GCG

THE GEOLOGICAL CURATOR

VOLUME 4 No. 9 Issue 3 for 1986

BRUYNZEEL STORAGE SYSTEMS LTD.
AND GEOLOGICAL STORAGE

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.

1987 COMMITTEE

Chairman	Michael F. Stanley, Deputy County Museums Officer, Derbyshire Museums Service, John Turner House, Parkway, Darley Dale, Matlock, Derbyshire DE4 2FW (Tel. 0629 733226).
Secretary	Geoffrey Tresise, Keeper of Geology, Liverpool Museum, William Brown Street, Liverpool L3 8EN (Tel. 051 207 0001/5451).
Treasurer	Tom Sharpe, Department of Geology, National Museum of Wales, Cathays Park, Cardiff CF1 3NP (Tel. 0222 397951).
Editor	Peter R. Crowther, Curator of Geology, City of Bristol Museum and Art Gallery, Queen's Road, Bristol BS8 1RL (Tel. 0272 299771).
Recorder	Donald I. Steward, Assistant Keeper, Department of Natural History, City Museum and Art Gallery, Hanley, Stoke-on-Trent ST1 3DW (Tel. 0782 202173).
Minutes Sec.	Diana M. Smith, Curator, Bath Geological Museum, 18 Queen Square, Bath BA1 2HP (Tel. 0225 28144).
Public Relations	Hugh Torrens, Department of Geology, Keele University, Keele, Staffordshire ST5 5BG (Tel. 0782 621111).
Committee	Michael J. Benton, Department of Geology, The Queen's University of Belfast, Belfast BT7 1NN.
	Christopher J. Collins, Assistant Keeper Conservation, Leicestershire Museums Service, 96 New Walk, Leicester LE1 6TD (Tel. 0533 554100).
	Wendy Kirk, Department of Geology, University College London, Gower Street, London WC1E 6BT (Tel. 01 387 7050).
	Simon J. Knell, Keeper of Natural Science, Scunthorpe Borough Museum and Art Gallery, Oswald Road, Scunthorpe DN15 7BD (Tel. 0724 843533).
	Monica T. Price, Department of Mineralogy, Oxford University Museum, Parks Road, Oxford OX1 3PW (Tel. 0865 272590)

Typed by Mrs Judy Marvin, Leicestershire Museums Service.
Printed by Leicestershire County Council's Reprographics Unit, County Hall, Glenfield, Leicester.

 ISSN 0144 - 5294

COVER. Geological specimens are housed in purpose designed wooden drawers within a Bruynzeel 'Montamobile' installation at the Department of Geology and Physical Sciences, Oxford Polytechnic. (Photo: Cyril Reed Associates)

THE GEOLOGICAL CURATOR

VOLUME 4, NO.9

SPONSORED BY BRUYNZEEL STORAGE SYSTEMS LTD.

CONTENTS

GEOLOGICAL CURATORS' GROUP

November 1987

EDITORIAL

The name of Bruynzeel is well known within the museum world; their mobile systems have found a particular market in the dense storage of geological material, where space for large and growing collections is often at a premium yet quick and easy retrieval remains essential. It is appropriate then to take a close look at what Bruynzeel currently offers the geological curator, as we do in the following pages. The history of Bruynzeel's involvement with geological storage and the company's present wares are summarized by John Upton, their Marketing Director (pp.541-544). The users of three recently acquired systems give their views on installation and routine operation within a national, local authority and university museum (pp.545-551). Anybody contemplating upgrading their stores will find much of interest here. GCG is pleased to acknowledge that Bruynzeel has most generously agreed to sponsor the printing costs of this issue.

The raising of standards of geological curation remains the primary aim of GCG (and storage is but one aspect of this mission). Yet, strange to say, the Group has never produced a concise, punchy, authoritative set of recommendations summarizing either its view of 'minimum' standards of care, or how such standards might best be achieved. 'Rescue a Heritage on the Rocks' (copy enclosed) was launched at the British Association for the Advancement of Science Meeting in Belfast this summer, and is an attempt to rectify this omission. Perhaps it says little that you could not glean from the Group's previous publications, but the crucial point is that here, in just a few hundred words and structured into eleven short recommendations, is what anyone responsible for geological collections (geologist or not) should know about GCG policy. As such, it needs careful targeting at those most able to effect its implementation nationally, regionally, and at local level. [Copies are available from me to anyone who knows of curatorial staff, line management, or governing bodies whose decision making might benefit from its content.]

Most members of GCG will be familiar with the sorry state into which the internationally important geological collections of the Bath Royal Literary and Scientific Institution were allowed to sink while under the 'care' of Bath Corporation in the 1960s and early 1970s. It was Bath perhaps more than any other single case of neglect that fuelled the enthusiasm of those who saw the foundation of GCG in 1974 as a means of marshalling the forces of the geological community against corporate ignorance and disinterest. Ron Pickford's heroic struggles, which brought the collections back from the brink of disaster, have been chronicled in these pages (Geol. Curator, 1, 117-122; 4, 287-288) and recognised by the award to him of the Group's highest honour, Honorary Membership, in 1985. In the 1980s, the approach of Avon County Council (whose Libraries Service had inherited responsibility for the collections from Bath Libraries at local government reorganisation in 1974), coupled with the vital input of both advice and grant-aid from the Area Museum Service for the South West (Geol. Curator, 4, 172-173), has produced progress - foremost being the establishment by Avon of a full-time, professional Geology Curator (currently Diana Smith).

Nevertheless, Avon's inheritance clearly sits uneasily within their Library Service (which has no other museum presence) and, despite the record of the old Bath Corporation, a transfer to Bath District Council and its now highly successful and prestigious Museums Service, makes sense. This is all the more so since Bath Museums are keen to make the institution's collections the core of a new, truly City oriented museum. So no problem - why not simply transfer the trusteeship of the Institution from Avon to Bath? This is in fact what the two local authorities wish to do, and I am sure that they consider the interests of the collections to be best served by so doing. But - read on ...

The wisdom of such a transfer of trusteeship (and even its legality) at present is being forcefully questioned, directly with the Charity Commissioners, by a group of well informed Bath residents and long standing friends of the Institution's collections. Their case rests primarily on the fact that no proper inventory exists - not yet for the one million (plus) geological specimens of the Moore Collection, and certainly not for important botanical and ethnographic material. They contend to the Commission that the present trustees (Avon) should be required to account for what they currently hold before any transfer is considered. After all, they argue, how could the Commission approve a transfer (as they must before it can go ahead) when neither they, Avon County, nor Bath District knows just what is being transferred? There is clearly logic in what they say, and GCG will be keeping a close watch on future developments.

Good news regarding the long awaited Indexes for Geol. Curator Vols.2 and 3! Following the appeal in Vol.4, No.8 I am delighted to report that Justin Delair has most kindly taken up the challenge. Justin is a regular contributor to these pages, and his unpublished hand-lists of the vertebrate fossils held by many provincial museums will be familiar to all who have visited such collections up and down the country. 1988 should see publication of both indexes - at last!

Geological Curator, Vol.4, No.9, 1987 (for 1986), pp.541-544

THE BRUYNZEEL APPROACH TO GEOLOGICAL STORAGE

BY JOHN UPTON

[John Upton is Marketing Director of Bruynzeel Storage Systems Limited and a past President of the Storage Equipment Manufacturers Assocation. Here he reviews the company's involvement in the development of specialised equipment for the storage of geological material. - Ed.]

Bruynzeel's interest in the development of specialised equipment for the storage of geological material really began in the early 1960s, when a Swiss engineer, Walter, who was marketing the company's shelving equipment in Switzerland, invented a new method of high density mobile storage. Using well engineered bases, combined with a unique guidance system, Walter introduced a hand push-pull system which allowed shelving stacks to be moved over floor-set rails, to create an access aisle at will, anywhere within the stack.

This system was suitable for heavy loads on relatively short runs, and was practically trouble free. Hitherto, the only other powered mobile system (also of Swiss origin) utilised a slipping clutch powered method, which by definition was difficult to maintain in good working order; it was, if anything, 'before its time'. It had been slow to 'take-off' and was generally thought to have very limited application. It had, however, scored in library and archival storage where retrieval was infrequent, and an ever increasing stock constantly created the need to expand.

With his new system, Walter targeted on the works engineers' stores, an area familiar to him, and met with considerable early success in Switzerland. As a consequence, Bruynzeel struck a deal with him, and the system was marketed by Bruynzeel throughout Europe. This gave a real impetus to Walter's development enthusiasm, and we were soon to see the push-button controlled, pneumatically operated central cylinder system, capable of handling heavier loads on longer runs; it was the first real challenger to the Ingold slipping clutch system.

Fig.1. High density storage for the Palaeolithic Collections at the British Museum, using Bruynzeel's 'MontaMobile'system (Photo: Cyril Reed Associates).

monta mobile system
hand-push type MMB

Rails:
Guide and running rails made from cold rolled solid steel 60 mm wide x 14 mm high fixed level to the floor to an accuracy of 1:2,000.

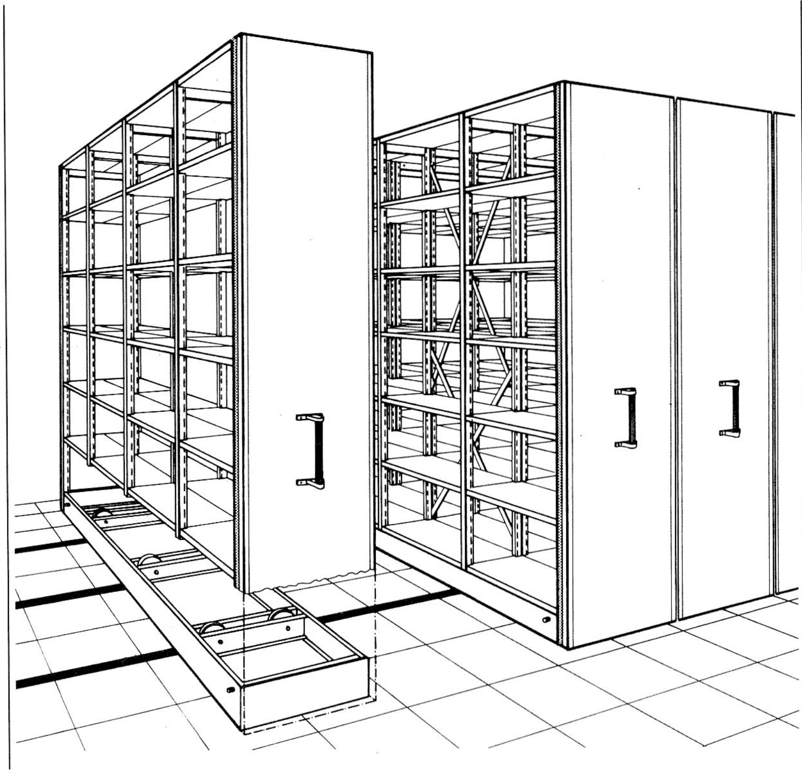
Static and mobile bases:
Welded frame constructed from cold rolled steel 'C' Profile 40/150/40 x 2.5 mm incorporating guide and running wheels.

Wheel sets:
Maintenance-free running and guide wheels with 'sealed for life' double ball bearings. 148 mm diameter x 33 mm wide.

Operation:
Pull – push via 'D' shape handle.

Operating force/moveable load:
1 kg force will move 285 kg. load.

Test certificate:
Test number A.VW 5026/79.



Knowing of problems regarding space in connection with growing museum collections, Bruynzeel set out to capture the lion's share of the market, with vigorous promotional activity. The UK Division sold its first pneumatically operated system in 1967, to Southampton University for geological storage (it is still in operation today and likely to be for many years to come). Advantages of the system included smooth operation and its ability to move the accumulated weight of any number of units as a single block. This application also called for the development of special drawer block units to store a wide range of geological material.

Sales 'took-off' for Bruynzeel. Simultaneously, other manufacturers entered the market, principally with hand operated and electrically powered units. The added publicity boosted awareness in the market place, and as the slipping clutch system became outdated, old prejudices were overcome. To further their lead in mobile storage, Bruynzeel also introduced electrically powered units as an option.

More significantly, however, Bruynzeel developed hand-cranked mechanisms with options of three gear reductions, to move loads of up to 45 tonnes in one operation. We also introduced various end panel options to help customers match their existing decor. Complementary accessories included long span shelving, many variations of drawer block units, dividers, lateral filing, computer and film tape racks, seismic core cradles, picture storage and hanging rails. (Even a mouse proof installation of seed containers for research laboratories has been achieved!) All powered systems feature 'safety' kicking plinths and braking mechanisms, and there are various means of locking the units for security.

More recently, Bruynzeel has introduced automatic lighting. This ensures ideal lighting conditions in each picking aisle, and can be a big energy saver in some instances. It also overcomes the frustration of co-ordinating building services.

Fig.2. Core samples in purpose designed trays on shelves at the Department of Geology and Physical Sciences, Oxford Polytechnic, using Bruynzeel's 'MontaMobile' system (Photo: Cyril Reed Associates).

monta mobile system hand-crank drive types MMB 10/20/30

Rails: As type MMB plus floor chain.

Bases: As type MMB plus hand crank drive mechanism.

Operation:
Hand crank with three spoke handle.

Drive:
Positive drive – handle operation drives centrally mounted sprocket wheel, via a reduction gear and shaft, along a fixed floor mounted chain.

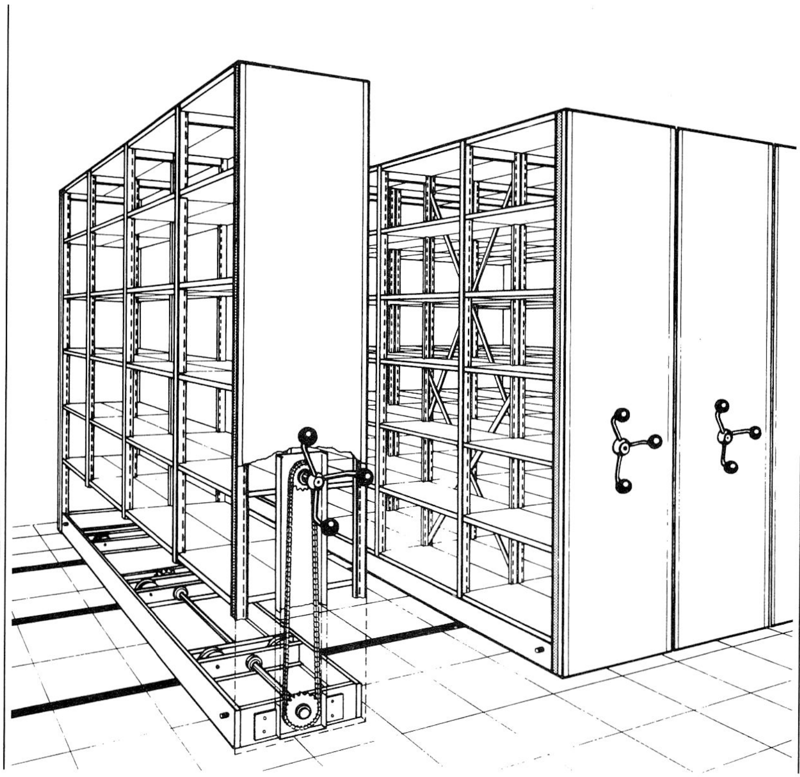
Moveable load:
Up to 15 tonnes per operation for MMB 10
Up to 30 tonnes per operation for MMB 20
Up to 45 tonnes per operation for MMB 30

Operating force/moveable load:
MMB 10 1 kg force will move 1,425 kg load
MMB 20 1 kg force will move 2,850 kg load
MMB 30 1 kg force will move 5,000 kg load

Length of units: Up to 12 m standard.

Distance moved per revolution of operating handle:
MMB 10 210 mm
MMB 20 104 mm
MMB 30 45 mm

Test certificate:
Test number A.VW 5025/79.



Of course, mobile shelving costs more to buy than conventional shelving. However, the long term benefits are significant, and particularly where narrow depth shelving is the natural choice – since the narrower the shelf depth, the greater the space lost to access aisles. With any static system, a high proportion of space is obviously lost to 'picking access' between shelving runs. Yet with closing aisle, high density block storage all you need is a single aisle, created where and when required by moving the units over rails laid on or into the floor. In this way, for just a small installation of around 500 sq ft, for example, savings of 200 – 250 sq ft are possible (depending on layout) – increasing storage capacity by up to 50%. This represents an annual overhead cost benefit, which can pay for the installation in rapid time.

So successful has the mobile concept become, there is now a growing trend to adopt it not only for its space saving attributes, but also for its beneficial effects on collection management, i.e. ensuring retrieval and replacement of specimens, shorter picking routes with reduced operator fatigue, improved security, and creating a pleasant uncongested working environment.

High density mobile storage exerts a dynamic and concentrated load over the floor area, so it is essential to contact the storage layout designer when first considering such a scheme, particularly when considering installations above ground level. He will recommend rail locations and calculate potential loads, before co-ordinating with the architect or structural engineer regarding building suitability. In the case of new building projects, this early joint liaison will avoid costly abortive attempts or expensive extras, and overcome delays as construction progresses.

Fig.3. A Bruynzeel 'MontaMobile' system at Oxford University Museum, designed to accommodate existing, glass-fronted wooden cabinets (Photo: Cyril Reed Associates).

Systems exclusive to Bruynzeel are marketed under the closing aisle 'MontaMobile' label. They range from manually operated, and mechanically assisted, through to fully automatic with a choice of electric or pneumatic power. Runs may be up to 12m long and loaded up to 45 tonnes; these can be moved easily by finger light hand crank systems, or powered by the touch of a button. Because of the improved efficiency of hand cranked systems, Bruynzeel finds the call for more expensive powered systems is declining.

Other installations that Bruynzeel have supplied for geological storage include:

British Geological Survey, Edinburgh, where MontaMobile is used to house a comprehensive range of rock and core samples (some of which are in a low temperature controlled environment). To make the best use of available space, a two tier shelving system with access stairways was installed.

Department of Geology, Oxford Polytechnic, where a hand-cranked MontaMobile installation provides space saving storage and ease of access for core and rock samples.

Oxford University Museum (see Powell herein) where a series of hand-cranked MontaMobile installations store a large geological collection. Interestingly here, some existing glass-fronted wooden cabinets were mounted on the mobile base units.

There is a large MontaMobile in operation storing geological samples at the National Museum of Wales (see Howe herein), and for the British Museum, MontaMobile is the chosen method for storing its boxed Palaeolithic collections.

Bruynzeel have built a reputation in this particular field, not only for quality, but also for a willingness to innovate to overcome specific installation and unit storage problems.

For more information contact:

Bruynzeel Storage Systems Limited
Pembroke Road
Stocklake Industrial Estate
Aylesbury
Bucks HP20 1DG

Tel. No. Aylesbury (0296) 395081
Telex: 83167 BRYNZL G

John Upton
Bruynzeel Storage Systems Ltd.

Typescript received 20 March 1987

Geological Curator, Vol.4, No.9, 1987 (for 1986), pp.545-547

BRUYNZEEL SYSTEMS IN USE: 1, NATIONAL MUSEUM OF WALES

BY STEPHEN R. HOWE

By 1977, like many institutions of its age, the Department of Geology at the National Museum of Wales found itself faced with the problem of its reserve collections outgrowing the available storage space, with little prospect of building expansion. The geological collections at the time were dispersed between six separate floors in the east wing of the building, as well as being interleaved between floors housing the Art and Botany Departments.

Investigations therefore began into a rationalisation of the storage space available and into new forms of storage. Most of the primary palaeontological and mineralogical collections were housed in traditional, static oak cabinets, whilst the secondary material was scattered through basement and sub-basement areas, in the mode of storage common to many institutions - the cardboard box and wooden crate - rendering it difficult to use and service.

THE STORAGE PROBLEMS

Given the lack of new buildings or rooms into which to expand, it was decided from the outset to try and move all the primary reserve and study collections onto one floor (at basement-level), with all secondary material (cores, rocks, models, etc.) in the sub-basement. Working within the confines of the available space initial investigations centred around the reorganisation of the storage cabinets already in use to obtain an idea of how many more it would be possible to house. These cabinets, holding up to twenty interchangeable wooden drawers, had been more than adequate for half a century. They had proved versatile, provided quick and easy access to specimens, and helped to buffer some of the environmental problems inherent in the building. On the other hand, they also had a number of drawbacks: as static units, with front opening doors, they take up a large floor area; suppliers of new cabinets purchased over the years had failed to match them identically so that the interchangeable drawer system had begun to break down, and after many years of fluctuating humidities and temperatures a number were in need of first-aid. They were also not cheap. By 1976 each cabinet (now only oak-faced) was costing £650. Using these cabinets in the limited space available soon led to an acknowledgement that in order to obtain any appreciable increase in storage capacity a mobile compacta-system of some sort would be necessary. Because of the large financial investment in oak cabinets over the years, the possibility of putting these directly onto mobile bases was considered but quickly rejected when it became obvious that much wasted space would be created due to their odd sizes, and the nominal increase in storage did not justify the capital outlay.

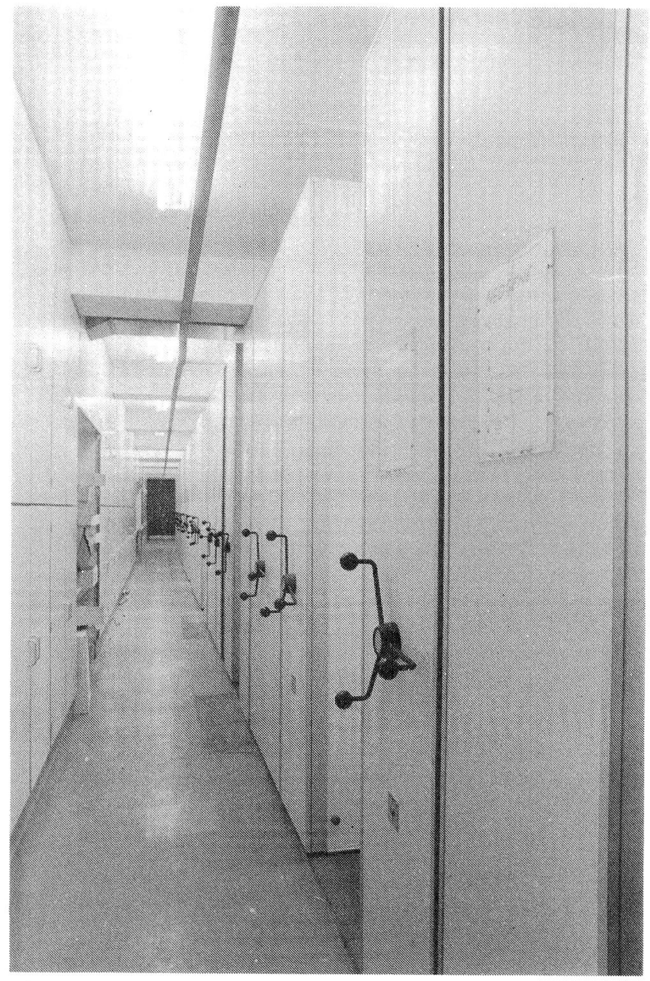


Fig.1. The main palaeontological store (before final sorting) with the Bruynzeel mobile system on the right and built in static cupboards on the left.

OPTIONS AND SOLUTIONS

Having decided that a purpose-built compacta-storage system was the only logical solution a number of different options were considered, with a final decision being made to install a Bruynzeel Monta Mobile System manufactured by Bruynzeel Storage Systems Limited. This is a metal-framed system divided into 0.5m square bays (measured to the upright centres), each upright being slotted at 20mm intervals and able to take one slotted, L-shaped, enamelled runner. Each metal-framed unit is enclosed by Monoform panelling and, in order to meet a specification for dust proofing purposes, the top and bottom surfaces have sealed blockboard covers and the internal end panels a hardboard lining. Rubber seals are fitted to the upright of each end panel, and nylon brushes to the tops and bottoms of each unit. Although probably not as dust-tight as the original oak cabinets the system has coped well considering the conditions it has had to face since installation. With environmental controls soon to be installed throughout the stores the extra dust-proofing should be more than adequate. It is of course possible to fit dust covers to each drawer if necessary, but the costs are exorbitant.

Each unit contains a series of upright, 0.5m square bays standing up to 2.3m high, each capable of taking 26 or 27 80mm deep drawers (Fig.2). All the wooden drawers are made of quarter inch plywood and designed to take 30 lbs weight; they come in a series of interchangeable sizes of 40mm, 80mm, 100mm and 120mm depths. With the central bracing shelf in each bay being movable it is possible to fill each bay using a range of drawer sizes without leaving any waste space. The runner systems in the first units to be installed were held in place by metal pins, but these have now been changed to slotted angle clips that allow quick and easy relocation. In the light of predicted weight loadings the manufacturers offered a choice of methods for moving the mobile elements of the system. Because of potential maintenance problems it was felt that there was little advantage to be gained with an electrically powered system. A geared-down, hand-crank system has proved excellent and all units can be moved easily by all members of staff.

One advantage of the Bruynzeel system is its steel runners. All the moving wheels run on top of the rails, not within a track, and the outer guide rails are only slightly raised while all others are flat. The only part of the system liable to collect dirt and debris is the static chain pit on which the drive mechanism works. To date there have been no problems and as long as this area is kept clean the mechanics function smoothly.

VARIATIONS ON A THEME

Three Bruynzeel compacta systems were installed between March 1981 and May 1983, located in three different store rooms. If necessary all are fully interchangeable. The first system installed houses the special palaeontological collections and was modified in places to accommodate large specimens. One bay has been deepened to 800mm and the drawers replaced by flat shelves (again fully adjustable), while the lower half below the central bracing shelf has vertical dividers to accommodate large slab specimens. Unlike the two later systems rails were laid on top of the existing floor and the floor level was raised by the installation of a raised wooden floor. The other two systems have rails sunk directly into the existing floor so negating the need for a false floor. Although creating considerable dust and noise during installation, the finished result is far better than mounting on a false floor, particularly when moving loaded trucks between the units.

Fig.2. Part of the mineralogy store showing the internal drawer and runner system and flat running rails.

Due to the presence of numerous pillars and alcoves in most of the stores there are a lot of areas unable to accommodate sliding storage. Using the Bruynzeel metal framework it has been possible to build a series of static, wood faced cupboards into the available spaces, the drawer systems for which are fully compatible with the mobile systems, which thus increases the storage capacity. Using this system a purpose built Type Specimen Store has been.constructed at the end of the main palaeontological store.

At the end of the day the reasons for undertaking such a radical change in storage methods have to be justified. Table 1 provides a breakdown of the number of drawers, the cost per drawer, and the cost per unit area of the three new storage areas comparing traditional oak cabinet storage against the compacta system in the same available space. The increase in storage capacity is over 110% whilst the comparative costs are half those of static storage. To achieve the same amount of storage now available by using traditional cabinets would have needed the acquisition of a further $246m^2$ of floor space (an area roughly the size of our existing Mineralogical and main Palaeontological Stores).

TABLE 1. Costs and storage capacity of three new stores comparing compacta-system mobile storage with static oak cabinet storage within the same available space.

	STATIC CABINETS	COMPACTA SYSTEM
Number of 'standard' drawers	6,400	13,680
Cost/unit drawer	£32.50	£11.00
Cost per m^2 storage space	£130.00	£52.00
Cost per m^3 storage space	£1,552.00	£778.00

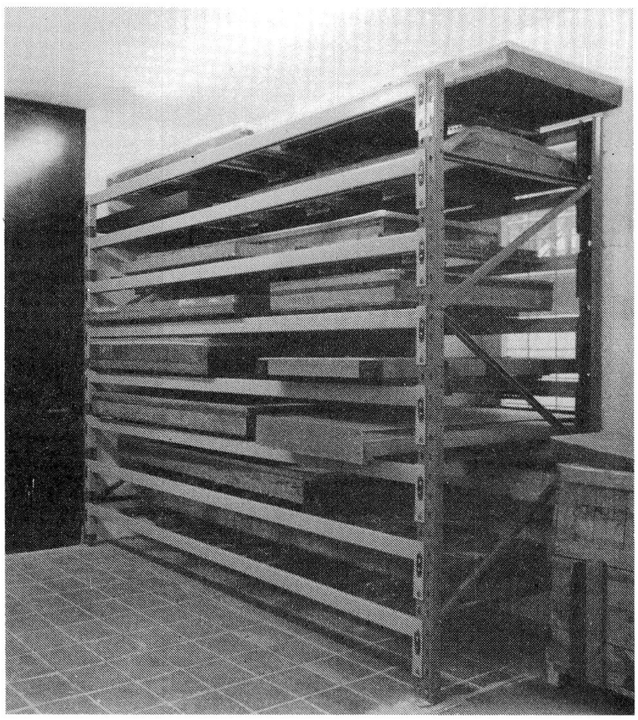


Fig.3. The large vertebrate store.

LARGE VERTEBRATES

By May 1983 the only collections uncatered for were large vertebrates, whose large assorted sizes and weights prevented them from being accommodated in the Bruynzeel systems. In March 1984 two bays of Dexion Speedlock were purchased to accommodate these collections (Fig.3). Each bay has nine pairs of stepped beams 9' 3" long and 4' deep, on which are mounted five cross-beams containing steel glide wheels that allow large crates and frames to be rolled in and out with ease by one person. Each set of beams will take a uniformly distributed load of 560lbs and the total capacity for each bay (up to 8' high) is two tons. To complement this system and to reduce the risk of staff injury, a four-way Electro-hydraulic Travel Stacker with a 2.7m lift of up to 1000kg load has been purchased. In addition to its normal forks, a removable 1000mm x 500mm ball table has been added, comprising a steel table inlaid with fifty steel ball bearings, which allow any of the specimens to be rotated through 360°. With the restricted access to the storage racks this stacker has proved extremely useful and now allows all specimens to be moved safely with a maximum of two people, instead of the six or more needed previously, and in a fraction of the time.

The complete reorganisation of the stores took four years in total, during which time many collections were moved two or three times before coming to rest in their new homes; repeated moves were necessary due to the unavailability of free space to temporarily store items when the new stores were being constructed. Original predictions were that the increased storage capacity would cope with acquisitions for a further twenty-five years at the then current rate. However, since completion the Department has been offered numerous large collections whose owners, having seen the facilities, are now keen to donate. If this is to continue, the twenty-five year prediction is likely to be seen as somewhat optimistic, and is already posing the question as to where to go after compacta system storage?

Acknowledgements. I would like to thank Dr Michael Bassett (Keeper of Geology, National Museum of Wales) for reading and commenting on this article and Miss Paula Westall for typing the numerous amended versions.

Stephen R. Howe
Dept. of Geology
National Museum of Wales
Cathays Park
Cardiff CF1 3NP

Typescript received 15 June 1987

Geological Curator, Vol.4, No.9, 1987 (for 1986), pp.548-550

BRUYNZEEL SYSTEMS IN USE: 2, BUXTON MUSEUM

BY MICHAEL J. BISHOP AND MICHAEL F. STANLEY

Buxton Museum and Art Gallery is stone-built, arranged on two floors, and part of a Grade II listed 1875 hydro. Buxton is the highest market town in England and receives more precipitation than Manchester, giving generally high levels of relative humidity (Rh) throughout the year. This fact, coupled with structural dampness in both the main store and the cellar (Fig.1) (which housed the Quaternary Bone collections until 1979) had caused concern for many years.

The plan drawn up in 1982 was to amalgamate all the collections into one re-designed and environmentally sound store. The original single door, reached through a small lobby, was blocked, thereby providing additional space for the new gas boilers which replaced an unsafe coal-fired boiler. A new higher level access, at ground level with the car park, was provided with secure double doors. Steps down into the store for people, a tail lift (usually seen on the back of a lorry) for specimens, a small first-aid 'conservation area' (sink and cupboards), and an extension to the picture store completed the redesign.

The structural dampness was tackled by the injection of a chemical damp proof course, waterproof rendering on the walls, and a 15mm pitchmastic screed (hot spread) on the floor. It was reasoned that this 'tanking' of the store would remove the dampness which, together with the Buxton winter, had produced conditions of 5^{o}C and 80% Rh; that the heating pipes skirting the store would provide even, low level heating; and that Rh would be controlled by a large amount of buffering material (i.e. shelving and specimen boxes). It proved possible to maintain Rh at a steady 55% and a temperature of 15^{o}C - too cool for working, but one room within the store enables staff to enjoy a higher temperature without affecting the main storage area. Buxton's high ambient Rh levels suggested that, although a humidifier would probably never be used, installing a dehumidifier would be a sensible precaution.

In the main store, an area 8.62m x 6.77m was available for a Bruynzeel mobile shelving system, comprising four mobile double (back to back) bays running between two fixed bays which formed the end stops. There is room to add further double bays when finances permit. Each bay is 7m long, 2.5m high, and shelf depth is 0.34m. The complete bay run is divided up into seven subsections for adjustable shelving, so that one side of a bay carries between 42 and 112 shelves. This system provides overall some 57.5m^3 of storage space, which will increase to 84.3m^3 when further bays are added. Static bays of the same dimensions with access between each bay would provide only 41.4m^3 of storage.

The ease with which Bruynzeel mobile shelving can be moved is remarkable. The mobile bays in Buxton's stores principally carry geological and archaeological material, yet a fully laden mobile double bay, 7m long with 100 - 200 shelves (both sides), can be moved with very slight effort by turning a well-geared crank handle on the end of the bay. All four bays can also be moved with equal ease by the same single operation applied to the last mobile bay in line. The aisle created between the bays has been designed at Buxton to open up to just over 1m, wide enough for a step ladder with enough room for a person to pass. Because aisles are opened up at any one of five points, our overhead fixed lighting of strip-lights running parallel to the aisles needed adjusting.

When estimating for a system such as ours, you may encounter the unwelcome addition of having to raise the overall floor level of your store (albeit by a matter of centimetres). Mobile shelving must run on a series of absolutely horizontal rails upon a firm base, and few of us can boast completely level floors in our stores. Rails set into most floors will inevitably protrude above the floor surface according to how level the floor is in the first place. Any substantial protrusions may warrant a secondary floor surface being applied to the entire store room floor, or you may have to cope with crossing five raised rails when walking up and down an aisle.

The bays in Buxton's system provide open shelving, so we have used appropriately sized trays and boxes for specimens. Black fibreboard trays of two standard sizes (470 x 330 x 75mm and 470 x 330 x 150mm) provide the basic storage container, into which large specimens are placed directly, and small specimens are arranged within their own boxes (Fig.2). We currently use four sizes of boxes, custom made to fit within the trays and made of acid free card with acetate lids. These containers have coped with over 99% of the geological collection; most are stored in the shallow fibreboard trays in acetate lidded boxes, which makes visual inspection of tray contents very easy (Fig.3) and protects specimens from dust etc. Labelling of trays is still a small problem: typed stickers are used, but some sort of label 'window' would be preferable - and no doubt someone somewhere makes such a device that could be slipped onto the edge of the tray. Please let us know!

The only other handling problem is the perennial one of how to support a loose tray half way up a ladder and rummage through its contents with both hands. At present the easiest and safest way to examine the contents of a tray is to remove it from a bay

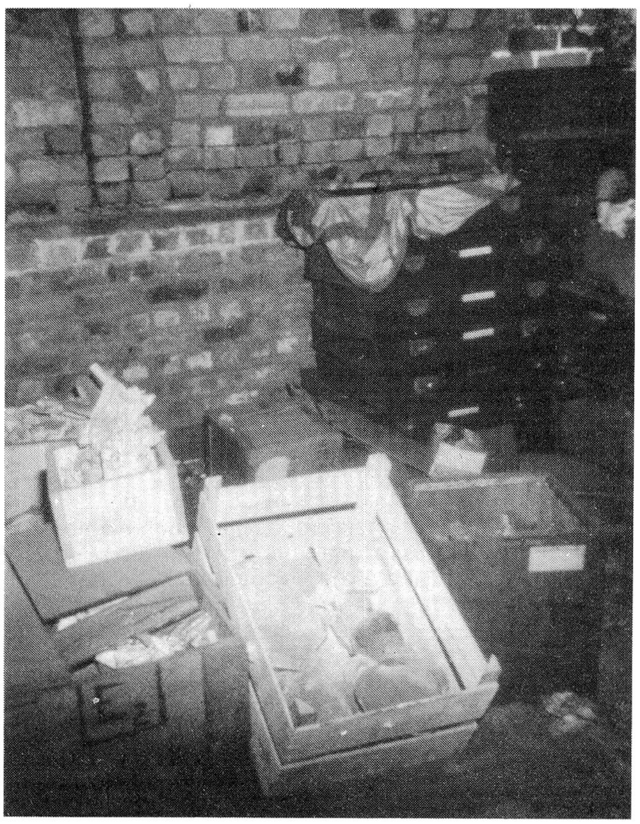


Fig.1. The stores before work started in 1982.

and find an empty worktop elsewhere in the storeroom. There are many occasions, however, when it would save much time and effort if the tray could remain more or less where it belongs while the contents are inspected. The answer would clearly be some sort of collapsible or sliding support built about half way up every subsection of the bay - the construction of the bays and shelves is simple enough to incorporate one's own custom made device if you are good with a screwdriver and saw.

Another important potential adaptation would be to introduce some sort of security lock into the movable bays. With one aisle open, access to the other aisles is prevented so a locking device on the rails or on the crank handles would provide an additional means of securing collections within the store. There are several permutations in which bays could be locked together using padlocks.

The large size of these mobile shelving units and their potential load carrying capacity might suggest to some the possible generation of cataclysmic momentum when in motion. They are actually surprisingly well cushioned by rubber bumpers and end brakes, and at Buxton we have boxes full of Crown Derby porcelain and glass bottles happily trundling up and down without a sound. (There is more danger of hurting a person than an object, by forgetting that visitor counting brachiopod growth lines in another bay!)

If you have limited storage space, then a mobile shelving system will make the very most of the space available, while still giving you total access to your collection.

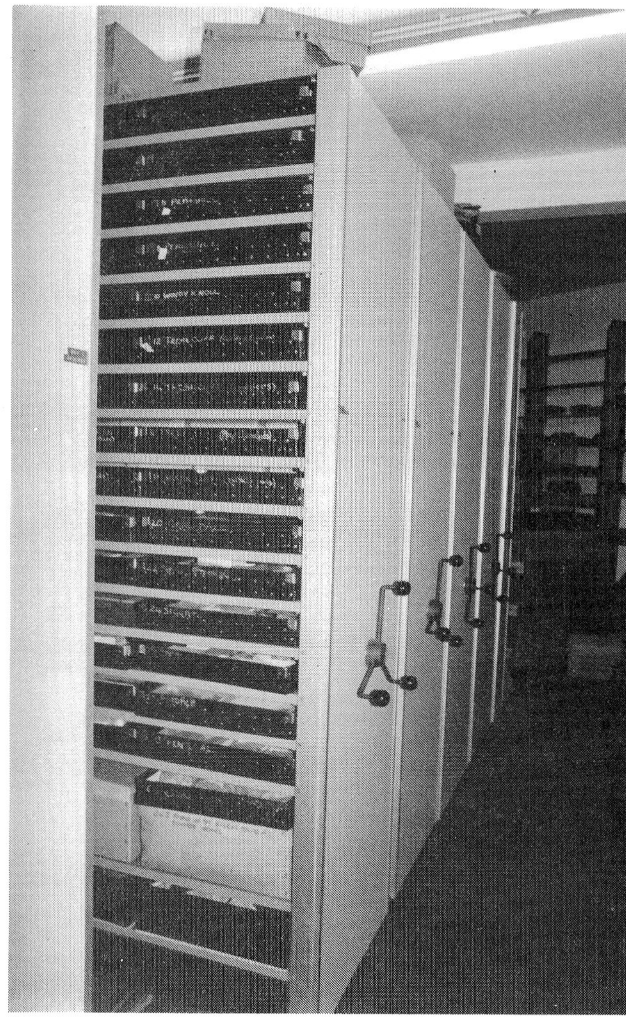


Fig.2. The finished Bruynzeel system, showing the four hand-cranked mobile double bays and the static single bays at each end.

DETAILS AND COSTINGS (1983 prices)

Bruynzeel monta mobile, hand-cranked steel frame with montex shelves (hardboard and timber sandwich) and monoform end panels. Four double bays and two static single bays each 7m x 2.5m x 0.34m deep £6,300.

Ratcliff RDM 1000 wall lift of 1000kg capacity (rated 500kg) with offset overhead beam, electro-hydraulic single phase mains motor pump unit, and a 1m x 1.15m torsion bar assisted closing, 3mm steel tread plate surfaced platform having hinged safety ramps fitted to sides and lead on edge, cable load device and wrap-around stops. Controls up and down at door and platform height, 1.15m floor to loading level and 750mm for waist-high loading. Safety barrier to lock in place and prevent lift from working when platform down. Wall fixed above damp proof course. £3,450

Fibreboard, black trays -
470 x 330 x 75mm £3.65 each

Fibreboard trays with ply wood base -
470 x 330 x 150mm £5.75 each
£1,140

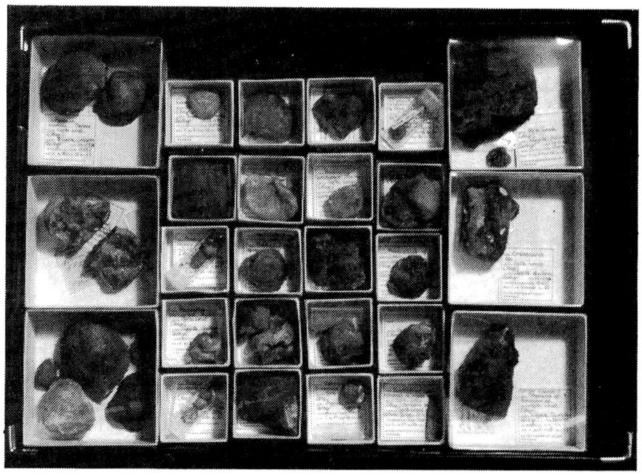


Fig.3. A standard fibreboard tray containing small specimens in their individual, acetate-topped boxes.

800 µm white-lined chipboard trays, cut, scored, corner cut and corner stayed, covered in white. Acetate lids to suit. 1000 of each size: 100 x 100 x 40mm; 200 x 150 x 50mm; 50 x 50 x 30mm; 300 x 100 x 50mm. £440

Michael J. Bishop
Buxton Museum and Art Gallery
Terrace Road, Buxton
Derbyshire SK17 6DU

and

Michael F. Stanley
John Turner House
The Parkway
Darley Dale, Matlock
Derbyshire DE4 2FW

Typescript received 23 March 1987

Chemical injection damp proof course and waterproof rendering (sika additive to mortar and limelite plaster), 90 running metres of each. £2,500

15mm pitchmastic screed (hot spread) and all building works including removing old plaster, make new doors, and block old doors. £6,000

The building work was undertaken by Derbyshire County Council Works Department under the direction of the job architect from the County Architects' Department. The shelving, pitchmastic screed, chemical damp proof course, plaster and wall lift were all supplied by contractors ordered by both architect and client.

Subsequently the chemical damp proof course has been found wanting and work is currently underway to remedy the problem. No other work has failed.

Geological Curator, Vol.4, No.9, 1987 (for 1986), p.551

BRUYNZEEL SYSTEMS IN USE: 3, OXFORD UNIVERSITY MUSEUM

BY H.P. POWELL

Bruynzeel storage systems are used by the Geological Collections at the Oxford University Museum in different ways at each of three sites:

1. In the lower of two new rooms created by dividing a lofty lecture room with the insertion of a new floor. The original plan was to make maximum use of the space by filling it with mobile racks. However, because the planning authorities would not allow insertion of steel joists into the walls, the scheme had to be modified to include a number of fixed stacks, the ends of which were to support wooden joists for the new floor. The lesser number of mobile units reduced the storage potential by about 16%.

The racks are fitted with steel shelves, each 46 x 16.5 ins, to carry reserve collections packed in standard cartons. The shelves are easily rearranged so that they also carry a variety of other material including documents, framed maps, books and large pieces of rock. For heavy loads, a shelf can be strengthened with one or more reinforcing bars.

2. In a store room for vertebrate collections. The plan here developed from the need to house thirty or so Lower Lias ichthyosaur skeletons, each set in cement and surrounded by an oak frame; they had been removed from the walls of the public display area during renovations.

Here the full width of the room could be used for mobile units, which are arranged so that from the doorway in the centre of one wall the observer looks across the permanent gangway at the ends of the racks. The rails on which the units roll were laid on the existing solid floor and a false floor built up around them, with a ramp onto the permanent gangway.

The racks for the ichthyosaurs consist of steel stiles and rails on top of standard bases. The stiles are in pairs spanning the width of the unit (26ins), with three pairs to each base. The rails are square-section beams, each nearly 9ft long, that can be fitted to whatever height and spacing is needed. The lower parts of the units are used to carry the heavier specimens (some weigh up to half a ton) which are fixed in an upright position to a central longwise panel of blockboard. The upper part is fitted with shelves on which the smaller specimens are laid.

The ichthyosaurs take up only half of the racks. Onto the remaining bases are bolted some redundant display cases which were easily converted to cupboard space to house large and long specimens, such as the bones of sauropod dinosaurs.

3. A redundant Victorian church some eight miles from the museum. The storage here is on two levels, to take advantage of the lofty nave. Geological material is stored in the lower part, in standard cartons placed on steel shelves in fixed racks; the racks are arranged in bays on each side of a central gangway. There are no mobile units and the fixed racks support the joists of the upper floor.

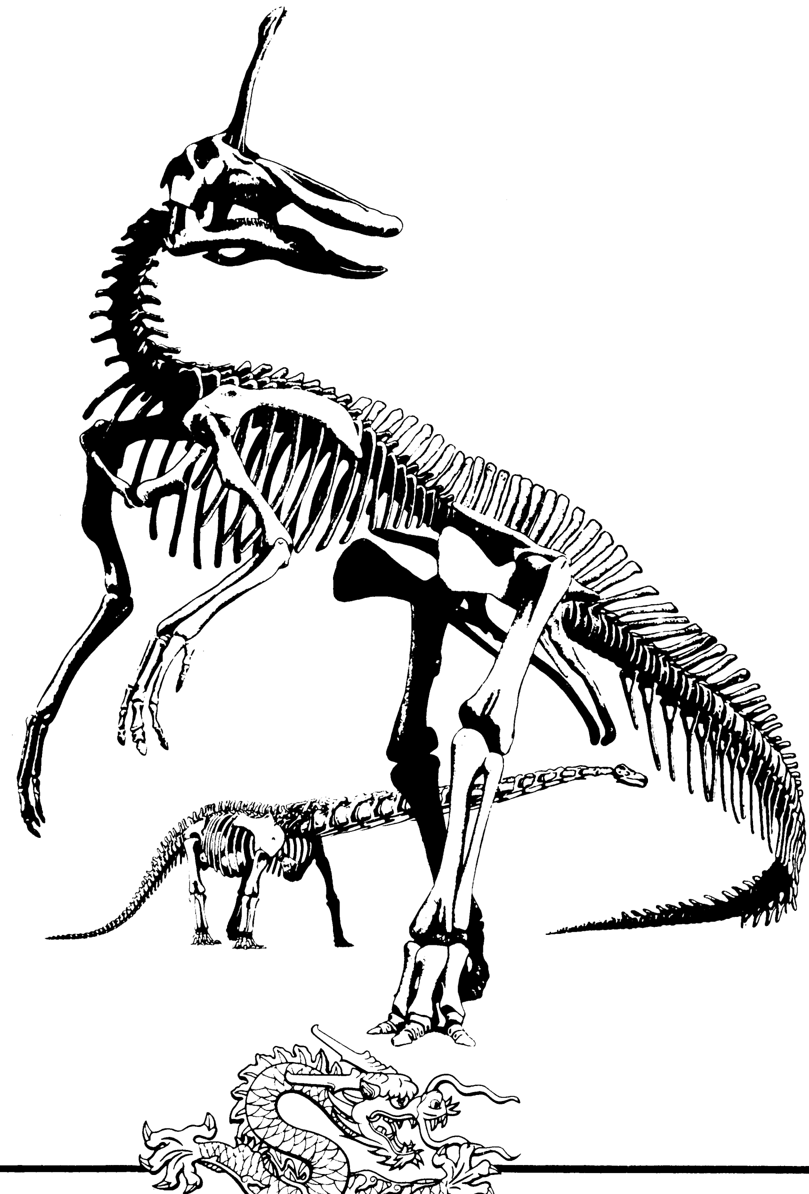
A steel stair gives comfortable access to the upper level which is used for bulky but relatively light zoological material, such as mounted skeletons. The shelving is therefore of lighter and hence cheaper construction. All the racking in the church has been installed without alteration to the fabric of the building.

These three sites impose different demands on the Bruynzeel systems yet all require that material of different shapes, sizes and weights be housed in a compact and convenient way. Bruynzeel's adaptability has admirably satisfied these requirements. Only minor complaints occur to us: in the vertebrate collections room some trouble was caused by the stop mechanism on the end racks which, instead of dropping into a socket in the floor, tended to tear up the carpet; and the painted steel shelves scratch very easily.

H.P. Powell
Geological Collections
Oxford University Museum
Parks Road
Oxford OX1 3PW

Typescript received 22 April 1987

中國的恐龍



DINOSAURS
FROM CHINA
DECEMBER 1986 – APRIL 1988

National Museum of Wales
Amgueddfa Genedlaethol Cymru

OPENING TO THE PUBLIC
20 December 1986

CLOSING DATE
10 April 1988

NOTE: The Museum is closed on Mondays, Sunday mornings, Christmas Eve, Christmas Day, Boxing Day, New Year's Day, Good Friday and May Day.

ADMISSION PRICES

Adults (18 yrs and over)	£1.50
Children	£0.80
Senior Citizens/ Friends of the National Museum of Wales/ Members of the Museums Association	£0.80
School parties from Local Authorities supporting the National Museum Schools Service, Booking by prior arrangement with MSS	£0.50

Geological Curator, Vol.4, No.9, 1987 (for 1986), pp.553-559

PALAEOBOTANY IN MUSEUMS

BY CEDRIC H. SHUTE AND CHRISTOPHER J. CLEAL

INTRODUCTION

Museums, whether national or local, have a variety of roles and thus have diverse and sometimes conflicting pressure put on their resources. For many local museums, the provision of public displays is their most important role (Waterston 1979), since either directly or indirectly (e.g. the spin-offs of tourism) this is for the immediate benefit of their main paymaster, the ratepayer. As was cogently argued by Waterston, however, they can have another important role, which is to store specimens for academic research (see also Bassett 1979). Such material may have a national or even international importance and may thus have a greater long-term significance than the public displays. Unfortunately, the scientific community most interested in such collections rarely provides direct funding for the museums and so it may be unreasonable to expect its interests to be given top priority. Nevertheless, many museums are aware of the importance of such material and provide resources for its curation and study.

What makes a museum curatorially successful tends to vary from discipline to discipline, and so it is often difficult for curators to judge the scientific worth of their particular collections. They become heavily dependent on comments from visiting specialists for an assessment, which cannot always be relied on for its impartiality. Most visitors will be willing to praise the successful efforts of a curator, but may be reluctant to criticize openly the poorer collections for fear of causing offence. In this article, we hope to give an impartial view as to what we think makes a museum collection useful for the palaeobotanist. Both of us work in this field and have independently come to very similar conclusions. We must emphasise that the article is not a discourse on the practical aspects of curating and conserving plant fossils; these have been admirably covered by Brunton et al. (1985) and Collinson (1987). Instead, we will comment on certain aspects of palaeobotany which may influence how a curator can best arrange a collection to benefit the specialist. We provide two appendices: one outlining the common preservational states of plant fossils; and the other giving an introductory guide to literature which the curator might find useful in interpreting British plant fossils.

ASPECTS OF PLANT FOSSILS INFLUENCING THE VALUE OF A COLLECTION

Fragmentation of plant fossils

Probably more than in any other field of natural history, palaeobotany has to deal with fragmentary material. Fragmentation of plants can result from a variety of processes, including disarticulation during life (e.g. periodic shedding of leaves and seeds) and post-mortem disarticulation (e.g. breaking up of the pieces of plant during transportation). Scott and Collinson (1983) provided a useful discussion of these processes. There is also the fragmentation that can result from accidental breakage during the collection of the fossils, or from the intentional segmentation of the specimen for its better examination (e.g. serial thin sectioning for microscopical examination, as discussed by Shute 1986). Even the simple splitting of the rock with a hammer in order to find an adpression fossil (as defined in Appendix 1) will produce two specimens (the part and counterpart) that often, and sometimes importantly, demonstrate two aspects of the plant (Rex and Chaloner 1983; Rex 1983, 1986).

The following example illustrates some of the difficulties to which fragmentation leads. The remains of fronds of pteridosperms (sometimes informally known as 'seed-ferns') are amongst the commonest fossils found in Carboniferous floras. However, they occur only rarely with fructifications attached, and so the foliage has to be identified without recourse to them. Few neobotanists would encourage such a procedure because of the emphasis usually laid on fructifications. Nevertheless, palaeobotanists must identify sterile fragments if they are going to work on such fossils. The problem is compounded because the fossils usually show only a small part of the frond, often with short fragments of pinnae (the branches of the frond) and a few pinnules (the leaflets borne on the pinnae). The rare, more complete specimens of the fronds show how variable pinnule shape can be (see Fig.1). Consequently, when working on the commoner small fragments, the palaeobotanist should use large numbers of specimens to make identifications, so as to get some indication of the original range of pinnule variation within the frond.

Morphological variation

This affects most fields of biology and palaeontology. Every species shows some degree of variation in form, and analysing it has become a vital part of taxonomic work. Identifications can often be improved by basing them on as many characters as possible. Two related species might have very similar ranges of morphology in one organ, but in another organ they may be quite distinct. However, as shown above, palaeobotanists frequently have to base their identifications on only a part of the plant. The only way to get round this is to determine ranges of variation carefully and try to detect subtle differences by examining as many specimens as possible, preferably from single localities and horizons (such assemblages are known as palaeodemes: Anderson and Anderson 1983; Cleal 1986a).

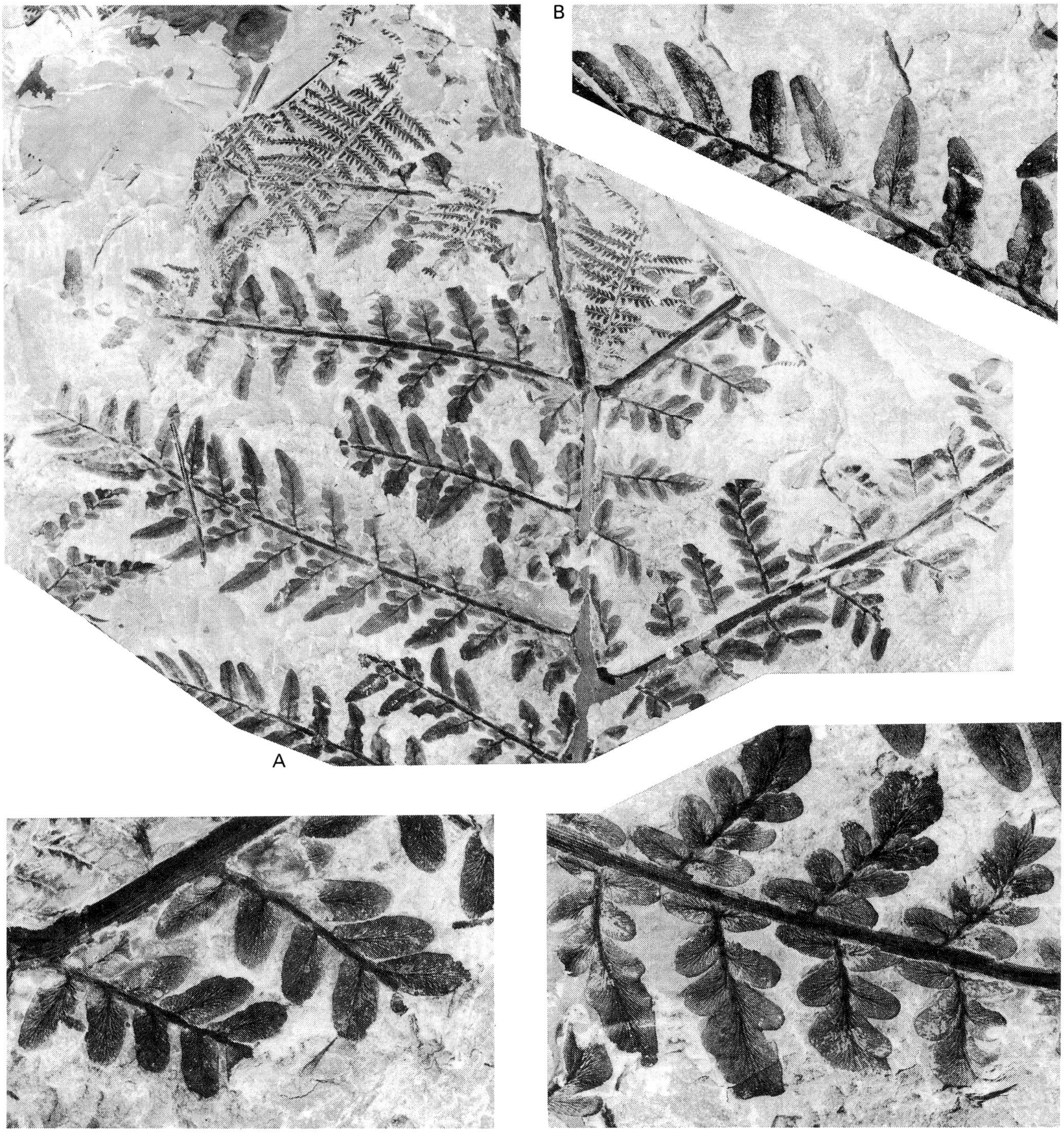


Fig.1. A, A large piece of a pteridosperm frond, Neuropteris heterophylla Brongniart, B–D, the marked variation in pinnule form within that frond. BM(NH) V.1872, from the Coal Measures of Clay Cross, Derbyshire, Great Britain. A, x0.5; B–D, x1.

Significance of surface features

Although gross morphology is a plant fossil's most obvious feature of interest, fine surface details can often provide important information. In compression fossils the cuticle of the plant may still be preserved and, when separated from the rock (as in Fig.2), can show details of the epidermal cells (Harris 1956). Such well preserved material occurs extensively in Britain, e.g. the Wealden of Sussex (Watson 1969), the Yorkshire Jurassic (Harris 1961-1969) and the Yorkshire Coal Measures (Kidston 1925). Even if the cuticle itself has been destroyed, the fossil, or even the rock matrix, may show impressions of epidermal cells (Chaloner and Collinson 1975). Epidermal structures, particularly features associated with the stomata (Fig.3), are often of considerable importance for understanding plant fossils, and it is essential that nothing is done to damage such fine surface detail.

Careless handling of any fossil can destroy information. While some groups of fossils in

Fig.2. Cuticle from the axis of the pteridosperm Neuropteris macrophylla Brongniart, showing epidermal cell pattern. BM(NH) V.62295, from the Coal Measures of Brogan's Pit, near Point Aconi, Cape Breton, Canada, x300.

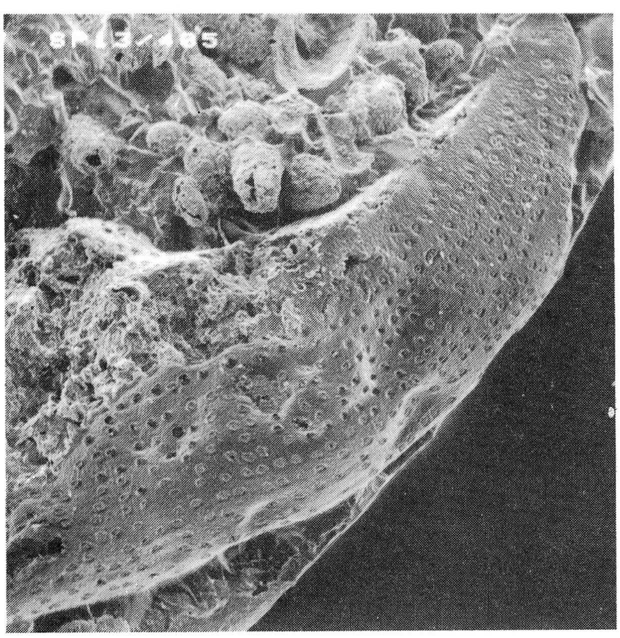
certain preservational states can be handled occasionally with no significant data loss, adpression plant fossils may be grievously damaged by finger pressure. Some material, such as certain Yorkshire Jurassic specimens, may even be damaged by blowing on the surface to remove 'museum dust', since this can remove the cuticle and the compression part of the fossil.

Disintegrating matrix can be consolidated with polyvinyl acetate (PVA), but the actual plant fossil should not be covered. Perhaps the greatest curatorial crime that can be committed to a plant fossil, particularly an adpression, is for it to be coated with a varnish for aesthetic reasons (e.g. to enhance the contrast between fossil and matrix). Pyritized specimens (e.g. from the London Clay) must also not be coated by consolidants, but should be suitably treated and then preserved in silicon oil (see Collinson 1987). For examination purposes, the plant/matrix contrast can be enhanced in adpressions by flooding the surface with alcohol or colourless paraffin (kerosene), if the matrix is suitably indurated. A better technique is to use cross-polarized light, but this involves rather expensive equipment.

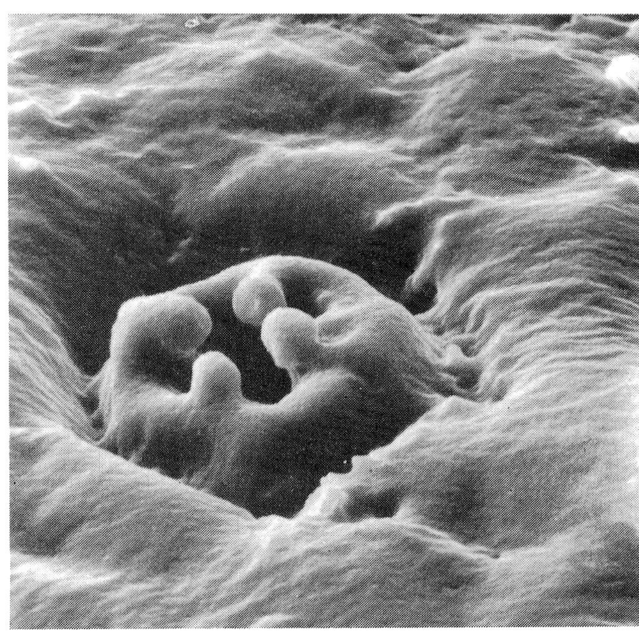
Reconstructing whole plants from fossils

One main aim of palaeobotany is the reconstruction of plants from their fossil remains. Fragmentation (discussed above) hinders this, but sometimes the pieces can be linked together. Such reconstructions are of major importance, since the taxonomic position of reconstructed plants can be determined far more reliably than that of the more fragmentary fossils.

There are several means of attempting whole-plant reconstructions. The most reliable is when organic connection is found between organs (e.g. seeds attached to fronds), but such evidence is rare. Easier to determine are characters shared in common by different organs. For instance, it is assumed that the Carboniferous seed called Lagenostoma was borne on the frond Lyginopteris because both have the same type of distinctive glandular hairs on their surface. Repeated occurrence together in the field of particular organs may also indicate that they originated from the same plant, although clearly such evidence can never be conclusive. An example is the reconstructed plant belonging to the now extinct order Caytoniales, which was based on the repeated occurrence together in Jurassic floras of the leaf Sagenopteris, the female organ Caytonia, and the male organ Caytonanthus. Another example is the attempted reconstruction of the whole



A



B

Fig.3. Scanning electron micrographs of A, the leaf of the conifer Pagiophyllum araucarinum (Pomel) Saporta, showing finely preserved stomata; and B, close up of stoma. BM(NH) 38932, from the Middle Jurassic Stonesfield Slate, Stonesfield, Oxfordshire, Great Britain. The leaf measures 4.5mm long.

lycophyte plant based mainly on the repeated association of Stigmaria rooting organs, Lepidodendron stems, leafy shoots and Flemingites cones (Fig.4). In order to help make reconstructions based on association, a museum collection should thus include as much of the original fossil assemblage as possible, including specimens such as stems and roots which might not look particularly attractive.

Reconstructing floras from fossils

Reconstructing ancient plant communities can be important for interpreting the palaeoecology of an area, as well as for understanding vegetational succession. To achieve this, it is necessary to examine fossil assemblages from all available sedimentary facies (Scott and Collinson 1983). For example, not only well-preserved specimens from shales have to be examined, but also the possibly more 'scrappy' material from sandstones and siltstones. If a museum is to assist such studies, it should therefore include plant fossils found in all the sedimentary facies at a locality.

Biostratigraphical palaeobotany

Plant fossils, when used for biostratigraphy, present few special difficulties for the curator, but one point is worth making. Palaeobotanists concerned mainly with anatomy and/or taxonomy tend to look for rare and unusually well-preserved specimens. The biostratigrapher, on the other hand, is more interested in plant distribution, and thus tends to look for the more ubiquitous species. A species is only of any real biostratigraphical value if it occurs widely in the stratigraphical record. One of us (Cleal 1986b) has recently clarified an important part of the geology of the Forest of Dean using a sphenophyte stem related to the ubiquitous Calamites, which would probably not normally be regarded as stratigraphically useful. A collection of plant fossils useful to the biostratigrapher must contain all of the component species from a flora.

WHAT MAKES A GOOD RESEARCH PALAEOBOTANY COLLECTION?

It should now be clear that a most useful feature of good palaeobotanical collections is that they reflect, as far as possible, the composition of the original floras. This can only be achieved by having extensive collections from particular localities, including numerous well-preserved specimens of each species and as many part/counterpart combinations as possible. They should include specimens in all available preservation states and assemblages from all available sedimentary facies. Such collections will assist the palaeobotanist in determining more accurately the ranges of morphological variation, and help to attain more reliable identifications. This in turn will help to improve the resolution of biostratigraphical studies, and refine any palaeoecological and palaeoenvironmental analyses. Such collections also show which particular organs tend to be regularly associated, or may even demonstrate their attachment, thus providing a guide for attempting whole plant reconstructions.

Most museums have constraints on storage, particularly for research collections. It seems best, therefore, for the research collections to be based on only a few localities rather than on small samples from many places. Priority should perhaps be given to localities in the area which the museum serves. Such collections can be relatively easily expanded and improved, either by the curator or by local geologists. Furthermore, local people are more likely to be interested in something which reflects well on where they live. Specialist researchers will also find it to their advantage since they will be able to combine field-work in a region with a worthwhile visit to its museum.

In our experience, the most useful primary arrangement for such collections is by stratigraphical horizon and locality. A fossil assemblage from one horizon and locality consists of palaeodemes (sensu Anderson and Anderson 1983; Cleal 1986a) of the component species. This type of arrangement is relatively objective, whereas a taxonomic organization tends to vary according to the whims of the last person who classified it. It also provides a much clearer indication of the original field associations of organs, the importance of which we have already discussed. It is thus important in the research collection for accurate records to be kept of locality and horizon information. We hope that all new material is being properly curated, but this has not always been so in the past. The palaeobotanist can sometimes deduce the origin of a specimen from features of the rock matrix or perhaps the type of preservation, but this can never be as reliable as an accurately labelled specimen. Poorly localized material may be useful for teaching or display work, or may even be of historical interest, but it will rarely have any major scientific significance.

If the museum has a large collection from a single horizon at one locality, then some type of secondary sorting may be considered. A taxonomic sorting within such a collection suffers from the same disadvantages as discussed above; and an alternative, more objective arrangement is simply to sort the specimens according to organ-type (leaf, stem, seed, root, etc). If the curator feels confident enough to assign names to the specimens, then a taxonomic arrangement might finally be considered within the organ groupings.

We do not presume to dictate the collections policy of any museum. However, for museums that regard their plant fossil collections as having research potential, we hope that these notes will prove useful. The value of local museums for research is considerable and perhaps not fully realized; they can provide

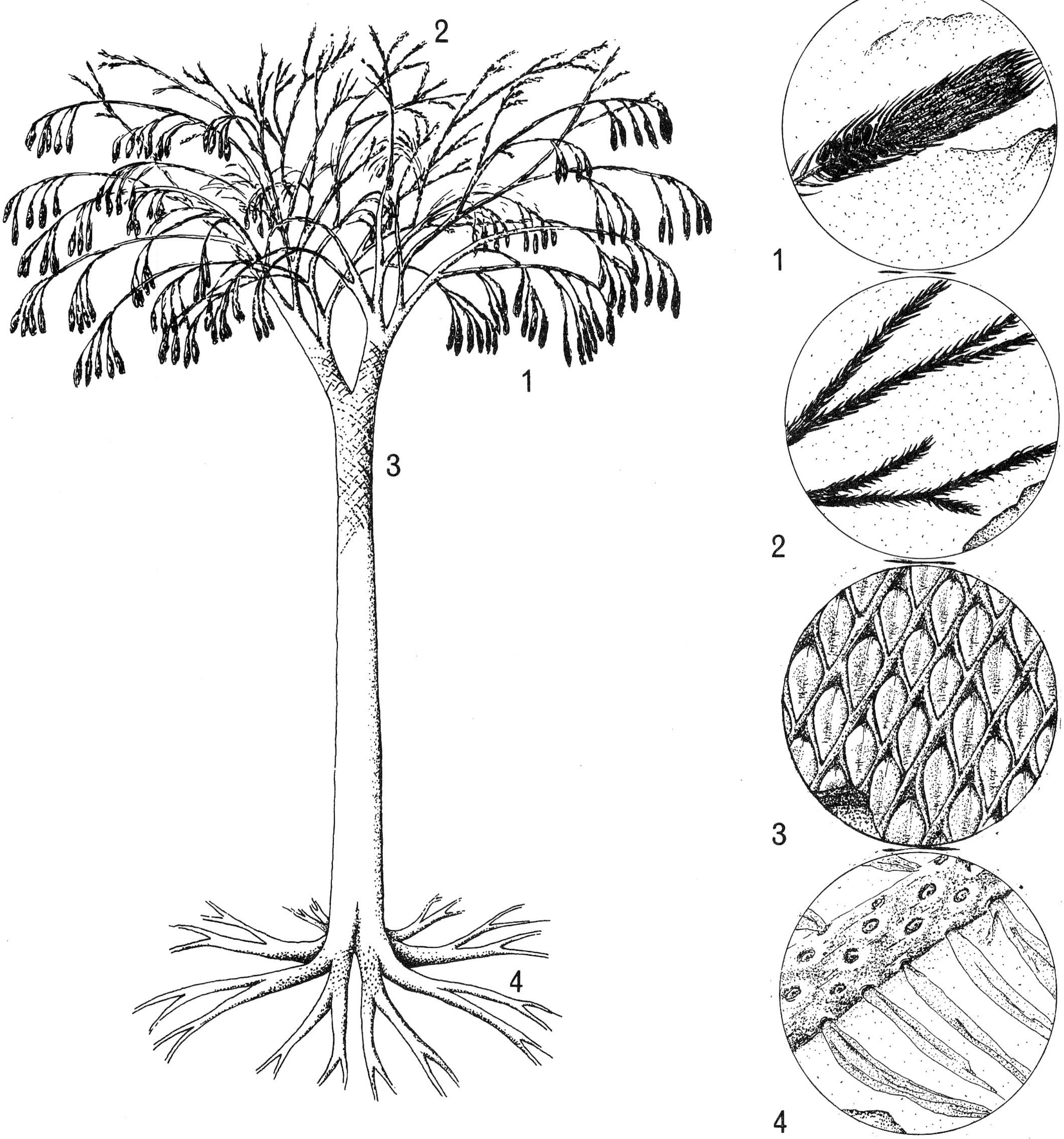


Fig.4. An attempted whole-plant reconstruction of a Carboniferous lycophyte. The principal component parts include: 1, the cone Flemingites; 2, leafy shoots; 3, the stem Lepidodendron; and 4, the rooting organs Stigmaria. Originally figured by Cleal (1976, p.19).

much greater local collections resources in specialist fields than could ever be achieved by national museums. This inevitably requires the local museum to reserve some of its hard pressed financial and staff resources for maintaining and supplementing such specialist collections, and perhaps for supplying basic research facilities, such as a bench stereo-microscope and adequate light source. There may be no immediate return for the outlay, but the enhanced national or international reputation gained by the museum should repay the effort expended.

ACKNOWLEDGEMENTS

We thank Dr C.R. Hill for constructive criticisms of the manuscript, and for providing the photograph shown in Fig.3. Fig.4 is reproduced by permission of the National Museum of Wales, Cardiff. All the photographs are from specimens in the British Museum (Natural History). The paper is based on lectures given on Wednesday 18 September 1985 at the GCG meeting entitled 'Aspects of palaeobotany in museums', organized by Mr Alan Howell and held at Bolton Museum.

REFERENCES

Anderson, J.M. and Anderson, H.M. 1983. Palaeoflora of southern Africa. Molteno Formation (Triassic). Volume 1. Part a. Introduction. Part 2. Dicroidium. A.A. Balkema, Rotterdam.

Bassett, M.G. 1979. Institutional responsibility for palaeontological collections. Spec. Pap. Palaeont. 22, 37-47.

Brunton, C.H.C., Besterman, T.P. and Cooper, J.A. 1985. Guidelines for the curation of geological materials. Misc. Pap. geol. Soc. Lond. 17, 182pp.

Chaloner, W.G. and Collinson, M.E. 1975. Application of SEM to a sigillarian impression fossil. Rev. Palaeobot. Palynol. 20, 85-101.

Cleal, C.J. 1976. Plants of the Coal Measures swamps. Amgueddfa, 23, 9-30.

——— 1986a. Identifying plant fragments. In Spicer, R. and Thomas, B.A. (eds.). Systematic and taxonomic approaches in palaeobotany. Spec. Vol. Syst. Ass. 31, 53-65.

——— 1986b. Fossil plants from the Edgehills Sandstone, Forest of Dean. Bull. Br. Mus. nat. Hist. 40, 235-246.

Collinson, M.E. 1987. Special problems in the conservation of palaeobotanical material. Geol. Curator, 4(7), 439-445.

Harris, T.M. 1956. The fossil plant cuticle. Endeavour, 15, 210-214.

——— 1961-1969. The Yorkshire Jurassic flora. (5 vols, vol.4 in conjunction with W. Millington and J. Miller). British Museum (Natural History), London, 899pp.

Kidston, R. 1925. Fossil plants of the Carboniferous rocks of Great Britain. Part 6. Mem. geol. Surv. Palaeont. 2, 525-681.

Kryshtofovich, A. 1944. The mode of preservation of plant fossils and its bearing on the problem of coal. Am. J. Sci. 242, 57-73.

Rex, G.M. 1983. The compression state of preservation of Carboniferous lepidodendrid leaves. Rev. Palaeobot. Palynol. 39, 65-85.

——— 1986. Further experimental investigations on the formation of plant compression fossils. Lethaia, 19, 143-159.

——— and Chaloner, W.G. 1983. The experimental formation of plant compression fossils. Palaeontology, 26, 231-252.

Schopf, J.M. 1975. Modes of fossil preservation. Rev. Palaeobot. Palynol. 20, 27-53.

Scott, A.C. and Collinson, M.E. 1983. Investigating fossil plant beds. Geology Teaching, 7, 114-122; 8, 12-26.

Shute, C.H. 1986. Suggestions on the designation and terminology of palaeobotanical type material. In Spicer, R. and Thomas, B.A. (eds.). Systematic and taxonomic approaches in palaeobotany. Spec. Vol. Syst. Ass. 31, 275-282.

Waterston, C.D. 1979. The unique role of the curator in palaeontology. Spec. Pap. Palaeont. 22, 7-15.

Watson, J. 1969. A revision of the English Wealden flora, I. Charales - Ginkgoales. Bull. Br. Mus. nat. Hist. (Geol.), 17, 209-254.

C.H. Shute
Department of Palaeontology
British Museum (Natural History)
Cromwell Road
London SW7 5BD

and

C.J. Cleal
37 Lipscombe Close
Newbury
Berkshire RG14 5JW

Typescript received 18 August 1986
Revised typescript received 8 December 1986

APPENDIX I - MODES OF PRESERVATION OF PLANT FOSSILS

Plant fossils occur in a variety of different states of preservation, several of which are mentioned in the main body of this article. We outline below the most common.

Permineralization. This is where the cells and interstices of the plant have become permeated with minerals in solution before much or any compression has occurred. Consequently, the later compressive forces do not destroy the cellular texture of the plant. It can result in extremely fine detail being preserved, and allows aspects of the cell structure to be observed. British examples of such fossils include those found in the Scottish Lower Devonian Rhynie Chert, and the Westphalian Coal Balls of Yorkshire and Lancashire. A further discussion of this mode of preservation was given by Schopf (1975).

Compression. Plant parts compressed by sediment. The plant tissue is still preserved in the fossil as a highly compressed, coalified layer (the phytoleim of Kryshtofovich 1944).

Impression. The phytoleim in a compression fossil can leave a surface impression. Splitting a rock to reveal a compression specimen usually results in a part and counterpart. If the fracture has not occurred through the phytoleim, then the part and counterpart will be a compression and impression respectively.

Adpression. A plant fossil specimen showing a mixture of compression and impression states has been called a compression/impression specimen. This term has also been used to describe an assemblage of specimens showing the two states; hence compression/impression flora. In this article, we introduce the term adpression (based on the Latin adpressus - lying flat against) to substitute for the term 'compression/impression'.

Casts and moulds. This occurs where the surrounding sediment hardens before the plant tissue has altered significantly. Subsequent disintegration of the plant tissue creates a hollow mould in the rock, reflecting the original shape of the plant fragment. This may in turn become secondarily infilled with sediment, resulting in a natural cast. For soft tissues, the sediment has to lithify very quickly and this usually only occurs when a chemical process is involved, as in the formation of ironstone nodules (e.g. the Westphalian nodules found at Coseley, near Dudley, West Midlands). This is the authigenic preservation of Schopf (1975), and can result in very fine surface details (e.g. of fern sporangia) being preserved. With more woody tissue, which takes longer to disintegrate, it can occur in coarser, more slowly lithifying sediments; hence, casts and moulds of wood may often be found in sandstones, such as the Westphalian Pennant Formation of South Wales and the Forest of Dean. A particular variant of the formation of casts occurs in the well-known Calamites, which in life had mature stems and rhizomes which were hollow. These could become sediment-filled on the death of the plant and, if the surrounding plant tissue decayed, the result is a sediment-cast of the pith cavity. These pith-casts show a reverse impression of the internal tissues, such as the longitudinal furrows which represent the former vascular strands that protruded into the pith cavity.

APPENDIX II - PRIMARY REFERENCES FOR BRITISH PLANT FOSSILS

One of the questions most frequently asked of us when we visit museums is, what references should be used to help identify plant fossils? The answer is unfortunately far from easy, since there is remarkably little review literature easily available on this subject. However, the following works will provide an introduction to British floras.

Devonian

Gensel, P.G. and Andrews, H.N. 1984. Plant life in the Devonian. Praeger, New York, 380pp.

Carboniferous

Chaloner, W.G. and Collinson, M.E. 1975. An illustrated key to the commoner British Upper Carboniferous plant compression fossils. Proc. Geol. Ass. 86, 1-44.

Crookall, R. 1955-1976. Fossil plants of the Carboniferous rocks of Great Britain (Second Section). Mem. geol. Surv. Palaeont. 4, 1-1004 (in 7 parts).

Kidston, R. 1923-1925. Fossil plants in the Carboniferous rocks of Great Britain (First Section). Mem. geol. Surv. Palaeont. 2, 1-681 (in 6 parts).

Permian

Stoneley, H.M.M. 1958. The Upper Permian flora of England. Bull. Br. Mus. nat. Hist. (Geol.), 3, 295-337.

Jurassic

Harris, T.M. 1961-1969. The Yorkshire Jurassic flora. (5 vols, vol.4 in conjunction with W. Millington and J. Miller). British Museum (Natural History), London, 899pp.

Cretaceous

Watson, J. 1969. A revision of the English Wealden flora, I. Charales - Ginkgoales. Bull. Br. Mus. nat. Hist. (Geol.), 17, 209-254.

Tertiary

Collinson, M.E. 1984. Fossil plants of the London Clay. Pal. Ass. Fld Guide Foss. 1, 121pp.

Quaternary

Godwin, H. 1975. The history of the British flora (2nd edition). Cambridge University Press, 551pp.

General

Stewart, W.N. 1983. Paleobotany and the evolution of plants. Cambridge University Press, 405pp.

Taylor, T.N. 1981. Paleobotany. An introdution to fossil plant biology. McGraw-Hill, New York, 589pp.

Thomas, B.A. 1981. The evolution of plants and flowers. Peter Lowe, London, 116pp.

Geological Curator, Vol.4, No.9, 1987 (for 1986), pp.560-562

MICHAEL EAGAR: A ONE MAN INSTITUTION

BY MICHAEL J. BISHOP

One of this country's top museums, the Manchester Museum of the University of Manchester, loses its Deputy Director and Keeper of Geology this year through retirement. I am of course referring to Michael Eagar who retires after some 42 years service. Energy, enthusiasm, willingness and kindness are all qualities readily applied to Michael by his friends and colleagues, to say nothing of his immense skills as a palaeontologist. His remarkably busy career and considerable achievements have been undertaken despite the handicap of total deafness caused by cerebro-spinal meningitis at the age of nineteen. He endeavoured to overcome the communication problems met with in his career by learning to lip-read, even applying this skill abroad whilst undertaking field work!

Michael's energy and enthusiasm is infectious, if at times exhausting, if you are engaged with him upon some common purpose. I have no experience of accompanying him in the field but am told that at his favourite localities (the domain of Carboniferous molluscs) he is most thorough, and no bivalve will escape his scrutiny or hammer - even associated trace fossils, once a humble and ephemeral subject unworthy of palaeontologists' attention, are avidly levered out of their ancient resting places for a predestined home in the Manchester Museum. Within the Museum Michael has cared for and very greatly extended its vast collections of fossils and other geological specimens, and for much of his career he has done this, and much more, single handed. My impression of first meeting Michael (and apparently that of many others) is of continual confrontations with locked doors, at which he would retrieve from a bulging pocket a truly immense bunch of keys (themselves a bewildering array of the locksmith's art) and, like the Bastille gaoler, deftly select the appropriate means of entry. I still wonder how the BM(NH) staff get around with just one key!

To backtrack, Michael joined the Manchester Museum in October 1945 as the Assistant Keeper of Geology (title changed to Keeper of Geology in 1957), succeeding Dr J. Wilfrid Jackson who had held the post from 1907 - 1945. He had previously gained a First Class Honours Degree in Geology at Oxford (1942) and a Ph.D. at Glasgow University (1944), where he had worked under Professor A.E. Trueman on the non-marine lamellibranchs of the Coal Measures of Lancashire and Yorkshire. Michael has ever since specialised in Carboniferous palaeontology and stratigraphy of Europe and North America; in particular, upon non-marine bivalves, becoming one of the world's foremost specialists in this field.

Recognition of his work has been made on many occasions and includes awards from the Daniel

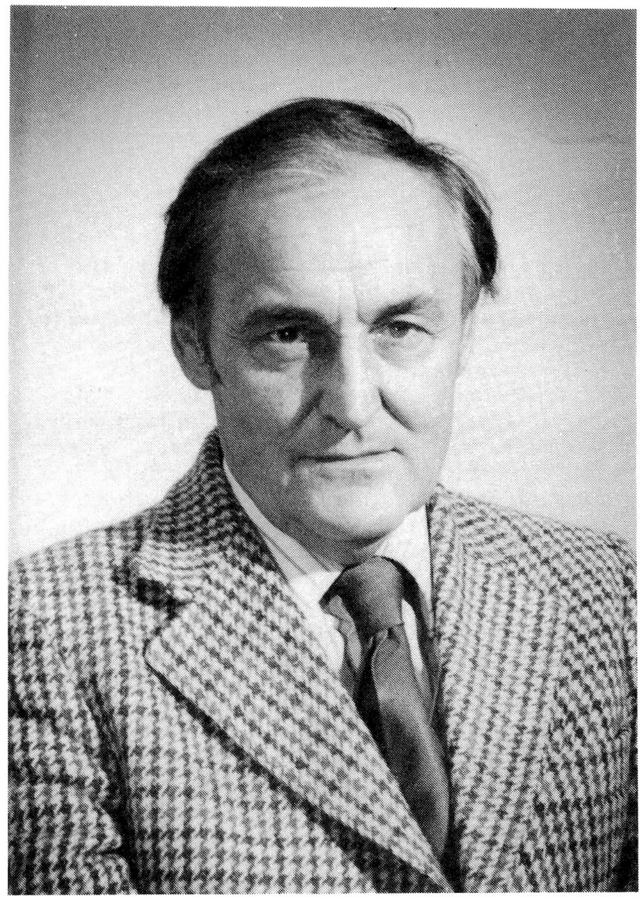


Fig.1. Dr R.M.C. Eagar, M.A., Ph.D., D.Sc., F.G.S., F.M.A., F.R.S.A.

Pidgeon Fund (1943) and Lyell Fund (1952) of the Geological Society of London; the Silver Medal of the Liverpool Geological Society (1962); the John Phillips Medal of the Yorkshire Geological Society (1970); the degree of D.Sc. from Glasgow University (1969), and within Manchester University itself he has been honoured by the title of Reader. Such impressive academic achievements and opportunities are usually only possible for the very small number of museum geologists who work within our university or national museums; these institutions naturally value highly the academic standing of their specialists, and protect and support their research interests.

The history of the Manchester Museum, its geological collections and services have already been covered by Eagar and Preece (1977), which enables me to say a little more about Michael's personal role in the Museum. He joined the Museum at a great watershed in history, 1945, the very beginning of peacetime in Europe when there was a widespread ethos of rebuilding and generally looking to new horizons. The Manchester Museum, like most institutions that survived the war, was re-emerging from a low profile of reduced activity, and when Michael joined it various portions of the geological collections (such as the type and figured material) had only just returned to the building after wartime storage. Michael, with characteristic zeal, first launched into replanning the entire series of displays in the extensive Stratigraphic Hall. He had to achieve a level of treatment to cover the requirements of both university students and the general public, but was constrained by limited financial resources and manpower, and had in the end to use the existing fixed hardwood cases. In 1949, however, the University was able to significantly increase its annual grants to the Museum; this led among other things, to the addition of three new technicians to the staff.

Michael attacked the vast job of refurbishing the Stratigraphic Hall exhibits in a 'pincer' type movement, working on the Cambrian and Pre-Cambrian cases and the Tertiary cases before grappling with matters in between. Early in this enterprise he specially designed and had built a coloured geological column to bring unity to the stratigraphical exhibits. This was inspired by the earlier efforts of E.D. Currie for the Geological Museum, London (Eagar 1951). Michael immortalised it in 1965 by producing a colour printed version in leaflet form, now in its 6th edition and without doubt the most fact filled, concise publication on historical geology that money can buy!

Ten years into the job, Michael had completely overhauled the stratigraphic galleries (Eagar 1956) and was already having to cope with revisions to some of his earlier displays, thanks to the relentless march of science. Whilst technical help was available for preparing specimens, making models and so on, he otherwise arranged most of the displays himself, including the provision of explanatory graphics which he has for many years drawn personally to accompany exhibits. The Stratigraphic Hall received constant attention to take account of relevant advances in palaeontology and stratigraphy; the scale of the exhibits tackled has on occasions been of gargantuan proportions, notably when arranging the famous Carboniferous tree fossils and, in recent years (since 1980), loans from the BM(NH) of dinosaur material - including a full sized Iguanodon cast.

Mineralogy, hard-rock petrology, and other areas of geology are displayed in the so called 'First Geology Gallery' at Manchester. Here and in the adjacent gallery Michael has introduced some very innovative permanent and temporary exhibits over the years. Because of his position within a university, with its various science departments, Michael was quick to grasp the opportunity to draw upon the expertise of specialists working in other scientific fields. In this sense he treated geology very much in the frame of mind of what we would now call an 'earth scientist' but at the time when most museum geologists had a much narrower view of their subject. As early as 1947 Michael had set up an exhibition on radioactivity, complete with demonstration apparatus (Eagar 1947), which later circulated as a travelling exhibition. From 1950 he started serious work on designing a large sectioned globe to represent a scale model of the earth, taking into account all the latest geophysical evidence available at the time - this became a permanent exhibit (Eagar 1952) to which he added a specially made 'perspex atmosphere' (Eagar 1960). Michael's 'whole earth' approach has also gone extra-terrestrial on many occasions, thanks to the valuable contributions from science departments within the University, and has included extensive exhibits on the Moon (Eagar 1964) and inner planets. The crowning glory in specimen terms was the brief appearance for exhibition of a fragment of Moon rock in 1969, collected just two months ealier by the crew of Apollo 11 (Eagar and Owen 1970)!

Behind the scenes Michael has expended a massive effort over the years, systematically reorganizing the entire stored collections. Early in his career he had drawer units built into showcases which remain a very important storage resource; more recently, he was able in 1977 to rehouse large parts of the collection (stored in the basement) in a new museum extension. He designed special dust free drawer units to cope with the geological collections, and has paid special attention to the storage requirements of the type and figured material.

Under David Owen's Directorship (1957-1976), Assistant Keeper posts were introduced, as well as posts for a designer and conservator. Michael benefited for fifteen years from an Assistant Keeper, occupied successively by Barbara Pyrah (1965-1968), Derek Rushton (1968-1974) and Rosemary Preece (1974-1980), but unfortunately the post was frozen in 1980. The Assistant Keepers did a great deal of work in particular on rearranging and classifying the mineral and petrological collections, as well as helping with the mounting of permanent and temporary exhibitions; the assistance they gave has been much missed over Michael's last years at Manchester. From time to time he has been able to draw upon volunteer help from students in the Department of Geology, and he has also benefited from Manpower Services Schemes for such special projects as the Geological Site Recording Scheme (initiated in 1977). One of Michael's more recent Ph.D. students, Peter Chapman, has been designated Honorary Assistant Keeper.

The Museum's present Director, Alan Warhurst, introduced the position of Deputy Director upon taking up his post in 1977, and chose Michael to fill it. Michael had in fact already served as acting Director for eight months between David Owen's departure and Alan Warhurst's arrival. As ever, Michael coped admirably with communication problems in his new role - more recently he has been very fortunate in acquiring his own part-time secretary who has proved invaluable in coping with such everyday problems as communciation by telephone.

Over and above these major projects and responsibilities Michael has coped with many thousands of enquires, identifications, loans of specimens, as well as countless talks, lectures and tours - and has of course contributed a massive number of papers to the scientific literature. All this and he still found time to give to other groups, in particular the Manchester Geologists' Association, which he joined in 1945 and served as President (1952-1954), Honorary Librarian (since the 1950s) and Editor for its journal (now the Geological Journal).

Michael will doubtless be continuing his specialist research into retirement, and perhaps will indulge again in his past hobbies of painting and gardening, as well as pursuing a special interest in the development of methods of recall of music for the deaf. In the meantime Manchester friends and colleagues extend a fond farewell to someone who can only, I think, be described as an irreplaceable one man institution.

Finally, as an example of Michael's literary talents and sense of humour, the following parody of Lewis Carroll's 'Father William' shows how he can poke fun at himself more stylishly than most!

An unknown boy I heard say:-
'You are old, Dr Eagar, a student can tell,
    And your hair has become very white
Yet you work all the day and the evening as well,
    And they say you work much of the night.'

"In my youth, I replied, I began to explore
    All the old mussel bands that existed
Now the weight of these fossils endangers my floor
    And I struggle to get them all listed."

But he returned:-
'You are old, Dr Eagar, your fingers are bent
    And binoculars strengthen your sight.
Yet you drew fifty shells with infernal intent,
    And you got all the measurements right.'

"In my youth, I replied, I examined with care
    The dark life of the freshwater clam.
I measured each shell when it came up for air
    And then had it on toast with smoked ham."

And yet again:-
'You are old, Dr Eagar, your battles are done,
    And your energies ought to be shrinking.
Yet you bound up the stairs like a shot from a gun
    To dictate all your turbulent thinking.'

"In my youth, I replied, I was never in doubt
    When resolving my problems by hammer.
But now that I know what I'm talking about,
    Why - I just add the words and the grammar."

And finally:-
'You are old, Dr Eagar, my colleagues compel
    Me to nag you again and to natter.
Your lectures are lengthy and boring as hell,
    Now what is exactly the matter?'

"I have answered three questions, and that is enough.
    As your tutor," I said, "to my cost,
Must I listen all day to such truculent stuff?
    It is time you piped down and got lost!"

Michael J. Bishop
Buxton Museum and Art Gallery
Terrace Road, Buxton
Derbyshire SK17 6DJ

Typescript received 1 June 1987

Acknowledgements. In researching for this article my special thanks go to Mrs Enid Eagar, Alan Warhurst (Director, Manchester Museum), Dr Fred Broadhurst (Department of Geology, Manchester University), Derek Brumhead, Mrs Rosemary Preece, Miss A.S. Jackson; and my thanks to many other colleagues who contributed information. Finally I must record a tribute to the late Dr David Owen who was particularly helpful, and who I was probably the last person to interview about his own career at the Manchester Museum before he died in April 1987.

REFERENCES

Eagar, R.M. C. 1947. A radioactivity exhibition. Museums J. 47, 9-10.

——— 1951. The geological column in the Manchester Museum. Ibid. 51, 126-127.

——— 1952. A new sectioned globe in the Manchester Museum. Ibid. 52, 55-58.

——— 1956. New geological displays. Ibid. 56, 109-112.

——— 1960. A perspex atmosphere. Ibid. 59, 233-236.

——— 1964. The Moon in a geological gallery. Ibid. 64, 132-137.

——— and Owen, D.E. 1970. Moon rock in Manchester. Ibid. 69, 159-160.

——— and Preece, R. 1977. Collections and collectors of note, 14. The Manchester Museum. Newsl. geol. Curators Grp, 2, 12-40.

Geological Curator, Vol.4, No.9, 1987 (for 1986), pp.563-566

KENT'S CAVERN MATERIAL IN BOLTON MUSEUM

AND SOME RELATED EXCAVATIONS DATA

BY ALAN C. HOWELL

The excavations by William Pengelly between 1865 and 1880 at Kent's Cavern, Torquay, were a well-known episode in British Quaternary bone-cave exploration. Enormous numbers of bones and artefacts were removed from the cave system during the course of these excavations, and many of the finds were lodged in the British Museum and the Torquay Natural History Society Museum. However, some material was dispersed to other UK museums, as mentioned by Tresise (1976) and Hancock et al. (1976). The exact basis of these dispersals seems poorly documented but Bolton acquired its material in 1903 (Acc. No. 72.03) from W.J. Else, then curator of the Torquay Natural History Society.

In a letter dated 6 February 1903, presumably to the curator of the Chadwick Museum in Bolton, Else stated that the remains 'were presented to my father many years ago by Mr Pengelly and Mr Vivian.' He went on to say 'I wish to dispose of them to make room for a large collection of foreign shells which I have packed away at present. The price is £8.10s.0d.'

For their money the Bolton ratepayers acquired a total of 353 items presently in the geology collection, together with some 140 archaeological items. The sub-fossil material includes remains of hyaena, reindeer, red deer, rhinoceros, horse, cow, bear, mammoth, fox, badger, sheep and/or goat, wolf, Irish elk and some small mammals. Hyaena and bear remains are particularly numerous (59 and 73 items respectively), and additionally there are many bone fragments which, though incomplete, are probably identifiable.

The nineteenth century excavation which unearthed all this material was sponsored by the British Association for the Advancement of Science, and Pengelly conducted the project on their behalf in a most methodical manner. His detailed system of recording the stratigraphy and exact location of each find within the cave system (Fig.1) was described by Campbell and Sampson (1971). Each specimen (or group found in close proximity) was given a number which corresponded with an entry in Pengelly's diary of the excavation - in effect his field notebook. Thus specimens may simply bear the straightforward excavation number, handwritten directly on the specimen in small numerals. Alternatively, in the case of specimen groups, a running number appears above the excavation number, giving the impression of a written fraction, eg. $\frac{26}{4921}$. The figures seem to have been written in black ink. Many of the Bolton specimens appear unmarked, or simply carry the initials 'K.C.' with no obvious excavation number. However, in the case of some specimens, close scrutiny revealed numbers which had presumably faded even by the time Else listed the material on offer in 1903. Illumination with ultra-violet light allowed some of these to be read with certainty, but many remain an elusive series of possibilities. Any cleaning operations on historic Kent's Cavern material should clearly only be undertaken with extreme caution!

The volumes which comprise Pengelly's excavation diary are held by Torquay Natural History Society and in March 1978 the present author arranged to see them while on holiday in the south-west. The purpose of this 'work-break' was to extract accurate locality data for the Kent's Cavern material within the Bolton Museum collection. It made available, for instance, the information that the Equus molar in Bolton with the excavation number 26/4921 was found in the layer Pengelly termed the Cave Earth, in the passage known as North Sally Port on 20 January 1870. Pengelly location co-ordinates for the specimen also became available, together with their diary-entry page number and the fact that Torquay Museum was the principal recipient of material from that area of the cave.

Clearly it would be ideal if a microfiche copy of the complete diary was available at every institution housing Kent's Cavern material. However, in the absence of this ideal it seemed a useful idea to list the locations of the find groupings within the cave system, together with their year of excavation. This particular exercise did not take too long but clearly copying out the entire diary was impractical in the limited time available. The list is included here with general in-cave distribution details of the Bolton Museum holdings, based on the identified material which has legible excavation numbers. A detailed catalogue of the Bolton specimens would be out of place here and, in any case, must await the attention of a vertebrate specialist able to identify the undetermined material.

REFERENCES

Campbell, J.B. and Sampson, C.G. 1971. A new analysis of Kent's Cavern, Devonshire, England. Univ. Oregon Anthrop. Pap. 3, 1-40, i-vii.

Hancock, E.G., Howell, A.C. and Torrens, H. 1976. Geological Collections and Collectors of Note, 11: Bolton Museum. Newsl. geol. Curat. Gp, 1, 323-335.

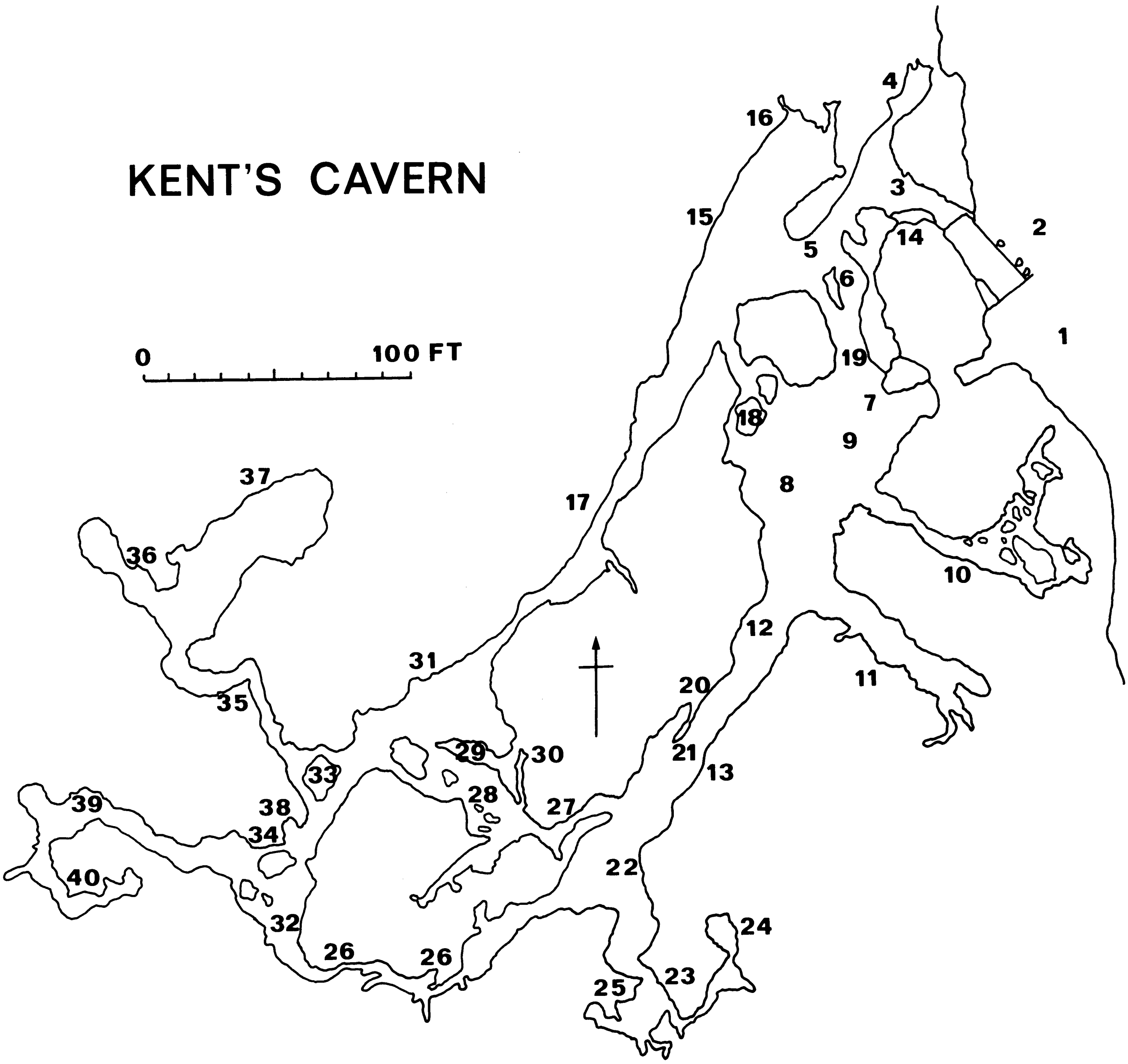


Fig.1. Plan of the Kent's Cavern system, after Lake (1934), re-drawn from Campbell and Sampson (1971). 1, South Entrance; 2, North Entrance; 3, Vestibule; 4, North East Gallery; 5, Sloping Chamber; 6, Passage of Urns; 7, Great Chamber; 8, Gallery; 9, Lecture Hall; 10, North Sally Port; 11, South Sally Port; 12, South West Chamber; 13, Water Gallery; 14, Smerdon's Passage; 15, Wolf's Cave; 16, Cave of Rodentia; 17, Long Arcade; 18, Charcoal Cave; 19, Cox's Passage; 20, Crypt of Dates; 21, The Lake; 22, Bear's Den; 23, The Tortuous Gallery; 24, The Terminal Chamber; 25, Undervault; 26, Great Oven; 27, Mathew's Passage; 28, Labyrinth; 29, Underhay's Gallery; 30, Little Oven; 31, The Bridge; 32, Cave of Inscriptions; 33, Hedges Boss; 34, Inscribed Boss; 35, Clinnick's Gallery; 36, Organ Chamber; 37, Rocky Chamber; 38, The Alcove; 39, High Level Chamber; 40, Swallow Hole Gallery.

Lake, P.M.B. 1934. Map of Kent's Cavern. In Rogers, E.H. Stratification of the cave earth in Kent's Cavern. Proc. Devon Archaeol. Expl. Soc. 1954-1955, 1-25.

Tresise, G. 1976. Geological Collections and Collectors of Note, 10: Merseyside County Museums. Newsl. geol. Curat. Gp, 1, 253-270.

Guernsey Museum and Art Gallery
Candie Gardens, St Peter Port
Guernsey
Channel Islands

Typescript received 24 February 1986
Revised typescript received 22 May 1987

APPENDIX: KENT'S CAVERN EXCAVATION NUMBERS (with Bolton Museum's holdings).

Year	Exc. No.	Loc. in cave	Plan Ref. No.	Bolton Museum holdings
1865	1-6	Outside South Entrance	1	
	7-10	South Entrance	1	
	11-1096	Great Chamber	7	hyaena, bear, rhinoceros, horse, indet.
1866	1097-1272	" "	7	indet.
	1273-1279	Gallery	8	
	1280	Great Chamber	7	
	1281-1285	Gallery	8	
	1286	Great Chamber	7	
	1287-1291	Gallery	8	
	1292	Great Chamber	7	
	1293-1581	Gallery	8	hyaena, cow, indet.
	1582-1627	Great Chamber	7	flint, pottery
	1628-1753	Passage of Urns	6	hyaena, flint, ? pottery
	1754-1813a	Sloping Chamber	5	
	1814	Vestibule	3	
	1814a-1815	Sloping Chamber	5	
	1815a-1816	Vestibule	3	
	1816a-1817	Sloping Chamber	5	
	1817a	Vestibule	3	
	1818	Sloping Chamber	5	
	1818a	Vestibule	3	
1866	1819	Sloping Chamber	5	
	1819a	Vestibule	3	
	1820	Sloping Chamber	5	
	1820a	Vestibule	3	
	1821	Sloping Chamber	5	
	1821a	Vestibule	3	
	1822	Sloping Chamber	5	flint
	1822a	Vestibule	3	
	1823	Sloping Chamber	5	
	1823a-1824	Vestibule	3	
	1824a-1826	Sloping Chamber	5	
	1826a-1827	Vestibule	3	
	1827a-1828	Sloping Chamber	5	
	1828a-1916	Vestibule	3	elk, flint
1867	1917-2357	Vestibule	3	mammoth, deer, indet., flint
	2358-2460	North East Gallery	4	bear
	2461-2692	Great Chamber	7	?rabbit, indet., pottery
	2693-3178	Lecture Hall	9	cow, ?rhinoceros, ?elk, indet.
1868	3179-3182	" "	9	
	3183-3377	South West Chamber	12	horse
1870	3378-3643	Smerdon's Passage	14	hyaena, elk, rhinoceros, indet.
	3644-3649	North Sally Port	10	
1871	3650-3663	North Sally Port	10	

	3664-3777	Sloping Chamber	5	horse, flint, pottery
1868	3778	South West Chamber	12	
1871	3778a	Sloping Chamber	5	
1868	3779-3948	South West Chamber	12	
1869	3949-3954	" " "	12	
	3955-3962	Water Gallery	13	
	3963	The Lake	21	
	3964-4052	Water Gallery	13	
	4053-4674	South Sally Port	11	hyaena, sheep, deer, bear, cow, horse
	4675-4845	North Sally Port	10	rhinoceros, bear, cow, indet.
1870	4846-5246	" " "	11	rhinoceros, hyaena, rabbit, mammoth, bear, elk, horse, deer, cow, indet. ?pottery
	5247-5400	Smerdon's Passage	14	
1871	5401-5527	Sloping Chamber	5	elk, indet.
	5528-5665	Wolf's Cave	15	rhinoceros
	5666-5801	Cave of Rodentia	16	hyaena, indet.
1872	5802-5843	Long Arcade	17	
	5844-5925	Charcoal Cave	18	
	5926-6053	Long Arcade	17	
1873	6054-6206	Long Arcade	17	
	6207-6289	Underhay's Gallery	29	
	6290-6325	Long Arcade	17	
1874	6326-6458	" "	17	
	6459-6491	Clinnick's Gallery	35	
	6492-6517	Cave of Inscriptions	32	bear
1875	6518-6589	" " "	32	bear, rhinoceros
	6590-6593	High Chamber	39	
	6594-6624	Alcove	38	
	6625-6674	Great Oven	26	
	6675-6714	Labyrinth	28	
1876	6716-6809	"	28	
	6810-6858	Mathew's Passage	27	
	6859-6866	Bears Den	22	
	6867	Mathew's Passage	27	
	6868-6987	Bears Den	22	
1877	6988-7075	" "	22	
	7076-7099	Tortuous Gallery	23	bear
	7100-7132	Undervault	25	
1878	7133-7151	Great Oven	26	
	7152-7232	High Chamber	39	
	7233-7234	Undervault	25	
	7235-7243	Great Oven	26	
	7244-7264	High Chamber	39	
	7265-7313	Swallow Gallery	40	
	7314-7317	Clinnick's Gallery	35	
	7318-7322	Rocky Chamber	37	
	7323-7340	Deeper excavation		

Geological Curator, Vol.4, No.9, 1987 (for 1986), pp.567-570
COLLECTIONS, COLLECTORS AND MUSEUMS OF NOTE, No.53

GEOLOGICAL COLLECTIONS AT NORTH EAST FIFE DISTRICT MUSEUM SERVICE

BY DAVID M. BERTIE

Introduction

In May 1975 the newly-created North East Fife District Council inherited museum collections in the burghs of Cupar, Newburgh and St Andrews. All three museum collections had suffered years of neglect through lack of curatorial care. In late 1982 the district council appointed a curator whose priority tasks were the cataloguing and conservation of existing collections. The museum service moved into its present accommodation in Cupar (the old police station) in December 1984. Since then cataloguing and conservation work has been fully operational. In November 1984 a Manpower Services Commission team was appointed, including a part-time geologist. I joined the team in April 1985. Since only the Cupar and Newburgh collections contain geological material, this account will not consider the St Andrews collection further.

Despite the years of neglect, the geological specimens were in good shape physically. Dirt, particularly soot, was the only serious problem, there being no pyrite or other chemical decay. All specimens have now been cleaned, although it has proved impossible so far to remove soot completely from porous material.

All the specimens had been catalogued by July 1985, using MDA cards. The Cupar material has the accession prefix CUPMS, as will all future museum service accessions. The Laing Museum at Newburgh remained virtually untouched since its creation in 1896 and its collection forms an almost unique example of the holdings of a small, late Victorian museum. The Newburgh material is therefore being treated as a distinct 'closed' collection and has been given the separate accession prefix NEGLM.

Both the Cupar and Newburgh collections are housed in an environmentally-controlled store at museum service headquarters in Cupar. The material is stored in cardboard boxes which are arranged by accession number. MDA cards arranged by subject form an index to the collections. The Cupar and Newburgh collections are boxed separately.

After July 1985 the main tasks were label hand-writing identification, correspondence transcriptions, and the preparation of designs for the new geology displays in the Laing Museum, Newburgh (which reopened on 13 May 1986).

CUPAR MUSEUM

Introduction

The origins of the Cupar Museum lie in the collections made during the 1830s and 1840s

Fig.1. Duncan Institute, Cupar

by the Fifeshire Literary, Scientific and Antiquarian Society and the Phrenology Society. References to these collections mention minerals, birds, archaeological and phrenological material (Leighton 1840, p.23; newspaper cutting in Album for the Cupar Antiquarian and Literary Society 1840, Cupar Library, L913.4133). Apart from the phrenological material, which the museum service still possesses, the subsequent fate of these collections is not known.

In 1870 the Duncan Institute was erected in Cupar (Fig.1). This was a mechanics' institute, with a museum and library, where lectures in scientific subjects were to be provided. Attempts at forming a museum appear not to have been very successful and the museum is reported as having been closed in 1905 (information supplied in legal submission to transfer Duncan Institute to Fife County Council in 1972); it is not known whether any material had in fact been collected by this date.

In 1931 the Duncan Institute received a bequest under the will of James Bonnar for

Fig.2. Laing Library and Museum, Newburgh

the purpose of providing accommodation in the Institute for Bonnar's private museum. Bonnar's collection forms the nucleus of the present Cupar collection. Bonnar's bequest re-established a museum collection in Cupar but public access was extremely limited and curatorial care was virtually non-existent due to the lack of funds available to the Duncan Institute Trustees. In 1972, at the request of the Trustees, the Duncan Institute with the library was taken over by Fife County Council, while the museum collection and the trusteeship of the various funds associated with the Institute were taken over by Cupar Town Council. The museum collection was moved to the Burgh Chambers and amalgamated with the phrenological collection mentioned above (whose history since the 1840s is presently unknown) and a number of Burgh Council historical items. The attempt to turn the Burgh Chambers into a museum failed and the place remained merely a store.

In May 1975 the museum collection was transferred to the North East Fife District Council following local government reorganisation.

James Bonnar (1849-1930)

James Bonnar was born in Cupar in 1849, the son of Dr George Bonnar, a medical practitioner in Cupar (Anon. 1930). He was educated at the Cupar Madras Academy (now Bell-Baxter High School). After training in the flax industry, James Bonnar sailed for South Africa where he commenced farming with his brother in Natal. After the Boer War, in which he served, Bonnar returned to Cupar in 1907.

Bonnar's main hobby was the collection of historical articles associated with Cupar, and he established a museum in the Castlehill School. In addition to historical items, he also made a small collection of different types of building and roofing stones (mainly granites and slates). He died in August 1930 and his museum collection was transferred to the Duncan Institute in 1931.

Collection

The Cupar geological collection is very small, with only 168 specimens, all from Bonnar's bequest. There are 37 granites (most of which are part of Bonnar's collection of building stone types), 20 quartz specimens and 33 crinoid fragments. The remainder are a mixture of rocks, minerals and fossils, some of which were given to Bonnar for his private museum. None of these specimens are of particular note individually, apart from a rather battered sandstone slab from Dura Den with the Upper ORS fossil fish Holoptychius andersoni (= H. nobilissimus), Phanereopleuron andersoni and Bothriolepis ?cristata. 50 specimens are labelled but many of these have the trade name of the building stone (e.g. Bonaccord Red, Braemar Grey, Swedish Blue, etc.) without stating actual locality.

LAING MUSEUM, NEWBURGH

Introduction

The Laing Museum in Newburgh was established in 1896 under the will of Alexander Laing, a local antiquarian and historian, as part of the Laing Reference Library and Museum (St Andrews Citizen, 21 March 1896) (Fig.2). A curator was never appointed and access was possible only by application to the librarian for the key. The collections contained geological, historical, archaeological, natural history and ethnographical material. The Laing Museum was under the control of Newburgh Town Council until May 1975 when it passed to North East Fife District Council following local government reorganisation.

The Laing Museum at Newburgh was officially re-opened on 13 May 1986. The new geology display consists of two panels (Creation or Evolution; the Rev. John Anderson 1796-1864) and three small cases (Minerals and Rocks; Fossils/Geology of the Newburgh area; John Anderson and Dura Den).

Rev. John Anderson D.D, F.G.S. (1796-1864)

John Anderson was born in Newburgh in 1796 and was minister of Newburgh from 1833 until his death in 1864. His principal geological discoveries were the fossil fishes of Dura Den in 1836. A biography of John Anderson and the context of his fossil fish discoveries was given by Andrews (1982).

Alexander Laing LL.D., F.S.A.Scot. (1808-1892)

Alexander Laing (Fig.3) was born in Newburgh in 1808, the eldest son of Peter Laing and Anne Anderson (elder sister of John Anderson). Laing's mother died when he was five and his father, a Newburgh draper, emigrated shortly after to South Africa, leaving him and his brothers and sisters to be brought up by their maternal grandfather. Laing first worked as a draper with his uncle Thomas Anderson. When his uncle later became a banker, Laing became his bank assistant. Together with his uncle John Anderson, Laing helped establish a library and a school in Newburgh and he was closely connected with the parish Sunday School.

Laing's principal interests were historical and antiquarian. He wrote several books on local history; another, The triumphs of Christianity, was translated into Tamil; and he took part in excavations at Dunsinane hill-fort. The degree of LL.D. was conferred upon him by St Andrews University in 1878. Laing's natural history interests were less strong and appear to have been more related to a love of the outdoors. He inherited Anderson's geological collection and writing-desk when his uncle died in 1864. How much Laing added to the geological collection is uncertain; only 22 specimens have labels in his handwriting and there is no mention of geological interests in any of his writings.

Laing never married and died in Newburgh in December 1892. He left £1000 for the building of a new library and museum in Newburgh together with his books (some 1600), pictures, antiquarian specimens and his uncle's writing-desk. The library and museum was opened in March 1896.

Collection

The Laing Museum geological collection has 1034 specimens, comprising rocks, minerals and fossils. Apart from a large agate collection, there are no particular strengths. Less than 25% of the specimens have any documentation relating to them, and in some cases documentation is merely a number on a label.

The main interest of the collection lies in the historical association of at least some of the material with John Anderson. 43 specimens (nearly all fossils) have labels in Anderson's handwriting. Other unlabelled specimens, particularly ORS fossil fish material and Lower Carboniferous fossils, were also very probably collected by Anderson. It could be argued that the bulk of the collection belonged to Anderson before his nephew inherited it, but without documentation this cannot be proved.

The ORS fossil fish material is very fragmentary but includes Holoptychius andersoni (= H. nobilissimus), Bothriolepis ?cristata, B. hydrophila and Glyptopomus sp. from Dura Den; H. nobilissimus from Clashbennie; H. sp. from Parkhill;

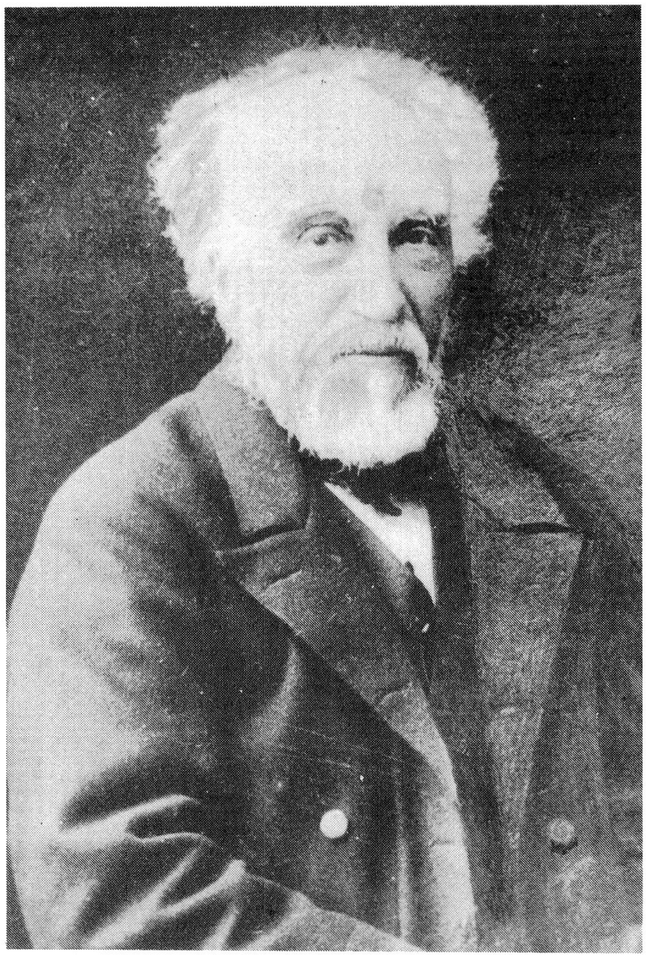


Fig.3. Alexander Laing (1808-1892)

Glyptolepis sp. and Pterichthyodes milleri from the Moray Firth area; and Osteolepis macrolepidotus from an unknown locality. One of the Glytopomus specimens carries the label 'Diplopterus N.S. Diplopterus supposed new Sp.' in Anderson's handwriting. This specimen may be the one cited by Anderson in The course of Creation (1851, p.68) and in Dura Den (1859, p.71).

Anderson corresponded widely with other geologists and received material from them. Andrew Robertson of Inverkeithing (later Professor of Chemistry at Calcutta; his father was Andrew Robertson, minister of Inverkeithing and Rosyth) sent Anderson a packet of Lower Carboniferous fossils from Duloch and Charlestone in south Fife in 1839 (MSS, North East Fife District Museum Service, NEGLM: 1985.1061). Thomas Brown of Cirencester sent Anderson a packet of Upper Oolite cidaroids in 1860 (MSS, North East Fife District Museum Service, NEGLM: 1985.1064). Both these sets of specimens are still held by the museum service. In 1859 the Rev. George Gordon of Binnie in Elginshire sent Anderson a specimen of Stagonolepis (MSS, Moray District Record Office, DDW/71/859/3) but the subsequent fate of this specimen is not known.

Anderson in turn also gave material to other geologists, particularly fossil fish from Dura Den. Anderson material is presently known to be held by Dundee Museum (ex-Kinnaird collection) (pers. comm., David Henderson, Dundee Museum); Hunterian Museum and Paisley Museum (Cleevely 1983); and the Royal Museum of Scotland, BM(NH) and BGS (Andrews 1982). It is probable that other institutions may have Anderson material and information about this would be gratefully received.

Anderson personalia held by the museum service include, in addition to his writing-desk, some correspondence (mainly letters to his grandchildren) and two sets of presentation silverware (one of which was presented to him in 1838 by the Highland and Agricultural Society of Scotland for his Essay on the Geology of Fifeshire).

David M. Bertie
North East Fife District Museum Service
County Buildings
Cupar, Fife

[present address]
North East of Scotland Museum Service
Peterhead Arbuthnot Museum
St Peter Street
Peterhead A34 6QD

Typescript received 3 December 1985
Revised typescript received 11 August 1986

REFERENCES

Anderson, J. 1851. The course of Creation. Longman, London, 420pp.
——— 1859. Dura Den. Constable, Edinburgh, 96pp
Andrews, S.M. 1982. The discovery of fossil fishes in Scotland up to 1845. Royal Scottish Museum, Edinburgh, 87pp.
Anon. 1930. The late Mr James Bonnar, Cupar. In Fife News Almanac for 1931. Fife News, Cupar, n.p.
Cleevely, R.J. 1983. World palaeontological collections. BM(NH), London, 365pp.
Leighton, J.M. 1840. History of the County of Fife, Vol.II. Joseph Swan, Glasgow, 266pp.

FORTHCOMING MEETINGS

Thu. 22 October 1987
The Ironbridge Institute
The marriage of mechanical engineering and mining
Long Warehouse, Coalbrookdale, Ironbridge Gorge Museum

Smeaton and the rise of the mechanical engineering profession - Denis Smith
The special needs of mines and the rise of the colliery viewer - Hugh Torrens
The engines in Shropshire mines in the eighteenth century - Barrie Trinder
The evolution of pumping and winding equipment in mines - Graham Hollister-Short
Mechanical engineering in mining museums - Ivor Brown

Fee (includes lunch): £12
Contact: Janet Markland, Ironbridge Institute, Ironbridge Gorge Museum, Telford, Shropshire TF8 7AW (tel. 0952 452751)

Fri. 4 December 1987
GCG
Public access to collections, and AGM
National Museum on Merseyside

A meeting based at the Museum's new Natural History Centre. The concept of making parts of the Museum collections accessible to the general public and the use of computers to provide the public with information about the collections in store will be discussed. The afternoon session will include a talk by Andrew Roberts on new initiatives at the Museum Documentation Association in Cambridge.

Contact: Geoff Tresise, National Museum on Merseyside, William Brown Street, Liverpool L3 8EN (tel: 051 207 0001/5451).

Geological Curator, Vol.4, No.9, 1987 (for 1986), pp.571-572

THE WEST MIDLANDS AREA MUSEUM SERVICE AND GEOLOGICAL CONSERVATION

BY ROSEMARY RODEN

In August 1984 the West Midlands Area Museum Service initiated a geological service with the appointment of a Peripatetic Curator. Prior to the appointment, a survey of geological collections in the West Midlands, undertaken by the Midlands Collections Research Unit, had confirmed the depressing findings of the 1981 Doughty Report. Within the area, and at risk, were collections of historic significance containing important and irreplaceable material. From these reports, WMAMS identified the urgent need for some form of pastoral scheme and so became the third Area Museum Service to create a 'travelling' geological post.

Although these new posts all have the same objectives, WMAMS has taken a slightly different approach in response to the particular problems of the West Midlands. With the basic survey work completed before 1984, WMAMS was able to assess priorities and select projects into which funding and conservation work could immediately be directed. The whole emphasis has been on practical curation work.

A curator has been employed on one year contracts to carry out specific projects in an allocated number of days. Funding has been provided by WMAMS, the host museums, a special Museums and Galleries Commission Conservation Grant, and sponsorship. Renewal of the MGC grant has fortunately allowed the work to continue into a third year.

The first year's work was almost entirely devoted to a single project: the 'rescue' of the neglected Fraser Collection in Wolverhampton. During a year of carefully programmed conservation this fine palaeontological collection was saved and its future assured. Besides the go-ahead being given for a new museum extension, including a geology gallery, the project received generous sponsorship from Tarmac plc.

By August 1985 the post had become truly peripatetic as the service expanded into four projects:

(i) the 'rescue' of Worcester City Museum's excellent mineral collection.

(ii) the launching of Ironbridge Gorge Museum's ambitious scheme to introduce geological and mining material into the collections and displays; the curation of the George Maw Geological Collection.

(iii) continuation of the Fraser 'rescue curation' and the preparation of the new geology gallery in Wolverhampton.

Fig.1. The George Maw Geological Collection on its arrival at Ironbridge in 1985. For the first few months the 5,000 specimens in 76 boxes were stored at Jackfield before the move to the new store at Rosehill (Photo: Ironbridge Gorge Museum Trust).

(iv) continuation of the cataloguing of Lichfield Library and Museum's geological collection at Stoke-on-Trent City Museum.

The type and scale of work involved in these projects is clearly seen in the accompanying photographs (Figs. 1 and 2), which show the George Maw Geological Collection on its arrival at Ironbridge in 1985. The 5,000 specimens, collected in the 1860s by the famous tile manufacturer, were returned to Ironbridge as a generous gift from the British Geological Survey. Originally, this collection, of mainly British rocks, had been presented in 1887 by George Maw to the Jermyn Street Museum of the Geological Survey of Great Britain. Four superbly illustrated note books, referring to both the specimens and Maw's numerous geological papers, accompanied the collection.

After an initial examination, a report and an accompanying plan for the proposed curation work were produced. The 76 wooden lidded boxes housing the collection were temporarily stored at Jackfield, the site of Maw's tile factory. Many boxes were filled with neat newspaper or brown paper parcels containing specimens and their loose labels. Lying amongst the parcels were interesting letters, photographs and papers. Although the Queen of 1887 made fascinating reading, the brittleness of the paper, due to age, caused

Fig.2. The contents of one of the Maw Collection boxes with the specimens still in their 1879 wrappings (Photo: Ironbridge Gorge Museum Trust).

a problem. A number of parcels had split, spilling their precious contents and parting specimens and labels.

The priority of housing the collection in a suitable and stable environment was soon satisfied when the collection was moved to Rosehill. A racking system for the boxes has kindly been donated by Welconstruct Co. Ltd. and the 'Friends' of the Museum are aiding the purchase of acid free and acetate lidded specimen trays. With the collection stored and sorted, work has concentrated on the vital task of documentation; this is being carried out in accordance with the Museum's Documentation Centre. The painstaking work of numbering each specimen and securing the data onto catalogue sheets is well underway. The whole project, with its collection and collector, is proving rewarding and interesting beyond expectation.

WMAMS' simple, straightforward approach of concentrating effort and funds on a few selected projects appears to be working. The service has expanded and the objective of saving the West Midland's geological heritage and ensuring its future is now being realised.

At the end of the third year, owing to limited Area Council funds, the Commission's grant was switched to support a similar peripatetic post in another discipline. To overcome the problem of funding and ensure the future of the new geological service, WMAMS has launched a new venture. The work is now continuing on an agency arrangement and the Peripatetic Curator has changed her role to the recognised Geological Agent for WMAMS. Under the new scheme, the financial commitment made by the client museum towards the care of its geological collection will receive grant aid at 40%. With adequate support from West Midlands museums for the year ahead, this new enterprise commenced on 1 May 1987.

Rosemary Roden
Pine Ridge
110 The Ridgeway
Astwood Bank
Worcestershire B96 6NA

Typescript received 8 December 1986
Revised typescript received 28 May 1987

LOST AND FOUND

COMPILED BY DONALD I. STEWARD AND HUGH S. TORRENS

Abbreviations

DNB - Dictionary of National Biography.
GCG - Newsletter of the Geological Curators' Group, continued as the Geological Curator.

150 William Henry Fitton (1790-1861)

GCG, 4(3), 176-177

An article by John Challinor entitled 'Some correspondence of Thomas Webster, geologist (1773-1844)' which appeared in six parts in Annals of Science (1961 - 1964, vols.17-20) lists twenty-seven letters written by W.H. Fitton to T. Webster. These are transcribed in the article and the original documents are in the library of the University College of Wales, Aberystwyth. This material should provide ample examples of handwriting for comparison with the annotations found in the journals held at Bolton Museum.

192 J[ohn] MAWE [1764-1829]

We have heard from Peterborough Museum as follows:

'In 1985 Peterborough Museum acquired a large geological collection from Burghley House, near Stamford. The First Assistant Curator, Dr Gordon Chancellor, is hoping to produce a history of the collection once cataloguing is complete.

Of immediate interest from the Burghley Collection are two identical marble slabs (each 125mm x 69mm x 20mm) in the middle of each of which is a metal stem, indicating that they were bases for something for display. Each slab has a glued-on orange paper base, to which is attached the following small label: 'J. Mawe, Mineralogist, Museum, Cheltenham, And at 149 Strand, London'.

We would be interested to know any further information about J. Mawe, about the whereabouts of similarly labelled material in existence, and if this J. Mawe is the same person as John Mawe, the author of Familiar Lessons on Mineralogy and Geology (London 1822)'.

H.S.T. writes:

'John Mawe (1784-1829) of DNB, well known author, mineralogist and mineral dealer of the Strand, London from 1811 onwards, opened a further retail outlet for the sale of his specimens in Cheltenham in 1816. At first this was in partnership with his son-in-law Anthony Tatlow (1789-1828), and was known as 'Mawe and Tatlow's Museum, Monpelier Walk'. Tatlow died in July 1828 and the name then became simply Mawe's Museum. It closed in 1843; this means the Burghley material must date from 1828 - 1843. Only one other such specimen is known up till now - an inlaid paperweight of British and foreign marbles owned by HST; this has an engraving of Mawe's Museum in Cheltenham on the stuck-on label that is to be reproduced, along with further details of Mawe's career, in the study of 'Early geological collections and museum in Cheltenham' which HST has in preparation.'

193 The Naturalist's Directory (1895-1907)

Hugh Torrens (Lower Mill Cottage, Furnace Lane, Madeley, near Crewe CW3 9EU) writes:

'Information is sought concerning the availability of copies of a publication produced in at least ten editions between 1895 - 1907 entitled The Naturalist's Directory 'for the use of students of Natural History, and collectors of Zoological, Botanical, or Geological specimens, giving the names and addresses of British and Foreign Naturalists, Natural History Agents, Societies and Field Clubs, Museums, Magazines, etc.' (7th edition. 1902-1903. L., Upcott Gill, London).

Table 1 indicates the current whereabouts of editions as known to me; any further information about this useful book would be gratefully received.'

Table 1.

Year	Edition	Known whereabouts	Remarks
1895	1st		?publ. by Booth
1896	2nd		
1897	3rd	BL	
1898	4th		
1899	5th	NUC; BM(NH)	167p.
1900	6th		
1902-3	7th	HST	168p.
1904-5	8th	NUC; BM(NH)	184p.
1905-6	9th		
1906-7	10th	BL	

BL, British Library; BM(NH), British Museum (Natural History); NUC, National Union Catalogue; HST, Hugh Torrens, personal copy.

194 Photographs of Irish naturalists

Nora McMillan (The Nook, Uplands Road, Bromborough, Merseyside L62 2BZ) writes:

'In about 1970 the late A.W. Stelfox gave to me a small collection of old photographs of Irish naturalists which he had from R. Lloyd Praeger in 1949. The people represented are as follows:

1. [2nd] Earl of Enniskillen [1807-1886, fossil collector]. photo by Maull, Tavistock House, Fulham Road, London;
2. Dr Robert Ball (1802-1857). photo by Magill of Donegall Place, Belfast. (This is reproduced in Some Irish Naturalists);
3. G.C. Hyndham. photo by John Gibson, 20 Castle Lane, Belfast. (This is reproduced in Some Irish Naturalists);
4. John Fowler 'died 29 Feby. 68, aged 62 years'. photo by Thos. North, Grafton Street, Dublin;
5. Sir Edward Coey (or Grey?). photo by Mayall, Regent Street, London;
6. Alexander Mitchell, the blind engineer. photo reproduced in the Centenary volume of the Belfast Natural History and Philosophical Society (1924); and
7. another photo is named as 'Mr Burden Glendivis' but it is in fact another view of Mitchell (see 6 above). Dr Burden married Mitchell's daughter Margaret and they lived in the house called Glendivis (Ballygomartin Road, Belfast) where I spent my childhood.

I have no information concerning John Fowler or Sir Edward Coey. I assume that they were Irish and that Praeger intended to make use of them in his book Some Irish Naturalists (1949) but for some reason did not do so. I believe Sir Edward Coey may have been a geologist but can provide no supporting evidence. Any information about John Fowler and, particularly, Sir Edward Coey would be gratefully received.'

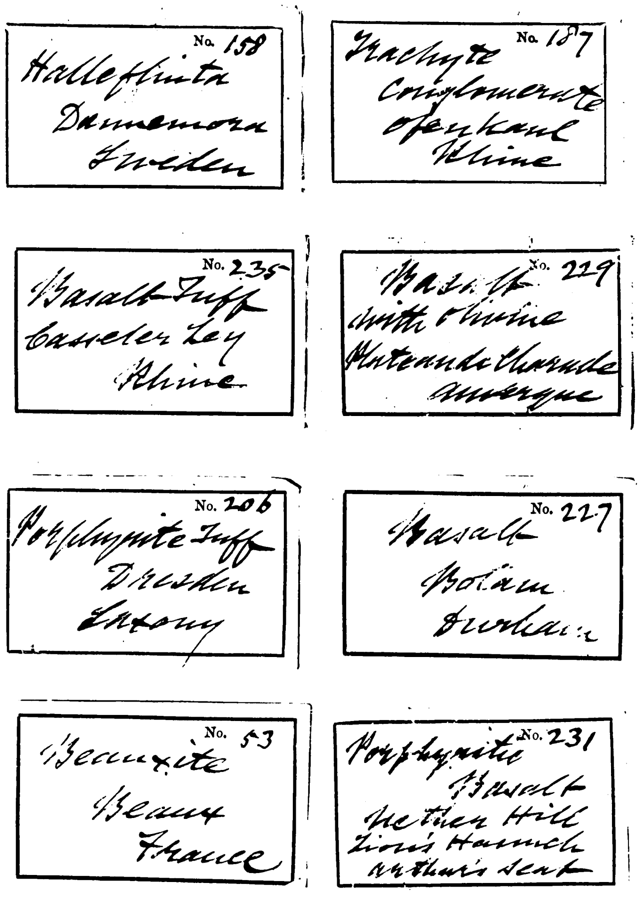


Fig.1. Mystery labels from Perth Museum.

195 Suppliers of geological specimens c.1895

Michael A. Taylor (Keeper of Natural Sciences, Museum and Art Gallery, George Street, Perth PH1 5LB) writes:

'Among the collections of Glenalmond College, Perthshire recently acquired by Perth Museum are large numbers of specimens bearing small printed numbers which were probably purchased as complete cabinets of specimens by Arthur S. Reid, the Hon. Curator of the college museum c.1895. Many are accompanied by hand written labels (Fig.1) although some have lost labels and others their numbers. Were such cabinets issued as standard sets and if so do any complete sets survive?

I would be pleased to hear from any GCG member who might recognise the label style or know of surviving series which would help to reunite the Glenalmond specimens with their data. Minerals numbers go up to approximately 146, rock numbers to 302, and fossil numbers to 250'.

COLLECTION INFORMATION NETWORK GEOLOGY

COMPILED BY DONALD I. STEWARD

CING 1 IRONBRIDGE GORGE Museum, TELFORD

The complex history of part of the Reynolds-Anstice Shropshire geological collection dating back to the late eighteenth century (Torrens, H.S. 1982. Arch. nat. Hist. 10(3), pp.429-441) has taken another, and hopefully final, turn. The Carboniferous fossils held at Keele University (ibid. p.438) originating from the collection, which was donated to the Coalbrookdale Institution in 1865, have completed their tour of the western Midlands and have now been returned to their original home within the museum complex at Ironbridge.

Six specimens of copper ore slag collected at the site of the Whiston Copper Smelting Works, Staffs. and collected c.1972 by Frank Beasley, formerly of Shugborough Museum, Staffs., have been transferred from Stoke-on-Trent Museum to the 'National Slag Collection' held by the Coalbrookdale site of the Ironbridge Gorge Museum.

CING 8 BROXBOURNE Museum, HODDESDEN

Geological public service: permanent display (very small); no specialist curator; no identification service; not a NSGSD record centre.

Geological collections: c.200 specimens; minerals and fossils; Pleistocene material dehydrating; not easy to locate, records poor; major strength in local Pleistocene vertebrates. April 1986.

CING 18 MAIDSTONE Museum

Geological public service: permanent display; access to reserve collection by appointment; no specialist curator; not a NSGSD record centre.

Geological collections: 5,000-10,000 specimens; rocks, minerals and fossils (good local); condition mainly good; systematically stored but records poor; type, figured and cited fossils. May 1986.

CING 37 STOKE-ON-TRENT City Museum

Geological public service: permanent display; access to reserve collection by appointment only; one specialist curator, involved with other aspects of Natural History as well; free identification service; NSGSD record centre for Staffordshire.

Geological collections: c.8,000 specimens; good local coverage of rocks, minerals and fossils, also maps, references and photographs; condition good; systematically stored and majority registered; major strengths in Carboniferous fish fossils and north Midland minerals; a few cited fossils. March 1986.

Nearly 100 specimens of Lower Carboniferous limestone fossils collected by J.T. Wattison c.1908, from the inlier at Astbury on the northern borders of Stoke-on-Trent, have been transferred from Keele University to the City Museum and Art Gallery, Stoke-on-Trent. These specimens are those referred to in the Macclesfield memoir (Evans, W.B. et al. 1968. Geology of the country around Macclesfield, Congleton, Crewe and Middlewich. Mem. geol. Surv. G.B., sheet 110, p.10).

CING 38 GROSVENOR Museum, CHESTER

Geological public service: permanent display; access to reserve collections; part-time Natural History assistant; identification service; NSGSD recording unit for Chester District.

Geological collections: 5,000-10,000 specimens; rocks, minerals and fossils (c.80% of material), also maps, periodicals and books; condition generally good; systematically stored and mostly registered; type, figured and cited material in the process of being transferred on long-term loans - Telia Quarry fossil flora to National Museum of Wales, Triassic vertebrate footprints from Storeton and Nicholson Quaternary molluscs to Liverpool Museum. August 1986.

CING 39 CLITHEROE CASTLE Museum

Geological public service: permanent display; access to reserve collections on request; one specialist curator; identification service; NSGSD record centre for Lancashire.

Geological collections: c.20,000 specimens; good local coverage of rocks, minerals and fossils, also maps and photographs; condition mainly good; systematically stored and mostly registered, MDA cataloguing proceeding; major strength in Carboniferous crinoids; type, figured and cited fossils. August 1986.

CING 40 RUSKIN Museum, CONISTON

Geological public service: permanent display; no reserve collections; no specialist curator; no comprehensive identification service; not a NSGSD record centre.

Geological collections: less than 500 specimens; rocks, minerals and fossils; condition good; all in show-cases and all registered; specimens mainly from Ruskin's own collection. July 1986.

NOTES AND NEWS

COMPILED BY MICHAEL A. TAYLOR

SEDGWICK THE BARROW-DIGGER

We belatedly mark the 200th anniversary of the birth of Adam Sedgwick, Professor of Geology at Cambridge University, by bringing your attention to a recent piece commemorating the 'excavation' of the Roman burial mounds at Bartlow in Essex: Addyman, P. 1985. Adam Sedgwick's archaeological excursions. Antiquity, 60 (228), 56-58. An 'eclogue' by Dr Whewell is balanced by a letter from Sedgwick to his niece Fanny.

EVEN OLDER CURATORS?

Bob King's 'The Oldest Profession' (Geol. Curator, 4, p.356) recalls several even older examples of fossil curatorial activity. An Eocene sea urchin was found in deposits of Old Kingdom age (2700-2200 BC) in Heliopolis, Egypt, bearing the label 'Found south of SOPDW quarry by the priest Tanofre' incised in hieroglyphs: 'no data could be more securely attached to an object' (Torrens 1985)!

The concept of data security and indeed of documentation does depend upon a certain degree of literacy, but fossils have been collected by many preliterate people (admittedly often for 'ritual' purposes). To Oakley's review (1965) and the more recent one by Mike Bassett (1982) can be added the curious case of the two Upper Palaeolithic people buried with an ammonite collection (Donovan 1968), while fossil sea-urchins were collected by Iron Age and Romano-British people in Dorset (Field 1965). Glastonbury retains its reputation for mystery with the strange accumulation of hundreds of ammonites in the Dark Ages deposits on top of the Tor, although this could just possibly be a natural accumulation due to erosion of the Midford Sands (Rahtz 1970). At any rate, there is no doubt about the masonry with inset ammonites surrounding the Chalice Well at the foot of the Tor: despite the fond illustrations of ley-liner tourists, the Well is a mediaeval well (Rahtz 1970) so the ammonites are presumably a modern addition!

Bassett, M.G. 1982. 'Formed stones', folklore and fossils. National Museum of Wales, Cardiff, 32pp.

Donovan, D.T. 1968. The ammonites and other fossils from Aveline's Hole (Burrington Combe, Somerset). Proc. Univ. Bristol spelaeol. Soc. 11, 237-242.

Field. N.H. 1965. Fossil sea-urchins from a Romano-British site. Antiquity, 39, 298.

Oakley, K. 1965. Folklore of fossils. Ibid. 9-16, 117-125, pls.1, 2, 21-26.

Rahtz, P. 1964. Excavations at Chalice Well, Glastonbury. Proc. Somerset arch. nat. hist. Soc. 108, 145-163.

———— 1970. Excavations on Glastonbury Tor, Somerset, 1964-6. Arch. Jl, 127, 1-81.

Torrens, H.S. 1985. Early collecting in the field of geology. Pp.204-213. In Impey, O. and Macgregor, A. (eds.). The origins of museums. The cabinet of curiosities in sixteenth- and seventeenth-century Europe. Oxford University Press, Oxford, 300pp.

X-RAY SCANNING OF FOSSILS

A recent paper by G.C. Conroy and M.W. Vannier (1984. Non-invasive three-dimensional computer imaging of matrix filled fossil skulls by high-resolution computed tomography. Science, 226, 456-458) described the use of X-ray computerised tomography scans, in themselves two-dimensional sections, to produce three-dimensional computer images of fossils in matrix. The image of the test specimen, a skull of the Miocene mammal Stenopsochoerus, could be manipulated on screen to show the inside of the skull by 'taking the lid off', as it were. These techniques allow the non-invasive dissection of a matrix-filled fossil with an accuracy of a millimetre or less. The authors suggest using them to measure the intracranial volume and other hidden features of fossil skulls filled with matrix, and they could also be useful for those faced with the preparation of complex specimens.

FESTIVAL TIME IN EDINBURGH

The National Museums of Scotland was created in October 1985 by the merger of the Royal Scottish Museum (now the Royal Museum of Scotland) with the other Scots nationals. Despite the closure of the main Chambers Street building for urgent roof repairs, the NMS put on a major exhibition, 'Hotbed of Genius', about the Scottish Enlightenment of 1730-1790. This exhibition featured Joseph Black the chemist and mineralogist and James Hutton the geologist, together with David Hume and Adam Smith, in a somewhat startling combination of impressionist modern display and conventional exhibits. The chance to see it has long gone, but it lives on in the book of the same name, reviewed elsewhere in this issue.

An attractive new colour booklet of 16 pages, National Museums of Scotland explains the behind-the-scenes activities of acquisition, curation, conservation and reconstruction, and the display and public services departments. Geology features prominently in the colour photos, ranging from mineral collecting in Shetland to one of Stan Wood's latest beasties, but best of the lot is the teasing front cover which turns out to be a superb scenic agate from the Blue Hole of Angus.

APPEALS FOR INFORMATION ON MARY ANNING (1799-1847)

When, towards the end of her short life, the King of Saxony visited the Dorset town of Lyme Regis he called into the celebrated shop of Mary Anning who there sold the fossils of the neighbouring coast line. She was able to tell him correctly that she was 'well known throughout the whole of Europe'. Despite such celebrity she has never been properly treated biographically and for this Hugh Torrens (Centre for the History of Science and Technology, Keele University, ST5 5BG, England) seeks any information about her. In particular he hopes to locate further primary sources like letters to or from her (already thirty-five of her letters have been traced), references to her in contemporary letters or diaries and to specimens supplied by her. Assistance will be gratefully acknowledged.

Please can all members with such information respond? This will be a most worthwhile project which has already yielded a great deal of new information, and it is clear that we will have to revise our ideas of Mary Anning very substantially.

PILED ICHTHYOSAUR?

Some of us will have been alarmed by the Guardian's diary column of 14 April 1987 with its allegation that the fossil marine reptiles mounted on the wall of the East Gallery of the British Museum (Natural History) were being endangered by piledriving for a new cafe. The facts are that while piledriving was proposed, it was not agreed, and will not happen.

PEOPLE

Dorothy Harding has moved from Keele University to the post of Keeper of Natural History at Kirklees Museum Service; Steve Thompson, previously MSC part-time assistant at the Hancock, is now Assistant Keeper of Geology at Clitheroe Museum; David Hill, a geology graduate of University College Cardiff, with three years experience in Stone conservation for the Wells Conservation Trust, becomes Assistant Geologist with special responsibility for preparation and conservation in Bristol City Museum's new, MSC grant-aided, geology laboratory (on a two-year contract subsidised by the Area Museum Council for the South West).

NEWS FROM LYME REGIS

The 1986 Curator's Report by John Fowles records various geological doings of that year, including the following:

'We also acquired during the year on loan from the Royal Albert Memorial Museum, Exeter, a most interesting table-model of the 1839/40 Landslip. It was apparently made very soon afterwards under the supervision of the original surveyor of the Landslip, William Dawson, and therefore is of value not only in itself, but as an early scientific model. We have sternly refused any repainting or refurbishment of it; although much of the lichen and moss used to represent the Undercliff foliage now shows its age. Nick Vale kindly supplied a new stand.

'We also bought during the year an attractive water-colour of the cliffs below Southdown, between Beer and Branscombe. That may seem outside our area, but the slip there, of 1792, was in fact the most famous precursor of the celebrated slip of 1839; and although in slightly different geological conditions, produced very similar effects. Beer fishermen who the night before had sunk pots just offshore in their usual several fathoms of water were astounded to find them hoisted several feet in the air the next morning, on a new ridge of rock.'

JOSEPH WRIGHT, F.G.S., 1834-1923

A paper titled as above by John Wilson (Dept. of Geology, Ulster Museum) appeared recently in The Irish Naturalists' Journal, 22 (1987), 169-180; it describes the life, work and collections of Joseph Wright. 'During his lifetime, Joseph Wright was in turn a collector of Carboniferous fossils, a micropalaeontologist, a protozoologist and in later life shifted to the almost exclusive study of Foraminifera in the boulder clays of the world' (Wilson 1987, p.169).

GEOLOGY AND THE MEDIA: GCG's 1986 AGM REPORT

The following report by GCG Committee member Mike Benton (Dept. of Geology, Queen's University, Belfast) appeared in the Palaeontological Association Circular 127, pp.4-5 (reproduced here with thanks to the Pal. Ass.):

'Palaeontology is probably ahead of most other sciences in its appeal to the public. Certainly, it would seem to be the most-reported area of geology. However, we should not be complacent about our good fortune that the public has an appetite for dinosaurs, mass extinctions, fossil humans, Precambrian fossils, and so on. Some useful tips about how we can enlist the help of the press in promoting palaeontology were given at a meeting entitled "Geology and the Media" sponsored by the Geological Curators' Group, and held on 5 December at the Manchester Museum.

The first key point was made by Dr Beverly Halstead, that renowned palaeontological promoter and pugilist from Reading: do not be sniffy about dinosaurs and mass extinctions. It would be very nice if we could have stories in our popular press about new graptolite zonations in the Lower Silurian, or a new classification of crinoids. However, that will probably never come to pass. Beverly illustrated how general points and less eye-catching topics in palaeontology could be got across by leading up to them gently. Ideas about rates of evolution, modes of classification, and so on can be introduced by looking at a dinosaur or human example. New ammonites can be introduced as denizens of the deep during the age of the dinosaurs, and so on.

Beverly made this first point in a rather more characteristic way: what the public want is sex and violence. Maybe so, but one would have a longer and more tortuous journalistic path to tread from sex and violence to a discovery of new ammonites.

The second key point was made by Matt Ridley, a science writer for The Economist: help the journalist to sell his story to his editor. The first hurdle of getting a journalist interested in your story is only the start. Many of us know of cases where a story has been written and checked, and has then failed to appear. In most newspapers, space is at a premium, and a pederastic parson will always replace a palaeontological puff. We have to offer strong headlines and good illustrative material if possible, so that the science journalist can fight for a space. Luck is involved here, and it is hard to time news releases for maximum coverage. It is often said that August is a good time, when Parliament is in recess, and people are looking for some entertainment.

The third key point was touched by both Beverly and Matt, and by the third speaker, John Simmons, an independent film-maker: people like characters and controversy. In journalism, science is nearly unique in that the protagonists are rarely characterised and rarely criticised. Political and sports reporters tell us all about the main players, what they wear, what they think, and how wrong they are. We need to encourage good science journalists to describe the characters, and to describe and comment on controversies. In palaeontology, this has happened to some extent over cladism and mass extinctions. This is a much larger topic than can be discussed here, but controversy and characterisation can ensure quite extensive coverage of a topic in science because the journalists and readers feel greater involvement. In the future, it might even be helpful in certain disciplines to have incisive comments and criticisms from qualified "observers". However, this aspect of science reporting is in its infancy in Britain.

A final point, and one which probably impressed most of the audience, who were nearly all museum and university geologists, was that: journalists can be human. The bizarre notion that there is some kind of tension, or battle of wits, going on between scientists and journalists is outmoded (indeed, was it ever inmoded?). We can only hope for more full-time and freelance qualified science journalists such as Matt and John who can ferret out stories and ask pointed questions themselves. Until then, we must be patient with general features writers from local rags, cultivate them and buy them drinks. They can be used to promote particular universities and museums, and to promote palaeontology as a whole.'

NATURAL HISTORY MUSEUM IN CRISIS!

No, not that Natural History Museum. Our Chinese correspondent (actually Derek Siveter, Geology Dept., University of Hull) came across the following familiar tale on a recent visit to China. It is taken from the China Daily, 28 March 1987:

'A shortage of funds is paralyzing the Beijing Natural History Museum. It can neither expand its area nor properly preserve valuable exhibits.

Examples of animals and plants in the 3,600-square-metre exhibition hall are decaying after having been displayed for 30 years in an environment without guaranteed constant temperature and humidity.

And the museum cannot afford new exhibits to replace the deteriorating ones. Meanwhile, thousands of items which cannot be displayed because of lack of space are threatened by mould in a moist underground store-room, while some have been left outside.

"The best way for our museum to survive is to be listed as a national one," Geng Yingshuang, one of the officials, told China Daily. "That would mean we could get more than the present total of about 400,000 yuan (about $108,000) a year from the Beijing Academy of Scientific Research, our superior organization."

The museum now has only about 70,000 yuan (about $19,000) a year left after its 160-member staff is paid.

Fortunately, it is allowed to keep all it gets from ticket charges - about 30,000 yuan (about $8,000) annually from around 400,000 visitors - instead of handing part over to the State, as usually required. A ticket costs 10 fen (about 2.5 cents) for adults and five fen for schoolchildren.

The museum has contacted the Cultural Ministry and the State Commission of Science and Technology as well as its direct superior to raise the possibility of getting national status.

China has four other local museums similar to the one in Beijing, in Shanghai, Tianjin, Dalian and Chongquing, but no national one yet.

"But things do not look good for the time being," said Geng. As a non-profit-making unit, she implied, the museum is not likely to be promoted to national status, as China is trying to cut capital construction spending.

The museum held a press conference earlier this week to make its difficulties known to the public.

"Our museum is in a real crisis," Geng said.

The Museum, in southern Beijing, was first built as a national one. But when it was opened in 1958, it was put under the administration of the Beijing municipal government, along with some other national projects, to lighten the burden on the central government.'

CHEDDAR'S OLDEST FOSSIL MAN DISCOVERY

Excavations at Gough Cave, Cheddar, Somerset in April 1987 by Chris Stringer and Andy Currant of the BM(NH) have revealed the most complete remains of a 12,000 year old human face and jaw known from Britain. This is 3000 years older than the famous skeleton 'Cheddar Man'. The fossils discovered are of a child, probably male, aged about twelve years at death, and include the left side face and upper jaw, the lower jaw, and a rib. The upper jaw has one milk tooth and two molars in place. The lower jaw has three permanent molars and a canine. All teeth are perfectly preserved, and show no signs of decay. They are some twenty per cent larger than the teeth of modern British people.

This fossil find is also important because of the associated faunal remains and artefacts found in the cave. The faunal remains include those of wild horse, arctic hare, red deer and saiga antelope, all of which probably provided the staple diet of the human inhabitants. Other material discovered includes charcoal, flint tools and a remarkable six inch long ivory rod made from a mammoth's tusk. Other remains found in the same levels have already been radiocarbon dated at about 12,000 B.P., towards the end of the last Ice Age.

The research has been carried out in conjunction with Dr Roger Jacobi and Ruth Charles of the University of Lancaster. Last year Dr Jacobi found some isolated human teeth in the same area of the cave. These may belong to the Cheddar boy. He also found the base of a human skull that may also be part of the boy's remains. The skull bears cut marks indicating that the head may have been severed from the body, possibly as a result of dismemberment before burial rather than execution or cannibalism. There are also possible cut marks on the newly discovered material and these will be studied in the near future.

The excavation and research at Gough Cave have been possible through the full co-operation of the management of Cheddar Caves Limited. A further small excavation is planned later in the year.

AMBER SURVEY

Helen Fraquet, author of Amber (Butterworths Gem Books) and Fellow of the Gemmological Assocation, is conducting a survey (via a questionnaire) of amber coming ashore on Britain's East Coast and writes:

'The amount of amber cast up on our beaches has dwindled considerably during this century and there is now an urgent need to record when and where amber has been found over the last 50 years by local people, before all such chances are lost. The survey is being funded by the Leverhulme Trust, and its purpose is to provide a record for future archive material for local museums. Those connected with the survey have no commercial interest in amber.

If you have collected amber and have recollections that you would be happy to contribute, write for a questionnaire to: Amber Survey, c/o Floor 5, 16 Strutton Ground, London SW1P 2HP.

BOOK REVIEWS

Crowther, P.R. and Martin, J.G. 1985. The Rutland Dinosaur. Cetiosaurus - the tale of a reluctant hero! Leicestershire Museums Publication No.68; Leicestershire Museums, Art Galleries and Records Service, 8pp. ISBN 0 85022 194 3. Price 40p.

Martin, J.G. 1986. Dinosaurs in Britain. Cetiosaurus and its relatives. Leicestershire Museums Publication No.70, Leicestershire Museums, Art Galleries and Records Service, 16pp. ISBN 0 85022 198 6. Price 50p.

Crowther P.R. and Martin J.G. 1986. Not the Rutland Dinosaur. Plesiosaurus and others - friends of Cetiosaurus. Leicestershire Museums Publication No.71, Leicestershire Museums, Art Galleries and Records Service, 8pp. ISBN 0 85022 199 4. Price 40p.

(one third trade discount available on purchases for resale from Publications Officer, LMAGRS, 96 New Walk, Leicester LE1 6TD)

In November 1985, Leicestershire Museums Service opened 'The Dinosaur' gallery at the Leicestershire Museum on New Walk, Leicester. The star of the exhibition is a Cetiosaurus discovered in Rutland in 1968 and the Museum has produced three A5 booklets based on or around this specimen. Although thin, they pack in a lot of information and are written in a style aimed at children. The prices, too, are of pocket-money dimensions. There is no shortage of illustrations; about half of each booklet is taken up with diagrams, drawings, or (more rarely) photographs. Some of these are also used in the display, providing a good link between the two media. But I must say, with apologies to John Martin, the artist, that I don't like the style of many of the drawings, especially the reconstructions in Dinosaurs in Britain where some of the beasts look distinctly deformed or like badly-stuffed cushions. Such illustrations also appear on the cover of each booklet. The lifeless ichthyosaur in Not the Rutland Dinosaur looks more like a plastic model than the plastic models on sale in our museum shop, and the two world maps in Dinosaurs in Britain showing Jurassic and Cretaceous palaeogeography (uncaptioned) are very rough and sketchy. I don't want to labour the point, but I really do feel that the style of many of the illustrations lets the booklets down, which is a pity.

The Rutland Dinosaur outlines the story of this specimen from carcass to fossil, digging up and naming, preparation and reconstruction, its importance, environment, lifestyle, ancestors, and descendants. These are the subtitles to the sections in the booklet; the main headings are much more sensationalist such as 'Discovered at last' and 'Cetiosaurus as megastar!' There is also a page on the extinction of the dinosaurs and a short reading list. A photograph of (presumably) the section in the brick pit where the specimen was found, suffers from the lack of a caption or annotation.

Dinosaurs in Britain puts the Rutland Cetiosaurus in context. An introduction deals briefly with fossilisation, palaeogeography and history of the discovery of dinosaurs. The section on palaeogeography is weak and the text is not supported by the two world maps; in fact they seem to contradict the statement made in the text that Britain was covered by sea during much of the Mesozoic. A geological timescale refers to the Triassic, Jurassic and Cretaceous as eras, and an uncaptioned sketch of saurischian and ornithischian hip bones fails to distinguish which is which. Notes follow on every family of dinosaurs (including a two-page centre-spread about Cetiosaurus) found in Britain, with a check-list of these on the inside back cover. So if you want a good summary of British dinosaurs then this is 50p well spent.

The title of Not the Rutland Dinosaur plays out a joke which has worn rather thin, although I appreciate the idea is to get across the fact that the plesiosaurs, ichthyosaurs, crocodiles, pterosaurs, birds and fish dealt with in this booklet were not dinosaurs. The centre pages present 'a new key to vertebrate animals' which seemed to be a bit unnecessary. The space could have been better used to illustrate, say, some examples of the Barrow-on-Soar reptiles. One element of the key which was certainly new to me was the classfication of ichthyosaurs as 'reptiles or amphibians'. For some reason, ichthyosaurs were the only beasts in all three booklets singled out for a phonetic spelling of their name ('pronounced ik-theo-saws'). This is fine if you're an Anglo-Saxon Hooray-Henry who can't pronounce a gutteral 'ch' and roll your 'rs', but if you're a Celt you pronounce it, like the original Greek (according to my Berlitz phrase book), with 'ch' as in 'loch' and 'saurs' as in 'wars'.

Away from Leicestershire's exhibition, the three booklets stand on their own reasonably well, and represent good value for money - Dinosaurs in Britain, particularly so. On the whole, typographical errors are few. Despite my carping criticisms and reservations about the illustrations, I have bought several copies of each booklet myself and we have sold over two thousand of them during the first six months of our dinosaur exhibition here in Cardiff.

Tom Sharpe
Department of Geology
National Museum of Wales
Cardiff CF1 3NP

10 August 1987

James, K.W. 1986. "Damned Nonsense!" - the geological career of the third Earl of Enniskillen. Ulster Museum Publication No.259, 24pp. ISBN 0 900761 18 0. Price £0.95 (£1.15 incl. p. & p. from the Ulster Museum shop).

Kenneth James's biography of William Willoughby Cole (1807-1886), third Earl of Enniskillen, charts the geological career of a remarkable man. With single-minded enthusiasm, Cole built up a superb collection of fossil fishes which, during his lifetime, was regarded as one of the finest in Europe. The Enniskillen Collection, numbering almost 10,000 specimens, was sold to the newly-opened British Museum of Natural History in 1883 for the record sum of £3,500; it remains a prized research collection.

The strange title of this very reasonably priced and generously illustrated, A5-sized booklet derives from the second Earl's views of his son's fossil-collecting tours. Fortunately for posterity, his opinion was swayed by the convivial company of a distinguished party of geologists who visited Cole's already famous collection at Florence Court, Co. Fermanagh, in 1835. The old Lord Cole found Sedgwick, Murchison, Griffith, Phillips, Egerton and Agassiz to be 'such a jolly set' that all opposition to his son's geological activities was dropped.

Cole wrote very little about his collection; his lasting contribution to the developing science of palaeontology lay in amassing the specimens and in generously allowing others to study them. Kenneth James uses photographs, anecdotes, and correspondence to bring Cole and his distinguished contemporaries to life, making this an entertaining and amusing book which can be enjoyed by geologist and layman alike.

It would be a pity if potential purchasers were put off by the title and by the peculiarly surrealist illustration on the cover.

Elizabeth J. Loeffler
Department of Geology
University of Bristol
Queen's Road
Bristol BS8 1RJ

22 May 1987

Bare Bones Dinosaur Tyrannosaurus rex model, about 1/12 scale, Methuens Childrens Books Ltd, 11 New Fetter Lane, London EC4P 4EE. Price £4.95 (trade discount 35% with first order on basis of sale or return for credit).

The merchandise of a museum shop weighs heavily on public goodwill and financial income, and it deserves as careful a review in these pages as the learned volumes for the curator's office.

The latest educational model is a card cut-out Tyrannosaurus skeleton which comes in a very large plastic bag, some 50 by 35 cm, with a colour flysheet announcing the contents. These include a colour poster about T. rex and a four page booklet by Isaac Asimov on the Age of Dinosaurs. Both are very acceptable. Asimov's text on dinosaur extinction is particularly clear and balanced about what is a complex debate. Unfortunately neither has a list of further reading, although they use pictures from books by Alan Charig and David Norman.

The model itself comes as four sheets of card which are accurately printed on both sides, an excellent feature saving doubling up or hand colouring blank reverses. Once cut out, the model assembles fairly quickly after one has mastered the Rubik's Snake-like design of flat pieces joined by linked tetrahedra which gives the model flexibility at almost every joint. Such flexibility is arguably unnecessary in the vertebral column around the ribcage, and in the tail, which is currently thought to have been fairly stiff and held out as a balancing pole. Building is made harder by the unforgivably sloppy mislabelling of the right leg parts as those of the left, and vice versa. Thankfully the corresponding faces of each joint are printed with the same number, greatly easing construction. However, the average ten year old would have difficulty without adult help. The packaging seems aimed at the child market but no skill level or age group is given (this should always be stated). The instructions are only fair: they do not, for example, suggest what type of glue to use. The accuracy of design is, again, only fair and one or two joints need to be forced to fit.

The completed model is all the floppier for its 110 cm length from nose to tail, and without support it looks like something the Phobosuchus brought in. Despite the illustrations given, it won't stand up but has to be hung - yet the beam given in the kit is far too short for anything other than a sit-up-and-beg posture, and won't support that for very long before beginning to droop. A further 50p's worth of wooden dowel and plenty of white thread enabled me to create the more natural stance of a running beast which has just spotted its dinner. Accuracy is, on the whole, as good as one can expect from the method of construction, but it's not perfect: many small bones are omitted and swopping left and right arms gave a better result. However, the model is, to its credit, based on the shorter-tailed reconstruction of recent years.

My general feeling is that the model's design is a novel experiment with some good features (e.g. the mobile and poseable skeleton) which hasn't quite worked in the expected way, and that the packaging and design haven't been completely adjusted to match this. It cannot be made wholly satisfactorily as it comes and as the instructions suggest.

So, to sum up, is Bare Bones Dinosaur sufficiently accurate, saleable and practical for the museum shop's clientele? It's effectively a very large and relatively expensive mobile, too floppy not to be hung from the ceiling (just as well, given its size), and too costly for the pocket money market. It's more likely to be bought as an occasional present or treat, and therefore falls within the more upmarket end of the range of the larger museum shop. By all means consider the beastie for your shop, but I would have been happier had the kit fully lived up to the packaging's claim to be 'scientific, accurate, fun to make, [and] fun to keep', especially in view of the price. Nevertheless, it's clearly an experiment, and if reviews like this encourage the publishers to produce items of better quality which can be sold in museum shops, then so much the better.

Michael A. Taylor
Leicestershire Museums Service
96 New Walk
Leicester LE1 6TD

29 June 1987

Daiches, D., Jones, P. and Jones, J. 1986. A hotbed of genius : the Scottish Enlightenment, 1730-1790. Edinburgh University Press, Edinburgh, xii + 160pp.

As a schoolboy I learned that central Scotland consisted of a rift valley bounded by faults running from Helensburgh to Stonehaven and between Girvan and Dunbar. What I was never taught in school was that during the eighteenth century this fault-bounded lowland had been the scene of such remarkable intellectual ferment that Scotland had come to be regarded as the throbbing cultural centre of the world. It was the age of the Scottish Enlightenment when that nation nurtured men of the calibre of Robert Adam, Joseph Black, Adam Ferguson, David Hume, James Hutton, Henry Raeburn, Adam Smith, and James Watt. It was an age when eager students flocked to Scotland as moths to a light. It was an age when Edinburgh began to think of itself not as 'Auld Reekie' but as 'the Modern Athens'. Today, to take a stroll among the sombre memorials of that city's Greyfriars Churchyard is to receive a powerful reminder of the intellectual talent which once was her's.

In Edinburgh during 1986 there was organised a special programme of events to commemorate the Scottish Enlightenment and this book was published as a contribution towards the celebrations. It is a handsome and splendidly illustrated volume which deserves a wide readership. There are six chapters: one devoted to the Scottish Enlightenment in general, one devoted to Scotland and America, and one each devoted to those four great Enlightenment figures - Black, Hume, Hutton, and Smith. Among those chapters the philosopher of science will turn to the essay on Hume and the historian of chemistry will turn to the essay on Black, but it is Jean Jones's essay on Hutton which will capture the attention of the historian of the earth sciences.

In 1947, on the 150th anniversary of Hutton's death, a granite tablet was placed over his hitherto unmarked grave in Greyfriars Churchyard. With breathtaking aplomb it proclaims him to have been 'The founder of modern geology'. Today such a sweeping claim must surely embarrass even the most ardent of Hutton's fans. There is, however, no disputing the fact that Hutton's theory of the earth, first publicly propounded in 1785, does indeed incorporate a number of ideas which were then startlingly original but which today constitute the very warp and weft of the earth-science's fabric. Since his death in 1797 Hutton has attracted a great deal of historical attention but, so far as the details of his life were concerned, all these studies were grounded upon John Playfair's admirable obituary of Hutton published in 1805. Very little else about Hutton's life had come to light. Recently, however, the situation has changed.

Following the 1968 discovery in Penicuik House of the 'lost' illustrations which were to have accompanied the projected third volume of Hutton's Theory of the Earth, Jean Jones began to research Hutton's life and she has succeeded in unearthing a surprising amount of fresh material. Her recent publications have shed significant new light upon Hutton, ranging from his involvement in the affairs of the Forth and Clyde Canal Company to his hitherto unsuspected interest in oceanography. In her essay in the present volume she makes use of all this new material to present a readable and authoritative account of Hutton's life. As such it deserves to be widely read among historians of the earth sciences although they should note that the essay makes little attempt at critical assessment of Hutton's intellectual achievement. The biography of a polymath - and Hutton, with interest ranging from geology to philosophy and agriculture, was certainly one of that breed - must always present an author with perplexing problems. We must hope, however, that Jean Jones will not be deterred and that she will go on to give us that full-scale definitive biography which Hutton so richly deserves. One final point: the Raeburn portrait of Hutton has often been reproduced but usually only in black and white. How delightful it is to see it here reproduced in full colour with Hutton appearing, as Robert Louis Stevenson once wrote, 'in quakerish raiment, and looking altogether trim and narrow, and if he cared more about fossils than young ladies'. But appearances may belie the truth. We now know that upon Hutton's death his close friend Joseph Black was surprised to discover that his late and unmarried companion possessed a natural son then aged about fifty. Clearly Hutton's passion had not always been for fossils rather than for young ladies.

Gordon L. Herries Davies
Department of Geography
Trinity College
Dublin 2
Ireland

28 December 1986

THE 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. Because of recent delays in publishing, four issues will be published in both 1987 and 1988, approximately quarterly, to make up the deficit to members.

NOTES TO AUTHORS

Articles should be submitted typed on good quality paper (A4 size) double spaced, with wide margin. 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 299771). Line drawings should be prepared in black ink at twice desired publication size. Photographs for halftone reproduction should be printed on glossy paper and submitted at approximately final size. 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. 50 reprints can be purchased at cost (details from the Editor). 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 Don Steward, Department of Natural History, City Museum and Art Gallery, Hanley, Stoke-on-Trent ST1 3DW (Tel. 0782 273173).

NOTES AND NEWS contains short pieces of topical interest. Please send contributions to Michael Taylor, Leicestershire Museums, Art Galleries and Records Service, 96 New Walk, Leicester LE1 6TD (Tel. 0533 554100).

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, Art Galleries and Records Service, 96 New Walk, Leicester LE1 6TD (Tel. 0522 554100).

BOOK REVIEWS contains informed opinion of 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.

INFORMATION SERIES ON GEOLOGICAL COLLECTION LABELS consists of loose A4 size sheets, issued irregularly, which carry reproductions of specimen labels usually written by a collector of historic importance. The aim of the series is to aid recognition of specimens originating from historically important collections. Contact Ron Cleevely, Department of Palaeontology, British Museum (Natural History). London SW7 5BD.

ADVERTISEMENT CHARGES

Full A4 page	£40 per issue)	
Half A4 page	£25 per issue)	Discounts for space bought in three or more issues
Quarter A4 page	£15 per issue)	

Further details from Diana Smith, Curator, Bath Geological Museum, 18 Queen Square, Bath BA1 2HP

Inserts such as publishers' 'flyers' can be mailed with issues of the Geological Curator for a fee of £35. 500 copies of any insert should be sent to the Editor.

SUBSCRIPTION CHARGES

UK Personal Membership	£6 per year
Overseas Personal Membership	£8 per year
UK Institutional Membership	£8 per year
Overseas Institutional Membership	£10 per year

All enquiries to the Treasurer/Membership Secretary, Tom Sharpe, Department of Geology, National Museum of Wales, Cathays Park, Cardiff CF1 3NP (Tel. 0222 397951).

BACKNUMBERS

Backnumbers of the Geological Curator (and its predecessor, the Newsletter of the Geological Curators' Group) are available at £2.50 each (£5.25 for the double-issues Vol.2, Nos.9/10 and Vol.3, Nos.2/3; £7.50 for Vol.4, No.7 Conference Proceedings) including postage. Orders should include payment and be sent to the Treasurer (address above).