

GCG

NEWSLETTER
OF THE
GEOLOGICAL
CURATORS
GROUP

NUMBER 7

SEPTEMBER 1976

FOR SALE BY PRIVATE TREATY.

UNDER AN ADMINISTRATION ORDER.

In the County Court of Lancashire holden at Bolton.

In the Matter of ROOKE PENNINGTON, F.G.S., Deceased.

The Castleton Museum.

This well known and interesting Collection comprises a series of the Fauna of the neighbourhood of Castleton, Derbyshire.

Antiquities, as Roman and old English remains and Archaic Mining Implements from the same district. Pre-historic Archæology articles of the Bronze and Stone (Neolithic) periods obtained from the Barrows of the district, with the like from Cessbury, Yorkshire, Sussex, Switzerland, Denmark, America, &c.

Also Palæolithic Implements and the teeth and bones of the Mammoth Bison, Grizzly Bear, Rhinoceros, Reindeer, Hyæna, and the other pleistocene animals found near Castleton and in other parts of Derbyshire.

Geological and Mineral series, in which especial care has been taken to illustrate the formations prevailing in the Peak of Derbyshire. Also the Natural and Commercial productions of the district, together with a selection of Curiosities, Maps, Pictures, &c.

The Collection contains upwards of 3,500 Fossils, 500 Minerals, and 600 Archæological Curiosities, and is the result of explorations during many years by the late Mr. Pennington and other scientific gentlemen.

Professor W. BOYD DAWKINS, F.R.S., of Owen's College, says:—
Mr. Pennington's Museum, which he formed to some extent with me, is an excellent one, and one of the best private museums I know.

Owing to the recent death of the owner it is intended to offer the Collection for Sale by Private Treaty in one lot. Tenders are invited on or before the 29th day of February, 1888.

The Trustee of the Estate reserves to himself the right to refuse the highest or any tender.

The Museum is open to inspection at any time on application to Mr. JAMES HOW, of Castleton.

For further information apply to Mr. THOS. H. WINDER, Solicitor, Official Receiver in Bankruptcy, 16, Wood Street, Bolton, Lancashire, to whom tenders must be sent.

DISTANCES FROM RAILWAY STATIONS:—Chapel-en-le-Frith, 7 miles; Buxton, 12 miles; Sheffield, 16 miles; Millers Dale, 9 miles; Bakewell, 12 miles; where (except Millers Dale) conveyances can be obtained.

COVER

The Castleton Museum opened in early 1876. It contained many of Rooke Pennington's collections and further additions were made to it during its existence. However, in May 1883, the contents were put up for sale but remained unsold until after Rooke Pennington's death in 1887 when the anonymous pamphlet (preproduced on the cover) was published.

For further details see under 'Rooke Pennington' in the article on Bolton Museum.

Back numbers of Newsletters are still available at 50p. each (including postage). Remuneration must accompany all orders, which should be sent to Tim Riley, Sheffield City Museums, Weston Park, Sheffield S10 2TP.

Submission of MSS

Three Newsletters are published annually. The last dates for submission of MSS for publication are:

March 1st for April issue

August 1st for September issue

November 1st for December issue.

MSS should be sent to the editor typed and double-spaced, please.

ADVERTISEMENT CHARGES

Full A4 page	£12 per issue
Half A4 page	£6.50 per issue

Further details from the Editor.

c Published by the Geological Curators Group. Printed at Keele University.

For further details please contact either the Editor or the Secretary.

GEOLOGICAL CURATORS GROUP

(Affiliated to the Geological Society of London)

CHAIRMAN

Dr. R.G. Clements,
Geology Department,
University of Leicester,
Leicester LE1 7RA. Tel: 50000

TREASURER & MEMBERSHIP SECRETARY

Mrs. P.A. Pennington-George,
Doncaster Museum,
Chequer Road,
Doncaster, DN1 2AE.
Tel: 62095 and 60814

EDITOR

Mr. B.W. Page,
Geology Department,
University of Keele,
Keele, Staffs. ST5 5BG.
Tel: Keele Park 371

GENERAL SECRETARY

Mr. M.D. Jones,
Leicester Museum,
New Walk,
Leicester LE1 6TD
Tel: 539111, Ext.280

ASSISTANT SECRETARY

Mr. T. Riley,
Sheffield Museum,
Weston Park,
Sheffield S10 2TP
Tel: 0742 27226

COLLECTIONS INFORMATION TO:

Dr. H.S. Torrens,
Geology Department,
University of Keele,
Keele, Staffs. ST5 5BG.
Tel: Keele Park 371, Ext.595

CONTENTS:

Report on Meeting at Birmingham - March 1976	319
Committee Notes	320
Geological Collections and Collectors of Note:	
11. Bolton Museum	323
12. Glasgow Art Gallery and Museum	336
Collections and Information Lost and Found	
B. Collections Found	346

Technical:

A Glass Reinforced Plastic Cast and Mount of
the Tertiary Mammal Arsinoitherium 348

Key to Illustrations 358

Illustrations 359

References 368

Technical Notes 369

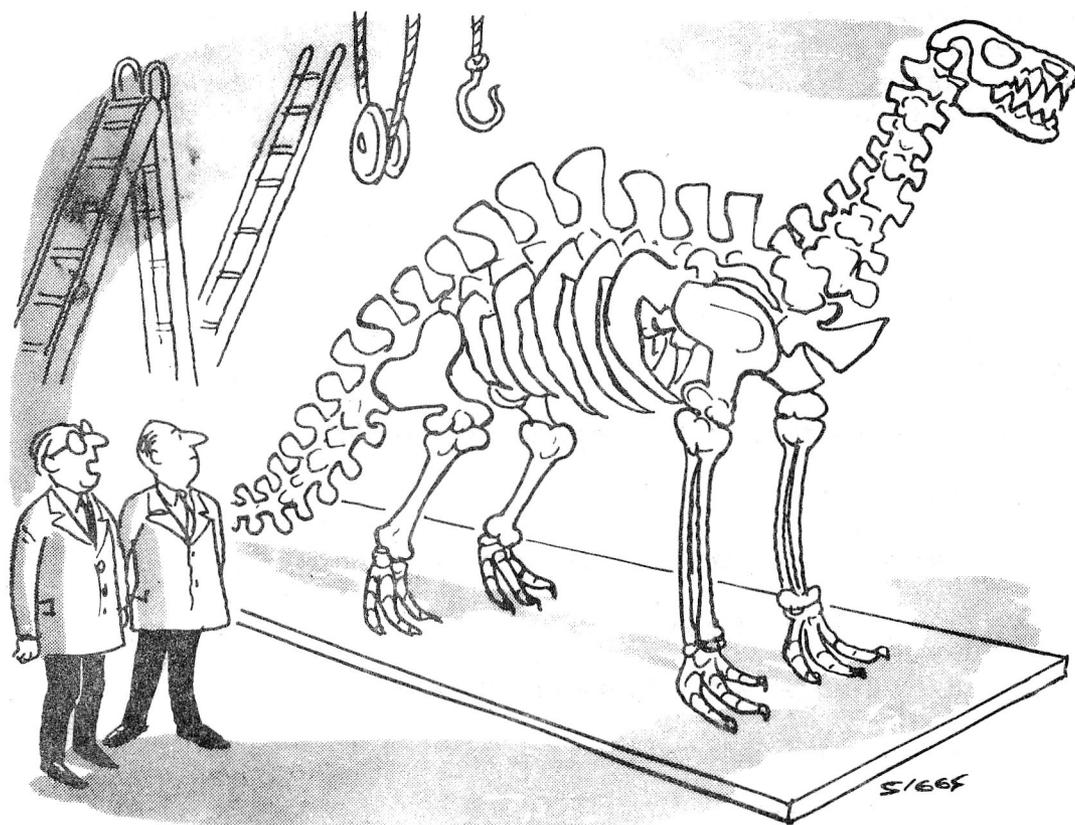
Book Review:

Natural History Auctions 1700-1972 370

Publications:

Report on British Palaeobotany & Palynology 1972-1975 372

Other Societies 372



"This one evolved from plasticine to re-inforced plastic."

MEETING AT BIRMINGHAM - MARCH 1976

On Friday 12th March the Group met at Birmingham Museum and Art Gallery for a specialist session on the Replication of Fossil Vertebrates, under the watchful eye of that institution's well known replica of Tyrannosaurus. Although the attempted emulation of Waterhouse Hawkins fell short of an intercostal banquet the day's proceedings nevertheless proved sufficiently attractive to tempt 38 members.

Peter Sewell, Deputy Keeper of Natural History at Birmingham began the meeting with a spirited account of the reconstruction of Tyrannosaurus. As a similar account was written up in the Transactions of the Museums Assistants Group for 1971 (No. 10 pp 2-6), this has not been reproduced here. Ron Croucher, Head of the Palaeontology Laboratory at the British Museum (Natural History) followed with a highly instructive exposition of the reconstruction of Arsinoitherium, an Oligocene sub-ungulate. Not only did this cover the methods used to erect the skeletal cast of the animal but also the techniques used by Ron Nash of the Museums Exhibition Section in preparing anatomical reconstructions and the model displayed with the skeleton. This account is reproduced in full in this issue.

In the afternoon, Stuart Baldwin of Educational Palaeontological Reproductions outlined his ambitious plans for producing a comprehensive range of fossil vertebrate replicas. These should be particularly valuable to the larger and more specialised museums in the provision of displays and reference collections for advanced teaching purposes. Stuart then concluded the day's events with a series of invaluable demonstrations of moulding and casting techniques, the success of which emphasises the need for more sessions of this kind.

M.D. Jones

COMMITTEE NOTES

At the last GCG Committee meeting, it was decided that your Chairman and Secretary should get together to produce for the Newsletter an informal set of notes, at fairly regular intervals, outlining some of the more important issues that have been or are being dealt with by Committee. It was felt that the Newsletter would benefit from an injection of "newsiness", and that the Group as a whole would benefit from a greater sense of participation. Many of the issues discussed and decisions made by your Committee are fundamental to the Group's aims of improving the status of Geology in museums in this country, and a wider discussion of these issues could be nothing but beneficial. In compiling this first set of notes, I shall confine myself to current issues. Perforce - a lot has transpired in a little over two years!

CENTRES OF EXCELLENCE

The Standing Commission on Museums and Galleries has established a working party to study means of implementing the recommendations of the Department of Education and Science's Report on Provincial Museums (HMSO, 1973 - the Wright Report) in regard to the establishment of Centres of Excellence. In our submission to this Working Party, your Committee have proposed that the Geological Sciences should be clearly differentiated from the other Natural Sciences for the purposes of establishing Centres of Excellence. Further to this, we recommended that the same broad distinctions as are currently applied to Archaeology should be invoked in evaluating and designating such geological Centres, i.e.:

1. Geological Sciences - British Regional
2. Geological Sciences - National
3. Geological Sciences - International

As a result of our submission, we have been invited to establish an ad hoc working party to produce a list of recommended Geological Centres of Excellence for this country, although the Commission's Working Party gave no commitment to accept any of the recommendations it produces.

MUSEUMS ASSOCIATION CONSTITUTION

Working parties abound! The Museums Association has established one to look at its constitution. The Group is lucky in that our Recorder, Philip Doughty, besides being a member of the MA Council, is also a member of this particular Working Party, although he is in no way acting as a GCG representative on this body. Independent of Philip's efforts on the Working Party, your Committee was invited to submit evidence on behalf of GCG. Much of the discussion on the Working Party has revolved around the constitution of the MA Council itself. How big should it be, the proportion of professional vis à vis institutional councillors, should the professional councillors be elected on an essentially disciplinary basis, etc. In our submission we have expressed strong support for the principle of disciplinary representation on Council, and strongly urged that in any such re-organisation Geology should be clearly recognised as a separate discipline. As a Committee we felt constrained by the Constitution of the Group not to make more specific proposals, although we would hope that individual members would make their views known to the Working Party.

RESCUE OPERATIONS

Up to the present time, the Group has been unable to do much to rescue important geological collections that are at risk throughout the country. To establish and co-ordinate this work, we have established a post of Rescues Secretary on Committee. A small rescues Fund, administered by the Treasurer under the direction of the Rescues Secretary, is to be established in order to cover the initial costs of any rescue operation (e.g. travelling expenses, etc.). Mike Bassett has agreed to take on this work, and he will head a small ad hoc committee to co-ordinate it as well as to sort out priorities and the ethics of such operations, and to seek sources of finance. Help, information, suggestions, etc., will be needed if we are to be successful.

GEOLOGICAL SOCIETY

Affiliation to the Geological Society of London has brought in its wake a number of issues for your Committee to consider. Dr. A.H. Stride, who is Geol. Socs. representative on the Council for Nature, sought our views on the possible extension of the Council's sphere of interest into the field of geological conservation. Your Committee welcomed interest, from any quarter, in these problems, particularly from such an influential body. However, the view was also put, that the whole problem of geological conservation (not just geological sites, but also geological collections) needs to be debated to see whether an agreed set of realistic priorities and objectives can be established.

We are following up a suggestion made by the Promotions Committee of Geol. Soc. that booklets on the collection and conservation of geological specimens should be produced, and published by Geol. Soc.

The Group has developed fruitful relationships with the Nature Conservancy Council as a result of our National Site Documentation Scheme. Geol. Soc. has also been exploring the possibilities of closer co-operation with NCC. As a result of this initiative, we have been able to arrange for the NCC Information Circular (published twice a year) to be circulated to members, with our Newsletter.

INFORMATION GATHERING

On the information gathering front, our Recorder reports he has received over 430 completed questionnaires in our national geological collection survey. This is a very pleasing response. The returns have revealed a lot of valuable information, even before they have been properly analysed. There can be but few uncompleted copies of the questionnaire suffering compaction in dusty in-trays!

Barbara Pyrah is co-ordinating another information gathering exercise - a directory of geological curators, and this will be the subject of another questionnaire. If this survey is as successful as the previous one, the Group will be in a good position to start fulfilling another of its Constitutional objectives.

MEMBERSHIP AND FINANCE

Our membership figures are very healthy, with, to date, about 160 ordinary members (including 4 overseas), and 50 subscription members (including 5 overseas). Partly reflecting this, our financial position seems to be relatively secure for the time being, in spite of inflation. Nevertheless, we do need more advertising revenue for the Newsletter, so if you have any suggestions as to possible sources, please get in touch with Brian Page, our Editor.

Roy Clements,
Chairman.
3.ix.76.

GEOLOGICAL COLLECTIONS AND COLLECTORS OF NOTE

11. BOLTON MUSEUM

1. HISTORY OF THE MUSEUM AND ITS COLLECTIONS

The town of Great Bolton adopted the Libraries and Museums Act of 1850 in February 1852 and claims to be the third town in the country to do so (Saxelby, 1953; Scholes, 1892). It was housed in what had been the Exchange Newsroom, built by subscription in 1824-6, a fine Georgian building which still stands today next to the Town Hall (1873) and is leased to the Nationwide Building Society. Shortly following, the townships of Great and Little Bolton amalgamated to form the Borough of Bolton, although it was quite frequently referred to as Bolton-le-Moors, as seen in Hull (1862).

However, the museums part of the Act was not acted upon as enthusiastically as was the Libraries and neither was there a local society which fulfilled the function so that such activities were low key until 1876 when Dr. Samuel Taylor Chadwick donated £5,000 "towards a building, fitting and furnishing of a museum of natural history to be erected within four years of his death in the Bolton Public Park, to which the public are to be admitted free" (W.W. Midgeley c.1890 in.litt. manuscript notes in museum files). Another local family of philanthropists, the Thomasson's, donated £1,000 towards the internal fitments (Scholes, 1892). The Park, Museum and Burial Board accepted from the library the three dimensional material which had been inadequately stored/displayed in an upstairs room. The Accessions Book lists 273 lots of items and some archival material referring to it also survives. When the Chadwick Museum was erected in 1883, a curator was appointed and displays completed to open in the following year (see detailed descriptions in the Bolton Evening News, June 7th, 1884, and Bolton Journal, May 31st, 1884). The main palaeontological collection from this period was that of Matthew Dawes, a local solicitor, and some of the material can still be identified despite the general lack of labelling.

With a full-time curator, W.W. Midgeley, the collections expanded rapidly so that by 1920 (by which time his son, T. Midgeley, had succeeded to the post) all the major collections had been bought or donated. The ability to purchase large collections was not due to the generosity of the local council, but to the philanthropy of J.P. Thomasson. Even after his death, his wife continued to purchase the material which the curator had earmarked at auctions or private sales, and it then appears as a donation from Mrs. Thomasson. In this way it would appear that the Thomasson's were

collectors but except for birds and their eggs, they did not themselves collect natural history material.

Throughout the complete field of natural history, the collections of Bolton Museum owe most to Philip Brookes Mason (1842-1903). He was a collector but acquired his huge private museum by purchase. Bolton acquired the majority of his collections (money provided by the Thomassons) from his widow. As well as a large herbarium, insect collections and crustacea, representing many famous collectors' names, some geological material, notably some fossil Bryozoa of G.R. Vine, came to Bolton.

The contents of the collections have never been adequately publicised. Although Howarth and Platnauer give some indication of the scope of the collections and a short series of Annual Reports were published at the turn of the century, previous curators have not given the collections the publicity they deserve. In 1939 a new building was erected in the centre of Bolton to house Library, Museum, Courts, etc., and on completion, the collections were moved and the new displays opened to the public in 1948. The Chadwick Museum building in Queen's Park has now been demolished, the new museum being part of the Civic Centre of Bolton.

2. PALAEOLOGICAL COLLECTIONS AT BOLTON MUSEUM

A. REV. CHARLES CLEMENT COE (1830-1921)

Born in King's Lynn and came to Bolton as a Unitarian Minister in 1874 where he remained until 1895, when he retired to Bournemouth where he died April 1 1921 (annotation in Bolton Ref. copy of Sparke 1913 p.50). He was a Fellow of the Geological Society.

In 1883 he donated a "large Collection of Minerals, Fossils and Stalactite from the chalk, Lias, Carboniferous Limestone Coal Measures, Silurian and Devonian formations". This is not thought to be an important collection.

Coe is most memorable for his religious pamphleteering (listed in Sparke 1913) and for other pro-evolution but anti-Darwinian tracts. He seems to have been a firm believer in the existence of Satan!

B. ROBERT FERRIS DAMON (1845-1929)

was the son of one of the best known natural history, geology and mineral dealers of his day called Robert Damon (1814-1889) who operated his business from Weymouth. On his death, his son continued the extensive

business for some years but in 1909 to 1910 and 1929 all the remaining stock of natural history and geology specimens was disposed at auction in London. The Bolton Museum acquired large lots of rocks, minerals and fossils at a sale in 1909 probably on October 29 at Foster's Sale Rooms, London (Acc. no. 108.09) when Chalmers-Hurst 1976 lists a Damon sale of this nature.

C. MATTHEW DAWES (1804-1860)

Dawes was born in Bolton on 16 September, 1804, son of Matthew Corr Dawes (see Sefton 1934). He was a solicitor there and a man of many interests. He was elected a fellow of the Society of Antiquaries rather late in life 17 March 1853 and was also a member of the Historic Society of Lancashire and Cheshire to whom he presented his only recorded publication (archaeological) which appeared in 1852 (Sparke 1913 p.55).

His name earlier appears as a subscriber to vol. 2 only of John Phillips "Illustrations of the Geology of Yorkshire" published in 1836, when he was living at Acresfield, Bolton. At about the same time his collecting in the Bolton area had come to the attention of John Lindley and William Hutton who figured several and mentioned other fossil plants in vol. III pub. 1837 of their "Fossil Flora". (e.g. plates 217, 221, 222, 224, 228).

In 1841 he was a council member of the Manchester Geological Society (Trans. Manc. Geol. Soc. vol 1). He was still a member in the year of his death in 1860. He was earlier elected FGS in February 1839 and his death was noted in QJGS vol 17 Proc. p.ix. 1861. He also appears as a member of the Palaeontographical Society in their first printed list of members 1848 and was then the Society's Local Secretary for the Bolton area, living at Westbrook, Bolton.

By 1851 Dawes had already presented a collection of Coal Measure fossils to the Manchester Geological Society and in that year it was transferred to the Manchester Nat. Hist. Soc. Museum which was in Peter Street, Manchester (Jackson 1945 p.20). These include many specimens subsequently figured which are now in the Manchester Museum collections (see Jackson 1952 pp. 4, 5, 10, 12, 13, 16, 18, 20, 23 etc.).

In 1860 Dawes died at Bolton on 16 September.

After his death his possessions including furniture, library and antiquities were sold by William Lomax Jnr. on 27-28 February 1861. A copy of the sale catalogue survives in the Bolton Reference Library. This contains geological books (inc. lot 524 his subscribed-for copy of Phillips' Yorkshire vol. 2. mentioned above) and some geological specimens (inc. lot 188 "Fossil bones and 2 Antlers and plaster cast of Dodo's Head").

His remaining geological collection was sold at the same time but whether as an undescribed lot in the catalogue or as a prearranged sale is not certain; probably the latter as the Bolton Museum archives have a 2 page report and inventory of the collection dated 15 February 1861 by Rev. Philip P. Carpenter, (1819-1877), a well known conchologist (see DNB) who then lived in Warrington "where he was a printer and publisher". This list recorded about 1,581 of which about two thirds were Coal Measures specimens and these were purchased by the Bolton Museum for £60. Carpenter noted that most of the Chalk and Tertiary fossils were named but only very few of the coal fossils, of which some were labelled with localities. As a general rule the specimens were neither named or localised.

Dawes certainly had some of his best specimens in his possession at his death but he had also given specimens to both the Manchester Geological Society and the London Geological Society before his death (see discussion on pp.332-4).

D. WILLIAM J. ELSE (dates unknown)

Else was curator of the Torquay Nat. Hist. Soc. Museum from 1897-1912 and was instrumental in distributing duplicate material from Kents Hole, Devon, to various museums. This was collected with grants from the British Association for the Advancement of Science by William PENGELLY (1812-1894) (see H. Pengelly 1897).

Else sold some of this material to Bolton Museum in February 1903. This is identifiable by the excavation numbers still on the specimens, as referred to by Tresise (1976).

E. JOHN STARKIE GARDNER (1844-1930)

Gardner was educated abroad but soon turned to palaeontology working both on the Eocene Flora which culminated in his joint authorship of the Palaeontographical Society monograph with Baron Ettingshausen 1879-1886 and on the Gault and associated deposits from the early 1870's.

In 1883 he founded the London metal works of J. Starkie Gardner Ltd. and turned quite soon after to the study of the history of decorative art (Iron and Silverwork etc) and published several standard works on this subject.

Sherborn (1940 p.55) and A.S. Woodward (1904 p.290) record the purchase of his Gault collection by the BM(NH) in five instalments over 1876 to 1886 and his Tertiary plant collections 1880-1886 and that most of his type specimens are there. However the Bolton Museum also purchased a large

collection of Gault, Greensand and Chalk fossils belonging to him in 1887 which was made for him by John Griffiths. Rooke Pennington in a letter to the Bolton Evening News of 7 February 1887 records that he had secured the option to buy these for Bolton from Mrs. Gardner and that the funds for this had been forthcoming from J.P. Thomasson. His letter also renews appeals for funds for Griffiths from the Bolton area.

One can only presume that Bolton had all that was left over of Gardner's Gault collection after the BM(NH) had selected the best material. In view of Sherborn's statement that most of Gardner's types are at the BM it may be worthwhile seeking any missing specimens at Bolton.

For biographical information about Gardner see Who Was Who 1929-1940 p page 493.

F. JOHN GRIFFITHS OF FOLKESTONE fl. 1855-died 1911

He was a professional collector who worked mainly on the Gault of Folkestone and whose name appears often in descriptions of the Gault and its fossils from this date. C.D. Sherborn (1940 p.61) lists some of those for whom he collected. In Nature vol 24 pp. 224-5 July 1881 there appears an appeal for a fund to be set up for him as he was then suffering ill health brought on by collecting in all weathers for 25 years.

For biographical information about him see his obituary notice in the Geological Magazine 1911 p.528.

One of the collections he made was for J.S. Gardner (see E).

G. Allen (or Alan) HOLDEN (c.1866-1912)

Holden was a Rochdale dentist who died in suspicious circumstances on January 31 1912 aged 46, see obituary in Rochdale Observer February 3 1912. He was a member of the Rochdale Literary and Scientific Institution, who made the collecting of minerals and fossils his hobby. His large collection of a general nature was donated to the Bolton Museum in 1912 by his widow. (Acc. no. 40.12).

H. JAMES LOMAX (1857-1934)

After working as a coal miner Lomax became interested in Coal Measure faunas and in 1906 founded the 'Lomax Palaeobotanical Laboratories' in Bolton to collect and prepare fossil plant material for teaching and research. Biographical notes about him and his work can be found in an obituary notice in the Bury Times 20 October 1934. Dr. M.D. Crane of Bristol City Museum is writing a full notice of his life and work for future publication.

The first donation of geological material to Bolton Museum by Lomax is recorded on 11 November 1897. This marked the beginning of a long and fruitful association with the Museum until his death in 1934 and resulted in a series of accessions throughout this period. The most important of these are sectioned palaeobotanical material though many other types of geological thin sections are present. A series of 334 palaeobotanical sections donated in 1935 by a Mrs. Barnes (presumed to be a relative of Lomax) contains early sections made by him.

His son Joseph R. Lomax was active in the business his father had founded from circa 1920 until after this period, including the nationalising of the coal industry into which the Palaeobotanical Laboratories were absorbed.

I. PHILIP BROOKS MASON (1842-1903)

had a most distinguished career as a medical student at Glasgow and University College London. Later he settled in his birth place, Burton-on-Trent, where he gathered the remarkable collections in most branches of British Natural History which were housed in a special annexe to his house there.

The disposal of his collections is very complex and the following is a certainly inadequate attempt to summarise what is known. Mason was primarily an entomologist and before his death explored the possibility of selling some of his collections through the Janson Natural History agency in London. But his death in November 1903 intervened and his Lepidoptera and some of his magnificent library were sold at Stevens Auction Rooms in 1904 and 1905 (see Chalmers-Hunt 1976 and Allingham 1924 p.71, 140 and notices of sales in Nature March 1905 p.c/xvii and Athenaeum February 1905 p.226).

After the limited public auctions of material from the Mason collections, a vast amount of material remained (excluding that which was bequeathed by him to the British Museum (Natural History)).

Mason's widow at first tried to sell off this material to Jansons, the previously mentioned London dealers but later, apparently feeling dissatisfied with the prices she was offered, dealt directly with Bolton Museum's curator.

Collections came to Bolton in fits and starts as follows:-

- | | | |
|----|--|----------------|
| 1. | Herbarium (including recent Bryozoa and Leaf Miners) | |
| | Purchased from Mrs. Mason April 1907 | £100 |
| 2. | Crustacea | |
| | Purchased from Mrs. Mason October 1908 | £15 |
| 3. | Diptera Neuroptera, Fossil Bryozoa | |
| | Purchased from Mrs. Mason April 1909 | No price given |

- | | | |
|----|--|----------------|
| 4. | Echinoderms
Purchased from Mrs. Mason May 1909 | No price given |
| 5. | Minor orders, insects
Purchased from Mrs. Mason January 1911 | " " " |
| 6. | Coleoptera and Hymenoptera
Purchased from Mrs. Mason July 1911 | £95 |
| 7. | "Many thousands of British microlepidoptera duplicates
from collection of the late Dr. Mason of Burton-on-Trent"
Purchased at Stevens sale June 30 1914 (Lot 133A) | ? |

The British marine mollusca were purchased by L. StG. Byne in 1914 and from him by R. Winckworth in 1924 (Winckworth 1940). Winckworth passed the non-marine specimens on to A.S. Kennard in the same year. The marine material went with Winckworth's own collections to Liverpool Museum (Sherborn 1940 p.93), but much was destroyed in World War II.

Mrs. Mason too died before the sale of all the Mason collections had been completed. The cases of British birds still stood intact along with some echinoderms and a portion of the herbarium. These were offered by the Executors to Burton-on-Trent Museum for purchase at a very moderate figure (teste Dr. B. Fox in litt). These collections are still at Burton but have been incorporated into other collections by the area museums service.

The geological material passed to Bolton included the collection Acc. no. 25.09 purchased in 1909. This was a collection of Fossil Bryozoa and a complete MSS catalogue of it made after 1909 has been discovered headed "These were acquired by Dr. Mason from the collection of Mr. G.R. Vine of Attercliffe, Sheffield". In some letters also preserved at Bolton is a statement from P.B. Mason to Janson (the dealer in whose hands the collections were first put for sale) dated February 1901. This states "The four microscopic cabinets contain the type collection of Bryozoa etc. formed by G.R. Vine of Sheffield referred to in his papers in the Reports of the British Association for the Advancement of Science. Afterwards he sold to the British Museum a second collection but one greatly inferior to this."

Sherborn (1940 p.137) records Vine's collection of Polyzoa and Ostracoda as at the BM(NH) and Woodward 1904 p.334 adds that it was purchased from him in the year of his death 1893 and amounted to 1695 mounted and labelled specimens.

It seems likely from the above that some of Vine's best and figured material may be present at Bolton. In any case Vine's collection is not all at the BM, there is a collection also in his home city Sheffield (Spalding 1970 p.222) and also much material studied by him at Northampton (see GCG 2 p.51).

J. ROOKE PENNINGTON (1844-1887)

was born at Leeds on October 2 1844 and in 1864 graduated at London University. He worked as a solicitor first in Manchester moving to Bolton in 1870 where he died in 1887. Biographical information and an incomplete list of his periodical publications can be found in Sparke (1913 p.111-112) and a very long informative obituary notice in the Bolton Chronicle 9 July 1887 p.8. See also the Roy. Soc. Cat. for a list of his publications.

He was a member of the Manchester Geological Society elected 1877 and of the London Geological Society elected in 1875, see his obituary notice in QJGS vol. 44 Proc. p.48 1888.

His first geological publications date from 1875 and in Nature vol 13 February 1876 pp.335-6 appears a notice about the imminent opening of a new very interesting private museum at Castleton, Derbyshire. This stated "Mr. Pennington's collections are all included in the museum" which was under the care of John Tym (1829-1901) who also contributed to the collections, which were briefly listed.

However some of Pennington's geological collections had already previously gone to other homes. Sheffield City Museum acquired in 1876 a collection from Derbyshire bone caves of Pleistocene age (Spalding 1970 p.222) and this was the subject of Pennington's major work published in London 1877. "Notes on the barrows and bone caves of Derbyshire."

After the setting up of the Castleton Museum additions were made to the collection and Pennington's interesting article "Upon the arrangement of a Geological Museum" in Trans. Manch. Geol. Soc. 1880 15 247-261 refers to 'my collection at Castleton' and describes how it must then have been arranged.

However in May 1883 a notice appeared in Nature vol 28 p.xviii offering for sale "The contents of the Castleton Museum" covering Antiquities, Archaeology and Natural History as well as Geology. Of the Geology collections the Pleistocene, Crag, Oolite, Lias and Carboniferous collections were described as being particularly good with many very fine Minerals as well. Presumably the financial burden of building up and maintaining the collection had proved too great. The same year Rooke Pennington offered by auction through Hayhurst and Taylor of Bolton on December 20-21 1883 285 lots of

China, Books, Engravings, Curios (including Mineralogical specimens), and Shells which take up 36 pages in the printed sale catalogue preserved at Bolton Reference Library. This suggests that his own collections were already being dispersed as well at this time.

In January 1885 John Tym who had acted as curator of the Castleton Museum from its opening was appointed curator of Stockport Museum where he had worked part time from 1874. He was born in Castleton in 1829 and before becoming associated with Rooke Pennington had been lessee of the Speedwell Cavern there. When the Castleton Museum was opened one entered through Tym's Spa and Marble Shop from which he acted as a dealer in fossils, minerals and rocks (see Pennington 1875 p.20).

Tym remained at Stockport from 1885 until his death in August 1901 aged 72 (Fancy 1971) in Stockport. Obituary notices of him can be found in the Stockport County Borough Express August 29 1901 and the Stockport Advertiser August 30 1901.

Pennington died at Bolton on 5 July 1887 and the only remaining auction sale traced after his death was that of his Library, 137 lots offered by Lomax Sons and Mills October 10 1887. The printed sale catalogue (7p) survives in the Bolton Reference Library.

The contents of the Castleton Museum however still remained unsold from 1883. After his death but before February 1888 an anonymous pamphlet (Anon ? 1887) was prepared offering the contents of the Museum for sale by private treaty in one lot. "The collection contains upwards of 3,500 fossils, 500 minerals and 600 Archaeological curiosities." The pamphlet lists the contents over 8 pages of which 5 cover geology. It's main strength was and is in the Pleistocene Cave fossils collected from Windy Knoll Quarry near Castleton, Cresswell Crags, and other Derbyshire and Staffordshire caves, many of these excavations being carried out with W. Boyd Dawkins (1838-1929), then curator of the Manchester Museum.

Most of the material is described only in general terms in this catalogue but some more specific entries are found e.g. "Large Plesiosaurus from the oolite of Denton, Lincolnshire - this is a very valuable specimen" or "Ichthyosaurus from Lyme Regis".

This catalogue which was found in a junk shop by an ex member of staff of the museum may well be unique but will prove invaluable in identifying material from the Castleton Museum now in the Bolton Museum. In March 1888 the Bolton Museum responded to the offer of this collection and their stock records note the payment in this month of "£200 for the purchase of the

contents of the Castleton Museum (fossils and minerals etc.) from the trustees of the late Rooke Pennington F.G.S." (Accession no. 88.15).

The purchase was also noted in the April 5 1888 issue of the Bolton Evening News; although in further issues in October 1889 letters appeared stating and refuted that the purchase was politically motivated; a remarkable claim.

3. PALAEOLOGICAL TYPE MATERIAL SO FAR RECOGNISED IN BOLTON MUSEUM

ANIMALIA

Arthropoda

Class ARACHNIDA

Maiocercus orbicularis Gill 1911 HOLOTYPE
 Gill, E.L. (1911) A Carboniferous Arachnid
 from Lancashire
 Geological Magazine, Decade V, Vol.VIII; 395-398

Middle Coal Measures

Westhoughton, Nr. Bolton

? Date and collector

This comprises two parts, the fossil and its counterpart but there is no indication of its history in the museum collections.

PLANTAE

Lindley and Hutton figure in vol 3 1837 six species of material of which five were new supplied by Matthew Dawes of Acrefield, Bolton-le-Moor, Lancs.

These are (1)

pl 217 Holotype of Cyclopteris oblata sp nov from Little Lever, Bolton, Lancs. Blake (1902 p.3) records this type as being in the Geological Society Museum collection R5209, British specimens of which were transferred to the I.G.S. Geological Survey Museum in 1911. However the Bolton Museum has a specimen, which was acquired at the sale of Matthew Dawes collection in 1861, which closely resembles the original figure in Lindley & Hutton 1837. The answer is kindly supplied by Roger Clark of the I.G.S. who confirms (in lit 11.2.75) that the ex Geol. Soc. specimen is a counterpart specimen whereas the Bolton Museum is the original positive of the same specimen. The Holotype could thus be reassembled after over a hundred years separation!

The Bolton specimen is closer to the figure than the I.G.S. counterpart and seems likely to have been the source of the figure which is therefore not reversed.

(2) pl 221 Holotype of Trigonocarpum Dawesii sp. nov from Peel Stone Quarry, Bolton.

Manchester Museum L.10070 is recorded as probably the holotype figured on fig.2; fig.1 the external cast of the same specimen is not preserved. Manchester have other specimens which are listed by Jackson (1952 p.23) as ? syntype material but they can technically only be topotype material from the Dawes collection.

(3) pl 224 Sternbergia approximata Brongniart FIGURED from Halliwell Stone Quarry, Bolton.

no type status.

Blake (1902 p.3) records this specimen as in the Geological Society of London collection reg. no. R5249 and R5249A. Being British these will have been transferred to the I.G.S. Geological Survey Museum.

(4) pl 228 fig.1. Halongia regularis Sp. nov. (syntype) from Halliwell Stone Quarry, Bolton.

Bolton Museum have a specimen which could be this figure if (a) the drawing is not reversed (b) one end has been broken off (c) the drawing is not quite accurate in relation to the knobs on the specimen. This specimen has certainly been previously labelled as one of the types, by someone at Bolton Museum.

pl 228 fig.2. Halongia regularis sp. nov. (syntype) from Peel Stone Quarry. Blake (1902 p.3) records this specimen as also in the Geol. Soc. collection R5250, now at I.G.S. but Roger Clark says of this "it bears little resemblance to the plate and so cannot be source for the plate". (in lit.) Bolton Museum has a specimen labelled as this specimen but the label dates from only 1884. This one is, like the figure, in two halves, but the break is different and could not be reversed or inverted to match the figure. Manchester Museum also have material of this species ex Dawes collection (Jackson 1952 p.10), but not apparently this specimen. The whereabouts of the actual figured specimen are thus unknown.

(5) pl 222 figs. 1 & 3. Syntypes (2) of I. olivaeforme sp. nov from Peel Stone Quarry, Bolton.

Manchester Museum L.10071 is the syntype figured as fig.1. (Jackson 1952 p.24). Bolton has a specimen labelled as that figured in fig.3 but it is of a seed trapped in matrix with several other casts of other seeds in the same block. It can be the syntype only if the original drawing is idealised.

(6) pl 222 figs. 2 & 4. Syntypes (2) of I. noggerathi sp. nov. from Peel Stone Quarry, Bolton.

Manchester Museum L.12128 (Jackson 1952 p.23) is recorded as this (these?) with some doubt.

There might well be more types present in the collection but they have not been located. Perhaps some specialists may know of specimens which are supposed to be in Bolton Museum (nee Chadwick Museum, Bolton) in which case the curator at Bolton Museum would be pleased to hear from them.

Acknowledgements

We thank Roger Clark of I.G.S. for help with Dawes material at that institution, also Mrs. B. Lees of Stockport Museum for much information about John Tym.

E.G. Hancock
A. Howell
H.S. Torrens

BIBLIOGRAPHY

- Allingham, E.G. 1924. A Romance of the Rostrum. Witherby, London.
[Anon. ?1887]. In the matter of Rooke Pennington F.G.S. Catalogue of the Castleton Museum. Bolton: Tillotson & Son. 12p.
- Blake, J.F. 1902. List of the Types and figured specimens ... in the Collection of the Geological Society of London. Taylor & Francis, London.
- Chalmers-Hunt, J.M. 1976. Natural History Auctions 1700-1972. Sotheby Parke Bernet, London. 189pp.
- Ellis, H.W. 1942. John Sang's original drawings of British Coleoptera and Lepidoptera with a note on Dr. P.B. Mason's Collections. Proc. Royal Ent. Soc. (A), 17(4-6), 62-3.
- Fancy, H. 1971. A history of Stockport Museum. Stockport Mus. Inf. Leaflet 4, 22p.
- Hancock, E.G. 1976. A list of Zoological Collections of Note in Bolton Museum. Biological Curators' Group Newsletter, No. 3, 2-11.
- Howarth, E. & Platnauer, H.M. 1911. Directory of Museums in Great Britain and Ireland. 1-312. Museums Association.
- Hull, E. 1862. Memoirs of the Geological Survey The Country around Bolton-le-Moors, Lancashire, HMSO, 46pp.

- Jackson, J.F. 1945. Biography of Capt. Thomas Brown.
Mem. Manch. Lit. Phil. Soc. 86 1-28.
- Jackson, J.W. 1952. Catalogue of Types and Figures Specimens in the
Geological Department of the Manchester Museum. Manchester Mus.
Pub. 6 179p.
- Lindley, J. and Hutton, W. 1831-1837. The Fossil Flora of Great Britain.
3 vols. London: James Ridgeway & Sons.
- Midgley, W.W. 1896. Annual Report of the Museums & Meteorological Observatory
for 1895, and annually up to 1907 for the year 1906. Bolton.
- Pengelly, H. 1897. A memoir of William Pengelly. London: John Murray.
- Pennington, R. 1875. The Pebbles in a Bolton Brick-Field. Bolton: 20p.
- Saxelby, C.H. (Ed) 1953. Bolton Survey; Bolton Survey Committee, 140pp.
- Scholes, J.C. 1892. History of Bolton, with memorials of the Old Parish
Church, Bolton, 555pp.
- Sefton, T.W. 1934. Note on Dawes Street, Bolton. in "A local habitation
and a name" no. 46. Bolton Evening News. June 1927.
- Sherborn, C.D. 1940. Where is the - Collection. Cambridge University Press.
- Spalding, D.A.E. 1970. Geology in East Midlands Museums.
Mercian Geol. 3, 209-222.
- Sparke, A. 1913. Bibliographica Boltoniensis. Manchester University Press.
- Tresise, G.R. 1976. Geological collections and Collectors of note
10. Merseyside Co. Museums. GCG Newsletter 6, pp.253-270.
- Winckworth, R. 1940. The Mason collection of British Shells.
Journ. Conch. 21, 186-9.
- Woodward, A.S. 1904. Geology: in History of the collections contained
in the Natural History Departments of the British Museum. Vol. 1.
Brit. Mus. (Nat. Hist.).

GEOLOGICAL COLLECTIONS AND COLLECTORS OF NOTE12. GLASGOW ART GALLERY AND MUSEUMINTRODUCTION

Glasgow Museum was founded in 1870 in Kelvingrove House, which was situated in what is now Kelvingrove Park. Since then the museum has commonly been referred to as Kelvingrove Museum. Originally the museum was known unofficially as the City Industrial Museum and was devoted mainly to showing the products and processes of Glasgow's booming manufacturing industries. The natural history department had little display space, though large collections of botanical and zoological material were being accumulated. The geology section of the department was not of any consequence until near the end of the century when several large collections were donated.

The present building, which is known as Glasgow Art Gallery and Museum and is also in Kelvingrove Park, was opened for the International Exhibition of 1901. This date marked a sudden expansion in the geological collections which continued until the First World War. This expansion was partly due to the energies of Peter McNair, a geologist who was appointed Curator of Natural History in 1902, and partly to the beneficial, if not happy, coincidence of the death of a number of the most prominent members of the Geological Society of Glasgow around the turn of the century. The collections which these geologists had been accumulating throughout the second half of the nineteenth century were donated or bequeathed to the City, usually as a matter of civic pride in the fine new museum. It is very likely that had the new geology gallery not been in existence these collections would not have come to Glasgow. The specimens donated in this period still form the major part of our collections.

COLLECTIONS

All the geological specimens apart from the rocks have recently been housed in modern unit storage cabinets, making the collections accessible and easily catalogued for the first time in recent years.

The fossil collections include type specimens of about one hundred species and about 350 figured or cited specimens. The total number of fossils is probably in the region of 100,000 but the predominance of groups of small fossils makes any estimate of numbers difficult. The most important collections are the Carboniferous invertebrates from the West of Scotland.

Other important aspects are the Silurian fish and arthropods from Lesmagagow, Scottish Old Red Sandstone fish and plants and Quaternary invertebrates. There is a representative collection of English Mesozoic and Tertiary material, but no outstanding collections.

The mineral collection contains about 10,000 specimens, the majority not Scottish. The Glen Collection (q.v.) provides most of the specimens. Many of the specimens are of high quality, but the collection has suffered to some extent from poor storage which has left many specimens without data.

There is an extensive collection of about 2,000 hand-specimens of rocks, mainly Scottish, but there are few thin sections.

REFERENCES

- McNair, P. 1907. On the history and development of the natural history collections in Glasgow Museum.
 Proc. R. Phil. Soc. Glasg. 38, 81-96.
- McNair & Mort, 1908. History of the Geological Society of Glasgow, Glasgow. Annual Reports of the Corporation of the City of Glasgow on Museums and Art Galleries. 1876-1917, 1942-1971.
- Type-written catalogues of type specimens, vertebrates and arthropods 1974-6. Copies of these may be available on application.

MAJOR COLLECTIONS

JOHN YOUNG (1823-1900) LL.D., F.G.S.

was Assistant Keeper of the Hunterian Museum from 1859-1899. He is not to be confused with Professor John Young, M.D. who was Keeper of the Hunterian at the same period, and who sometimes published papers jointly with his namesake. Young's collection of Carboniferous invertebrates is the most important geological collection in Glasgow Museum and formed the basis of the 'Catalogue of Western Scottish Fossils' published for the B.A. meeting in Glasgow in 1876 (Armstrong, Young & Robertson 1876).

Young was a friend and correspondent of most of the great palaeontologists of his day. He contributed to, and partly proof-read, Lyell's 'Antiquity of Man'. His specimens were used extensively by Davidson, Jones, Kirkby, Brady and Woodward in their descriptive monographs, and these authors often used the specific name youngi as a token of gratitude. Young's specimens are notable for the meticulous labels giving details of horizon, locality and often date of collection. This information is supplemented by

numerous papers by Young in the Trans. Geol. Soc. Glasg. and the Proc. Nat. Hist. Soc. Glasg. giving details of localities.

Although Young published a large number of papers on a great variety of aspects of local structure, stratigraphy and palaeontology, his claim to fame as a scientist rather than a collector is less well known but perhaps deserves equal credit.

His main fields of work were bryozoa (with Professor Young), ostracods and shell structure. In 1877 he described a 'transfer' method for studying bryozoan fronds. Apart from being a very early example of this technique, Graham (1975) has stated that Young's process has still not been superseded. Other recent workers on bryozoa have paid tribute to the excellence of the Young's pioneer work (Owen 1966 p.135).

With ostracods Young left the description of new species to his close friends Jones and Kirkby (Jones wrote Young's obituary in the Geol. Mag.); while he himself published papers on distribution (e.g. Young 1893). It was not just ostracods, but all 'microzoa' which seemed to fascinate Young. He published a paper on collecting techniques (Young 1866) for what at that time were neglected groups of fossils. His collection of beautifully mounted specimens of ostracods, foraminifera, sponge spicules and minute gastropods are a memorial to years of patient work in this field.

Another outstanding aspect of Young's work was the preparation of thin sections of all kinds of fossil shell. His collection of about 500 sections of brachiopods, molluscs, ostracods, echinoderms, corals etc. is a further illustration of the painstaking nature of his technical work. The details of brachiopod shell structure which he described (Young 1886) were of an importance which was appreciated only at a much later date.

Young's collection was donated by J.T. Tullis in 1901. Some specimens collected by Young, but not part of his personal collection, are in the Hunterian Museum.

Obit. Geol. Mag. (4) 7, 382-384, 1900.

Biog. McNair & Mort, 1908. pp.183-188.

REFERENCES

Armstrong, J., Young, J., Robertson, D. 1876.

Catalogue of Western Scottish fossils. Glasgow.

Graham, D.K. 1975. A review of Scottish Carboniferous acanthocladid bryozoa. Bull. Geol. Surv. Gt. Br. 49, 1-21.

Owen, D.E. 1966. New Carboniferous polyzoa from Derbyshire. J. Geol. 5(1), 135-148.

Young, J. 1866. Notes of the method adopted in collecting Entomostraca and Foraminifera from the Carboniferous strata of the West of Scotland. Trans. Geol. Soc. Glasg. 2(2), 155-157.

- Young, J., 1877. Notes on a new method of fixing fronds of Carboniferous polyzoa on a layer of asphalt to show the celluliferous face. Proc. Nat. Hist. Soc. Glasg. 3(2), 207-210.
- _____, 1886. Notes on the Carboniferous brachiopods of Scotland. Trans. Geol. Soc. Glasg. 8(1), 143-160.
- _____, 1893. Notes on the group of Carboniferous ostracods found in the strata of the West of Scotland. Trans. Geol. Soc. Glasg. 9(2), 301-312.

ANDERSONIAN UNIVERSITY OR COLLEGE (founded 1796)

Also known as the Technical College collection. This collection contains some important early type specimens. These fossils had been collected by Dr. John Scouler (1804-1871) in the 1830's and include 'Scouler's Auld Heid' - the lectotype of a bizarre Carboniferous eurypterid which has a prosoma resembling a human face.

The collection also includes an important piece of personalia relating to David Ure (d. 1798), the 'Father of Scottish Palaeontology'. This is a plaque of microfossils mounted by Ure and presented by him to Professor John Anderson (1726-1796), the founder of the University.

Donated by the Trustees of the College in 1902.

- Ref. Muir, James 1956. John Anderson and the College he founded. Glasgow. Biog. of Ure: McNair & Mort 1908 pp.7-9.
- Obit. of Scouler: Trans. Geol. Soc. Glasg. 4(2), 194-205. 1873.

CAMP SILURIA (1899-c.1906)

This camp was set up in 1899 by David Nimmo and other members of the Geological Society of Glasgow in order to collect from the recently (1896) discovered Silurian fish beds at Lesmahagow. The camp was the successor to Dr. Hunter's tent 'Siluria' which the famous collector had set up in the summer months of the 1880's. These camps were necessary because of the amount of rock-shifting equipment involved in any collecting from these beds. An account of life in the camp was given by McNair (1905), who was Curator of Glasgow Museum at the time. As well as collecting fish and arthropods, the camp members discovered the famous and enigmatic Ainiktozoon material (Scourfield 1937 p.533) which is now in the Hunterian Museum.

A small but important collection of fish and arthropods collected by the camp members was donated by David Nimmo in 1903 and 1904.

References

- McNair P., 1905. Camp Siluria. Trans. Geol. Soc. Glasg. 12, 203-213.
- Scourfield, D.J., 1937. An anomalous fossil organism, possibly a new type of Chordate from the U. Silurian of Lesmahagow, Lanarkshire. Ainiktozoon loganense. Proc. R. Soc. Lond. B. 121, 533-547.

ROBERT CRAIG (c.1820-1901)

Craig was a quarrymaster from Beith in Ayrshire. He collected exclusively from the Carboniferous rocks around Beith and Dalry, building up a valuable collection of invertebrates. His specimens have very detailed information horizons and localities and are supplemented by a series of papers in the Trans. Geol. Soc. Glasg. 2-9 which describe the stratigraphy and palaeontology of north Ayrshire. In these papers Craig evolved his own system of stratigraphical nomenclature which he uses on his specimens labels. His position as a quarrymaster gave him a unique opportunity to study the geology of the numerous quarries which were working in the area at the time. His own quarry was a favourite venue for excursions by the Geological Society of Glasgow due to the piles of spare fossils that Craig left lying around for visitors.

On his death his collection passed to James Neilson, who presented 'the duplicates' to Glasgow Museum in 1908. Neilson sold the rest of the collection to the Royal Scottish Museum in 1909, where it is referred to as the Neilson Collection.

Biog.: McNair & Mort 1908, pp.208-210.

JAMES DAIRON (d.1891)

is an example to all good geologists. Having been told that he was incurably ill with three months to live, he made his will, took up his hammer and set out to pass his remaining days collecting graptolites. This pastime proved so beneficial that he managed to survive for another thirty years.

During this time he built up a large collection of Ordovician/Silurian graptolites from the Southern Uplands. He was a friend of Lapworth, but unfortunately his specimens are of little significance as they very rarely have details of horizon. Dairon wrote several papers on graptolites for the Trans. Geol. Soc. Glasg. but these seem to have been disregarded by subsequent workers. Donated in 1901.

Biog.: McNair & Mort 1908, pp.120-122.

PROFESSOR JOHN FLEMING (1785-1857)

was one of the pioneers of Scottish geology. He published his first paper, on Shetland minerals, in 1807. Although mineralogy was his 'first and last love' and he was a life-long friend of Thomas Thomson the mineralogist, Fleming is now remembered as a palaeontologist and zoologist. His reputation is based on his main work 'History of British Animals' published in 1828.

This work attempted to describe all British recent and fossil species and was the first major binomial work on Scottish fossils.

Fleming was the first Professor of Natural History at the Free Church College, Edinburgh. His collection of about 1,000 Scottish minerals was donated in 1902 by Major J.A. Fleming. The collection also includes his herbarium (with specimens collected around 1800 by G. Don), and an important letter from Hugh Miller (Absalom 1933). His fossil collection was presented to the Royal Scottish Museum in 1870.

Biog.: Trans. R. Soc. Edinb. 22, 655-680

Proc. R. Soc. Edinb. 4, 14-17.

Ref. Absalom, R.G., 1933. Two unpublished letters of Hugh Miller. North-Western Naturalist, Mar. 1933, pp.20-27.

DAVID CORSE GLEN (1824-1892)

was a successful Glasgow businessman who used his fortune to build up a very fine collection of 8,000 minerals from all over the world. The basis of his collection was an eighteenth century collection of about 2,500 specimens which apparently belonged to a Mr. Atkinson. A sale catalogue of this collection was published in 1805 and mentions that specimens in the collection had come from the Butean Collection, the Museum Geversianum, Professor Gaubius in Holland and a Mr. Voigt. This collection seems to have been purchased entire by a Mr. Fraser of the famous Lovat family of Abertarf. Glen acquired the collection from the Frasers around 1886 and it was purchased by the Museum in 1896.

Biog.: McNair & Mort, 1908. pp.239-240.

Ref. Glen, D.C., & Young, J. 1876. List of minerals and rock specimens in Armstrong, Young & Robertson, 1876, pp. 156-164.

DR. J.R.S. HUNTER-SELKIRK (1835-1898)

called his collection the Braidwood Collection in recognition of the gifts of Dr. Selkirk, his partner in the Braidwood Coal, Lime and Coke Co. He changed his name from Hunter to Hunter-Selkirk late in his life, around 1896. He was inspired at an early age by reading of the collections of John Hunter, the anatomist and founder of the Hunterian Museum. He seems to have been a lively character. In 1868 he visited the 'Wild West' where he was involved in a gun-fight with an American General in Kansas. He is also said to have been the originator of commercial strawberry growing in Clydesdale.

Hunter collected from the Carboniferous of Lanarkshire at a time when the ironstone mines were providing amphibian and reptilian remains of great importance, but he is perhaps best known for his collecting at Lesmahagow

(Hunter 1885). His major discovery was the finding of the first specimen of a Silurian scorpion in 1883 (Hunter 1886 p.170).

His vast collection was presented to the Kilmarnock, Airdrie and Lanark Museums. Our part of the collection was donated in 1925 by the Trustees of Airdrie Museum and consists mainly of Carboniferous corals and Silurian arthropods.

Biog.: McNair & Mort, 1908. pp. 228-234.

Ann. Kilmarnock Glenfield Ramblers, 5, 11-15, 1904-7.

References

Hunter, J.R.S., 1885. Three months tent life amongst the Silurian hills of Logan Water, Lesmahagow. Trans. Geol. Soc. Glasg. 7(2), pp.272-278.

_____, 1886. Notes on the discovery of a fossil scorpion (Palaeophonus caledonicus) in the Silurian strata of Logan Water. Trans. Geol. Soc. Glasg. 8(1), pp. 169-170.

DAVID ROBERTSON (1806-1896) F.L.S., F.G.S., LL.D.

is well known for his biological work on the marine fauna of the Firth of Clyde (Stebbing 1891), but he also made extensive collections of 'Post-Tertiary' material from the Flandrian/Devensian sediments around the shores of the Firth. He published lists of species from numerous localities in a series of papers in the Trans. Geol. Soc. Glasg. 2-8.

His collections of recent and Quaternary plants and invertebrates number several thousand. Part of the collection is in the Marine Biological Station at Millport and the rest was donated to the Museum in 1902 by Mrs. Robertson.

Biog. Brady, G.S., Crosskey, H.W. & Robertson, D. 1874. The Post-Tertiary Entomostraca. Palaeontogr. Soc. (Mono.).

Obit. Geol. Mag. (5)4, pp.94-96. 1897.

Science 4, 874. 1896.

Q.J.G.S., 53, lxiv. 1897.

Trans. Nat. Hist. Soc. Glasg. (2)5, 18-42. 1900.

ROBERT SLIMON (1803-1882) M.D.

is credited with the discovery of the famous arthropod fauna from the Silurian inlier near Lesmahagow in Lanarkshire. Slimon had been collecting the fossils since 1851 and was persuaded, apparently with some difficulty, to exhibit them at the B.A. meeting in Glasgow in 1855. The specimens caused a mild sensation amongst such famous geologists as Murchison, Ramsay and Page (Murchison 1856).

As a result of this meeting Slimon's more important specimens went to the British Museum and the Museum of Practical Geology and were figured by Salter (1856). Other specimens were given to David Page and to the Royal Scottish Museum. I have also seen unmarked specimens in the Hunterian Museum, Glasgow and the Sedgwick Museum, Cambridge. Slimon's specimens can be recognised as they are mounted on wooden or glass plaques covered with bright yellow paper, with a double border drawn in black ink.

Apart from the specimens mentioned above, the bulk of the collection was donated to Glasgow Museum by Slimon's family in 1909. This consists of about 750 eurypterids and phyllocarids and is probably the largest collection from Logan Water. Anyone who has collected from Lesmahagow will appreciate the vast amount of rock which Slimon and his family must have quarried in order to accumulate such a collection. Slimon did not keep detailed records of his localities, his specimens merely being labelled Logan Water, Lesmahagow. Fortunately, it is known that this usually refers to the section between Dunside (NS 751371) and Shank Castle (NS 746362), where the beds exposed belong to the Kip Burn Formation of the Priesthill Group. The only record of Slimon's that we have is the account reported by Woodward (1869 p.50).

The collection also contains numerous Carboniferous specimens most of which have no data.

References

- Murchison, R., 1856. On the discovery, by Mr. R. Slimon, of fossils in the uppermost Silurian rocks, near Lesmahago. Q. Jl. Geol. Soc. Lond. 12, 15-19.
- Salter, J., 1856. On some new crustacea from the uppermost Silurian rocks. Q. Jl. Geol. Soc. London. 12, 26-34.
- Woodward, H., 1869. Fossil Merestomata. Palaeontogr. Soc. (Mono.) (2). Biog.: Trans. Geol. Soc. Glasg. 7(2), 238-243. 1885.
- McNair & Mort, 1908 pp.224-228.
- Kilmarnock Glenfield Ramblers Annals. 5, 9-11. 1904-7.
- Geol. Mag. 1910., pp. 143-4.

JAMES THOMSON (1823-1900) F.G.S.

is best known for his work on Carboniferous corals. He was the first coral researcher to base his species on internal characteristics rather than external shape. To this end he sectioned thousands of rugose corals and illustrated them by a process which he had invented himself. These illustrations are so good that Hill was able to identify most of the specimens even when all data had been lost. Although a pioneer in coral studies, it must be said that he took his ideas on the 'plasticity' of species to extremes, and many of his species were dropped by Hill (1938-40) in her revision of his material.

Most of his specimens, including his Carboniferous amphibians, went to Kilmarnock Museum where they were badly damaged by fire in 1909 (Dunlop 1910). Some of this material seems to have come to Glasgow after the fire, but the rest of our part of the collection was donated in 1903 by Thomson's trustees.

Obit.: Nature 62, 83. 1900.

Science 11, 958. 1900.

Geol. Mag. (4) 7, 479-480. 1900.

Trans. Geol. Soc. Glasg. 12(1), 102. 1902.

Biog. McNair & Mort, 1908 pp. 188-191.

References

Dunlop, R., 1910. The fossil amphibia in the Kilmarnock Museum previous to the fire of 1909. Trans. Geol. Soc., Glasg. 14(1), pp.60-64.

Hill, D., 1938-40. The Carboniferous Rugose Corals of Scotland. Palaeontogr. Soc. (Mono.).

MINOR COLLECTIONS

DR. R.G. ABSALOM (1902-1975) M.Sc., F.M.A.

Collection of about 1,000 Carboniferous plants from the Scottish coal-fields. The specimens have very full details of horizon and locality. He was curator of Natural History from 1931-1946.

JOHN ALSTON

Collection of over 200 Red Crag fossils. Donated 1903.

DR. ROBERT BROOM (vertebrate palaeontologist)

Collection of about 30 skulls and teeth of Tertiary mammals from the U.S.A. Donated 1914.

JAMES COUTTS (1810-1886)

Collection of about 250 Quaternary fossils from Scotland. Donated 1914.

GEOLOGICAL SOCIETY OF GLASGOW (founded 1858)

Collection of 300 fossils of all ages. Although the Society was one of the foremost Victorian societies, the collection is not outstanding as most members kept their own collections. However it does contain specimens collected by James Armstrong and Dr. Bryce. Purchased 1899.

GEOLOGICAL SURVEY OF SCOTLAND

Several fine collections of Scottish rocks and fossils, including Cambro-Ordovician fossils from the North-West, Silurian fossils from the Pentlands, Lower Carboniferous fossils from the Esk Valley and rocks from Ballantrae. Donated 1902.

DR. S.M.K. HENDERSON

Collections of 400 rocks from Girvan and Aberfoyle, and 300 thin sections of Girvan rocks. Donated 1972.

WILLIAM MELVEN

Collection of about 500 Old Red Sandstone fish from North-East Scotland. There are also a fair number of Mesozoic fossils from the same area and some Silurian fossils from the Pentland Hills. Donated 1908.

DAVID NIMMO

Several collections, 1. 20 Permian fossils from Durham. 2. 80 English Eocene and Oligocene fossils. 3. 30 Carboniferous fossils from Airdrie. 4. Camp Siluria collection (q.v.). All donated 1900-1905.

A. POUILLON-WILLIARD

Small collections of French and German Mesozoic and Tertiary fossils. Purchased and donated 1900-1910.

ARTHUR PRATT

Collection of about 500 thin sections, mainly of Scottish dolerites. The sections were made from 1868 onwards. Donated 1903.

Reference

Pratt, A., 1879. Scottish trap rocks and their structure under the microscope. Trans. Geol. Soc. Glasg. 6(1), 58-62.

JAMES REID

Collection of about 40 well-preserved fish and plants from the Middle O.R.S. of Caithness. Includes one of only two known specimens of Hocklingia (Zosterophyllophitina). Donated 1899 and 1900.

DAVID SANDEMAN

Collection of 750 mainly Scottish rocks, fossils, and minerals. Donated 1902.

COLLECTIONS AND INFORMATION LOST AND FOUND

B. COLLECTIONS FOUND

13. David Christopher DAVIES

A case of multiple serendipity has allowed the fate of the Davies collection to be partly uncovered. On a recent visit to a mining historian friend David E. Bick, Pound House, Market Square, NEWENT, Glos; he told me, when Davies name was mentioned, that he had just purchased about 80 letters written by Davies and his eldest son G. Christopher Davies who was a lawyer in Norwich to William Whitwell, F.G.S. from circa 1865 to circa 1890.

In one of these from Christopher Davies dates January 24 1887 is the following paragraph.

"My father's fossils were not sold at the sale [this must refer to a house sale after D.C. Davies sudden death at sea while returning from Norway in 1885], and I really do not know what to do with them. I thought perhaps you might be able to find me a purchaser. I sent the Catalogue [to you] by parcels post. The fossils are bulky and weighty and are now stored at Maesbury [near Oswestry] with my brother-in-law R.A. Richards. He is however moving to another house in March and wants to get rid of them by then. I wrote to the British Museum about them but they required me to pay the expense of an expert going down to see them and I did not feel justified in incurring that expense. I shall be glad to hear what you advise."

Two days after my visit to David Bick, Dr. Tom Vaughan of the Department of Applied Geology, Strathclyde University, GLASGOW, also called on David out of the blue. It transpired Dr. Vaughan was similarly interested in mining history and was born near Oswestry. As a young man in the 1930's he had made many visits to the Oswestry Museum where there was a large collection of fossils etc. made by D.C. Davies. He last saw the Museum and this collection in 1954 while he was on leave from Chile. He understood that within the next five years a new librarian was appointed and the library moved to a new building in the town. The fossils were however thrown out as he has been told.

Once again it would appear that a historic collection has survived two world wars only to be thrown away in the last twenty years. This needs confirmation and we hope that if any new information comes to light it will be forwarded.

15. Charles CROFT

A.C. Armstrong, Assistant Keeper at the Art Gallery and Museum, Cliffe Castle, KEIGHLEY, Bradford BD20 6LH, kindly writes as follows:-

"The Bradford Metropolitan District Museums has a large collection of Charles Croft specimens, inherited from Cliffe Castle Museum, Keighley. Many specimens are from the Ordovician of North Wales. It seems highly likely that the 3 specimens you are seeking are probably amongst this collection. I have had an initial look at some of the more accessible parts of this collection, but have not found these particular specimens. Fortunately most of the collection is fairly clean, but all have at some time been relabelled by former curators, and firmly glued onto pieces of glass."

All correspondence relating to "Collections and Information Lost and Found" should be addressed to Dr. H.S. Torrens, Geology Department, Keele University, Keele, Staffs. ST5 5BG.

ANY COMMENTS ?

"Each specimen should contain with it a note on where found with grid reference, if possible, however, ignore the pundits who bleat about fossils being of no value without full data. This is just so much codswallop. Museums and university collections are full of fossils without source data - but they are still displayed and used."

From Fossilis No.2 Vol.2 Winter 1976. Journal of the Nottingham Geological Society in an article titled "Fossil Identification" by R.W. Morrell, Sam Abraham & Peter Micklewright.

TECHNICALA G.R.P. CAST AND MOUNT OF THE
TERTIARY MAMMAL ARSINOITHERIUMABSTRACT

Glass reinforced plastic (G.R.P.) tube was used to provide a rigid but lightweight internal mount for an exhibited G.R.P. cast. The methods used in providing curvature in the tube and attachment to the cast, etc., are described.

INTRODUCTION

The Palaeontology Laboratory of the British Museum (Natural History) produced polyester resin and glass-fibre casts of fossils as early as 1960⁽¹⁾. Shortly afterwards "resinated glass-fabric (R.G.F.) tube" became easily obtainable⁽²⁾ and it was thought (R.C.) that the combination of tube and G.R.P. casts would be ideal for the production of strong yet lightweight exhibits of large fossil tetrapod skeletons. Whereas in principle the actual fossil cannot be cut or drilled to hide its supporting-mount (usually mild-steel), the cast of course, can; also G.R.P. casts as lightweight alternatives to solid Plaster of Paris require proportionally lighter supports. Using R.G.F. tubes (approx. 60% lighter than equivalent steel-tubes and 30% lighter than aluminium) in conjunction with quick-setting epoxy adhesives and glass-fibre, both the time and effort involved in working steel is avoided.

Unfortunately, the opportunity to try out this technique did not arise until plans were made for a new fossil mammal gallery (opened 14 July 1972). The large (over 3 m. long) Tertiary mammal Arsinoitherium was required as an exhibit and coincidentally casts of the animal were requested by other institutions. Although a solid plaster cast cum reconstruction mounted on a heavy steel frame was available from the old gallery, (see Fig.1.) the several requests made it worthwhile producing new moulds and casts and eventually four sets in G.R.P. plus an extra skull (i.e. over 400 separate casts) were produced from "Vinamold"⁽³⁾ moulds.

One set, it should be noted, was the "master" which would be used for study as the gallery "bones" would be fused, not separate as on a steel "clip" mount. As the "Vinamold" was re-used, this "master" would also be required for future re-moulding.

METHOD

Construction proceeded initially as with a steel-mounted skeleton; the working baseboard was selected of dimensions suited to the fossil's and those of the proposed exhibition site. (See Fig.3.)

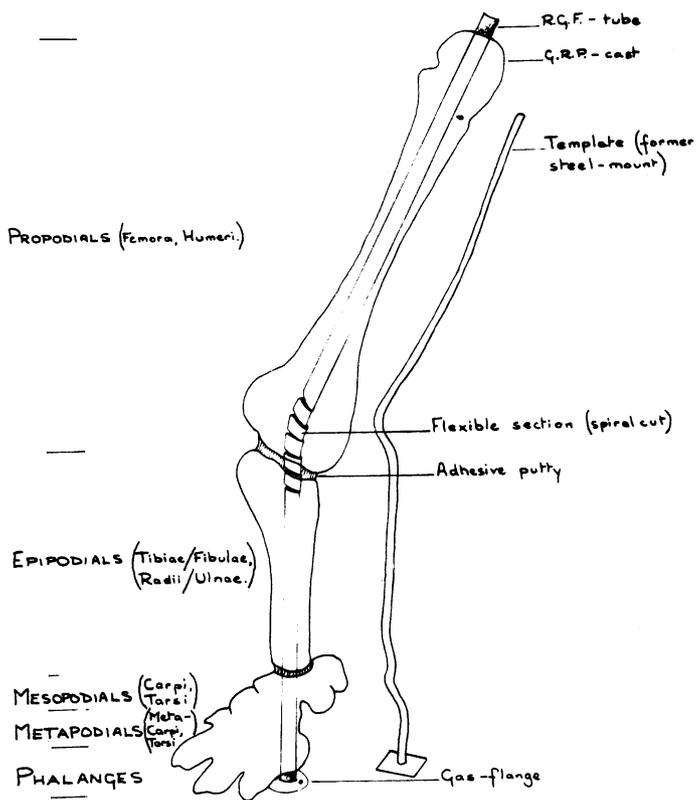
Placed in the workshop on trestles of suitable height, the baseboard was close to needed facilities and away from other personnel. This false floor could be drilled, cut and contaminated with resins etc., during erection of the mount, because, if necessary, a template would ensure easy transfer to an exhibition baseboard.

Starting from scratch the vertebral column would first be restored, temporarily mounted and affixed with ribs. Limbs would follow, mounted in a predetermined pose and adjusted (with the vertebral column) into the correct position. In this case however, the old Arsinoitherium mount was considered reasonably accurate and thus cardboard templates were made of the position of the "feet" relative to the centre line and the two steel uprights. This information was then transferred to the working baseboard.

Each "foot" (inc. meso- and meta-podials and phalanges) was cast in one piece which simplified mounting somewhat, as did the fused epipodials. Thus each limb consisted of three elements requiring mounting.

Pro- and epipodials were bored through at proximal and distal ends using a hole-saw of 31.75 mm diameter, in order to accept the R.G.F. tubing ("Nu-glas" 1" x 1 1/8" [25.4 mm x 28.5 mm]). Then the limbs were mounted temporarily in order to mark the points on the tubing where bends were required. Fortunately the old steel-mounts were available to speed the process.

Marked with a grease-pencil it was a simple job to spirally cut the R.G.F. tube in the selected areas by using a dental diamond cutting disc⁽⁴⁾ mounted in a workshop handpiece⁽⁵⁾ and driven by a flexible shafted electric motor.⁽⁶⁾ (See Fig.4.) The line of the cut did not require great accuracy in its drawing - the pencil was merely drawn slowly down the tube as the latter was rotated. More acute bends required a more closely spaced cut.



The casts removed once more from the steel supports were threaded on to the now part-flexible tube and a quick setting epoxy adhesive-putty (7) was applied to the surfaces of the podial joints, including the ankle. Good bonding was ensured by wiping over surfaces with an acetone-soaked rag before applying the putty.

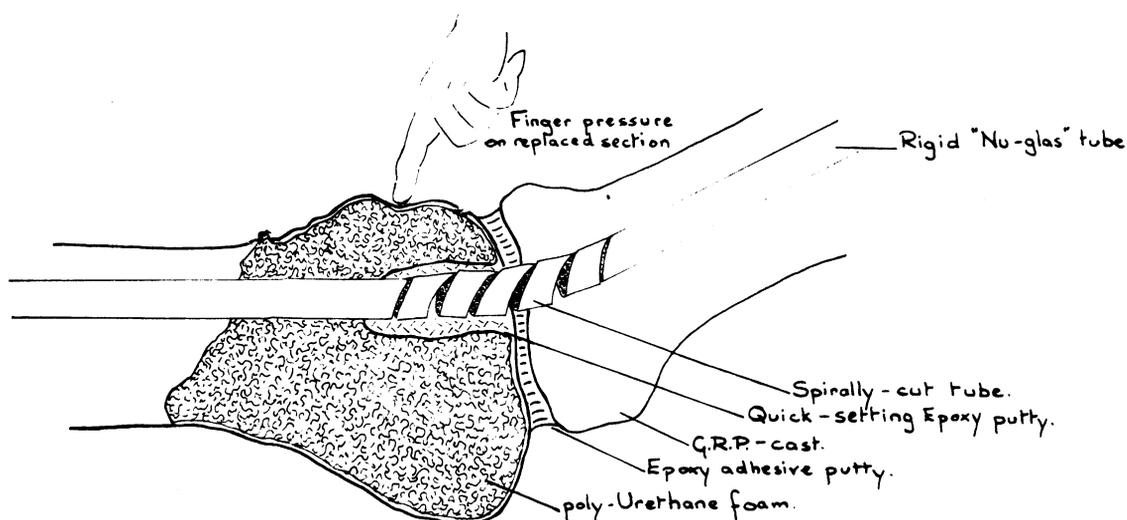
The limbs were quickly set up again on the "template" mounts and the putty (thickly applied to represent the absent cartilage) was given a neat finish by again applying an acetone swab.

After one-hour the now rigid limbs were removed from the templates. Although the casts were now a rigid unit, the internal tubes were not, as their spiral cuts project beyond the

thin-walled joints. To deal with this a dental cutting disc was again used, this time to cut out a 38 mm wide panel from the G.R.P. cast adjacent to the joints. (See Fig.5.) This exposed the tube to the cuts in which the epoxy putty (7) was applied by palette-knife (or disposable wooden tongue-depressor).

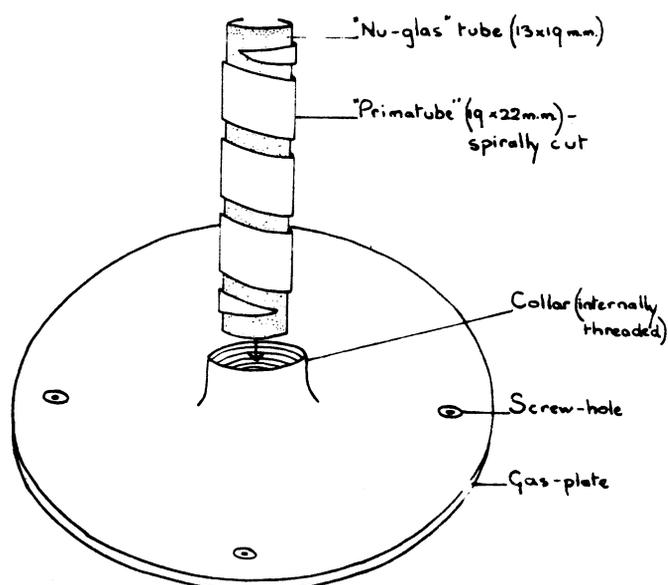
It was debated at this point whether to further anchor the tubing by filling the cast interior with poly-Urethane foam (8). There seemed little point in wasting money filling the whole of a strong, rigid G.R.P. cast, but a small amount of the foam at the ends of each would give both extra stability and ease the problem of replacing the cut-out sections. (See Fig.6.) These pieces were held in place by finger-pressure against the rising foam and when foaming had ceased after four minutes, all that remained was to scrape off the exuded surplus and where necessary fill remaining gaps with a little poly-Ester paste.

A warning here! Cutting the G.R.P. casts and tubing produces quantities of dust and should therefore be carried out where an efficient extract system is provided. At the very least a dust-filter mask (to British Standard 2091) should be worn where the operator only is exposed to the dust. The use of p-U-foam also requires efficient fume extraction. An M.D.I. component is safer than T.D.I. (9) but still requires great care in use.



It now remained for the four limbs to be attached to the baseboard at the templates points. For this "gas-plates" were utilised - flat circular plates of malleable-iron or mild-steel of 100 mm diameter with a $\frac{3}{4}$ " B.S.P.-tapped central Collar. (See Fig.7.)

The plates were drilled and screwed down to the baseboard and a short (50 mm) rod was added to the central collar of each. This could have been a threaded section of gas-pipe or galvanised water-pipe, but devotion to the G.R.P. theme dictated the use of available resinated components. These were, 13 mm x 19 mm "Nu-glas" as a core inside 19 mm x 22 mm spirally-cut "Primatube", these fitting neatly into the metal collar, cemented by a thick liquid epoxy adhesive⁽¹⁰⁾ poured into the collar first of all. Once set firmly (1 hour) the rods were pasted with the same resin and the larger tubes of the podials were pressed into place over them. Further reinforcement consisted of an application of the chopped-strand glass filled putty⁽⁷⁾ to the gas-plate/limb-tube joint.



The vertebral column was again constructed the "easy way"; the old steel frame providing the template. Aluminium cooking-foil placed over the mild-steel acted as a "separator" and over this was clamped "Nu-glas" 25.4 mm x 32 mm tube cut in a spiral of large amplitude (all that was necessary to allow this gentle curve). The extra

thickness of tube was selected because of the length of the vertebral column and the weight it would be required to take. A standard delivered length of 1.2 m also dictated a joint in the "spine" - completed with the same combination of tubing as in the limb/gas-plate connection. Once again the spiral cuts were fixed with the epoxy/glass-fibre putty⁽⁷⁾ (See Fig.8.) and on removal from the "template" the surplus cement was rapidly removed by disposable abrasive caps⁽¹¹⁾ (mounted on rubber holders) held in a dental workshop handpiece⁽¹²⁾. (See Fig.9.). Reinforcement was added in the form of 50 mm plain, open weave (255 g) glass-fibre tape. After painting the "Nu-glas" surface with a liquid epoxy resin⁽¹³⁾ the tape was stippled down in a continuous length along the R.G.F.-tube with the same resin. Once set (~ 3 hours) the process was repeated along the uncovered half.

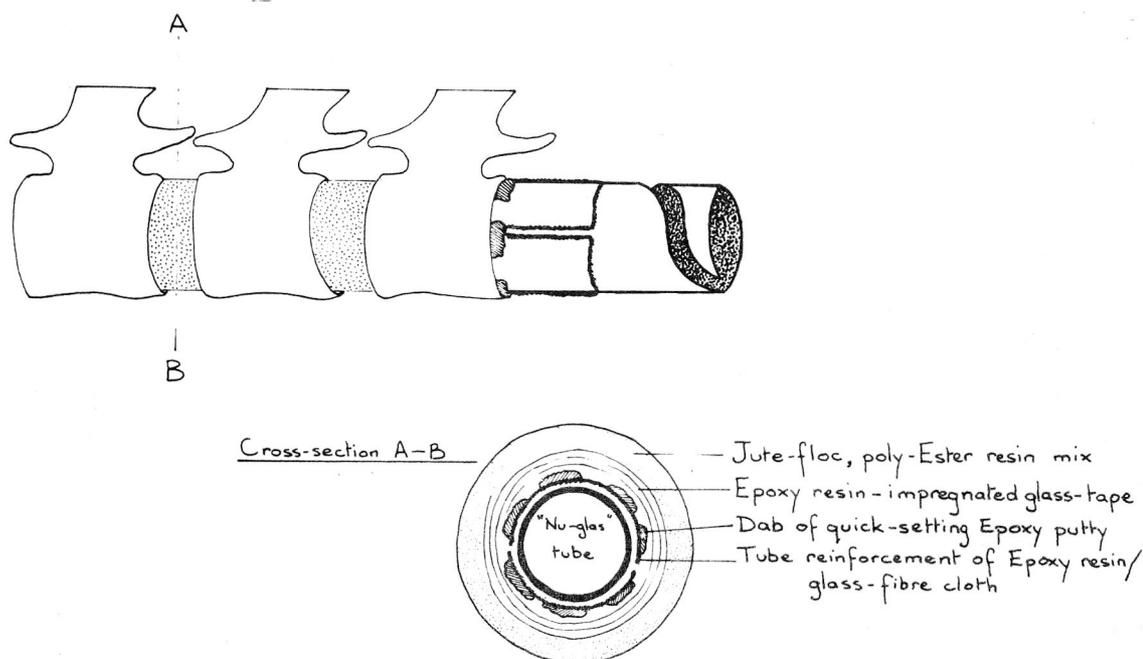
The resin used was one of two systems purchased to use as a glass-strand filled putty (this one for slower curing-time), but to avoid the problems of purchasing several resins in quantities set by the minimum order requirements of CIBA, and because, in the warm conditions prevailing at the time, the resin was reasonably liquid, we decided to use it as a laminating resin instead of the recommended one⁽¹⁴⁾⁽¹⁵⁾. In cooler conditions the addition of 0.5% (wt.) Acetone to the mix used to stipple down the glass tape (not the layer on the R.G.F.-tube!) eased the application without causing shrinkage problems.

Meanwhile a simple cruciform jig (in wood) was constructed to find quickly the middle-point of the vertebral centra. Each arm was graduated in 6.3 mm sections and the centre drilled to allow a marker (fibre-tip pen) through to spot the centrum. A low-speed electric drill plus hole-saw of 38 mm diameter, bored out the vertebrae in a very short time ready for threading onto the support-tube.

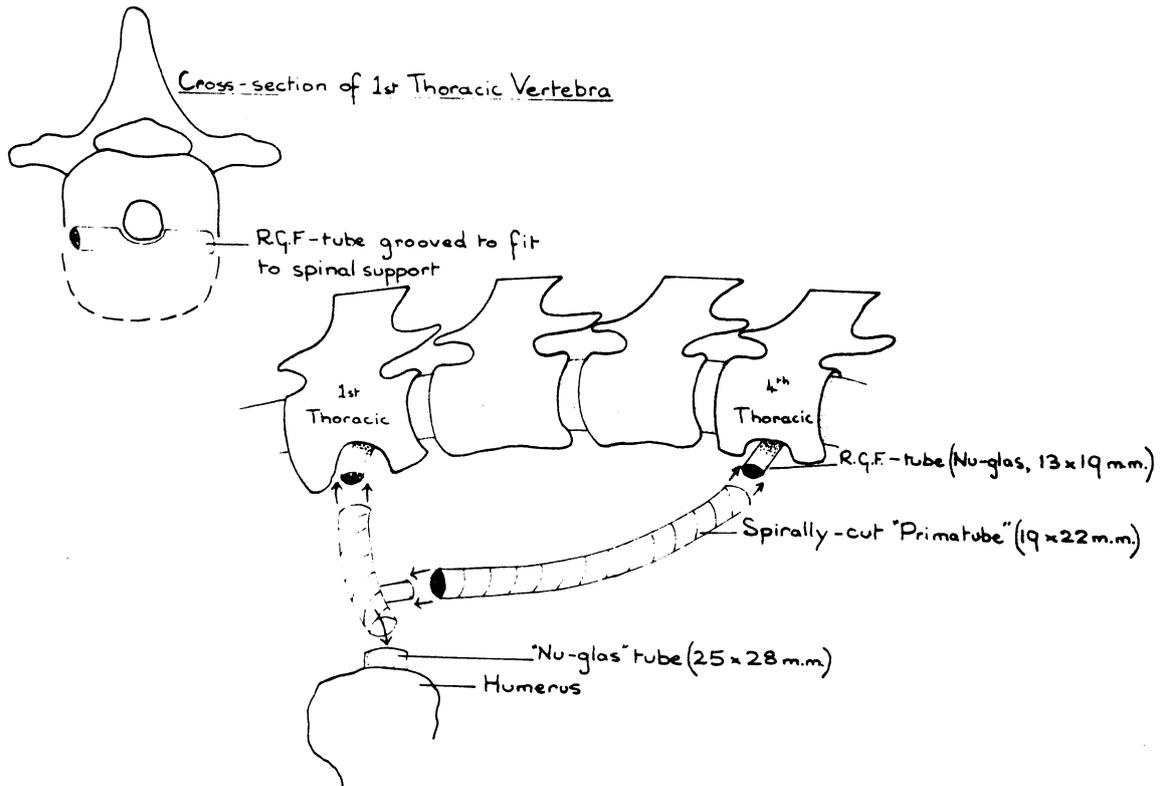
A thin rope slung over a convenient beam supported the G.R.P.-tube at its centre and laboratory scaffolding clamped to the baseboard, stabilised the ends. Reference points for orientating the "spine" were of course taken from the old steel mount.

Commencing with the lumbar end (the sacrals were cast in with the girdle) each vertebra was positioned and tacked in place using the rapid setting putty⁽⁷⁾ at the tube/centrum joint and between the opposing zygapophyses (the placing of the vertebrae from rear to front is of course dictated by the way the zygapophyses link-up). Three or four vertebrae were cemented at a time, care being taken to ensure orientation was correct - here again, laboratory scaffold was effective. (See Fig.10.)

Once all vertebrae were tacked in place, reinforcement was applied in the form of resin-soaked⁽¹³⁾ glass-fibre tape drawn through the intervertebral gaps and wrapped several times around the G.R.P.-tube. (See Fig.11.) Apart from the use of disposable (P.V.C.) gloves for this messy job, straight crucible tongs proved invaluable in collecting the ends of the resinated tape and pulling it through the narrow gaps. The remaining gaps to the outer borders of the centra were filled with a cheaper more easily used mix of poly Ester resin (gel-coat)⁽¹⁶⁾ and Jute-floc⁽¹⁷⁾ applied by spatula and finally smoothed with an acetone damped rag, thus representing the intervertebral discs.



Attaching the vertebral column to the fore-limbs was also quite simple. A section (ventro-lateral) was cut from each of two thoracic vertebral centra (1st and 4th) to allow the coupling of a 13 mm x 19 mm "Nu-glas" tube of 125 mm length to the spinal support. This was accomplished by grinding a 9.5 mm radius groove in the centre of the smaller tube and tacking this (at right angles) on to the larger tube. Glass-fibre tape impregnated with resin was then closely wound round both tubes and when set was further reinforced by the addition of glass-strand filled putty. (7)

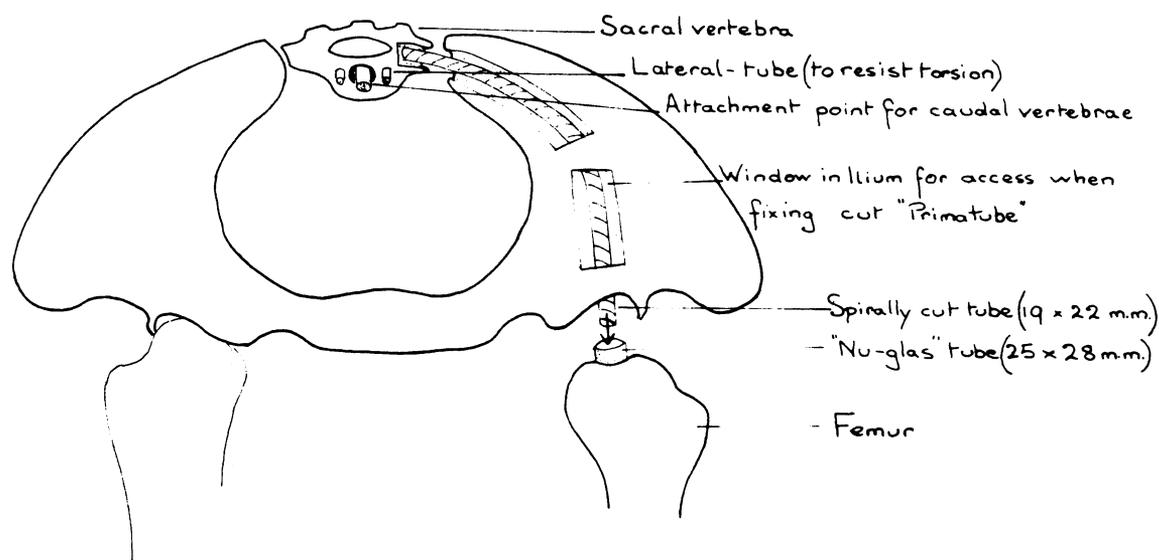


The spirally-cut "Primatube" (19 mm x 22 mm) was used to link the first thoracic vertebra to each of the humeri. It was eased over the 19 mm tube in the centrum, following a graceful curve into the 25.4 mm tube protruding from the top of the humeri. The spiral cut was cemented as before and a short "spur" of 19 mm tube was inserted into a drilled hole (in the Primatube) posteriorly and 76 mm from the top of the humerus. This spur, cemented in place provided anchorage for more "Primatube" running down from the fourth thoracic vertebra, after the cementing of which, further reinforcement in the form of resin and glass-fibre tape was added, (as with the "spine"). (Fig.12.)

This double linkage was devised to both increase stability and reduce flexing of the vertebral column when the weight of the skull and mandible was added. At the rear of the animal the work was a little more involved although not difficult. The one-piece cast of the pelvis included the two sacral vertebrae which could be threaded onto the spinal G.R.P.-tube as were the other vertebrae. However to brace the mount against torsional effects, two tubes (6.35 mm x 12.7 mm "Nu-glas") were inserted laterally to the main support and cemented in place. A third tube of the same dimensions was cemented into the "spinal" support, protruding 25.4 mm beyond the "sacrals" to provide an anchor for the caudal vertebrae (13 separate and 8 fused in one casting).

The rear part of the second "sacral" was cut away and two 76 mm wide panels were also removed from the dorsal side of the Iliac. The spirally-cut Primatube was threaded through these gaps, running in a curve from each side of the centrum to the acetabula, 50 mm protruding to slot into the femora supporting tubes. (See Fig.13.)

Quick-setting putty⁽⁷⁾ was again applied thoroughly in order to fix the curvature and anchor the support to the pelvis.



The G.R.P. panels were replaced without the aid of poly-Urethane foam (because of the orientation of the Iliac and lack of ventilation). Small wedges of Plasticene held the panels in place whilst the resin cement⁽¹⁰⁾ set. At this stage, with the vertebral column firmly set on the limbs, the temporary supports could be removed.

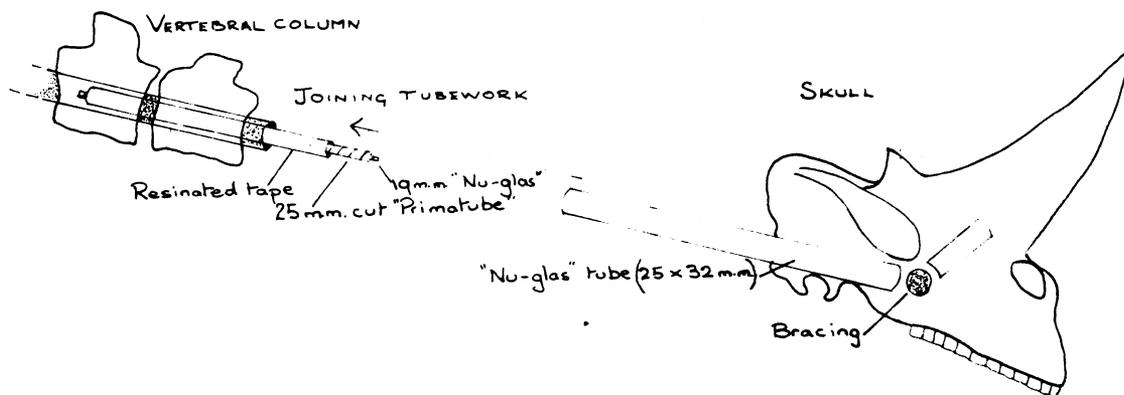
Nineteen pairs of ribs required attachment next and the thought of dowelling each one to the vertebrae was daunting, so a risk was taken in using the quick setting epoxy putty⁽⁷⁾ only, to secure them. As the ribs were double-headed and the G.R.P. itself very light in weight, it was perhaps not too great a risk; since the erection of the mount in the gallery in 1971, no rib has come away. One was however neatly punctured perhaps by a school-child's ball-pen, but even so it was not detached.

To set the ribs accurately and in neat opposition to their pairs was a problem which was solved once again by using the old steel frame, although only portions of the rib-frame could be utilised, albeit temporarily, in the new situation. Judicious use of corks, "Blu-tack" and thin wire held the ribs firmly whilst the epoxy putty set, and the 2nd, 3rd and 4th pairs further required some "carving" to accommodate the spine/limb linkage.

Thus it remained only to affix the skull, mandible, scapulae, patellae and cervical vertebrae. Firstly the skull roof was cut away in order to insert bracework anchoring the "mount-tube" to the skull, as it was felt that the weight of the massive horns (even if G.R.P.) might twist the skull and shear the cement at the joint between skull (a thin G.R.P. shell) and the R.G.F. tube mount.

This tube-mount (and the bracework) were identical to the tube used in the "spine" and extended back through the foramen-magnum for about 0.6 m, a length calculated to accommodate the cervical vertebrae plus an extra 30 mm or so as a safety-margin.

To connect skull and "spinal" tubes, a smaller diameter tube (in fact a composite tube as used in the foot anchorage) was cemented⁽¹⁰⁾ into that of the "spine". When ready the skull was slipped on as far as it would go and the cervicals were added to check the length of the tube. (See Figs. 14 & 15) The fit of the Atlas to the occipital condyles was also checked and marked - the head was to be set lower than in the original mount. The skull was withdrawn, the tube trimmed to length and the Atlas was cemented in place on the condyles.

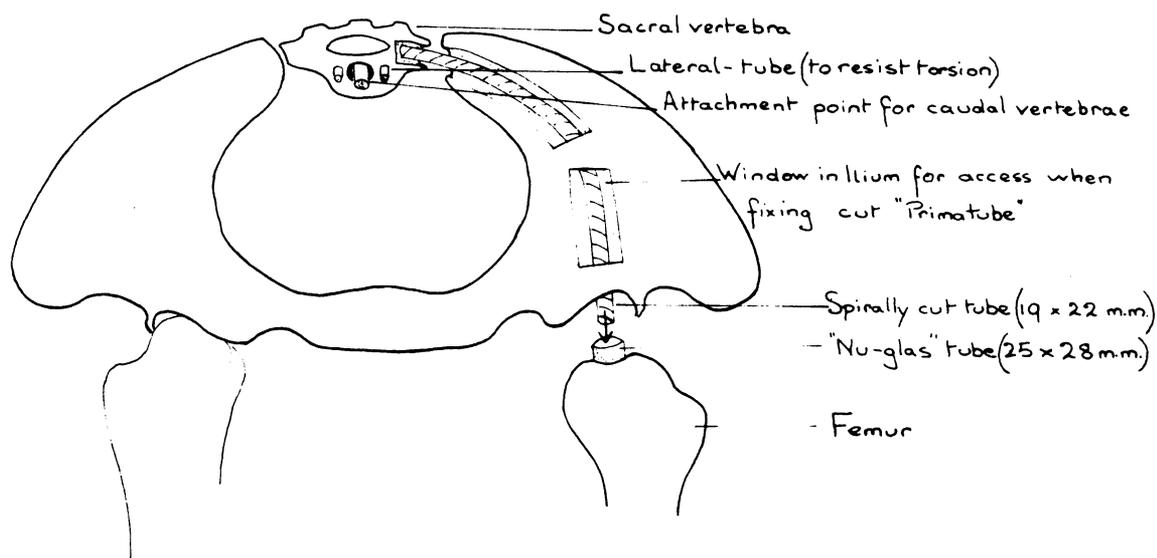


Completion of the mount took place in the exhibition gallery on the ground floor (the Palaeo. Laboratory is in the basement) and therefore the mount was dismantled for transport. This was a simple process; the skull/atlas was already off and the "body-unit" (Vertebral column, ribs and pelvis) was removed entire by simply sawing through the pectoral linking-tubes where they entered the humeri and withdrawing the pelvic links by lifting the whole unit.

It must be admitted that there was trepidation as to whether the "body-unit" was strong and rigid enough in its construction to be handled, inverted onto a pallet and transported to the gallery. It was, and in fact suffered

The rear part of the second "sacral" was cut away and two 76 mm wide panels were also removed from the dorsal side of the Iliac. The spirally-cut Primatube was threaded through these gaps, running in a curve from each side of the centrum to the acetabula, 50 mm protruding to slot into the femora supporting tubes. (See Fig.13.)

Quick-setting putty⁽⁷⁾ was again applied thoroughly in order to fix the curvature and anchor the support to the pelvis.



The G.R.P. panels were replaced without the aid of poly-Urethane foam (because of the orientation of the Iliac and lack of ventilation). Small wedges of Plasticene held the panels in place whilst the resin cement⁽¹⁰⁾ set. At this stage, with the vertebral column firmly set on the limbs, the temporary supports could be removed.

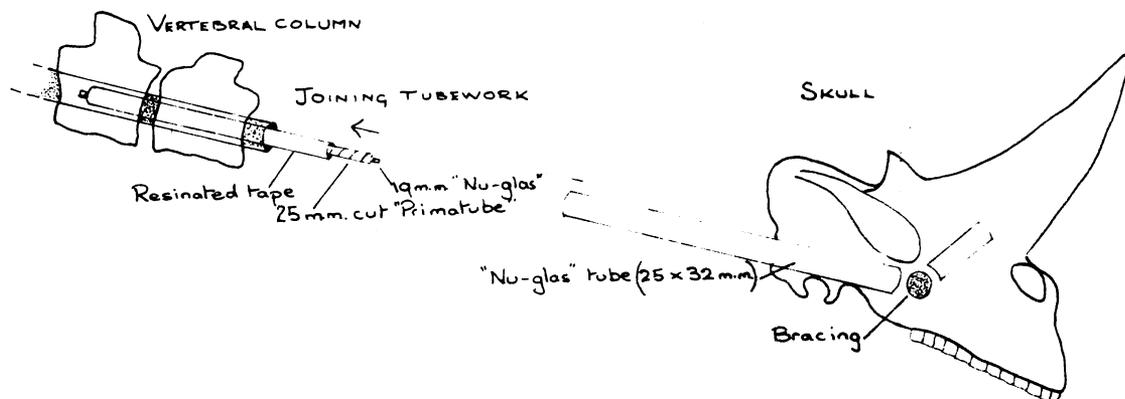
Nineteen pairs of ribs required attachment next and the thought of dowelling each one to the vertebrae was daunting, so a risk was taken in using the quick setting epoxy putty⁽⁷⁾ only, to secure them. As the ribs were double-headed and the G.R.P. itself very light in weight, it was perhaps not too great a risk; since the erection of the mount in the gallery in 1971, no rib has come away. One was however neatly punctured perhaps by a school-child's ball-pen, but even so it was not detached.

To set the ribs accurately and in neat opposition to their pairs was a problem which was solved once again by using the old steel frame, although only portions of the rib-frame could be utilised, albeit temporarily, in the new situation. Judicious use of corks, "Blu-tack" and thin wire held the ribs firmly whilst the epoxy putty set, and the 2nd, 3rd and 4th pairs further required some "carving" to accommodate the spine/limb linkage.

Thus it remained only to affix the skull, mandible, scapulae, patellae and cervical vertebrae. Firstly the skull roof was cut away in order to insert bracework anchoring the "mount-tube" to the skull, as it was felt that the weight of the massive horns (even if G.R.P.) might twist the skull and shear the cement at the joint between skull (a thin G.R.P. shell) and the R.G.F. tube mount.

This tube-mount (and the bracework) were identical to the tube used in the "spine" and extended back through the foramen-magnum for about 0.6 m, a length calculated to accommodate the cervical vertebrae plus an extra 30 mm or so as a safety-margin.

To connect skull and "spinal" tubes, a smaller diameter tube (in fact a composite tube as used in the foot anchorage) was cemented⁽¹⁰⁾ into that of the "spine". When ready the skull was slipped on as far as it would go and the cervicals were added to check the length of the tube. (See Figs. 14 & 15) The fit of the Atlas to the occipital condyles was also checked and marked - the head was to be set lower than in the original mount. The skull was withdrawn, the tube trimmed to length and the Atlas was cemented in place on the condyles.



Completion of the mount took place in the exhibition gallery on the ground floor (the Palaeo. Laboratory is in the basement) and therefore the mount was dismantled for transport. This was a simple process; the skull/atlas was already off and the "body-unit" (Vertebral column, ribs and pelvis) was removed entire by simply sawing through the pectoral linking-tubes where they entered the humeri and withdrawing the pelvic links by lifting the whole unit.

It must be admitted that there was trepidation as to whether the "body-unit" was strong and rigid enough in its construction to be handled, inverted onto a pallet and transported to the gallery. It was, and in fact suffered

no breakage or distortion, fitting back on to the limbs without trouble. Despite its apparently awkward shape and size it could be handled by two persons with ease. (See Fig.16.)

The baseboard although originally due to be discarded, was used on the exhibition dais, as it had been decided to cover the whole floor with a thick, coarse screed which would consequently hide the somewhat scarred working base. Hence no template was needed to resite the limbs. A short length of G.R.P. tube was cemented into the proximal end of each humerus-support and after an hour the "body-unit" was lowered into place, all four linkages engaging easily.

The skull was slipped on and locked in place by drilling two holes, a few inches apart and at right angles to each other through both tubes, and then pushing in two 6 mm steel bolts. In attaching the mandible a hole was drilled from the side hidden to public view through the angle of the jaw, the ventral processes of the pterygoid and the inner side of the opposing jaw and then inserting a 6 mm brass-rod, (the mandible had of course been correctly aligned on the skull first!). Epoxy putty⁽⁷⁾ cemented the mandibular condyles in place, held firmly by the weight of the jaw pivoting through the brass-rod.

The cervical vertebrae were cut to slip saddle-like over the R.G.F. tubing behind the skull and were cemented in place, replacing much of the cut out centra, and finishing off the "intervertebral-discs" as with the earlier vertebrae.

Patellae were simply cemented in place, but the Scapulae required some cutting to slip over the pectoral linkages before being cemented to the humeri.

The result then was a strong, lightweight mounted "skeleton" with a mass of 67 kg (cf. 1500 kg. of the original Plaster of Paris cum steel mount) with the added benefit of no visible support. (See Fig.2)

Acknowledgements

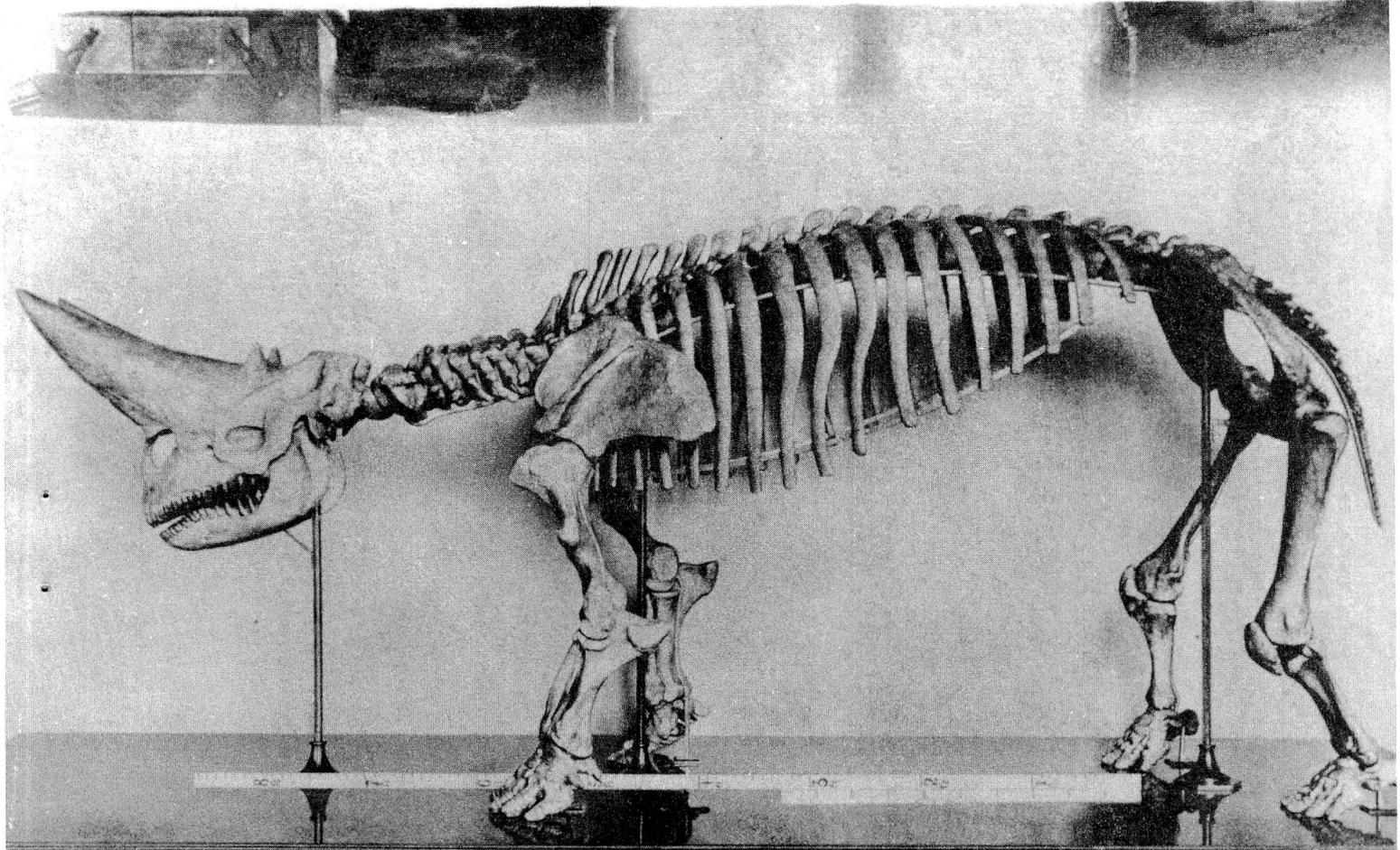
It remained then for Phil Watson of the Museum's Central Services Dept. aided by David Davenport to skilfully paint the cast in Fayum-deposit colours.

The authors' thanks are also due to Tim Parmenter for his fine photographic record of the work; to Mrs. Jane Croucher for producing the diagrams and of course to Mr. John Meade and colleagues for making the G.R.P. casts.

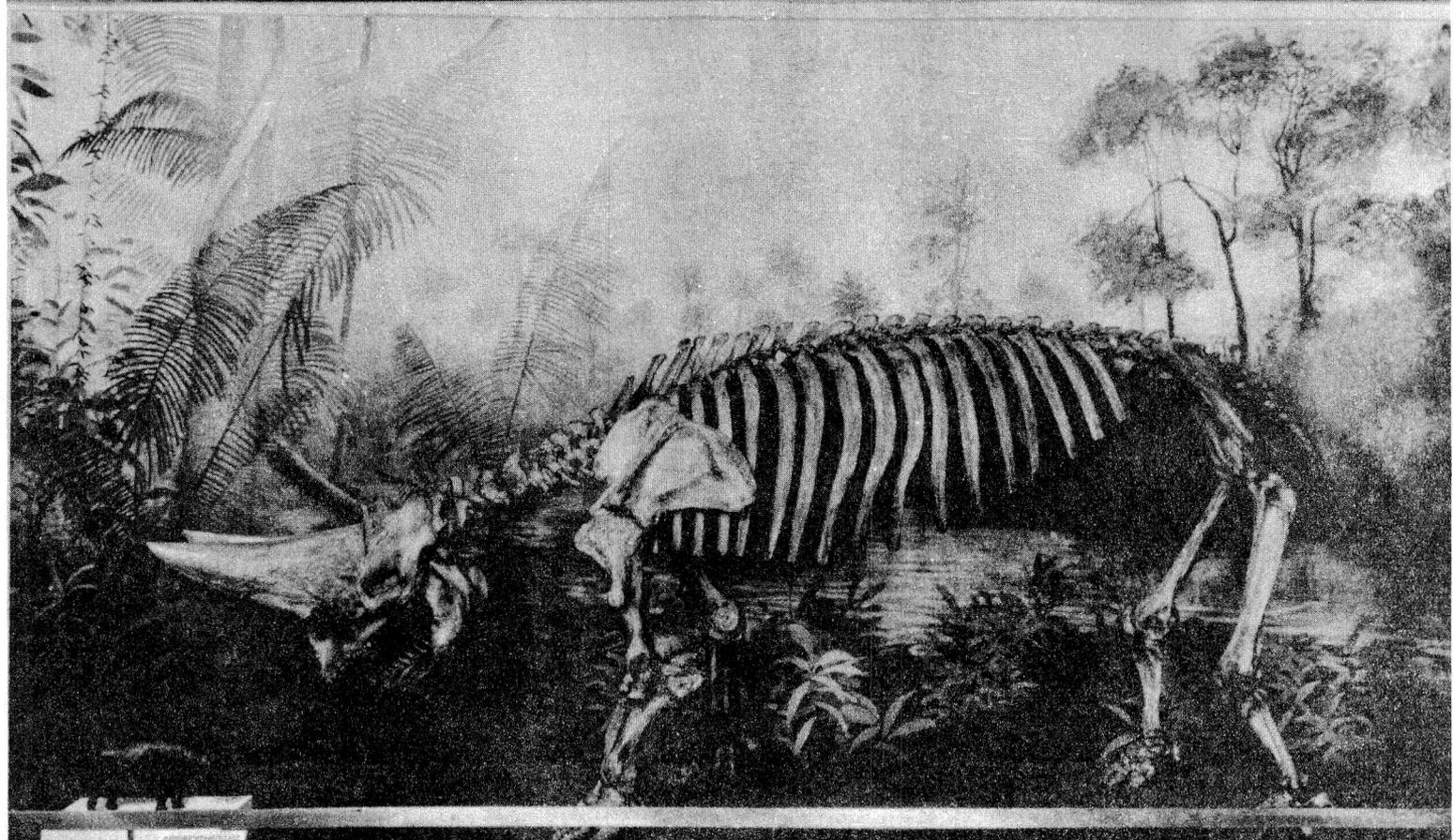
R. Croucher & F.M.P. Howie
British Museum (Natural History)

Key to Illustrations

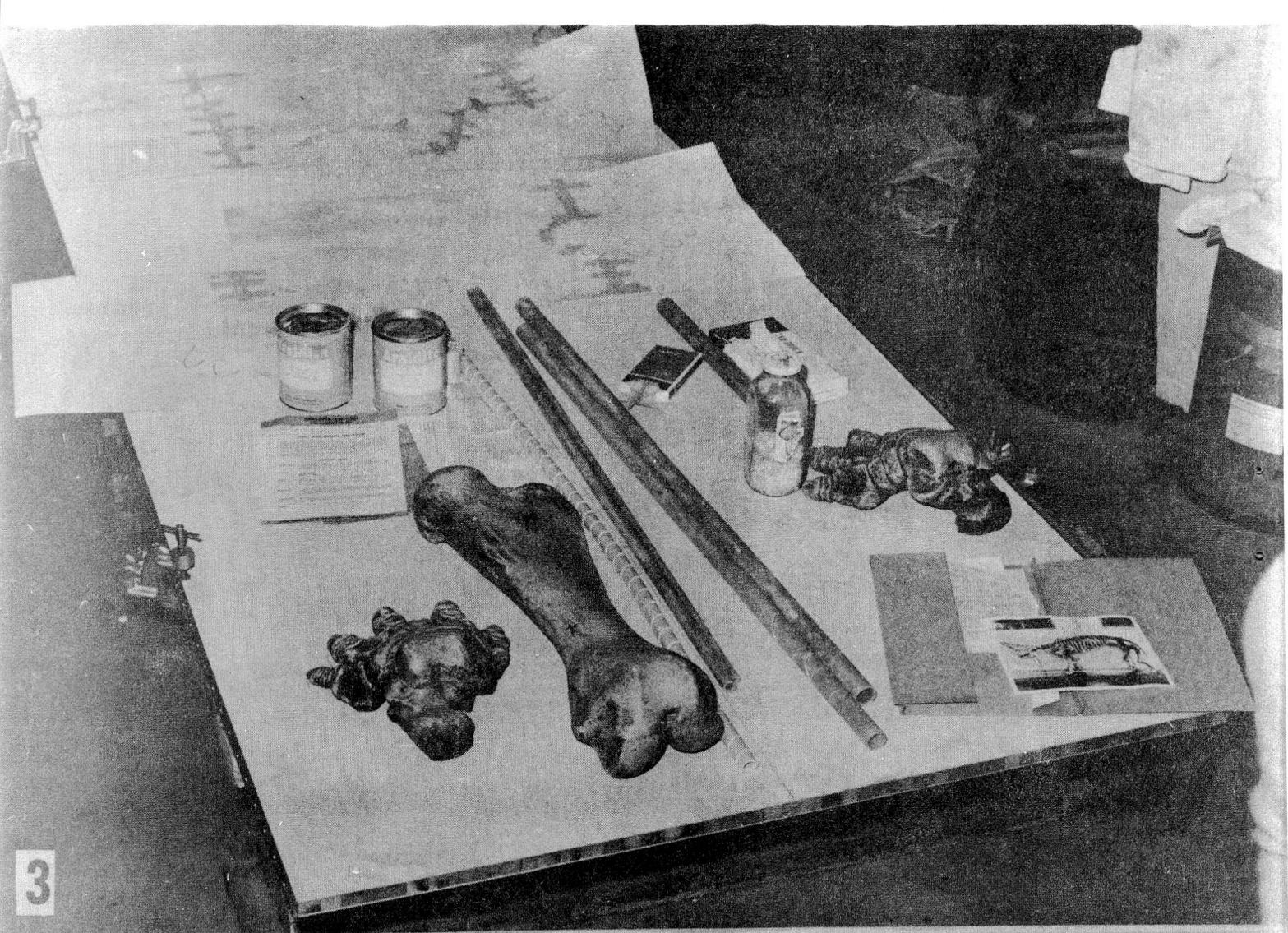
1. Arsinoitherium: a Plaster of Paris cast on the original steel mount.
2. Arsinoitherium: the completed Glass Reinforced Plastic mount on display.
3. Commencement of the G.R.P. mount. The templates for positioning the feet are in the background.
4. Production of the spiral-cut in the R.G.F. tube.
5. Limb: Panel has been removed to give access to cut and curved tube. Epipodials are already cemented to mesopodials.
6. Limb: the curvature of the internal tube has been fixed with epoxy putty and p-U-foam has filled the distal part of the propodial.
7. Limb: the G.R.P. access-panel has been replaced and the gas-plate "welded" to the foot of the support-tube.
8. The "Spine": removal of the clamps after fixing the tube's curvature by application of epoxy putty to the spiral cut.
9. The "Spine": surplus putty is sanded-off (foreground) before application of glass-fabric and resin (background).
10. The "Spine": the Vertebra, bored through the centrum has been slipped along the tube and tacked in place with quick-setting putty.
11. The "Spine": the Vertebrae are further secured by winding resinated glass-fabric tape between them.
12. Pectoral linkage: spiral cut tube connects the vertebral column to the forelimbs. The forepart shows the cut tube fixed and reinforced.
13. Pelvic linkage: panels have been cut away to insert the spiral-cut tube (part in place). The two "anti-torsion tubes" are adjacent and parallel to the main "spinal" support.
14. Cervical vertebrae: temporarily fitted to check spacing.
15. The Skull: with Atlas cemented in place, the skull has been slipped on to the forward extension of the vertebral support.
16. Ready for transport to the exhibition gallery, this unit demonstrates its strength and rigidity.

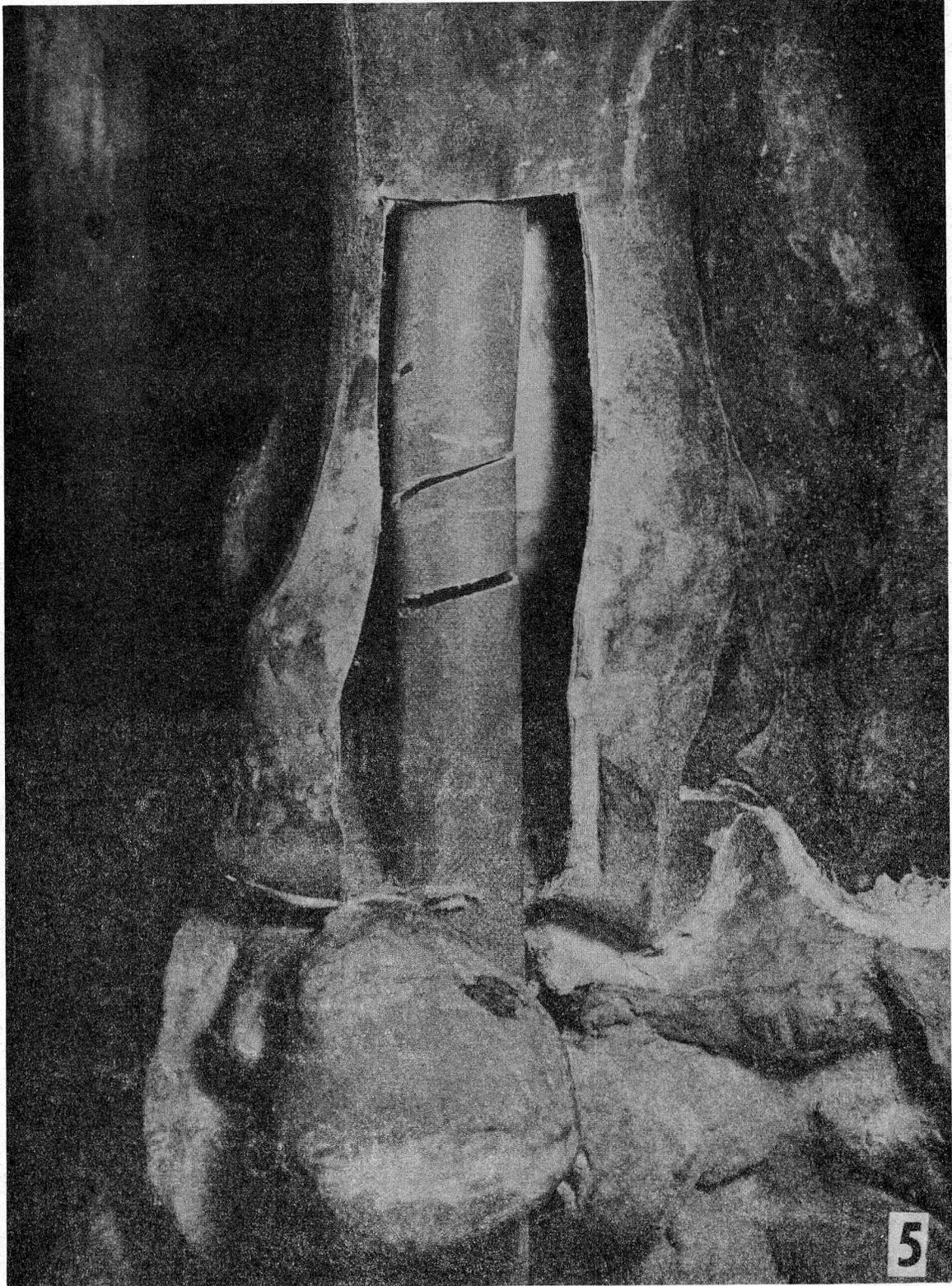


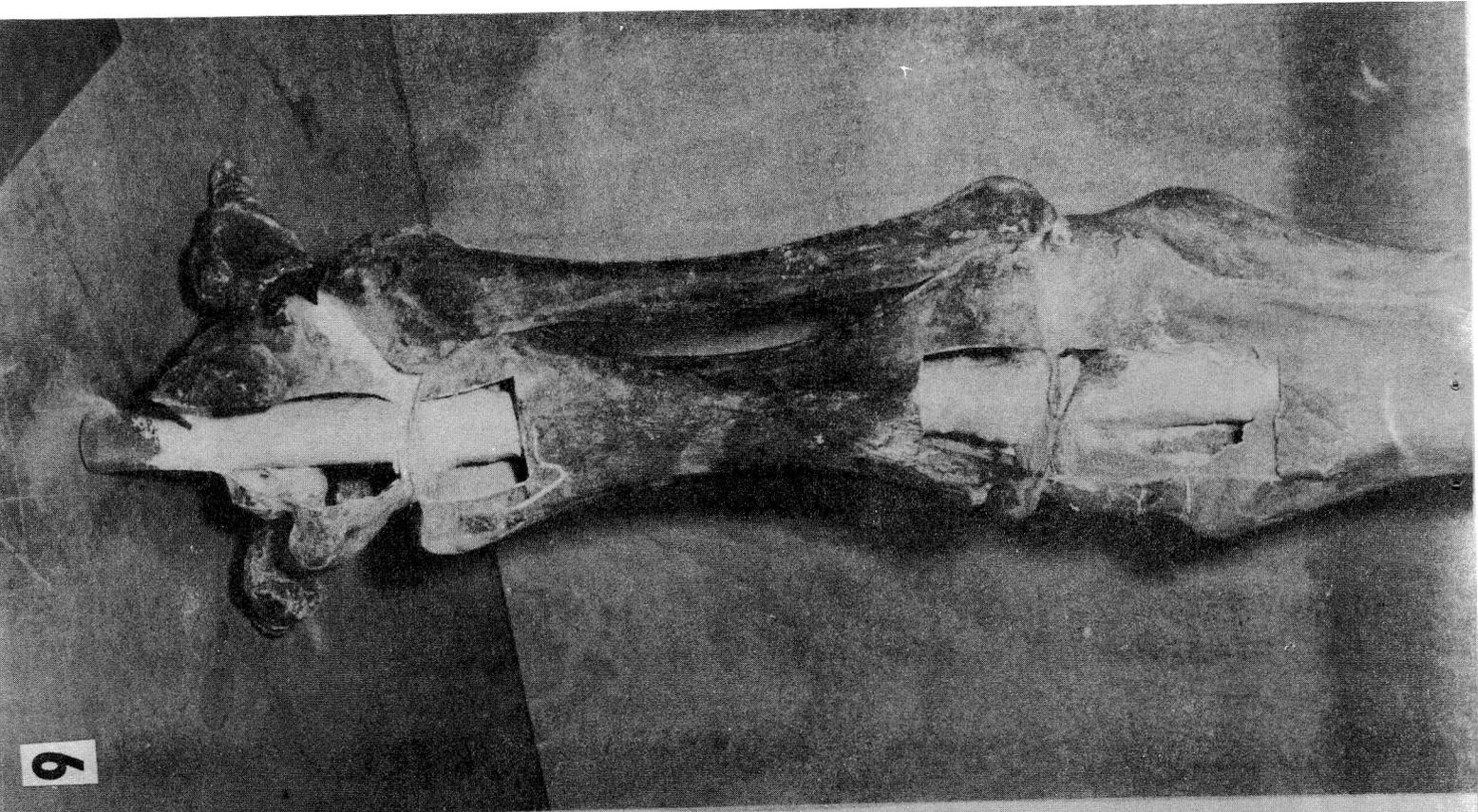
1

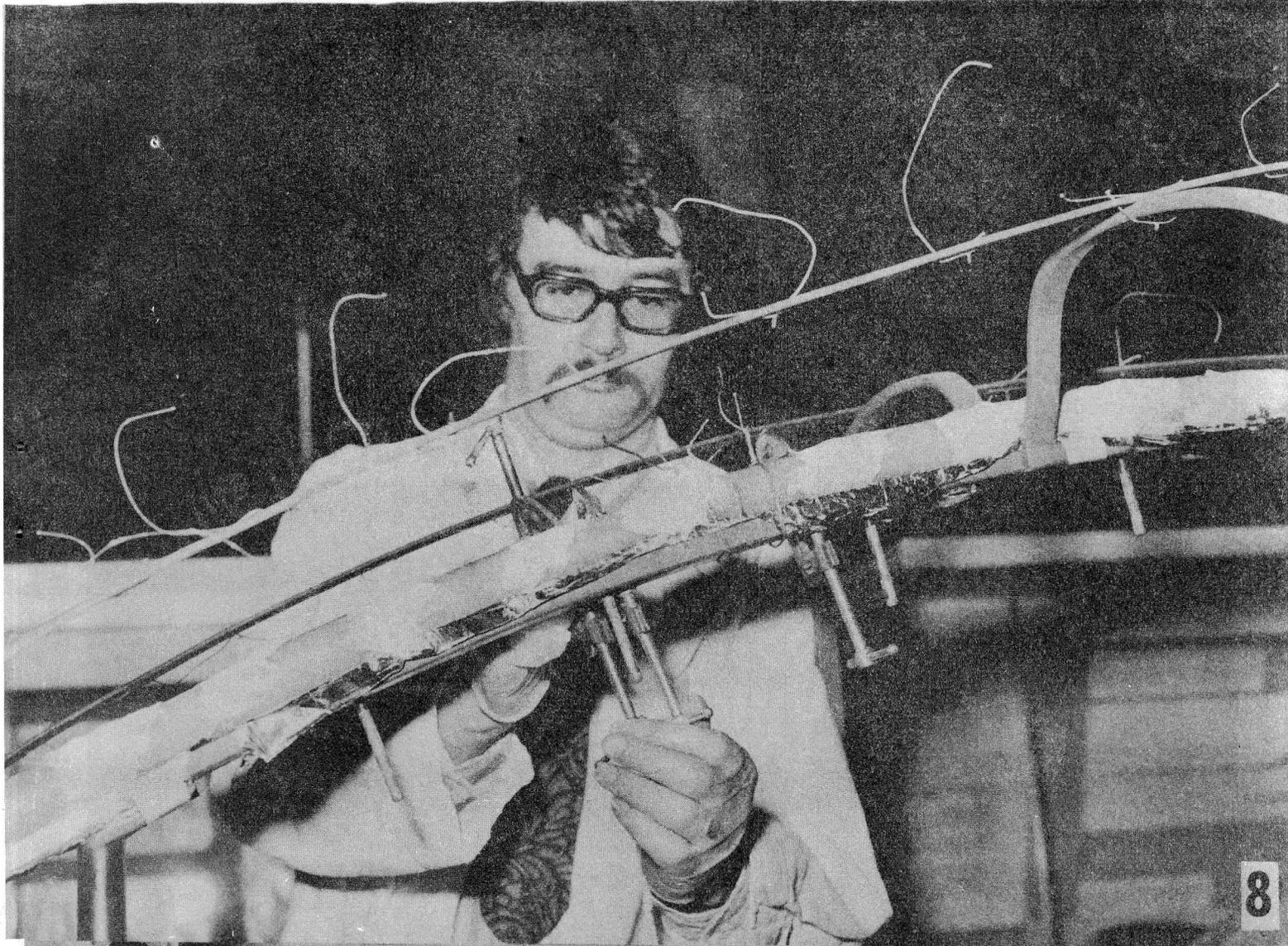


2

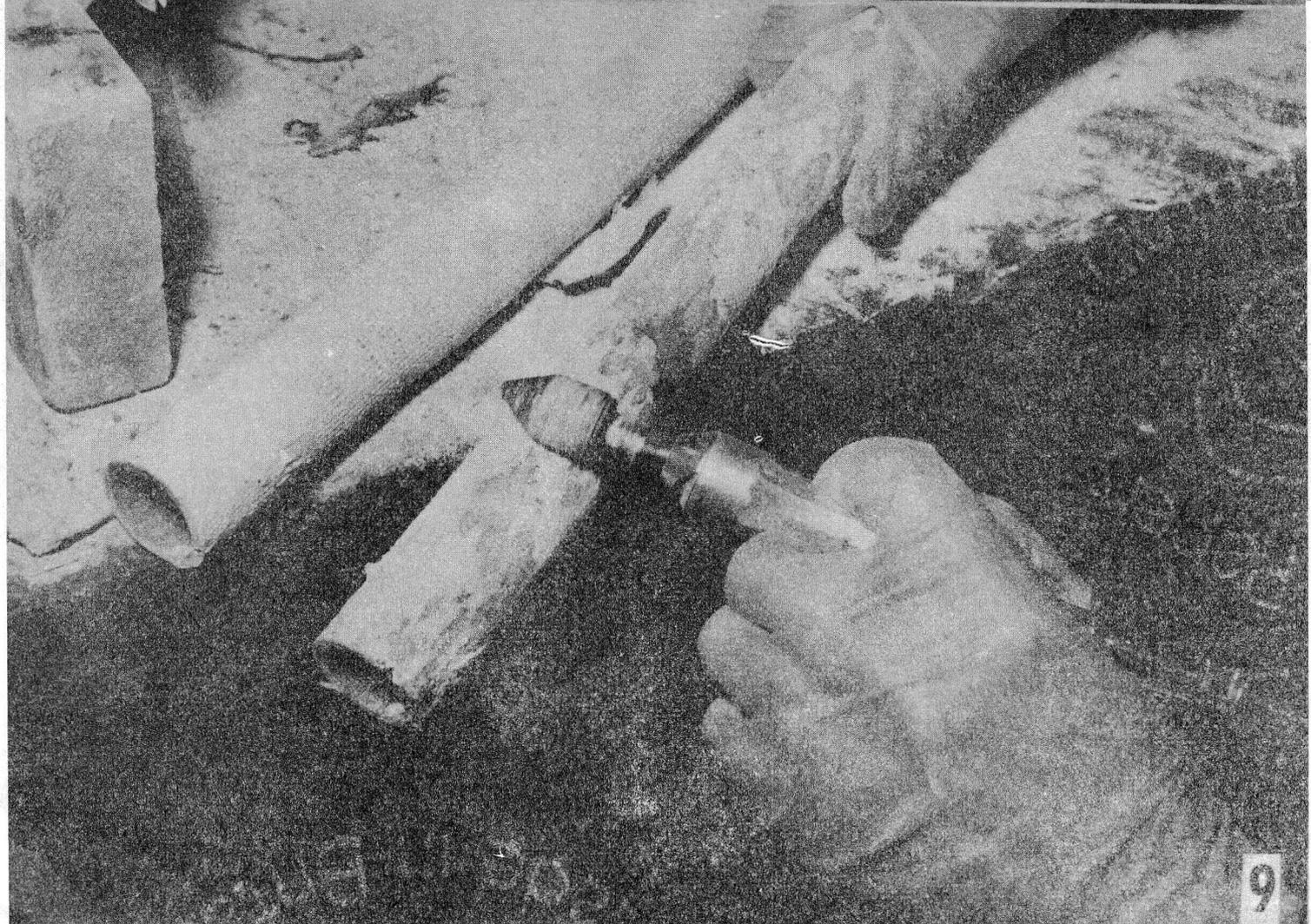




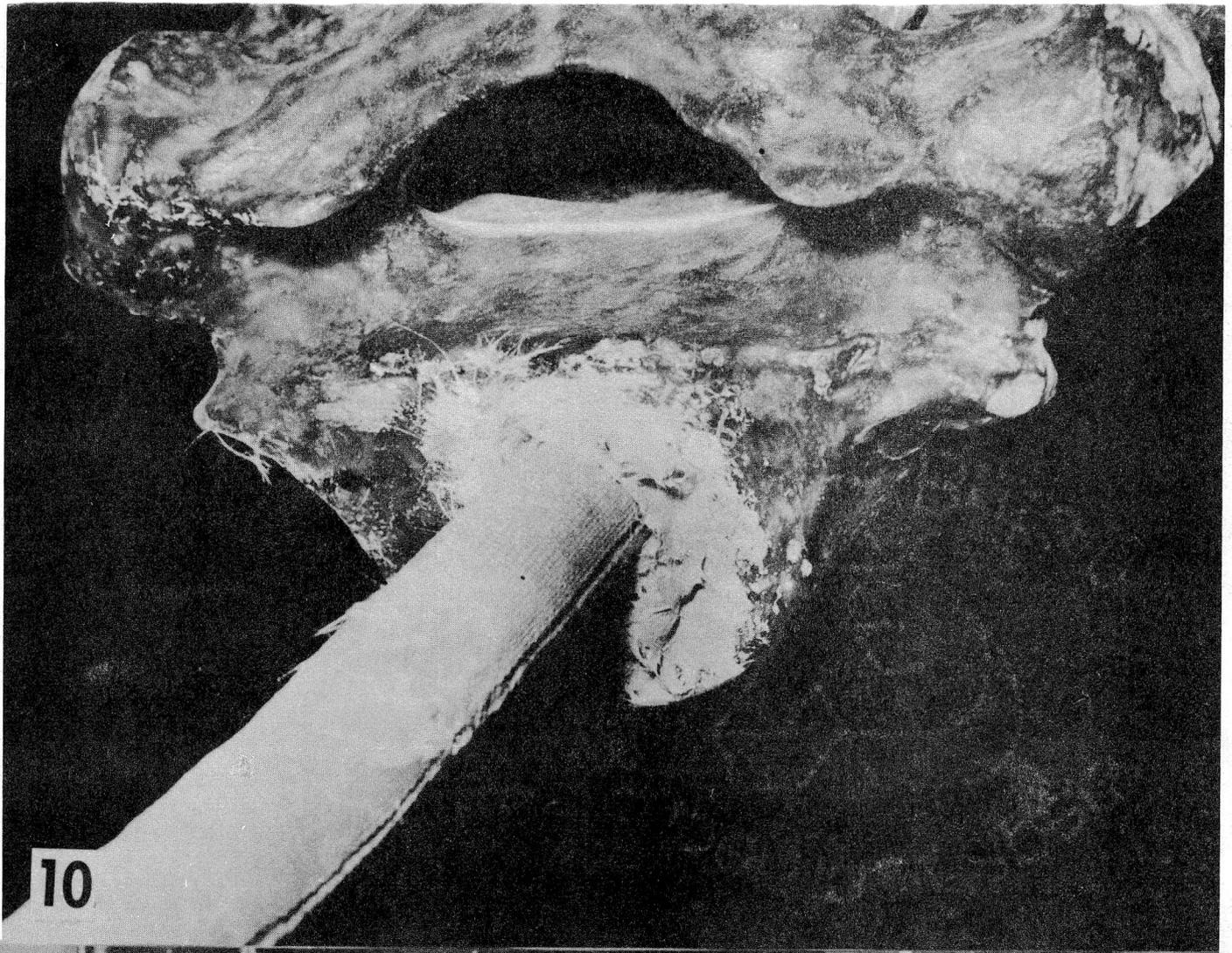


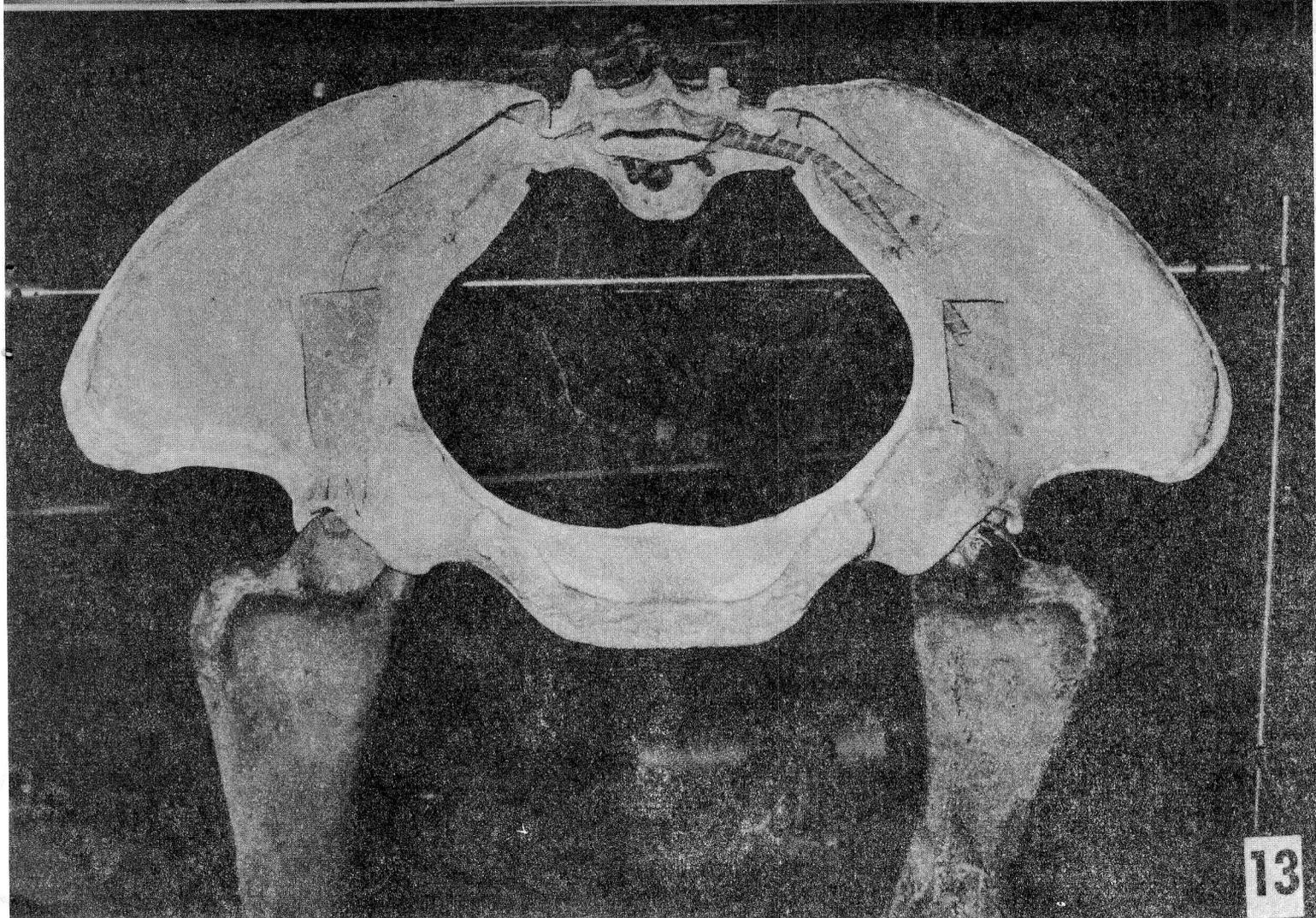
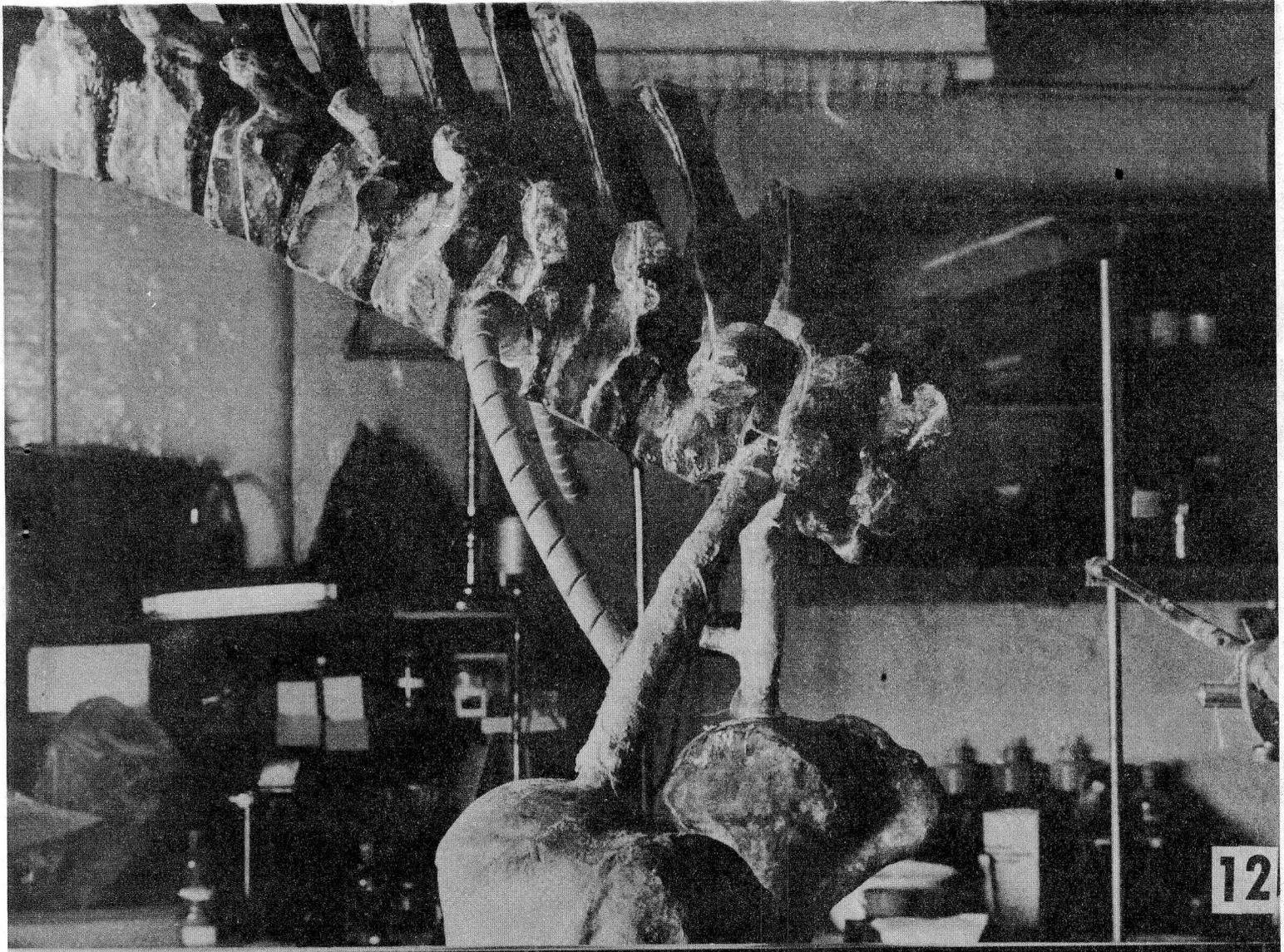


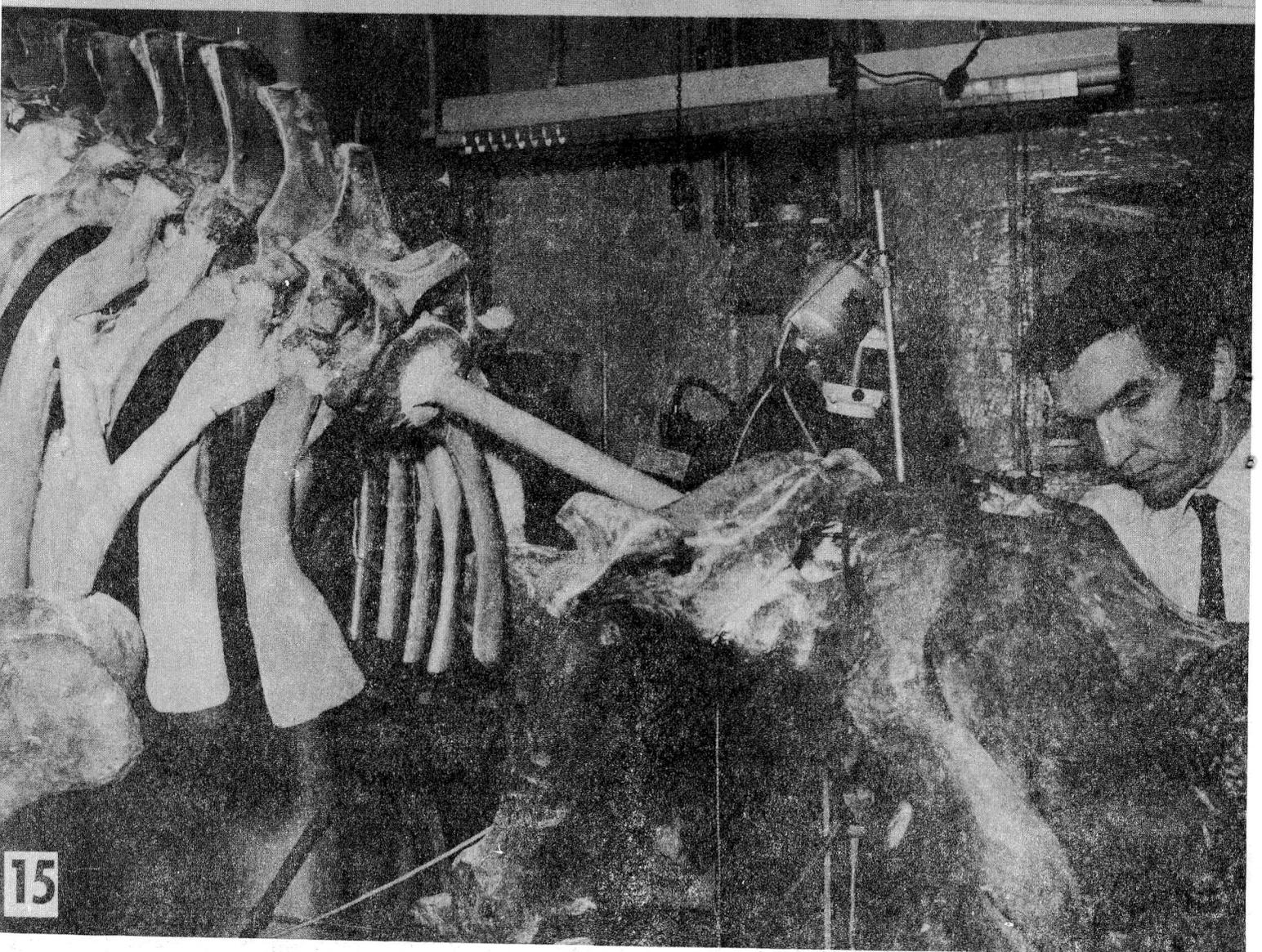
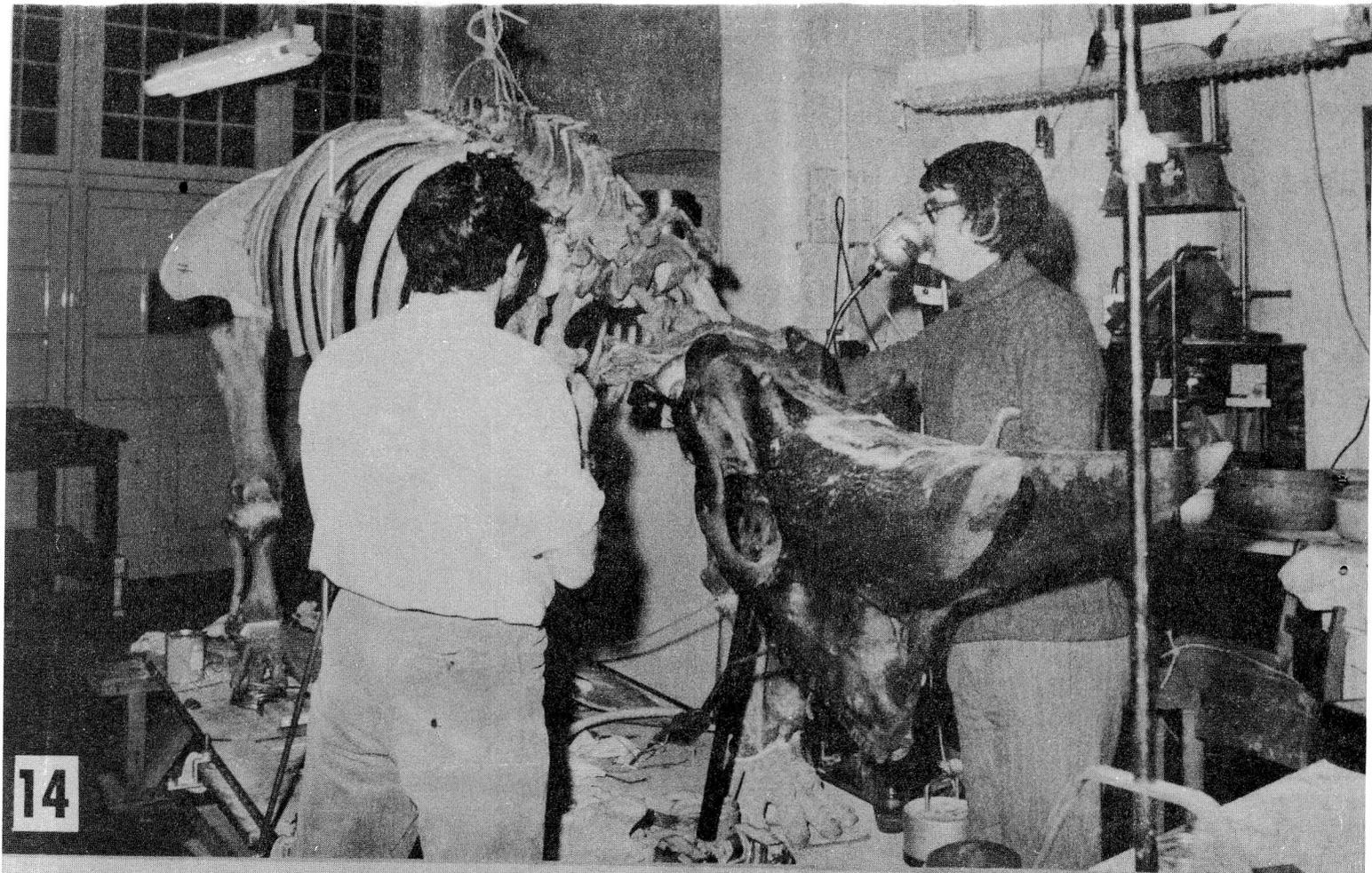
8

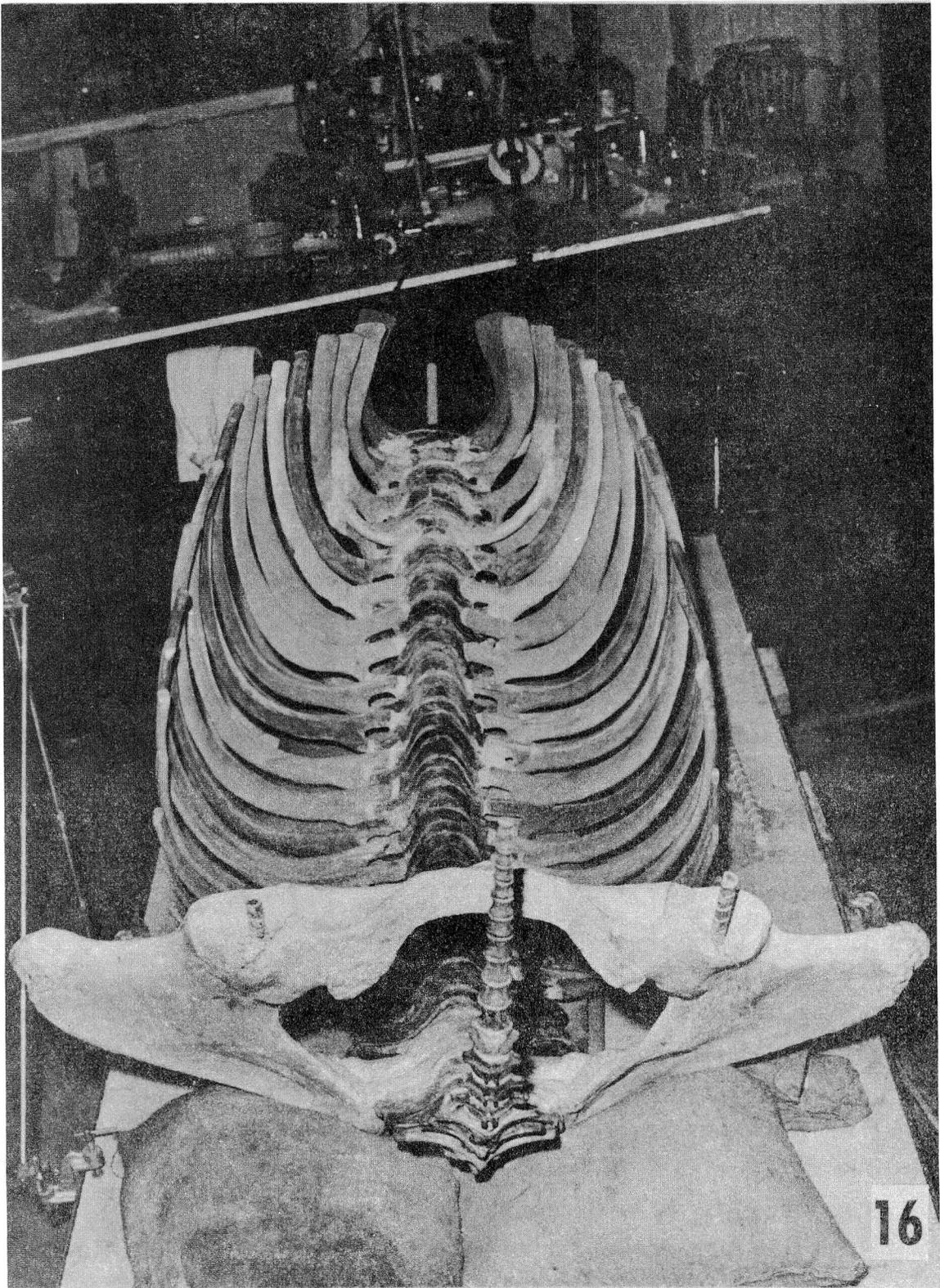


9









References

1. "Glass-Fibre Resin Casts of Fossils", A.E. Rixon & M.J. Meade. *Palaeontology* v. 3, pt. 1, April 1960.
2. "Resinated glass-fabric tubes" manufactured by Fothergill & Harvey Ltd. Ogden Smiths & Hussey Div., Summit, Littleborough, Lancs.
3. "Vinamold H.M.C. 1028" - Hot melt compound based on Vinyl resins - manufactured by Vinatex Ltd., New Lane, Havant, Hants. P09 2NQ - obtainable from Norman & Raymond, 122, Stonhouse St., London SW4.
4. "Hi-Di" No.60 - Diamond Precision Tools Ltd., 263 City Road, London EC1.
5. "W & H" No.115K - obtainable from J. & S. Davis Ltd., Cordent House, Torrington Park, London N12.
6. Type HSB (inc. foot-control) - manufactured by Citenco Ltd., Boreham Wood, Herts.
7. "Araldite" resin AW 120 (medium viscosity) + Hardener HY 120 (high viscosity) + 6.35 mm (1/4") chopped glass strand. Pot-life (mixed) 10-20 minutes; Cure 3/4 to 1 hour at 21°C.
8. PolyUrethane foam kits, 2 Kg. or 10 Kg. from Strand Glassfibre Ltd., Brentway Trading Estate, Brentford, Middlesex.
9. M.D.I. (Methane di-Isocyanate); T.D.I. (Toluene di-Isocyanate). "Product Information" on poly-Urethanes, from Bibby Chemicals Ltd., 8 Stanley Street, Liverpool L1 6EZ, includes useful notes on storage, handling, fire and toxicity hazards of polyurethane foam systems.
10. "Araldite" resin AW 120 + hardener HY 120 without chopped glass strand (see ref. 7).
11. "Abracaps", type A, 16 R.C. from Engis Ltd., Parkwood Trading Estate, Maidstone, Kent.
12. KaVo dental workshop handpiece, No. 277, with interchangeable chucks. KaVo Dental Ltd., Industrial Estate, Raans Road, Amersham, Bucks.
13. "Araldite" resin AV 123B + Hardener HY 953F (= pasty liquid). Pot life - 2½ hours, cure time - 24 hours.
14. "Araldite" resin CY 219 + Hardener HY 219 + Accelerator DY 219. (Low viscosity mix with adjustable cure rate.)
15. "Araldite" Instruction Manual T 11 d - "Laminated Tooling Aids".
16. "Trylon" gel-coat "GC 150 PA" - from Trylon Ltd., Thrift Street, Wollaston, Northants, NN9 7QJ.
17. "Jute-floc" obtainable as "Cleaned Jute Dust" from William Cleghorn, PO Box 17, Clepington Works, Dundee, Angus, Scotland, DD1 9BR.
18. "Blue-tack", a re-usable adhesive (rather like permanently tacky chewing-gum) - manufactured by Bostik Ltd., Consumer Products Div., Leicester.

TECHNICAL NOTES

DUNLOP A800 LR - RED RUBBER LATEX

This product is no longer being manufactured. However, the same results may be obtained by mixing Dunlop AL800 (Natural) Latex, obtainable from:

D.B. Shipping Ltd., (01-623-2316)

Monument House,

16 Monument Street,

London E.C.3.

(1 gall. approx. £4.76)

with 1% "Vulcafor Red M" colourizer, obtainable from:

Bellman, Ivey & Carter, (01-540-1372)

538-374 Grand Drive,

Raynes Park, London, SW.20.

(5 ozs approx. 33p)

Alternatively, Revultex LR (Natural) from Bellman, Ivey & Carter may be used with the colourizer.

MONO CUPS - 7 OZ SIZE

Mono Containers Ltd. are no longer manufacturing paper cups but Bowater No. C7 RL 6V unwaxed paper cups may be obtained from:

Automatic Catering Supplies Ltd.,

Kestral House,

1-5 Queen's Road,

Walton-on-Thames,

Surrey, KT12 5NQ.

The price is approximately £14.00 per 1,000.

Mrs. P.P. Hamilton-Waters,
Palaeontology Laboratory,
British Museum (Natural History)

BOOK REVIEW

NATURAL HISTORY AUCTIONS 1700-1972

A Register of Sales in the British Isles compiled by J.M. Chalmers-Hunt, with articles by S. Peter Dance (Shell Sales), Peter G. Embrey (Minerals), W.D. Ian Rolfe (Fossil Sales), Clive Simson (Ornithology and Oology), William T. Stearn (Botanical Sales), J.M. Chalmers-Hunt (Entomological Sales), Alwyne Wheeler (Other Zoological Sales).

published by Sotheby Parke Bernet, London, 1976. Price £12.50.

The usefulness of auction sale catalogues to Museum curators is obvious and well brought out in two of the introductory essays to this fascinating and important book. Peter Embrey (using in part such sale catalogues) shows how particular mineralogical specimens have been traced through six owners previous to the BM(NH). William Stearn mentions the famous herbarium of A.B. Lambert (1761-1842) sold at auction in 1842 because he had suffered severe financial losses before his death. The subsequent fate of this collection has been ably investigated by Hortense (not Honorine as stated) Miller, again using sale catalogues.

The tragedy of Lambert's financial position was to disperse to the four corners of the earth the material from his priceless collection built up over many years. This book will give us some chance to restore the history of material thus dispersed at auction. In it are listed all those auction sales which involved natural history specimens (and books if of special significance or part of a specimen sale) that have been traced by J.M. Chalmers Hunt. The date of the sale, the owner (when known) and type of material auctioned, the auctioneer, the numbers of lots offered and the number of pages in the printed sale catalogue, are all listed, and last but not least the whereabouts of copies of these when known, and if annotated.

Apart from individual dealers and collectors auctions are listed of sales of private Museums such as Lever's, Donovan's and Rackstrow's and others more recent such as Eton College Museum (1899). Sales of Society collections like the Royal Entomological and Linnean Societies of London also appear. This latter collection must have included the types of various Cretaceous Mollusca bequeathed to the Linnean Society by Richard Pulteney (who had described them) after his death in 1801. Perhaps study of the four copies of the sale catalogue now located may shed light on the thus-far unknown purchases of these important specimens.

Looking through the locations of surviving sale catalogues one sees how much the author had to rely on the wonderful collections of the BM(NH) libraries and also the private collection of such catalogues brought together by RB and DB Janson, to whom I must also express personal indebtedness. With London the centre of British auctioneering it is natural that the vast proportion of sales seem to have been held there. The location of some extra-London sales is given but sadly none of these locations are indexed so that anyone seeking all sales in say Cambridge will need a long search.

I would hazard the guess that a considerable number of provincial sales catalogues will have slipped through even Mr. Chalmers-Hunt's widely cast net (as he acknowledges p X). He appeals for information to help add to and correct the Register and it is to be hoped that all those curators with such sale catalogues in their care will search and report any new information. We may start this process here and point out the two Bolton sales noted on page 331. Two more listed below locate copies of sales catalogues known to have been produced but for which no copies were located.

(a) The Register lists p.75 the January 1816 sale of one Llwydins (Lloyd), a catalogue of which is supposedly in Paris but not traced. Copies of this survive in the Bodleian (some prices marked) and the family copy is in the Nat. Lib. Wales, MS.12500B (with prices marked see Nat. Lib. Wales J1. 10 185-204). The Lloyd was John Lloyd (1750-1815) friend of Joseph Banks, and the sale was held in Chester.

(b) The Register lists p.180 the sale of unknown date noted only by E.G. Allingham 'Romance of the Rostrun' p.20 of John Strange. The sale catalogue annotated by John Lochee one of the auctioneers and surely that seen by Allingham is in the BM (1255 c 19); 'Catalogue of the Genuine and Entire Museum of curious subjects of Natural History, of John Strange [1732-1799] deceased'. Sale held by King 11 July - 19 July 1800. Fos.Min.Cor.Sh. [many foreign].

Hopefully more of the unlocated sale catalogues will emerge.

Apart from the few comments above one can have nothing but praise for this compilation; the fruits of many years work. The complex textual typography seems excellent; Redlad for Redland p.80 is very probably a typographic error dating from the original 1826 sale catalogue. These are often very inferior examples of typography which contributed to their ephemeral nature and added to the problems of locating them today.

H.S.T.

PUBLICATIONS

"Report on British Palaeobotany & Palynology" 1972-1975, by William G. Chaloner and Alison J. Hill, produced by Department of Botany, Birkbeck College, University of London, April 1976.

OTHER SOCIETIES

APPEAL

Robin Stevenson, Diary Sub-Editor of 'Geology Teaching' would like our members to let him know of "any events etc. taking place in their museums which might be of interest" to the members of the Association of Teachers of Geology.

Society for the Bibliography of Natural History

SECOND

EASTER MEETING

Linnean Society of London, Burlington House, London W1

14th and 15th APRIL 1977

A meeting open to all interested in the history and bibliography of natural history.

The four sessions making up the meeting will be on the following topics:

Natural History Manuscripts and Drawings: the location of natural history manuscripts and drawings; curation and administration of natural history archives; historical and scientific researches based on studies of manuscript collections and individual items.

Natural History and Exploration: biographies of explorers and the scientists who accompanied them; collections, manuscripts and books associated with voyages of exploration; the bibliography of exploration.

Descriptive Bibliography: publishing, printing, binding and illustration of natural history books; the publishing history and bibliography of individual books.

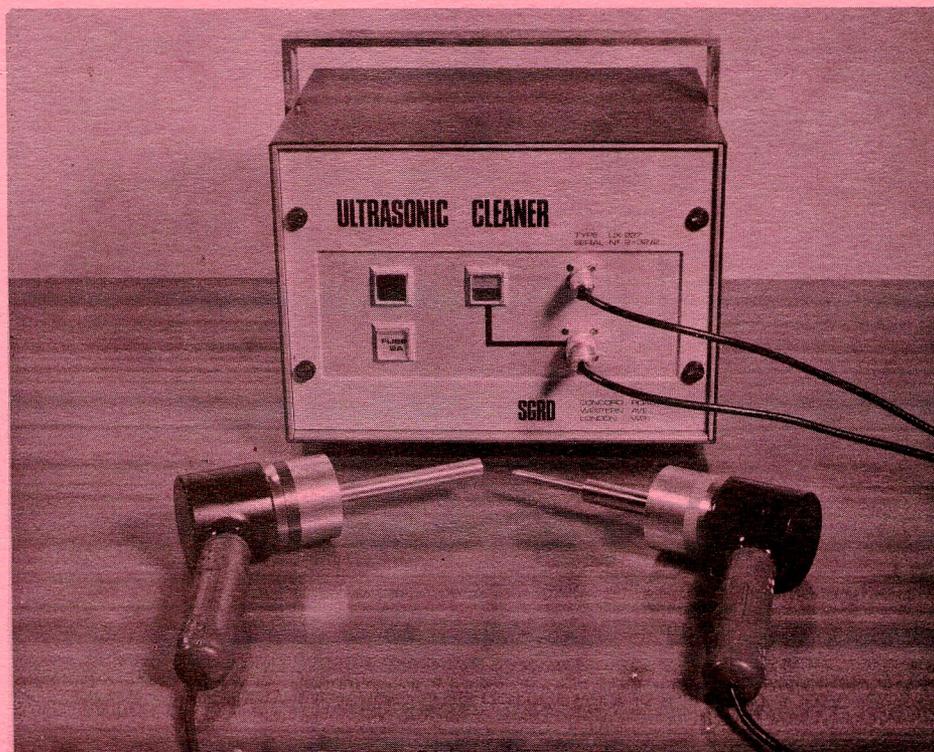
History of Natural History: studies in the history of the animal, plant and earth sciences; history of societies, museums and other institutions; biographies of naturalists.

In addition to the sessions of papers the meeting will be backed up by exhibitions of natural history books and manuscripts in museums and libraries around London.

It is hoped to arrange an informal meeting on Wednesday evening, before the meeting, and a formal reception on Thursday evening.

All correspondence regarding the meeting should be addressed to the Meetings Secretary, Mrs. J. A. Diment, Palaeontology Library, British Museum (Natural History), Cromwell Road, London SW7 5BD.

THE MODERN WAY TO CLEAN FOSSILS



The SGRD Limited ultrasonic pistol cleaner, as used in museums world-wide, can considerably reduce the time required for preparing rock covered fossil bones for exhibition. For example, it has been calculated that some two years work could have been needed to clean 200 specimens by conventional methods. By using the ultrasonic instrument the cleaning time amounted to 15 months.

Delicate fossils can be cleaned without danger to their fragile structures and it is possible to retain much of the extra fine detail of the specimens which would be removed by other, more harsh cleaning methods.

For further details contact: The Electronics Department,
SGRD Limited
Concord Road,
Western Avenue,
LONDON W3 0SE.

Tel. 01-992 7784