, mica, magnetite, rutile, apatite, sanidine, anorthoclase, corundum and zircon.

There are several reasons why the dyke is important. The most significant is that the inclusions provide geologists with major evidence of the deep crust and upper mantle rocks underlying the Lewisian block. This provides important constraints on the petrographic and geochemical nature of the Hebridean mantle. There are also notable occurrences of both a mineralogical and gemmological character. The dyke is only the second authenticated occurrence of the rare Scottish zeolite, phillipsite; the corundum and apatite crystals are the largest found so far in British alkali basalt dykes. The corundum crystals are sapphires of gem quality. Most of the crystals are fractured, but a fracture-free stone of 2.9 carats was cut from a crystal fragment. This is the largest faceted British sapphire.

In order to preserve this unique exposure the outcrop is to be designated a Site of Special Scientific Interest by the NCC. Thereafter collecting from the remaining outcrop will be prohibited. The rescue collecting by the NMS was done from the talus slope at the foot of the dyke and, using a JCB, dyke material, used as hardcore, was recovered from the nearby rough track that leads to peat diggings. No specimens were collected from the remaining outcrop in order that the field relationships can be studied and to observe the spirit of the forthcoming preservation order.

The material collected has been lodged in the NMS both as registered and research material and a representative suite of rocks and minerals has been lodged with the local museum in Stornoway.

### **A look at 'Sea Dragons' in Bristol**

Nigel T. Monaghan (National Museum of Ireland, Geological Section, 7-9 Merrion Row, Dublin 2) reports on the GCG seminar held at Bristol City Museum and Art Gallery on 9 March 1989, soon after the opening of 'The Great Sea Dragons' exhibition:

'The day started as all good meetings should with a leisurely look at the galleries followed by a well earned cup of coffee. Peter Crowther (Curator of Geology) treated the assembled audience to a behind the scenes look at the organized chaos which accompanies the planning of any exhibition where the acquisition of a £27,000 giant ichthyosaur is added to the plans half way through. His success in raising funding for a spectacular purchase was in contrast to the difficulties

in chasing commercial sponsors for the exhibition. One new idea was to trace the companies associated with members of the founding institution. It sounded promising but unfortunately produced no hard commercial cash until British Gas piped up at the very last minute. The resulting exhibition was impressive in itself - even more so when the work involved was taken into account. The Curry Fund of the Geologists' Association are to be congratulated for grant aiding both the exhibition and the purchase of the Charmouth Ichthyosaur.

Neil Marriott (Bristol Exploratory) explained the philosophy behind the interactive science exhibits at the nearby Exploratory. For a small entrance charge children of all ages could experiment with anything from basic optics to thin section study of rocks. Some of the exhibits were simple to construct but appeared effective. As imitation is a form of flattery I'm sure the Exploratory will be flattered in many museums from now on. Roger Clark (Assistant Curator of Geology) covered the nineteenth century rise and fall of the Bristol Institution (the forerunner of the present Museum), a familiar story of Victorian ambitions for the edification of the masses, with success tempered by the intractable personalities of some of its members.

David Hill (Geology Conservator at Bristol Museum and for the Area Museum Council for the South West) emerged from the economical space of his new conservation laboratory to shed light on the technology behind the facade of 'The Great Sea Dragons' exhibition. Preparation of the 1.6m long skull of a pliosaur from the Kimmeridge Clay of Westbury, Wiltshire, was an ordeal in itself. This was matched only by the excitement of assembling the giant Charmouth Ichthyosaur on its display mount for the first time - in the 'Blue Peter' studios at Television Centre in London, minutes before going live to the nation. The mounts are in moulded glass-fibre reinforced plastic (GRP) and distribute the weight evenly, avoiding damage to the specimen. The bones simply sit on the shaped mount, leaving them free for examination (for scientific study or pyrite decay). Apart from the materials used, this is similar to the storage method described by Gerry Fitzgerald (*Geol. Curator*, 5, 72-76). On exhibition, the GRP base for the Westbury Pliosaur skull was strewn with chippings of Kimmeridge Clay for effect - which as it turned out, provided a source of free souvenirs for some of the children.

The schools programme associated with the exhibition must have made a great contribution to children's understanding of fossils and fossil reptiles in particular. Susan Swansborough (Museum Assistant in Geology) explained the way in which the associated videos and booklets were produced, with hints on how to manage

on a low budget. One of the by-products of the exhibition was a plastic pliosaur added to the popular Invicta/Natural History Museum range of models.

Peter Crowther closed the meeting with a summary of recent developments in the Geology Section at Bristol which included the addition of the Geology Conservation Laboratory and a mobile storage system (incorporating the original static storage racks). Visitors could see these developments for themselves, and enter into discussion about the merits of various computer software - such as the relational database 'Revelation' which is being used for inventory cataloguing of the vast geology collections at Bristol.

### **A leaf out of McKenny Hughes' field notebook**

The following extract was uncovered by Simon Timberlake (AMSSEE Travelling Geology Curator) in one of Professor T. McKenny Hughes' field notebooks amongst the archives of the Sedgwick Museum, Cambridge (reproduced with the kind permission of the Curator, Dr David Price). McKenny Hughes was the Woodwardian Professor after Adam Sedgwick and was a somewhat charismatic character in the same tradition. [North Wales, then as now, seems to have been a popular venue for undergraduate field trips.]

'Wednesday April 1st 1885

Wet in morning. Some of the party went up to Tan-y-Grissau. Mr Fulcher and I went out to find fossils at Tyhwnt y bwlch. Got some traces of trilobites and a lot of thecas higher up the hill. Came back and put down our loads - bought a pot of jam and some gingerbreads and then went off to the Middle Lingulas of Borth and U.L.F. [Upper Lingula Flags?] of W. of Borth where we got *Agnostus Davidis*, *Agnostus pisiformis* and *Olenus*. - Very nice day -

There was a man of Trinity  
And he was wondrous wise.  
He ran into a quarry vast  
And searched with all his eyes.  
But fossils like their hunters bold  
Love well their little beds  
And while he sought in vain they hide  
Their undiminished heads.

Worn out with unrewarded toil  
to Madoc's Port he turned  
There bought a noble pot of jam  
And gingerbreads, well earned.  
Much cheered with thoughts of future feasts  
He Borthward took his way,  
And there upon the sunny mile  
The Lingulellas lay.

A cry of "spiffing" rent the air  
 A loud exultant shout -  
 "The little sneaking rascals.  
 At last I've found them out."  
 With bag and pockets amply filled  
 He turned unto the West  
 With visions fair of Olenus  
 And n'er a thought of rest.  
 Before him rose a towering wall  
 He scaled its fearful height  
 And gazed across the darkening fields  
 With feelings of delight.

### Anti-monk??

Simon Timberlake again contributes an anecdote from the printed catalogue of the mineral collection of J. Yelloly Watson FGS in Colchester Museum (1873):

'ANTIMONY. .... This metal was originally called anti-monk, from the following circumstances. Basil Valentine, a German monk, threw some of it to his pigs, and after it had purged them, they immediately grew fat. This made Basil think, that by giving a like dose to his fellow monks, it would also fatten them. But his experiment failed, and the whole brotherhood died to a man. Hence the name, anti-monk.' Well, whadyaknow!

### John Farey's *Derbyshire* reprinted

Farey's *A general view of the agriculture and minerals of Derbyshire, volume 1*, has been reprinted by the Peak District Mines Historical Society Ltd. John Farey (1766-1826), the surveyor and geologist who became a disciple of William Smith, agreed in 1807 to prepare a new edition of the *Report on the Agriculture of Derbyshire* at the behest of the President of the Board of Agriculture, Sir John Sinclair. On making the agreement he announced that he would combine matters geological with the inquiries usually made by Reporters for the Board and would also include a geological map. The first volume of three was published in June 1811 and the following advertisement was placed in the *Derby Mercury* on 18 July 1811:

'This day is published in 8vo. price £1-1-0 in boards, illustrated with coloured plates Vol. 1st. "A General View of the Agriculture and Minerals of Derbyshire" with observations on the means of their improvement, drawn up for the consideration of the Board of Agriculture and Internal Improvement; containing a full account of the Surface, Strata, Soils, Minerals, Mines etc. etc. By John Farey, Snr. Mineral Surveyor.'

The book is widely used by historians of mining and many other disciplines researching Derbyshire's past. The reprint's value is considerably enhanced by the addition of 'John Farey - an unrecognised polymath', a biography by Trevor Ford (University of Leicester) and Hugh Torrens (University of Keele), which includes a 250-item bibliography. The hardback reprint (ISBN 0 904334 02 3) costs £27.50 (plus £2.50 post and packing) from the Peak District Mining Museum, The Pavilion, Matlock Bath, Derbyshire DE4 3PS (cheques payable to the PDMHS Ltd).

### Believe it or not

The South Wales daily newspaper, *The Western Mail*, carried an advertisement in its property supplement which caught the eye of Tom Sharpe (National Museum of Wales, Cardiff). The key point in the sales blurb for a farmhouse in Pembrokeshire was not the number of rooms of character modernised to a high standard but the fact that its grounds included an SSSI containing 'fossils of some 400 million years' standing' (actually the type locality of the Ashgill Shoalshook Limestone). Could this be the start of a trend? Will we soon see '3 bedroomed end terrace, recently modernised, on outcrop of Pennant Sandstone with uninterrupted views of glaciated valley' or '2 bedroomed semi, conveniently placed for local facilities and Carboniferous Limestone exposure'?

### Natural historians through the ages

Those of you who have enjoyed David Allen's book *The naturalist in Britain: a social history* will be interested to know of a short paper on the development of the various societies, institutes and trusts forming organised (or should one say disorganised?) natural history in Britain. Allen, D. E. 1987. The natural history society in Britain through the years. *Ann. nat. Hist.* 14, 243-259.

### The good old days

Stella Pierce (Bath) and Hugh Torrens (Department of Geology, Keele University, Staffordshire ST5 5BG) contribute the following:

On 10 December 1838 *The Times* (p. 7, col. e) carried the following notice of a recent archaeological discovery:

'A Roman Mosaic Pavement - ..... Dr. Allnatt published a statement ..... of some ancient relics which had

been discovered at Pangbourn, Berks, by the labourers employed on the Great Western Railway, and which were supposed to be of Roman origin ..... further confirmation by the exhumation of an almost perfect floor of tessellated pavement ..... The discovery has excited much interest: a great many persons from distant parts of the country, artists, and scientific gentlemen, having visited the spot; they are unanimous in declaring the floor to be a beautiful and interesting specimen of ancient art ..... Orders have been given by Mr. Brunel, the engineer, for the whole to be preserved entire.'

Such confidence in the proper preservation of our natural treasures, however, soon proved misplaced. We learn of the sorry subsequent history and 'curation' of this treasure in the strident editorial note which appeared early the following year 1839, in the *Civil Engineers and Architects Journal* (Vol. 2, p. 29). It reads:

'It is with great regret that we have since learned that Mr. Brunel has directed this interesting relic to be broken up. Messrs Grissel and Peto, however, have had a drawing made, which is intended to be lithographed. We are sorry to see this disrespect for objects which are of universal interest to every man of education and refinement. Such deeds of barbarism have been but too frequent, and geologists have repeatedly complained of the ravages which have been committed through the negligence of the engineers. Very little expense would have restored this pavement, and it would have formed an interesting object in the waiting-room of the station. We do not see, indeed, why museums should not be formed at every station, illustrative of the geology of the line. - EDITOR C. E. & A. Journal.'

Here one sees the same contemporary enthusiasm for geology and the formation of Local Museums as is shown by William Sharp in his paper to the same year's British Association for the Advancement of Science, 'On the Formation of Local Museums'. The results of these enthusiasms 150 years later would make a fine topic for discussion at a future BAAS meeting.

### **European Earth-Science Conservation Week - May 1992: first announcement**

The European Working Group on Earth-Science Conservation was founded four years ago to bring together Earth-scientists for the purposes of promoting the conservation of Earth-science sites and landscapes, for the sharing of knowledge and experience, and for the pursuit of joint research to solve the problems which affect our shared geological heritage (see *Earth Science Conservation*, 29, p.20). The Working Group has been invited to hold its annual meeting for 1992 in

the UK. This is an important year for Europe, and it seems like a perfect opportunity, with or without the Working Group visit, to further the cause of Earth-science conservation by promoting a series of related but autonomous activities (field excursions, discussions, workshops and lectures) at separate centres throughout the UK. Sponsoring and organising bodies thus far committed to the 'European Earth-Science Conservation Week' are: Joint Nature Conservation Committee (new government UK conservation body), European Working Group on Earth-Science Conservation, Geological Society of London's conservation committee, British Institute for Geological Conservation, British Geomorphological Research Group, National Museum of Wales, Countryside Council for Wales, and William Pengelly Cave Trust. There are, in theory, no limits to the type and number of events which might be organised under this 'umbrella'.

The Week will provide an opportunity to further and gain wider publicity for local or regional initiatives: these might include the launching of a publication, the purchase or opening of a geological reserve, the initiation of local conservation activities, the holding of an open-day or of a meeting to involve a wider public. Some of the events already planned are listed below. Any organisation or individual wishing to become involved, that wishes to further the activities listed or has suggestions for other events is invited to contact the organising secretary with details as soon as possible.

#### **Proposed Core Meetings**

Meeting of Members of the European Working Group on Earth-Science Conservation Discussion meetings in parallel with the EWG meeting

#### **Autonomous major activities**

Palaeontological site workshop/field excursions - University of Bristol

'Earth-science conservation in Wales' - National Museum of Wales meeting/allied field meetings  
Stratigraphic/soft rock site conservation workshop - ?University of Reading

Geomorphological site workshop - ?Portsmouth/Southampton, and field excursions.

'European Symposium on Quaternary site conservation' - Royal Holloway and Bedford College

'World heritage and historical site conservation' (centre to be announced)

Mineralogical/metallogenesis discussion meeting (centre to be announced).

Please contact: Dr W. A. Wimbledon, Second Secretary of the European Working Group, c/o Nature Conservancy Council for England, Northminster House, Peterborough PE1 1UA.

# CONSERVATION FORUM

Compiled by Christopher J. Collins

## Introduction

'Conservation Forum' provides that long awaited problem page in the *Geological Curator* where curators can air those niggling little conservation problems that quietly destroy their geological collections. 'Conservation Forum' will document current trends in the field, identify suppliers of materials, highlight new techniques, and discuss Health and Safety issues. If you have a conservation problem (or a new solution!) write to 'Conservation Forum'.

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## Suppliers

With the demise of Frank Joel Ltd, there have been problems in finding suppliers of resins, adhesives and general specialist conservation materials and equipment. Two companies seem to be taking over: Archival Aids, Spondon, Derby; and Conservation Resources (UK) Ltd, Units 1, 2 and 4 Pony Road, Horspath Industrial Estate, Cowley, Oxford OX4 2RD.

Supplies of Frank Joel's Paraloid B72 adhesive (see Koob, S. 1986. The use of Paraloid B72 as an adhesive. *Studies in Conservation*, 31, 7-15) are difficult to find. H. Marcel Guest, a company who supply the cellulose nitrate adhesive HMG glue, have started making up a B72 based adhesive in a purple tube! Although the exact formulation of the glue has not been run to ground yet, early reports are that it is good stuff. It is available either direct from H. Marcel Guest, Collyhurst, Manchester M10 7RU, or from Conservation Resources (address above) who also supply a glue made to Koob's specifications. Small quantities of Paraloid B72 resin can now be bought from Archival Aids (address above). Those not yet clear about why we are moving away from cellulose nitrate based glues should read Koob's paper on 'The instability of cellulose nitrate adhesives' in *The Conservator* (1984), pp. 30-34.

## Interested groups

Several groups have now established their concern for the state of geological collections in North America and Europe. Besides the Geological Curators' Group, the Society for the Preservation of Natural History Collections (SPNHC - a combined BCG/GCG) is making waves in North America. It would be nice to see all the concerned groups establishing and working towards definite policies and aims - one international lobby moving with a single voice, rather than several small ones, would do the field a power of good. The ICOM working party on natural science conservation

(which is being kept alive by Velson Horie's valiant work) would provide a good vehicle for establishing closer contact between the growing number of international groups. SPNHC have suggested a joint BCG/GCG/SPNHC meeting in Madrid in 1992 - this seems like a good date to work towards. All this activity seems to have passed Australasia by - if there is anyone interested in geological specimen conservation down there, I would like to hear from you!

Relevant addresses are: The Society for the Preservation of Natural History Collections, c/o Suzanne B. McLaren, Treasurer, 5800 Baum Blvd, Pittsburgh, PA 15206, U.S.A.; and Velson Horie, ICOM (Natural History Conservation Committee), The Manchester Museum, Oxford Road, Manchester M13 9PL.

## Training

Thanks to sponsorship by the Museums and Galleries Commission's Conservation Unit and the British Council, an international working party on training in geological specimen conservation has been established. UK input comes from Chris Collins (yours truly) and David Hill (Geology Section, City of Bristol Museums and Art Gallery). We are currently working on two courses: a short collections maintenance course for curators (pilot course held in Bristol in October 1990); and a longer training course for conservators on techniques and theory in geological specimen conservation.

## Correct use of terms stable, metastable, and unstable

Robert Waller (Mineral Sciences Division, National Museum of Natural Sciences, Box 3443, Station D, Ottawa, Canada K1H 8H4) writes:

'The term 'metastable' has appeared in recent years in the literature on mineral specimen conservation. Unfortunately, it is used in an incorrect manner and is being confused with the term 'unstable': these terms are not equivalent. Although this note may seem pedantic, I believe that a proper understanding of these terms is essential for understanding chemical stability and instability, especially as it pertains to mineral specimen conservation.

Properly speaking, these terms should always be used with the phase, the product phase or phases, and the pertinent environmental conditions all specified. Conditions that are frequently important are temperature, relative humidity (RH), and concentration of any gases that are reactive with the phases. If no conditions are specified, then it is implied that the term is applicable over the entire range of conditions that may be encountered in any storage or display area and with respect to all possible product phases.

'Stable' describes a phase that has no thermodynamic tendency to change at the conditions specified. For example, chalcantite is stable with respect to other hydrates and the solution phase at room temperature at any RH in the range 33 -97%. It is important to realise that many phases are only stable within a limited set of conditions.

'Metastable' describes a phase that persists indefinitely, despite a thermodynamic tendency to react or transform. For example, diamond is metastable with respect to carbon at normal room temperature and pressure (e.g. 20°C and 0.1MPa). Most metals are metastable with respect to an oxide when exposed to air. In conservation it is important to realise that while phases which are truly metastable do not pose a conservation problem, a metastable phase may become unstable if the conditions

to which it is exposed are changed. For example, the addition of pollutants to the atmosphere and/or an increase in RH may make a metastable phase reactive.

'Unstable' describes a phase that is not thermodynamically stable at the conditions specified and that reacts or transforms at a measurable rate. For example, halite is unstable with respect to the solution phase at room temperature and when RH is greater than 75%

The distinction between stable and metastable or stable and unstable is precise and can be well defined. The distinction between metastable and unstable is a matter of degree and hence is arbitrary. In general, a phase that is not thermodynamically stable and that shows no significant change over time (measured at least in centuries) may be considered metastable.

Interestingly, a large majority of mineral species, perhaps more than 80%, are metastable. Most of these are extremely resistant to change and require little if any environmental control for their preservation. The remainder are either stable or unstable depending on the environmental conditions to which they are exposed. Only a small number of species are either wholly stable or wholly unstable under the entire range of conditions that may be found in collection and display areas.

It is helpful for anyone involved with mineral specimen preservation to realise that the preventative conservation of unstable species usually involves establishing conditions under which the species is stable. Often this only requires temperature and RH control. In contrast, the preservation of metastable species that become unstable under stable conditions generally involves the maintenance of kinetic barriers. This will require control of pollutants, RH, light and ultraviolet radiation, or other reaction rate determining variables.'

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## BOOK REVIEWS

Newman, A. and Chatt-Ramsey, J. 1988. *A catalogue of specimens figured in the Fossil Flora by John Lindley (1799-1865) and William Hutton (1797-1860) held by the Hancock Museum, Newcastle upon Tyne, including a biography of William Hutton*. The Hancock Museum, Newcastle upon Tyne, 67pp. ISBN 0-9509630-4-8. Price £9.95 (including p.& p. from Hancock Museum).

The inordinately long title of this slim volume takes up most of the front cover in an attractive (unattributed) design which instantly conveys its Northumbrian origin.

The book is clearly aimed at palaeobotanists who wish to trace specimens figured in the *Fossil Flora* of Lindley and Hutton. The biographical details of Hutton, his collecting activities and the genesis of the 'Fossil Flora' will also interest historians of science.

In addition to the contents proclaimed in its title, the book also has a preface which puts the *Fossil Flora* briefly into historical context, and a short section of notes consequent upon the biography of Hutton. These notes are mainly biographical details of people mentioned in the Hutton piece. Note '7', however,

cited at least 10 times, merely refers the reader to the Hancock Museum Archives. This works where the text gives details of the item, but leaves unanswered questions such as the identity of the Bristol mineral dealer writing to Hutton in 1827. Further, it seems a pity that the co-author of the *Fossil Flora* is relegated to a brief entry without any reference to further biographical sources. The involvement of the young W. D. Williamson with producing some of the *Fossil Flora* plates is given very little emphasis here - intriguingly less than the account in his own autobiography might seem to warrant (Williamson 1896).

The terms of reference of the catalogue section of the book are explained in a short introduction to the list of specimens in the Hutton Collection at the Hancock Museum. The catalogue itself is laid out in the order of Lindley and Hutton's plates and gives all the expected details of locality, stratigraphy, later references to the specimen and so forth. As a bonus, at the end of the work are added details of figured specimens held in some other institutions. These include 14 specimens in the University Museum, Oxford; 12 in Manchester Museum; five in the Woodend Museum of Natural History, Scarborough and one specimen each at the British Museum (Natural History) and the Sedgwick Museum, Cambridge.

Lindley and Hutton's *Fossil Flora* was published in three volumes between 1831 and 1837. It contains 230 plates illustrating 300 British fossil plants. The Hutton collection at Newcastle appears to hold 88 of the figured specimens, while the other included institutions have 33 between them, making a total of 121. This leaves 179 specimens unaccounted for, and immediately highlights the question of their present whereabouts. Perhaps the publication of this catalogue was partly intended to stimulate responses from other institutions holding material figured by Lindley and Hutton, so that further information could be included in a second edition?

To this end, perhaps, this reviewer might mention *Cyclopteris oblata* Lindley and Hutton (Vol. 3, pl. 217). The part and counterpart are currently in the collections of Bolton Museum and the British Geological Survey respectively. The question of which is the figured half was raised by Hancock *et al.* (1976, p. 332) in this journal, together with details of other material held at Bolton and supposedly figured in the *Fossil Flora*. It is difficult to understand why the would-be compilers of this particular catalogue did not seek such information through the columns of *The Geological Curator* itself! However, perhaps I missed the request and, to be fair, the *title* of the book does not say anything about specimens in museums other than the Hancock.

The advent of computerised catalogues, word processing and 'desktop publishing' presents museums with few excuses for failing to disseminate information about their collections. Professionally turned out publications such as this become increasingly feasible, even though sales may be limited by the very nature of the subject. Minor quibbles aside, the Hancock Museum is to be congratulated for showing what can be achieved. It is hard to resist the suggestion that others might take a leaf out of their book!

Williamson, W. C. 1896. *Reminiscences of a Yorkshire naturalist*. Redway, London, xii + 228 pp.

Hancock, E. G., Howell, A. and Torrens, H. S. 1976. Geological collections and collectors of note. No 11, Bolton Museum. *Newsl. geol. Curators Grp*, 1, 323-335.

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15 June 1989

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Knell, S. K. and Taylor, M. A. 1989. *Geology and the local museum*. HMSO, London, 150pp. ISBN 0-11-290459-9. Price £9.95.

The authors' aim in writing *Geology and the local museum* is to help curators who are not geologists (and geologists who are not curators) to look after and use their collections, and to find the help and advice they will need to do this. The book (which the authors describe as short and simple, but which could equally well be described as comprehensive and clear) succeeds well in achieving this aim.

The book is organized in three broad sections: 'Geology and museums' deals with the general significance of geological collections, their place in the museum world and how to approach an 'action plan' for their care and use; 'Care of collections' gives very practical and comprehensive guidance about the conservation (in its widest sense) of geological collections; and 'Using collections' provides a range of advice, from firm instruction to more subjective views, about promoting geology to the museum public.

The needs of non-curatorial geologists and non-geological curators are rather different, and it is a virtue of this book that each individual should easily be able to identify particular elements which will support his or her needs. Thus, the biological curator can easily

find and use specific information on geological conservation requirements, and the section on using collections will provide him or her with ideas, which, with the benefit of a natural science background, should be easy to adapt to particular circumstances. The geologist with little curatorial training will find all the care of collections section invaluable, not just because of the practical advice and information given, but because it stresses the integrity of collections for museum purposes, an important point to emphasize to geologists who may have previously only dealt with collections as research collections.

Indeed, so comprehensive and careful is this book, that many an established and experienced geological curator will find it helpful. It provides a most useful guide to practise, and a check to see that one's own curatorial effort is comprehensive and up-to-date.

There are some excellent appendices, including a well organized bibliography and very useful simple classifications of geological time, fossils, rocks and minerals, which should be perfectly adequate for all but the most specialized collections.

Altogether, I am tempted to describe this as the model curatorial handbook which will rapidly become not only a standard reference for geological curators, but a goal for other curatorial disciplines to achieve.

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25 June 1989

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Dunning, F. *et al.* 1988. *Britains offshore oil and gas*. Natural History Museum, London, 48pp. ISBN 0-565-010298. Price £2.95.

This 48 page, 20 x 21cm. booklet compliments the exhibition of the same name at the Geological Museum. It is superbly illustrated throughout from the full colour photograph on the front cover to the numerous colour maps, diagrams and photographs liberally interspersed throughout the text. After a brief introduction the bulk of the book is divided into four sections.

The first and largest section (22 pages) is entitled 'The Geological Setting'. It begins by discussing the genesis of oil and gas mainly in the context of the North and Irish Sea basins (inorganic genesis is omitted). Migration is then described (some excellent scanning electron micrographs are used to illustrate the differences between permeable and impermeable sandstones). This is followed logically by a subsection on the trapping of

oil and gas. The next subsection, 'Forces that shape the Earth's crust', is a slight digression, being essentially a condensed explanation of plate tectonics with respect to tectonic forces affecting basin evolution. This leads on to a description of the Crust around Britain. The following four subsections 'Foundations', 'Forces', 'Western Basins' and 'North Sea Basins' provide a very well illustrated summary integrating the basic geological structure of Britain with the evolution of the surrounding offshore basins. A lay person might find this heavy going but the text is concise and the illustrations fully pertinent and of good quality. The last three subsections deal with the geology of the North Sea production area, concluding with a description of eight specific fields.

The second section (8 pages) describes the techniques of exploration. Geophysical techniques are well summarised again with good illustrations. Techniques of borehole exploration are likewise fully explained.

The third section (6 pages) outlines the stages in the development of an oilfield. I particularly liked the last subsection 'Pathways to Production' which takes the form of a board game. Each player begins with an exploration licence and has to progress by throwing a dice and moving a counter across the board. The winner is the first to get their field 'on stream'. It illustrates effectively and imaginatively the many factors and risks encountered in off-shore exploration.

The fourth and final section (10 pages) deals with production. It includes an appraisal of the natural hazards of operating in the hostile environment of the North Sea before going on to describe the construction, installation and functions of a production platform. The techniques of drilling development wells and transporting oil and gas ashore are then discussed. A final subsection looks to the future as regards production trends and the eventual abandonment of the fields whilst minimizing damage to the environment.

The publication is attractively priced and would sell well in the shop of a museum with a geological or technological section. It is certainly a must for any geological curator planning displays including an economic or offshore geological theme. All in all a well researched and excellent publication from the Geological Museum team.

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30 August 1989

Wallace, J. 1987 (reprinted 1989). *The rise and fall of the dinosaur*. Michael Friedman Publishing Group (distributed by David and Charles, Newton Abbot). ISBN 0-8317-2368-8. Price £9.95.

Why does a new dinosaur book prompt its reviewer to consider politics? *The rise and fall of the dinosaur* does not specifically mention Republicans or Democrats, after all; but, just as with Stephen Gould's essays on the history of science or Bob Bakker's interpretation of dinosaur physiology, the writer's own point of view on 'life in general' is often revealed as clearly as if the writing was overtly about politics or philosophy. Steve Bell's 'If ...' cartoons featuring *Tyrannosaurus* as Margaret Thatcher and cf *Oligokyphus* as Neil Kinnock do the same thing backwards, and show nicely what I mean.

Joseph Wallace tells me a lot about himself in *The rise and fall of the dinosaur*, even though he does not appear to have any original thoughts of his own on the subject of the book. For example, from the front flap, 'our image of these great reptiles has been drastically changed from the lumbering, pea-brained hulks ... to a creature that was *quite diversified and capable*'. Praise indeed! To be fair to Wallace, what I interpret as his bias against dinosaurs as Nature's gigantic imperial flop may be the result of his unqualified use and acceptance of 30-year-old references and 50-year-old illustrations; moreover, because he is a freelance writer rather than a palaeontologist, I should perhaps expect no better. Which brings me to a second pseudopolitical point: an ill-informed pot-boiler like this one, whose main aim seems to be to cash in on an identifiable market with a minimum of effort, typifies for me the 1980s style. The book exploits the kind of original and generally excellent hard work of authors like Norman (1985) and Bakker (1986) in producing popular and innovative dinosaur books, and at the same time reduces the share of the market income which should be theirs.

The text is seriously misleading or outdated, especially in the early chapters about vertebrate evolution. I soon ran out of slips of paper to mark the errors or misleading oversimplifications - 'the invasion of the land began 350 million years ago, when certain fish developed simple lungs, evolving into the first amphibians', 'the cold-blooded, thick-skinned reptiles that eventually evolved from these amphibians', 'the true mammals evolved from ... mammal-like reptiles [*only one suborder of synapsids led to Mammalia*]', 'the Diapsids ... gave rise to two family lines. One evolved into snakes and lizards. The other [Archosaurs] did not evolve into any creatures which still survive today in any recognisable form [*so what about crocodiles?*]'. All these examples come from pages 16 and 19.

The style is journalese throughout, which in itself would not be a bad thing if it made the prose more readable or clearer for newcomers to the subject. The concept used to introduce each main chapter is one of a time machine, but expressed like this (from the Triassic chapter) 'If technology ever leads to the invention of a time machine, and brave scientists are willing to operate it ...' the idea is dangerously misleading. 'Back to the Future' is understood to be fantasy, but here in a popular 'serious' science book the idea takes on a spurious authenticity.

Captioning is sloppy. For example, a caption 'Two hundred million years ago, all the earth's land was joined to form Pangaea ...' is used for a map of present plate positions from which, incidentally, some plate boundaries have been confusingly omitted. A photograph of a *Camarasaurus* skull in the American Museum of Natural History is captioned 'this close-up of a *Brontosaurus* skull' - especially inexcusable in view of the well-publicised replacement in 1979 of the *Camarasaurus* skull which had been on the Pittsburgh Carnegie Museum's '*Brontosaurus*' mount since 1915.

There are some good things in the book. The illustrations are a mixture of modern, attractive and well-researched life restorations, mostly by Gregory Paul and Douglas Henderson, and a number of Greg Paul's fine line reconstructions of dinosaur skeletons with body silhouettes. These are interspersed with a selection of historic Charles R. Knight paintings. Perhaps the book is worth having for the pictures? Even this one positive comment has to be qualified, as the Charles Knight illustrations, with their dinosaurs in 1930s bow-legged postures, are placed alongside the modern ones with no explanation of their historical context. As for the Paul, Henderson and other 'new' pictures, all seem already to have appeared in Czerkas and Olson's (1987) *Dinosaurs Past and Present* which was published to accompany an exhibition and symposium with the same name.

The book is a straight reprint of the American printing, and so contains the spellings of 'color' and 'meter' one would expect. Also, *Brachiosaurus* has 'front legs longer than those in back', which is perfectly clear English, if odd anatomically. Some British readers may not know what a chickadee is, but then the British equivalent would be even more confusing to American readers.

There are many dinosaur books to choose from if you are stocking your museum's shop or updating your library - some would say too many already. This particular addition to the range is in my opinion definitely one too many.

Bakker, R. T. 1986. (British edition 1987). *The dinosaur heresies: a revolutionary view of the dinosaurs*. Longman Group UK Ltd.

Czerkas, S. J. and Olson, E. C. 1987. *Dinosaurs past and present*. Natural History Museum of Los Angeles County.

Norman, D. 1985. *The illustrated encyclopedia of dinosaurs*. Salamander Books.

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22 January 1990

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Smith, J. D. D. 1989. *The Silurian System by R. I. Murchison: a catalogue of the fossils illustrated in Part 2*. British Geological Survey Research Report SH/89/1, x + 211pp. ISBN 0-85272-109-9. Price £12.

This extensive and well-researched catalogue is very reasonably priced at £12 and will form an indispensable tool for anyone researching Lower Palaeozoic faunas, especially those working on brachiopods, molluscs and corals. It presents information available on all the specimens figured in *The Silurian System* together with subsequent references to those specimens.

The catalogue begins with a potted biography of Murchison and some useful notes on the publication dates and editions of *The Silurian System* and *Siluria*. Smith (wearing his hat as a member of The International Commission on Zoological Nomenclature) then explains the criteria used for determining the exact authorship of some of the species first named in *The Silurian System*, especially those whose descriptions were actually written by other authorities.

A stratigraphical correlation table, compiled by Adrian Rushton and Denis White, compares Murchison's classification with that of the present day and forms a useful reminder of current nomenclature.

The catalogue itself comprises 179 pages of the total volume and deals with each of the 463 specimens in the order that they were originally figured by Murchison on the 31 plates of *The Silurian System*. The citation for each specimen is fairly comprehensive and includes: a running serial number; the taxonomic group; the page, plate and figure reference; the make-up of the figure (e.g. '3 views, upper, lower and middle'); the collector or owner; the specimen name, author, geological horizon and locality as given by Murchison and as updated by any more recent publications; the present registration number and repository of the specimen;

and finally, references to subsequent publications where the specimen has been described.

Appendices include: a useful systematic index to the catalogue entries (so that one can readily pick out, for example, all the bryozoans); a list of the genera established in *The Silurian System*; and a complete genera and species index. A clever addition is the pull-out guide to the catalogue entries, bound at the back of the volume, enabling one to refer to the catalogue and the guide at the same time.

My only trivial criticisms are in the lay-out of the catalogue which has resulted in a deal of wasted space, and the rather poor quality of the printing in my copy. In these days of stringent economies a saving in the former could have resulted in an improvement of the latter. But all in all an excellent buy!

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28 January 1990

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Broadhurst, F., Porter, R. and Selden, P. 1990. *Building stones* (postcard set). Department of Extra-Mural Studies, University of Manchester, set of 16 postcards (with wraparound information card). Price £3.50 (£2.50 for 10 or more sets); 25p per postcard (17p for 100 or more). Sets and individual postcards available from Veena Seth, Department of Extra-Mural Studies, University of Manchester, Manchester M13 9PL.

Previous building stone publications in the past 15 years have appeared as conventional books, albeit of varying sizes: from Whitaker's (1981) A5 'landscape' *Leicester trail*, via A4 'portrait' *Central Manchester* by Simpson and Broadhurst (1975) and Leary's *Building limestones ....* (1983) and *Building sandstones of the British Isles* (1986), through A5 'portrait' *Cardiff* (Perkins 1984), *Stoke-on-Trent* (Branney 1983) and *Edinburgh* (Bunyan 1987), to the handy but unusually sized two volume *London walks* (Robinson 1984, 1985). Eric Robinson's elegant prose in the last mentioned is coupled with frequent illustrations of buildings and rock types, and is packed with relevant detail for the geologist and architectural historian alike. Bunyan (1987) sticks to sandstones used in and sourced mainly from the Edinburgh area: both a quarry by quarry and street guide to the wealth of sandstones involved. A similar treatment for the other building and decorative stones found in the city is eagerly awaited. Branney's (1983) *Ornamental and buildings stones of Stoke-on-Trent* follows the pattern set by Simpson and Broadhurst (1975) for Manchester. It is, however,

better illustrated and more informative but such is the way for those that follow. Perkins (1984) on Cardiff and Whitaker (1981) on Leicester also take the Manchester pattern but are at the Stoke level of presentation.

Colour is only found in Leary's *Building limestones....* (1983) and *Building sandstones ....* (1986). Both have close-ups of the ashlar surface of the varieties in production at the time of compilation (i.e. 1982 and 1985 respectively). The geological descriptions leave a lot to be desired but Leary comes closest to a building stone reference pack. It is a pity that the A4 format does not lend itself to field, or should I say, street work.

The postcards under review are a very good idea, if on the pricey side, although the choice of subjects could have been wider and more eye-catching 'for sending messages in stone'. Experience suggests that the individual cards are probably 10p too high but I imagine the print run was low in number. Simple, clear presentation and excellent colour reproduction will no doubt make the set a good seller, and other museums may wish to purchase individual cards for re-sale, especially the striking Blue Pearl Larvikite, Baltic Brown, Rosa Porrino and Crinoidal Limestone.

'The sixteen postcards in this set can be used as a field guide to identify building stones in the street. Because they are reproduced at natural size, the postcards can be placed onto the rock surface for direct comparison.' The wraparound cover also states that 'The Postcards have been selected to represent all the common types of building stone', but 'some' should have been substituted for 'all' as, except for the Larvikites (Blue Pearl and Emerald Pearl), Balmoral Red (Swedish/Finnish), Southwest England Granite, Carrara, Portland Stone, Slate, Verde Issorie and Crinoidal Limestone, all of which have been used since or before the 1880s, the remaining decorative stones are of more recent use. Imperial Mahogany granite from South Dakota, Baltic Brown or Rapakivi granite from Finland and Bon Accord gabbro from Rustenberg in the Bushveldt complex of South Africa have only been in use since the 1970s. Deep red gneiss from India and Rosa Porrino are 1980s introductions.

But what of the omission, many not now available, such as the Scottish granites (Peterhead, Kemnay and Rubislaw), the Mountsorrel suite, and the Devonian 'marbles' (Ashburton, etc.). Shap (both dark and light), Portland Roach (from 1964) and the magnificent Derbyshire Namurian sandstones from Stanton Moor (Birchover and Pilhough), Whatstandwell (Duke's), Stoke Hall and Stancliffe are all available and have been extensively used over the past 200 years or so. There are many more that could have been selected and

the hope is that the Extra-Mural Department of Manchester University will produce further sets of postcards, perhaps with different stone finishes and presented in a swatch for easy comparison and protection of the cards.

Branney, M. J. 1983. *The ornamental and building stones of Stoke-on-Trent*. City Museum and Art Gallery, Stoke-on-Trent.

Bunyan, I. T. 1987. *Building stones of Edinburgh*. Edinburgh Geological Society, Edinburgh.

Leary, E. 1983. *The building limestones of the British Isles*. Building Research Establishment, Watford.

\_\_\_\_\_ 1986. *The building sandstones of the British Isles*. Building Research Establishment, Watford.

Whitaker, J. D. McD. 1981. *Building stones of Leicester - city trail*. Leicestershire Museums Service, Leicester.

Perkins, J. W. 1984. *The building stones of Cardiff*. University College Cardiff Press, Cardiff

Robinson, E. 1984. *London illustrated geological walks*. Book One. Geologists' Association, London.

\_\_\_\_\_ 1985. *Ibid*. Book Two. Geologists' Association, London.

Simpson, I. and Broadhurst, F. 1975. *A building stones guide to Central Manchester*. Department of Extra-Mural Studies, Manchester University, Manchester.

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25 April 1990

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Oma, E. 1987. *Information policies for museums*. MDA Occasional Paper 10. The Museum Documentation Association, Cambridge, 48pp. ISBN 0-905963-60-1. Price £10.00.

You are probably a museum curator. That means you probably do not have much time for reading. Unless you are an information specialist (or have been set an essay on information for your Museums Association Diploma!) you are unlikely to have put the paper under review here at the top of your reading list.

The message is that museums are in the information business, that they will operate most efficiently when they are clear about what information they deal in, who uses it and what they do with it. What a museum does with its information constitutes its information policy.

The paper kicks off with a Foreword by Frank Atkinson, a Preface and an Introduction. There then follows a short chapter putting information policies into context, explaining their basis, scope and uses. The next chapter, on developing a policy, makes clear that the first step is to set objectives for the particular museum in question: it uses the Natural History Museum's Corporate Plan 1986-91 as an illustration. The fourth chapter describes the prerequisites of whoever's task it is in the museum to manage information, then the fifth takes the development of the information policy from the statement of objectives right through to implementation. The final chapter is the real meat of the paper: it deals with the actual management of museum information.

Having read this paper from beginning to end, I have to say that it did not teach me much that I didn't already know, and I suspect that this is because most of it is rather obvious to anyone who has ever been responsible for a museum collection! However, to be fair, it is no doubt useful to have most of the issues distilled in one publication, and it is refreshing to see the curator's stock-in-trade in terms of information rather than objects *per se*.

In my view this paper is excessively long and with good editing could have been drastically reduced without doing violence to its message. I am also less than convinced that the flow-diagrams say anything not said in the text. It is printed in excruciatingly small letters on A4 pages which could so easily have taken far more readable type, although the paper is of good quality, the binding is strong and the text is more or less free from typographic errors.

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2 May 1990

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Young, J. 1990. *Alabaster*. Derbyshire Museum Service, Darley Dale, 68pp. ISBN 0-906753-18-X. Price £6.50.

Visit any church in the Midlands (or indeed any part of England and Wales) and you are likely to come upon a chest tomb in the chancel, or more often a wall tablet of pinkish-grey material with faint red veining. The pearly lustre surface may be scratched in a manner unusual for marble, indicating a softer stone. The material is alabaster. So far, so good, but where does one find a comprehensive account of this material which will meet the questions asked by the art historians? Up to now, answers regarding the geological occurrence,

some ideas as to the origins, and some documentation of the medieval workings has come from papers by Sarjeant (1962) and Firman (1984), but more needed to be said, and in simple language.

The present account is cast in seven chapters, with titles: 'Origins and outputs' (2), 'Medieval developments in stone carving' (3), 'The Chellaston Workshop' (4), 'Impact of events beyond Chellaston' (5), 'Chellaston Plaster' (6), and 'Chellaston Alabaster from the 18th century' (7). The system in all this is not always easy to follow but the content of each chapter does enough to disarm what would have been carping criticism. Each provides a wealth of quotations from sources which only a dedicated researcher would normally have seen. Often, there are quotations from those who have worked in the local pits or workshops, comments which might easily have been lost but for the opportunity which this account offered.

One example of the approach of John Young comes in his Introduction (really his first chapter) when he focuses upon what can be found by visiting All Saints, Mackworth with Markeaton. First, there is the Touchet Tomb of 1409, a worn slab representing an early period of work from Chellaston. Nearby, the Mundy Tomb of 1609 corresponds to the high point for local work before a sudden decline. Having said that, the same church contains a Victorian lectern which, carved from a single block of alabaster by a craftsman (Lomas of Derby) must demonstrate the sculptural qualities of the material for three dimensional carving in a very direct fashion. What can be seen in this church is in a way a synopsis of the alabaster trade in the Trent Valley.

Briefly, 'Origins and output' takes data available elsewhere and presents it graphically, often with the help of period photographs (1915 shots of alabaster workings at The Leys, and one of Mr and Mrs Forman, the family involved in the working of The Leys at the opening of this century). All of this effectively conveys the concentration of workings in and around the village of Chellaston, and the community involvement in all aspects of the industry. Chapters 3 and 4 do much to establish the idea of a Chellaston school of work through a recognisable style and by the simple association of finished work being done close to the actual extraction point where blocks could be selected. Once again it is the quotations from others, brought together here conveniently, which helps make these points. Chapter 5, 'Impact of events beyond Chellaston', is really about the effect of estate management in the period of enclosure and agricultural improvement under the Harpurs of Calke. This included the growth of that other use of gypsum, the plaster industry, aided by the improvement in means of transport, and the effect which that had upon the alabaster trade. Chapter 7 tells of the 19th century revival in alabaster as it was sought

to enrich the interiors of neo-Gothic churches, encouraged by architects such as Sir George Gilbert Scott, and the skills of the Formans as managers of the alabaster pits in the latter half of the 19th century. Fittingly, a whole dynasty of Formans appears in one of the photographs toward the end of the chapter.

In fact, the book is illustrated by a wide range of photographs, reproductions and maps, all of which contribute to its success. The well-lit colour photographs of tomb details (usually the work of Mick Stanley) are particularly effective, as is the cover design which conveys some of the character of alabaster.

John Young has written a very personal account of alabaster which can't fail to answer many of the questions asked by non-geologists, simply because it is written with an enthusiasm for the subject matter. It could have been a very technical and academic book - and failed. Instead, it prompts a new awareness and an anticipation for the next church visit, which is a measure of success for any book.

Reviewing books can be a nervous experience. Will it look as if you have an axe to grind? A score to settle? A debt to be repaid? Will you reveal a total misunderstanding of the subject through careless comment? I have few fears on any of these counts. What I know of alabaster in church monuments and field occurrence I have learnt largely from Ron Firman who has made a life's work of the study. In the Foreword to John Young's book, Ron gives it his blessing in fulsome terms. I feel I don't need to say more, just join in the applause.

Firman, R. J. 1984. A geological approach to the history of English Alabaster. *Mercian Geologist*, 9, 161-178.

Sarjeant, W. A. S. 1962. Gypsum in Derbyshire. *Bull. Peak District Mines Hist.Soc.* 1(6), 45-53.

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25 July 1990

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## GALLERY REVIEW

### **New permanent Geology and Wildlife gallery, Peterborough City Museum, Priestgate, Peterborough.**

Peterborough City Museum is situated on Priestgate in the city centre, close to the railway station. The Museum building has a complex history. Originally a large private dwelling built in 1816, it was later converted as the Peterborough Infirmary in 1856. Subsequent additions were made in 1897 and 1902 to celebrate Queen Victoria's jubilee and the coronation of Edward VII. The building ceased to be a hospital in 1928 and was bought in 1929 by Sir Percy Malcolm Stewart, of the London Brick Company, who presented it to the Peterborough Natural History, Scientific and Archaeological Society for housing their extensive collections. The building and collections were handed over by the Society to the City Council in 1968. Any comment on these new displays must therefore be predicated by the fact that the building is anything but purpose-built. On the other hand, the rooms are a decent (ward) size and can be used to advantage. All-in-all the designers have arranged the displays very snugly and with great economy of space. As yet no targeted literature exists, but the Museum bookshop is well supplied with local-interest material. It is hoped

that purposely written material will be forthcoming in the future.

There are two main areas in the gallery, divided into three topics; one area is devoted to Peterborough in the past, the other to Peterborough today. Taken together, these show how the city relates to its past and present in a surprisingly economical manner. Peterborough is situated on the edge of the Fens, where the Jurassic Wolds meet the Quaternary-Recent peatlands. Underlying the peat are large deposits of brick-making clay, and it is from the clay and the peat (deposits differing in age by about 160 million years) that the fossils which form the core of the first gallery originate. Three large glass-fronted display cases, reaching from knee height to near ceiling, house representatives of the marine reptile fauna of the Middle Jurassic Oxford Clay - a plesiosaur (*Cryptoclidus*), an ichthyosaur (*Ophthalmosaurus*) and a marine crocodile (*Steneosaurus*). The prize would go by a short head to the very large, dramatic, whole-skeleton mount of the croc, about 5 m long, but the plesiosaur comes very close and is laid out to represent it as it must have looked when on the sea-floor prior to burial. The ichthyosaur is represented by the front-end only of an ophthalmosaur, with an interpretive panel identifying the bones and

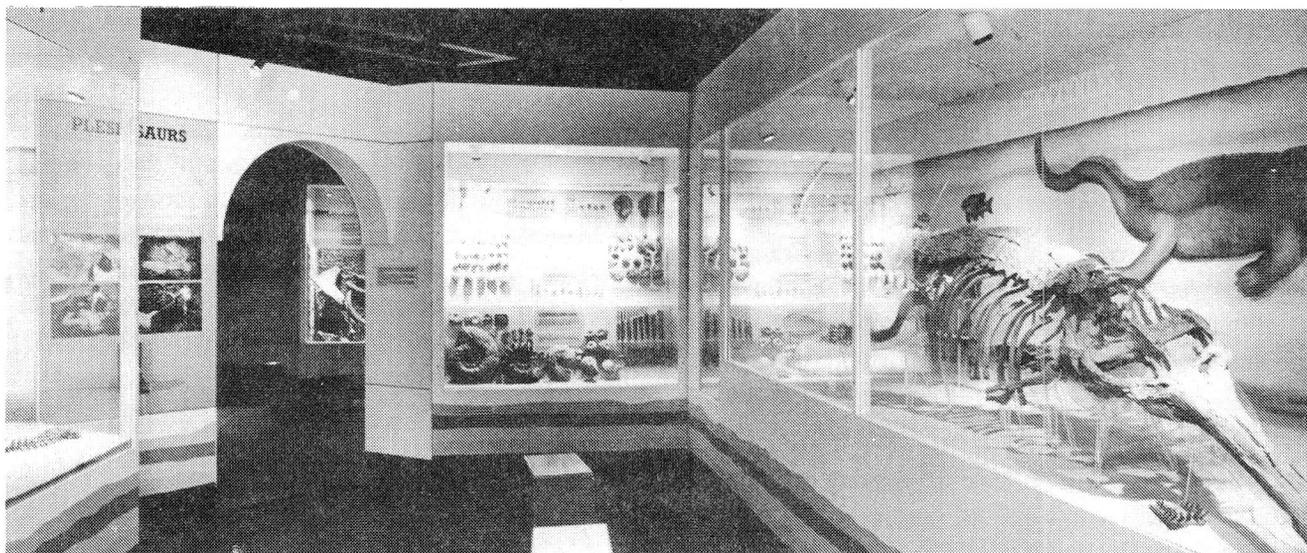


Fig.1. The new Geology and Wildlife Gallery, Peterborough City Museum, opened 30 June 1989 by David Bellamy.

their orientation. Between these cases there are smaller cases and panels on which are mounted various fish and invertebrates from the local Oxford Clay.

At the far end of the fossil gallery, the Pleistocene is represented by cases with fossils typical of the Period; this part of the display concludes with an array of stone implements attributed to Neanderthal Man (as the first Peterborian). The Quarternary cases are topped off with friezes showing dioramas of the scenery around Peterborough at the height of the Ice-age and during interstadials. A short corridor links the palaeontology displays with those concerned with modern times, and is lined by a set of panels which outline the early history of Modern Man in the Peterborough area.

The second main area of the new gallery is made up of a connected sweep of small but natural sized dioramas showing all the major local habitats with representative habitat-groups. The sweep of land starts with an upland view, on the Wolds, and runs successively through a lowland wood, an urban garden and thence out into the Fen. The whole new gallery could quite easily be viewed from this end, backwards, with nothing being lost.

At the opening ceremony on 30 June 1989, Dr David Bellamy congratulated the designers and originators of the displays. He was particularly warm in his appreciation of the fact that the Museum still has free admission - drawing attention to the policies of most of the National museums which now charge for admission. He noted that the bulk of his morning had been spent judging a competition for local primary school children, about who could make the best crocodile, because the large *Steneosaurus* now finds itself as the new gallery logo. As a very generous touch, the cutting of the ribbon was carried out by Alan Dawn who had devoted so much of his voluntary time to preparing the fossil

displays - and who had, incidentally, been responsible for the recovery of the nearly complete *Cryptoclidus*.

How then does one assess the new gallery? Does it work for the average person in from the Peterborough pavement? The texts are short, informative and, in general, accurate; but I wonder if some of them are not a bit far off to be seen clearly by children? The small section devoted to changing sea-levels does not quite come off, mostly for lack of size as well as space for more explanation. However, my feeling is that, within the limits imposed by the nature of the building, these displays work well; every visitor will come away having seen many fossils and attractively displayed animals, birds and plants. The texts provide just enough information to stimulate further reading and enquiry, without being boring. The displays are imaginatively laid out and attractively mounted. This new gallery is what all local museums should aim towards - dealing in detail with local matters and not becoming bogged down in exotica. The Nature Conservancy Council and the local firms who have supported the venture can be very pleased with their efforts and the Museum authorities must be congratulated on the outcome.

Peterborough City Museum and Art Gallery, Priestgate, Peterborough PE1 1LF (Tel. 0733 343329) is open Tuesday to Saturday and Bank-holiday Mondays from 10.00 to 17.00 hrs, admission free. Access for disabled is limited, and enquiries should be made beforehand if at all possible.

Dr Arthur R. I. Cruickshank  
The Open University  
Walton Hall  
Milton Keynes MK7 6AA

1 August 1989

# GEOLOGICAL CURATORS' GROUP

## 15th Annual General Meeting

### 2 December 1988 at Rowley's House Museum, Shrewsbury.

About 35 members present

#### 1. Apologies for absence

Tristram Besterman, Rosina Down, Marie Hughes, Philip Phillips, Paul Selden and Di Smith.

#### 2. Minutes of the 14th Annual General Meeting 1987

They were approved and signed by the Chairman.

#### 3. Matters arising

13. Any other business: Mick Stanley said that GCG had not liaised with BCG over the Museum of the Year awards, and that BCG had so far failed to make progress in their own attempts to get an award established.

#### 4. Chairman's Report - from Mick Stanley

'The Group continues to engender awareness of geology in all its activities and specifically to ensure that collections are accessible and maintained. However, the initiatives of last year have not all reached fruition: *Geology and the local museum* will now be published next Spring, to meet HMSO publications strategy, and should be reviewed in the new-style Museums Association *Bulletin/Journal* about the same time. The *Guidelines* should have been reviewed in the *Museums Journal* two years ago but, due to the loss of review copies and short-lived editors, that too will appear in the Spring. 'Thumbs Up' Leaflet No.2, *not* on observational geology (which proved too difficult to explain simply) but further detailing the work of local museums, will be published for free distribution next year (thanks again to Robertson Research International).

GCG Committee made one major submission, of eight pages, to the UGC Committee on Museums and Collections in March this year and still awaits a reply. The submission was received favourably and many points we raised were included in the Williams Report. However, that report was not accepted by the National Committee of the Earth Sciences Review and has not been published. Such important matters do not remain static and rejection spurred on others to action with the result that some of our members are currently arranging to save collections from 'at risk' university departments to Type M departments, National Museums and a handful of local authority museums.

The parlous state of the Bath Royal Literary and Scientific Institution continues to cause great concern to the Committee, especially as the urgently required new trustee body has yet to be formed. A considerable volume of data from interested and concerned groups and individuals was sent to Avon County Council, the present sole trustee, during the Summer but their précis of respondents' points and their replies is still awaited. Meanwhile, Di Smith has become Curator of Haslemere Museum and consequently her old post at Bath is unfilled. There appears to be little intention of appointing a new full-time Curator of the geology collection of the RLSI in the near future.

No news of the Open University-style, credit-valued, distance-learning packaged Museums Association Diploma, and the shedding of the Leicester University contract for the Association Diploma courses, inspires the Committee to increase our commitment to training. This October's Curatorial Course in conjunction with BCG was very successful even though, as we knew from the start, the main complaint would be 'it should have been two weeks not one'. Another course will be run next year, based on Sheffield University, using the successful format but of longer duration and with more 'hands on' training.

I reported last year that a Geological Record Centre was to be established, with further details appearing in the *Geological Curator*. Pressures of time and money precluded the hoped-for start in September this year, but from January 1989 BGS will commence a contract with NCC to input site records from the 50 Geological Locality Record Centres within the National Scheme for Geological Site Documentation. Output will be as hard copy or on floppy disk of the data supplied by each Centre, but fully computerised. Eventually enquirers and researchers will be able to ask each Centre what sites are available within England, Scotland, Wales and Northern Ireland by means of 'compact disk read only memory' (CDROM) technology or similar.

The Geological Conservation Review criteria has prompted the de-notification of SSSI's of mainly multi-interest because single interest localities are the substance of the GCR. The removal of SSSI status has down-graded many interesting localities so that no statutory protection is available; this in turn suggests to Planning Departments and County Trusts that the site is not worthy of protection/conservation. The situation

may be retrieved by the suggestion of establishing ESSIs (i.e. Educational Sites of Scientific Interest) and I eagerly await NCC's deliberations on this matter.

GCG Committee was asked if the Group would affiliate to the Museums Association for £34 p.a., but every member of the Committee gave it the 'Thumbs Down' - because of the lack of any perceived benefit that might justify the cost. We were also asked to suggest topics for joint seminars with the Association and I seek your thoughts. Further, our comments were solicited on the extension of the Association's 'Code of Conduct for Curators' to other workers in museums (e.g. designers). My reply was affirmative on condition that this AGM agreed.

We felt that our contribution to Museums Year 1989 should take the form of a publicity/awareness campaign for geology in the museum/local area. To that end we would like every geological curator (with an \* in the 'Thumbs Up' guide) to organise a geological walk in early June. It could be a town trail, a cemetery walk or one to view local geology in the field. We hope to publish details on a national basis and Phil Phillips and Geoff Tresise of Liverpool Museum are co-ordinating events. The date should coincide with David Attenborough's forthcoming 'Fossils' series on BBC television.

Finally, today is the last time that you will see Geoff Tresise as Secretary of the Group. He resigns after eight short and glorious years and will be sorely missed for his quiet diplomacy, attention to detail, solidarity and reliability.'

Roy Clements reported on planned changes to the Museum Studies course at Leicester - that geology be subsumed into a Natural Science/Natural History component of the course, and be minimal in content. He pointed out that geology could usefully form a separate discipline, and it may be necessary to find alternative ways of producing properly trained geological curators, perhaps linked with the allied field of geological conservation.

Mick Stanley said he had received requests that meetings be called 'seminars' to enable local authority staff to claim expenses more easily.

David Price reported on the UGC Earth Science Review. Progress was spasmodic, but the National Committee would be meeting again early in 1989. GCG had made a submission to the Williams Committee in March, whose report, made 'available' in April/May, had still not been released. The Committee meeting in early January would either appoint assessors to tour the

country and report on collections or follow the recommendations of the Williams Report that five university museums be supported by the UGC. A small committee comprising curators from the five museums would be given the brief and resources to 'sort out' collections elsewhere.

Mick Stanley said that museums with geological site records would be receiving a questionnaire about their records in preparation for the BGS Geological Record Centre. It was a good opportunity for museums to get their records computerised.

Mick Stanley thanked Geoff Tresise once more for his excellent work as Secretary of GCG - to which the membership responded with applause.

### **5. Secretary's Report - from Geoff Tresise**

'Group meetings in 1988 comprised a visit to the British Geological Survey at Keyworth in April, a two-day meeting at Whitby in June and the AGM at Shrewsbury in December. The meeting planned for Edinburgh in September had to be cancelled at a late stage through lack of support - the first time that it has been necessary to cancel a meeting. More encouragingly, the curatorial course organised in conjunction with BCG and held at Losehill Hall, Derbyshire in October, was well-supported and may become an annual fixture.

Meetings planned for 1989 are a visit to 'The Great Sea Dragons' exhibition at Bristol on 9 March, to Worcester on 8 June and Newcastle on 7 September. The AGM, which will have a mineralogical theme, is to be held at the University Museum, Oxford on Thursday 14 December. A visit to Peterborough is scheduled for March 1990.

The Museums Association have invited professional groups to organise special activities to commemorate Museums Year 1989. The Committee decided that museums which had received the 'Thumbs Up' accolade should be asked to organise geological walks for the general public during the early part of June. A leaflet publicising the events will be produced by the Group and distributed to museums taking part. Philip Phillips of Liverpool Museum has agreed to act as co-ordinator.

In addition to the items covered in the Chairman's report, the future of the Tyne and Wear Museum Service has given cause for concern. Letters urging the continuation of a united county-wide service with adequate funding and staffing levels have been sent to the Museums and Galleries Commission Working Party and the Chairman of the Joint Museums Committee at Tyne and Wear.

The North West Museum and Art Gallery Service has also been lobbied concerning the safeguarding of type specimens of fossil arthropods from the Sparth Bottom brick pits, currently housed at Rochdale Museum.

As usual, there will be changes to the officers and committee in the forthcoming year. Simon Knell (Scunthorpe Museums) will take over as Secretary, and Philip Doughty (Ulster Museum) as Public Relations Officer. Simon Knell and Monica Price complete their terms of office as committee members and Chris Collins (Leicestershire Museums) and John Cooper (Booth Museum, Brighton) have been nominated in their place.

Before completing my term of office, I must sincerely thank my fellow officers and committee members who have undertaken much of the work which, under other circumstances, might have fallen to the Secretary. Without their support, I would not have survived for eight years!

Geoff completed his report with a request for additional meeting venues in 1990. There were no questions, and Geoff was thanked by the Chairman.

## 6. Treasurer's Report - from Tom Sharpe

### (i) Membership

The Group welcomed 21 new subscribers this year (13 UK Personal Members; 3 UK Institutions; 4 Overseas Personal Members; and 1 Overseas Institution), bringing our total membership to 468 as follows:

UK Personal Members	
(including 2 Honorary Members):	257
Overseas Personal Members:	50
UK Institutions:	105
Overseas Institutions:	56

In addition, we distribute 14 complimentary copies of the journal.

### (ii) Finance

The accounts for the period 17.11.87 - 8.11.88 appear below.

### (iii) 1989 Subscriptions

On the face of it, the accounts presented here indicate that, financially, the Group is in a fairly comfortable position. Although the surplus of income over expenditure for the Current Account is £1733.49, 1988 was an exceptional year as £1100.61 of the income comprised Bruynzeel sponsorship of Vol. 4, No. 9 and the residue of the Conservation Conference Account. As I mentioned in my 1985 report, our only reliable income is from subscriptions; income from advertisements and the sale of backnumbers and reprints is unpredictable. Subscription income alone should cover the costs of production and distribution of our

journal and the day-to-day running costs of the Group, such as committee meetings, expenses and postage. These costs are barely covered by the present UK Personal subscription of £6; the cost per issue for the last two issues of the journal averaged £1.96, leaving only 12p out of every £6 subscription to cover the costs of stationery and the Group's activities. The latter are, of course, largely funded by the surplus built up since 1985.

The accounts as presented here are complicated by the fact that publication of the journal is running late. If we estimate the accounts for a 'normal' year in which we produce three issues, and taking into account a cost element toward the production of an index and general costs such as stationery, committee expenses, and meetings card and compare these with income from subscriptions, sale of backnumbers and reprints and advertisements, the Current Account would close with a deficit of about £400. This would be covered by a surplus carried forward from the preceding year, but in the space of about five years this surplus would be completely eroded by cumulative Current Account deficits.

To compensate for such a deficit, I propose, with the greatest reluctance, that subscriptions for 1989 be increased as follows:

UK Personal subscriptions to be raised by	£1 to £7
UK Institutional subscriptions to be raised by	£2 to £10
Overseas Personal subscriptions to be raised by	£1 to £9
Overseas Institutional subscriptions to be raised by	£2 to £12

Thanks are due to Steve Howe and Bob Owens for auditing the accounts.'

There were no questions and Tom was thanked by the Chairman.

## 7. Editor's Report - from Pete Crowther

### (i) 1988

Only one issue of the *Geological Curator* has been published this year: Vol. 5, No. 1 (Issue 1 for 1987), pp.1-52, published 22 April 1988.

The paste-up of Vol. 5, No. 2 (Issue 2 for 1987) is almost complete, and it will go to press this month for publication in January 1989. Copy for Vol. 5, No. 3 (Issue 3 for 1987) is being word processed. I can only apologise for this unacceptable rate of publication and plead mitigating circumstances in Bristol, where Geology has had a particularly hectic year.

I have also had to spend editorial time seeing *The use and conservation of palaeontological sites* volume through Oxford University Press, with my co-editor

Bill Wimbledon at NCC. Published this very day as *Special Paper in Palaeontology*, Vol. 40, 200pp., it records the proceedings of the GCG/Pal. Ass./Geol. Soc. conference held at Burlington House on 1 and 2 October 1987. [A prepublication copy is available for inspection here today.]

Much progress has also been made with the *Index for Vol. 2 (1977-1980)*, thanks to some remarkably painstaking work by Justin Delair. Checking of the 5,000+ entries is virtually complete and transfer to word processor can begin soon. We will explore ways to offset production costs through sponsorship and grant-aid.

#### (ii) 1989

I better not make any rash promises this year ..... Vol. 5, No. 2 (Issue 2 for 1987) will be distributed in January. Thereafter, once things quieten down in Bristol (i.e. post opening of 'The Great Sea Dragons' exhibition in mid-February), I envisage having more time for our illustrious organ.

For longer term consideration, I have begun talking to Oxford University Press about the economics of involving them in printing the journal. They, and other large houses, are now able to take disks from a customer's own word processor, feed them through their computer typesetting equipment, and return 'galley proofs' for the customer to check, without involving their own keyboard operators - thus reducing the cost substantially. Once proof read by the customer (again, not OUP readers), they can undertake page make-up, print and bind. This *may* provide an affordable 'half-way house' between the type of labour intensive, 'kitchen-table' editing and production of camera ready copy we presently rely on (cheap but very time consuming), and a fully 'professionally' produced (and expensive) journal.

#### (iii) Thanks

As usual, sincere thanks go to Earth Sciences staff at Leicestershire Museums Service: to Judy Marvin for word processing; to Mike Taylor for compiling Lost and Found, CING, and Notes and News; to Chris Collins, Kate Pontin, Gill Weightman and Arthur Cruickshank for dealing with distribution; to John Martin for allowing his Section to undertake such 'trivial pursuits'; and to Dr Patrick Boylan (Director of Museums and Arts) for his support of GCG's publishing activities. Over in Cambridge, Mike Dorling and David Price continue to produce the main article titles ready for pasting up.

Thanks especially to all the contributors who keep our standards high at a time of decreasing resources and increasing calls on curatorial time. I apologise again for depriving the world of such wisdom and erudition....!

Roy Clements asked whether other publishing houses, such as the in-house group in the Geological Society, would be asked to supply tenders for the preparation of *Geological Curator*. Pete replied that if OUP's tender was financially viable then he would investigate other tenders. But OUP were unlikely to be very different from other publishing houses; if they were not viable, he would be unlikely to do much better elsewhere.

There were no further questions and Pete was thanked by the Chairman.

#### 8. Recorder's Report - from Mike Taylor

'It has been a quiet first year as Recorder since Don Steward and Hugh Torrens handed over. I am most grateful to them for their efficient and neat transfer.

Work on *Geology and the local museum* has prevented doing more than the routine CING and 'Lost and Found' columns in the *Geological Curator*. In any case, relatively little new information has come into the CING database, especially from Tom Sharpe in Wales. I am grateful to the regional coordinators for their efforts. Peter Crowther is temporary replacement for me in the south west, while David Bertie has taken over in Scotland from Mike Taylor (Perth).

In 1989 I plan to revise the CING database at the same time as putting it on a microcomputer. Its main value will be as a listing of UK geological collections, with details of staffing and usage. This will be useful, for example, for sending out free copies of *Geology and the local museum*, or revising the 'Thumbs Up' leaflet.

The CING database is necessarily founded on questionnaires so that the information on content of collections is inconsistent, scanty and unreliable. I don't think it worth doing much about this, which is best left to the Collections Research Units.

The CRUs continue to be locally active. The Scottish area has published its listing of collectors and collections. FENSCORE itself is considering changes in policy, notably the attempt at a catalogue of UK type specimens (the pilot group possibly being the Molluscs), and a shift away from computer data at Manchester towards maintaining databases at regional (CRU) level, thence compiling a national database with search facilities at the MDA.'

There were no questions and Mike was thanked by the Chairman.

#### 9. Public Relations Officer's Report - from Phil Doughty

Phil pointed out that there was no PRO according to the Constitution. The Committee had decided to circulate a questionnaire to find out whether members needed help with public relations and what help was required.

It had been circulated around the Committee, revised, and would be sent to members soon.

Phil reported on the launch of the 'Rescue - a heritage on the rocks' leaflet. Following the report on Biological Collections in the UK, he suggested setting up a joint meeting of all interested parties, with GCG/BCG/Museums Association/Museums and Galleries Commission, at MGC to examine the problems confronting the natural sciences in museums.

So far, Phil had received only one enquiry from a member, but the services of the PRO had yet to be advertised.

The MGC had introduced a grant scheme for travelling exhibitions which appeared to be directed largely towards the sciences. There was considerable scope for geological exhibits, and it would be important to have a range of ancillary activities around each exhibition, such as 'Blue Peter' coverage. The 'Thumbs-Up' leaflet could be a useful link here too.

There were no questions and Phil was thanked by the Chairman.

#### **10. Subscription Rates**

Tom Sharpe proposed that subscriptions be increased as detailed in his report. He explained that although the financial situation was good, the Committee had discussed producing a newsletter to give more up-to-date notes and news. He would be investigating the possibility of subscription payment by variable direct debit. He also pointed out that the meetings card was a receipt for subscriptions. Mick Stanley seconded the motion.

Roy Clements pointed out that the subscription was constitutionally an annual charge to cover the cost of the *Geological Curator* and newsletter. Would this rise be sufficient to hold the subscription steady for a few years? Tom replied that based on calculations for a hypothetical year, it would be enough to hold subscriptions steady for about four years; the

subscription would be expected to go up in stages at four year intervals. Mick Stanley pointed out that this was about equal to the rate of inflation. Howard Brunton asked whether the costings of sending the *Geological Curator* to OUP or its equivalent for printing would affect the proposed increase. Pete Crowther said that the costs had been taken into account.

Mike Taylor asked if it was clear that income tax could be reclaimed. Tom replied that this was made clear on the original membership application form. He pointed out that GCG was now a charity although he was still negotiating with the Income Tax Commissioners. The rise in subscription was agreed.

#### **11. Election of Officers**

The Committee nominated Simon Knell for Secretary and Phil Doughty for Public Relations Officer; there being no other nominations, they were declared elected. There being no other nominations, all other Officers agreed to remain on the Committee.

The Committee nominated John Cooper and Chris Collins as Ordinary Committee Members. There being no other nominations, they were declared elected.

There being no other nominations, Howard Brunton and Paul Selden agreed to remain as Ordinary Committee Members.

#### **12. Nomination of Auditors**

Steve Howe and Bob Owens were re-elected as auditors for 1989, the latter in his absence.

#### **13. Any other business**

Mick Stanley thanked Vivien Bellamy and the staff of Shrewsbury Museum for their hospitality, and noted with regret that senior staff of Shropshire County Council and Museum Service had been unable to stay longer. He thanked everyone for attending.

#### **14. Date and venue of 16th AGM**

14 December 1989 at Oxford University Museum.

## Annual Accounts 1988 (17 November 1987 - 8 November 1988)

	1988	1987
<b>Current Account Income</b>		
Subscriptions	2913.09	3229.00
Sale of backnumbers	239.80	344.55
Advertisements <sup>1</sup>	785.00	170.00
Sale of reprints	30.60	15.90
Meetings fees	90.50	432.50
Conservation Conference Account <sup>2</sup>	400.61	349.28
'Thumbs-up' orders	-	10.00
	4459.60	4551.23
Unpresented cheques	87.00	-
Transfer from HICA	1050.00	400.00
	5596.60	4951.23
Balance	832.59	555.11
	£6429.19	£5506.34

<b>Income due</b>		
Unpaid subscriptions	650.00	
Outstanding invoices	352.50	
	1002.50	
<b>Stocks of Geological Curator</b>		
	c. 7500.00	
	c. £8502.50	

1. 1988 includes £700 sponsorship of Vol. 4, No. 9 by Bruynzeel.
2. 1988 transfer of balance of Conservation Conference Account to Current Account

<b>Current Account Expenditure</b>		
Printing <i>Geological Curator</i> <sup>1</sup>	1470.00	881.00
Printing meetings card	50.26	38.87
Postage <sup>2</sup>	497.60	602.11
Typing	222.00	126.00
Stationery	40.25	115.68
Committee Meetings expenses	43.50	113.70
Ordinary Meetings expenses	94.00	462.86
<i>Index</i> Vol. 2	100.00	-
Belfast Mason Conference Fee	200.00	-
Girobank charge	2.50	-
Returned cheque	6.00	6.00
'Rescue' leaflet design	-	130.00
'Rescue' leaflet printing	-	194.46
Corporation Tax	-	103.07
	2726.11	2773.75
Transfer to HICA	2500.00	1900.00
Balance	5226.11	4673.75
	1203.08	832.59
	£6429.19	£5506.34

	1988	1987
<b>Committed Expenditure</b>		
<i>Geological Curator</i>		
5(2)-5(6)	c. 5500.00	
<i>Index</i> Vols. 2, 3, 4	c. 2100.00	
Committee expenses	c. 20.00	
NMW facility fee <sup>3</sup>	c. 100.00	
	7720.00	
Advance subscriptions	95.00	
	£7815.00	

1. 1988 Vol. 4(9) and Vol. 5 (1); 1987 Vol. 4(8).
2. 1988 postage of Vol. 4(9) and 5(1) and distribution of 1987 AGM papers; 1987 postage of Vol. 4(7) and 4(8); cost of distributing 4(7) was recovered from the Conservation Conference Account.
3. Charge for postage, photocopying, telephone, etc.

<b>Deposit Account Income</b>		
Interest <sup>1</sup>	0.80	5.68
Balance	107.39	101.71
	£108.19	£107.39

1. 1988 to 1.2.88 (account closed 2.2.88); 1987 estimate

<b>Deposit Account Expenditure</b>		
Transfer to HICA	108.10	-
Balance	0.00	107.39
	£108.19	£107.39

<b>High Interest Cheque Account Income</b>		
Transfer from Deposit Account	108.10	-
Transfer from Current Account	2500.00	1900.00
Interest	560.85	532.80
	3169.04	2432.80
Balance	6464.29	4431.49
	£9633.33	£6864.29

<b>High Interest Cheque Account Expenditure</b>		
Transfer to Current Account	1050.00	400.00
Balance	8583.33	6464.29
	£9633.33	£6864.29

<b>Total income</b>	5108.25	5089.71
<b>Total expenditure</b>	2726.11	2773.75
<b>Surplus</b>	2382.14	2315.96

<b>Income due</b>	1002.50	1627.62
<b>Cash in Bank</b>	9786.41	7407.27
	10788.91	9034.89

<b>Committed expenditure incl. advance subscriptions</b>	c. 7720.00	6125.00
<b>Carried forward (incl. advance subscriptions)</b>	c. 3068.91	2909.89

[signed] T. Sharpe  
GCG Treasurer

Auditors: S. R. Howe and R. M. Owens

## GEOLOGICAL CURATOR

### Publication scheme

Three issues of the *Geological Curator* are published each year; a complete volume consists of nine issues (covering three years) and an index.

### Notes to authors

Articles should be submitted typed on good quality paper (A4 size) double spaced, with wide margins. Two copies should be sent to the Editor, Peter Crowther, City of Bristol Museum and Art Gallery, Queen's Road, Bristol BS8 1RL (tel. 0272 223592). Line drawings should be prepared in black ink at twice desired publication size. Photographs for halftone reproduction should be printed on glossy paper. Both drawings and photographs should be proportioned to utilise either the full width of one column (85mm) or two (175mm). References in the text follow the Harvard system, i.e. name and date '(Jones 1980)' or 'Jones (1980)'. All references are listed alphabetically at the end of the article and journal abbreviations should follow the *World List of Scientific Periodicals* where appropriate. Authors will normally receive proofs of text for correction. Fifty reprints are supplied at cost. Major articles are refereed. Copyright is retained by authors.

### Regular features

LOST AND FOUND enables requests for information concerning collections and collectors to reach a wide audience. It also contains any responses to such requests from the readership, and thereby provides an invaluable medium for information exchanges. All items relating to this column should be sent to the Editor (address above).

NOTES AND NEWS contains short pieces of topical interest. Please send contributions to the Editor (address above).

CONSERVATION FORUM helps keep you up to date with developments in specimen conservation. Information on techniques, publications, courses, conferences etc. to Christopher Collins, Leicestershire Museums, Arts and Records Service, 96 New Walk, Leicester LE1 6TD (tel. 0533 554100).

BOOK REVIEWS contains informed opinion about recently published books of particular relevance to geology in museums. The Editor welcomes suggestions of suitable titles for review, and unsolicited reviews can be accepted at his discretion. Publishers should submit books for review to the Editor.

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