GCG

THE GEOLOGICAL CURATOR

VOLUME 4 No. 3 Issue 3 for 1984

HENRY CHARLES BEASLEY (1836-1919)

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.

1985 COMMITTEE

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COVER. Portrait of Henry Charles Beasley (1836-1919). See article on p.133 by William A.S. Sarjeant, 'The Beasley Collection of photographs and drawings of fossil footprints and bones, and of fossil and recent sedimentary structures'.

THE GEOLOGICAL CURATOR

VOLUME 4, NO.3

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GEOLOGICAL CURATORS' GROUP

July 1985

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Wed. 18th September 1985
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Bolton Museum

Bolton Museum and its collections. Geoff Hancock (Bolton Museum).
James Lomax - a local palaeobotanist. Alan Howell (Bolton Museum).
Palaeobotanical classification for storage purposes. Cedric Shute.
A working palaeobotanists view of collections. Chris Cleal.

Contact: Alan Howell, Museum and Art Gallery, Bolton (Tel. 0204 22311 ext.361).

Fri. 6th December 1985
GCG - Annual General Meeting
Banqueting Hall, Dudley, West Midlands

Contact: Alan Cutler, 21 Primrose Hill, Wordsley, Stourbridge DY8 5AG.

Thu./Fri. 23rd/24th January 1986
The Conservation of Geological Material
British Museum (Natural History)

The problems of caring for geological material have long been familiar to all involved with geological conservation. With few full time Geological Conservators, news of modern techniques is slow to filter through the museum community. Because of this the Geological Curators' Group is organising a major international conference on 'The Conservation of Geological Material'. In a series of lectures and practical demonstrations, the conference will attempt to discuss most topics, problems and modern techniques relevant to geological conservation.

Lecturers will include top geological and archaeological conservators from Europe and America; their presentations will be submitted for publication in a special issue of the Geological Curator devoted to geological conservation. It is hoped that the conference and publication will create a new interest in Geological Conservation, and that informal networks of specialist geological conservators will be set up throughout Europe and America. A timetable and registration form is included with this issue of the Geological Curator.

Contacts: Christopher J. Collins, Earth Sciences Section, Leicestershire Museums Service, 96 New Walk, Leicester LE1 6TD (Tel. 0533 554100)
Peter Whybrow, Dept. of Palaeontology, British Museum (Natural History), Cromwell Road, London SW7 5BD (Tel. 01-589-6323).

Fri./Sat. 30th/31st May 1986
GCG - Cornish meeting
Programme to be arranged.

Contact: Lesley Atkinson, Camborne School of Mines, Redruth, Cornwall.

Tony Cross (Hampshire Museums) found this in A Geological Primer in Verse, with a Poetical Geognosy or Feasting and Fighting; and Sundry Right Pleasant Poems.

A GEOLOGICAL PRIMER

A was an Agate as round as a Ball.
B was Basalt in the cave of Fingal.
C was King Coal, of Oxford the pride.
D Doubtful Diabase, close by his side.
E was Eurite called White-stone, the natural brother
F of Felspar; and much they resembled each other.
G stands for Granite, as old as my granny.
H for rough Hornblende, as blind as a Zanny.
I was Iron-stone very dull looking and sad.
J was Jasper, in red and striped livery clad.
K was Killas, an old Cornish cousin of slate.
L was Limestone, reclined on a mountain in state.
M was Mica, a shining elastic bright blazer.
N Novaculite, ready to sharpen your razor.
O was Oolite or Roe-stone, with little round eyes.
P was Porph'ry in masses, that reach'd to the skies.
Q was Quartz, whose clear crystals like diamonds shine.
R was Rock-salt from Cheshire, fresh out of the mine.
S was Slate-rock all covered with shivery matter.
T Trap play'd with fire, though his mother was water.
V Variolite, cover'd with little white spots.
W Wacke, all disfigured with freckles and blots.
X stands for Cross-stone, so pearly and white;
a very near cousin of Z, Zeolite.

The Geological Curator, Vol.4, No.3, 1985 (for 1984), pp.121-126

EDITORIAL

GEOLOGY AT THE N.C.C.

INTRODUCTION

The aim of the following compilation is to bring to the attention of museum geologists several important developments affecting the state and status of geology within 'the government body responsible for nature conservation in Great Britain', the Nature Conservancy Council. Many museum geologists are active in the conservation of geological sites; it was the GCG of course which spawned the National Scheme for Geological Site Documentation (containing some 19000 site records at thirty-nine recording centres by the end of 1983; see Geol. Cur. 4, pp.95-99). The NCC regularly taps both the data contained in the scheme and in the heads of many museum geologists, who are often uniquely qualified to advise on local geological matters. The state and status of geology within the NCC is therefore of legitimate concern to the museum community. I have done little more than to collate the relevant evidence from published and unpublished sources and, using a few comments of my own, attempted to compile a coherent story. GCG members may wish to air their own views on any of the issues raised, using the pages of the Geological Curator.

Two related issues crucial to the state and status of geology within the Nature Conservancy Council have caused concern among the wider geological community over the last few months. One a long standing gripe and one a more recent development, they were both highlighted by events associated with the publication in June 1984 of NCC's important new strategy document Nature Conservation in Great Britain.

The most obvious and long standing criticism of NCC's involvement in geological conservation has been its consistent undervaluing of the science in terms of manpower and financial resources, compared with the biological side of its remit. NCC are well used to such complaints (from within and without), but the Conservation Committee of the Geological Society took the opportunity provided by NCC's consultation exercise with non-governmental organisations over the new strategy to put the case again for a more realistic assessment of the needs of geology by the Council, and to appraise it of initiatives already taken by other bodies deserving of NCC support and involvement. Stanley's Annual Report of the National Scheme for Geological Site Documentation (Geol. Curator 4, pp.96-97) included an edited transcript of the Conservation Committee's reaction to the draft strategy document circulated in the autumn of 1983 by NCC's Chief Scientist Dr Ratcliffe. Much of the (precious little) geology in Nature Conservation in Great Britain appeared as a result of the Conservation Committee's representation to NCC.

Following the strategy's publication, the Geological Society pressed for a high level meeting with NCC to discuss the special problems facing geology today and what the NCC's view is about them. Such a meeting was held on 12th September 1984 and attended for the Geological Society by Professor C.H. Holland (President), Dr W.D.I. Rolfe (Chairman, Conservation Committee), Dr R.G. Park (Hon. Sec., Geological Society) and Mr R.M. Bateman (Executive Secretary), and for the NCC by Mr W. Wilkinson (Chairman), Mr R.C. Steele (Director General) and Dr D. Ratcliffe (Chief Scientist), with Mr R.A. Fox representing the Institution of Geologists. A report of this meeting, kindly provided by the Geological Society and dated 1st November 1984, is reproduced below with permission. The practical results of the meeting are discussed later.

The second issue and cause for concern springs directly from the new philosophy adopted by NCC towards the future designation of SSSI's, as spelt out in their strategy document. The new rationale marks a departure from NCC's long-established scientific tradition; according to Dr George Black the Council now intends to select additional sites of Special Scientific Interest under the Wildlife and Countryside Act, 1981, for 'cultural, recreational, aesthetic, inspirational and even 'spiritual' reasons' (see below). The implementation of such a policy clearly caused dissension within NCC itself and its adoption led to the widely publicised resignation (on 30th November 1984) of Dr Black, the de facto Chief Geologist at NCC since 1960 and one of the most widely respected figures in British geological conservation. Should we share Dr Black's apprehensions about the likely impacts of implementing the new policy on Britain's geological community and the extractive industries? His case and the public reaction to it are summarised below.

But first I will return to the Geological Society's attempts to influence NCC's attitude towards geology. What follows is the Society's own record of the issues raised, and is also reproduced in the July issue of the Geological Society Newsletter.

REPORT ON THE MEETING BETWEEN THE GEOLOGICAL SOCIETY AND THE NCC ON 12.9.1984

The Society was pleased that note was taken of its comments on Dr Ratcliffe's 'Objectives and Strategy for Nature Conservation' document, and that appropriate additions were made to the published version, Nature Conservation in Great Britain (1984). When compared with the excellent detailed account of biological conservation, however, there is relatively little discussion of the rationale behind geological conservation and of its

future prospects in terms of protection of key sites, especially unique palaeontological and mineral sites threatened by private collecting. It should be stressed that although biological sites are living, complex entities to conserve, many can be reinstated if damaged. Geological sites are complex in quite a different way and are less capable and in some cases incapable of restitution once damaged. We therefore see a need for a supplementary report on the objectives and strategy for geological conservation (there has been no such global statement of policy since 1974) including recommendations for the updating of the Geological Conservation Review, once completed.

Geological Records Centre

At a time of growth in geological education (field trips continue to grow by about 8% each year) there is increased pressure on sites. At the same time, restoration of derelict land and the infilling of quarries, as well as legal restrictions arising from Health and Safety at work and other Acts, combine to deny access to sites of geological interest. The voluntary National Scheme for Geological Site Documentation helps to alleviate this by suggesting alternative sites. It has already recorded 19000 sites, but impetus has slowed. We should like the NCC to press for a Geological Records Centre to be set up within NERC, analogous to the Biological Records Centre.

Voluntary Help

Nature Conservation in Great Britain records the success that geology has had in tapping voluntary workers in geological conservation. With university cutbacks and an increasingly commercial outlook by the British Geological Survey, it seems unlikely that this voluntary professional help will be able to operate at previous levels. Moreover, it is least available in remote areas of greatest need, where protection is required. We therefore feel, in line with NCC's own thinking, that more geological National Nature Reserves are needed with on-site educational and recreational facilities. We were suprised that a former member of our Conservation Committee had to go so far as to threaten his resignation from the Regional Committee for Scotland before agreement could be achieved to purchase Achanaras Quarry at £3,000. We hope that this is not symptomatic of a lack of even-handedness in dealing with geology within NCC!

Geological Representation in NCC

In view of Dr Bassett's commitments to Welsh regional affairs, the appointment of an additional geological representative on Council is highly desirable. The remarkable successes and few failures experienced by the Geological Unit are a tribute both to the quality of NCC geological staff, and to the level of voluntary assistance. We feel that there is over reliance on this level of assistance. There are only nine NCC geologists with geology as their prime responsibility, compared with thirty three biologists serving biology. A further c.142 biologists are employed on regional staff, compared with only c.5 geology graduates, i.e. a total of 175 biologists to 14 geologists. Out of 59 non-geological staff at PSO grade, there is only one geologist. We feel that it is essential to redress this imbalance and were gratified that the need appeared to be recognized at the meeting. We grant that there are more biological sites, occupying a greater land area than geological sites, yet fewer of these are of national importance (Nature Conservation in Great Britain, p.103 records 1500 sites of national or international importance, whereas only 834 biological sites are of national importance). The geological community is increasing its demands upon NCC - more geology is now taught, and sites are used more; management agreements consume more time, vetting of applications to work in SSSI's is demanding.

In this connection, we view the Doe Lea failure extremely seriously. We were gratified that the possibility of rectifying this error will be explored and for the assurance that steps were being taken to prevent future occurrences of this kind.

We were disturbed to learn that recent changes in line management appear to have moved the geology team one step lower in the administrative hierarchy, with consequently less immediacy of approach to top management, and apparent demotion of geology within the NCC. That the geology and physiography branch administratively is on a par with separate biological interests such as birds, grasslands, terrestrial invertebrates etc. seems to us unbalanced.

While we appreciate the Chief Scientist's assurance that he may be approached directly on matters of concern to the Society, we should like to press the NCC for an enlargement of the Geology and Physiography Unit to take account of the separate NERC-recognized disciplines of Petrology/ Mineralogy, Structural Geology, Stratigraphy, Palaeontology, and Quaternary Geology/ Geomorphology. We should welcome the appointment of an Assistant Chief Scientist to manage this team, since such an arrangement, implying a division into biological and geological managerial interests, would facilitate the resolution of the inevitable conflicts that must arise between ecologists and geologists competing for sites in remote areas where the 'sterilisation of land' argument applies (Nature Conservation in Great Britain, 14.3.7).

Furthermore, in view of the above, it seems advisable that an extra representative for geology should be present on Council, and we welcome the invitation to suggest nominations.

Research and Publications

We would like to see more independent research commissioned, especially into matters of long term concern that cannot be

undertaken by the Geology Unit because of its day to day preoccupations, e.g. into the impact of geological collecting at SSSIs and the conditions under which it should be conducted, use of statutory powers, encouraging cooperation with local nature Trusts, etc.

State and Status of Geological Collections

The whole question of the fate of geological collections, many of them derived from NNRs or SSSIs, needs to be investigated in the light of this Society's report on the State and Status of such collections.

Status and role of the Institution of Geologists

The Institution of Geologists was established to represent the geological profession in the United Kingdom, to advance the profession and practice of geology and allied disciplines, and to maintian proper professional standards and ethics. Most of its members (numbering about 1400) are geologists, geophysicists, and other earth scientists employed in Britain or working for British companies overseas. Whereas the Geological Society exists mainly to promote and encourage the study of geology, the Institution's primary function is to look after the interests of working geologists, particularly in industry.

It is very much in the interests of the Institution to encourage and support conservation wherever possible and, through its Field Access Working Party, the Institution is actively considering the problems involved in geological visits to quarries and other important geological sites, and is in the process of establishing a code of practice for access.

The Institution wholly supports the Society's views on Geological Conservation.

Recommendations

We recommend:

1. That an additional geological representative be nominated to the Council.
2. That a report on the objectives and strategy for geological conservation be prepared, to supplement 'Geological Conservation'.
3. That a means be found to update the Geological Conservation Review.
4. That a Geological Records Centre be established within NERC analogous to the Biological Records Centre.
5. That more National Nature Reserves be acquired for geology, with on-site educational facilities.
6. That more geologists be recruited to the Chief Scientist's team and to regional staff.
7. That a senior managerial post be established for geology at Assistant Chief Scientist level.
8. That research be commissioned into such matters as the impact of geological collecting at SSSIs.

Our understanding of points arising from the Meeting

1. The suggestion of an additional geological representative on Council was welcomed by NCC and our advice as to nominations would be sympathetically received.
2. Regular meetings between the NCC and the Society will be instituted.
3. Dr Ratcliffe, Chief Scientist, may be approached directly on wider matters of geological conservation.
4. NCC will welcome a statement from the Society detailing the particular problems of geological conservation.
5. The need for greater geological staff representation is recognised by NCC.

1st November 1984
W.D.I. Rolfe, R.G. Park and R.M. Bateman

SITES OF SPECIAL SPIRITUAL INTEREST?

That it was Dr George Black's intention to use his resignation from the NCC on 30 November 1984 to maximise media attention on the state of geology within the Council is clear from the widely distributed press release put out by 'George Black Associates (Conservation Analysts and Assessors)' on the following day. The main arguments ran as follows:

'Britain's leading geological conservationist resigns over policy differences'

'Dr George P. Black left the service of the NCC yesterday as he could no longer support the implementation of the Council's new policies as set out in their recent publication Nature Conservation in Great Britain. His decision was taken after full consideration of the new policies and after consultation over their likely impacts with Britain's geological community and with the extractive industries.

NCC's new strategy, as published, marks a departure from its long established scientific tradition; the Council now intends to select additional Sites of Special Scientific Interest under the Wildlife and Countryside Act, 1981, for cultural, recreational, aesthetic, inspirational and even 'spiritual' reasons. It is intended that eventually landowners' and occupiers' freedom of action will be severely restricted and subject to control by NCC in perpetuity over at least 10% of the total area of Britain (i.e. over more than 5½ million acres). Dr Black considers that the implementation of such policies can only lead to confrontation with all other land users.

In a farewell letter addressed to his staff, Dr Black writes: "Recent developments in NCC policy are, in my opinion, not easily acceptable. Many are alarming in their uncompromising militancy and matters have been made worse by the small print towards the end of Nature Conservation in Great Britain. In this publication NCC policy can be seen to break away from its scientific base and to move strongly towards attempting

to select and conserve a flood of scientifically sub-standard SSSIs for cultural, recreational, inspirational and spiritual reasons. Further, the general tone of the policy statement indicates a swift move away from conservation by co-operation and consent in favour of a new stance based on arbitrary decisions against which there is little if any appeal. I have always been in favour of conservation by consensus and not by diktat; further I do not feel that I am professionally qualified to select SSSIs on cultural, recreational, inspirational and spiritual grounds. The new policy seeks conflict rather than co-operation and in my opinion will be disastrous for earth science conservation, whose primary requisite is symbiosis with the mineral industry."

Throughout his service with NCC, Dr Black has been well-known for his efforts to maintain the closest possible relationships between the scientific community (as the persons for whom SSSIs are primarily to be conserved) and the other land using interests who are the owners and creators of many of the most important Sites. In Dr Black's opinion, conservation, both biological and geological, must be flexible enough to accommodate the needs of both the site owners and the site users. It must accept changes to the environment and seek to maintain its quality by offsetting losses with gains elsewhere. As a form of applied science, conservation must confine its attentions to scientific parameters (e.g. in the criteria it employs to evaluate sites) and not be seduced into accepting the apparently easy options provided outside science.

Unfortunately these views are in direct conflict with recently adopted NCC policy as promulgated in the definitive publication Nature Conservation in Great Britain.'

For those with access to NCC's new strategy documents, the sections most relevant to the above press release are paragraphs 14.2.2, 14.2.3, 14.2.4 and 15.2.5 of the main document Nature Conservation in Great Britain, and 2.1, 2.3, 2.4, 3.2, 3.3 and 3.4 of the separate supplementary Summary of objectives and strategy.

Given the position of geology within NCC highlighted by the report (above) of the Geological Society (on whose Conservation Committee Dr Black sits) it is perhaps a little puzzling to the 'outsider' why Dr Black should have restricted his resignation issue, at least publicly, solely around the potential widening of criteria used by NCC in designating SSSIs (to include 'cultural, recreational, aesthetic, inspirational and even spiritual' aspects). Many may share his disquiet but the long term effects of such changes are surely more difficult to predict than those, already with us, which stem from the presently recognized shortcomings in NCC's provision for geological conservation today? Certainly what media reaction there was to the press notice from George Black Associates failed to appreciate his unease about the long term disadvantages to geological site conservation which he saw resulting from NCC's new strategy; the Guardian took the line that a new 'uncompromising militancy' within NCC was possibly long overdue. The Guardian followed up an almost verbatim report of the original press notice on 1 December 1984 (under the title 'Scientist quits 'militant' nature council') with a more reflective leader on 5 December, headed 'Rancour in the grass'; the latter's general tone can be seen from the following extracts:

'This is a strange time for civil strife to break out in the Nature Conservancy Council. For years the NCC and the numerous voluntary organisations working the same ground have faced official indifference despite numerical evidence of strong popular support. Within the past twelve months their outlook has suddenly changed. Conservation has been promoted from a worthy cause to a political issue. The failings of the Wildlife and Countryside Act, 1981, no longer have to be argued: the Government recognises them, looks for amendments, and gives the NCC an extra £7 million to cover its added responsibilities.'.....'Against this backdrop the resignation of Dr George Black, the NCC's Chief Geologist, may be no more than an aberration; but his claim that the staff are being radicalised into young zealots will rejoice that section of the farming lobby which has little time for the NCC or any of its works. There is good reason why the staff should be radicalised, but not much evidence to support Dr Black's claim that they are.'.....'Dr Black's allegation that sites are now being chosen for protected status on diminishing grounds of environmental value needs evidence to support it. The NCC is amply occupied with the sites it has already named and any new ones are selected on grounds of their imminent vulnerability as habitats. That is not popular work with the landowner, but unless more of Britain is to go East Anglia's way into ecological oblivion a slight touch of zeal may be essential to the job.'

NCC GEOLOGISTS - ARE THERE ENOUGH?

A major concern brought out in the Geological Society's report reproduced above is the inadequacy of geological representation at all levels within NCC - on the Council and Committees, in senior management, among the Chief Scientist's staff, and at Regional Officer level. The imbalance in favour of the biologists is clear for all to see.

Growth in regional staff over the years has not been matched by equivalent growth in geological support - without which the regional staff cannot carry out their geological function. The Wildlife and Countryside Act, 1981 has resulted in a massive increase in workload for the NCC as a whole. But, as in the past, the recent increase in regional staff prompted by the requirements of the Act is not being matched by the extra geologists necessary to back them up.

Ironically, the longstanding and close cooperation between the small but effective

and well respected members of the geological units within the NCC and the wider geological community may have worked to the long term disadvantage of the science within NCC itself - at least in terms of permanent staffing levels. Geologists outside the NCC (drawn principally from the universities, museums and the British Geological Survey) have always been willing to assist NCC staff with site reconnaissance and specialist advice - perhaps to such an extent that the argument for NCC being too understaffed to properly respond to its geological responsibilities is dangerously flawed. Nevertheless, at a time of savage financial cut backs, particularly in the universities and BGS, the ability of this wider geological community to continue such cooperation at equivalent levels must be in doubt; surely it would be wise for NCC to rely less on this source of expertise and to expand its own specialist staff? This point was forcefully put by Dr Ian Rolfe (Hunterian Museum, Glasgow University and Chairman of the Geological Society's Conservation Committee) in a Guardian letter of 10 December 1984:

Why the NCC shouldn't go off its rockers

'Sir - I refer to your leader (December 5) concerning Dr Black's resignation from the Nature Conservancy Council: a tragedy after so many years of outstandingly effective service to geological conservation in this country. It signals his failure to convince from within the senior management of NCC that geology deserves a fairer share of the conservancy cake, in terms of staffing.

Consider the facts: to date 834 biological sites are agreed to be of national biological significance. Yet many more geological sites are recorded by Nature Conservation in Great Britain as being of national or international significance - as stratotypes or areas yielding unique evidence of ancient life, as well as of incidents and features from Britain's rich geological past over almost 3,000 million years. Couple that with the fact that there are only 12 geologists on the NCC staff to monitor these sites, compared with 175 biologists, and that Dr Black was the only geological Principal Scientific Officer, compared with 58 non-geological PSOs (or above), and you sense his frustration, to the point of resignation.

I do not share Dr Black's fear that the metaphysical qualities newly injected by NCC's recent Summary of Objectives and Strategy need prove damaging to its cause. Public relations are needed in any campaign for conservation, and zeal and appeal to such intangibles must play a part. Indeed, Dr Black himself has long been zealous for geology, an attribute which my committee, of which Dr Black remains a member, takes for granted.

The great effectiveness of geological conservation in Great Britain depends on hundreds of geologists in Higher Education and other institutions, as well as knowledgeable amateurs, freely giving their services to evaluate and monitor geological SSSIs. This system was largely evolved by Dr Black, and works well - but at substantial cost to the geological community, and the (now cut back) institutes they serve. The time has come for geological posts within NCC to be increased in number, and others inserted at the high managerial levels enjoyed by the biologists. Only then will NCC's geologists be able to exercise their fuller responsibilities for geological conservation in Great Britain, as their biological colleagues do so vigilantly for its wildlife.'

Unfortunately perhaps, the implications of Ian Rolfe's letter (that with their traditional sources of aid coming under ever increasing pressure, the NCC should itself carry out more of its responsibilities via an increase in staff) were somewhat clouded by a response from Dr Peter Banham (Bedford College, London) which appeared on the Guardian letters page 27 December 1984:

'Regarding Dr Black's resignation as chief geologist of the Nature Conservancy Council, Dr Rolfe's otherwise excellent letter (December 10) could be taken to imply that the contribution made by non-NCC geologists to conservation may decrease as a consequence of the recent cuts on Government funding to the universities and polytechnics.

Although these cuts have happened, it would be detrimental, both for conservation and for the teaching of geology at all levels, if non-NCC geologists and their institutions failed to keep up their vital contribution.

Given the enormous task ahead, an increase in the number of the NCC's own geologists and physiographers is surely needed, not in any way to replace the effort contributed by those outside, but rather to expand the NCC managerial service.

As I understand it, this is the essence of Dr Black's highly successful, enabling system, which is now being closely studied by conservationists of all sorts.'

THE STATUS OF GEOLOGY WITHIN THE NCC

The NCC has long had to suffer accusations of treating the earth sciences as a cinderella of its internal administrative and managerial structure, and the NCC's recent line management changes (effective from 1 April 1984) appear to formalise a second class status for the Geology and Physiography Branch. Previously no easy comparison between geology and biology could be made since the geologists' line management ran through the Scientific Services Division to the Deputy Director General - although geology's more lowly status was implicit in the relative gradings of the 'Chief Biologist' and 'Chief Geologist' (two grades below). With the scrapping of the Deputy Director General's post and the assignment (in managerial terms) of a status to the Geology and Physiography Section equal to each of the eleven separate biological subdisciplines (e.g. Woodlands, Coastal Terrestrial Habitats, Peatlands, Birds,

Mammals, Freshwater, etc.) - and reporting only indirectly to the Chief Scientist (ex 'Chief Biologist') via his Assistant - the comparison is all too apparent. Under such circumstances, the voice of earth science within the NCC must appear weaker than ever to concerned geologists outside.

RECENT DEVELOPMENTS

NCC replies to the Geological Society

A preliminary reply dated 27 March 1985 has been received by the Geological Society, from the NCC's Chief Scientist, in response to the report reproduced above. The Geological Society has yet to finalise its evidence of the special problems facing geological conservation today, as requested by the NCC, and another meeting is proposed to discuss further NCC's reaction to the original report. Without wishing to preempt or prejudice these further developments, it is encouraging to be able to report that the Chief Scientist's preliminary response included: a recognition that geological National Nature Reserves are under-represented, and that 'low cost' purchases of geological sites are planned; an expansion of the NCC's publicity and educational programmes, in both biology and geology; the addition 'within a couple of months' of more geologists to the Council, the Advisory Committee for Scotland, and the Advisory Committee on Science; a recognition that geological expertise is under-represented on their staff and an indication of a planned increase. It is less encouraging to report that at this stage the NCC sees no prospect of supporting the foundation of a Geological Records Centre, analogous to the Biological Records Centre, beyond that of the Geological Conservation Review database; and there seems little cause for optimism over their perceiving the need to expand the Geology and Physiography Section. As yet, NCC have not responded to the Geological Society's disquiet concerning the administrative status of the Section, nor to their concern over the future of geological collections made from NCC designated sites. A full transcription of the letter from NCC's Chief Scientist is published in the July issue of the Geological Society Newsletter. The geological world will follow developments keenly at the NCC to see if and when their promises are implemented.

Dr Black's resignation

Inevitably, the public demonstration of irreconcilable differences between a government funded organisation, like the NCC, and a widely respected senior employee, like Dr George Black, are rarely allowed to appear instrumental in forcing major policy changes upon the employing authority. Yet as a means of highlighting what might otherwise pass unnoticed by many outsiders, who should be concerned, a well publicised resignation can be an effective (if drastic) weapon. Dr Black's resignation and his use of the media to raise issues affecting the future of geological conservation in Britain have produced little visible reaction from the NCC, at least to the concerned onlooker; even his post remains unfilled after six months. Hidden from view within the Council, however, the impact of his resignation should cause some rethinking which, in concert with constructive lobbying from those outside bodies, like the Geological Society, with a legitimate interest in how NCC fulfills its responsibilities to earth science, must surely lead to a more secure future for geological conservation generally.

ACKNOWLEDGEMENTS

Written sources are acknowledged in the text. I thank those members of the Conservation Committee of the Geological Society who provided material and useful discussion, particularly its Chairman W.D. Ian Rolfe (Hunterian Museum), and also Michael Stanley (Derbyshire Museums Service and Coordinator, National Scheme for Geological Site Documentation) and Roy Clements (Leicester University). I thank the Committee as a whole for allowing me to reproduce their report to the NCC dated 1 November 1984.

Peter R. Crowther
Editor, Geological Curators' Group

4 June 1985

The Geological Curator, Vol.4, No.3, 1985 (for 1984), pp.127-128
COLLECTIONS, COLLECTORS AND MUSEUMS OF NOTE. NO.45 (cont.)

GEOLOGY AT STOKE-ON-TRENT MUSEUM AND ART GALLERY: SUPPLEMENT

BY DONALD I. STEWARD

The information below brings up to date the original article by Steward (1985) on 'Geology at Stoke-on-Trent Museum and Art Gallery' (Geol. Cur. 4, 29-42).

COX, MALCOLM D.

The sorting and distribution of the collection of 1765 geological items donated by Malcolm Fox to STKMG (accession number 7/NH/1980) has now been completed. Under the terms of the donation STKMG was given the authority to relocate specimens to other institutions, at the discretion of curatorial staff. This relocation took into consideration the nature of the material and its usefulness to institutions active nearer to the site of collection. A listing of specimen localities is available from this Museum upon request.

The 478 specimens retained by STKMG were in general those collected in Staffordshire and those deemed to be of use as comparative material from Carboniferous horizons elsewhere. STKMG also retained selected samples from other horizons for the general geological collection together with 14 specimens labelled in the hand-writing of J.T. Wattison, the uncle and mentor of M.D. Cox.

The majority of the 478 specimens transferred to the Earth Science section of the North Staffordshire Polytechnic were those with no locality data and those fossils which are relatively abundant in the horizons in which they were found. The 156 specimens transferred to Buxton Museum were from Derbyshire sites (mainly Treak Cliff, Castleton), in excess of those required by STKMG as comparative material. The National Museum of Wales received 446 fossils (mainly trilobites and graptolites) collected in Wales. Ludlow Museum, as the geological centre for the Shropshire Museum Service, was presented with 109 fossils relating to that county.

WARD, JOHN (11.8.1837 - 30.11.1906)

The donation of 243 Carboniferous Coal Measure fish fossils by the North Staffordshire Polytechnic (accession number 43/NH/1984) has increased the Museum holdings of fish collected by Ward to nearly 800 items. This means that the collection remaining on Ward's death and subsequently divided (see N.S.F.C. 1907/08, 1908/09a) between the North Staffordshire Field Club and the North Staffordshire Institute of Mining and Mechanical Engineers (subsequently incorporated into the North Staffordshire Polytechnic) has been re-united.

ROCK AND MINERAL COLLECTIONS

Approximately 95% of the total present holdings of rocks and minerals are now registered - just over 2700 items.

The rock collection has been completely rearranged according to the system listed by Harrison and Sabine (1970, Rep. no. 70/6 of the (then) Institute of Geological Sciences). The sedimentary rocks are stored stratigraphically and within this are separated into clastic and chemical-biochemical groups; igneous and metamorphic rocks are stored as coded. Building stones - igneous, metamorphic, and sedimentary - are kept as a unit, alpha-numerically coded and stored as above.

FOSSIL COLLECTION

Nearly 3300 fossils have now been individually registered - approximately 75% of the total collection at present held at STKMG.

RETRACED COLLECTIONS

A representative set of gemstones purchased in 1944 by the Museum from George Tarratt Ltd., 19 Market Street, Leicester (acc. no. 648,44) had, until recently, been thought lost. However, a letter written to a lapidary firm enquiring about the availability of a reference set of polished stones (to be used for comparison with jewellery brought into the Museum for identification) was noticed by the Director (Mr A.R. Mountford) and it reminded him of a small collection of gems stored in the main museum strongroom. Investigating this lead, a small box of gems was discovered nestling among the likes of original Wedgwood manuscripts. The gems, purchased for six guineas, had apparently been placed in the safe at an unknown date for security reasons as the set contained a diamond (approximately 3mm cube!). The Keeper of Natural History (Geoff Halfpenny - at the Museum for over 17 years) and myself (here for 7 years) had not seen the collection before, and it had never occurred to us that this comparatively unimportant material might be lurking in the most secure place in the building. Such a find does give some hope that other untraced collections may appear intact one day, although it also raises the question of whether it would be better to lock all collections into the safe so that they remain intact for years to come!

Fig.1. Photograph of John Thomas Wattison and his wife Alice Mary (nee Bennett) taken in Portugal, 1928. A copy of an original belonging to their son, Dr A. Wattison.

DATA PREPARATION PROJECT

Since October 1983 an MSC funded project, known internally as MAGIC (Museum and Art Gallery Initial Computerisation), has been completing computer compatible MDA cards in all sections at STKMG. During this time the following three geology graduates have been employed part-time to catalogue the geological collections:
Bob Holmes-Ievers Nov.1983-Feb.1984;
Andy Renwick Feb.1984-Feb.1985;
Kay Brindley Feb.1985-present.
There has been some additional input from Angela Edgar, the Project Supervisor, who is also a geologist.

About 3500 specimen records have been transferred on to MDA cards, including approximately 95% of the rock and mineral collection, the Sarjeant Collection, and all the Ward Carboniferous Coal Measure fish; work is now progressing on the bulk of the fossil material.

Two publications are planned: a revised booklet about the Sarjeant North Midland Minerals (now completed and awaiting distribution), and a booklet about the Ward Collection (in preparation). Experiments are also taking place with a video camera and it is hoped to produce a video about the Sarjeant material in the near future.

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COLLECTIONS, COLLECTORS AND MUSEUMS OF NOTE. NO.47

ROBERT HUNT F.R.S. (1807-1887)

BY R. LESLEY ATKINSON

The obituary of Robert Hunt reproduced below is taken from the Western Antiquary, vol.7, pp.147-149 (December 1887). It was written by T.W. Newton F.R. Hist. Soc., whose connection with Hunt is not known.

OBITUARY

Robert Hunt was born at Devonport (then called Plymouth Dock), on the 6th September, 1807. Just before this date, his father, who was an officer in the navy, had lost his life through the foundering of H.M.S. Mouchcron in the Aegean Sea.

Having received his earliest education in his native town, and subsequently at Penzance, to which place his mother removed, Robert Hunt, when about thirteen years of age, came to London. Here he was placed with a chemist at the West End, and afterwards with a physician, in view of adopting the medical profession; and at this time he attended the lectures of a celebrated anatomist. Becoming weak in health, and objecting to the treatment he received, he returned to Penzance. Later on he came again to London for a time, and during his second sojourn he appears to have received substantial support from two remarkable persons, viz., Mrs. Fry and Henry Hunt (known as 'Radical Hunt').

Once more he returned to the West. At the death of his grandfather, which occurred about this period, he came into possession of a small legacy, which enabled him to indulge in a holiday, and he then devoted several months to pedestrian travel through Cornwall. In beginning this journey, he says: "I landed at Saltash from the very ancient passage-boat which in those days conveyed men and women, carts and cattle, across the River Tamar, where now that triumph of engineering, the Albert Bridge, gracefully spans its waters." During this tour he "gathered in their native homes" those weird legends illustrative of ancient manners and superstitions which afterwards appeared in his charming contribution to folk-lore, the Popular Romances of the West of England.

Cornwall and Devon were always dear to the heart of Mr Hunt. He dwells with enthusiasm on "the rugged granite range of Dartmoor, rich with the golden furze; the moorlands of Cornwall, with their mighty Tors and giant boulders fringed with ferns and framed in masses of purple heath; the stern coasts, washed by an emerald sea; ... the woodclad valleys, ringing with the rush of rivers, and sheltered plains, rich with an almost tropical vegetation."

After publishing some juvenile literary production, he appears to have turned with great energy to the study of chemical and physical science, and he gave much attention to original scientific investigation. In 1840 he obtained the appointment of Secretary of the Royal Cornwall Polytechnic Society, which brought him into close relations with the miners of the western counties, in whom he was always greatly interested. To the work of this office, combined with constant travelling and lecturing on scientific and other subjects, he gave all the vigour and earnestness which were his special characteristics. When delivering an address, he is said to have had peculiar power in holding the attention of his audience. Caroline Fox, of Penjerrick, in her diary of August 12th, 1841, thus writes; "To Hunt's lecture in the evening." Calling to mind his ceaseless activity as a lecturer, it may be well imagined how often a similar remark might have been made, in those early days, in Cornwall and Devon.

In the year 1845, on the invitation of Sir Henry De la Beche, Director of the Geological Survey, Mr Hunt came to London, and was appointed Keeper of the Mining Records. On the establishment of the Government School of Mines, in 1851, he was made Lecturer on Mechanical Science, and two years later, Lecturer on Physics. The lectureships in science he held only for a short time. The main work of his life was in connection with the Mining Records Office, and the compilation and publication of statistics relating to mines. This office existed until the year 1883, so far as the Jermyn Street Institution is concerned. The work was then transferred to the Home Office; and is now carried on there by Mr Hunt's two assistants, Mr R. Meads and Mr J.B. Jordan.

"Until 1845," Mr Hunt tells us, in his British Mining, page 813, "no successful effort has been attempted to obtain reliable returns of the quantities of metalliferous ores obtained annually from the mines of the United Kingdon." Specially worthy of note is the fact that the collection of mineral statistics was an arduous undertaking, and its successful result was entirely owing to the tact and energy of Mr Hunt; there being at that time no law to compel owners of mines to give returns of their production. The Mining Record Office also became the depository, for the use of the public, of a valuable and extensive series of plans and sections, illustrating the subterranean workings of the metalliferous mines and collieries of the kingdom. It is gratifying to know that Mr Hunt's efforts met with the cordial co-operation of mine-owners and others; indeed, so highly was his work esteemed, that in 1860, he was presented with a testimonial of the value of five hundred guineas.

In the year 1854, Mr Hunt was elected a Fellow of the Royal Society; he having previously published, in the Philosophical Transactions, a memoir on phenomena connected with photographic processes.

Fig.1. Robert Hunt F.R.S. (1807-1887)

Mr Hunt was for many years a strenuous advocate for the establishment, in mining centres, of scientific schools for young miners, who always had his warmest sympathy. To him chiefly is owing the institution of the Miners' Association of Cornwall and Devon, which finally resulted from a public meeting at Camborne, called together by Mr Hunt, and presided over by Sir John St. Aubyn, Member for West Cornwall. It has been said that the scientific knowledge acquired by metalliferous miners through this association has contributed to the improvement of mining in all parts of the world.

He was closely connected with the organisation of the Great Exhibition of 1851, and also with the International Exhibition of 1862; for both of which he furnished guides and synopses. In 1866 he acted as one of the Royal Commission appointed to consider the possible exhaustion of coal fields of Britain.

The writings of Mr Hunt relate mainly to photography, the chemical action of light, mining, and folk-lore. He edited and reconstructed Ure's great Dictionary of Arts and Sciences. He contributed to the Art Journal, the Quarterly Journal of Science, The Athenaeum, the Dictionary of National Biography, the Western Antiquary, and many other publications. And even so late as the year 1884, after he had retired from active life, he published his important work British Mining; a volume of nearly one thousand pages, and of which he was preparing a new edition at the time of his death. His pen was never at rest. From the picturesque imagery displayed in some of his earlier writings, he was frequently spoken of as the 'Poet of Science'. His Panthea (although considered by its author to have been misunderstood), was, at the time of its appearance, characterised as work in which "Philosophy and Poetry are finely blended, and great truths and noble sentiments are expressed in language full of beauty and eloquence." His Poetry of Science passed through three editions.

In any publication issued in the western counties of England, it would be superfluous to dwell on the personal characteristics which made Mr Robert Hunt so deservedly popular. Scattered about the world, there might now be found many who owe their success in life to kindly help received from him. His fluent speech, his courteous bearing, his unvarying readiness to place his knowledge and influence at the service of others, will not readily be forgotten; and by no persons will respect for his memory be longer cherished than by those who had the privilege of daily association with him.

THE ROBERT HUNT COLLECTION

On the death of Robert Hunt in 1887 a fund was set up for a memorial to him. The donors from London suggested the getting up of a medal but local people thought a museum would be more desirable in the district. This was accepted and funds were made available to that end on the condition that it was called The Robert Hunt Museum. The collections of Mr Stephen Davey of Redruth and another unknown local gentleman formed the basis of the display. The unknown figure may have been Hunt's friend Sir John Herschell, whose wife possibly handed over Sir John's collection on his death.

The original building consisted of a large hall 40 x 30 x 20 feet high adjoining the Redruth Science and Art Schools on a site presented by Lord Clifton. Underneath the hall were rooms for the caretaker and storage space. The total cost was about £700. Initially there were seven cases containing 2263 specimens. The museum was opened on October 26th, 1891 by the chairman of the museum building committee Mr W.M. Grylls (from a local mining family). The building still survives.

The museum was absorbed into the Redruth School of Mines at some unknown date, while the Redruth, Penzance, and Camborne mining schools merged in 1909. The collection was transferred to the Camborne Museum in 1953 with the understanding that it should be made available to the public and displayed in the same cases. Much of the material was abandoned in cardboard boxes at the Camborne Mine and has since disappeared.

Fig.2. The Camborne School of Mines Museum at Camborne in 1904. From Mate's (1904) Illustrated guide to Camborne.

Fig.3. The Camborne School of Mines Geological Museum at Pool in 1985.

In 1975 the Camborne School of Mines moved into new buildings on the Trevenson site half way between Redruth and Camborne. The old cases were in poor condition and left behind but the Robert Hunt Collection has been given prominent display space in new cases in keeping with the original idea of a memorial to the founder of mining education in Cornwall.

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1851, 1855. Elementary physics.
1851. Handbook to the Official Catalogue of the Great Exhibition.
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1853. Manufacturer in metal (Cabinet Cyclopadeia).
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1867. (pamphlet). Is it practicable to insure colliery property, and the lives of coal miners?
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Royal Cornwall Polytechnic Society's Reports. Numerous papers related to earthquake phenomena, air in mines, waters from mining districts, Cornish engines, electricity of mineral veins, etc.
British Association Reports. Papers on the actinograph, the influence of solar rays on plants, the chemical action of solar radiations, the Daguerreotype process, etc.
Royal Society's Catalogue of Scientific Papers. Forty-nine articles published in transactions of learned societies and scientific journals; the earliest 'On Tritiodide of Mercury' appearing in 1838.

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'Team photograph' of GCG members at the Winchester meeting, 19th April 1985. Photograph: Hampshire County Museums Service.

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COLLECTIONS, COLLECTORS AND MUSEUMS OF NOTE. NO.48

THE BEASLEY COLLECTION OF PHOTOGRAPHS AND DRAWINGS OF FOSSIL FOOTPRINTS AND BONES, AND OF FOSSIL AND RECENT SEDIMENTARY STRUCTURES

BY WILLIAM A.S. SARJEANT

The Beasley Collection was assembled by an amateur geologist, Mr Henry C. Beasley of Liverpool, between about 1895 and 1914: it is now owned by the Liverpool Geological Society and held in the Library of the Geology Department, University of Liverpool. The Collection consists of some 370 photographs and drawings, the majority of which are of fossil vertebrate footprints (tracks and single prints), together with a few of Triassic vertebrate fossils and invertebrate tracks, and a number of sedimentary structures, Triassic and recent. The photographs are most often mounted on cards, numbered and annotated by Beasley himself; additional annotations were made many years later by Dr J.C. Harper of the University of Liverpool and Dr W.A. Cummins of the University of Nottingham. The majority of the earlier (and some of the later) photographs were taken for Beasley by friends or by curators of the collections which contained the specimens. In general, these are of high quality. Later Beasley acquired his own camera, but unfortunately his own photographs are generally of an inferior standard. In a number of instances, the name of the photographer is given only in abbreviated form (and remains unrecognized) or not at all. The collection also includes some mounted drawings of footprints made by Beasley from published photographs and figures.

The collection was borrowed by me early in 1970. Only narrowly did it escape destruction in the fire which devastated the upper floor of the new Geology building of the University of Nottingham in late March of that year, the boxes containing the photographs being charred and the photographs suffering some discoloration. Preparation of a list was embarked upon, as a prelude to deciding which photographs would be used in a historical article I was then preparing on the study of fossil footprints in the British Isles (Sarjeant 1974). So great was the interest of the collection, however, that I decided to prepare and circulate a restricted number of copies of that list. To increase its usefulness, supplementary information was added to Beasley's notes concerning the places of lodgement of specimens, whenever known, and the names currently applied to the footprint ichnotaxa. Since some numbers were duplicated and some vacant, whilst some photographs and drawings lacked numbers, I undertook a limited renumbering of the cards and photographs for the sake of coherence. Only 100 copies of the list (Sarjeant 1971) were produced, half of these being sent to the Liverpool Geological Society. The work

Fig.1. Portrait of Henry Charles Beasley (1836-1919).

has been long out of print and inaccessible; moreover, it contains some minor errors (here corrected). For these reasons, its republication in a more readily accessible form seems desirable.

In the revised list that follows, Beasley's comments are contained within inverted commas when directly quoted, though it should be noted that his comments have in some cases been reordered and that punctuation has sometimes been inserted, to clarify his meaning. Indirect quotations (summarised or amended) are not enclosed in quotation marks. His spelling 'Moreton' of the surname of George Highfield Morton (1826-1900) is retained, although incorrect. Beasley's system of letter designations of footprint types is explained in Sarjeant (1974, pp.301-309), the present equivalent ichnogeneric and ichnospecific names being specified there and herein.

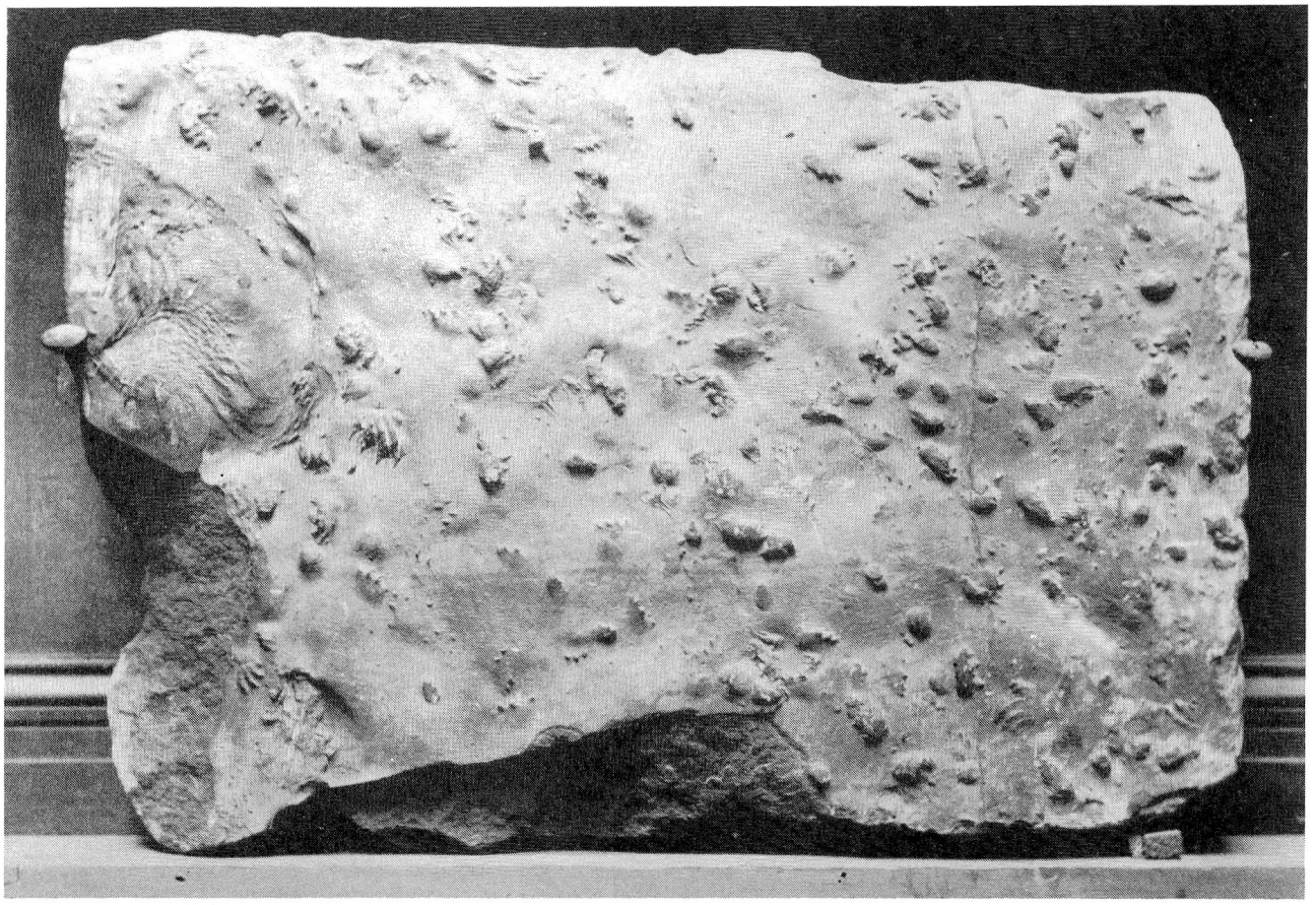

Fig.2. Triassic (Lower Keuper) sandstone slab in Bootle Museum, from the Storeton quarries, Cheshire, exhibiting vertebrate footprints of Rhynchosauroides type and other sedimentary structures. Photo: F. Anyon (Beasley Collection no.3).

All photographs are of footprints, unless otherwise indicated: all are of Triassic (Lower Keuper) specimens, unless otherwise indicated. An asterisk before the number indicates that a negative of a photograph made by me, either of Beasley's photograph or of the entire card, is lodged in my collection (University of Saskatchewan). Copies of these photographs can be produced, for a suitable small charge, on request.

Accounts of the Storeton Quarries, from which the greatest number of specimens photographed were obtained (many photographs being taken in the quarries themselves), were published by George H. Morton (1883) and by Beasley himself (1913). Working of the quarries ceased long ago; the area is now a park and the quarries largely overgrown or filled in. Unfortunately, Beasley rarely makes it clear from which quarry or from which horizon a particular specimen was obtained. Moreover, very often the lodgement of the samples is also left unclear; the fact that Beasley gave a number to a specimen does not mean it formed part of his own extensive collection, since he allocated his numbers also to specimens that he had examined in other collections. Moreover, many specimens photographed and numbered by Beasley may never have been collected.

Henry Beasley's personal collection was presented before his death to the Liverpool Museum, which already contained extensive footprint materials from Storeton. Unfortunately, as a consequence of wartime bombing of the Museum, some of the specimens were undoubtedly destroyed, but what proportion I do not know. Labels on the surviving specimens were very often burned away, so that their identification is not easy. Their restudy will be a major task, especially because of the size and 'unhandiness' of many of the footprint-bearing slabs; but its carrying out is highly desirable, in view of their importance. It should be attempted in association with Beasley's photographs, to facilitate the recognition of specimens.

Where a place of lodgement is stated, it has been checked by Dr Harper and/or myself, though in some instances confident identification was impossible. My list of holdings of fossil vertebrate footprints in British museums (Sarjeant 1984) should be referred to whenever necessary.

HENRY CHARLES BEASLEY (1836-1919)

Although he is perhaps the most important single figure in the field of British palaeoichnology, biographical information concerning Henry Beasley is meagre. The fullest biography known to me is an anonymous obituary published in the Liverpool Daily Post & Mercury for 18th December 1919; this is short enough to be quoted here in full:

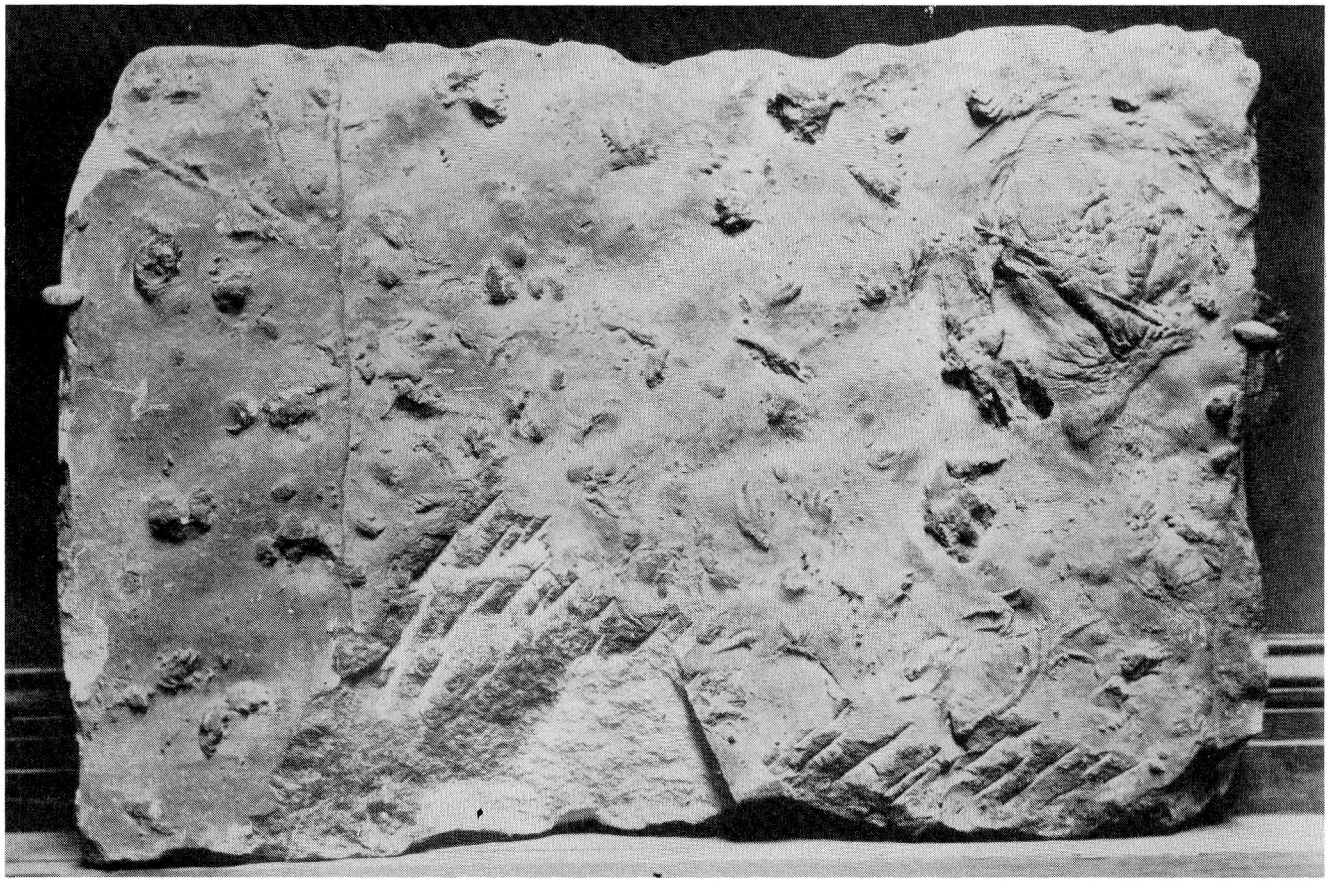

Fig.3. Triassic (Lower Keuper) sandstone slab in Bootle Museum, from the Storeton quarries, Cheshire, exhibiting vertebrate footprints of Rhynchosauroides type and other sedimentary structures. Photo: F. Anyon (Beasley Collection no.4).

Fig.4. Triassic (Lower Keuper) sandstone slab exhibiting vertebrate footprints (Chirotherium sp.), propped up in the Storeton quarry in 1906 before sale and transport to the British Museum (Natural History). Photo: W.H. Rock (Beasley Collection no.84).

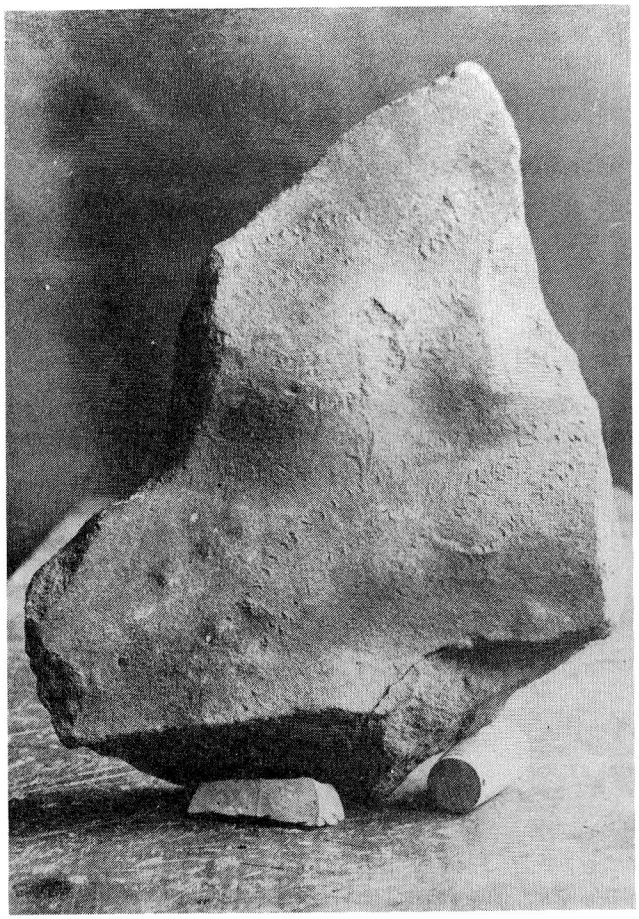

Fig.5. Invertebrate tracks (probably Permichnium volckeri Guthorl) in Triassic (Lower Keuper) sandstones from Storeton quarry, Cheshire. Photo: Edmunds (Beasley Collection no.211).

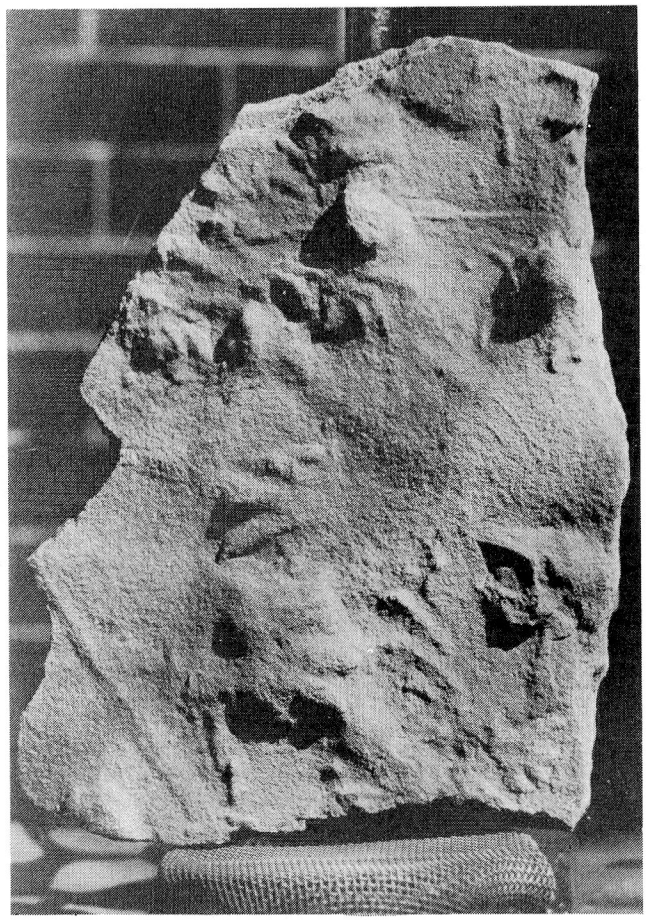

Fig.6. Vertebrate tracks in Triassic sandstones from Townhead Quarry, Alton, Staffordshire. Photo: A. Harris (Beasley Collection no.362).

The death of Mr Henry C. Beasley, at the age of eighty-three, removes from the life of Liverpool one who was well known for many years in scientific circles. His work in geology is known and appreciated not only in this country but on the Continent of Europe and in America. For over forty years Mr Beasley was an active member of the Liverpool Geological Society, and served the society as secretary for several years, and on two separate occasions as president. He is best known by his researches and original work on the remarkable footprints which are found on the sandstones of Storeton Quarry, in connection with which he was led to the study of similar occurrences in rocks of the same age in other parts of England and in other countries. He described a number of new species or varieties and suggested a classification of the local footprints. He secured valuable specimen slabs from Storeton for the geological department of the British Museum, the Liverpool University, and other public collections. His own valuable collection of footprints and other geological specimens was recently purchased by the Liverpool Public Museum, where a selection of typical and interesting specimens are at present on view in the large hall. Mr Beasley was for many years a Fellow of the Geological Society of London, and he also served in 1901-2 as president of the Liverpool Biological Society, taking as the subject of his presidential address his favourite study of the life of the local Triassic rocks.

However, this leaves one in ignorance of Beasley's antecedents, profession (if any), and marital status. A brief biography by 'W.H.' (1920) in the Geological Magazine provides only three pieces of further information; that Beasley was awarded the proceeds of the Barlow-Jameson Fund by the Geological Society of London in 1908, in recognition of his work on footprint classification, that he died on December 14th, and that his collection was purchased for Liverpool's Free Public Museum by Councillor C. Sydney Jones, M.A. 'W.H.' also notes that:

'Mr Beasley was a most indefatigable and persistent worker at his favourite geological subjects, such work being his relaxation from an active commercial career. His unselfish character and his readiness at all times to assist any fellow-worker endeared him to all who knew him'.

If any readers know of additional biographies I have missed, or can supply any reminiscences (personal or second-hand) or details of Henry Beasley, I would welcome their letters.

Fig.7. Part of the display of vertebrate footprint specimens in Warwick Museum, 1905. The principal slab shows prints attributable to Cheirotherium cf. herculis Egerton. Photo: J. Harriott, Warwick (Beasley Collection no.365).

ACKNOWLEDGEMENT

I am indebted to Dr Geoffrey Tresise (Keeper of Geology, Merseyside County Museums, Liverpool) for his valuable assistance in identifying localities mentioned by Beasley, and for his critical comments on this manuscript.

TAXONOMIC NOTES

I. Chirosaurus Kaup, though a more appropriate name, is unfortunately a junior objective synonym of Chirotherium Kaup: 'Cheirosaurus' and 'Cheirotherium' are variant spellings employed by Beasley and others from time to time.

II. Chirotherium (= Chirosaurus) storetonensis Morton is considered by Haubold (1971, p.55) to be a junior subjective synonym of Chirotherium barthii Kaup. However, since no restudy of the holotype of Morton's species has been made, I am not prepared as yet to accept this synonymization.

III. Chirotherium majus Sickler is likewise considered by Haubold (1971, p.55) to be a junior subjective synonym of Chirotherium barthii.

IV. Chirotherium minus Sickler is considered by Haubold (1971, p.55) to be a junior subjective synonym of Chirotherium sickleri Kaup.

V. Chelone? subrotundus Morton is considered by Haubold (1971, p.41) to be a junior subjective synonym of Dicynodontipus geinitzi (Hornstein) Haubold. However, until the holotype of Morton's genus is re-examined, this judgement must remain disputable.

VI. Brontozoum Hitchcock, 1847 is considered by Haubold (1971, p.75) to be a junior subjective synonym of Eubrontes Hitchcock, 1845.

VII. Ichnium gampsodactylum gampsodactylum Pabst, I. gampsodactylum gracilis Pabst, I. g. albendorfense Pabst, I. g. minor Pabst, and I. g. friedrichrodanum Pabst have been the subject of much taxonomic controversy. When Gampsodactylum was elevated to generic status by Nopcsa (1923, p.138), two species, G. albendorfense and G. friedrichrodanum, were distinguished: the subspecies gracilis and minor were both placed within the former. Kuhn (1963) retained these two ichnospecies (pp.25-26) but also treated them, on another page, as junior subjective synonyms of Eumekichnium lacertoides (Geinitz, 1861) Nopcsa. Haubold (1971) treated both these ichnogenera (Gampsodactylum and Eumekichnium) as junior subjective synonyms of Dromopus Marsh and the subspecies gracilis and minor as junior subjective synonyms of D. lacertoides (Geinitz) Marsh; his opinion on the placement of Gampsodactylum albendorfense and G. friedrichrodanum is unclear.

VIII. Whilst Ichnium pachydactylum minus Pabst and I. p. albendorfense Pabst are validly published subspecies, 'I. p. irregulatum' does not exist and must be considered a product of an orthographic error. I have not been able to place Beasley's card alongside Pabst's text and so cannot determine which subspecies was meant. Kuhn (1963) treated both subspecies as junior subjective synonyms of Ichniotherium leisnerianum (Geinitz) Kuhn. In contrast, Haubold (1971, p.20) treated them as junior subjective synonyms, not of I. leisnerianum (which he transferred to Dimetropus Romer and Price, as D. leisnerianus) but of his own ichnospecies Amphisauropus imminutus. (This is a perfectly correct taxonomic procedure, since Pabst's ichnotaxa, though senior, were mere subspecies and a name does not have priority outside its own taxonomic rank). A fuller study of the morphology and taxonomy of these ichnospecies is desirable to clarify which alternative placement is preferable.

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H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION+	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
* 1	Bootle Museum No. 10	Storeton, Cheshire	Pes and manus, *Cheirosaurus storetonensis* with rain pittings and other markings. Cast.	Holotype. Plaster cast made from this. [See Notes I-II].
* 2	Bootle Museum No. 6	Hessburg, Saxony, Germany	Footprints and mudcracks. (Obtained in exchange for casts.) Photo: F. Anyon	
* 3	Bootle Museum No. 3	Not stated: prob.Storeton, Ches.	Footprints, mudcracks and other markings. (Obtained at expense of Nat. Hist. Soc.) Photo: F. Anyon	Presumably the Liverpool Natural History Museum.
* 4	Bootle Museum No. 9	Storeton, Cheshire	"Footmarks of lizards and tortoises" in relief. (Obtained at expense of Nat. Hist. Soc.) Photo: F. Anyon	
* 5	Bootle Museum No. 8	Storeton, Cheshire	Footprints in relief. (Obtained at expense of Nat. Hist. Soc.) Photo: F. Anyon	Confused mass of tracks, with many toe-prints.
6	Bootle Museum No. 4	(?)Storeton,Ches.	Footprints in relief. (Obtained at expense of Nat. Hist. Soc.) Photo: F. Anyon	As last. See also No. 167.
7	Bootle Museum No. 5	Flaybrick Hill, nr. Birkenhead Cheshire	"I believe this is the slab referred to in a paper in the lst vol. *Liv.Lit. & Phil.Society*, where one of the footprints is figured--but the Bootle Museum has it marked 'probably Runcorn', on what authority I know not". Photo: F. Anyon	See Sarjeant, 1974, p. 290, fig. 7.
8	Geol.Dpt. U.Lpool. No.8025	Weston,nr. Runcorn, Cheshire	Slab with footprints, crack desiccation and curved surface, figured by Beasley, *Proc.Liv. Geol.Soc.*, Vol. vii, pl. III. Photo, with light from left, by F. Anyon.	
9	Same	Same	As last. Photo, with light from right, by F. Anyon.	
10	Same	Same	Enlarged photo of portion of slab. Photo F. Anyon.	
*11	British Mus.(Nat. History) No.R.729	Storeton, nr.Rock Ferry, Cheshire	Left hand of slab F729. Track of A crossed obliquely by track of L. (Left hand of slab).	
12	Chester Museum	Storeton, Cheshire	Pes and manus of *C. storetonensis*. Traces of scales of epidermis. "It seems from the texture of the stone that this is from the same bed as my No. 290". (photo 236) [Note in another hand: "Photographed from Stone by J.K. Oct 3rd. 1885, Jeffs"].	Topotype
*13	Manchester Museum	Prob. Storeton, Cheshire	"A_1. Two separate tracks, probably from Storeton." Photo: Ward	
14	Castle Museum, Norwich	Storeton, Cheshire	Presented by the Rev. J. Crompton. "Given me by Jas. Reeve F.G.S., Curator, 13/5/04".	
15	Castle Museum, Norwich	Storeton, Cheshire	Left: impression. Right: natural cast. Presented by the Rev. J. Crompton. "Given me by Jas. Reeves, F.G.S., Curator, 13/5/04".	
16	Lpool City Museum	Storeton, Cheshire	*Chirotherium minus*. Moreton, "Geology of Liverpool", 2nd Vol., plate XXI. Note the small circular scales of epidermis. The length of the mark is 3 inches. No. 256 is similar to this but rather smaller, and the opposite foot.	See also photo 278 and Note IV.

+ where other than Triassic-Keuper

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
17		Storeton, Cheshire	Pes and manus, *Cheirotherium*. "Footprints of A_1, D_1, &c.	No indication of place of lodgement. See also 220.
18		Storeton, Cheshire	Upper bed. Photo: J.A. Waite	Photograph prob. taken at quarry. No indication of place of lodgement.
19		Storeton, Cheshire	From 1st (upper) bed. Photo: J.A. Waite	Photograph prob. taken at quarry. No indication of place of lodgement.
20		Storeton, Cheshire	H.C. Beasley Collection No. 220	Prob. ?*Otozoum swinnertoni* Sarjeant 1970. No indication of place of lodgement.
21	Grosvenor Museum, Chester	Storeton, Cheshire	*Cheirotherium herculis* Egerton, 1839	Topotype: now *Isochirotherium herculis* (Egerton) Haubold.
22	Victoria Institute Worcester	Coven, nr. Brewood & Wolverhampton, Staffordshire	Slab of New Red Sandstone having upon it footprints of *Rhynchosaurus*. This probably comes from Coven & very much resembles 40.154 Brit.Mus., also slabs in Warwick & Livl. Museums - the latter has quite similar ripple marks. - The prints on all three are in very low relief. Pres. by H. F. Vernon: photo by W.H. Edwards.	Footprints now correctly termed *Rhynchosauroides*.
23		Runcorn, Cheshire	Series of E. footprints	No indication of place of lodgement.
24		Runcorn, Cheshire	Footprints of D_1.	*Rhynchosauroides articeps* Owen. No indication of place of lodgement.
25		Runcorn & Storeton, Cheshire	"229 from Runcorn: 127 & 309 from Storeton".	No indication of place of lodgement.
26		Storeton, Cheshire	Footprints of F_2 and D_1 tracks of invertebrate & other markings.	F_2 = a chelonoid print; D_1 - *Rhynchosauroides articeps* Owen. No indication of place of lodgement.
27		Oxton, nr. Birkenhead, Cheshire	Footprints of D &c.	*Rhynchosauroides* sp.plur. (See also photo. 280) Place of lodgement not indicated.
28	Warwick Museum	Shrewley, Brewood & Preston Baggot, Warwickshire	Photo by Harriot, High St., Warwick; from Warwick Museum, April 1902.	Photograph shows eight slabs, one labelled "Labyrinthodont footsteps."
*29	National Museum of Wales, Cardiff	Newton Nottage, Glamorgan	*Brontozoon thomasii*, "These are actual specimens, *not* natural casts in relief: this is fully borne out by a photograph sent me by Mr. J.H. Thomas, taken before the slab was cut to its present shape".	W.J. Sollas, *Quart. J. Geol.Soc.*, Vol. XXXV, p. 571, 1879. [Now *Anchisauripus thomasi* (Sollas) Haubold.] See also photo 134.
30	Natural Hist.Mus. Wollaton Park,Nott.	Mansfield Notts. (Permian)	Footprints (impressions) from the Permian of Mansfield, Notts. "The rock is a highly siliceous Magnesian Limestone: the sandy lenticular mass in the Mag. Limestone described long ago by Sedgwick". Photo given by Mr. J.W. Carr, University of Nottingham 17/2/05.	Holotype of *Chelichnus hicklingi* Nopcsa: redescribed by Sarjeant, *Mercian Geol.*, 1966, Vol. 1, no. 4, pp. 367-373.

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
31	Manchester Museum No. L6334	Mansfield, Notts. (Permian)	Left: "Plaster cast of a single specimen from a series on a slab in the Nottingham Museum given me by Mr. Hickling, Length of print alone 4 inches". Right: slab in the Manchester Museum. Photo: Ward.	The cast taken from Holotype of *Chelichnus hicklingi* Nopcsa: redescribed by Sarjeant, *Mercian Geol.* Vol. 1 no. 4, pp.367-373.
32		(Recent)	Footprints of *Crocodilus niloticus* in modelling clay. Photo: Dr. J.H. O'Connell. 5 February 1905 [Pencil note: "?*Emys orbicularis*"]	
33		(Recent)	Footprints of *Alligator mississippiensis* in modelling clay. Photo: Dr. J.H. O'Connell. 22 January 1905.	
34		Grinshill, Salop	Drawing taken from *Q.Jl.geol.Soc.Lond.*, vol. 57 pl. XXVII. Right pes of *Rhynchosaurus*.	
35	Geol.Dpt. U.Lpool. No.LU8023	South Quarry Storeton Cheshire	"Given me by Mr. Nicoll, Livl."	Present lodgement not known.
36	Ludlow Museum	Grinshill, Salop	"Natural cast of footprint (given me by Mr. Fortey, Hon. Curator). Very near actual size. Jan. 1898".	Presumably the photograph, not the specimen, was given to H.C. Beasley!
37	Ludlow Museum	Grinshill, Salop	"Natural cast of footprint (given me by Mr. Fortey, Hon. Curator). Very near actual size. Jan. 1898".	Ditto. Second specimen.
38	Geol.Dpt. U.Lpool. (formerly in Bootle Museum)	Guys Cliff, Warwick-shire	*Labyrinthodon* footprints	Identification now unacceptable; definitely a *Cheirotherium*.
39	Shrews-bury Museum	Grinshill, Salop	Pencil sketch "drawn and given me by Mr. Phillips of Shrewsbury", dated August 1896	Cheirotheroid print.
40	Musée Teyler, Haarlem, The Neth-erlands No.1324		Pen sketch from illustration in *Le Musée Teyler*, Vol. II page 426 pl. I. 1.33 mm x 0.65. In relief Sandstone slab. "There are 4 digits and ' l'appendice en forme de ponce écarté [words illegible]' on the extreme side it cannot represent the lst digit a thumb. Length of foot 0.19 m., length from one to another 0.49 m. The impressions of the forefeet a little in advance of the others. Each of the digits has [word illegible]".	These illustrations (40 to 45 are taken from Vol. 2 of the "Catalogue systématique de la collection paléontologique" *Arch.Musée Teyler*, 1863-1881, ser II, vol. II.
41	Musée Teyler, Haarlem, The Neth-erlands No.1323	Hessberg, Saxony, Germany	Pencil sketch from illustration in *Le Musée Teyler* vol. II p. 429 pl. II. Cracks made after the footprints. *?C.majus = ?barthii*. 0.85 m. x 0.72 m. in relief.	[See Note III].
42	Musée Teyler, Haarlem, Neth. Nos. 1345-1320	Hessberg, Saxony, Germany	Pen sketches from illustrations in *Le Musee Teyler* Vol. II, i.p.431 pl. V *Cheirotherium majus* One hind footprint. 0.195 m. x 0.15 m. ii.p.430 pl. III *Cheirotherium minus* P.M. Sickler. "The footprints are small, 4 digits & 'appendice laterale'. The fingers are 0.45 m. long (?0.045) & suggest a young animal".	[See Notes III and IV].
43	Musée Teyler, Haarlem, Neth.Nos. 1322,1325 & 1319	Hessberg, Saxony, Germany	Pen sketches from illustrations in *Le Musée Teyler* Vol. II: i. *Cheirotherium majus*. No dimensions. ii. *C. majus* The mud was rather wet & the animal slipped. iii. *C. minus* or young *Cheirotherium*. Nails very visible on the fingers & "appendice latérale".	[See Notes III and IV].

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
44	Musée Teyler, Haarlem, Neth. No. 1317	Hessberg, Saxony, Germany	Pen sketch from illustration in *Le Musée Teyler*, Vol. II p. 431 pl. VI *Cheirotherium minus*. "This very near resembles my L".	
45	Musée Teyler, Haarlem Neth. No. 1318	Hessberg, Saxony, Germany	Pen sketch from illustration in *Le Musée Teyler* Vol. II p. 431 pl. VIII. One impression is 0.08 m. in advance of the other but the [illegible] is 0.31 m. "N.B. The description is rather difficult to follow".	
46	Warwick Museum	Coten End Quarry, Warwick-shire	"Slab of Keuper Sandstone with impression of plants upon it". Grey sandstone with D. prints. [Specimen from Carboniferous of Yorkshire also shown on photograph].	*Rhynchosauroides* sp.
47	Warwick Museum	Brewood, Stafford-shire	"Slab of red sandstone with rhynchosauroid prints in relief". [Slabs with cheirotheroid prints visible in background: no locality]. Photo: F. Harriott, April '05.	Labelled "*Rhychosaurus articeps* (Owen). [Now *Rhynchosauroides articeps* (Owen) Maidwell]
48	Warwick Museum	Shrewley, Warwick-shire	Two slabs; 21. "Ripple marked sandstone with impressions of...." 22. "Somewhat similar slab with casts". Photo: F. Harriott, April '05.	
49	Warwick Museum	1)Brewood, Staffs. 2)Grinshill, Salop 3-6)Shrewley, Warwickshire	Six small slabs. 1. "D_3. Pes & manus. ?Water-stones". 2...?.L. Keuper. 3-6. D_6, Upper Keuper. (4,6. Pes & manus in relief; 5. impressions of do.)	*Rhynchosauroides* sp. plur.
*50	Br.Mus. (Natural History)	Storeton, Cheshire	*Cheirotherium storetonense*	Holotype. Figured in Morton, "Geology of Liverpool" 1891 pls. VIII and X: this specimen may well be the original of pl. VIII. Morton's collection was purchased by BM(NH) in 1900.
*51	Br.Mus. (Natural History)	Storeton, Cheshire	*Cheirotherium storetonense*. Figured Plate IX Moreton's "Geology of Liverpool" [1891] and described p. 110. From G.H. Moreton F.G.S.	Paratype. This specimen also may well be the original of Morton's plate. Morton's collection was purchased by BM(NH) in 1900.
*52	Manchester Mus. (Prob. LL.6662?)	Prob. Storeton, Cheshire	"A_1".	*Chirotherium storetonensis* Morton
*53	Br.Mus. (Natural History) No.R295	Tarporley, Cheshire	*Cheirotherium herculis* Egerton 1839 [Two photographs].	Holotype and paratype. [Now *Isochirotherium herculis* (Egerton) Haubold].
*54	Warrington Mus.	?Lymm, Cheshire	Length 9 inches	Possibly *?Otozoum swinnertoni* Sarjeant 1970
*55	Br.Mus (Natural History	Storeton, Cheshire	"A_2"	Similar to last.

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
*56		Storeton, Cheshire	K: four-toed print No. 220. Width of foot about 5"	*Chelone subrotundus* Morton: holotype? No indication of place of lodgement: apparently not among the material purchased from Morton's estate by the British Museum(Nat.Hist)in 1900.
57	Geol.Dpt. U.Lpool. LU 4522	Storeton, Cheshire	"A very similar manus is shown in the Brit. Mus. Nat. Hist., associated with a large pes, the same as my No. 237". Ricketts collection.	
58		Storeton, Cheshire	Footprint F_2 Figured by Beasley in *Trans. Liv. Bio. Soc.*, Vol. XI pl. VII.	
59		Storeton, Cheshire	As last: second photograph, annotated "This is the print referred to in correspondence with Prof. H.G. Seeley".	
60	Chester Museum	Storeton, Cheshire	Two photographs of same specimen ("Footprint I") the upper taken from *J.Lpool.Geol.Assoc.*, 1893-4 vol. XV, pl. 3 (paper by O.W. Jeffs). See also *Proc.Lpool.Geol.Soc.*, Vol. VIII p. 234: *Rep.Brit. Assoc. Rept.* No. 2 p. 7 (1904).	Jeffs' "Footprint of small Saurian, with distinct claws on toes".
61	Mr. J. Beeby Thompson's Colln.	Chillington, Staffordshire	Two photographs taken from *Geol.Mag.*, May 1902, (Footprints of *Rhynchosaurus*. Skin impression: Footprint of *Cheirotherium?*). See *Brit.Assoc. Rept.* 1904.	
62		Oxton Heath nr. Birkenhead, Cheshire	"D &c. footprints". No. 129	No indication of place of lodgement. [Possibly among the specimens described by Ricketts, *Proc. Lpool.geol.Soc.*, 1886
63		Runcorn, Cheshire	Slab showing footprints labelled "C" and "B": the latter is annotated "(doubtful if this should be included under B)".	No indication of place of lodgement.
64		Runcorn, Cheshire		No details or indication of place of lodgement.
65	Chester Museum	Storeton, Cheshire	Two photographs, figured *Proc.Lpool.Geol.Assoc.*, vol. XIV pl. I fig. 2 and pl. II fig. 4	No indication of place of lodgement.
66		Weston Quarries, Runcorn, Cheshire	"This was found by E.D.J. & myself April, 1865 or earlier". Photo: [W.H.] Rock.	No indication of place of lodgement.
67	Shrewsbury Museum	Grinshill, Salop	Reptilian bones: ventral aspect of right forelimb & nos. vertebrae. Length from elbow - point of middle digit 2 1/2 inches (E.J. Newton)	
68	Shrewsbury Museum	Grinshill, Salop	"*Rhynchosaurus* (Dr. A.S. Woodward)". Beasley appends detailed measurements and discussion. Photo: Forrest.	
69		Connecticut and Arizona, U.S.A. (Triassic, undivided)	Pen sketches from illustrations by O.C. Marsh [Source not stated but prob. "Dinosaurs of North America", 1896] *Ammopus, Anomoepus, Brontozoum, Otozoum* from Connecticut, bipedal dinosaurs from Arizona.	[See Note VI].

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
70		Nova Soctia, Canada (Carboniferous?)	Drawing from Pl. II, *Bull.Nat.Hist.Soc. New Brunswick* no. 21 showing *Theranopus McNaughtoni, Baropus unguifer, Dromopus celer* and *Myriapodites* (the latter a supposed myriapod track).	These are species described by George F. Matthew. [The first is now *Limnopus? mcnaughtoni* (Matthew) Haubold, the second *Barillopus unguifer*(Matthew) Matthew: the third *Dromillopus celer* (Matthew) Haubold].
*71	Geol.Dpt. U.Lpool. no.LU8019	Daresbury, Cheshire	Ricketts Collection [Type D_2 of Beasley, *Rep. Brit.Assoc.* 1904]	Holotype of *Rhychosauroides rectipes* Maidwell 1911
72		Fieldings Quarry, Hollington, Staffordshire	"Two photos of a pair of footprints...said by quarry men to be from stone immediately above lowest bed of marl. - length of pes 9"." Photo: W.H. Rock, 18/10/09	No indication of place of lodgement.
73		Mansfield, Nottinghamshire (Permian)	"Footprints (impressions) from Marl in the Permian Limestone....found & photo given me by Geo. Hickling 30 - ? - 05. See his letter. About 3/4 natural size."	No indication of place of lodgement.
74		Storeton, Cheshire	Pes A_4, no trace of manus. From 2nd bed. Mch/April. 1906 No. 136. "Thomas has original print". Photo: Jas. Waite	*Isochirotherium lomasi* (Baird) Haubold. No indication of place of lodgement.
75		Storeton, Cheshire	From 2nd. bed. Mch/April 1906 "This was accidently broken." Photo: Jas. Waite.	No indication of place of lodgement.
76	?Manchester Mus.	Storeton, Cheshire	From 2nd bed. Mch/April 1906 (No. 9). Size 7'10" x 3'0" [Two photographs] Photo: Jas. Waite. Length of pes 10".	Cheirotheroid prints
77	Leeds (University or Museum)	Storeton, Cheshire	From 2nd bed. Mch/April 1906 (No. 16) Photo: Jas. Waite.	Cheirotheroid prints on ripple-marked surface.
78	Leeds (University or Museum)	Storeton, Cheshire	From 2nd bed. Mch/April 1906 (No. 12) Size 3' 1 1/2" x 1'5" (across middle) Photo: Jas. Waite.	Cheirotheroid prints on ripple-marked surface.
79	"In possession Excrs.[executors] Lomas"	Storeton, Cheshire	From 2nd bed. Mch/April 1906 (No. 13). Photo: Jas. Waite.	Current location uncertain.
80	Hanley Museum, Stoke-on-Trent	Fieldings Quarry, Hollington, Staffordshire	Two Photographs: No. 3 slab [no details] and No. 1 slabl: Size 3 ft. 1" x 1' 11". Skids 1ft. 3" x 9". Extreme length of print 1 1/2". Easter 1906: photo by J. Lomas F.G.S.	Both show footprints: second slab shows linguoid ripple marks. Specimens no longer in Hanley (now Stoke-on-Trent) Museum Collection.
*81	Hanley Museum, Stoke-on-Trent	Fielding Quarry, Hollington, Staffordshire	Details of no. 1 slab (as above): three photographs, that at right reproduced in Beasley *Brit. Assoc. Rept.* 1906. Easter 1906: Photos by W.H. Rock.	Minute five-toed prints, type D_1 of Beasley 1906 (p.9). Specimens no longer in Hanley (now Stoke-on-Trent) Museum Collection.
82	Hanley Museum Stoke-on-Trent	Fielding Quarry, Hollington, Staffordshire	Details of No. 2 slab (as 80): two photos by W. H. Rock, Easter 1906.	Specimens no longer in Hanley (now Stoke-on-Trent) Museum Collection.

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
*83	Br.Mus. (Natural History) No.R.3483	Storeton, Cheshire	Footprints "at bottom corner of slab 6 ft. x 6 ft." photographed "before the mud had quite cleared off."	*Chirotherium* sp. Purchased by B.M. (N.H.) from Charles Wells,1906. (See also photo 107).
*84	Br.Mus. (Natural History) No.R.3483	Storeton, Cheshire	Photo of whole slab. "Series of tracks of A in front of second print. The small manus is seen". Photo: W.H. Rock.	*Chirotherium* sp. Purchased by B.M. (N.H.) from Charles Wells,1906. (See also photo 107).
85	Hull Museum	Storeton, Cheshire	From 2nd bed; 1906, no. 4. Showing nails of A_1.	*Chirotherium storetonensis* Morton. Many have been destroyed in blitz.
86		Storeton, Cheshire	1906, No. 6 Large print of A showing tubercles on both pes & manus. Photo: W.H. Rock.	Cheirotheroid print: no indication of place of lodgement.
87		Storeton, Cheshire	1906, No. 1 Part only, from 2nd bed. "The large print has slipped sideways, shows marks of tubercles. There are also invertebrate tracks." Photo: W.H. Rock	No indication of place of lodgement.
88		Storeton, Cheshire	Whole slab, depicted in two overlaid photos taken by H.C. Beasley	No indication of place of lodgement.
*89	Br.Mus. (Natural History) No.R.3483	Storeton, Cheshire	1906, No. 5 Slab. "Besides the large prints there are a number of prints in series of E_3". Two photos, 21/7/06, by H.C. Beasley: left at larger magnification than right.	[See also 330].
90	Geol.Dpt. Lpool.U. No.LU4521	Storeton, Cheshire	No. 7 [of 1906?], portion of central part A_1 & A_4. Pes & manus. Manus of A_4 length 7".	See also photos 111 and 131.
91		Storeton, Cheshire	Cast of ? bone. Length of object 10 1/2". Breadth of slab 1'5", height 1'6". ("Compare with No. 2, 1907").	No indication of place of lodgement. Publication details given under no. 111.
92		Fielding's Quarry, Hollington, Staffs.	Basically a quarry photograph; slab with *Rhynchosaurus* prints visible in background. Photo: H. C. Beasley.	Now *Rhynchosauroides*.
93		Fleming's Quarry, Hollington, Staffs.	"Markings on a block in Mr. Fleming's Hollington Quarry, 20 June/'06." [Note in another hand: "Afterwards sent to Dr. A.S. Woodward"].	Current place of lodgement not known.
94		(Recent)	Footprints of *Emys orbicularis*. Length from shoulder to hips 6.75 cm. width of shoulder 4 cm. width of hips 4 cm. [Illegible pencil inscription.	
95		?Runcorn, Cheshire	"3 small slabs from Runcorn" (latter word deleted in pencil, throwing doubt on locality). Nos. 124, 321, 322. "Compare [321] with C from Hollington." Photo: H.C. Beasley.	No indication of place of lodgement.
96		Storeton & Runcorn, Cheshire	Three photos of type C prints: one from Storeton, two from Runcorn. Photo: H.C. Beasley.	No indication of place of lodgement
97	Museum of High School, Nottingham	Railway cutting, Colwick Wood, Nottingham	"Footprint...found by Rev. A. Irving F.G.S...probably manus of A_1. Length of slab 4 7/8". Drawing on back "Lent by Rev. A. Irving 5 July, 1906: probably left forefoot. It is in rather high relief, 1 cm. above surface of stone, the highest part in front."	No longer in Nottingham High School collections.

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
98		Runcorn, Cheshire	"F_3. Imperfect prints...no. 310. Compare with small prints, Storeton, Ju/'06". Photo: H.C. Beasley.	No indication of place of lodgement.
*99	Br.Mus. (Natural History) no.R.3484	Storeton, Cheshire	"Print of F_3 about natural size, from No. 20 Storeton 1906. See Photo No. 100 (from a little to the left & above centre of print 100)" Photo: W.H. Rock 1/9/'06.	Purchased by BM(NH)from Charles Wells, 1906. [See also photo 214].
*100	Br.Mus. (Natural History)	Storeton, Cheshire	Photo of whole slab, with positions of photos 99 and 101 indicated. Photo: H.C. Beasley 1/9/'06.	
*101	Same as above.		Detail of same slab. Photo: H.C. Beasley 1/9/'06.	
102	Br.Mus. (Natural History)	Storeton, Cheshire	"Part of slab no. 5...1906. 2 prints of G form". Photo: H.C. Beasley 1/9/'06.	
103	Br.Mus. (Natural History) no.R.3484	Storeton, Cheshire	Another photograph of slab no. 20: cf. no. 100. Photo: H.C. Beasley 1/9/'06.	Purchased by BM(NH) from Charles Wells in 1906. [See also photo 214].
104	Same as above		"F_3. Central part of lower margin of track 101 on rather larger scale".	Chelonoid print.
105		Storeton, Cheshire	Storeton no. 2, 1906, with portions of no. 1 and no. 3 (right and left). Photo: H.C. Beasley 15/9/'06.	No indication of place of lodgement.
*106		Storeton, Cheshire	"Group of slabs nos. 12 to 17 (1906)". Photo: H.C. Beasley 15/9/'06.	Slabs depicted weathering out at quarry. Reproduced in Sarjeant 1974(fig. 11).
*107	Br.Mus (Natural History) no.R.3483	Storeton, Cheshire	"Slab no. 5, 1906, I. View of entire slab, Sept. '06 A_1 A_u F_3. The smaller prints on 108 are seen on left half of slab". Photo: C.B. Travis. "II. The lowest pair but one in the diagonal series of tracks, A_4 pes and manus, showing tubercles on each as well as on D_1". Photo: C.B. Travis.	Purchase by BM(NH) from Charles Wells in 1900. II shows two contrasting tracks, crossing one another. Compare with 108 and 121. [See also photo 84].
108	Same as above.		Three photos, enlarged from slab depicted in 107 (I). Measurements and photographed details are given. Photo: C.B. Travis.	[See also photo 84].
109	Bolton Museum	Storeton, Cheshire	Two photos: i. Pes from 13b, Storeton 1906. ii. Pes & manus from no. 15, Storeton 1906. "Was broken on way to Bolton". Photo: C.B. Travis.	[See also photo 84].
110		Storeton, Cheshire	Storeton no. 3 with series of a rather small A_1 print. Finely rippled surface. Photo: H.C. Beasley, 27 Oct./06.	*Chirotherium storetonense* Morton. No indication of place of lodgement.
*111	Geol.Dpt. Lpool U. no.LU8020	Storeton, Cheshire	Photo + copy of published drawing. "Storeton no. 7, showing the series of A_4 prints". [In another hand: "Track-way described by J. Lomas (*Brit. Assoc. Rept.* 1904) as A_4 of Beasley. Named specifically by F.E. Peabody 1948 (*Univ.Calif.Publ. Geol.* Vol. xxvii p. 347) on Lomas's description. Slab therefore becomes Type of *Cheirotherium beasleyi* Peabody 1948."] Photo: H.C. Beasley 27 Oct. /'06.	*Isochirotherium lomasi* (Baird) Haubold.
112	Br.Mus. (Natural History) no.R.3484	Storeton, Cheshire	"Storeton No. 20. The whole of the slab measures 9'6" long by 2'9" at further end, 2'2" at nearer end. Central protion now in British Museum." (cf. nos. 100, 103.) Photo: H.C. Beasley, 27 Oct/'06.	

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
113		Storeton, Cheshire	"Part of ?10 slab from probably the lower (3^{90}) bed with small prints & uneven surface, the lighter coloured being the highest, the lower parts brown. About 1/3". Photo: H.C. Beasley 27 Oct/'06.	No indication of place of lodgement.
114		Storeton, Cheshire	North face of South Quarry, Storeton, 1905. Position of footprint bed and fault indicated. Photo: Jas. Waite.	
115	Lpool. City Museum	Storeton, Cheshire	Slab no. 1: no. 338. A_4,light on digits. Photo: H.C. Beasley 1906.	Seen on display January, 1970. [See also photos 137, 137a, 234].
116	Lpool. City Museum	Storeton, Cheshire	Slab no. 1: no. 338. A_4,light on palmar surface. Photo: H.C. Beasley 1906.	Seen on display January, 1970. [See also photos 137, 137a, 234].
117	Lpool. City Museum	Storeton, Cheshire	Slab no. 1: no. 338. A_4 complete block, with pes & manus of A_4, plus invertebrate & other markings. Photo: H.C. Beasley.	Seen on display January, 1970. [See also photos 137, 137a, 234].
118		Storeton, Cheshire	Double print of F_3, some of G. No. 33. From Storeton 1906. "For better photo see 160 with light from other side". Photo: H.C. Beasley.	No indication of place of lodgement.
119		Storeton, Cheshire	"From Storeton 1906. My No. 337". Photo: H.C. Beasley.	Markings of uncertain character. No indication of place of lodgement.
119X		Storeton, Cheshire	"Markings of ?. Slab is 1'2" across about the middle." Photo: H.C. Beasley, Dec/'06.	Markings of uncertain character. No indication of place of lodgement.
120	? Manchester Museum	Storeton, Cheshire	No. 9. "Two pairs fore & hind feet of a fleshy [illegible] of A_1 & on the right [illegible] of normal A_1. Above the centre is a mark possibly? of the snout of the animal, at any rate difficult to explain".	*Chirotherium storetonensis* Morton
121	Br.Mus. (Natural History) no.R.3483	Storeton, Cheshire	"No. 5/1906. Series of F_3 footprints & two prints of G". Enlarged by A. Lloyd from H.C. Beasley photo, no. 107.	Chelonoid prints. Compare with 107 & 108.
122	Liverpool Museum	Storeton, Cheshire	F_2 No. 200, Beasley Collection. Photo: H.C. Beasley.	Chelonoid prints. No indication of present place of lodgement.
123	Liverpool Museum	Beetle Rock Quarry, Runcorn, Cheshire	From quarry spoil heap. Beasley Colln, no. 144. Photo: H.C. Beasley.	Comments as last.
124A-B	Same as last.	Beetle Rock Quarry, Runcorn, Cheshire	2 specimens found on quarry spoil heap. 124A: No. 191; 124B No. 144, Beasley Collection. Photo, with light from right, by H.C. Beasley.	Comments as for 122.
124C	Same as 123	Beetle Rock Quarry, Runcorn, Cheshire	Second photo. of no. 191. Photo: H.C. Beasley 5/9/91	Comments as for 122.
125	Liverpool Museum	Cossall, Staffordshire & Runcorn, Cheshire	Beasley Colln. nos. 267 and 300. Photo: H.C. Beasley.	Sedimentary structures (? flute and groove casts).

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
126	Liver-pool Museum	Aughton nr. Ormskirk, Cheshire	"Fine parallel markings in relief.... Own colln. no. 275, 21/8/97. Height 16 cm." Photo: H.C. Beasley.	Groove casts.
127	Liver-pool Museum	Little Crosby Quarry, Merseyside, nr. Liver-pool	"Straight markings... Own colln. 228. 4/6/96. Length of longest marking 12 cm. The markings are parallel; the one on the right is in relief, the middle one an impression, that on the left also an impression: these two may be margins [of] one object". Photo: H.C. Beasley.	Groove casts.
128	Liver-pool Museum	Daresbury, Cheshire	"Curved markings... The lower one is a fillet quite square in section, the others mouldings in low relief. Length of upper margin 18 cm. In the large slab of what [*sic*] this is a portion, the curve of the markings was clearly shown". No. 142, Beasley Colln. Photo: H.C. Beasley.	Groove casts.
129	Liver-pool Museum	Storeton, Cheshire	"Sundry prints... No. 179, own collection".	
130	Liver-pool Museum	Storeton, Cheshire	"Stems of *Equisetites*. Portion of No. 9/1907, about 1/2 nat. size". Enlarged by A. Lloyd from H.C. Beasley photo no. 176.	Inscription puzzling: photo 176 does not correspond to this! Renumbering?
131	Geol.Dept. Lpool.U. no.LU4521	Storeton, Cheshire	"A_4 Storeton 1906 no. 7 after removal to University". See also photo 90 & 111.	*Isochirotherium lomasi*
132		Storeton, Cheshire	"A1, very fleshy variety. Own colln. no. 237". Photo: H.C. Beasley	*Chirotherium storetonensis* Morton.
133		Runcorn, Cheshire	No. 210 (see also photo 23). F in series of pairs.	Flute casts and footprints. No indication of place of lodgement.
134	National Museum of Wales, Cardiff	Newton Nottage, Glamorgan (Triassic)	"Footprints of *Brontozoon Thomasi* (Sollas)... Photo of original slab before being cut down to present size... Copied from photo lent me by Mr. J.H. Thomas, the original discoverer".	[See also photo 29].
135		Runcorn, Cheshire	Photo. of 3 slabs. "No. 230. Small papilla a small surface... 9/7/98: 198 Rain prints (?) casts: 343 Very rough surface, desiccation crack & track of gasteropod".	No indication of place of lodgement.
136	?Geol.Dpt Lpool.U. no. 8030	Runcorn, Cheshire	"Curved surface, bounded by desiccation cracks, covered with tubercles resembling surface of epidermis...My colln. no. 319". Photo: H.C. Beasley	Identification with L.U. specimen not certain.
137	Liver-pool City Museum	Storeton, Cheshire	Details as for 115-117, q.v. Photo: H.C. Beasley	Seen on display, January 1970. [See also photo 234].
*137A	Liver-pool City Museum	Storeton, Cheshire	Details as for 115-117, q.v. Photo: H.C. Beasley	Comments as above.
*137B	Liver-pool City Museum	Storeton, Cheshire	"Pes & manus, showing the tubercles on sole of foot. A print of some other animal in cent. of manus."	Comments as for 137.
138		(Recent)	Stream markings from between tide marks, Hilbre.	
139		Elgin, Scotland (Permian)	"Plant impression and cast... Pho. given me by Mr. Wm. Taylor".	No indication of place of lodgement.

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
140	Liver-pool City Museum	Flaybrick Hill, nr. Birkenhead, Cheshire	"Supposed impressions of *Calamites*? My colln. no. 1." Photo: H.C. Beasley.	Groove casts: see Cummins, *Liv.Manch.Geol.J.*, Vol. 2 pt. 1, 1958. [See also photo. 232].
141		Aughton, nr. Ormskirk, Cheshire (280,279) & Calder Grange (341)	Photo of three specimens showing "flame shaped markings".	Specimen 280 illustrated by Cummins, *op.cit.*, 1958 (pl. 2 fig. 3) as flute casts. Place of lodgement not known.
142		Aughton, nr. Ormskirk, Cheshire	"(No. 255 in Colln)". Photo: H.C. Beasley.	Illustrated by Cummins, *op.cit.*, 1958 (pl. 2, fig. 1) as flute casts. Place of lodgement not known.
143		Storeton, Cheshire	"Plant form probably caused by stream of water (No. 197 17-3-94)". Photo: H.C. Beasley.	Probably furrow casts? No indication of place of lodgement.
*144	Br.Mus. (Natural History)	Storeton, Cheshire	"Slab of sandstone, bearing casts of prints of Cheirotheroid, Rhynchosauroid and Chelonoid forms. The white line is a 12 inch Rule for comparison for size. April, 1906".	
145		Storeton Hill Quarries, Cheshire	Lithograph: "Fossil Fucoidea discovered in the New Red Sandstone....by John Cunningham, F.G.S. August 1841. Published by the Natural History Society of Liverpool. From Nature by A.F. Tait; printed by McGahey 15 Lord St." Photo: H.C. Beasley.	
146	Liver-pool City Museum	Runcorn, Cheshire	"Fine current striations...(Own Colln. No. 305). Probably caused by slipping of a roughened surface of a foot".	Character not clear.
147	Liver-pool City Museum	North Quarry Storeton, Cheshire	"Invertebrate tracks, on upper surface, wave marked. Probably Arthropod, Crustacean. Own colln. No. 206. Found by Mawby & Bruce. See also a similar specimen [in] Brit. Mus. same place". Photo: H.C. Beasley.	Probably *Permichnium völckeri*. [See also 209].
148	Liver-pool City Museum	Small quarry, Five Lane Ends, Frodsham, Cheshire	"Series of curves, generally concentric in relief.... Some imperfect footprints in same quarry. In lower, rt. hand corner, probably worm boring, horizontal. (Own Colln. 294). Scale at side in centimeters." Photo: H.C. Beasley.	Probably groove casts.
149	Liver-pool City Museum	Oxton Heath nr.Birken-head, Chesh-ire (131): prob.Runcorn, Cheshire(208); prob.Aughton nr.Ormskirk, Cheshire(276)	Photo of three specimens, two with "cusp shaped markings" (131, 208), one with "straight markings" (276). Beasley Colln. Photo: H.C. Beasley.	Probably ctenoid casts (131, 208) and groove casts (276).
150		Oxton Heath, nr. Birkenhead, Cheshire	"Cast of injured portion (before accident) of slab... (My no. 205) with invertebrate markings". Photo: H.C. Beasley.	Furrow casts joining longitudinal channel cast? Place of lodgement not indicated.
151		Oxton Heath, nr. Birkenhead, Cheshire	"Entire slab...including central injured portion of which 150 is a photo before injury. Certain marks are supposed to represent webbed feet (right hand side of centre of fracture). There are other invertebrate markings."	Comments as last: "webbed feet" may be ctenoid casts?

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
152	?Geol.Dpt. Lpool.U. Museum	Storeton, Cheshire	"Possibly footprints of small vertebrates (No. 128 in Colln.)" Photo: H.C. Beasley	
153		?Harley, Staffordshire (324): Runcorn, Cheshire(143)	Photo of two specimens 324a footprint, 143 "? Worm Cast".	Place of lodgement not indicated.
154		Storeton, Cheshire (266,357): Runcorn, Cheshire(325)	Photo. of three specimens "266 Very small markings, probably footprints. 357 Worm casts. These appear to be on the upper side of the stone as the other side is covered with a thin & smooth layer of Iron Band... Compare with photo 153...which also appeared to be upper side when compared with other pieces in the quarry. 300 Short rods with longitudinal [illegible] Camp. 125. Runcorn".	Place of lodgement not indicated.
155		Bentley's(?) [Quarry?]	"Narrow end of large slab (my no. 200)...with invertebrate markings & two patches of irregular form but similar to 337".	Place of lodgement not indicated.
156		Storeton, Cheshire	"A_1 pes, bought from Bentley at Storeton. (No. 199, HCB Colln)" Photo: H.C. Beasley	Large print, with small toeprints superimposed. Place of lodgement not indicated.
157	Liverpool City Museum	Storeton, Cheshire	"A_1 (?) manus...the corresponding pes was very distinctly marked, so was not preserved. Own colln. no. 235" Photo H.C. Beasley.	Probably *Chirotherium storetonensis* Morton.
158		Storeton, Cheshire	"A_1 pes & manus. Tubercles well shown on ball of V. digit of pes. In grey sandstone...said to have come from 2nd [bed]. Own collection. See [photo] 236 fingers better". Photo: H.C. Beasley.	*Chirotherium storetonensis* Morton. Present place of lodgement not indicated.
159	Liverpool City Museum	Storeton, Cheshire	"A_2. The V digit is rather larger than usual in this form but the general form is decidely that of A_2. 15/7/02. Own Colln. No. 303" Photo: H.C. Beasley.	*Chirotherium* cf. *storetonensis* of Kuhn, 1963.
160		Storeton, Cheshire	1906 (No. 339) from slab No. 1, in relief. F_3 pes & manus, G also I & D_1 & other imperfect prints. Many of the prints of D_1 show transverse ridges on the digits, apparently by rows of papillae".	Place of lodgement not indicated.
161 & 162		Storeton, Cheshire	Two photographs. "1906 from no. 1 (my no. 339) F_3 Pes superimposed on manus, both left side". Photo: H.C. Beasley.	"Chelonoid" (prob. cynodont) footprint. Place of lodgement not indicated.
163		Storeton, Cheshire	"1907. Under surface of slab with adherent clay, containing worm casts or casts in sandstone of worm borings. Horizontal & vertical casts 1/8 in diameter. ?Amphipod Crustaceans". Photo: H.C. Beasley 5.Oct/'07.	Place of lodgement not indicated.
*164		Storeton, Cheshire	1907. "1A. Small slab probably from 1st bed with desiccation cracks. Worm casts & pes of A_1" [In another hand: "See also photo no. 195"]. Photo: H.C. Beasley 5.Oct/'07.	*Chirotherium storetonensis*
165	Geol.Dpt. Lpool.U. Museum no.8029	Storeton, Cheshire	1907 "Lower right hand corner of No. 2 slab with G. footprints from 2nd bed & west of fault". Photo: H.C. Beasley, 16 Nov/'07.	*Typopus* sp., according to Haubold (1971). [See also nos. 170 & 176-179].

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
166		Storeton, Cheshire	1904. "My no. 313. large print of G? several small ones." Two photos, taken with light from right and left respectively, by H.C. Beasley.	*?Typopus* sp., according to Haubold (1971).Place of lodgement not indicated.
*167	Bootle Museum No. 4	Storeton, Cheshire	"Webbed foot prints, about 1/2 nat. size."	[See also no. 6].
168		Grinshill, Salop	"Impressions made by rain". Photo: H.C. Beasley.	Place of lodgement not indicated.
169		Storeton, Cheshire	"Left hand of slab no. 2, showing also whole slab indistinctly". Photo: H.C. Beasley, 16 Nov/ '07.	Is whole slab preserved at Liverpool University?
170	?Geol.Dpt. Museum Lpool.U. No. 8029	Storeton, Cheshire	"Part of slab no. 2/1907". Two photos: left-G print about 1/2", right - "A portion of slab on smaller scale". Photos: W.H. Rock.	*Typopus* sp., according to Haubold (1971). It is not clear of which portion of the slab these photos were taken.
171		Barton, nr. Great Altcar, Lancashire	"Very fine sandstone. Impression of five-toed print on part of a 5 inch core with pseudomorphs of salt in relief. (No. 227 H.C.B. Colln)". Upper Keuper. Photo: H.C. Beasley.	Resembles *?Aetosauripus* sp. of Wills & Sarjeant, *Mercian Geol.*, vol. 3 no. 4, 1970. Place of lodgement not stated.
172		Barton, nr. Great Altcar, Lancashire	"Markings simulating integument & pseudomorph [of] salt in very thin layer of fine marl on Gypsum from 6 in. core. This piece 1/2 to 3/4 in. thick with alternating layers of marl & gypsum (No. 360 H.C.B. Colln)" Photo: H.C. Beasley.	Present place of lodgement not known.
173		Manchester Ship Canal Cutting, Warburton, Lancashire	"Pseudomorphs of salt, Upper Keuper, in grey marl. (323.11.89) No. 10 H.C.B." Photo: H.C. Beasley.	Present place of lodgement not known.
174		Grinshill, Salop	"Ripple marks. Lower Keuper (No. 13 H.C.B.)" Photo: H.C. Beasley.	Place of lodgement not stated.
175		Storeton, Cheshire	"No. 9/1907. Stems of plants with nodes and other traces of structure." Photo: H.C. Beasley	Place of lodgement not stated.
176	Geol.Dpt. Museum Lpool.U. No.8029	Storeton, Cheshire	"No. 2. right hand part." Photo: H.C. Beasley 11/1/'08	Compare 165, 170 and succeeding photos.
177	Geol.Dpt. Museum Lpool.U. No. 8029	Storeton, Cheshire	"No. 1 and part of No. 2". Photo: H.C. Beasley.	
178				
179	Geol.Dpt. Museum Lpool.U. No.8029	Storeton, Cheshire	"Right hand half". Photo: H.C. Beasley, 18/1/ '07.	
180		Storeton, Cheshire	Slab nos. 3 & 4, 1907. Photo: H.C. Beasley.	Depicted when weathering out against wall at quarry.
181	Geol.Dept Museum Lpool.U. Nos.8028 & 8028a	Storeton, Cheshire	Slab nos. 5 & 6, 1907. Photo: H.C. Beasley.	Comments as last.

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
182		Storeton, Cheshire	Slab no. 7, 1907. "I believe Lomas sent lower part of this to Mr. F. Cris". Photo: H.C. Beasley.	Comments as for 180. Present whereabouts not known.
183		Storeton, Cheshire	Slab no. 8, 1907. Photo: H.C. Beasley.	Depicted when weathering out against wall of quarry Footprints on ripple-marked surface.
*184 & 185		Storeton, Cheshire	2 photos of slab no. 9, 1907: upper photograph shows underside in relief, lower shows impressions.	Depicted when at quarry. Place of lodgement not indicated. 185 was reproduced in Sarjeant, 1974 (fig. 11).
186	?Bootle Museum No. 6	Woodside, Birkenhead, Merseyside	"Lithograph of a gigantic fucoid from Woodside... by H. Dercks 1837 lent me by Miss Morton...? Is No. 7 Bootle Mus. not left hand corner of this? See Geol. Livl".	
187		Thüringia, Germany (Permian)	Five photographs of plates in Pabst, *Z.Deutsch. Geol.Ges.* vol. 57 pt. 3, 1905, depicting *Ichnium gampsodactylum, gracilis, albendorfense, minor* and *friedrichrodanum.*	The latter four were originally subspecies of *Ichnium gampsodactylum* Pabst. [See Note VI].
188		Thüringia, Germany (Permian)	Four photographs from plates in Pabst, 1905, depicting *Ichnium pachydactylum minus, irregulatum* and *albendorfense.*	[See Note VII].
189		(Carboniferous)	[Two illegible words in pencil].	Plaster cast or slab, showing trail. No details.
190	Geol.Dpt. Museum Lpool.U. No.Lu8029	Storeton, Cheshire	No. 2, 1907. "Whole slab in relief". Photo: H.C. Beasley, 7/3/'08.	Photo taken in quarry. See also 196, 202-3, 205, 279.
191 & 192	Geol.Dpt. Museum Lpool.U. No.LU8029	Storeton, Cheshire	Same as above; two photographs. 191: Centre of upper part of slab. 192: right of upper part.	Comments as above.Sedimentary structures (furrow casts?). See also 196.
193 & 194	No.10 Geol.Dpt. Museum Lpool.U. No.8027 Others?	Storeton, Cheshire	193. Nos. 11 & 10, 1907. Impressions 194. Group of 11, 10, 1a and two fragments. Photo: H.C. B[easley], 7/3/'08.	Place of lodgement of nos. 1a, 11 and unnumbered fragments not indicated.
195		Storeton, Cheshire	No. La, 1907 "A large piece has been broken off sincephoto no. 164 was taken. In relief." Photo: H.C. B[easley].	Photo taken at quarry. Place of lodgement not indicated.
196	Geol.Dpt. Museum Lpool.U. No. 8029	Storeton, Cheshire	No. 2, 1907 "Left hand top quarter. Film H.C. B[easley]."	See also 190-192, 202-203, 205, 279.
197 & 198		"Couches' Corner", Runcorn, Cheshire	Stream markings, Lower Keuper Sandstone. 197. whole block, 198: left hand half, larger scale. Photo: H.C.B[easley], 4/4/'08.	Block probably not collected, even in part.
199		"Couches' Corner", Runcorn, Cheshire	197. Underside of thin bed with desiccation cracks on roof of hollow in quarry. Photo: H.C. B[easley], 4/4/'08.	197 not collected.
200		"Couches' Corner", Runcorn,Ches.	View of corner of quarry. Photo: W.H. Rock.	

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
201		"Couches' Corner", Runcorn, Cheshire	"Surface of block with footprints D." Photo: H.C. B[easley], 4/4/'08.	Place of lodgement, if any, not indicated.
202	Geol.Dpt. Museum Lpool.U. no.8029	Storeton, Cheshire	No. 2, 1907. Part of right hand half."	See also 190-192, 205, 279.
203	Geol.Dpt. Museum Lpool.U. no.8029	Storeton, Cheshire	No. 2, 1907. Boring on under surface etc. Total length of markings 7 1/2 inches from the lower end of boring to top of arms in relief. (light from left)". Photo: H.C. B[easley].	See also 190-192, 205 279.
*204	Geol.Dpt. Museum Lpool.U. no.8028	Storeton, Cheshire	No. 6, 1907. "Whole slab in two plates. A shallow trough fault with throw varying from 1/2 to 2 inches extends the whole length of the slab. A large portion of the upthrow side flaked off with frost: that also bore footprints". Photo: H.C. B[easley].	Photograph taken at quarry.
205	Geol.Dpt. Museum Lpool.U. no.8029	Storeton, Cheshire	No. 2, 1907. Left hand portion of lower part of slab. Photo: H.C. B[easley].	See also 190-192, 196, 202-203, 279.
*206		Monja(?), Basutoland	"Dinosaurian prints from Stormberg Series.... sent me by Rev. S.S. Dornau. See *Geol. Magazine* Feb. 1908 p. 63 for description: key with measurements etc. on back".	
207	Bootle Museum No. 7	No locality	"Natural casts of stream courses in sandstone. No locality: almost certainly from this district. (Light from right). In relief". Photo: H.C. B[easley] 16/6/'08.	Transverse furrow casts joining channel cast.
208		Storeton, Cheshire; Frodsham, Cheshire	Photo, depicts two slabs. "Tunnels & grooves (similar to these formed by *Kröyeria arenaria* on recent sea shore) both from Lower Keuper".	Place of lodgement not indicated.
209		North Quarry, Storeton, Cheshire	"Invertebrate tracks...Portion of my 206. Photo 147 on larger scale. About nat. size". Photo: H.C. B[easley].	Probably *Permichnium völckeri* Güthorl. Place of lodgement not indicated.
210		North Quarry, Storeton, Cheshire	"Invertebrate tracks...Portion of my 206. Photo 147 on larger scale. About nat. size". Photo: H.C. B[easley].	Probably *Permichnium völckeri* Güthorl. Place of lodgement not indicated.
211		North Quarry, Storeton, Cheshire	"Invertebrate tracks from Lower Keuper...from Mr. Lomas' collection. The pittings are rather larger than those on my specimen". Photo: Edmunds. Print: H.C. B[easley].	Probably *Permichnium völckeri* Güthorl. Present place of lodgement not indicated.
212	Orig.in Technical Institute, Runcorn	"Couches' Corner", Runcorn, Cheshire	Three photos. Whole slab in stone, showing pattern of mud cracks, and two close-ups of do.	Note in another hand: "Whereabouts of slab not known, 1957". See also 217, 295.
213	Same as above	Same as above	Three photos of suncracks.	Same as above.
214	Br.Mus. (Natural History) No.R.3484	Storeton, Cheshire	"Central portion (No. 20 Storeton 1906). Given me by Dr. A.S. Woodward".	See also photos 99-101.

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
215		Leasowe, Cheshire	"Stream markings from Leasowe shore a little N.E. of embankment. Photo: H.C. Beasley, Aug. 1906. Mounted the wrong way up."	
216		Grinshill, Salop	"Bones of *Rhynchosaurus* in possession of Mr. Kilvert a[t] Grinshill". Photo: H.C. Beasley, Sep. /'08.	No indications of present place of lodgement.
217	Orig. in Technical Institute, Runcorn	"Couches' Corner", Runcorn, Cheshire	Two photos of "Portions of the Footprint Slab, upper showing "webbed prints", lower showing "D_2 prints: *Rhynchosauroides rectipes*, Hind & Fore Left Feet". See also 212, 213, 295.	See note to 212.
218 & 219		Grinshill, Salop	"218 Left hand half, 219 right hand half of slab of footprints...in possession of Mr. Kilvert, former owner". Photo: H.C. B[easley], 30 Sep. /'08.	
*220 (over-sized)		Storeton, Cheshire	"H.C.B. No. 190. Woodchurch Rd. slab, about actual size. Reversed. "Enlarged by J.F. Smith from [words missing]".	No indication of place of lodgement.
221 (over-sized)	Shrews-bury Museum	Grinshill, Salop	"Forelimb of *Rhynchosaurus*, taken before the fossil was cleared of matrix by Brit. Mus." See A.S. Woodward, *Br.Ass.Advmt.Sci.Rept.*, York 1906, Plate I, About 3 times nat. size. Enlarged by J.F. Smith from photo by Mr. Forrest of Shrewsbury."	
222		Storeton, Cheshire	"My no. 227 - Type of I pes & manus". Photo: H.C. Beasley.	No indication of place of lodgement.
223		Storeton, Cheshire	"My No. 255. B_1....this is like a smaller (1/2) copy of Morton's *Cheirotherium minus* in Livl. Museum".	Possibly *Chirotherium sickleri* Kaup. Place of lodgement not indicated.
224	Sedgwick Museum U.of Cam-bridge	Penrith, Cumberland (Permian)	"Copies of Varty Smith's photos. Nos. 1 & 2 from Penrith Sandstone. See *Quart.J.Geol.Soc.* for paper (no figure) Vol. 40 page 479."	Possibly *Chelichnus ambiguus* Jardine [now *Laoporus ambiguus* (Jardine) Haubold]. See also photo 263.
225		Flaybrick Hill nr. Birkenhead, Cheshire	"Detached markings from Lower Keuper".	Groove casts? Place of lodgement not indicated.
226		Flaybrick Hill, nr. Birkenhead, Cheshire	"Ridges & grooves, with signs of drag... (No. 4)". Photo: H.C. B[easley].	Groove casts. Photo used by Cummins, *Liv.Mach.Geol. J.*, Vol. 2 pl. 1, 1958, pl. 2, fig. 2. Place of lodgement not known.
227		Wallasey, Cheshire	"Markings on Wallasey shore between tide marks. Small streamlets running into a little pool in the sand". Photo: H.C. B[easley]. Oct./'08.	
228		Wallasey, Cheshire	"Markings on Wallasey shore between tide marks. Effect of broad shallow streams". Photo: H.C. B[easley], Oct./'08. [Pencil note illegible].	
*229	Liver-pool City Museum	Storeton, Cheshire	"No. 9, 1907. Underside; footprints & plant re-mains in relief." Figured *"Brit.Assoc.Handbook Merseyside"*, opp. p. 242 *Proc.L'pool.Geol.Soc.* Vol. xiv, pl. 9 p. 190 (1925).	
*230 (over-sized)		Storeton, Cheshire	"(Type F_2 &c.) About Actual Size. Enlarged by J.F. Smith from Photo no. 267".	Not identical with photo 267!

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
231		Flaybrick Hill, nr. Birkenhead, Cheshire	"Ridges & grooves no. 5" Photo: H.C. Beasley.	Place of lodgement not indicated.
232		Flaybrick Hill, nr. Birkenhead, Cheshire	"Plant remains, *Calamites?* Own Coll. no. 1. Part of photo 140 on larger scale." Photo: H.C. Beasley, Nov./'08.	See note to photo 140.
233	Geol.Dpt. Museum Lpool.U. No.LU8028	Storeton, Cheshire	"Centre portion of No. 6/1907, now in my Colln. No. 369... See photo 204 of whole slab. Given to Livl. University who have adjoining piece" Photo: H.C. Beasley.	
*234	Liver-pool City Museum	Storeton, Cheshire	"No. 1, 1906. Small portion of my 338, showing papilla on portion of manus (A_4). Also small print; probably". Photo: H.C. Beasley.	
*235 & 235a		Storeton, Cheshire	235. "K. My no. 220". 235a "A_2 My 303". Both from Storeton previous to 1906.	K = *Chelone? subrotundus* Morton. A_4 = *Isochirotherium lomasi* (Baird) Haubold. Present lodgement not known.
*236		Storeton, Cheshire	"My no. 290. A_1 showing papillae. Small sized foot".	Place of lodgement not indicated.
*237		Storeton, Cheshire	"My 292. A_1 pes & (ill-defined) manus". Photo: H.C. Beasley.	Place of lodgement not indicated.
*238		Storeton, Cheshire	"Natural cast and original impression of foot-print C. No. 255a & b." [Date given incor-rectly as 3/9/19099 - pres. 1909]. Photo: H.C. Beasley.	*Typopus* sp., according to Haubold (1971). Place of lodgement not indicated.
239		Storeton, Cheshire	"1st of 1909. P. print in relief in a very light-coloured bed. Several other slabs very si-milar were found, same level, some years ago. The uppermost footprint bed No. 377", Photo: H. C. Beasley.	
240		Helsby & Runcorn, Cheshire	"No. 196 in relief from Helsby. C. Footprint No. 362 in relief from Runcorn. Pes & manus super-imposed resemble C, but are the marks in advance of points of digits the ends of long claws?"	Place of lodgement not indicated.
241		Storeton, Cheshire	"Plaster casts of footprints on a large block of stone in Storeton Quarry (Nos. 180a & b) pes & manus, probably Cheirotherioid prints? L: Compare photo 260".	Very bad photograph. Place of lodgement not indicated.
242		Runcorn, Cheshire	"Rain prints in relief...given me by Mr. C.W. Couchs (No. 370)" Photo: H.C. Beasley.	Couchs--cf. "Couches' Cor-ner", photos 197-201, 295?
243		Corncockle Quarry, Ann-andale, Dum-frieshire, Scotland (Permian)	"Prints of raindrops." Copied from Jardine's "Ichnology of Annandale" by H.C. Beasley.	
244			"Imprints of raindrops on soft clay. A thin coating on glass, allowed to dry." Photo: H.C. Beasley, April 1909.	
*245			"Impression of right hand on clay. Afterwards exposed to rain for very short time". Photo: H.C. Beasley, April 1909.	Reproduced in Sarjeant, 1974 (fig. 13).
246			"Imprints of rain & a short track of earth worm on left hand". Photo: H.C. Beasley, April 1909.	

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
*247	Penzance Museum, Cornwall	Nr. Warrington, Lancashire	"Slab with footprints A_1 &c. from near Warrington, given by Mr. Cunningham". Photo: W.A. Whitehead.	*Chirotherium storetonensis* Morton, etc.
248		Marazion, Cornwall	"Current markings on shore...Compare 228 from Wallasey." Photo: W.A. Whitehead.	
249		Storeton, Cheshire	"Slabs raised 1906 from upper bed": 4 photographs. These were some of the earliest raised in 1906 & were under the west side of quarry, not readily to be seen. Where are the films?" Photo: H.C. Beasley.	Place of lodgement not indicated.
250		Storeton, Cheshire	"P. Storeton 1909. In high relief (2-3 inches), longitudinal folds. No. 381" Photo: H.C. Beasley.	*Deuterotetrapous triassicus* Nopcsa. Place of lodgement not indicated.
251		Guest's Quarry, Runcorn Hill, Cheshire	View of Beetle Rock, taken by C.A. Timmins, Runcorn.	Reproduced in Sarjeant, 1974 (fig. 14).
252		Storeton, Cheshire	"F_3 & other markings on an old slab, probably 1906. Two other prints on side limit of photo; at the distances & directions as shown". Photo: H.C. Beasley.	Place of lodgement not indicated.
253				
*254		Storeton, Cheshire	Two photos. 1909 (No. 381). "P. footprints lighted from right a, from left, b." Photo: H.C. Beasley.	Place of lodgement not indicated. *Deuterotetrapous triassicus* Nopcsa, 1923.
*255		Storeton, Cheshire	Two photos 1909. P. footprints nos. 318 & 377, "1 deeply impressed, 2 shallow. 2 is from upper bed, 1 probably from same but not certain". See *Report Brit.Ass.Advmt.Sci.* 1909, Pl. 1 Photo: H.C. Beasley.	Place of lodgement not indicated. *Deuterotetrapous triassicus* Nopcsa, 1923.
256		Storeton, Cheshire	Photograph of "Storeton Quarries. East side of large South quarry, which is...where the footprints of *Cheirotherium* were first discovered. The "footprint bed" is well seen near the base of the section where pointed out by Mr. M." [G.H. Morton] "Taken Oct. 1881 by E. Newall,Esq."	Reproduced in Sarjeant 1974 (fig. 9).
257		Storeton, Cheshire	Photograph of "Section on the west side of the North quarry. 'Footprint bed' covered with bushes about two-thirds down from the top, but well seen in the photograph at the projecting corner of rock. Taken Oct.1881 by E. Newall, Esq".	Reproduced in Sarjeant 1974 (fig. 9).
258	Br.Mus. (Natural History) Nos.R4830 to R4833	Saltwick, Yorkshire [wrongly quoted as "Whitby" by H.C.B.] (Jurassic)	"Footprints from Lias... See Harold Brodrick, *Proc.Liverpool Geol.Soc.* 1908-9".	Slabs in fact fallen blocks of Inferior Oolite!
*259	Salford Museum	Lymm, Cheshire	Two photos: "a. has print of P with clear margin & posterior prolongation, also imperfect pes A_2 b. Pes of A_2 & probable manus." Photo: G. Cameron, Salford.	P = *Deuterotetrapous triassicus* Nopcsa 1923. A_2 = *Chirotherium* cf. *storetonensis* of Kuhn, 1963.
260		Storeton, Cheshire	"I. My 302". Photo: H.C. Beasley.	Place of lodgement not indicated.

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
261	a)Br.Mus. (Natural History) b)Geol. Dpt.Mus. Lpool.U. no.8027	Storeton, Cheshire	a. "Plaster casts from Storeton 4/1906... Manus & pes". b. "Plaster casts of D_7, Storeton No. 10/1906. About 4/6 nat. size".	
262		Hollington, Staffordshire	"Small prints in relief, Hanley's [?] quarry. Prints a little over an inch across". Photo: H.C. Beasley, 14 Oct.'09	Place of lodgement not indicated.
263	Sedgwick Museum, Univ.of Cambridge	Edenhall,nr. Penrith, Cumberland (Permian)	"No. 1 with Geo. Varty Smith's comps., *Q.Jl geol. Soc.Lond.* Vol. 40 p. 469."	See photo 224 for comments.
264		Same as 263.	No. 2 same as 263	See photo 224 for comments.
265	Liverpool City Museum	Storeton, Cheshire	"Side view of A_4 (H.C.B. 338), from Storeton. 1/1906" Photo: H.C. Beasley.	*Isochirotherium lomasi* (Baird) Haubold.
*266		Runcorn, Cheshire	Three photos "Examples of connecting bars between digits; supposed to indicate the presence of partial webbing. a. H.C.B. No. 388 b. Mr. Maidwell's specimen c. H.C.B[easley] no. 306".	Place of lodgement not indicated. 266b (=267 left) *Rhynchosauroides rectipes* Maidwell, 1911 (see discussion in Sarjeant, 1974, p. 308).
*267		Runcorn, Cheshire	Two photos. Left "Mr. Maidwell's webbed (?) print". Right. "No. 408 No trace of web". "Two prints of D_2. Mr. Maidwell's print shows connecting bars between digits II, III & IV & a trace between extremities of IV & V whilst my print No. 408 shows no trace of webbing."	Same as above.
268		Runcorn, Cheshire	"Indefinite markings--from small slab in possession of Mr. F.J. Maidwell". Photo: H.C.B[easley] July 1910.	Present lodgement not indicated. These seem to be vertebrate footprints.
269	Liverpool City Museum	Storeton, Cheshire	"Footprints F_3, D_1 etc. on slab in Liv. Mus. obtained from Storeton, end of 1895. The left hand photo does not show about 3" of lower portion & 2" of right side. Those all show on right hand photo". Photo: H.C. B[easley]. 1910.	F_3 = "Chelonoid print", considered by Haubold (1971) to be a cynodont. D_1 = *Rhynchosauroides articeps* Owen. Card bears note in another hand "Gone in blitz".
270	Liverpool City Museum	Storeton, Cheshire	Same as 269. on larger scale. Photo H.C. Beasley, Sep'1910.	Same as 269.
271	Geol. Survey Museum	Elgin, Morayshire, Scotland(?Perm.)	Three photos, all reproduced from Huxley. a. from plate XIV b. from plate XV c. from plate XVI of Brickenden's slab.	*Chelichnus megacheirus* Huxley, *Mem.Geol.Surv.* monograph III, 1877.
*272	Geol. Survey Museum GSM8687 or 8688	Elgin, Morayshire, Scotland (?Permian)	Photo slab figured in Huxley's pl. XIV & XV, figs. 5-6 *Chelichnus megacheirus* Huxley. Photo: Morgan & Kidd, printed H.C.Beasley.	Huxley, *Mem.Geol.Surv.* monograph II, 1877.
*273	Same as above	Same as above	*Chelichnus megacheirus*, manus & pes. Photo Morgan & Kidd, printed H.C.Beasley.	Same as above.
274	Same as 272	Same as 272	"Lower right hand portion. Large print". Photo: Morgan & Kidd, printed H.C.Beasley.	Same as 272. Print not recognizable on picture.

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
275	Br.Mus. (Natural History)	Storeton, Cheshire	Three photos, one by H.C. B[easley], one by W.H. Rock, one uncredited, taken in the quarry. Track of vertebrates *(Chelichnus)* and invertebrates.	See also photo 285.
276		Fieldings' Quarry,Hollington,Staffordshire	"*Equisetum* fragments &c. in relief on clab. Oct. 1910".	Probably groove casts with superimposed suncracks. Place of lodgement not indicated.
277		Fieldings' Quarry,Hollington,Staffordshire	"*Equisetum* fragments in relief on slab. Oct.1910".	Structure less clear: flute casts and groove casts? Place of lodgement not indicated.
278	Liverpool City Museum	Storeton, Cheshire	"*Chirotherium minus;* Morton, *Geol of Liverpool,* 2nd edn., Plate XXI.	See also photo 16.
279	Geol.Dpt. Museum Lpool.U.	Storeton, Cheshire	"Part of negative 205, enlarged".	See also 190-192, 196, 202-203.
280		Oxton Heath nr. Birkenhead,Cheshire	"Two photos: H.C.B[easley]. 129a." Whole slab, 7" by 9". b. D print on larger scale showing trace of 'shank' of pes". Photos: H.C. Beasley.	See also photo 27. Place of lodgement not indicated.
281		Storeton, Cheshire	H.C.B[easley] 200 "Two patches of rugae". Photo: H.C. Beasley.	Sedimentary structures.
282		Storeton, Cheshire	Two photos of 200 (another part of same slab as last). "a. F_3 lighted from left. b. do lighted from right".	Place of lodgement not indicated.
283		M[anchester] S[hip]Canal Quarry,Weston nr.Runcorn, Cheshire	"Squeeze of prints in situ...made 10 June 1911."	Cast; place of lodgement, if any, not indicated.
284	Br.Mus. (Natural History) No.R.295	Lymm, Cheshire	"Light from left, above. Traces of webbing? Given me by A.S. Woodward".	
285	Br.Mus. (Natural History)	Storeton, Cheshire	"1910. Englarged from 275c." Photo: W.H. Rock.	See also photo 275.
286	Manchester Mus.	Storeton, Cheshire	"Tracks of vertebrates (perhaps *Chelichnus*) and invertebrates. Storeton 1910". Photo: Ward.	
287			Two photos, both faint, one torn, with comment "Better prints wanted".	
288	Br.Mus. (Natural History) no.R.3874	Storeton, Cheshire	H.C.B[easley]. 411 & 412, 1910. "2 plaster casts of prints on slab. a. Curved digits of D. b. resembles Huxley's [*Chelichnus*] *megacheirus* & is a G. print; see paper in *Liv.Geol.Soc.Proc.* 1910." Photo: H.C. Beasley.	a. *Rhynchosauroides* sp.
289		Runcorn, Cheshire	"A rather abnormal form of D_1 (H.C.B[easley]. 409) found 27/7/10". Photo: H.C. Beasley.	*Rhynchosauroides articeps* Owen. Place of lodgement not stated.
290		Fielding's Quarry, Alton, Staffordshire	Two photos of "Three fragments...upper part of Keuper Building Stone, found June 1912". Photo: H.C. Beasley.	Ctenoid casts: see Cummins, *Liv.Manch.Geol.J.* Vol. 2 pt. 1, 1958.
291		Storeton, Cheshire	"1912. Large broad Cheirotheroid print from upper bed". Photo: H.C. Beasley 27/5/1912.	Place of lodgement not indicated.

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
292		Storeton, Cheshire	"Part of slab...1912, from upper bed. Small A_1 top right hand & scar of large Cheirotheroid print near bottom of print: This probably was same form as no. 291".	Place of lodgement, if any, not indicated.
293	?Geol. Surv.Mus. London (see 298)	Storeton, Cheshire	"III, IV & V digits of A_1 on no. 1/1912". Photo: W.H. Rock & H.C. Beasley, 27/5/12.	See also 298.
294		Storeton, Cheshire	"1912. Two slabs near crane. a. Large impressions. b. A_1 in relief (much foreshortened)". Photo: H.C. Beasley, May, 1912.	*Chirotherium storetonensis* Morton. Place of lodgement not indicated.
295	Formerly in Runcorn Technical Institute	"Couches' Corner", Runcorn, Cheshire	Large slab.	Note by J.C. Harper. "The clerk to the Runcorn Council failed to find this slab after numerous enquiries". See also 191, 212, 213.
296		Storeton, Cheshire	"From *upper* footprint bed, showing the network of desiccation cracks & cast A_1 pes & trace of manus, with deep hollow where the mud was pressed upward round the pes. Size of pes 9" x 7", stride 3'8". Photo: H.C. Beasley 22/6/12.	Place of lodgement not indicated.
297		Storeton, Cheshire	Same as above. "Whole length of 18/1912. 296". Photo: W.H. Rock 22/6/12.	Place of lodgement not indicated.
298	?Geol. Surv.Mus. [Note:"The Jermyn St. people want this"]	Storeton, Cheshire	"Series of manus & pes of A_1 clearly defined digits & nails: for large photo of digits see No. 293. Length of pes 7", stride 2'7", size of slab 5'3" x 5'3"." Photo: H.C.Beasley, 22/6/12.	*Chirotherium storetonensis* Morton.
299		Storeton, Cheshire	"6, 1912. 3 pairs of A_1 well defined". Photo: H.C. Beasley.	*Chirotherium storetonensis* Morton. Place of lodgement not indicated.
300		Storeton, Cheshire	"Storeton a/1912. Rather stout prints of A_1 length 8" stride 2'7"." Photo: H.C. Beasley.	Place of lodgement not indicated. Poor photograph, taken at quarry.
301		Storeton, Cheshire	"8/1912. Ripple marks more strongly shown where crossing large footprints". Photo: H.C. Beasley, 22/6/12.	Place of lodgement not indicated. Poor photograph, probably taken at quarry.
302		Storeton, Cheshire	"10/1912. Strongly 'ripple-marked' slab with some large D with long nails & traces of trail of foot in rear of print. (Vertical)". Photo: H.C. Beasley, 22/6/1912.	*Rhynchosauroides* sp. Place of lodgement not indicated. Poor photograph, taken at quarry.
303		Storeton, Cheshire	"10/1912. Rippled surface with D prints with nail in rear. Same slab as 302". Photo: W.H. Rock, 22/6/12.	*Rhynchosauroides* sp. Place of lodgement not indicated. Poor photograph, probably taken at quarry.
304	Denstone College Museum No. 884	Hollington, Staffordshire	"Supposed bone".	Note by W.A. Cummins: "Labelled Marl concretion simulating a bone". 14-6-57.
305	Geol.Dpt. Univ.Leic. (formerly in Denstone College Mus.)	Townhead Quarry, Alton,Staffordshire	"Supposed plant remains".	Figured and discussed by W.A. Cummins, *Mercian Geol.* Vol. 1 no. 2, 1965 [This invalidates Cummins' earlier comments in *Liv. Manch.Geol.J.* Vol.2, 1958.

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
306	Denstone College Museum	Townhead Quarry, Alton,Staffordshire	"Rectilinear markings...Compare with H.C.B[easley] 438 from same place".	Lodgement confirmed by W.A. Cummins 14-6-57. Groove casts.
307	Denstone College Museum No.937	Townhead Quarry, Alton,Staffordshire	"Phalangeal bones?".	Lodgement confirmed by W.A. Cummins 14-6-57.
308	?Denstone College Museum	Townhead Quarry, Alton,Staffordshire		Footprints etc.
309 & 310		Townhead Quarry, Alton,Staffordshire		Lodgement in Denstone College not indicated, but probable.
311 & 312	?Denstone College Museum	Townhead Quarry, Alton,Staffordshire		Ctenoid casts.
313 & 314	Denstone College Museum	Townhead Quarry, Alton,Staffordshire		Ctenoid casts.
315 & 316	Denstone College Museum	Townhead Quarry, Alton,Staffordshire		Ctenoid cast and (?) groove casts.
317 & 318	Denstone College Museum	Townhead Quarry, Alton,Staffordshire		Ctenoid cast (317) and groove casts.
319 & 320		Townhead Quarry, Alton,Staffordshire	"H.C.B[easley]. nos. 443/6".	Ctenoid casts (four specimens illustrated). Lodgement not indicated.
321		Townhead Quarry, Alton,Staffordshire	"Brush-like marking from same bed as ctenoid markings (H.C.B[easley]. No. 447)".	Place of lodgement not indicated.
322		Townhead Quarry, Alton,Staffordshire	"Parallel ribs, some very fine. (H.C.B[easley]. No. 438)".	Groove casts. Place of lodgement not indicated.
323		Townhead Quarry, Alton,Staffordshire	"Ctenoid marking with tail? (H.C.B[easley]. 439)". Photo: H.C. Beasley.	Place of lodgement not indicated.
324		Hollington, Staffordshire	"Sundry markings...(H.C.B[easley]. 440). Compare with those from Alton". Photo: H.C. Beasley.	Sedimentary structures, character not clear. Lodgement not indicated.
325		Hollington, Staffordshire	"Rhynchosauroid print with transverse ribbing on sole of digit, H.C.B[easley]. 441". Photo: H.C. Beasley.	Lodgement not indicated.
326	?Denstone College Museum	Townhead Quarry, Alton,Staffordshire	"Probably prints of D_3. See *Br.Ass.Advmt.Sci. Rept.*, 1904". Photo: H.C. Beasley.	*Rhynchosauroides* sp. Lodgement not indicated.

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
327, 328 & 329		Storeton, Cheshire	"All from...1st footprint bed, 1912. N.B. No. 327 is the upper part of same slab as 292 as it at present stands. They show the marks where the casts of footprints have broken off, owing to their being continuous with the bed of sandstone below the marl in which they were made" Photo: H.C. Beasley.	Almost certainly not collected.
330	Br.Mus. (Natural History) No.R.3483	Storeton, Cheshire	"No. 5/1906. Part of negative 89, enlarged". Photo: H.C. Beasely.	
331		Storeton, Cheshire	"Scar left after a large A print (photo 291) had been accidentally chipped off". Photo: H.C. Beasley.	Almost certainly not collected.
332		Fieldings' Quarry, Hollington, Staffordshire	"Stem of plant and other markings". Photo: H.C. Beasley	Groove casts, etc., Lodgement not indicated.
*333		Storeton, Cheshire	"Upper bed; sundry bootprints, including a three-toed foot". Photo: H.C. Beasley.	Photographed in quarry: perhaps not collected.
334	Leicester City Museum	Kegworth, Leicestershire	Photo and drawing. See Horwood, *Br.Ass.Advmt. Sci.Rept.*, 1909 Maidwell, *Geol.Mag.* 1916, "Note on the Kegworth footprint".	*Isochirotherium* cf. *herculis* (Egerton) Haubold: photograph in Sarjeant, 1974 (fig. 20).
335		Weston nr. Runcorn, Cheshire	"Impressions & in relief (light from left)...in a bed of micaceous fissile sandstone high up in the building stones". Photo: H.C. Beasley.	Place of lodgement not indicated.
336		Weston nr. Runcorn, Cheshire	"Invertebrate tracks (H.C.B[easley]. 465)". Photo: H.C. Beasley.	Possibly *Permichnium völckeri?* Lodgement not indicated.
337		Townhead Quarry, Alton,Staffordshire	"See photo 290 (H.C.B[easley]. 435/7 &c.) These lent me by Mr. C. Brett, Aug. 1913". Photo: H.C. Beasley.	Ctenoid casts. Present lodgement not indicated.
338 & 338X	Formerly Denstone College Museum	Townhead Quarry, Alton,Staffordshire	"Photo of slab...sent me by Mr. C. Brett, Aug. 1913".	Ctenoid casts, figured by W.A. Cummins, *Liv.Manch. Geol.J.* Vol. 2, 1958, pl. 1 fig. 4 [Note by Cummins on photo: "*Feb.1957*. This slab no longer preserved in Denstone Museum, thus; but other similar but smaller pieces are still there"]
339		Townhead Quarry, Alton,Staffordshire	"Original specimen lent me by Mr. C. Brett. 6 Aug. 1913". Photo: H.C. Beasley.	Ctenoid cast. Present lodgement not indicated.
340		Townhead Quarry, Alton,Staffordshire	"C. Brett 6 Aug 1913. No. XVI" Photo: H.C. Beasley.	Ctenoid cast. Present lodgement not indicated.
341		Townhead Quarry, Alton,Staffordshire	"C. Brett 6 Aug. 1913.No. II. Besides sundry invertebrate markings, this shows also 2 toes of D print. Compare my 409, [illegible word]". Photo: H.C. Beasley.	*Rhynchosauroides* sp. Present lodgement not indicated.

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
*342		Weston, nr. Runcorn, Cheshire	"Q prints...in a fissile micaceous sandstone. Aug. 1913 (My nos. 470, 1, 2)". Photo: H.C. Beasley.	Unnamed "footprint" type (could be produced by some other means!) Lodgement not indicated.
*343		Weston, nr. Runcorn, Cheshire	"Invertebrate markings...Aug. 1913 (My no. 468)". Photo: H.C. Beasley.	Possibly *Permichnium völckeri?* Lodgement not indicated.
344		Weston, nr. Runcorn, Cheshire	"Invertebrate markings....(H.C.B[easley]. No. 467). Has the straight edge any connection with the smaller markings?" Photo: H.C. Beasley.	Place of lodgement not indicated.
345		Oldfield and Oldfield Dungeon, nr. Heswall, Merseyside	"Linear markings...(H.C.B[easley]. 450)" [Pencil note: "Waterstones, Oldfield Dungeon" (?)].	"'The Dungeon' is a local landmark of Triassic sandstone"[G. Tresise, *in litt.* to W.A.S.S.].
346		Cutties Hillock, Elgin, Morayshire, Scotland(Permian)	"? *Chelichnus*...Photo given me by Geo. Hickling".	Place of lodgement not indicated.
347		Hollington, Staffordshire	"Traces of O prints". Photo by H.C. Beasley Sep. /1913.	*Typopus* sp., according to Haubold (1971). Also mud-cracks. Place of lodgement not indicated.
348		Hollington, Staffordshire	"Traces of O prints". Photo: H.C. Beasley 14/9 /13	*Typopus* sp. according to Haubold (1971). Also mud-cracks. Place of lodgement not indicated.
349		Townhead Quarry Alton,Staffordshire	"Orig. specimen lent me by C. Brett". Photo: H.C. Beasley, Sept. 1913.	Ctenoid casts, etc. Very dark photo. Present lodgement not indicated.
350		Townhead Quarry Alton,Staffordshire	"Given me by Mr. C. Brett. My No. 474". Photo: H.C. Beasley, Sept. [1913].	Ctenoid casts, etc. Present lodgement not indicated.
351 & 352				Two photos of slab, taken in a quarry. No details whatever are given.
353		Townhead Quarry Alton,Staffordshire	"Ctenoid markings; the same as 290 but on larger scale, being rather more than natural size". Photo: H.C. Beasley.	Place of lodgement not indicated
354				
355		Storeton, Cheshire	"A_1, 1906 large stone print, probably like *C. barthi*". Photo: W.H. Rock.	[See note II]. Place of lodgement not indicated.
356		Runcorn, Cheshire	Two photos: "F.T.M[aidwell]. 1 & 2".	Lodgement not indicated.
*357		Runcorn, Cheshire	Two photos: "F.T.M[aidwell]. 3 & 4".	Lodgement not indicated.
358		Runcorn, Cheshire	Two photos: "F.T.M[aidwell]. 5 & 6".	Lodgement not indicated.
359		Runcorn, Cheshire	Two photos: "F.T.M[aidwell]. 8 & 9. No 8 is part of no. 7".	Lodgement not indicated.

H.C.B. PHOTO NOS.	LODGEMENT MUSEUM & NO.	LOCALITY & STRAT. POSITION	BEASLEY'S COMMENTS	ADDITIONAL COMMENTS
*360		Runcorn, Cheshire	Two photos: "F.T.M[aidwell]. 7 & 8".	Lodgement not indicated. FTM 7
361		Runcorn, Cheshire	"F.T.M[aidwell]. 11".	Lodgement not indicated.
*362		Townhead Quarry, Alton,Staffordshire	"...with sundry footprints. Lent me by C. Brett, July, 1914" Photo: A. Harris.	Place of lodgement not indicated.
363	Woodwardian Mus. Cambridge	Storeton, Cheshire	"Copied from photo by J. Clarke".	Very dark.
364		Hollington, Staffordshire	"Slabs with traces of plants (in Waterstones of Survey), Lower Keuper. ? Where is the negative?".	Photo taken in quarry: probably sedimentary structures.
*365	Warwick Museum		*Brit.Assoc.Advmt.Sci.Rept.* 1905, p. 163. "The scale is a 1 foot marked in inches". Photo: J. Harriott, Warwick.	Shows a group of specimens.
366 & 367		Storeton (366) and Runcorn, Cheshire	"366 A_4 Plaster cast...H.C.B[easley]. No. 333. The manus described" *Brit.Assoc.Advmt.Sci.Rept.* 1906. "367. A_2 do. (H.C.B[easley]. no. 434)".	Place of lodgement not indicated.
368			Two photos of "Wood or bone? a. lighted from right, b. lighted from left".	Very bad photos. Lodgement of specimen not indicated.
369	Warrington Museum	Five Crosses, Frodsham, Cheshire	"Imperfect footprint (in relief)".	[Beasley quotes locality as "Vie Corners" but inscription on specimen reads "Five Crosses.]
370		(Recent)	"Footprints of *Emys orbicularis* in modelling clay, 22 Jany. 1905". Photo: Dr. J.H. O'Connell.	

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PREPARATION TECHNIQUES FOR MATERIAL FROM THE POSIDONIENSCHIEFER (LIAS EPSILON, UPPER LIASSIC) OF GERMANY

BY FRITZ LÖRCHER AND THOMAS KELLER

SUMMARY

The authors describe methods of mechanical and chemical treatment of fossils from the Posidonienschiefer (Lias epsilon, Upper Liassic, Lower Jurassic, south-western Germany). Special tools and techniques are discussed. The use of acids in the preparation of vertebrate fossils from calcareous layers gives very good results, better than any mechanical method of preparation.

MECHANICAL PREPARATION

Fig.1 sets out the chemical composition of the various lithologies found in the Lias epsilon of Holzmaden. The shale is usually impregnated with microscopic particles of pyrite which make preparation much more difficult.

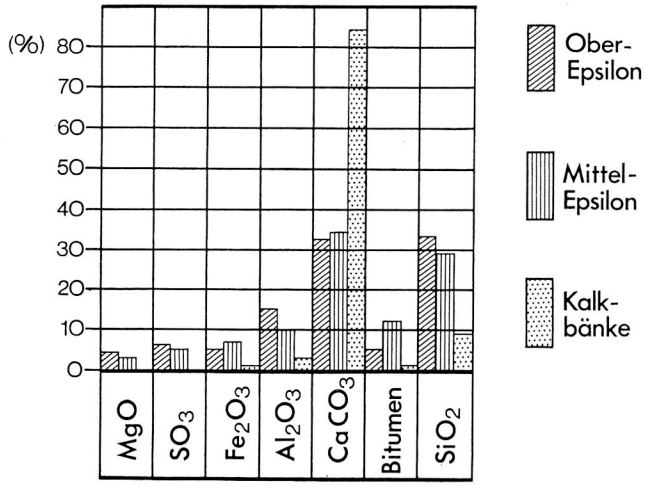


Fig.1. Chemical composition of the three main subdivisions of the Posidonienschiefer (Lias epsilon) at Holzmaden. Kalkbanke = epsilon I; Mittel-Epsilon = epsilon II; Ober-Epsilon = epsilon III.

Percussion tools - mallets (Fig.2)

(a) Wooden mallet: gives a gentle, full, and somewhat resilient blow easily varied by hand as required by the needs of the specimen in question; constructed from laminated hornbeam.
(b) Iron mallet: gives a hard, full, and less resilient blow which can also be varied according to need.
(c) Steel mallet: gives a powerful, hard, and resilient blow which again can be varied as needed.

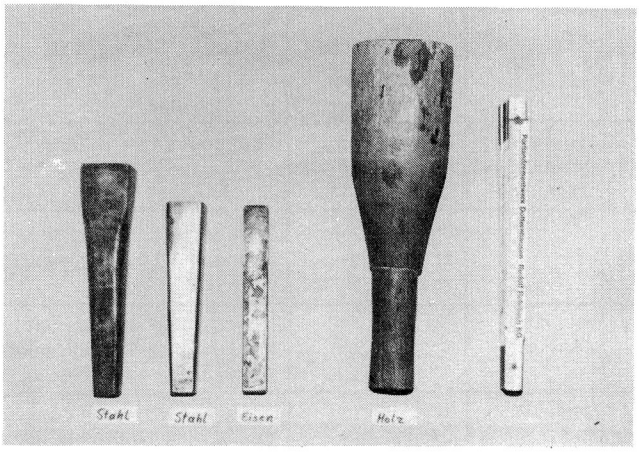


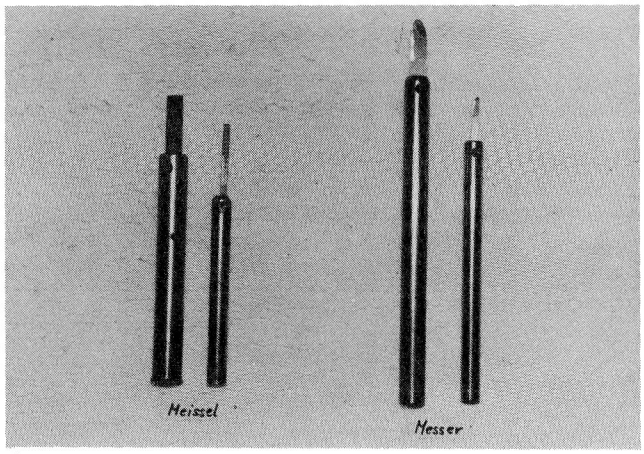
Fig.2. Steel (Stahl), iron (Eisen), and wooden (Holz) mallets used in mechanical preparation by chisels.

Cutting tools - chisels and preparation knives (Fig.3)

Old iron sawblades about 2-3mm thick (available from any locksmith) are cut into strips 10-15cm long and 5-10mm wide. Alternatively, use high capacity, high speed tool steel, such as can be obtained from Plate-Stahl, R. & H. Plate, Platehof, 5880 Lüdenscheid, specifying 'Atomit 1500V'. In both cases the metal should be 2mm thick for knives (small ones 5mm wide and 12cm long, large ones 10mm wide and 12cm long) and 3mm thick for chisels (small ones 4mm wide and 14cm long, large ones 10mm wide and 15cm long).

Handles can be obtained ready-made from a locksmith or toolshop. Alternatively, preparation knives can be inserted into quick-setting epoxy resin poured into test-tubes, so that 5cm is left projecting from the resin; when the resin sets, it shrinks and can be withdrawn. Chisels must have steel handles, of round steel 15cm long. For the coarse chisel, the handle should be of 16mm diameter stock and have a hole at one end 11mm in diameter and 10cm long. A 4mm diameter hole is bored in the side of the hollow cylinder thus produced, 8mm from the end, and tapped with a thread to take an 'Imbus' socket screw. This allows the chisel to be clamped in the handle. The handle for the fine chisel is made similarly, except that it is 12mm in diameter and the hole for the chisel is 6mm in diameter.

The initial rough grinding of chisels and knives is done on a mounted grinding machine



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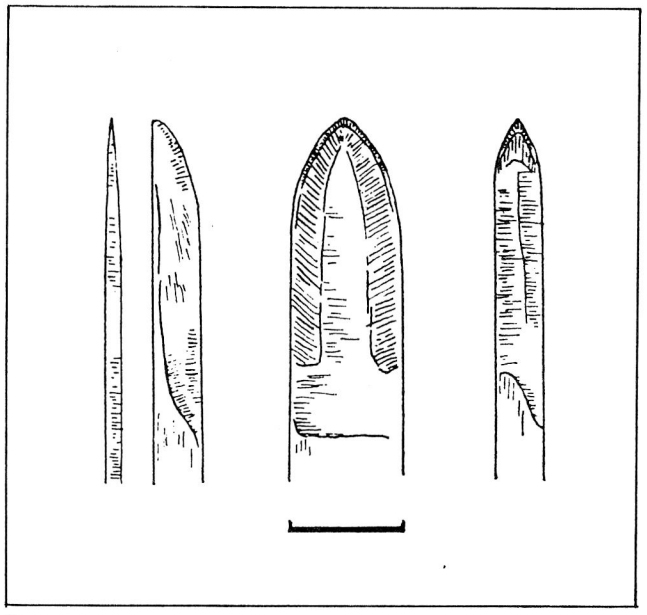

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Fig.3. A, specially fabricated chisels (Meissel) and preparation knives (Messer). B, cutting heads of chisels and knives.

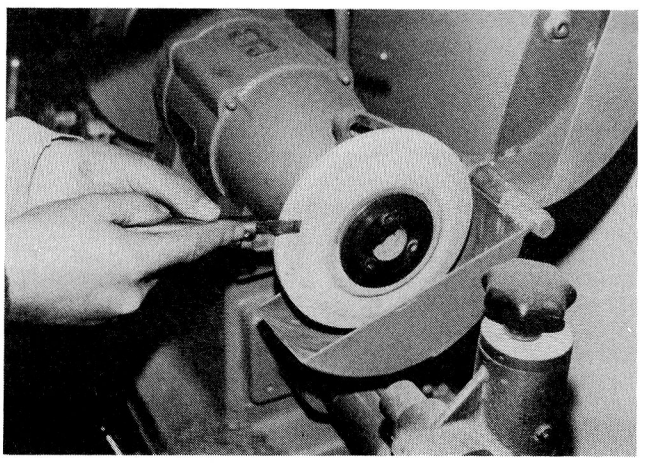

Fig.4. Grinding chisels and knives.

with a corundum wheel (Fig.4). Care must be taken not to overheat the steel; as soon as it begins to turn blue, its quality for preparation work is no longer guaranteed. The corundum wheel must therefore be harder than the steel being ground, otherwise too much frictional heat is produced. Fine sharpening is done by hand on rectangular corundum sharpening stones of middle and fine grain quality, with the stone well moistened with oil. The knife or chisel is moved back and forth on the stone under light pressure. The finest sharpening is done on an 'Arkansas' oilstone. The large, coarse preparation knife should be ground to give a moderately convex, lancet-like shape; the fine knife should have a half lancet shape (Fig.3B). Both coarse and fine chisels should be ground so that their sloping faces are not too steep.

PREPARATION TECHNIQUES

Extraction of fossils

Posidonienschiefer fossils are always prepared from the bottom side, and the top and bottom must always be clearly marked. Other important scientific data include compass orientation, precise stratigraphic horizon, and identification. After extraction, most fossils should be marked with the direction of compass north, top, bottom, and identification (on the matrix with a felt pen or oil or wax crayon) then wrapped in newspaper. The extraction of a valuable specimen from clayey, sandy, or weathered matrix needs great care. Cuts should be made downwards around the sides of the specimen, leaving the bottom in the matrix. The top is consolidated with shellac or other varnish; after this has hardened the top and sides are covered in plaster-impregnated sacking. When this too has hardened, the identification, orientation, and precise stratigraphic horizon are scratched or marked on the plaster. The fossil can then be extracted by undercutting and loosening the block. In exceptional cases synthetic resin can be used instead of plaster.

Preparation with knives (Fig.5)

Most preparators are unused to this technique since the tool is guided not by one but by both hands. The middle finger of the left hand is used to support and provide a fulcrum for the knife, which is used as a lever, with the right hand guiding the knife. In this technique care is taken only to scrape or shave with the knife, not to press; the force involved in pressing is too great and puts the fossil at greater risk of being damaged as the knife is under less control. The large knife is used for the coarse, rough uncovering work. The fine knife is used in the final stages and can reveal nearly all details if used under a binocular stereo-microscope. For very fine preparation work a steel blank, 2-3mm wide, is sharpened to a half-lancet shape similar to that of the small preparation knife.

Additional preparation techniques

When a fossil is incomplete, it is possible to cut away the matrix and to embed it in a large, thick slab of cement or plaster. It is also possible to replace missing pieces of shale with pieces from the same source bed. Broken and uneven fracture surfaces can be

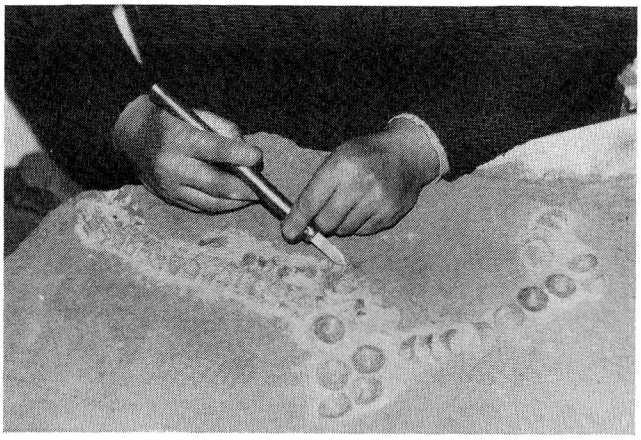

Fig.5. Using a hand held knife to remove matrix from an ichthyosaur, using both hands as described in the text.

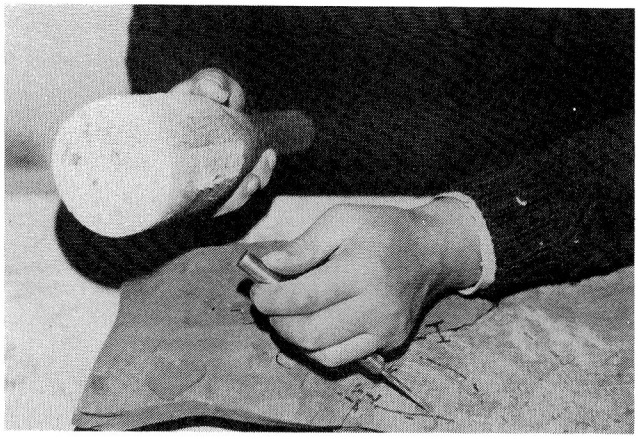

Fig.6. Wooden mallet and fine chisel being used to remove matrix near the bone. Note the marks indicating the known positions of bone, as seen along breaks in the specimen.

trimmed with a diamond saw and fitted to an exactly matched clean-cut replacement. A clean-cut jointing surface with a barely perceptible cemented joint can thus be ensured. Fossils which are not surrounded by shale can be embedded in a steel frame with lightweight concrete, cellular concrete, or 'Liapor' (a porous cement-based material manufactured by the Portlandzementwerke, Dotternhausen, from Lias rocks) mixed with concrete. The concrete or cement can be coloured to match the matrix, or simply left as it is.

The specimen is prepared after the pieces have been fitted together and mounted. As noted above, the fossil is prepared on its original bottom side. When the fossil is assembled the positions of any bone seen in the fractures can be marked on the bottom side (Fig.6) so as to give some help during preparation. The wooden mallet and a large, coarse chisel are used for the rough uncovering work. It is then best to use the large preparation knife, with caution but still boldly, so that any signs of fossil can be exposed, and an idea can be obtained of the layout of its upper surface. The uncovering should be done so that the work progresses to best advantage using the coarse chisel and large knife in turn. After the fossil has been exposed, you should carefully consider whether to omit any polishing or grinding of the matrix surface (as practised by Hauff) since the fossil shows up better if the surrounding matrix is left naturally rough.

As each section of the fossil is uncovered and finely prepared, the shale is cleaned up with a brass or nylon brush, and water applied with a sponge. This cleaning process has the side-effect of revealing fine details of fossil structure through the delicate interleaved layers of light and dark coloured shale, but only in the last layers which directly overlie the fossil.

Ammonites are freed from the Posidonien-schiefer matrix with a narrow chisel used almost vertically and struck with the wooden mallet. The ammonite should then be hardened by a consolidant. We use either a cellulose lacquer, such as 'Zaponlack', or the facing-stone sealer 'Fassaden-Stein-Siegel STH 201' from Stassig-Chemie, Krefeld. When applying the lacquer the fossil and shale must be warm (but not too hot, otherwise there is a possibility of white streaking caused by air bubble formation). Facing-stone sealer has the advantage that it is very fluid and sinks deeply into porous bone, hardening to a very resistant material. It is advisable not to use fluosilicate (fluate) as it is very difficult to clean off and, if the specimen deteriorates, it becomes difficult to cement or repair. Fluosilicate also spoils the appearance of the specimen due to its excessively glossy appearance.

Geodes and concretions from the Stinkstein bituminous limestone beds are often so strongly impregnated with pyrite that they are very difficult to prepare mechanically. In such cases they should only be prepared with 'Widia' chisels and vibrographs. For this operation the geode specimens should be placed on a sandbox or sandbag.

The cement used depends on the bitumen content of the matrix. In specimens from Holzmaden and its neighbourhood a satisfactory compound is polyester resin, coloured to match the local shale. Polyester resin is not recommended for material from Dotternhausen,Schömberg, Frommern, Balingen, and Weilstetten as the bitumen content is higher than at Holzmaden; here we use epoxy resin coloured with shale dust, powdered fossil wood (Gagatmehl) or the brown shale which occurs directly above the Unteren Stein.

Finally and unfortunately, no mechanical method of preparation has yet been found to prevent slight scratching of the superficial bone layer in vertebrates from one particular matrix, the marly bituminous shale of the Lias epsilon. It is only possible to use the special technique of acid preparation to dissolve away the matrix of concretions or geodes.

CHEMICAL PREPARATION

Mechanical preparation of vertebrate fossils from the hard limestones (Kalken) of the Upper Lias beds is not a very satisfactory method. Acetic acid preparation is not new but has seldom been practised in German institutions, although, when it is done properly, the risk is very slight and the results are very good. In July 1971 one author had the opportunity of visiting the laboratory of the British Museum (Natural History) where a method developed there was being very successfully practised by A.E. Rixon and R. Croucher. Knowledge of this English method is indispensable:

Prerequisites

(a) Suitability of a specimen for acid treatment: as the size of the object increases, so does the cost of materials; above all, the time spent on the job can be tremendous; and the need for special technical equipment becomes greater. With objects above the size of, say, an ichthyosaur skull (40-50cm), it is better not to use this method unless special equipment and facilities are available.

(b) The calcium carbonate content must be high.

(c) The inner structure of the matrix is important. Badly weathered, eroded, or fissured material is not suitable. Also unsuitable are more compact matrices in which the larger hollows have been filled with diagenetic calcite e.g. limestone with shell-bed layers, or grown-over ammonite chambers.

Preliminary treatment

Some preliminary mechanical treatment may be necessary. In the case of very thick concretions it is worth chiselling away the matrix until close to the bone, so that the acid can work equally all over. Parts not to be dissolved should be varnished, as a protective measure, then enveloped in rubber and epoxy resin (Rixon 1968). The specimen should be suitable for setting up, with a solid base and in particular with points where it can be grasped.

Preparation

It must be decided in advance how far the acid treatment will be taken, and which bones will be freed. Unlike material from Solnhofen or the Muschelkalk, it is necessary to remove the undissolved sludge from all areas - not just the bone - of the washed and dried specimen, so that acid dissolution can go on equally. This can take up much time in the case of complex and large specimens. The first general rule is never to leave the specimen too long in the acid, but rather to check it often. Excessive haste is inadvisable.

The acid often acts uncontrollably. Fine fissures or transversely or vertically embedded thick mollusc shells can lead acid to the interior where it can act injuriously

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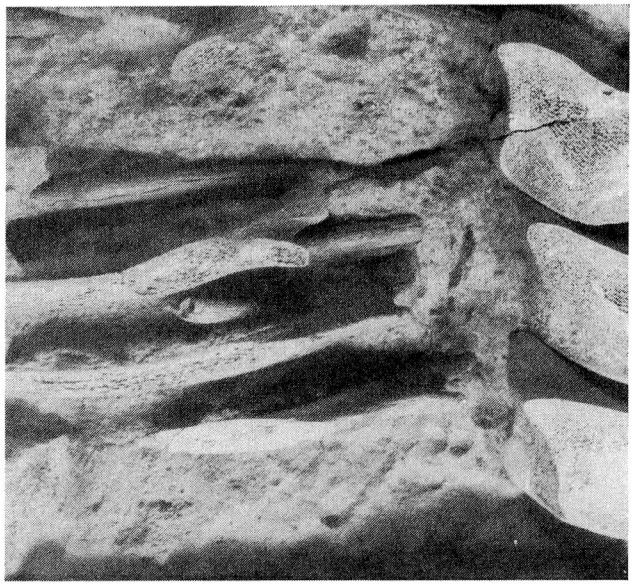

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Fig.7. A, ichthyosaur fragments in slab from the Unteren Stein, Holzmaden, before acetic acid preparation. B, close up of ichthyosaur bones after partial preparation in acid (field of view shown on A).

without being noticed. These inlets continuously have to be temporarily closed off with cement. When doing this it is difficult to keep a continuous and permanent closure without unwanted impregnation of the adjacent bone and softened sediment. The bone's calcite infilling is also eaten away; this considerably weakens the bone, which is already suffering from deformations, haircracks, and fractures.

Large artists' paint brushes can be used to clean away the residue of dried and powdery, caked sediment sludge; they should be held some two-thirds of the way down the length of the hairs so that a relatively firm yet yielding brush results. This brushwork must be done without applying too much pressure. Another general rule is to take care where you do not expect bone, and to avoid excessive lateral cutting, gradually deepening a level area instead. Progress slowly and methodically.

The application of careful and, if possible, repeated coats of consolidant is important for the strengthening of skeletal parts. Each portion of bone should be consolidated as it is revealed, so preparation should only progress by millimetre layers. Only the bone must be soaked, and this is not easy in complicated structures. Restoration,

fractures, and cracks can be made good with a cement made of cellulose lacquer, 'Lithophon' (no longer used; a powdered meal of organic and inorganic components) and powdered colouring matter, and if necessary synthetic resin.

A practical example

Ichthyosaur fragments in a slab from the Unteren Stein of Holzmaden were prepared with acid (Fig.7). This specimen was made easier to deal with by levelling the surface, and by carefully watching the progress of treatment and the behaviour of the bones during treatment and consolidation. Treatment required 91.5 hours in acid and 250 hours in water (frequently changed) to remove the acid. The result was an average dissolution of 7-8mm of matrix, corresponding to a continuous rate of 0.07mm per hour (the rate, however, falls away sharply when the acid grows weaker and is not really measurable). Very thin layers of shale or of harder rock enclosed in the limestone delayed the process, but frequent renewal of the acid considerably encouraged the treatment. It was necessary to interrupt preparation seven times for a cycle of washing, drying, and consolidation to remove the undissolved rock.

Further examples

An ichthyosaur mandible from the Arietenkalk (Lower Lias, Gryphaea limestone, Württemberg) was extracted by acid. The limestone was efficiently removed by the strongest concentration (17%) of acetic acid. There was little insoluble residue, which required less frequent removal than in the previous example from the Upper Lias. However, thin irregular layers in the rock form tough crusts which had to be regularly removed to ensure uniform solution.

ACKNOWLEDGEMENT

Translated by Mr A.C. Benton from the original German article, Lörcher, F. and Keller, T., 1976. Präparationstechniken des Lias-epsilon-Schiefers. Der Präparator, 22, 213-220. Some of the tradenames of resins, etc., mentioned in the original German have been omitted as they are unavailable in this country. I am grateful to Fritz Lörcher, Thomas Keller, and the publishers of Der Präparator for permission to use their article and photographs, to Thomas Keller for checking the translation, and to the Area Museum Council for the South West for paying translation charges. - M.A. Taylor.
Herr R. Uttenweiler (Dotternhausen) provided Figs.2, 3A, 4-6.

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LOST FOSSIL AMPHIBIAN OF BEAR ISLAND

BY ANTHONY G. DORÉ AND BJØRN WANDÅS

A large and potentially important Triassic amphibian - found 36 years ago on Bear Island (Norwegian Arctic) but presumed destroyed - has been rediscovered in good condition by a recent expedition.

Most people have only heard of Bear Island through Alistair McLean's adventure novel of the same name. However, this tiny island in the Barents Sea (Fig.1) is increasingly in the public eye in Norway due to the petroleum potential of the adjacent continental shelf. The island is one of the Svalbard group and has been under Norway's dominion since 1925. The ground is permanently frozen and the island is ice-bound and all but inaccessible in winter. It has in the past been a staging post for whaling and seal hunting, as well as (briefly) sustaining a coal mining town. The only inhabitants now are the dozen or so hardy Norwegians who man the radio station at the northern tip of the island.

In August 1984 the Norwegian Continental Shelf Institute and a small group of petroleum geologists (including the authors) visited the island and, while studying a sequence of Carnian (late Triassic) age, found the remains of a large vertebrate - the first from Bear Island and one of very few

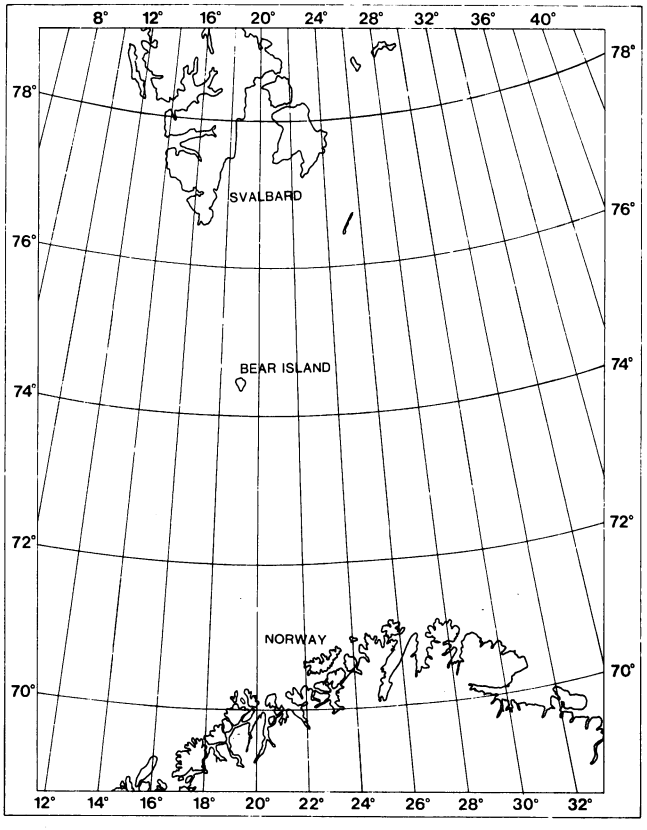

Fig.1. Location map for Bear Island, Norwegian Arctic.

such finds in Norway. It was discovered on the dark shale slopes of Miseryfjellet (Mount Misery - named by homesick British sailors in the seventeenth century) (Fig.2). The fossil is an amphibian of the labyrinthodont type 2.7m long and preserved in dorsal view. The first bone fragments were found weathered out by geologist Eigill Nysaether, who drew them to the authors' attention. A return to the site and subsequent excavations revealed a large number of ribs (broken but in place, Fig.3), vertebrae, skull fragments, and limb material. The bones were embedded in shale and covered by some of the thin siltstone flags which abound on Miseryfjellet. On upturning one such slab the finders were astonished to discover a rusty sardine can sitting amongst the bones! It was tempting to deduce that the amphibians of Triassic times preferred their food hermetically sealed, but after reluctantly dispelling this notion it became obvious that the fossil had been found previously. This seemed to corroborate a story several of the party had heard of a large vertebrate being found - and then lost - on Bear Island several decades ago.

In fact, the amphibian was first discovered in 1948 during an ecological survey of the island by Cambridge University. Because the fossil was in several hundred pieces, and due to the lack of available equipment, it could not be collected. Instead photographs were taken and a few sample bones were embedded in paraffin wax. The find was briefly described in a letter to Nature by Lowy (1949). Lowy feared that the vertebrate would almost certainly be lost during the ravages of the following winter. Obviously these original finders covered their discovery with siltstone slabs for protection. Slippage of shale down the slopes of Miseryfjellet completed the cover-up, putting an end to the amphibian's brief sortie into the daylight after 210 million years. The original photographs from the Cambridge expedition were found in the archives of the Palaeontological Museum, Oslo. These confirm that the two finds are one and the same, and - yes - there is a gleaming new sardine can in one of the pictures.

The fossil does not correspond exactly with descriptions of any known Triassic amphibian. It is probably a plagiosaur closely related to the much smaller Gerrothorax (Fig.4). Romer (1971) has described this highly specialized group as 'grotesque Triassic end forms' and indeed this seems to be a valid description. Gerrothorax had a short, very broad skull (the Bear Island specimen's skull is 70cm wide) and a flat body with armour above and below. A peculiarity of the genus is the

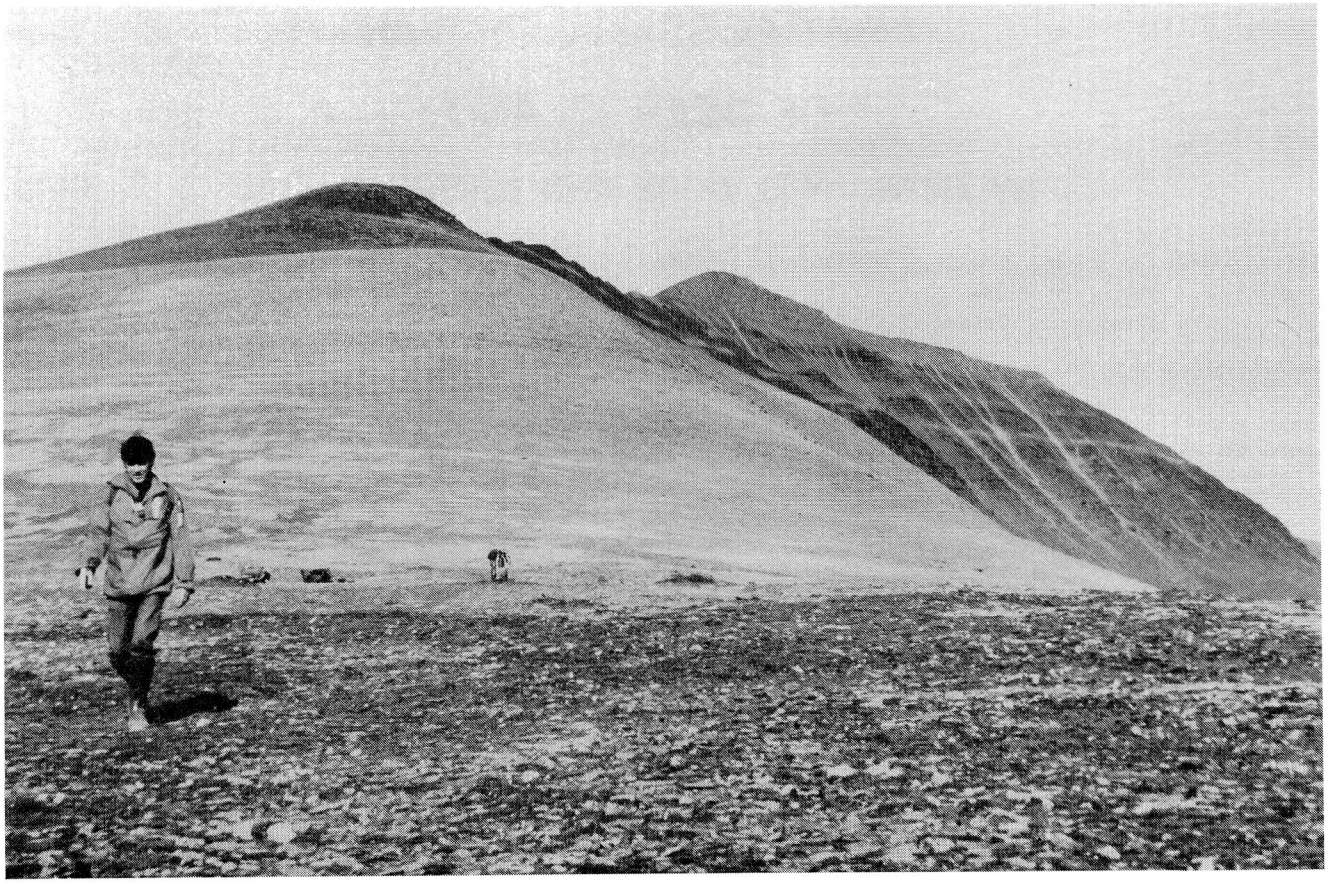

Fig.2. The Triassic section at Miseryfjellet, Bear Island (from the south).

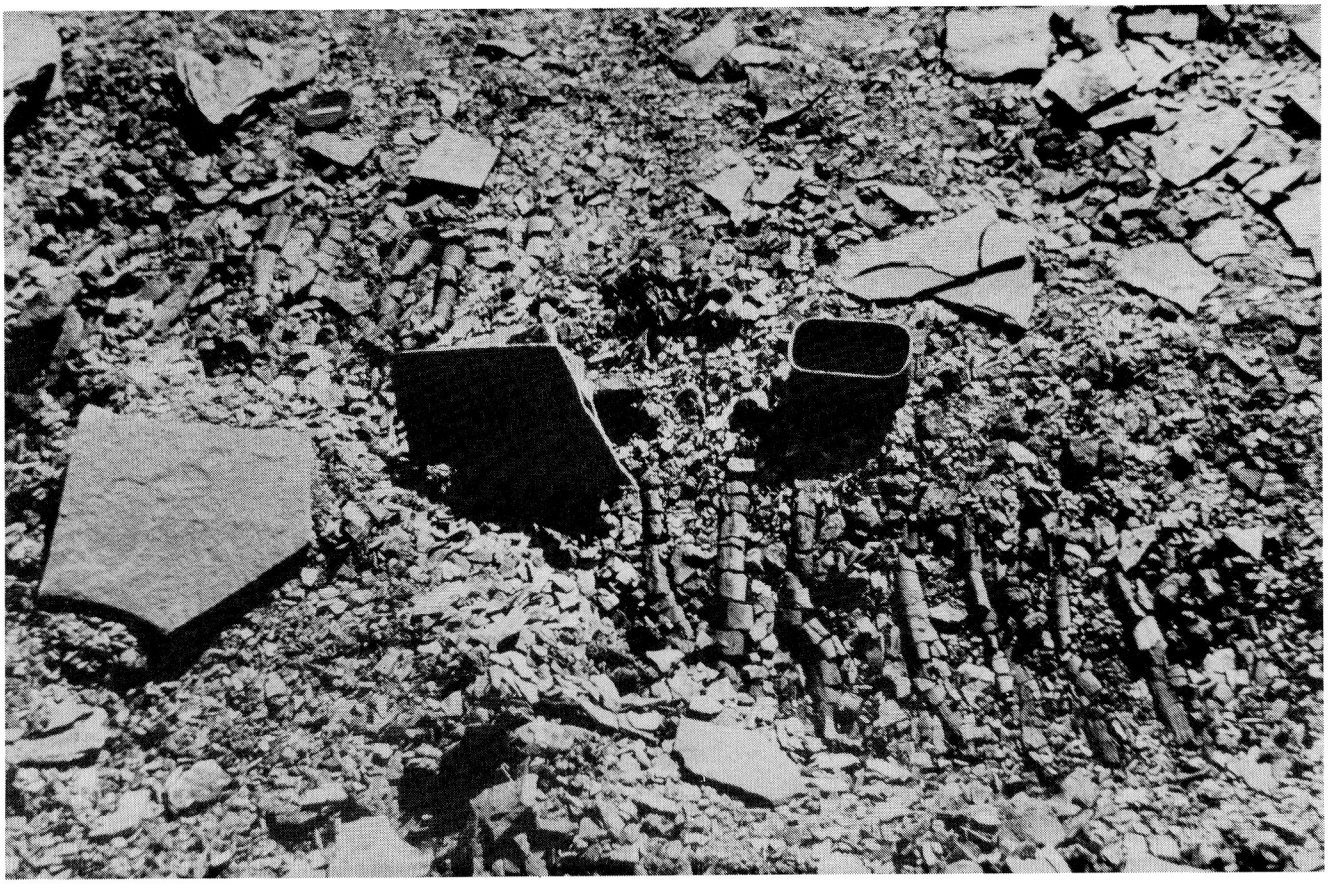

Fig.3. Initial re-excavation of the amphibian, complete with sardine can (see text). More of the skeleton has since been revealed, including substantial portions of the skull.

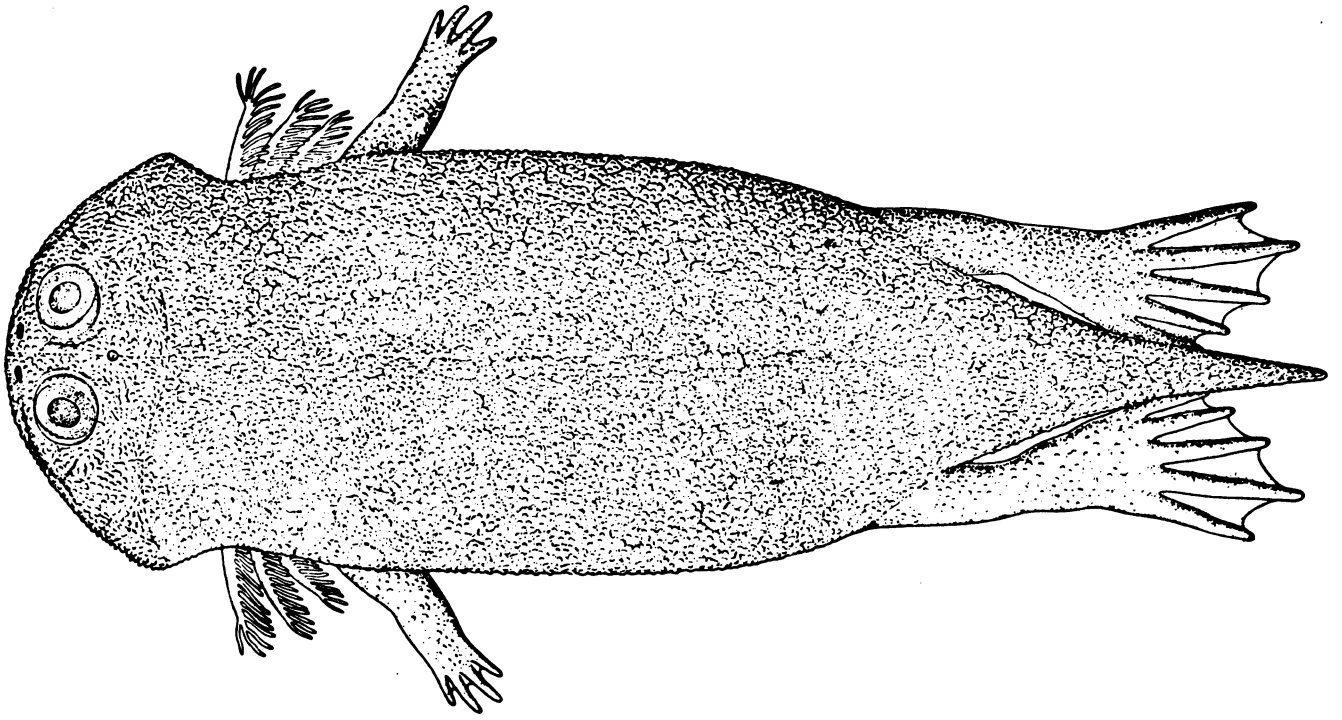

Fig.4. Gerrothorax, a Triassic plagiosaur (Romer 1971, fig.127 At about 1m long, it is approximately one-third the size of the Bear Island amphibian.

presence of external gills in the adult form, a characteristic seen in present day salamanders.

After carefully excavating enough of the specimen to determine the scale of the find, the 1984 rediscoverers realized that, like the 1948 expedition, they too lacked the equipment and specialist knowledge to collect and preserve the specimen. A hasty radio call to Oslo Museum secured the services of Aage Jensen, probably Norway's foremost expert on fossil extraction and development. Mr Jensen is currently sealing and preparing the fossil (not an easy task in the hostile environment of Bear Island) as a precursor to shipping it intact to Oslo. The find will be studied and its importance assessed by Natascha Heintz of the Palaeontological Museum, who has already made contact with vertebrate palaeontologists in England in an effort to trace any original material collected by the Cambridge expedition.

REFERENCES

Lowy, J. 1949. A labyrinthodont from the Trias of Bear Island, Spitsbergen. Nature, 163, p.1002.

Romer, A.S. 1971. Vertebrate palaeontology. University of Chicago Press, Chicago and London, 468 pp.

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The Geological Curator, Vol.4, No.3, 1985 (for 1984), pp.172-173

NEW DEVELOPMENTS AT BATH GEOLOGY MUSEUM

BY MICHAEL A. TAYLOR

The Geology Museum, Bath, houses the scientifically and historically important collections of the Royal Literary and Scientific Institution and of Charles Moore, as well as natural history and ethnographic material. The vicissitudes of the collections have been related in various articles in The Geological Curator but Ron Pickford, the Curatorial Assistant, has been able to restore considerable order to the collections and their documentation. Although much work remains to be done, it must be stressed that the present condition of the collections is now much better than one might expect from reading the various articles. Their comments, while valid when published, are now somewhat out of date thanks to Mr Pickford's work.

A matter of fundamental importance is the organisation and status of the museum. The collections are presently in the care of Avon County Libraries, who have continued to employ Mr Pickford as Curatorial Assistant - Curator de facto. During the three financial years 1983-1986 Avon Libraries have been a major contributor towards the cost of setting up and running the post of Geological Conservator-Preparator, Area Museum Council for the South West, presently held by the author. In return Bath receives assistance and, as a first instalment, the author prepared several reports on the importance, curation, conservation, storage, and present and potential use of the collections, while Bryan Cooper (Torquay Natural History Society Museum) is reporting on the minerals.

In the longer term the collections may be transferred to Bath City Museum Service. Bath City Council has decided in principle to develop a new museum in the town centre, using the premises presently occupied by the Victoria Art Gallery and City Lending Library. The new museum would take over responsibility for the collections of the Geology Museum but such a transfer will not in any case take place for the next two years. The A.M.C.S.W. has meanwhile provided the Bath Museum Service with detailed advice on the storage environment and furniture required by geological material. This transfer is still under discussion but in these circumstances no decision has been made to make extensive improvements to the storage arrangements at Queen Square, nor has the A.M.C.S.W. provided detailed advice; the large ichthyosaurs at the National Museum of Wales will also remain in Cardiff for the time being. This important scheme has been discussed and agreed in principle between Avon County Council and Bath City Council but complex property and financial arrangements are involved and it is likely to be at least two years before any formal transfer of the geology collections occurs.

Meanwhile, the Director of Community Leisure for the County of Avon, Mr D. Liddle, is anxious that Avon Library Services care for and promote the use of the collections as much as possible and has discussed particular measures with Stephen Locke, the Executive Director of the A.M.C.S.W., as described below.

A Select Catalogue of the Bath Collections is to be produced, and probably financed as a joint publication between Avon County Libraries Service and the Area Museum Council for the South West. It has provisionally been decided to publish the catalogue as a series of separate sections in the South West Natural Science Collections Research Unit Newsletter, which is already funded by the A.M.C.S.W., as this will help avoid the bibliographic problems of special publications. The Catalogue will be based very largely on the pre-existing but unpublished work of Charles Copp (invertebrates) and Christopher Duffin (vertebrates), and produced and edited by the author as part of the A.M.C.S.W. service to Bath. It will include a catalogue of type, figured, and cited specimens. However, the collection contains many unpublished specimens of undescribed species or which show important new features of previously known species, and the Catalogue will therefore include a listing of these important specimens. It will also include relevant historical notes and perhaps sections devoted entirely to the history of the collection as a whole. Eventually the Catalogue will become a powerful tool in making the collections better known to researchers.

Avon Libraries have also allocated £1,000 towards the cost of materials to conserve the twenty-eight or so cased ichthyosaurs presently stored in excellent facilities at the National Museum of Wales, Cardiff. This work will be done in late 1985 or early 1986. The most important specimens in Bath which urgently need treatment will soon be conserved at the A.M.C.S.W. geology conservation laboratory at Bristol City Museum. The superb fossil fish and reptiles from the Upper Lias at Ilminster will also be sampled for trial acetic acid preparation, although there will only be time to do a few demonstration specimens.

The storage of the collection has been studied but, in view of its potential transfer, no substantial improvements are being recommended for the existing arrangements which are in any case reasonably adequate. A detailed report on the requirements of the collection was prepared for Bath Museum Service to help them consider the implications of a transfer, and the A.M.C.S W. is ready to offer further advice in the light of a final decision on the location of the collection. It is also anticipated that a curatorial appointment will be made upon the retirement of Mr

Pickford to ensure that the collections receive proper care and are appropriately promoted and used, as far as possible.

ACKNOWLEDGEMENTS

I am delighted to be able to report this splendid news for the Bath Collections, especially in the light of Mr Pickford's hard work on them over the years, and I am grateful to Mr D. Liddle (Director of Community Leisure, County of Avon) and Mr S. Locke (Executive Director, Area Museum Council for the South West) for permission to publish this article.

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POET'S CORNER

Tony Cross (Curtis Museum, Hampshire County Museum Service) sends the following from A Geological Primer in Verse (1820).

GEOLOGICAL COOKERY

To make Granite

Of Felspar and Quartz a large quantity take,
Then pepper with Mica, and mix up and bake.
This Granite for common occasions is good;
But, on Saint-days and Sundays, be it understood,
If with bishops and lords in the state-room you dine,
Then sprinkle with Topaz, or else Tourmaline.

N.B. The proportion of the ingredients may be varied ad libitum; - it will keep a long time.

To make Porphyry

Let Silex and Argil be well kneaded down;
Then colour at pleasure, red, grey, green, or brown:
When the paste is all ready, stick in here and there
Small crystals of Felspar, both oblong and square[1].

To make Pudding-stone

To vary your dishes, and shun any waste,
Should you have any left of the very same paste,
You may make a plum-pudding; but then do not stint
The quantum of Pebbles - Chert, Jasper, or Flint.

To make Amygdaloid

Take a mountain of Wacke[2], somewhat softish and green,
In which bladder-shaped holes may be every where seen;
Choose a part where these holes are decidedly void all,
Pour Silex in these, to form Agates spheroidal,
And the mass in a trice will be Amygdaloidal.

To make a good Breccia with a Calcareous Cement

Break your rocks in sharp fragments, preserving the angles;
Of Mica or Quartz you may add a few spangles;
Then let your white batter be well filter'd through,
Till the parts stick as firm as if fasten'd by glue.

To make a coarser Breccia

For a Breccia more coarse you may vary your matter;
Pound Clay, Quartz, and Iron-stone, moisten'd with water:
Pour these on your fragments, and then wait awhile,
Till the Oxyd of Iron is red as a tile.

[1] This is the old-fashioned receipt for making Porphyry. used by our grandmothers: viz. they made the paste first, and stuck in the Felspar afterwards. This method is easy and plain: but in the most approved modern receipts, the ingredients are all mixed together at first, and the Felspar is left to crystallize while the paste is hardening.

[2] Wacke is generally greenish, and rather unctuous to the touch. This rock must not be confounded with Grey Waccé.

LOST AND FOUND

COMPILED BY MICHAEL D. CRANE AND HUGH S. TORRENS

In previous issues of 'Lost and Found' requests for information and responses to those requests have appeared under separate 'Lost' and 'Found' headings. Here, and in future issues, the entries for information and collections sought and the responses will appear together in a single sequence.

Abbreviations

CLEEVELY - Cleevely, R.J. 1983. World palaeontological collections. British Museum (Natural History) and Mansell Publishing Company, London.
DESMOND - Desmond, R. 1977. Dictionary of British and Irish botanists and horticulturalists. Taylor and Francis, London.
GCG - Newsletter of the Geological Curators' Group, continued as The Geological Curator.
SHERBORN - Sherborn, C.D. 1940. Where is the ———— collection? Cambridge University Press.

13 David Christopher DAVIES (1827-1885)

GCG, (6), 298-299; (7), 346; (8), 428-429; (9), 454-455; (10), 489.
CLEEVELY, p.98.

For a biographical note of this geologist see Bick (1982, pp.105-110) which contains other references to his life and work.

Bick, D.E. 1982. The old copper mines of Snowdonia. Pound House, Newent, Gloucestershire.

H.S.T.

35, 66 James HARRISON (1819-1864)

GCG, (10), 490, 491; 2(5), 263; 2(6), 353-354
CLEEVELY, p.145

Dr M.A. Taylor (Area Museum Council for the South West, c/o City of Bristol Museum and Art Gallery) and John Fowles (Lyme Regis (Philpot) Museum) write:

'It is now possible to answer the query made by one of us (J.F.) concerning the whereabouts of Harrison's correspondence with pioneer palaeontologists, summarised by Lang (1947), and of Harrison's juvenile specimen of the eponymous dinosaur Scelidosaurus harrisoni, figured and described by Owen (1861). All had been bequeathed to the Museum in 1937 by Harrison's youngest daughter, Miss Mary Harrison, together with other books and fossils.

John Fowles has discovered that the letters are deposited in the Lyme Regis Borough Archives at the Dorset Record Office (DRO Lyme Archives Index, p.28, N18). Mike Taylor has hunted down the specimen of the dinosaur, with Paul Ensom's help, to the British Museum (Natural History), where it had remained after having been borrowed by a member of the Museum's staff some fifteen years ago. It has now been returned to the Lyme Regis (Philpot) Museum and reunited with copies of Owen's two monographs on Scelidosaurus inscribed by him and presented to Harrison. Thus neither the specimen nor the letters had been formally transferred to the British Museum (Natural History), pace the suggestion made by Torrens (1979).

The juvenile specimen is, incidentally, still regarded as Scelidosaurus by Dr Alan Charig and Dr Angela Milner (pers. comm. to John Fowles), despite the suggestion by Newman (1968) and later workers that it is not referable to this taxon.'

Lang, W.D. 1947. Proc. Dorset Nat. Hist. Archaeol. Soc. 68, 103-118.
Newman, B. 1968. The Jurassic dinosaur Scelidosaurus harrisoni, Owen. Palaeontology, 11, 40-43.
Owen, R. 1861. Monograph of the Reptilia of the Liassic Formations. Part 1. A Monograph of a fossil dinosaur (Scelidosaurus harrisoni Owen) of the Lower Lias. Palaeontogr. Soc. [Monogr.], 14pp., 11pls.
Torrens, H.S. 1979. Collections and information lost and found. 66. James Harrison (1819-1864). GCG, 2(6), 353-354.

68 Rev. William Fox (1813-1881)

GCG, 2(5), 264
CLEEVELY, p.121

Blows, W.T. 1983. William Fox (1813-1881), a neglected dinosaur collector of the Isle of Wight. Annals of Natural History, 11(2), 299-313.

M.D.C.

89 ECHALAZ collection

GCG, 2(8), 507 [as Eschalaz]; 2(9&10), 616 [as Eschalaz/Echalaz]

Browsing in an old secondhand book catalogue recently I noted the following entry: 'ECHALAZ C Waterloo Museum, Liverpool. Complete History (and Description) of the Echalaz Collection (of Birds). CROYDON (1908) 8vo., plates, cloth'. This seems to be a very scarce item and it would be interesting to locate a copy to see if the Museum included geological material. The Waterloo Museum is clearly that described by Howarth and Platnauer (1911, p.230) as the Museum at Waterloo-with-Seaforth, near Liverpool (pop. 26,399) run by the urban district council, in a single room. The contents are chiefly birds with a general collection. The birds are the collection of

Lt. Col. Echalaz, for which 'a hand-book (illustrated) of the Echalaz collection, compiled by Echalaz price 1s 6d is available.' This is clearly the item noted above.

Howarth, E. and Platnauer, H.M. 1911. Directory of museums in Great Britain and Ireland. London.

H.S.T.

96 Admiral Sir Edward BELCHER (1799-1877)

GCG, 2(9&10), 611; see also 3(9), 14 [entry for J. Cheetham (fl.1870s)]
CLEEVELY, pp.52-53

Buckland (1837, p.336) records that 'Captain Beechey and Lieutenant Belcher found Ammonites on the Coast of Chili in Lat. 36S in the cliffs near Conception, a fragment of one of these Ammonites is preserved in the Museum of Haslar Hospital in Gosport.' This reference prompts an inquiry into what happened to these collections (see under 152)? SHERBORN, p.15, comments on Belcher's collections; 'Shells. Sale, Ath. May 1877, 863.'

Buckland, W. 1837. Geology and mineralogy considered with reference to natural theology. London, 2 vols.

H.S.T. & M.D.C.

99 Louis HUNTON (1814-1838)

GCG, 2(9&10), 612
CLEEVELY, p.159

The short life and work of this collector have been described by Torrens and Getty (1984). Here, too, is to be found a short note about what is known of his geological collection (p.66).

Torrens, H.S. and Getty, T.A. 1984. Louis Hunton (1814-1838) English pioneer in ammonite biostratigraphy. Earth Sci. Hist. 3, 58-66.

H.S.T.

103 Alexander BROGDEN and
104 John BROGDEN

GCG, 2(9&10), 616; 3(1), 24-25

Details of the Welsh industrial activities of these two can be found in papers by the late Leonard S. Higgins (1974, 1978)

Higgins, L.S. 1974. John Brogden and Sons. Glamorgan Historian, 10, 148-156.
Higgins, L.S. 1978. The Brogden pioneers of the early industrial development in Mid Glamorgan. National Library of Wales Journal, 20, 240-252.

H.S.T.

111 James LOMAX (1857-1934)

GCG, 3(1), 20; see also 3(4), 234-235 and 3(5), 322-323
CLEEVELY, p.187

Alan Howell's thesis on Lomax was submitted to the Faculty of Technology of the University of Manchester for the degree of M.Sc. in October 1984, and accepted for the following month. It is to be hoped that some, at least, of this work will be published before too long.

Howell, A. 1984. James Lomax (1857-1934), his life, work and influence on palaeobotany and coal research. M.Sc. thesis (unpubl.), University of Manchester.

M.D.C.

120 Specimens from the BEAGLE voyages

GCG, 3(2&3), 162

Buckland (1837, p.603) wrote that 'Mr C. Darwin has deposited in the Museum of the Royal College of Surgeons London, a most interesting series of fossil bones of extinct Mammalia, discovered by him in South America.' SHERBORN comments 'Some 'Beagle' things at Cambridge. Foss. Mamm. in Coll. of Surgeons, London. Obs on coral reefs, 1851, part of the fossils are in B.M.' Porter (1980) may prove a useful starting point.

Buckland, W. 1837. Geology and mineralogy considered with reference to natural theology. London, 2 vols.
Porter, D.M. 1980. Charles Darwin's plant collections from the voyage of the Beagle. Journal of the Society for the Bibliography of Natural History, 9(4), 515-525.

H.S.T. & M.D.C.

148 Henry BELCHER (c.1786-1854)

GCG, 3(9), 15, 17
[? Mr Belcher of CLEEVELY, p.52]

As noted in GCG 3(9), and reiterated by Peter Lingwood, this collector was honoured by Martin Simpson (1843, p.12) in the somewhat flattering description contained within that of a new species of ammonite, A. Belcheri. Peter, who provided the copy of this description here reproduced (Fig.1), also notes that this work appears to contain a number of useful short references to local geologists.

H.S.T. writes that a recently discovered letter (now Geological Society of London archives MUS 2/9) gives further information about Belcher and his geological activities in Yorkshire. It is dated 16 September 1837 from the Whitby Stone Company Office (in which Belcher was clearly a partner).. It notes that, in addition to specimens already left at the Society, the letter accompanies one of Porcelain Earth found near Whitby. It asks that these donations should be recorded as in the name of the Whitby Stone Company

13. A. Belcheri.

Depressed; volutions 6 or 7, exposed, rather flat on the sides, back rounded; radii straight, prominent, obsolete on the back, separated by concave spaces; aperture squarish; diameter $1\frac{1}{2}$ inch.

The smoothness and elegance of this beautiful shell reminds me of the politeness and urbanity of H. Belcher, Esq., President of the Whitby Philosophical Society; whose love for natural science, also, entitles him to a grateful remembrance. It is from the lower Lias, and may be readily distinguished from A. gagateus, and others, by the smooth back.

Fig.1. From Simpson (1843 , p.12)

instead of as by Mr King and Mr Belcher as recorded previously. The material in question is recorded as donated to the Geological Society's Museum on 30 August 1837 as 'Specimens of the Whitby and Whitehouse building stone and of the Whitby porcelain earth in contact with a whinstone dyke' [Trans. geol. Soc. Lond. (2), 5, List of Donations 1840].

Simpson, M. 1843. A Monograph of the Ammonites of Yorkshire Lias. London and Whitby.

149 Rocks and minerals from the Outer Hebrides, Scotland

Dr Keith Nicholson (Hunterian Museum, The University, Glasgow G12 8QQ), writes: 'I am gathering details of rock and mineral collections, held in museums throughout the UK, which include specimens from any of the islands in the Outer Hebrides. In this I also include the islands of St Kilda, North Rona, Sula Sgeir, the Flannan Isles and Rockall. I would therefore be very interested in details of any specimens from these islands, and the collections, however small, in which they are included.'

150 William Henry FITTON F.R.S. (1780-1861) and
151 William Roby BARR F.G.S.

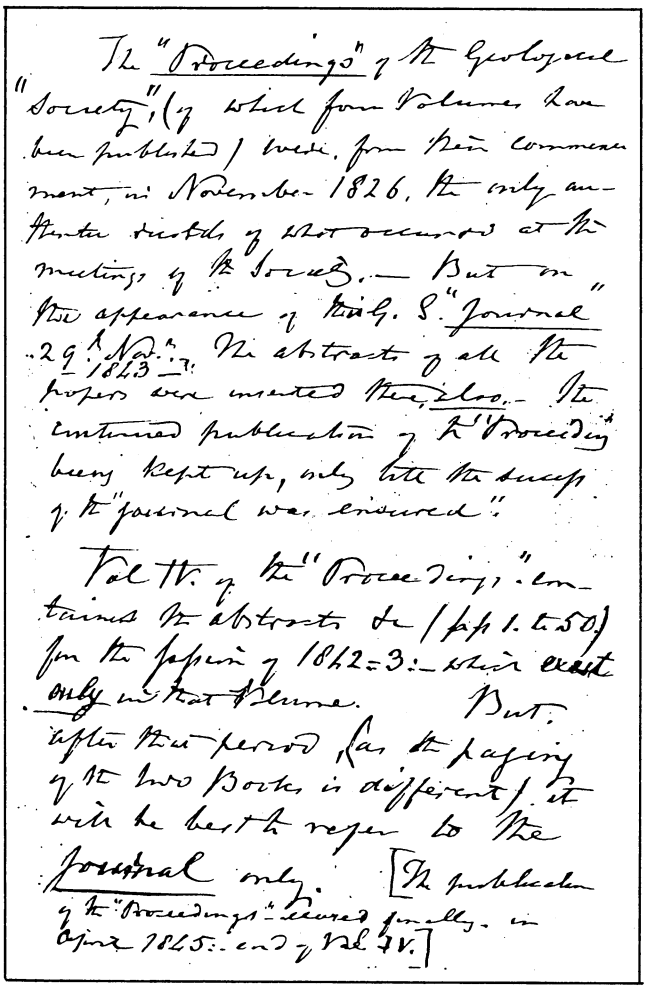
Geoff Hancock (Department of Natural History, Glasgow Museums and Galleries, Kelvingrove, Glasgow; formerly of Bolton Museum and Art Gallery, Le Mans Crescent, Bolton BL1 1SA), writes: 'To have a good run of the published organs of the Geological Society of London is an asset for any museum but to have some of the earliest volumes which once belonged to William Henry Fitton FRS (1780-1861) and possibly annotated by him adds considerable interest. Part of the set in Bolton Museum bears Fitton's bookplate (Fig.2) showing arms and crest in volumes one to five of the Journal. These are bound in exactly the same way as the twelve volumes of the Transactions (quarter bound in leather with marbled boards and raised bands) although these latter do not carry his bookplate. There are some annotated corrections to his seminal 225 page article 'Observations on some of the strata

Fig.2. Bookplate of William Henry Fitton

between the Chalk and the Oxford Oolite, in the South-east of England' in the Transactions (second series, volume four, 1836) but there are also copious notes in volume one of the Journal. These refer to the way in which the Proceedings were treated (Figs.3, 4). This tends to confirm the annotations as Fitton's because he was the founder of the Proceedings in 1827 and would naturally be concerned if their identity became altered or confused. Unfortunately the first four volumes of Proceedings do not form part of this series, as these might also have been of interest. Comparison with known examples of his handwriting will resolve this question, and any information will be welcome.

Volumes 6-18 (1850-1862) contain instead the bookplate of William Roby Barr, who was elected Fellow of the Geological Society of London in 1864. Apart from his address, given as Norris Bank, Stockport, nothing else can be found of his activities. He is presumably the ancestor of Charles E. Barr of Holme Lee, Lostock, Bolton, who donated (in 1913) this run of Geological Society periodicals up to 1867 and also The Geologist, later The Geological Magazine, also to 1867. These are all uniformly quarter bound with a different marbled board and with no raised bands on the spine. This could be taken to indicate that W.R. Barr had his own set bound, obtained Fitton's* to complete his run and died circa 1867. Any information on Barr would be welcome'.

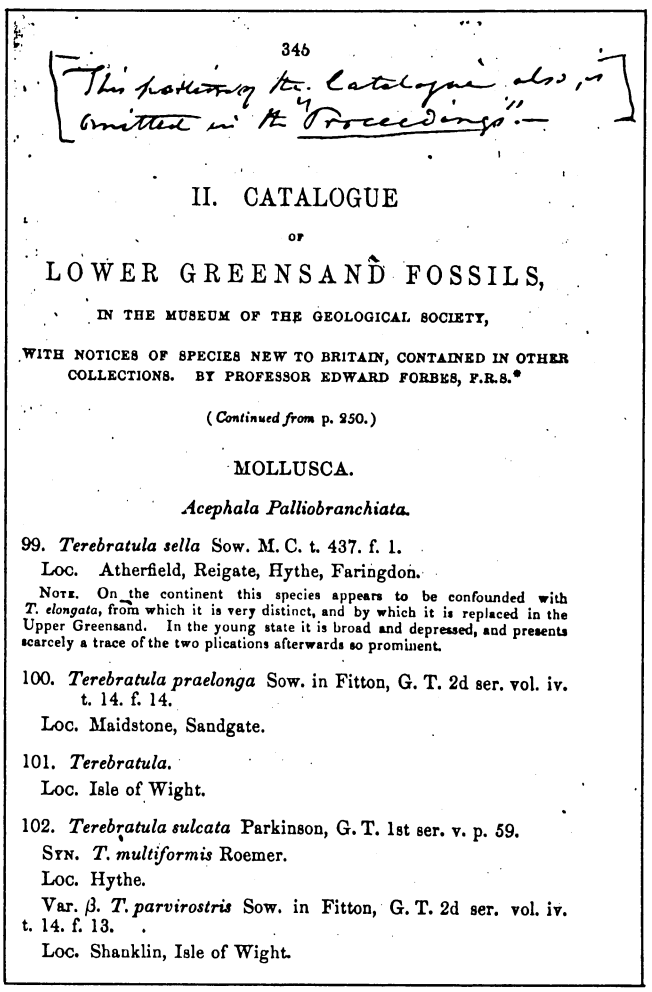
*These were probably acquired at the sale of Dr Fitton's library at Sotheby's on 8-9 May



The "Proceedings" of the Geological Society," (of which from Volume 1 have been published) were from their commencement, in November 1826, the only authentic record of what occurred at the meetings of the Society.— But on the appearance of Vol. 5. "Journal" 29th Nov. 1845. the abstracts of all the papers are inserted therein also.— The continued publication of the "Proceedings" being kept up, only with the success of the "Journal" was ensured".

Vol IV. of the "Proceedings," contains the abstracts &c [pp 1. to 50.] for the Session of 1842-3:— which exist only in that Volume. But after that period, (as the paging of the two Books is different) it will be best to refer to the Journal only. [The publication of the "Proceedings" ceased finally in June 1845:- and of Vol IV.]

Fig.3. Annotations in Bolton Museum's copy of Q. Jl geol. Soc. Lond. 1 (1845), probably in Fitton's handwriting.



346

[This portion of the Catalogue also, is omitted in the "Proceedings".—]

II. CATALOGUE

OF

LOWER GREENSAND FOSSILS,

IN THE MUSEUM OF THE GEOLOGICAL SOCIETY,

WITH NOTICES OF SPECIES NEW TO BRITAIN, CONTAINED IN OTHER COLLECTIONS. BY PROFESSOR EDWARD FORBES, F.R.S.*

(*Continued from* p. 250.)

MOLLUSCA.

Acephala Palliobranchiata.

99. *Terebratula sella* Sow. M. C. t. 437. f. 1.
Loc. Atherfield, Reigate, Hythe, Faringdon.
Note. On the continent this species appears to be confounded with *T. elongata*, from which it is very distinct, and by which it is replaced in the Upper Greensand. In the young state it is broad and depressed, and presents scarcely a trace of the two plications afterwards so prominent.

100. *Terebratula praelonga* Sow. in Fitton, G. T. 2d ser. vol. iv. t. 14. f. 14.
Loc. Maidstone, Sandgate.

101. *Terebratula.*
Loc. Isle of Wight.

102. *Terebratula sulcata* Parkinson, G. T. 1st ser. v. p. 59.
Syn. *T. multiformis* Roemer.
Loc. Hythe.
Var. β. *T. parvirostris* Sow. in Fitton, G. T. 2d ser. vol. iv. t. 14. f. 13.
Loc. Shanklin, Isle of Wight.

Fig.4. Annotations in Bolton Museum's copy of Q. Jl geol. Soc. Lond. 1 (1845), probably in Fitton's handwriting.

1856. A copy of the catalogue is in the Geological Society. (H.S.T.)

152 Museum of Haslar Hospital, Gosport

CLEEVELY, p.245 [entry for Sir John Richardson]
See entry 96 above for Belcher

The Royal Hospital at Haslar was built in 1762 for sick and wounded seamen of the Royal Navy. The Museum attached to it was used to house the 'official collections of plants, birds and possibly even minerals for the official naval collections at the Haslar hospital' (see GCG, 3(2&3), 162 - Specimens from the Beagle voyages). Clearly, from the item on Admiral Sir Edward Belcher (supra), geological material was included in their collection.

SHERBORN, p.67, records that 'All coll. came to B.M. in 1855.' The BMNH (1904) History of the collections (pp.91-92) confirms that in 1856 a large donation of botanical material was received there 'from the Royal Naval Hospital, Haslar', but no confirmation has been found that all the Haslar collections went to London. Indeed Greenwood (1888; reprinted GCG, 3(5), 326-333) still included the Hospital, the special features of the Museum being 'Anatomy, Natural History etc' under the curatorship of Dr W. Reid R.N.

Further information about this Museum and the fate of its collections would be welcomed.

BMNH. 1904. The History of the Collections contained in the Natural History Departments of the British Museum. Trustees of the BM(NH), London. 2 vols, xvii+442, 782pp.
Greenwood, T. 1888. Museums and Art Galleries. Simkin Marshall & Co. London.

H.S.T.

153 Minerals from Newent, Glos.

David Bick (Pound House, Newent, Glos.) would be pleased to hear of any mineral specimens from this vicinity in geological collections or museums. Iron ores were worked here in the eighteenth century, but the sites have largely been lost.

NOTES AND NEWS

COMPILED BY TONY CROSS

NATIONAL MUSEUM OF IRELAND'S EXHIBITION 'AN INTRODUCTION TO GEOLOGY'

The Geological collections of the National Museum of Ireland, which have not been seen by the public since 1922, are featured in an exhibition 'An Introduction to Geology' which has been on display at the National Museum Exhibition Centre, 7-9 Merrion Row since 26th March 1985. The press release runs as follows:

Geology is the science involving the study of the physical earth. It is of value in discovering and exploiting our natural resources such as coal, oil, water and metals. It is also a science of general interest, as there are geological features all around us in the form of natural landscapes and in the raw materials of which our civilisation is built.

This exhibition illustrates the natural processes which are active in the world about us and their end results in the form of rocks. There are specimens on display of the rocks and their minerals of which the earth is formed, including those of economic importance to man. There are also specimens of fossils exhibiting the vast variety of extinct forms of life which have inhabited our planet in the past.

The whole exhibition is lavishly illustrated with views of the earth from crust to core, of landscapes and of the animals and plants which inhabited them. The exhibition is aimed at a level suited to schoolchildren and adults alike. An information poster is available.

This exhibition offers an unique opportunity to view a section of this large collection, built up over 200 years of collecting at a time when Geology as a science was expanding at a remarkable rate. Recently, the need for new sources of energy and raw materials means that Geology is of increasing importance to our future.

The exhibition continues at the National Museum Exhibition Centre until June 23rd, then tours to the University of Cork (July-August) and the City Museum, Limerick (September-October).

Further information from:

Geological Section
The National Museum of Ireland
Dublin
(Tel. 01-603063)

Felicity Devlin
Education Officer
The National Museum of Ireland
Dublin
(Tel. 01-765521)

GEOLOGY SERVES THE NATION
150 years of the British Geological Survey

'Geology Serves the Nation' is a travelling exhibition which is at the Geological Museum, London until 13th September 1985.

Geology as a science was scarcely forty years old in 1835, the year of the founding of the Geological Survey. It was pursued by gentlemen of means and leisure, whose researches were discussed and published by the Geological Society of London (founded 1807) or by scientific and natural history societies in the provinces. The geology of Britain had been known in outline since 1815 when the canal engineer William Smith had published the first geological map of Britain. In addition many areas had been studied in detail by local specialists such as G.A. Mantell in Sussex, John Phillips in Yorkshire and N.J. Winch in Northumberland and Durham.

Little government money went into geology, or science of any kind, in the early nineteenth century. The Board of Agriculture paid for a mineral survey of Derbyshire in 1810 and the Ordnance Survey encouraged geological work by its surveyors in Ireland and supported John Macculloch in making his great map of Scotland which was published in 1836.

Henry Thomas De la Beche was a typical gentleman-geologist. He was an officer of the Geological Society and had published papers in their Transactions. He had travelled abroad and was well-known on the Continent. His income began to fail in 1831 when he was in the middle of making a geological map of Devon. He turned to the Government for funds and was granted £300 by the Ordnance Survey to colour the eight sheets of Devon and write a memoir. In 1835 he was told to proceed to Cornwall and was given a regular salary as 'Geologist to the Ordnance Trigonometrical Survey'; the Geological Survey was born.

PRINCETON TO GIVE UP ITS FOSSILS

Mike Crane (Bristol City Museum) spotted this in Science (vol.228, p.38, 5th April 1985)

Princeton University's geology department has decided to give away most of its large paleontology collection to make way for laboratory facilities for geophysics and geochemistry. The move constitutes the coup de grace for Princeton's presence in macropaleontology and has been greeted with great dismay by paleontologists around the country. Princeton geophysicist William Bonini points out, however, that 'macropaleontology has been more or less defunct here for some time ' and the university must put its resources into more productive areas.

The collection of fossils and specimens is one of the largest and oldest in the country. It includes an unsurpassed accumulation of vertebrate fossils, one of the five original collections in North America, which will be transferred intact to an as yet undesignated institution. Princeton also has a collection of microfossils, which will be retained in the Department of Geological and Geophysical Sciences; paleobotanical specimens, most of which have already been loaned out to Yale University and the Smithsonian Institution, and two collections of invertebrate fossils, one of which is up for adoption. The final decision on disposition of the fossils was supposed to be made at a 21 March meeting of the board of trustees, but as of this writing, a university spokesman said it had been delayed.

If the university proceeds, it will be in the face of strenuous objections by a committee of paleontologists from around the country that it had invited to advise on the disposal of the collection.

Basically, Princeton's stance is that it wants to keep up with the times, and confine itself to doing a few things well rather than attempting to cover the gamut of disciplines.

According to Malcolm McKenna of New York's American Museum of Natural History (one of the advisory committee of palaeontologists) 'In order to make room for a couple of hot shots,' that is, geochemists and geophysicists, 'they are willing to throw away a tremendous library' of primary data. Philip Gingerich of the University of Michigan, a Princeton alumnus, points out that with its broad and eclectic approach to geology, Princeton supplied an environment that has hatched many of today's most creative thinkers. 'Princeton will never be big, but we don't need that. We need what Princeton is uniquely endowed to do,' he says. 'Technical universities like MIT and Caltech don't train general geologists' or people on the interface between biology and geology, 'This isn't Princeton Tech. This is a liberal arts university'.

MUSEUM MERGER

The merger of the Geological Museum with the British Museum (Natural History) took place on 1 April 1985. Sixty-six members of staff, along with the collections of building stones, minerals and gems, and the building itself, passed from the control of the Natural Environment Research Council to that of the Trustees of the British Museum (Natural History). British Geological Survey staff remaining in the Museum will move, along with the rock and fossil collections, library and archives, to the new headquarters at Keyworth, Nottinghamshire. The Geological Museum was founded as the Museum of Economic Geology in 1835 specifically to accommodate specimens collected by the newly-formed Geological Survey. In recent years the Museum exhibitions have become less and less dependent on the Survey collections, while the Survey itself has been forced to abandon its wider educational role in favour of close ties with industry. Although many are sad that a 150-year old link is being broken, it is likely that the Geological Museum (which will retain its name) will have a better chance of flourishing with the BM(NH) than with NERC.

PAPER DUST AND JUTE FLOC

Mike Taylor (Area Museum Council for the South West) reports:

'Recently some geological conservators have been using paper dust, then available from F.W. Joel Ltd., as a substitute for jute floc in preparing gap-filling compounds and mixing with latex rubber to produce jackets for acid preparation. Paper dust was a by-product of a process for making Sundeala board, and this process has recently been changed. As a result Joel's no longer sell paper dust. It may be useful to note that jute floc is available, as reported by R. Croucher and A.R. Woolley (1982), Fossils, minerals and rocks: collection and preservation, but that the supplier has undergone a change of name to: Martin Cleghorn, P.O. Box 17, Dundee DD1 9BR.

I have just been able to obtain 10 kgs. for £1.40 plus VAT, and carriage.'

A SCHOLAR AND A GENTLEMAN

'Lord Cole, later the Third Earl of Enniskillen (William Willoughby Cole 1807-1886), with his friend Sir Philip Grey Egerton, amassed one of the world's finest fossil fish collections, amounting to nearly 10,000 specimens. During his lifetime this was housed in the family seat at Florence Court, Co. Fermanagh in the west of the province of Ulster. There were fossil fishes from all the classic localities in Europe, and Louis Agassiz (the foremost vertebrate palaeontologist of the Victorian era) twice journeyed to Florence Court, in 1835 and 1840, especially to study the Collection for his work Recherches sur les Poissons Fossiles (1833-44). The Collection was presented to the British Museum (Natural History) shortly before Enniskillen's death, and remains important to science today. The Third Earl of Enniskillen was a Fellow of the Royal Society, a Fellow of the Geological Society, and a Member of the Royal Irish Academy. As well as being a friend of Sir Philip Grey Egerton, of Oulton Park, Tarporley, Cheshire, Lord Cole was a student at Oxford of Dean William Buckland.

The Department of Geology in the Ulster Museum hopes to mark the centenary of the death of the Third Earl of Enniskillen in 1986 with an exhibition illustrating his life and work. It is planned that this will be a travelling exhibition, available throughout the British Isles'.

Kenneth James would be interested to hear from colleagues knowing of the whereabouts of any papers, letters, portraits, or other

relevant material. The present Earl of Enniskillen has vacated the family seat taking all of the papers with him so little is available locally.

THE NAUTILUS AND THE AMMONITE

Both Tony Doré (Conoco Norway Inc.) and Hugh Torrens (Keele University) point out that the poem 'The Nautilus and the Ammonite' attributed to Ernest Westlake (1855-1922) in Geol. Cur. 4, 57-58, was in fact written and published in 1838 by G.F. Richardson (1796-1848), one of the first true geological curators. Richardson's life and work (and the poem) will be discussed in a forthcoming article by Hugh Torrens and John Cooper in Geol. Cur. 4, no.4 or 5. It is Hugh's excellent suggestion that this piece inaugurates a new series of articles on other forgotten curators, under the series title 'Uncurated Curators'.

STOPPING THE ROT!

Hunterian Museum volunteer Dr Lawrence Jubb (right) and M.S.C. draughtswoman Laraine Selbie examine a 150 million year old crocodile jaw for signs of pyrite-rot during its move to a new environmentally controlled store. The store, recently installed in the Hunterian Museum, and financed by a special conservation grant from the Museums and Galleries Commission, will provide the stable temperature and humidity necessary to prevent the chemical decay of pyritised fossils and so help preserve Britain's fossil heritage. For further information contact: Dr Graham Durant, Hunterian Museum, University of Glasgow (041-339 8855 ext. 206).

BOOK REVIEWS

Environmental recording and museums. MDA Information, 8 (4). 87-129.

What has everyone else been doing? Geological Curator readers, familiar with the now long-established National Scheme for Geological Site Documentation, might like to give themselves a pat on the back by reading this special issue of MDA Information. It is a collection of nine short to medium-length articles which describe the state of the art of environmental recording by biologists, geologists, historians, and archaeologists. The link with museums in the title proves to be somewhat tenuous - and this is where the pat on the back comes - as it is shown that the only curators who have initiated, devised, and developed a working, nationally coordinated environmental recording scheme so far are museum geologists.

Our Archaeology colleagues come very close to winning the imaginary 'oscar' for being first. Oxfordshire's Sites and Monuments Record, for example, was set up in 1967, beating the CGSD scheme by ten years. However, as described by C.J. Bone, although it developed at Woodstock into a comprehensive environmental records service, it never formed the basis of anything to be applied nationally in the way that the Leicester pilot geological site register (1975) did. More recently, the 1979 Wiltshire Buildings Record described by Pamela Slocombe has been able to use the standards and expertise of MDA (in this case partly because Martin Norgate, new Museums Officer for Wiltshire, joined the steering committee) in the same way as have the many other post-MDA archaeology/history site recording schemes.

Meanwhile, as shown in four of the remaining articles, biology seems to have been lapped in the race to start a national environmental recording scheme. At first this seems surprising in view of the wider public appeal and much greater numbers of curators of natural history (than, for example, of geology); but I suspect that a ubiquitous enthusiasm for the natural world has made it all the harder for biologists to get together and run in the same direction. Everyone wants to have a go! There are currently, and more or less independently, potential schemes either at an early or advanced stage of development by the Nature Conservation Trusts (a national scheme sponsored by the Royal Society for Nature Conservation, which includes computer hardware), by the Institute of Terrestrial Ecology of NERC through the Biological Records Centre (a peripheral index of site information generated by species records), by the Biology Curators' Group (first steps towards a national scheme resulting from a seminar held in Leicester, September 1984), and of course by individual museums which may or may not adopt the MDA's standards, data recording formats, or software. Interestingly, too, there are instances of help, encouragement or money from the Nature Conservancy Council for elements of all these separate initiatives.

M.F. Stanley summarises the history of the develoment of the National Scheme for Geological Site Documentation. With 41 recording centres compiling records in a standard manner, the scheme is ideal for the application of a standard electronic information storage and retrieval system; with this in mind, MDA and Derbyshire Museums have developed a peripheral package to GOS called the LAP (Locality Applications Package). As readers may know, GCG Committee has proposed the establishment of a centralised data bank for geological site records, while the Conservation Committee of the Geological Society is pressing NCC to establish a Geological Records Centre. The LAP can also handle environmental records for other disciplines; this surely gives the long awaited opportunity for geologists, biologists, archaeologists, historians and, for that matter, artists and technologists too, to adopt an interchangeable, standard system for their environmental recording.

I have left to the end what is in fact the introductory article by G. Stansfield. After a summary of the development of environmental recording in museums, the author contemplates "the way forward" with apparent pessimism. "The present situation is very complex and unsatisfactory" he writes, with particular reference to biological environmental recording; there is, for instance, no agreement on a definition of the recording unit - the site - for biology or archaeology.

The papers in this special issue of MDA Information demonstrate the need for a coordinated and standardised system for environmental recording in museums. BCG is to set up a working party, and Stansfield comments that a similar initiative is needed for archaeology and history. To which I add from the concluding article by R.B. Light, "it was assumed (by IRGMA) that ... a single multidisciplinary structure for museum records .... would facilitate the exchange of computer-based records between institutions. However the MDA data standard ... has not been widely used ... for the exchange of records." To me, it seems that environmental recorders should not ignore the help of MDA and the opportunities of the now-available LAP package and recording standards. Biologists, archaeologists and all - don't be LAPped by geology again!

John Martin
Keeper of Earth Sciences
Leicestershire Museums, Art Galleries and Records Service
96 New Walk, Leicester LE1 6TD

MORRIS, S.F. and FORTEY, R.A. (compilers). 1985. Catalogue of the type and figured specimens of Trilobita in the British Museum (Natural History), i+183pp, 8pls. British Museum (Natural History), London.

The palaeontological collections of the British Museum (Natural History) have never, it seems, been victims of over-cataloguing, at least in published form. Catalogues of several large groups or parts of groups have in the past appeared sporadically, particularly in two bursts: one in the late years of the last century, and one about fifty years ago. This volume is (I think) the fourth to appear in what may be called a modern (third) series of 'type and figured' catalogues. One should not be so churlish as to ask why it has taken so long to produce and publish this first listing of what is an important group of fossils. Rather one should give sincere and heartfelt thanks that the motivation (and/or money) has been provided (presumably from 'upstairs') to bring to general notice the depth and breadth of the collection.

It is a wonder that this trilobite collection has, at least in the recent past, been so well used and published - even without such a catalogue. That it has may largely be placed at the doors of the compilers of this volume - Sam Morris and Richard Fortey - who have been the 'living catalogues' of the collections. If they didn't have in their head the information you wanted about the collection, there was a struggle in view to find what information there was. They have now compiled this catalogue; it is as complete as currently possible, and it can only greatly aid trilobite research.

The book is A4 in size and printed by offset. About 3,000 entries are listed alphabetically by their current generic name, while older generic attributions are cross-referenced. The work includes all relevant material to the end of 1982. Each entry is comprised of the generic and specific name (in bold type) followed by author and date, the status of the specimen, its BM(NH) catalogue number, its plate and figure number in the reference given, its horizon, locality, and finally the collector. At the end of the entry section, 16 pages of references are given. An index of specific and subspecific names, with presently-accepted generic attribution completes the text. It is a pity that no room could be found for further indexes of stratigraphy, geography and, particularly, collectors. The eight plates are included to '...correct some of (the) omissions' caused by the discovery '....of a number of specimens which had been inadequately figured, or unnecessarily neglected'. Specimens from Iran, Australia, USA, India, Portugal, Bolivia, Burma, South Africa, Federal Republic of Germany, and Canada are figured. Either to my own shame, or to underline the need for such a catalogue, I here discovered that the types of Prosopiscus mimus Salter, 1865 from India were safe in London, presumably for over a century, although in the 60's I had assumed (mercifully without saying so in print) that

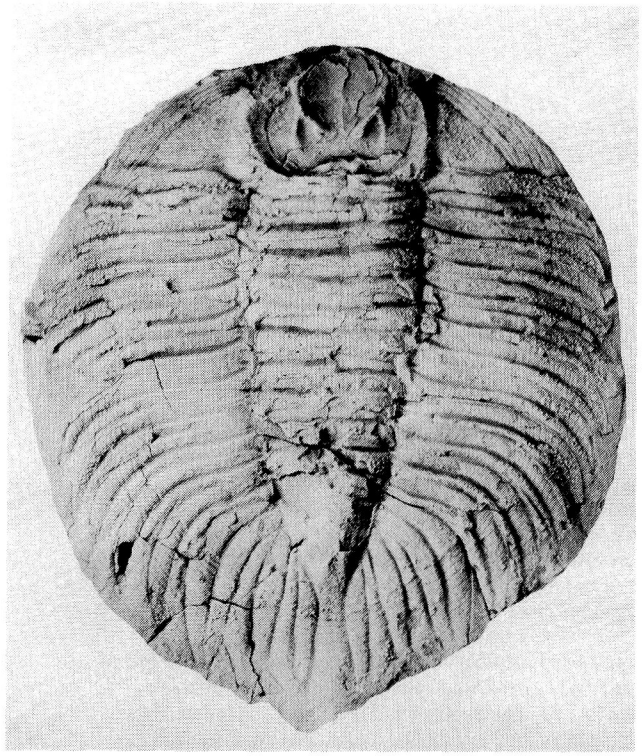


Fig.1. Front cover illustration for BM(NH) Trilobite catalogue. Arctinurus boltoni (Bigsby, 1875), from the upper Silurian Rochester Shale of Lockport, New York State, x0.5.

they were long-lost or languishing in foreign parts.

A random check on the entries disappointingly soon showed some errors. Podowrinella straitonensis is a Lamont species, not one erected by Clarkson, Eldredge and Henry (it is their genus); the holotype of Acernaspis superciliexcelsis was figured by Howells 1982, pl.10, fig.18 (not fig.10). But by far the great majority of entries I checked was correct; inaccuracies of detail are inevitable in a work of this nature. I presume that the compilers would be grateful for notification of incorrect or incomplete details, or of material which is supposed to be at BM(NH) but is not listed - that is, if you can find a copy of this catalogue to check. For now we come to the bad news. At £25.00, this catalogue is massively overpriced. The Trustees of the BM(NH) will have difficulty in keeping up with the infringements of copyright which will undoubtedly occur. Nevertheless, congratulations to the compilers, and not least the motivators.

This catalogue is a must for the trilobite workers of the world and all university reference libraries. It is clearly laid out, and with its reference list and systematic index it is a work which will be a time-saver for research workers.

Dr P.D. Lane
Department of Geology
Keele University
Staffordshire ST5 5BG

FOWLES, J. 1982. A short history of Lyme Regis, 53pp. Dovecote Press, Wimborne, Dorset. Price £4.95.

FOWLES, J. 1983. Lyme Regis: three town walks, 24pp. Friends of the Lyme Regis Museum, Lyme Regis, Dorset.

If you are planning a visit to Lyme Regis you would do well to pack two recent books by John Fowles (Honorary Curator, Lyme Regis (Philpot) Museum) into your beachbag - together with spade, hammer, and Good Beer and Museum Guides.

A short history of Lyme Regis is a delightfully illustrated account of Lyme's vicissitudes and glories, and includes a chapter on the famous geologists who have always come to admire the fossils and landslips. John quite rightly points out that the common idea of the history of collecting at Lyme has been greatly distorted by the romantic accretions around Mary Anning; this chapter, together with Howe, Sharpe and Torrens' (1981), are just about the only accurate accounts currently in print. Equally interesting, indeed surprising, was the revelation of the extent of quarrying of the foreshore for stone, stucco, and hydraulic cement from the 1820s to the First World War, at both Lyme itself and Charmouth. As at Whitby, this quarrying must have had a great effect on the rate of discovery and sale of fossils.

Lyme Regis: three town walks conducts the reader about a Lyme which has many delights in addition to the seafront and the Cobb (try the river walk). The geologist will be pleased to find where Mary Anning, Henry De la Beche, and the Philpot sisters lived, not to mention Mary's grave in the churchyard.

Both publications, which are available from the Lyme Regis (Philpot) Museum and from the local bookshop, also contain much more about the local history of Lyme - I particularly liked the Cruikshank etching of ladies sea-bathing in 1819!

References

Howe, S.R., Sharpe, T. and Torrens, H.S. 1981. Ichthyosaurs: a history of fossil 'sea-dragons', 32pp. National Museum of Wales, Cardiff.

Michael A. Taylor
Area Museum Council for the South West
City of Bristol Museum and Art Gallery
Queen's Road, Bristol BS8 1RL

LAUNCHING 'GUIDELINES FOR THE CURATION OF GEOLOGICAL MATERIALS'

BY C. HOWARD C. BRUNTON

Nearly three years ago I wrote in the Geological Curator about the plans for the GCG producing Guidelines (Brunton 1982) and I concluded "..whilst the contained information must be sufficient to guide the curator in any particular section, it must not be so voluminous as to deter the reader!" Since that time about twelve authors have contributed innumerable pages of script which the editors have rendered, forged, tempered, and honed into about 300 typescript pages ready to pass to the Geological Society for publication as their Miscellaneous Paper No.17. This we hope will be published by early summer, 1985. The Geological Society has agreed to depart from tradition and publish our Guidelines in a form suitable for using as a loose-leaf book. The suggestion is that most copies would be published with holes already punched for a four-ring binder, but sold only in a paper cover. For an extra couple of pounds some copies will be available in a four-ring binder printed with the same cover design. We hope the basic version will be sold to Geological Society and GCG members at approximately £5.00.

The GCG Guidelines are divided into five parts: Acquisition, Documentation, Preservation, Occupational Hazards, and Uses. There follows a References section of about 200 titles, and then three Appendices: I, dealing with a large range of adhesives of potential use in the museum; II, listing apparatus, equipment, materials and organisations, with names and addresses; and III, describing the Geological Site Documentation Scheme, with addresses of all recording centres. The five parts are to be printed on different coloured papers for easy differentiation.

For the first time practicing geological curators, and other experts, have written guidance for all likely procedures in the museum for any curator with geological material in his care. The subjects dealt with are much as indicated in 1982, but there has been some reorganisation, as can be seen by comparing the brief Contents list here with that of 1982.

In the halcyon days of 1973, NERC reported on the geological sciences and wrote: "Curating .... is an essential element in relating the complex data of Earth history in ways that enable a succession of researchers to make use of expensively collected and often irreplaceable material." Such views have been treated by governments like the proverbial 'lead balloon'. Phil Doughty's (1981) report exposed the extent of our

troubles and he concluded by recommending the establishment of "Museum standards of curatorial care ... to include the environment, furniture, organization, documentation and conservation of museum collections."

The GCG Guidelines make a start at setting these standards and undoubtedly provide much to think about when considering the proper care of geological materials. Readers of the preliminary script from within and without geological circles have enthusiastically praised the Guidelines, so please be sure to advertise them widely and buy your copies as soon as possible. We must demonstrate to the Geological Society and the world at large our concern for geological materials - and how better than by creating a demand for the book which provides information and standards at which to aim in preserving collections safely, in good condition, and available, with all their data, for use now and in the future.

I offer a sincere thank you to all who have contributed in so many ways to the Guidelines. but especially to fellow contributors and editors John Cooper and Tristram Besterman.

CONTENTS LIST

C. Howard C. Brunton
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Typescript received 19 March 1985

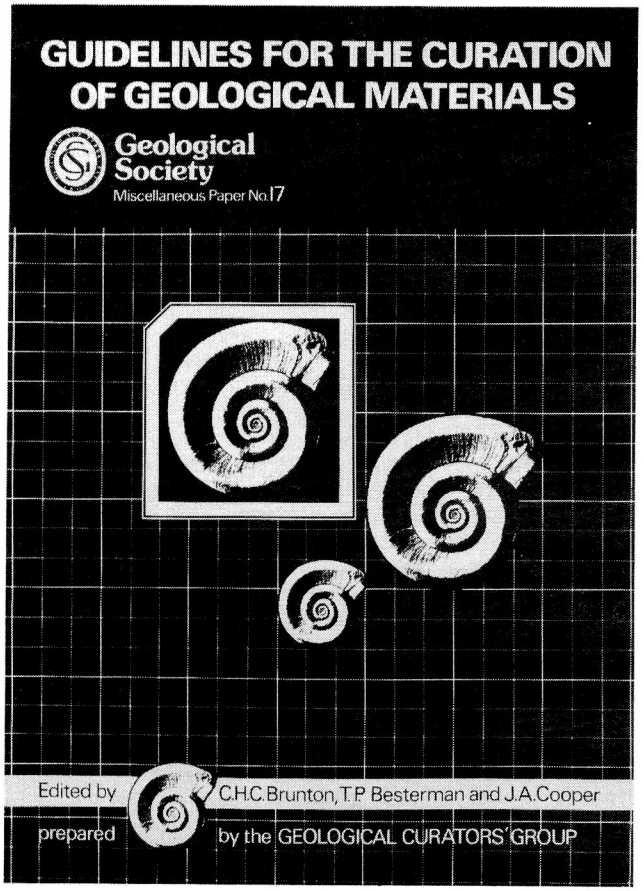

Fig.1. Cover for the Guidelines.

REFERENCES

Brunton, C.H.C. 1982. Towards 'Guidelines for the Curation of Geological materials'. Geological Curator, 3, 182-185.

Doughty, P.S. 1981. The state and status of Geology in U.K. museums. Miscellaneous Paper, Geol. Soc., London, 13, 1-118.

Natural Environment Research Council. 1973. Research in the Geological Sciences. NERC Publication Series 'B', 7, 113pp.

POSTSCRIPT

THE ERUDITE GEOLOGIST

(With apologies to W.S. Gilbert and geologists everywhere.)

I am the very model of an erudite geologist,
I'm both a metamorphic and an igneous petrologist;
I know the common minerals from andesine to cryolite,
And have the skills required to tell a limestone from a rhyolite.
I'm very well acquainted with the freezing of the liquidus-
I understand the temperature at which the melts ubiquitous;
I know the very latest trends of isochron and isotope,
I've mastered every facet of the polarizing microscope!
I'm very good at sediments and basinal stratigraphy,
I read the writing of the rocks like crystal-clear calligraphy;
In short, I'm neither braggart nor a falsely sham apologist,
But I am the very model of an erudite geologist.
I have a thorough knowledge of all matters geochemical,
From aqueous solutions to the cyanide systemical;
I know the flaws and pitfalls of the methods analytical,
Of any slight discrepancy I'm always super-critical.
For scientific methods I've remarkable propensity,
(I know that gold and platinum have high specific density),
I can quote the precious elements from silver to germanium,
But know it's never politic to talk about uranium!
I'm keen to bandy language with the budding geophysicist,
Of jargon and verbosity I'm quietly a quizzicist
Because I've got the makings of an amateur philologist,
And I am the very model of an erudite geologist.
I've conquered all the problems that are classified explorat'ry,
By observation in the field and back in the laborat'ry;
The meaning of the outward sign is usually deducible,
Resorting to the rigmarole of spatula and crucible.
I can pick a new bonanza from a spurious anomaly,
I'll preach on my opinion in a never-ending homily.
I know of ores and aquifers from principles theoretical,
I follow the establishment - I've never been heretical.
My exploration formula is definitely empirical,
I think that sulphide genesis is nothing but a miracle,
And that divining minerals is done by a theologist.
I <u>am</u> the very model of an erudite geologist.

W.J.L. Brooke
From Ex-Div Magazine (Western Mining) 1983.

From Diana Smith (Norfolk Museums Service) whose sister found this in Tasmania.

NOTES

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 1985 and 1986 to make up the deficit to members. The following timetable should be noted by those wishing to submit material for publication:

Vol.4, No.4 (for 1985) copy date 16th Aug. 1985 for publication Oct. 1985
Vol.4, No.5 (for 1985) copy date 15th Nov. 1985 for publication Jan. 1986
Vol.4, No.6 (for 1985) copy date 14th Feb. 1986 for publication Apr. 1986
Vol.4, No.7 (for 1986) copy date 16th May 1986 for publication July 1986
Vol.4, No.8 (for 1986) copy date 15th Aug. 1986 for publication Oct. 1986
Vol.4, No.9 (for 1986) copy date 14th Nov. 1986 for publication Jan. 1987

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, Dr P.R. Crowther, Leicestershire Museums Service, 96 New Walk, Leicester LE1 6TD. 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 final size. Both drawings and photographs should 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. Reprints can be purchased at cost (details from the Editor). Major articles are refereed.

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 exchange. All items relating to this column should be sent to Dr M.D. Crane, Department of Geology, City Museum, Queen's Road, Bristol BS8 1RL (Tel. 0272 299771).

NOTES AND NEWS contains short pieces of topical interest. Tony Cross, Curtis Museum, High Street, Alton, Hampshire GU34 1BA, is pleased to receive items for potential inclusion.

BOOK REVIEWS contains informed opinion on 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

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Further details from Diana Smith, Castle Museum, Norwich, Norfolk NR1 3JU (Tel. 0603 611277 ext.287).

Inserts such as publishers' 'flyers' can be mailed with issues of The Geological Curator for a fee of £35. 450 copies of any insert should be sent to the Editor by the required copy date shown above.

SUBSCRIPTION CHARGES

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Overseas Institutional Membership	£9 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 (or £5.25 for the double-issues Vol.2, Nos.9/10 and Vol.3, Nos.2/3, including postage. Orders should include payment and be sent to the Treasurer (address above).