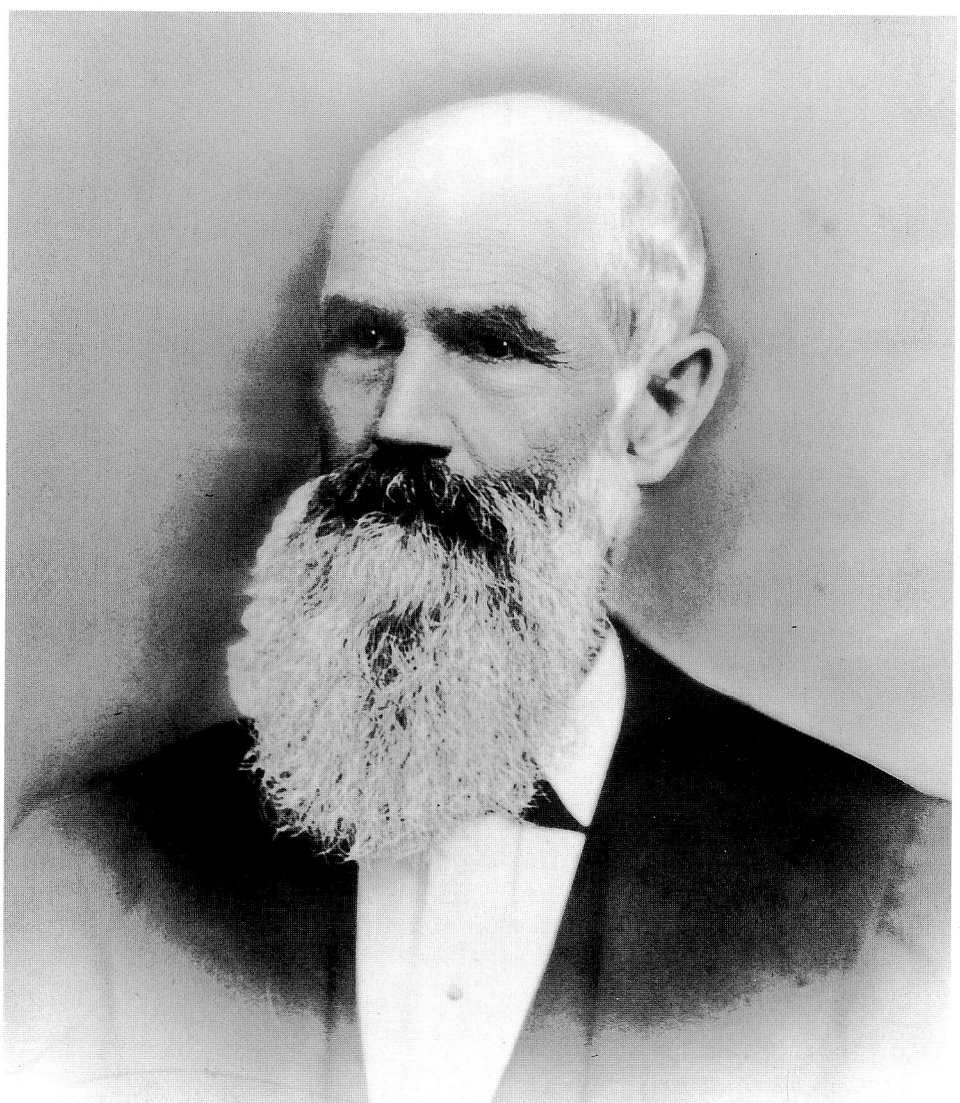
GEOLOGICAL CURATOR

Volume 6 Number 5



GEOLOGICAL CURATORS' GROUP

Registered Charity No. 296050

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

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

1996 COMMITTEE

 ISSN 0144 - 5294

Cover: Amos Henry Worthen (1813-1888). See article by Richard L. Leary and Susan Turner, p. 195-205.

THE GEOLOGICAL CURATOR

VOLUME 6, No.5

CONTENTS

PAPERS

TYPE, FIGURED AND CITED SPECIMENS IN THE MUSEUM OF ISLE OF WIGHT GEOLOGY (ISLE OF WIGHT, ENGLAND).
by J.D. Radley 187

THE WORTHEN COLLECTION OF PALAEOZOIC VERTEBRATES AT THE ILLINOIS STATE MUSEUM
by R.L. Leary and S. Turner 195

LOST AND FOUND 207

BOOK REVIEWS 209

GEOLOGICAL CURATORS' GROUP - 21ST ANNUAL GENERAL MEETING 213

GEOLOGICAL CURATORS' GROUP - April 1996

TYPE, FIGURED AND CITED SPECIMENS IN THE MUSEUM OF ISLE OF WIGHT GEOLOGY (ISLE OF WIGHT, ENGLAND)

by Jonathan D. Radley

Radley, J.D. 1996. Type, Figured and Cited Specimens in the Museum of Isle of Wight Geology (Isle of Wight, England). *The Geological Curator* 6(5): 187-193.

Type, figured and cited specimens in the Museum of Isle of Wight Geology are listed, as a consequence of a recent collection survey and subsequent documentation work. Strengths currently lie in Palaeogene gastropods, and Lower Cretaceous invertebrates and vertebrates in general. It is anticipated that further specmens belonging to these categories will be established as status material in the near future, given prevailing research interests in the collection.

Jonathan D. Radley, Geology Department, Bristol City Museum and Art Gallery, Queen's Road, Bristol, BS8 1RL, U.K. *Received 3rd November 1995; revised version received 13th January 1996.*

Introduction

The Museum of Isle of Wight Geology originated through the activities of the Isle of Wight Philosophical Society, which was established in 1810 and held meetings in the county town of Newport. Society members accumulated items of archaeological and natural historical interest, and these collections formed the basis of the first Isle of Wight Museum, founded at Newport Guildhall in 1852 (Norman 1887, p.224). Through the efforts of the honorary curator, Mr Ernest Wilkins, public awareness resulted in further growth of the collection and the Museum was relocated twice before public interest started to fade after the death of Mr Wilkins in 1881.

Soon after, the Newport Literary Society took custody of the collections which were ultimately housed in a new Newport Museum at Quay Street, Newport (Norman 1887, p. 224). Some time prior to 1887, the geology display was arranged by Mr Henry Keeping, who was in the employment of Adam Sedgwick at the Woodwardian Museum, Cambridge (Rickards 1979).

Levels of public interest in the new museum were low and by about 1905 most of the collection had been put into storage (Anon. 1910). In 1913, Mr Frank Morey arranged the removal of the geological collections to a room above the Free Library in Sandown (Jackson 1943). This was opened as a public museum in 1914, although work on the displays was not completed until 1923. Mr James Frederick Jackson came to the Island as Morey's assistant in 1924 and was curator of the Sandown Museum from 1925 to 1943 (Howe 1994).

From the late 1940s until 1974, the Sandown and Shanklin Urban District Council employed honorary custodians to care for the collections. Since 1974, the collections have been the responsibility of geological curators, employed by the Isle of Wight County Council and now reorganised as the Isle of Wight Council (Radley 1993*a*).

The collections almost wholly comprise locally collected Cretaceous and Tertiary fossils and sedimentary rock samples. J.F. Jackson, in particular, amassed a large number of Cretaceous and Palaeogene invertebrates. The collections of G.T. Woods and H.F. Poole were presented in 1938, and include Wealden reptile remains and other Lower Cretaceous fossils. The W.J.P. Burton bequest was accessioned in 1940 and largely comprises Palaeogene fossils, especially molluscs. Important collections of fossil vertebrates accessioned since the 1970s include those of Steve Hutt and Keith Simmonds (Wealden reptiles), and Andy Yule (Palaeogene reptiles).

The only existing published catalogues are those of J.F. Jackson (1925, 1928, 1929, 1930*a*, 1930*b*, 1933, 1938). These works comprise stratigraphically-ordered faunal lists, and are extremely useful in the context of stratigraphic palaeontology. Jackson omitted corresponding accession numbers in these and other papers (listed by Howe 1994), but the tabulated taxa can nevertheless sometimes be matched to specimens in the present collection. Such accessions are not included in the present list, but certainly deserve future documentation and publication.

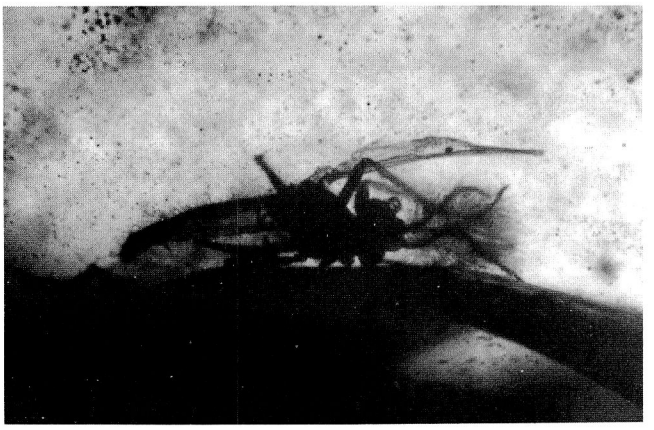


Figure 1. Chironomid midge (preserved in amber). IWCMS:1994.100. Wessex Formation, Wealden Group, Lower Cretaceous. Brightstone Bay, Isle of Wight. Wingspan: 2.9 mm. (Photograph by Peter Austen).

This catalogue provides a list of the type, figured and cited specimens that I encountered during a collection survey in 1993-94, and in subsequent documentation work. Given the importance of status specimens (Crowther 1990) and my impending move to a new post, I considered it judicious to publish at the present time.

Some of the listed specimens probably correspond to undetected citations of illustrations in the scientific literature. Specifically, recently published "popular" dinosaur texts may provide some records and I would urge current and future curatorial staff and volunteers of the Museum to make note of such records, as and when they are encountered. In addition, like Jackson's specimens (see above) numerous unnumbered citations exist in recent literature, which could be linked to museum holdings with a little work. If readers know of additional citations, I would be extremely grateful if they could contact me, or staff of the Museum of Isle of Wight Geology.

A significant number of Museum specimens have been recently listed in an unpublished thesis (Clarke 1993, appendix 1) and some of these have been subsequently cited and figured in several publications (noted herein). Similarly, Museum holdings will feature in postgraduate theses resulting from research currently (1996) being undertaken by Steve Hutt (Curator of the Museum of Isle of Wight Geology), Martin Munt (University of Portsmouth) and myself.

Stratigraphic terminology used herein is summarised by Radley (1994*a*) for the Lower Cretaceous, and Daley and Insole (1984) for the Upper Cretaceous and Palaeogene.

The collection bears two prefix codes: MIWG (Museum of Isle of Wight Geology: old system) and IWCMS (Isle of Wight County Museums Service: MDA code, 1994 onwards). Some citations correspond to papers currently (January 1996) in press. These works are all due for publication in 1996 and are recorded where appropriate.

Type, Figured and Cited Specimens

Lower Cretaceous Bivalves

Prohinnites favrinus (Pictet and Roux), MIWG 145 (collector: J.F. Jackson), cited.
Lower *Gryphaea* Beds, Ferruginous Sands Formation, Lower Greensand Group, Isle of Wight.
Harper, Radley and Palmer 1996 (in press).

Prohinnites favrinus (Pictet and Roux), MIWG 7176 (collector: J.D. Radley), cited.
Perna Beds Member, Atherfield Clay Formation, Lower Greensand Group, Redcliff, Isle of Wight.
Harper, Radley and Palmer 1996 (in press).

Prohinnites favrinus (Pictet and Roux), IWCMS: 1994. 20 (collector: J.D. Radley), cited.
Perna Beds Member, Atherfield Clay Formation, Lower Greensand Group, Redcliff, Isle of Wight.
Harper, Radley and Palmer 1996 (in press).

Prohinnites favrinus (Pictet and Roux), IWCMS: 1994. 137 (collector: J.D. Radley), cited.
Perna Beds Member, Atherfield Clay Formation, Lower Greensand Group, Redcliff, Isle of Wight.
Harper, Radley and Palmer 1996 (in press).

Prohinnites favrinus (Pictet and Roux), IWCMS: 1995. 222 (collector: J.D. Radley), cited.
Perna Beds Member, Atherfield Clay Formation, Lower Greensand Group, Redcliff, Isle of Wight.
Harper, Radley and Palmer 1996 (in press).

Upper Cretaceous Bivalves

Durania mortoni (Mantell), MIWG 5055 (collector: F. Mew), cited.
Glauconitic Marl, Lower Chalk, the Undercliff (coast between Luccombe and St. Catherine's Point), Isle of Wight.
Radley 1991, p. 148.

Durania mortoni (Mantell), MIWG 6675 (collected by the Isle of Wight Natural History and Archaeological Society), cited.
Chalk Marl, Lower Chalk, approximately 600m west-north-west of Compton Chine, Isle of Wight.
Radley 1991, p. 148.

Lower Cretaceous Gastropods

Viviparus fluviorum (J. Sowerby *non* de Montfort), MIWG 6685 (collector: P. Newbery), figured.
Wessex Formation (Bed 10 of Radley 1994*b*), Wealden Group, Yaverland foreshore, Isle of Wight.
Radley 1993*b*, pls1-2.

Viviparus fluviorum (J. Sowerby *non* de Montfort), MIWG 6709 (collector: J.D. Radley), figured.
Wessex Formation (Bed 10 of Radley 1994*b*), Wealden Group, Yaverland foreshore, Isle of Wight.
Radley 1993*b*, pls1-2.

Palaeogene Gastropods

Colwellia flexuosa (Edwards), MIWG 4778 (W.J.P. Burton bequest), cited.
Venus bed, Colwell Bay Member, Headon Hill Formation, Solent Group, Colwell Bay, Isle of Wight.
Nuttall and Cooper 1973, p. 210 (MIWG 748, ex-Newport Museum, also cited but unlocated in stores).

Pseudocominella solanderi (Cossmann), MIWG 1084 (collector: probably F. Morey or J.F. Jackson), cited.
Barton Clay, Barton Beds, Alum Bay, Isle of Wight.
Nuttall and Cooper 1973, p. 199.

Pseudocominella solanderi (Cossmann), MIWG 4720 (probably W.J.P. Burton bequest) cited.
Barton Clay, Barton Beds, Alum Bay, Isle of Wight.
Nuttall and Cooper 1973, p. 199.

Pseudocominella deserta (Solander), MIWG 3554 (collector: probably J.F. Jackson), cited.
Barton Clay, Barton Beds, Alum Bay, Isle of Wight.
Nuttall and Cooper 1973, p. 191.

Pseudocominella semicostata Nuttall and Cooper, MIWG 1930 (collector: probably J.F. Jackson), paratype.
Brockenhurst bed, Colwell Bay Member, Headon Hill Formation, Solent Group, Whitecliff Bay, Isle of Wight.
Nuttall and Cooper 1973, p. 197.

Sandbergeria vectiana, Munt and Barker, IWCMS:1995.254. 2 (collector: M. Munt), holotype.
Corbula beds, Cranmore Member, Bouldnor Formation, Solent Group, Cranmore, Isle of Wight.
Munt and Barker 1996 (in press).

Sandbergeria vectiana Munt and Barker, IWCMS:1995.254.1 (collector: M. Munt), paratype.
Corbula beds, Cranmore Member, Bouldnor Formation, Solent Group, Cranmore, Isle of Wight.
Munt and Barker 1996 (in press).

Strebloceras cornuoides Carpenter, IWCMS:1995.254.6 (collector: M. Munt), figured.
Corbula beds, Cranmore Member, Bouldnor Formation, Solent Group, Cranmore, Isle of Wight.
Munt and Barker 1996 (in press).

Pusillina tubrinata Leach, IWCMS:1995.2551 (collector: M. Munt), figured.
Corbula Beds, Cranmore Member, Bouldnor Formation, Solent Gorup, Cranmore, Isle of Wight.
Munt and Barker 1996 (in press).

Hydrobia sp., IWCMS:1995.255.2 (collector: M. Munt), figured.
Corbula beds, Cranmore Member, Bouldnor Formation, Solent Group, Cranmore, Isle of Wight.
Munt and Barker 1996 (in press).

Teinostoma decussatum Sandberger, IWCMS:1995.255.6 (collector: M. Munt), figured.
Corbula beds, Cranmore Member, Bouldnor Formation, Solent Group, Cranmore, Isle of Wight.
Munt and Barker 1996 (in press).

Teinostoma decussatum Sandberger, IWCMS:1995.255.7 (collector: M. Munt), figured.
Corbula beds, Cranmore Member, Bouldnor Formation, Solent Group, Cranmore, Isle of Wight.
Munt and Barker 1996 (in press).

Syrnola sp. IWCMS:1995.255.4 (collector: M. Munt), figured.
Corbula beds, Cranmore Member, Bouldnor Formation, Solent Group, Cranmore, Isle of Wight.
Munt and Barker 1996 (in press).

Lower Cretaceous Ammonites

Prodeshayesites obsoletus Casey, MIWG 88 (ex Newport Museum), figured.
Perna beds Member, Atherfield Clay Formation, Lower Greensand Group, Atherfield Point, Isle of Wight.
Casey 1961*a*, pl, 82, fig. 3.

Roloboceras hambrovi (Forbes), MIWG 3899 (collector: G.T. Woods), figured and cited.
Crackers Member, Atherfield Clay Formation, Lower Greensand Group, Atherfield, Isle of Wight.
Casey 1961*b*, pl. 29, figs 5a, b; p. 178, p. 180.

Sonneratia caperata Casey, MIWG 4461 (collector: G.R. Haynes), holotype.
Carstone Formation, Lower Greensand Group, Reeth Bay, Isle of Wight.
Casey 1965, pl. 87, figs 2a, b; p. 537.

Sonneratia rotator Casey, MIWG 4670 (collector: G.R. Haynes), figured and cited.
Carstone Formation, Lower Greensand Group, Reeth Bay, Isle of Wight.
Casey 1965, pl. 89, figs 4a, b; p. 525.

Sonneratia kitchini Spath var. *chalensis* Casey, MIWG 4388 (collector: H.F, F. Poole), holotype of variety.
Carstone Formation, Lower Greensand Group, Reeth Bay, Isle of Wight.
Casey 1965, pl. 89, fig. 6; p. 523.

Lower Cretaceous Insects

Coleopteran elytron, MIWG 7087 (collector: R.J. Twitchett), figured.
Shepherd's Chine Member, Vectis Formation, Wealden Group, beach west of Cowleaze Chine, Isle of Wight.
Twitchett 1994, fig. 3a.

Coleopteran elytron, MIWG 6672 (collector: B. Jarzembowski), cited.
? Shepherd's Chine Member, Vectis Formation, Wealden Group, foreshore near Shippards Chine, Isle of Wight.
Twitchett 1994, p. 48.

Coleopteran elytron, MIWG 7285 (collector: E.A. Jarzembowski), cited.
Shepherd's Chine Member, Vectis Formation, Wealden Group, Shepherd's Chine, Isle of Wight.
Twitchett 1994, p. 49.

Blattodean forewing, MIWG 7085 (collector: R.J. Twitchett), figured.
Shepherd's Chine Member, Vectis Formation, Wealden Group, beach west of Cowleaze Chine, Isle of Wight.
Twitchett 1994, fig. 3b.

Blattodean forewing, MIWG 7074 (collector: R.J. Twitchett), cited.
Basal Shepherd's Chine Member, Vectis Formation, Wealden Group, just west of Shepherd's Chine, Isle of Wight.
Twitchett 1994, p. 48.

Blattodean clavus, MIWG 7086 (collector: R.J. Twitchett), figured.
Shepherd's Chine Member, Vectis Formation, Wealden Group, beach west of Cowleaze Chine, Isle of Wight.
Twitchett 1994, fig. 3c.

Dipteran wing, MIWG 7102 (collector: R.J. Twitchett), figured.
Shepherd's Chine Member, Vectis Formation, Wealden Group, beach west of Cowleaze Chine, Isle of Wight.
Twitchett 1994, fig. 3d.

Chironomid midge, IWCMS:1994.9 (collector: G. Leng), figured.
Wessex Formation, Wealden Group, Brightstone Bay, Isle of Wight (locality details held at the Museum of Isle of Wight Geology and by Dr. E.A. Jarzembowski, Maidstone Museum and Art Gallery).
Geology Today, vol. 11 (2), (1995), front cover, contents page, p. 42.

Chironomid midge, IWCMS:1994.100 (collector: G. Leng), figured.
Wessex Formation, Wealden Group, Brightstone Bay, Isle of Wight (locality details held at the Museum of Isle of Wight Geology and by Dr. E.A. Jarzembowski, Maidstone Museum and Art Gallery).
Geology Today, vol. 11 (2), (1995), front cover, contents page, p. 42.

Lower Cretaceous Reptiles

Yaverlandia bitholos Galton, fragmentary skull cap, MIWG 1530 (collector: F.M.G. Abell), holotype.
"Upper Silty Bed", Wessex Formation, Wealden Group, north of the sea wall below Yaverland Battery, Yaverland foreshore, Isle of Wight (probably Bed 30 of Radley 1994*a*).
Galton 1971, text figs. 1, 2, pp. 41-43.

Hypsilophodon foxii Huxley, metatarsal of MIWG 4127 (collector: H.F. Poole), cited.
Hypsilophodon Bed, Wessex Formation, Wealden Group, Cowleaze Chine, Isle of Wight.
Galton 1974, p. 10, fig. 58.

Predatory dinosaur, MIWG 6348 (collector: K. Simmonds), figured and cited.
Unnamed plant debris bed approximately 17m. below the Grange Chine Black Band, Wessex Formation, Wealden Group, north-west of Grange Chine, Isle of Wight.
Hutt, Simmonds and Hullman 1989, figs 3-6; discussed throughout.
Radley 1994*d*, fig. 3.

Predatory dinosaur, MIWG 6352 (collector: K. Simmonds), figured and cited.
Wessex Formation, Wealden Group, Chilton Chine foreshore, Isle of Wight.
Hutt, Simmonds and Hullman 1989, figs 2, 4; discussed throughout.

Possible baryonychid tooth, MIWG 3642 (collector: Mrs. Mackenzie), figured and cited.
Wessex Formation, Wealden Group, Yaverland, Isle of Wight.
Martill and Hutt 1996 (in press).

Possible baryonychid tooth, MIWG 5120 (collector: S. Hutt), figured and cited.
Wessex Formation, Wealden Group, Hanover Point, Isle of Wight.
Martill and Hutt 1996 (in press).

Possible baryonychid tooth, MIWG 5122 (collector: S. Hutt), figured and cited.
Wessex Formation, Wealden Group, Isle of Wight.
Martill and Hutt 1996 (in press).

Possible baryonychid tooth, IWCMS:1995.207 (unknown collector), figured and cited.
Wessex Formation, Wealden Group, Isle of Wight.
Martill and Hutt 1996 (in press).

Possible baryonychid tooth, IWCMS:1995.208 (unknown collector), figured and cited.
Wessex Formation, Wealden Group, Isle of Wight.
Martill and Hutt 1996 (in press).

Possible baryonychid tooth, IWCMS:1995.209 (unknown collector), figured and cited.
Wessex Formation, Wealden Group, Isle of Wight.
Martill and Hutt 1996 (in press).

Iguanodon sp., rib (mounted thin section and three SEM stubs), MIWG 6770 (J. Clarke, thesis collection), figured and cited.
Bed SS24 (L11) of Stewart (1978), Wessex Formation, Wealden Group, Brightstone Bay, Isle of Wight.
Clarke and Barker 1993 (erroneously cited as MIWG 6671), figs 4-7; pp. 60-63.
Clarke 1994 (erroneously cited as MIWG 6670), figs 3, 4.

Iguanodon sp., sectioned vertebra, MIWG 5196 (collectors: Mr. & Mrs. Johnson & S. Hutt), figured and cited.
Diplocraterion ironstone, Shepherd's Chine Member, Wealden Group, 200m west of Atherfield Point, Isle of Wight.
Clarke 1990, pls. 1-6, figs 1-7; discussed throughout.

Clarke and Barker 1993, figs 2-3; pp. 57-63.
Clarke 1994, fig. 6.

Iguanodon sp., centrum of caudal vertebra, MIWG 5385 (collector: S. Hutt), cited.
Wessex Formation, Wealden Group, Grange Chine beach, Isle of Wight.
Clarke and Barker 1995, p. 906.

Iguanodon sp., centrum of caudal vertebra, MIWG 5454 (unknown collector), cited.
Wessex Formation, Wealden Group, Isle of Wight.
Clarke and Barker 1985, p. 906.

Iguanodon sp., centrum of caudal vertebra, MIWG 7320 (unknown collector), figured and cited.
Wessex Formation, Wealden Group, Isle of Wight.
Clarke and Barker 1995, text figs 4, 6, 8, pl. 1., figs 1, 3, 4, 5, 7, 8, 9; pp. 906, 912-913.

Iguanodon sp., centrum of caudal vertebra, IWCMS:1994.14 (unknown collector), figured and cited.
Wessex Formation, Wealden Group, Isle of Wight.
Clarke and Barker 1995, (erroneously cited as IWGMS:1994.14), text figs 3, 5, 7, pl.1., figs 2, 6; pp. 906, 908.

Iguanodon bernissartensis Boulenger, MIWG 5126 (collector: S. Hutt), figured.
Approximately 10m below the top of the Wessex Formation, Wealden Group, Barnes High, Isle of Wight.
Radley 1993*a*, fig. 1 (number not cited).
Radley 1994*d*, fig. 9.

Iguanodon atherfieldensis Hooley, MIWG 6344 (collector: K. Simmonds), figured.
Unnamed plant debris bed approximately 17m below the Grange Chine Black Band, Wessex Formation, Wealden Group, north-west of Grange Chine, Isle of Wight.
Radley 1994*c*, fig. 2 (number not cited).

Polacanthus foxi Hulke, ossicles and tail plate base, MIWG 37 (ex Newport Museum), cited.
Wessex Formation, Wealden Group, Brook Bay, Isle of Wight.
Blows 1987, Appendices 1 and 2.

Polacanthus foxi Hulke, dorsal spine, MIWG 1191a (collector unknown), cited.
Wessex Formation, Wealden Group, Isle of Wight (unlocated in stores).
Blows 1987, Appendices 1 and 2.

Polacanthus foxi Hulke, ossicle and sacral shield fragment, MIWG 1983 (collector: F.M.G. Abell), cited.
Wessex Formation, Wealden Group, Yaverland, Isle of Wight.
Blows 1987, Appendix 1.

Polacanthus foxi Hulke, ossicle, MIWG 4222 (collector: H.F. Poole), cited.
Wessex Formation, Wealden Group, Yaverland, Isle of Wight.
Blows 1987, Appendix 1.

Polacanthus foxi Hulke, caudal vertebra, MIWG 5144 (collector: Mrs. Hodgson), cited.
Wessex Formation, Wealden Group, Brook Bay, Isle of Wight.
Blows 1987, Appendices 1 and 2.

Polacanthus foxi Hulke, caudal plate fragment, MIWG 5145 (collector: S. Hutt), cited.
Wessex Formation, Wealden Group, between Grange Chine and Chilton Chine, Isle of Wight.
Blows 1987, Appendix 1.

Polacanthus foxi Hulke, plate fragments and ossicle, MIWG 5186 (collector: S. Hutt), cited.
Wessex Formation, Wealden Group, Brook Bay, Isle of Wight.
Blows 1987, Appendix 1.

Polacanthus foxi Hulke, ossicles, MIWG 5187 (collector: S. Hutt), cited.
Wessex Formation, Wealden Group, Brook Bay, Isle of Wight.
Blows 1987, Appendix 1.

Polacanthus foxi Hulke, centrum of dorsal vertebra, MIWG 5188 (ex Newport Museum), cited.
Wessex Formation, Wealden Group, Isle of Wight.
Blows 1987, Appendices 1 and 2.

Polacanthus foxi Hulke, dorsal spine, MIWG 5307 (collector: S. Hutt), cited.
Wessex Formation, Wealden Group, approximately 300m north-west of Grange Chine, Isle of Wight.
Blows 1987, Appendices 1 and 2.

Brachiosaurid sauropod femur, MIWG 6484 (collector: S. Hutt), figured and cited.
Approximately 10m below the top of the Wessex Formation, Wealden Group, Barnes High, Isle of Wight.
Radley 1994*d*, fig. 4.
Blows 1995, text fig. 5b; p. 194.

Brachiosaurid sauropod humerus, MIWG 5211 (collector: S. Hutt) figured and cited.
Wessex Formation, Wealden Group, between Chilton Chine and Grange Chine, Isle of Wight.
Blows 1995, text fig. 5c; p. 194.

Palaeogene Reptiles

Diplocynodon hantoniensis (Owen), MIWG 6486 (collector: A. Yule), jaw figured.
Headon Hill Formation, Solent Group, foreshore approximately 1km east of Fishbourne Creek, Isle of Wight.
Hutt, Simmonds and Hullman 1989, fig. 3.

Palaeogene Mammals

Eotalpa anglica Sige, Crochet & Insole, tooth, MIWG 5355 (collector: J. Hooker), holotype.
'Lower Headon Beds', Headon Hill Formation, Solent Group, Headon Hill, Isle of Wight.

Sige, Crochet and Insole 1977, pl. 1, fig. 1a-c; pp. 144-145.

Eotalpa anglica Sige, Crochet & Insole, tooth, MIWG 5356 (collector: J. Hooker), figured and cited.
'Lower Headon Beds', Headon Hill Formation, Solent Group, Headon Hill, Isle of Wight.
Sige, Crochet and Insole 1977, pl. 1, fig. 2a-c; p. 145.

Pleistocene Mammals

Bos sp., mandible, MIWG 1776 (collector: M. Thorne), cited.
Pleistocene, Newtown, Isle of Wight.
Munt and Burke 1986, p. 7, unlocated in stores.

Lower Cretaceous Reptilian Ichnofossils

Iguanodontid footcast, MIWG 5419 (collectors: staff of the Museum of Isle of Wight Geology), figured.
Wessex Formation, Wealden Group, Hanover Point, Isle of Wight.
Radley 1994*a*, fig. 3a.

Sauropod or ankylosaur footcast, MIWG 6508 (collector: P. Manning), figured.
Wessex Formation, Wealden Group, Brook Bay, Isle of Wight.
Radley 1994*a*, fig. 3b.

Theropod footcast, MIWG 5768 (collector: J. Crouch), figured and cited.
Shepherd's Chine Member, Vectis Formation, Wealden Group, Cowleaze Chine beach, Isle of Wight.
Radley 1994*a*, fig. 3c.
Radley 1994*e*, photo 1.
Radley 1994*f*, p. 134.

Theropod digit cast, MIWG 6343 (collector: unknown), figured.
Shepherd's Chine Member, Vectis Formation, Wealden Group, Cowleaze Chine beach, Isle of Wight.
Radley 1994*a*, fig. 3d.
Radley 1994*e*, photo 2.

Lower Cretaceous: derived Lower Jurassic clast

MIWG 6408 (collector: S. Hutt), cited.
3m below Grange Chine Black Band, Wessex Formation, Wealden Group, 500m east of Grange Chine, Isle of Wight.
Radley 1993*c*, discussed throughout (number not cited).

References

ANON. 1910. The Isle of Wight Museum. *Isle of Wight County Press*, 19th November.

BLOWS, W.T. 1987. The armoured dinosaur *Polacanthus foxi* from the Lower Cretaceous of the Isle of Wight. *Palaeontology* **30**, 557-580.

BLOWS, W.T. 1995. The Early Cretaceous brachiosaurid dinosaurs *Ornithopsis* and *Eucamerotus* from the Isle of Wight, England. *Palaeontology* **38**, 187-197.

CASEY, R. 1961*a*. The stratigraphical palaeontology of the Lower Greensand. *Palaeontology* **3**, 487-621.

CASEY, R. 1961*b*. The Ammonoidea of the Lower Greensand, Part 3. *Monograph of the Palaeontographical Society*, 119-126, pls. 26-35.

CASEY, R. 1965. The Ammonoidea of the Lower Greensand, Part 6. *Monograph of the Palaeontographical Society*, 399-546, pls. 67-90.

CLARKE, J.B. 1990. Diagenetic and compactional history of an *Iguanodon* vertebra from the Vectis Formation of the Isle of Wight. *Proceedings of the Isle of Wight Natural History and Archaeological Society* **10**, 149-158.

CLARKE, J.B. 1993. *The diagenesis of Lower Cretaceous vertebrate fossils from the Purbeck Formation of Durlston Bay, Dorset, and the Wealden Group of the Isle of Wight.* Unpublished M. Phil. Thesis, The Open University.

CLARKE, J.B. 1994. Authigenic minerals in vertebrate fossils from the Wealden Group (Lower Cretaceous) of the Isle of Wight. *Geological Curator* **6**, 11-15.

CLARKE, J.B. and BARKER, M.J. 1993. Diagenesis in *Iguanodon* bones from the Wealden Group, Isle of Wight, Southern England. *Kaupia-Darmstädter Beiträge zur Naturegeschichte* **2**, 57-65.

CLARKE, J.B. and BARKER, M.J. 1995. Abnormal histology in an *Iguanodon* caudal centrum from the Lower Cretaceous of the Isle of Wight. *Palaeontology* **38**, 905-914.

CROWTHER, P.R. 1990. Collection care and status material. *In* Briggs D.E.G. and Crowther, P.R. (eds). *Palaeobiology, a synthesis*. Pp. 515-517. Blackwell, Oxford.

DALEY, B. and INSOLE, A, 1984. *The Isle of Wight.* Geologists' Association Guide No. 25.

GALTON, P.M. 1971. A primitive dome-headed dinosaur (Ornithischia: Pachycephalosauridae) from the Lower Cretaceous of England and the function of the dome of pachycephalosaurids. *Journal of Paleontology* **45**, 40-47.

GALTON, P.M. 1974. The ornithischian dinosaur *Hypsilophodon* from the Wealden of the Isle of Wight. *Bulletin of the British Museum (Natural History) Geology* **25**, 1-152.

HARPER, E.M., RADLEY, J.D. and PALMER, T.J. 1996 (in press). Early Cretaceous cementing pectinid bivalves. *Cretaceous Research* **17**.

HOWE, S.R. 1994. James Frederick Jackson 1894-1966. *The Geological Curator* **5**, 343-366.

HUTT, S., SIMMONDS, K. and HULLMAN, G. 1989. Predatory dinosaurs from the Isle of Wight. *Proceedings of the Isle of Wight Natural History and Archaeological Society* **9**, 137-146.

JACKSON, J.F. 1925. A catalogue of Eocene and Oligocene fossils in the Museum of Isle of Wight Geology, The Free Library, Sandown. *Proceedings of the Isle of Wight Natural History and Archaeological Society* **1**, 340-373.

JACKSON, J.F. 1928. A supplementary catalogue of Eocene and Oligocene fossils in the Mueum of Isle of Wight Geology, The Free Library, Sandown. *Proceedings of the Isle of Wight Natural History and Archaeological Society* **1**, 571-579.

JACKSON, J.F. 1929. A catalogue of Cretaceous fossils in the Museum of Isle of Wight Geology, The Free Library, Sandown. Part I: Upper Cretaceous. *Proceedings of the Isle of Wight Natural History and Archaeological Society*, **1**, 659-682.

JACKSON, J.F. 1930*a*. A supplementary catalogue of Upper Cretaceous fossils in the Museum of Isle of Wight Geology, The Free Library, Sandown. *Proceedings of the Isle of Wight Natural History and Archaeological Society* **2**, 39-44.

JACKSON, J.F. 1930*b*. A supplementary catalogue of Cretaceous fossils in the Museum of Isle of Wight Geology, The Free Library, Sandown. Part II: Lower Cretaceous. *Proceedings of the Isle of Wight Natural History and Archaeological Society* **2**, 45-61.

JACKSON, J.F. 1933. A supplementary list of fossils in the Museum of Isle of Wight Geology, The Free Library, Sandown. *Proceedings of the Isle of Wight Natural History and Archaeological Society* **2**, 311-318.

JACKSON, J.F. 1938. A second supplementary list of fossils in the Museum of Isle of Wight Geology, The Free Library, Sandown. *Proceedings of the Isle of Wight Natural History and Archaeological Society* **3**, 58-72.

JACKSON, J.F. 1943. History of the collection (unpublished notes in Jackson's specimen register, held at the Museum of Isle of Wight Geology).

MARTILL, D.M. and HUTT, S. 1996 (in press). Possible baryonychid teeth from the Wessex Formation (Lower Cretaceous, Barremian) of the Isle of Wight, England. *Proceedings of the Geologists' Association* **107**.

MUNT, M.C. and BARKER, M.J. 1996 (in press). Some micromorphic gastropods from the *Corbula* beds, Cranmore Member (Solent Group, Early Oligocene) of the Isle of Wight, southern England. *Tertiary Research*.

MUNT, M.C. and BURKE, A. 1986. The Pleistocene geology and faunas at Newtown, Isle of Wight. *Proceedings of the Isle of Wight Natural History and Archaeological Society* **8**, 7-14.

NORMAN, M.W.M. 1887. *A Popular Guide to the Geology of the Isle of Wight*. Knight's Library, Ventor.

NUTTALL, C.P. and COOPER, J. 1973. A review of some English Palaeogene Nassariidae, formerly referred to *Cominella*. *Bulletin of the British Museum (Natural History), Geology* **23**, 179-219, Pls. 1-9.

RADLEY, J.D. 1991. Rudist bivalves from the Lower Chalk (Cenomanian) of the Isle of Wight. *Proceedings of the Isle of Wight Natural History and Archaeological Society* **10**, 148.

RADLEY, J.D. 1993*a*. Museum File 25: The Museum of Isle of Wight Geology. *Geology Today* **9**, 236-237.

RADLEY, J.D. 1993*b*. An occurrence of *Viviparus fluviorum* in the Wessex Formation (Wealden Group, Lower Cretaceous) of Sandown Bay, Isle of Wight. *Proceedings of the Isle of Wight Natural History and Archaeological Society* **11**, 97-100.

RADLEY, J.D. 1993c. A derived Jurassic clast from the Wealden Group (Lower Cretaceous) of the Isle of Wight, southern England. *Proceedings of the Geologists' Association* **104**, 71-73.

RADLEY, J.D. 1994*a*. Field Meeting, 24-25 April, 1993: the Lower Cretaceous of the Isle of Wight. *Proceedings of the Geologists' Association* **105**, 145-152.

RADLEY, J.D. 1994*b*. Stratigraphy, palaeontology and palaeoenvironment of the Wessex Formation (Wealden Group, Lower Cretaceous) at Yaverland, Isle of Wight, southern England. *Proceedings of the Geologists' Association* **105**, 199-208.

RADLEY, J.D. 1994*c*. News from the Museum of Isle of Wight Geology. *The Geological Curator* **6**, 28-29.

RADLEY, J.D. 1994*d*. Collecting dinosaurs on the Isle of Wight, southern England. *The Geological Curator* **6**, 89-96.

RADLEY, J.D. 1994*e*. Tracking a carnivorous dinosaur on the Isle of Wight. *Earth Heritage* **2**, 15.

RADLEY, J.D. 1994*f*. Geological records for 1991-1992. *Proceedings of the Isle of Wight Natural History and Archaeological Society* **12**, 133-137.

RICKARDS, R.B. 1979. The physical basis of palaeontological curating. *In* Bassett, M.G (ed.) Curation of palaeontological collections. *Special Papers in Palaeontology* **22**, 75-86.

SIGE, B., CROCHET, J. and INSOLE, A, 1977. Les plus vieilles taupes. *Géobios Mémoir spécial* **1**, 141-157.

STEWART, D.J. 1978. *The sedimentology and palaeoenvironment of the Wealden Group of the Isle of Wight, southern England.* Unpublished Ph.D. Thesis. Portsmouth Polytechnic.

TWITCHETT, R.J. 1994. A new Lower Cretaceous insect fauna from the Vectis Formation (Wealden Group) of the Isle of Wight. *Proceedings of the Geologists' Association* **106**, 47-51.

THE WORTHEN COLLECTION OF PALAEOZOIC VERTEBRATES AT THE ILLINOIS STATE MUSEUM

by Richard L. Leary & Susan Turner

Leary, R.L. & Turner, S. 1996. The Worthen Collection of Palaeozoic vertebrates at the Illinois State Museum. *The Geological Curator* 6(5): 195-205.

The Illinois State Museum holds a very important Palaeozoic fish collection, containing almost half of the material which was the basis for the Geological Survey of Illinois palaeontology reports at the end of the last century. The other major part of the material studied by Amos H. Worthen and Orestes St. John is at the Museum of Comparative Zoology, Cambridge, Massachusetts. The Worthen collection of vertebrate fossils at the Illinois State Museum had not been adequately curated since nearly being destroyed by a move without expert museum supervision over 100 years ago. Recuration of the vertebrates has resulted in a new catalogue of the fossils.

Richard L. Leary, Illinois State Museum, Springfield, Illinois, 62706, USA and Susan Turner, Queensland Museum, P.O. Box 3300, S. Brisbane, Queensland 4101, Australia.
Received 1st March 1996.

Introduction

For one week in April 1983, Susan Turner visited the Illinois State Museum to examine Palaeozoic vertebrate fossils. Most of the fossils in the Museum were collected in the mid-nineteenth century by noted amateur-turned-professional, Amos Henry Worthen (1813-1888, Figure 1). During a move to a new museum location in 1887, the fossils were literally shovelled into boxes. This event almost certainly contributed to Worthen's subsequent rapid decline and death in 1888. In the 1960s, Leary undertook a search for all recognizable type and figured specimens in the State Museum. Of the supposed 4700 described and 3500 figured specimens claimed by Museum Director A. R. Crook in 1910, Leary (1971) could locate only 66, six of which were vertebrate specimens (five types, two questionable; and one figured). Following enquiries from Turner about the whereabouts of a Lower Carboniferous shark, *Thrinacodus* St John and Worthen 1875, the authors planned to make further joint searches of the collection.

Upon Turner's arrival in Springfield, we decided that it was time to recurate the collection as well as possible. The specimens were collected together in a bank of drawers within the Carboniferous section of the Museum's basement storage (Figure 2). Loose labels had been retained in a separate box. Most fossils had on them a small handwritten number in ink (e.g., Figure 3). These could be matched with labels in some cases. The numbers beginning with a '3' came from the old Geological Survey collections, presumably collected by Worthen prior to 1858; those beginning with a '7' are vertebrates collected by Worthen or his co-collectors; those beginning with '13' are later additions. Some of the fossils are figured specimens or specimens studied for the classic works of Newberry and Worthen (1866) and St John and Worthen (1875, 1883). A further few important specimens have been recognized in the latest search. These were designated TYPE or Figured by St John and Worthen. As others have recognized (e.g., Kent 1982), the use of the term TYPE by Worthen and colleagues does not necessarily mean a type specimen in the modern sense. However, such designated specimens were undoubtedly used by Worthen and co-workers in formulating descriptions.

History of Worthen's Collection

The broad outlines of Worthen's life are well known (Bliss and White 1890, Kent, 1982). He was essentially a self-taught geologist being inspired and stimulated by another well-known amateur, Gideon Mantell, whose books *Wonders of Geology* (1838) and *Medals of Creation* (1844) were the first he acquired (Bliss 1890). His early finds in the geode beds near Warsaw, Illinois, where he moved in 1836, led him on to be the chief exponent on Lower Carboniferous geology and palaeontology of Illinois. Worthen was appointed State Geologist in 1858 (Kent 1982). His and his colleagues' pioneer work on the vertebrate faunas of the Carboniferous of mid-USA has not yet been superceded. Worthen was the first to recognize the importance of what he called the "platforms of death" - beds crowded with fish remains found in the lower *Archimedes* (Keokuk) Limestone; he published his first papers on these beds (Worthen 1857). His discoveries

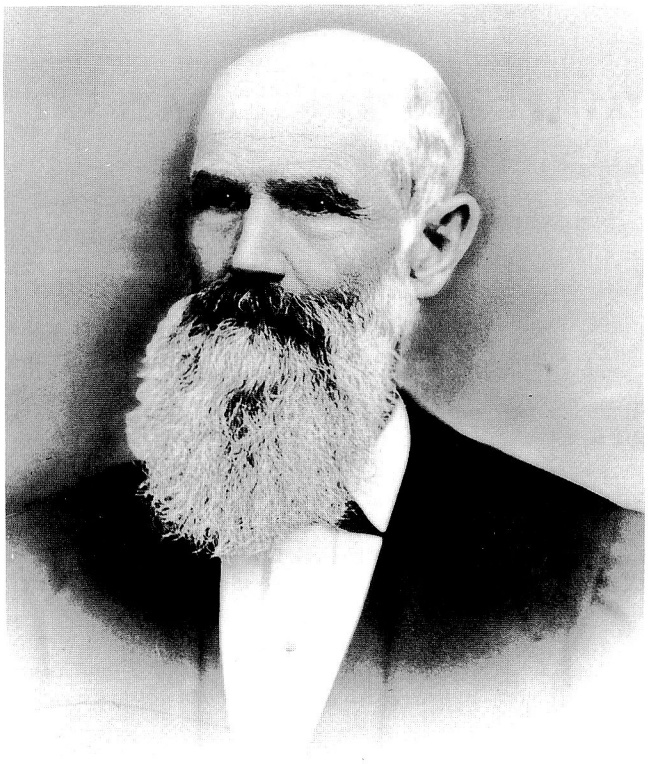


Figure 1. Amos Henry Worthen (1813-1888) - photograph Illinois State Museum.

Figure 2. Examples of current layout of Worthen specimens.

interested Louis Agassiz anew to resume his work on fossil fish (Bliss 1890) and led to his collaboration with two of America's greatest Palaeozoic fish workers, John Strong Newberry (Kemp 1892) and Agassiz's student, Orestes St. John (Keyes 1921). Only recently has interest been revived in these important sequences. After a spell in Massachusetts, Worthen returned to Warsaw in 1844 and resumed collecting, spending more time on his collections than on his business, which eventually was sold in 1855. By that time he was established as an expert in the field and began work for Dr. J. G. Norwood at the budding Geological Survey of Illinois.

Kent (1982, p.3) has discussed the collecting of that period. Worthen worked assiduously to form the nucleus of a State Museum collection. For several years the Illinois collections were housed at New Harmony, Indiana, a centre for scientific study in mid-century. The museum collections were moved to Springfield in 1855. After a rough passage on the river, the collection was stored first in the Supreme Court Building, then in the Senate Chamber where it was open to view in the winters of 1855 and 1856, and finally in the new Arsenal building (Figure 4), where working conditions were sadly inadequate (Crook 1907).

In 1858, after a period as James Hall's assistant on the Geological Survey of Iowa, Worthen replaced Norwood as State Geologist. Hall acknowledged Worthen's valuable aid on the survey: "My assistant - whose intimate acquaintance with the principal localities of the Carboniferous limestones in the Mississippi valley, enabled me to accomplish my investigation in much less time and with far more satisfaction than I should otherwise have been able to do in a single season. We explored together these formations as far as the mouth of the Ohio, after which Mr Worthen carried on, under my direction, the observations through Tennesee and Alabama, with a view to the recognition of the groups established in the investigation in Iowa, Illinois, and Missouri." (Hall 1857). In his time as State Geologist, Worthen enlisted many outstanding palaeontologists to study Illinois fossils, the results of which were published in eight tomes between 1866 to 1890 (two of which dealt thoroughly with fossil fishes), volumes referred to as the Worthen Survey (Bergstrom 1982) (Figure 5).

During his collecting, Worthen spent much time trying to provide duplicate sets of specimens to the educational institutions of the State. The State collections built up and were again moved to a rented room in the Springfield Masonic Hall where they were partially saved from fire in 1871 by the prompt action of Worthen's son, Charles. However, much was damaged by water and specimens and labels were lost (Kent 1982). The collections were moved again, this time to the basement of the new state capitol building. In 1875, the State Legislature, in the belief that everything was then known about the geology and natural resources of Illinois, disbanded the State Geological Survey. Worthen immediately pressed for

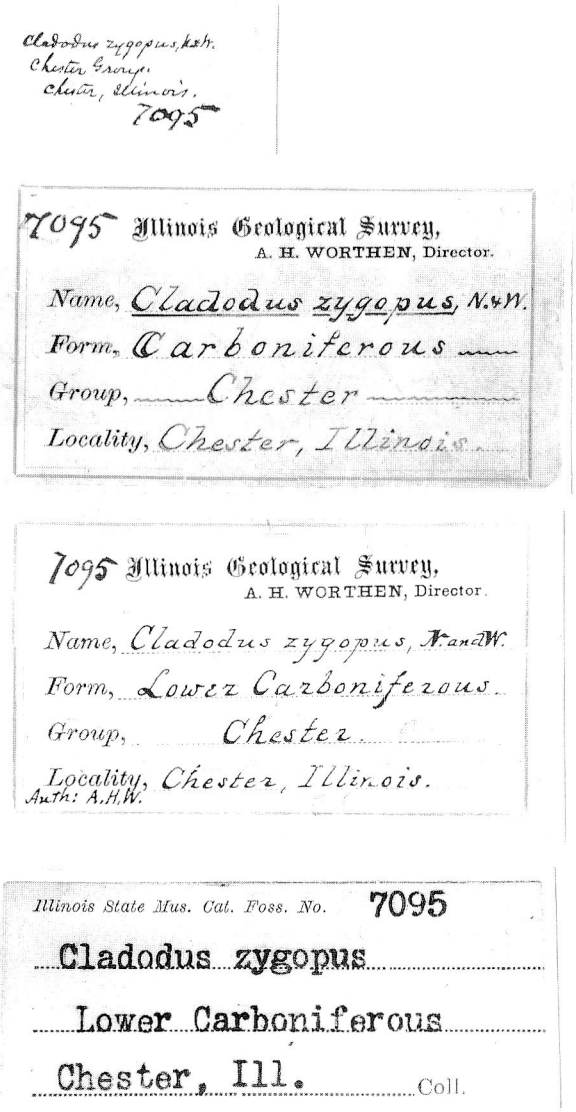


Figure 3. Labels associated with the Worthen collection and specimens.

a State Cabinet of Natural History but was not successful (Kent 1982). He kept the collections in his care and worked without pay until 1877, when finally the Legislature established the State Historical and Natural History Museum. Worthen was made first Curator, reimbursed to the tune of $1897.50, and the collections moved again to be stored in the basement of the new Capitol building. For moving and increasing the collections, $2500 was appropriated and the museum transferred "...and established in creditable style in the west wing of the third floor of the State House." (Crook, 1907).

During the next 10 years Worthen moulded the State Museum collection, selecting a complete series of Carboniferous fossils and separating these from the mass of Geological Survey material. The collections were then organized with the assistance of Fannie Fisher who served the museum almost continuously until her death in 1935. Then in 1887 came the disasterous move which ruined all that careful and

Figure 4. The Arsenal, Springfield, one of the former repositories of Worthen's collection.

patient work. Kent (1982) tells us that "against Worthen's wishes and during his absence from town", the museum was moved from the third floor to the main floor and basement of the State House. This was done on higher authority by ordinary laborers of a furniture moving firm "who had no more idea of the value of museum materials than Geronimo had of Shakespeare" with no supervision (Crook 1907). Lindahl, Worthen's successor, explained how "only in exceptional circumstances were the labels fixed to the specimens, and none of these had any numbers written or painted on them. Labels and specimens were therefore shovelled into the drawers and showcases at haphazard, and by no means always so that the labels belonged to any specimens in the same drawer" (Crook 1907). In the basement it was worse, for the workmen piled up the collections of 35 years into a rubbish pile, where eventually Lindahl retrieved what he could and put it in a locked room, "after much arguing". Worthen was a broken man. He told Fannie that he could never attempt

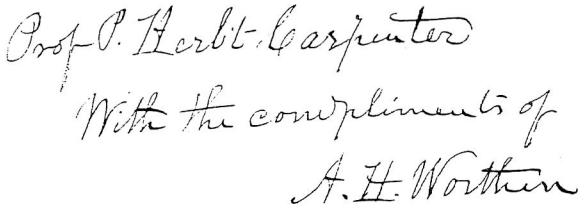


Figure 5. Example of Amos Henry Worthen's writing. Dedication written in University of Queensland Geology library copy of a Geological Survey of Illinois volume.

Figure 6. The present day Illinois State Museum at Springfield, Illinois

to remedy the havoc. Later Lindahl did what he could, devoting "years of assiduous work" to save what could be saved. Kent (1982) outlined the subsequent history of the collection and attempts made by successive curators to maintain it.

The Museum acquired a more permanent home in 1923 when the Centennial Memorial Building was completed and finally the present museum was built in 1963 (Figure 6). Various inroads have been made on the collections at various times. Kent (1982) has mentioned three effects which have led to a depletion of the collection. For instance, J. Marvin Weller removed material to the Geological Survey in Urbana in 1938-39, which may have included some vertebrate material. Worthen's handwritten catalogue was located in the Museum in 1962 and this helps to recognize type and figured specimens. However, as Kent reiterated, Worthen's concept of a type specimen was not as it is now understood; and so several specimens in each taxon might be designated "type". Kent explains the numbering system and the duplication of numbers that can occur so that 3000 numbers can become 13000 numbers. We are pleased to think that in mid-1983 at least the vertebrate part of Worthen's collection in the State Museum was almost back to its original condition, and we hope Worthen would feel a little easier if he could see it today. However, in 1988 the museum's collections were again moved. They now reside in an old factory building renovated as a collections and research facility; the collections storage area has precisely controlled temperature and humidity which will further protect the fossil collection. There, yet again, Worthen's collection awaits reorganization and further curation.

Geology

Worthen collected vertebrate fossils from the Middle Devonian to Upper Carboniferous in Illinois. The oldest fish fossils collected by Worthen are from the Middle Devonian of Jackson County in southwestern Illinois. The Lingle Formation, which Worthen referred to as the Hamilton Formation, and the underlying Grand Tower Formation, are exposed at the Devil's Backbone, prominent ridges along the Mississippi River at Grand Tower, Illinois. Specimens in the Worthen collection are from both formations (Joseph Devera, pers. comm.). The locality is shown in fine engraving from Worthen and Meek (1868) in volume III of the Geological Survey of Illinois (Figure 7).

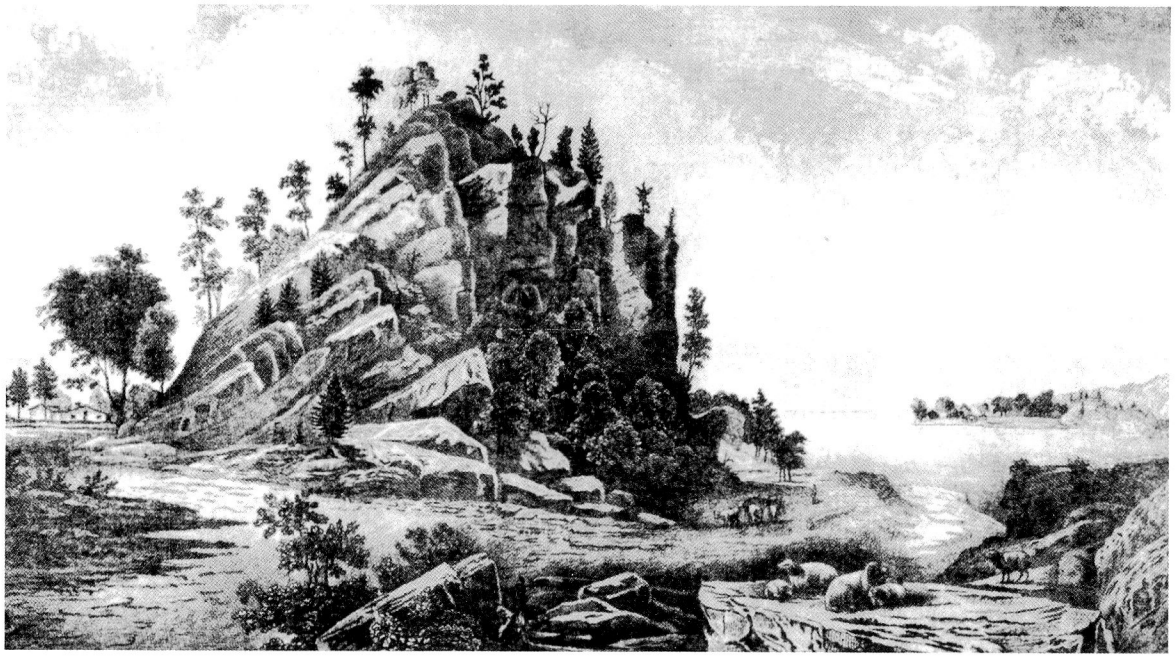


Figure 7. The Devil's Backbone, along the Mississippi River at Grand Tower, Illinois, one of Worthen's fossil collecting localities (from Worthen and Meek 1868).

Although not included in his description of Carboniferous "fish beds" (Worthen 1866), the deposits of the Middle Devonian Lingle and Grand Tower formations are similar. They consist of horizons of concentrated fragmentary fish remains. The Lingle limestone is equivalent to the Waspsipinicon and Cedar Valley of northern Illinois. "The Middle Devonian is dominantly limestone, although it is dolomitic in some areas. The upper part grades laterally to black shale in the deeper part of the Illinois Basin and a thin sandstone or sandy limestone occurs at the base in many areas. The Middle Devonian strata are generally very fossiliferous and the large fauna is dominated by brachiopods, corals, and conodonts, although other forms are common." (Willman *et al.* 1975, pp. 113-4]

Newberry and Worthen (1866, pp. 14 & 15) wrote regarding the origin of the fish beds: "It [the formation of the fish beds] seems to have been the probable result of one of two causes: either a superabundant development of ichthyic life during the accumulation of the sedimentary materials that forms these thin beds of limestone, or else (and more probably) from the sudden introduction of heated waters or noxious gases, that caused a general and overwhelming destruction of the finny tribes of the Carboniferous ocean at these different periods. Such destructive agents may have been introduced, either by the action of submarine volcanoes or of thermal springs, and it is perhaps quite impossible, at the present time, to determine to which of these causes, if either, we are indebted for the phenomena we are now considering". Later they added, "With a profound conviction that the suggestions thus thrown out are not altogether a satisfactory answer to the query propounded, we have nevertheless felt impressed to offer them as the most probable solution presented by the facts before us, and with the hope that they may lead to further investigation and a more satisfactory answer to this interesting inquiry." Earlier they wrote (p.11), "The fossilized remains of fishes were observed in the Subcarboniferous limestone of Illinois, by one of the authors (A.H.W.), as early as 1845; and the fact that they were the only memorials of the vertebrated animals of the Carboniferous then known in this country gave this class of fossils a peculiar interest". However, in spite of this recognition of their importance and call for further work, these fossils have remained largely unstudied during the intervening 130 years.

Collections

The State Museum collection of Palaeozoic vertebrates at Springfield was donated by A. H. Worthen effectively in 1855. Other parts of the vertebrate collections of Worthen and his co-collectors are safely housed and catalogued at the University of Illinois (Hansman and Scott 1967). The Museum of Comparative Zoology, Harvard University, contains material donated by Orestes St. John which contains Worthen and Charles Wachsmuth material; the Paleobiology Section of the Smithsonian Institution houses the Frank Springer and some of St. John's collection, part of which undoubtedly came from Worthen. The State Museum collection is of importance because of the large percentage of type material which has been effectively unavailable until properly curated. There are specimens collected by Worthen himself, by Alexander (Alex) Butters, Anderson, Fletcher, Frank Springer (Schuchert 1927), members of the State Geological Survey, and there are written notes from St. John and Worthen with the material. Worthen began to write up the fish material on his own in 1857 and continued to be interested in the palaeoecological aspects of the bonebeds (Worthen 1870). He co-operated with some of the expert fish palaeontologists of his day, assisting John Strong Newberry (1822-1892), then professor of Geology in the School of Mines, Columbia College, New York, in two major monographs on the Carboniferous fish (1866 and 1870). Later, Worthen co-authored two major works on the fish with Orestes Hawley St John (1875, 1883).

There is a need to review all the nineteenth century work done on Palaeozoic vertebrates because of their increasing use in biostratigraphical studies. Some of Worthen's material has undergone review in recent years (e.g., Maisey 1984, Lund 1985, Hansen 1987) and other taxa are now being studied as part of a recent UNESCO-IUGS International Geological Correlation Programme project 328 on Palaeozoic Microvertebrates (1991-1995). The perceived lack of adequate original diagnoses which Newberry, St John and Worthen and others gave, albeit typical of the time, has led to a feeling that these fossils are of little use in biostratigraphy. However, as Newberry himself realised, there is potential for use of Worthen's collection because the specimens were collected systematically, beautifully illustrated and well-documented. The specimens can be tied into the modern succession in mid-USA with ease to provide a framework of vertebrate faunas for use by the biostratigrapher.

Below is a list of the known Worthen specimens in the Illinois State Museum. It might be possible in time to identify more Worthen material. Each entry lists museum accession number, name recorded, any comments on condition and number of specimens, geological horizon and locality, collector and date of collection where known, and any reference to published works. Original documentation is housed at the Illinois State Museum.

CATALOGUE OF WORTHEN SPECIMENS AT ILLINOIS STATE MUSEUM

by Susan Turner

Abbreviations: *, **FIGD** = Figured specimen according to label; + = 2 disparate specimens with the same number; AN = Anderson; B = Alexander Butters; BUL = Burlington Limestone; CG = Chester Group; CL = Chester Limestone; CM = Coal Measures; Co. = County; Dev. = Devonian; F -= Fletcher; Fm. = Formation; Gp = Group; I = Illinois; IND = Indiana; IO = Iowa; KI = Kinderhook Limestone; KL = Keokuk Limestone; M. = Middle; MO = Missouri; N & W = Newberry & Worthen; Path. = pathological specimen; PA = Pennsylvania; Penn. = Pennsylvanian; St J. = St John; SLL = St Louis Limestone; SP = Frank Springer; UBL = Upper Burlington Limestone; unno. = unnumbered; W = Worthen; WB = Warsaw Beds; WC = Wachsmuth.

NB. Kinderhookian = basal Mississippian/Tournaisian up to top Hastarian; Up. Burlington Lst = Viséan/Chadian; Keokuk Lst = Viséan/Arundian; Warsaw Beds = Viséan/basal Holkerian; St Louis Lst = Viséan/late Holkerian-Asbian; Chester = Chesterian/Brigantian.

Devonian

7545 placoderm? bone, Dev. or reworked into Kinderhook Gp?
7617 placoderm bone, Jackson Co?
7630 *Holoptychius* scales, Upper Dev., Famennian, Catskills, PA.
7632/34? piece of bone, Bake-Oven, Devil's Backbone, Jackson Co.
7635 Worthen label "Devonian fish remains, Hamilton Group, Jackson Co., Ill. " - *Ptyctodus* toothplate, *Asterolepis*? bone, possible placoderm spinal plate, piece of bonebed including scales and *Ptyctodus* = M. Dev. Lingle Fm.
7636 labelled "Devonian fish" (no obvious sign), brachiopods, Devil's Backbone, Jackson Co., Illinois.
7638 placoderm bone, Dev., Jackson Co.
7639? rhipidistian scales & ornamented bones, Catskill Gp, Mansfield, Tioga Co., PA.
7641 *Holoptychius*, Catskill Gp, Mansfield, PA.
unno. large placoderm plate *Aspidichthys*?, M. Dev., Ill. or Ohio?
unno. placoderm, Cement Quarry, M. Dev., Missouri?

Carboniferous

1236 *Peripristis semicircularis*, Penn.
*2791/21 "TYPE", *Deltodus spatulatus/Cochliodus*.
2932 "*Chitonodus tubulis*", KL, Keokuk?, W (wrong label with specimens?)
*3059 *Polyrhizodus princeps* FIGD, SLL, Alton, B.
3063 *Ctenacanthus coxianus*? (3, worn), KI?, Burlington?
3027? *Deltodus occidentalis* Leidy, WB, Warsaw.
3065 *Ctenacanthus*, SLL, Alton, I.
3076 *Petrodus occidentalis*, Bellville.
3077 *Petrodus*, Coal no. 1, CM, Rock Island Co., I, W 1873.
3080 *Asteroptychius*, SLL, St Louis, MO.
3082? *Polyrhizodus parvulus*, UBL, Quincy, I, W.
*3093 *Desmiodus* sp. FIGD, SLL, St Louis, MO, W.
3103 *Sandalodus?/Deltodus spatulatus*, SLL, Alton, I, W 1881.
3114 *Deltodus grandis*, KL, Keokuk, IO, W.
3116 *Deltodus rhomboidus* (2) N & W, SLL, NE of Waterloo, Monroe Co., State.
3118 *Deltodus*, KL, Le Grand, I.
3119 *Deltodus stellatus*, Greencastle, IND, W.
3133 *Deltoptychius primus*? St J & W (poor), MtL, Honey Ck, I, GS.
*3140 *Deltoptychius varsoviensis* TYPE, WB, Golden Bluffs, Warsaw, I.
*3141 *Deltodus trilobatus*(?) St J & W, WB, Cement Mill, Piaxa Ck, Jersey Co., I, W 1870, note from St J "an extraordinary large tooth"..."please keep this specimen for further study".
3121 *Deltodus spatulatus* N & W, UBL, Quincy, I.
3123 *Deltodus spatulatus*, UBL, Augusta, IO.
3124 *Deltodus spatulatus*, UBL, Honey Ck, Henderson Co., I.
3128 *Deltodus*?, UBL, Quincy, I.
7016 *Gyracanthus* fin spine, CM, USA or UK?
7035 *Ageleodus pectinatus*, UCM, ?Newsham, Northumberland, England, T. Atthey coll?
7046? *Petalodus* (with basal 'root').
7048 ?*Deltodus*/cochliodont.
7050 *Deltodus*, CM, Carlinville, B.
7052 *Acondylacanthus*?, SLL, Alton, I.
7053 *Polyrhizodus*.
+7054 *Deltodus propinquis*, roof no 5 coal, LCM, Carlinville and UC, Gillespie, I, B.
7058 *Ctenoptychius semicircularis*, LCM, roof of Coal no. 5, Carlinville, I, B.
7066 petalodont (broken), CM, Springfield, I, W.
7068 *Petalodus ohioensis*, Penn.
7076 *Cladodus* sp.
7078 *Petalodus*, SLL, Alton, I, W.
7080 *Petalodus*? (3), CG, Chester, I, W (St J).
7081 *Fissodus bifidus* "TYPES" (4), CL, upper bed, Chester, I, W.
7082 *Petalodus linguifer* (4), CG, Chester, I, W.
7089 *Polyrhizodus* sp., SLL.
7090 *Deltodus stellatus*, KL, Keokuk? - check St J. and W. figures.
7093 *Orthopleurodus carbonarius* (6), UC, upper lst bed, La Salle, I, W.
7094/194 *Cladodus micropus/Cladodus politus*, CL?, Chester, I, IGS.
7095 *Cladodus zygopus*, CG, Chester, I.
7096 *Cladodus costatus*, CL, Chester, I, W.
7097 *Cladodus magnificus* Tuomey, CL, Chester, I, IGS, ident. W.
7098 *Cladodus grandis* N & W, CL, Chester, I, IGS.
7099 *Cladodus grandis* (no. 173), CL, Roseclear Bluff, Hardin Co., I.
7100 *Cladodus zygopus* + petalodont cf. F, "Mountain L", Chester, I.
*7101 *Aspidotus crenulatus*, CG, Chester, I, W; FIGD v.II, pl.viii, Fig. 11. (13533)
7102 *Aspidotus crenulatus* (*Psephodus*) (18), CL, Chester, I, W.
+7103 *Chomatodus pusillus* (3), *Chomatodus "cultillus"* (2), UBL, Chester, I, W. (13546)
7104 *Gyracanthus* spine, CM, Newsham, UK?, W - needs humidity control (one also marked 7103)
7106 *Chomatodus* sp., CG, Chester, I, W.
7109? *Helodus politus*?, KL.
7110 *Polyrhizodus littoni*, CM? - not found.
7113 ? specimen found but no data.
7115 *Dactylodus lobatus* N & W, SLL, Alton, I, B
7116 *Helodus* (20), CG, Chester, I, W. (13539)
7117 *Dactylodus excavatus*, CG, Chester, I.
7118 *Helodus*, CL, Monro Co., I, State coll. 1870.
7119 *Helodus elytra* N & W, KL?, Keokuk, Io, Fletcher.
7120 *Psammodus reticulatus*, CG, Chester, I.
7121 *Lambdodus*?, CL, Chester, I.

7122 *Poecilodus rugosum*, KL or CL?
7124 *Petalodus acuminatus*, CL, Chester, I.
7125 coprolites, CL, Chester, I.
7126 *Cladodus* , CL, Chester, I.
7128 *Orodus*, CG, Chester, I.
7131 *Venustodus angustus*? (9), CL, Chester, I, W & State.
7132 *Xystrodus venus*, CL, Chester, I.
7135 indet?, CL, Chester, I.
7136 tooth of ?, CL, Chester, I.
7137 *Helodus*? (small rectangular tooth), CL, Chester, I, W.
7138 tooth?, CG, Chester, I, W.
7139 "*Cladodus* " (broken cusp), Miss, Huntsville, Alabama.
+7140 ?palaeoniscoid, no. 4 CL, Chester, Randolph Co., I, State 1870. (+ 13544)
7141 *Acondylacanthus*?, CG, Chester, I.
7142 fin spines, CL, Chester, I.
7143 *Ctenacanthus similis*, CG, Chester, I, W.
7144 *Ctenacanthus cannaliratus*, CG, Chester, I, B? - GS.
7145 *Ctenacanthus angulatus* N & W (4), CL, Chester, I, W.
*7147 *Ctenacanthus deflexus* (broken), SLL, Alton, I, B, Figd, v. VII?, pl.22, fig.2.
7149 *Ctenacanthus* (broken), SLL, Alton, I, B.
+7150 spines (rotten) + *Helodus nobilis*?, Cuyahoga Shale, Berea, Ohio - Dev./Carb.
7151 cochliodont/*Helodus*?, SLL, Alton, I, B.
7152 spine undet. (2), SLL, Alton, I, B.
7155 *Erismacanthus maccoyanus*, SLL, Alton, I, B.
7156 "*Drepanacanthus*" *reversus* (*Physonemus*?), SLL, Alton, I, B. (as 4156)
7158 "*Ctenacanthus*" *gracillimus*, SLL, Alton, I, B.
7159 "*Ctenacanthus*", SLL, Alton, I, B.
7163 *Amacanthus gibbosus* N & W, SLL, Alton, I, B/GSI.
7164 various spines incl. *Ctenacanthus*, & calcified cartilage, SLL?
7166 spine top, SLL, Alton, I, B.
7168 shark cartilage - braincase or girdle, KI or SLL.
7169 *Deltodus* sp., SLL, Alton, I, B.
7170 cochliodont, SLL, Alton, I, B.
7171 cochliodont, SLL, Alton, I.
7172 "a new species" (pencil note), SLL, Alton, I, W/B.
7173 calcified cartilage, SLL, Alton, I.
7174 palaeoniscoid bone? & petalodont?, SLL, Alton, I, B.
7175 *Poecilodus st ludovici*, SLL, Alton, I, B.
7176 *Cochliodus*, WB, Keokuk, IO, AN.
7177 *Drepanacanthus*, SLL.
7178 *Psammodus plenus* St J & W (9), SLL, Alton, I, B.
7180 *Petalodus hybridus*, SLL, Alton, I, B.
7182 *Helodus* (tiny), SLL, Alton, I, B.
7183 *Helodus*? sp. (2),
7184 *Helodus* sp., SLL, Alton, I, B.
7185 cochliodont, SLL, Alton, I, B.
7186 *Marracanthus rectus* (several), N & W, SLL, St Louis & Alton, I, B/W/IGS.
7187 *Marracanthus rectus* , SLL, Alton, I.
7188 *Deltoptychius parvulus* (mandibular post. teeth), SLL, Alton, I, B.
7189 *Sandalodus*?/*Deltodus spatulus*, SLL, Alton, I, IGS.
7191 *Polyrhizodus littoni*, SLL, Alton, I, B.
7193 *Polyrhizodus*, SLL, St Louis, MO, (det. M. Hansen?)
+7194 *Cladodus* sp., CL, Chester, I, and 7194 *Erismacantus maccoyanus* (3), SLL, Alton, I, B.
7195 *Chomatodus insignis* (3), SLL, Alton, I, B/W?
+7197 *Cladodus magnificus*, CL, Chester, I; *Deltopsis* (13540), SLL, Alton, I, B.
7198 *Stenopterodus parvulus*, SLL, Alton, I, B.
7199 *Venustodus venustus* Leidy, SLL, Alton, I, B.
7200 *Tanaodus fasciatus*?, WB, Warsaw, I, W.
7201 ganoid, SLL, St Louis, MO, W.
7202 bone indet., SLG, Winchester, Scott Co., I.
7203 *Physonemus altonensis*, SLL, St Louis, Monroe Co.
7204 *Acondylacanthus occidentalis* (3), SLL, St Louis, W.
7206 *Ctenacanthus gracillimus* & other, SLL, Alton, I, W
7208 *Cladodus* jaw, SLL, Alton, I, W.
7210 *Cladodus ferox* (2 - one enormous but broken), SLL, Alton, I, B/IMNH/IGS.
7211 undet. spine?.
7212 *Cladodus* jaw (fine specimen), WB, St Louis, MO
7213 *Cladodus stenopus* (2 & base), SLL, Alton, I, W.
7214 worn spine (2), WB, Hop Hollow, Madison Co., I, W.
7215 bradyodont tooth undet., WB, 3 mls above Alton, I, W.
7216 spine ornamented with stellate tubercles (6), St Louis, MO, W.
7218 *Erismacanthus*? (6), SLL, St Louis, MO, B.
7219 *Chomatodus*?, SLG, St Louis, MO, W.
7222 *Tanaodus*? (3), SLL, St Louis, MO, W.
7223 tuberculated spine, SLG, St Louis, MO.
7224 *Acondylacanthus*? (4), SLL, St Louis, MO, W.
7225 petalodont?/*Helodus*?, SLL, St Louis, MO, W
7226 undet. teeth (2), SLL, St Louis, MO, State.
7227 palaeoniscoid & other scales, SLL, St Louis, MO.
7228 calcified cartilage, SLL, Monroe Co., I, B?
7229 undet. tooth, KI/St Louis?
7230 pustulate bone, SLL, Alton, I, W
7231 undet. spine, SLL, Monroe Co., I.
7232 *Antliodus*? (2), SLL, Monroe Co.
7235 cochliodont & undet., WB, Warsaw, I.
7236 bone, WB.
7237 *Orodus*? spine, SL/WB?, nr Warsaw, I.
7239 *Antliodus politus* (3), WB, Warsaw, I.
7240 *Asteroptychius* spines, SLL, Monroe Co., I, B.
7241 *Asteroptychius*, SLL, St Louis, MO.
7242 *Chitonodus* (*Deltodus*), WB, Warsaw, I.
7243 *Chomatodus insignis* Leidy (8), SLL, Monroe Co., I, IGS.
7244 *Chomatodus insignis* (3), SLL, Alton, I, B.
7245 *Cladodus ferox* (2), SLL, Alton, I, B.
7246 *Cladodus* , SLL.
7247 *Cladodus spinosus*, SLL, Alton, I, B.
7248 *Cladodus stenopus*, SLG, Warsaw, I.
7249 *Cladodus* sp. (2 worn), WB, nr Warsaw, I.
7250 *Cladodus stenopus* N & W, SLL, Monroe Co., I, W label "State coll.".
7251 *Cladodus stenopus*, SLL, Alton, I, W 1881.
7252 *Cladodus* sp. (possibly *Thrinacodus* - S.T.), SLL, Alton, I.
7253 *Cladodus* , SLG, Monroe Co., I.
7254 *Cladodus* , SLL, St Louis, MO.
7255 *Cladodus* , WB, 3 mls above Alton, I, W.
7256 *Acondylacanthus*?, SLL, Alton, I, B?
7257 "*Ctenacanthus*" *gracillimus* (straight dentine ribs, 3), SLL, St Louis, MO, IGS.
7259 *Ctenopetalus* sp. (2), SLL, Alton, I.
7261 *Polyrhizodus* (*Dactylodus*) *princeps* N&W (6), SLL, Alton, I, B?
7262 *Dactylodus lobatus* (4+bits), SLL, Alton, I, B.
7263 bone & *Polyrhizodus*, SLL, St Louis, MO.
7265 *Erismacanthus mccoyanus*, SLL, Monroe Co., I.
7266 *Gampsacanthus typus* (22), SLL, St Louis, MO.
7267 *Gampsacanthus*?/M, SLL, Alton, I, W.
+7268 *Homacanthus gibbosus* (3) & *Polyrhizodus lobatus*, SLL, Alton, I, B.
7270 *Orodus plicatulus*, SLL, Monroe Co., I.
7271 *Orodus* sp., SLL, Monroe Co., I.
7272 *Orodus* (7), SLL, Alton, I.
7273 *Desmiodus* or *Venustodus*, SLL, Barrett Station, St Louis, MO, W note.

7276 *Petalodus curtis* N & W, SLL ("WB"), 1.5 miles below Bluff City, Scotts Co., I; St J to W note "21 Dec 1870".
7277 *Poecilodus st ludovici* (3), SLG, Bremer/m Quarry, St Louis, MO, B.
7278 *Polyrhizodus dentatus* (3), SLL, Alton, I, B.
7279 *Polyrhizodus littoni*, SLL, Alton, I, B.
7281 *Psephodus planus* (broken), SLL, St Louis, MO.
7284 *Tanaodus pusillus* (3), SLL, Alton, I, W.
7285 *Venustodus* (2), WB, Alton, I, W.
7286 *Venustodus leidyi* (3), SLL, Alton, I, B.
7287 *Venustodus* (3), UBL, Burlington, IO, B.
7288 *Vaticinodus*, KI, Le Grand, IO.
729-? *Antliodus politus*, UBL, Pleasant Grove, State.
7293 *Antliodus politus*, KL, Keokuk?, B.
7297 *Antliodus similis* (3), WB/KL, Warsaw, I, B.
73—? *Antliodus* or *Chomatodus*.
7300 *Antliodus sulcatus* (3), KL, Warsaw, I, B.
7301 *Antliodus*, KL, Keokuk, IO.
7302 *Aspidotus crenulatus*, KL, Burlington, IO.
7303 *Chomatodus affinis*, KL, Warsaw, I, B/W.
+7304 *Chomatodus angulatus* (2), UBL, Burlington, IO and *Helodus*.
7306 *Chomatodus cultillus* (3), UBL, Burlington, IO.
7307 *Chomatodus pusillus* (3), KL, Keokuk?, AN.
7312 *Chomatodus pusillus* (3), BL, W.
7313 *Chomatodus* sp., BUL, Quincy, I.
7314 *Chomatodus* sp. (11) & small neoselachian? tooth, UB, Quincy, I, W July 1870.
7315 *Chomatodus* sp. (2), KI, Le grand, IO, B.
7317 *Chomatodus* sp. nov?, KI, Burlington, IO.
+7318 *Cladodus alternatus*, KI, Burlington, IO and (13535) *Cladodus micropus & Lambdodus*, KL, Keokuk, AN.
7319 *Cladodus alternatus*, KI, Burlington, Io, State.
7320 *Cladodus angulatus*, KL, Keokuk, IO, AN.
7321 *Cladodus angulatus*, KL, Keokuk, IO, AN
7322 *Cladodus bellifer*?, BUL, Burlington, IO, AN.
7325 *Cladodus exiguis*, KI, Burlington, IO.
7327 *Cladodus intercoststus*, UBL, Cedar Ck, Warren Co., I, coll?
7328 *Cladodus lamnoides*, KL, Warsaw, I.
7330 *Cladodus micropus*, KL, Keokuk, IO, F.
7331 *Cladodus* , BUL, F.
7332 *Cladodus micropus*, UBL, Honey Ck, I.
7333 *Cladodus micropus* N & W, UBL, Burlington, IO.
7334 *Cladodus prenuntius*, KL, Keokuk, I, F.
+7335 *Cladodus* , UBL, Pleasant Grove & Burlington, IO, "cf. with *Cladodus robustus*".
7336 *Cladodus springeri*, KI, Burlington, IO.
7337 *Cladodus succinatus*, KI, Burlington, IO.
7338 *Cladodus wachsmuthi*, KI, Burlington, IO
7340 *Cladodus* , KI, Le Grand, IO.
7341 *Cladodus* , KI, Le Grand, IO.
7342 *Cladodus* sp., KIG, Le Grand, IO.
7343 *Cladodus* , KI, Le Grand, IO.
7344 *Cladodus* (specimen not found), KL, Keokuk, F.
7346 *Cladodus* , UBL, Burlington, IO.
7347 *Cladodus* , BUL, Quincy, I.
7348 *Cladodus* , KL, Keokuk, IO, AN.
7349 *Cladodus* , UBL, Burlington, IO.
7350 *Cladodus* (2), UBL, Burlington, IO.
7352 *Cladodus* (worn with raised labial ridge) (2), LBL, Burlington, IO.
7353 *Cladodus* sp., BUL, Burlington, IO, AN.
7354 *Cladodus* , UBL, Quincy, I.
7355 *Cladodus* , BUL?
7356 *Cladodus robustus*, BUL?, N, I.
7357 *Cladodus exilis*, KI, Burlington, IO.
7358 *Deltodus grandis*, KL, AN.
7359 *Deltodus occidentalis*, KL, Keokuk, IO, F.
7360 *Deltodus angularis*, KL, Keokuk, IO, F.
+7361 *Deltodus occidentalis = Deltodus angulus*, KL, Keokuk, IO, F.
7362 *Deltodus angularis & Deltodus occidentalis*, KL, Keokuk, IO, F.
7363 *Deltodus spathulatus*, UBL.
7364 *Deltodus spatulatus*, Burlington, IO, AN.
7365 *Deltodus stellatus*, KL, Warsaw, AN.
7366 cochliodont/*Deltodus*, BUL?
+7367 *Deltodus stellatus* (some with dentine anomalies), KL, Keokuk, IO, AN. **Path.**
7369 *Deltodus undulatus/Poecilodus*, KL, Keokuk, IO, F.
7370 *Deltodus undulatus*, KL, Hamilton, I.
+7371 *Deltodus undulatus*, KL?, Warsaw, I.
+7373 *Deltodus/Sandalodus*, KL, Keokuk, IO, F and *Deltodus*, KI, Le Grand, IO and *Deltodus*, WB, Warsaw, I.
7374 *Deltodus*, KL, Keokuk, IO, F.
7375 *Deltodus*, KL, Keokuk, IO.
7376 *Deltodus*, KL, Keokuk, IO, F.
7377 *Deltodus*, KL, Keokuk, IO, F
7378 *Deltodus*, KL, Keokuk, IO, F.
7380 *Deltodus*, KL?, AN.
7381 *Deltodus/Sandalodus* (2), KL, Keokuk, IO.
7384 *Deltoptychius wachsmuthi* St J & W, KL, Keokuk, F.
7387 *Desmiodus* (2, 1 *Helodus*?), KI, Le Grand, IO.
7388 *Sandalodus laevissimus*, Keokuk, IO, F.
7392 *Deltodus complanatus* (3) & *Acondylacanthus* spine, UBL, Burlington, IO.
7398 *Sandalodus laevissimus*, KL, Warsaw, I.
7402 *Deltodus* sp., BUL, Sagetown, I, W.
+7403 *Ctenacanthus*, KL, Keokuk, IO, AN; fish spines, SLL, St Louis, MO.
7404 *Ctenacanthus tribulus*, KL, Keokuk, IO, F.
7406 *Cochiodus costatus* (8 + 1), UBL, Warsaw, I.
7408 *Cochliodus costatus* with bone/spine, KL, Warsaw, I, IGS.
7409 *Helodus nobilis = Chitonodus latus*, KL, Keokuk, IO. F.
7410 *Helodus consolidatus* (3), KL, Warsaw, I, F.
7411 *Helodus consolidatus* (2), KL, Keokuk, IO, F.
7412 *Helodus nobilis*, KG, Keokuk, IO, AN.
7414 *Helodus angulatus* (2) (stuck to 7429 label), UBL, Pleasant Grove & Quincy, I.
7415 *Helodus compressus* (5, incl *Chomatodus*?) UBL, IO & I, Warsaw; St J note.
7416 *Helodus coniculus* (28), LC.
7418 *Helodus crenulatus*, BUL, Burlington, IO.
7419 *Helodus politus*? N & W, KL?, Keokuk & Burlington, AN.
7420 *Asteroptychius*, SLL, Monroe Co., I.
7423 *Helodus sulcatus* (7, cf. *Chomatodus*), UBL, Honey Ck, I, W.
7424 *Helodus*? sp., KL, Keokuk, IO, F.
7426 *Helodus angulatus/sulcatus*, UBL, Augusta, IO, St J note.
7427 *Helodus*, UBL.
7429 *Helodus*?, UBL, Burlington, IO, State.
7431 *Orodus*.
7432 *Orodus ornatus* (many, all sizes), KL, Keokuk, IO, AN.
7433 *Chomatodus* ("= *Helodus*"), UBL, Cedar Ck, I, W.
7434 *Liodus calcaratus*, UBL, Burlington, IO.
7435 *Lisgodus* sp. nov?, KI, Burlington, IO.
7437 *Mesodmodus explanatus* St J & W (5), KI, Burlington, IO, W.
7439 *Orodus ornatus* (several in jaw, teeth & scales), KL, Keokuk, IO, AN.
7440 *Orodus daedalus* (6), KI, Burlington, IO.
7441 *Orodus daedalus* (16), KI, Le Grand, IO.
7442 *Orodus decussatus*? (2), KI, Le Grand, IO.

7443 *Orodus decussatus* (5), KI, Burlington, IO.
7444 *Orodus elegantulus* N & W, UBL, Quincy, I, W Old coll.
7445 *Orodus major* (2, 1 is *Helodus*), KI?, Burlington, IO.
+7446 *Deltodus* sp., BUL, Honey Ck?, Henderson Co., I, W and *Orodus tuberculatus* (2), UBL, Burlington, IO.
7447 *Orodus whiteii* (articulated), KI, Le Grand, IO.
7448 *Orodus* sp. (6 articulated), KI, Le Grand, IO.
7449 *Helodus*? (2), KIG, W.
+7450 *Helodus*; and *Orodus culcaratus*, UBL, B/, W.
7451 *Orodus ornatus*? (2), KL, Warsaw, I.
7452 *Orodus maxillaris*, UBL, Honey Ck, I.
7454 *Orodus varicostatus*, BUL/, Burlington, IO, AN.
7455 *Orodus varicostatus*, BL, Burlington, IO
7456 *Helodus* sp. (7), UBL, Honey Ck, I, W.
7457 *Cladodus*, *Mesodmodus* & assorted teeth, LBL, Burlington, IO, SP 1872.
7458 *Mesodmodus variabilis* (7), UBL, Buffinton Ck, IO, "L. SP".
7460 *Antliodus* (16), UBL, Quincy, I, IGS.
7461 *Petalodus*?, KG, Keokuk, IO, F.
7462 *Petalorhynchus striatus* N&W (2), UBL, Quincy, I, W.
7463 *Petalorhynchus striatus* (2), UB, Honey Ck, I, W.
7467 *Petrodus* sp., UBL, Quincy, I, State.
7468 *Polyrhizodus porosus*? or *Chomatodus*, UBL, Pleasant Grove, Des Moines, IO, St J to W.
7469 *Antliodus*, *Petalodus* or *Tanaodus*, UBL, Burlington, IO. (13538)
7470 *Poecilodus stellatus* (3), WB, Warsaw, I.
7471 *Poecilodus ornatus*, KL, Keokuk, IO, F.
7472 *Poecilodus ornatus*, KL, Keokuk, IO, AN
7473 *Poecilodus porosus* (3), KG, Keokuk, IO, AN.
7474 *Poecilodus rugosus*, KL, Keokuk, IO, F.
7475 *Polyrhizodus truncatus*, BUL?, Burlington, IO, W.
7476 *Polyrhizodus porosus* N & W or *Petalodus* or *Chomatodus* (12), UBL, Quincy, I; W note "is this a *Polyrhizodus* at all".
7477 *Polyrhizodus*?, BUL, Sagetown, I, W.
7478 *Psephodus tumidus*, BUL, Burlington, IO.
7479 *Psammodus springeri*, UBL, Burlington, IO, W.
7480 *Psammodus springeri* N & W (2), UBL, Burlington, IO, WC.
+7482 *Ctenacanthus* sp. spine or *Physonemus depressus* (2), KI, Burlington, IO.
7483 *Physonemus depressus*? (2), KI, Le Grand, IO.
7484 spine undet.
+7485 *Physonemus carinatus* (missing?) & "*Physonemus proclivus*" = *Cladodus* tooth, KI, Burlington, IO.
7486 *Physonemus*? sp., KI, Le Grand, IO.
7487 *Psephodus obliquus*, BUL, Burlington, IO. AN.
7488 *Psephodus obliquus*?
7489 *Psephodus symmetricus* (several), KI, Le Grand, IO.
7496 *Ctenacanthus varians* (5), KIG, Le Grand, IO.
7497 ?*Ctenacanthus spectabilis* St J & W (2), KI, Le Grand, IO.
7498 *Ctenacanthus sculptus*? (very worn), KI, Le Grand, IO, B.
7499 *Ctenacanthus sculptus* (2), KI, Burlington, IO.
7500 *Drepanacanthus/Batacanthus* sp., KI, Le Grand, IO.
7501 *Ctenacanthus* sp. (very large ornament), KI, Le Grand, IO.
7502 *Ctenacanthus*?, UBL, Burlington, IO, W.
7503 *Drepanacanthus*? (*Ctenacanthus*) *keokuki*, KL, Keokuk, IO, F.
7504 *Drepanacanthus*?/*Xystrodus*, KL, Keokuk, IO, F.
7505 *Drepanacanthus*?, KL, Keokuk, IO, F.
7506 *Ctenacanthus coxanus* St J?, KL, Keokuk, F.
7507 *Ctenacanthus*, UBL, Honey Ck, I.
7508 "*Ctenacanthus raridentatus* n. sp.", UBL, Pleasant Grove, I.
+7509 *Ctenacanthus keokui*, KL, Warsaw, I, State; Acondylacanthus?, UBL, Pleasant Grove, I.
7510 *Ctenacanthus speciosus* (3, 1 worn), KI, Burlington, IO.
7511 *Ctenacanthus*.
7512 CAST *Acondylacanthus ziphias* St J & W, SLL, Alton, I,
7514 *Acondylacanthus gracillimus*, KI, Burlington, IO.
7515 *Asteroptychius vetustus* St J & W or *Acondylacanthus* (2), KI, Le Grand, Io.
7516 *Asteroptychius*, KI, Burlington, IO.
7517 *Asteroptychius* or *Acondylacanthus* (4), KI, Le Grand, Io.
7518 *Glymmatacanthus*?, KI, Le Grand, IO.
7519 *Drepanacanthus*?, KL?, Keokuk?, IO.
7520 *Physonemus gigas*? (worn) = *Ctenacanthus*?, UBL, Quincy, I.
+7523 *Cladodus deflexus*, UBL, Pleasant Grove, IO; coprolite?/ phosphate nodules & bits of cladodont tooth, KI, Clarksville, MO, B?
7524 *Orodus*.
7525 palaeoniscoid fragments, KI, Burlington, IO, W.
7526 *Drepanacanthus*?, KL, Keokuk, IO.
7531 assorted teeth etc., L, *Cladodus*, *Helodus*, BUL, Burlington, IO, F
7534 *Poecilodus/Helodus*?, KL, Keokuk, IO, F.
7535 cochliodont, KL, Keokuk, IO.
7537 *Polyrhizodus*, KL, Keokuk?, F.
7539 *Glymmatacanthus* spine.
7542 indet spine (2), KL, Keokuk, IO, F.
7545 piece of skull bone? - see Devonian.
7546 dermal scutes (iniopt?) & *Petrodus*, KI, Burlington, IO.
7547 fin spine, KI, Le Grand, IO.
7548 indet?, KI, Burlington, IO.
7549 *Deltodus*?, KIG, Burlington, I.
7550 spine, KI, Burlington, IO.
7551 *Chomatodus* (2), KI, Le Grand, IO.
7552 cochliodont, KIG, Burlington, IO.
7553 palaeoniscoid? bone, KI, Burlington, IO, W.
7554 *Chomatodus*, UBL, Pleasant Grove, Des Moines Co.
7556 cochliodont & Deltodus, BUL, Burlington, IO.
+7557 *Deltodus*, UBL, Burlington, 10 and *Ctenacanthus*? spine.
7561 *Acondylacanthus*? spine, LBL, Burlington, IO.
7562 helodont, UBL, Pleasant Grove, IO.
7563 cochliodont, L, LC.
7564 *Helodus*?, UBL, Quincy, I.
7565 assorted teeth, petalodont, *Orodus*, *Helodus*, glauconitic band.
7566 *Antliodus*?, BUL, Quincy, I.
+7567 *Polyrhizodus*, *Deltodus* & *Chomatodus* (5), BUL, Quincy, I.
7568 *Cladodus* & *Petalodus* (12), UBL?, Quincy, I.
7569 indet bone fragments, UBL, Quincy, I.
7571 large bones ?bradyodont, BUL, Sagetown, Henderson Co., I, W.
+7572 *Cladodus* sp., SLL, Quincy, I and *Cladodus cuspidatus*, UBL, Quincy, I.
7573 helodont/cochliodont?, BL, Quincy, I, B.
7574 fish spine (worn, KL, Warsaw, I.
7575 *Drepanacanthus* (2, tuberculated), KL, Warsaw, I.
7576 *Cochliodus* (2), KL, Warsaw, I.
7577 *Deltodus* sp., KG, Niota, I.
7578 bradyodont, KL.
7579 cochliodont/*Deltodus*? (2), KL, Warsaw. I.
7580 CAST - fin spine, KL.
7581 *Deltodus* sp., De Moines Rapids, Lee Co., IO.
7584 bone bed sample, KL, Keokuk, IO.
7585 *Helodus*? and petrodi, KL, Keokuk, AN.
7586 *Cochliodus* (2), KL, Keokuk, AN.
7587 round spine?, BUL, Burlington, IO, AN.
7589 *Deltodus* sp., UBL, Honey Ck, I.
7591 *Lambdodus* denticle, UBL, Honey Ck, I.

7592 helodonts, UBL, Honey Ck, Henderson Co., I, W.
7593 *Orodus/Helodus*?
7595 *Cladodus* and stellate placoderm? bone or is it crossopt? (reworked?), BUL, Honey Ck, I.
7596 fin spine in sst - acanthodian?, CM?.
7597 spine indet. (worn), KI, Le Grand, IO.
7598 calcified cartilage, KI, Le Grand, IO.
7600 calcified cartilage (spine or skeletal element), KI, Le Grand, IO.
7601 fish spine (worn), KI, Le Grand, IO.
7602 *Petrodus*, calcified cartilage, KI, Le Grand, IO.
+7603 *Psephodus*; fish spines (worn, unusual), KI, Le Grand, IO.
7604 *Petrodus pustullosus* (several), KI, Le Grand, IO.
7605 *Psephodus* and *Helodus*, KIG, Le Grand, IO.
7606 *Psephodus obliquus*/cochliodont (assorted small plates), KIG, Le Grand, IO.
7608 bonebed & 8 assorted tooth plates, KIG, Le Grand, IO, B?
7609 "cruciform" bone, KIG, Le Grand, IO, B.
7611 *Drepanacanthus*?, KL, Hamilton, I.
7614 mostly *Ptychtodus*, KIG, Pike Co., I (reworked Devonian?).
7615 bradyodont undet.
7623 large fish bones, KIG, Louisiana, MO, B
7626 cochliodont, bone with tooth.
7627 *Deltodus angulatus*? & ptychtodont? toothplate (reworked Devonian?), KI, Louisiana, MO.
7628 *Helodus*? or eugeneodont, KIG, Louisiana, MO.
7629 *Deltodus*.
7642 *Chitinodus vaticinus* (several), UBL, W.
7648/98 cochliodont.
7753 *Chomatodus*, BUL.
7835 *Cladodus* & spine indet.
7838 *Deltodus*? with *Calopodus*-type tooth, LC.
7891 *Antliodus cucullus*, KL, Hamilton, I, B.
*8720 *Physonemus falcatus* St J & W 1875, SLL - Lund 1985 refers to *falcatus*.
*8721 *Orodus vetustus* **FIGD**, SLL, St Louis, MO, Washington University.
13527 *Ctenacanthus* sp. = *Acondylacanthus aequicostatus*, CG, Chester, I. (+7147)
13528 *Drepanacanthus* (3)
13530 *Batacanthus stellatus*, KL, Keokuk, IO.
13533 cladodontid, cartilages - jaws and head?, SLL, Alton, I, B.
13541 *Helodus*, UBL, Quincy, I, W.
unno *Antliodus* and cf. *Antliodus*.
unno *Chomatodus*, LC.
unno *Chomatodus inconstans*, CG, Sloan's Valley, Kent. I?
unno *Ctenacanthus*.
unno *Helodus nobilis*, KL?, I?
unno *Deltodus* (assorted), UBL, Warsaw, St Louis, C.
unno *Deltodus stellatus*, KL, Keokuk, IO.
unno *Deltodus stellatus*, BUL, Quincy, I.
unno *Deltodus* with dentine blister, LC. **Path.**
unno *Cladodus stenopus*, KL or SLL?, Whitehall Green Co.
unno *Helodus/Orodus*?, WB, Scott Co., I, W
unno *Deltodus stellatus* "one of the originals of *Deltodus stellatus* N & W, Keokuk, W".
unno *Helodus* sp., BUL, Burlington, IO.
unno edestid or petalodont in jaw.
unno *Rhizodus hibberti* SLL, Alton, I.
unno *Acondylacanthus*, KL, Bentonsport?
unno *Physonemus*.
unno *Polyrhizodus* (*Dactylodus*) *princeps*, SLG, Alton?, B?
unno *Polyrhizodus littoni*?, no. 4, Chester, Randolph Co.,?
unno *Poecilodus*, BUL, W.
unno *Drepanacanthus*
unno *Psephodus/Helodus biformis* N & W (14), KI, Burlington, IO, W.
unno *Helodus* (2), KI, Burlington, IO; St J note "Newberry referred to *Helodus biformis*".
unno *Drepanacanthus gemmatus* N & W (4), KL, W, I; St J. note to Worthen "5 Aug. 1870".

Acknowledgements

We thank Joseph Devera (Geological Survey of Illinois) for transmitting information on current geological nomenclature. Photographs courtesy of the Illinois State Museum (photographer Marlin Roos), the Illinois State Library. S.T. thanks the Illinois State Museum for financial help and the Leary family for excellent hospitality during her stay in Springfield and the Queensland Museum for basic facilities during her Honorary Research Fellowship.

References

BERGSTROM, R.E. 1982. Illinois State Geological Survey: its history and activities. Illinois Institute of Natural Resources. *Illinois State Geological Survey. Educatuional Series* **12**, i-iv + 40pp.

BLISS, N.W. and WHITE, C.A. 1890. The private life and scientific work of Professor Amos Henry Worthen. *In Geological Survey of Illinois* v. **8**, Appendix, 1-37.

CROOK, A.R. 1907. *A history of the Illinois State Museum of Natural History*. Illinois State Museum, Springfield, 20 p.

HALL, J. 1857. On the Carboniferous limestones of the Mississippi valley. *Proceedings of the American Association for the Advancement of Science*, 10th meeting, 1856, Albany, NY, 51-69.

HANSEN, M.C. 1987. Systematic relationships of petalodontiform chondrichthyans. *In* J.T. Dutro Jr & H.W. Pfefferkorn (eds). *Neuvième Congrès International de Stratigraphie et de Géologie du Carbonifère*. Compte Rendu, v. **5**, Paleontology, Paleoecology, Paleogeography. Pp. 523-544.

HANSMAN, R.H. and SCOTT, H.W. 1967. Catalog of Worthen type and figured specimens at the University of Illinois. *Journal of Paleontology* **41**, 1013-1028.

KEMP, J.F. 1892. Memorial of John Strong Newberry. *Geological Society of America, Bulletin* **4**, frontispiece + 393-406.

KENT, L.S. 1982. Type and Figured Fossils in the Worthen Collection at the Illinois State Geological Survey. *Illinois State Geological Survey Division, Circular* 524, 65 p.

KEYES, C.R. 1921. Memorial of Orestes Hawley Saint John. *Geological Society of America, Bulletin* 33, 31-44 + pl. 2.

LEARY, R.L. 1971. Catalog of Paleozoic Paleozoological type and figured specimens at the Illinois State Museum. *Illinois State Academy of Science, Transactions* **64** (3), 254-259.

LUND, R. 1985. The morphology of *Falcatus falcatus* (St John and Worthen), a Mississippian stethacanthid chondrichthyan from the Bear Gulch Limestone of Montana. *Journal of Vertebrate Paleontology* **5** (1), 1-19.

MAISEY, J.G. 1984. Studies on the Paleozoic Selachian genus *Ctenacanthus* Agassiz. No 3. Nominal Species referred to *Ctenacanthus*. *American Museum Novitates* **2774**, 1-20.

MANTELL, G. 1838. *Wonders of Geology; or, a Familiar Exposition of Geological phenomena*. London. Henry G. Bohn, London.

MANTELL, G. 1844. *The Medals of Creation: or First Lessons in Geology, and the Study of Organic Remains*. Henry G. Bohn, London.

NEWBERRY, J.S. and WORTHEN, A.H. 1866. Descriptions of new species of Vertebrates, mainly from the Subcarboniferous limestones and Coal Measures. *Geological Survey of Illinois*, v. **II**, Palaeontology, 9-134.

NEWBERRY, J.S. and WORTHEN, A.H. 1870. Descriptions of Vertebrates. *Geological Survey of Illinois*, v. **IV**, Pt II Palaeontology, 346-374.

SCHUCHERT, C. 1927. Memorial of Frank Springer. *Geological Society of America, Bulletin* **39**, 65-80.

ST JOHN, O. and WORTHEN, A.H., 1875. Descriptions of Vertebrates. *Geological Survey of Illinois*, v. **VI**, Geology and Palaeontology, 245-488.

ST JOHN, O. and WORTHEN, A.H. 1883. Descriptions of fossil fishes; a partial revision of the cochliodonts and psammodonts. *Geological Survey of Illinois* v. **VII**, 55-264.

WILLMAN, H.B., ATHERTON, E, BUSCHBACH, T.C., COLLINSON, C., FRYE, J.C., HOPKINS, M.E., LINEBACK, J.A., and SIMON, J.A. 1975. Handbook of Illinois Stratigraphy. *Illinois State Geological Survey, Bulletin* **95**, 261pp.

WORTHEN, A.H. 1857. On the Occurrence of Fish Remains in the Carboniferous Limestone of Illinois. *Proceedings of the American Association for the Advancement of Science*, 10th meeting, 1856, Albany, NY, 189-191.

WORTHEN, A.H. 1866. Remarks on the Occurrence of Fossil Fishes in Illinois. *Geological Survey of Illinois*, v. **II**, Palaeontology, 11-16.

WORTHEN, A.H., & MEEK, F.B. 1868. *Geological Survey of Illinois*, v. **III**, Geology and Paleontology.

LOST & FOUND

Enquiries and information, please to Patrick Wyse Jackson (Department of Geology, Trinity College, Dublin 2, Ireland). Include full personal and institutional names and addresses, full biographical details of publications mentioned, and credits for any illustrations submitted.

The index to 'Lost and Found' Volumes 1-4 was published in *The Geological Curator* 5(2), 79-85. The index for Volume 5 was published in *The Geological Curator* 6(4), 175-177.

Abbreviations:

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

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

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

204 British Association for the Advancement of Science collection of geological photographs.

See also GCG 5(4): 158; 5(6): 230; 6(4): 174.

Professor Frank Hodson, University of Southampton writes:

The idea for a collection of geological photographs originated in a paper by Mr. Osmund W. Jeffs in a paper read to the Association at its meeting in Bath in 1888. At the 1889, Newcastle meeting it took concrete form in the establishment of a Committee for the "Collection, Preservation and Systematic Registration of Photographs of Geological Interest in the United Kingdom". The Chairman was Professor James Geike and the Secretary Mr O.W. Jeffs. The Committee existed until the beginning of the Second World War with the following officers.

The two Chairmen were Prof. J. Geike (1889-1916) and Prof. E.J. Garwood (1916-1940) and the Secretaries O.W. Jeffs (1889-1895); Prof W.W. Watts (1895-1916); jointly Prof. W.W. Watts and Prof. S.J. Reynolds, and finally Prof. S.J. Reynolds (1916-1940). Over the years the Committee issued 29 printed reports, the last in the report of the 1939, Dundee Meeting. By that time the number of prints had grown to 9102. Professor Reynolds reported that the prints were contained in "about one hundred albums" kept in the library of H.M. Geological Survey. The other property including the card catalogue, the negatives, spare copies of successive reports and other printed matter, the negatives of the published series and corresponding lantern slide negatives and other miscellaneous property. The published series refers to prints, mounted, unmounted and lantern slides accompanied by a booklet with extensive captions and issued as First Series, First Issue (A) in 1902. The cost was guaranteed by subscribers. It was very popular and led to an extension of the First Series to the Second Issue (B) in 1903 and the Third Issue in 1904. A Second Series was produced in 1931 with a First Issue (D) and a Second Issue (E). Mounted prints from these Issues were commonly to be seen ornamenting the walls of numerous Geology Departments up and down the country.

Almost everything that was housed in Bristol was destroyed by air raid and sometime after 1940 the collection of prints was transferred from the Geological Survey to the Geology Department of Imperial College. In 1970, Prof. J. Sutton wished to relocate the collection and Prof. F. Hodson, at that time Recorder of Section C (Geology) of the Association, accepted them. Sixty eight portfolios were received for storage in the Geology Department at Southampton University. Discussion with the Nature Conservancy took place as to a permanent repository for the collection. They, however, were awaiting a new larger building and were not able at the time to house it in their then current premises. In 1979, the Irish material was transferred to the Ulster Museum in Belfast. It partially contributed to the catalogue of the photographs of R. J. Welch (1983). Eventually, in 1992 after half a century, the residue of the collection was returned to the custody of the British Geological Survey.

237 Plant fossils from the Keele Formation, central England descrivbed by Emily Dix (1935).

Dr Christopher J. Cleal, Department of Botany, National Museum and Gallery of Wales, Cathays Park, Cardiff CF1 3NP, Wales, U.K., writes:

Plant macrofossils are extremely rare in the red beds of the uppermost Carboniferous of the English Midlands. One of the most widely quoted records is by Emily Dix

(1935, *Geological Magazine* **72**, 556) who lists species from the Keele Formation exposed at the Foleshill Brick and Tile Co Pit, Longford, near Coventry. The specimens were reportedly obtained 'with the assistance of Messers J.F. Cooper and F.W. Shotton'. The record is of particular interest as it includes the species *Odontopteris* cf. *schlotheimii* Brongniart which strongly indicates a late Stephanian age, a view which has become widely accepted in the literature (eg Wagner 1983, *Scottish Journal of Geology* **19**, 152). There is, however, other evidence that these beds may be of earliest Stephanian (Cantabrian) in age and that Dix's identifications are wrong. Establishing which age determination is correct has important consequences for understanding the Variscan evolution of central England.

The problem is that none of the specimens has ever been figured and their present whereabouts is unknown. I have checked the two main holdings of Dix's specimens, at the National Museum and Gallery of Wales and the Sedgwick Museum, all to no avail. I would be very interested to know if these important specimens are still available for study, and also if there are any other known assemblages of plant macrofossils from the Keele or Enville Formations.

238. Bright, a Wenlock Limestone locality.

Matthew Parkes (Geological Survey of Ireland, Beggar's Bush, Haddington Road, Dublin 4, Ireland) would appreciate any information on the following:

A locality called Bright, either on the outcrop of the Wenlock Limestone or else at about the same stratigraphical interval. The label would suggest it is probably in England or Wales, but it need not be.

239. Carboniferous limestone fossils in Geological Survey of Ireland.

Matthew Parkes (Geological Survey of Ireland, Beggar's Bush, Haddington Road, Dublin 4, Ireland) would appreciate any information on provenance of the following collection:

A suite of Carboniferous limestone fossils in the Geological Survey of Ireland collections have an unusual numbering system. Each specimen has a printed number, usually of two digits, which are preceeded by a handwritten "58" in a distinctive red ink.

240. Thomas Owen Bosworth (1882-1928)

Dr James B. Richardson III, Chairman, Division of Anthropology, Professor of Anthropology, University of Pittsburgh, Edward O'Neil Research Centre, 5800 Baum Boulevard, Pittsburgh, PA 15206-3706, U.S.A. [fax: 412-6652751] writes:

I am seeking information and archival material belonging to Dr. Thomas Owen Bosworth, the noted English geologist. Bosworth spent a time employed as a school teacher in Northampton before becoming a geologist with the Geological Survey in Scotland. He then worked for a petroleum company in northwestern Peru and later in Canada. He died at the early age of 46, in Spratton, leaving a widow and five children.

He was the author of *Geology of the Tertiary and Quaternary Periods in the north-west part of Peru* (Macmillan 1922).

My purpose is to determine if any of his unpublished papers, fieldnotes, photographs, or memorabilia from his years in the oil fields of the Talara region of northwest Peru exist. I am an archaeologist who has worked in the region for 30 years.

BOOK REVIEWS

Stanier, Peter 1995. *Quarries of England and Wales, an historic photographic record.* 120 pp, 114 photographs, 32 maps and line illustrations, ISBN 0 906294 33 9. Hardback. Price: £12-95.

Many geologists will be familiar with the photographic collection of the British Geological Suvey through the inclusion of prints in their invaluable sheet memoirs, many of which were originally produced in the early part of this century. Listed at the rear of these publications, one was aware of the range of geological photographs available, although rarely did one consult the actual images in the BGS Library.

In recent years, with the revival of interest in local building materials and local history, these old photographs have been "re-discovered".

Peter Stanier has made a fascinating selection from the large and important collection of photographs held by BGS. Whilst illustrating geological and related landscape features, the photographers inevitably included views of the workers and the mining and quarrying methods.

Nearly 120 photographs, all from glass negatives taken between 1904 and 1935, have been chosen to show traditional quarrying techniques, cranes, tramways, mineral railways, processing works and other machinery. Many have not appeared in print before and all are fully described.

The photographs record many quarrying and stone-working methods that are no longer practised. For example, more than half include a railway or tramway in some form, a feature that has long been superseded by rubber-tyred trucks and dumpers. Often the photographs are the only record of a vanished industry that once had a major impact on a local community and environment.

The book is arranged in 13 chapters including details relating to the BGS collection and an overview of quarries in England and Wales. Stone types covered are:chalk, clays, granite, ironstone, limestone, Portland stone, roadstone and slate. Quarries in most parts of England and Wales are featured.

Each section begins with an introduction to the rock type and includes a map showing the locations of the selected photographs. The images are of high quality and the well written captions show evidence of extensive research.

If one had a criticism it would be that the format of the book does not allow all of the pictures to be large enough to fully appreciate their wealth of detail. Certain well-known quarries are conspicuous by their absence, but that seems to be the responsibility of BGS for not recording them. Those who like to find fault will probably notice the incorrect positioning of the odd quarry on the maps, although their locations in the text are accurate. A number of maps are included, but the quality of the early editions of OS sheets used are not equalled by those specifically drawn for this publication.

The author gives away his Cornish origins with the fascinating section on the China Clay industry. In addition, his adopted home in Dorset is reflected by the section on the Portland Stone industry. As a native of that county I wholeheartedly approve of this treatment!

I showed this book to a colleague who has a long experience of the China Clay industry and he was particularly impressed by the photographs and captions dealing with the intricate processes of the industry.

Old photographs are interesting; if they include a geological feature so much the better; an additional human interest is a bonus, whilst the historical value of former industrial processes and transport ensures that there will be considerable interest in this book.

Containing a bibliography and a full index, it will be a welcome addition to the bookshelf of a wide range of people with geological and related interests. I thoroughly recommend it to you!

Tony Cross, The Curtis Museum, Alton, Hants, UK. 7th September 1995.

Gunning, A. 1995. *The Fossil Grove.* Glasgow Museums, Glasgow. ISBN 0 902752 52 9. Paperback. Price: £2-50.

Over a century after its discovery the amazing Carboniferous fossil grove in Glasgow's Victoria Park is less well known than it ought to be. As a site of public interest and palaeobotanical information for the scientist it should be widely recognised as of international importance. Preserved at this site are not just the fossilised stumps of Coal Measure trees, but the spatial layout of the vanished forest in which they grew. Alastair Gunning's colourful booklet "The Fossil Grove" published by Glasgow Museums at £2.50, should help to make the Fossil Grove better known to a wider public.

The colour photographs of the tree stumps and other geological features at the site are excellent. Lighting and shadow have been used to such good effect in clearly defining the specimens that the combination gives one a feeling of actually observing the ancient forest. I am less impressed by the plate showing the common lycopsid plant fossils *Lepidodendron*, *Lepidostrobus* and *Stigmaria*. Although such fossils are notoriously difficult to capture on film, being mainly black on black, I feel that they are unnecessarily obscure. The steps in the fossilisation process, figured on page 19, are curiously static and lack any feeling of continuity. The location map within the back cover lacks a scale, making it less useful for the visitor new to Glasgow who wishes to plan the most convenient and direct route to Victoria .I take greatest issue with Alistair Gunning is in his affiliation of the Fossil Grove trees to the living clubmosses without further explicit qualification. However, it is implicit in the text and photograph on p. 13 that comparison is with extant herbaceous Lycopodiaceae. Although this allows the reader to make the link with a modern plant with which they may be familiar, it is not the most appropriate one. The evidence for the woody *Isoetes* as the closest living relative and only living descendant of the ancient arborescent lycopsids is now very strong (Stewart & Rothwell, 1993) and can no longer be conveniently ignored. Yes, the herbaceous clubmosses are relatives of the Fossil Grove trees, but that relationship is certainly more distant than that with *Isoetes*. Gunning has stretched an old and now slightly tenuous relationship to fit the booklet and thereby lost the opportunity of bringing the current scientific status of these palaeobotanical wonders before a more discerning public.

The refurbishment of the Fossil Grove building at Victoria Park was long overdue. I think that the whole project has been thoughtfully undertaken and well carried out. If you have not yet visited this wonderful site then I urge you to do so. Gunning's booklet is colourful, attractive, easy to read and well worth £2.50 for the atmospheric photos of the stumps alone.

Stewart, W.N. & Rothwell, G.W., 1993. *Paleobotany and the evolution of plants*, 2nd ed. Cambridge University Press, pp. 150-153.

W.J. Baird, National Museums of Scotland, Chambers Street, Edinburgh EH1 1JF, Scotland. 12th September 1995

Scrutton, Colin. (ed.). 1995. *Northumbrian rocks and landscape: a field guide.* Yorkshire Geological Society/Ellenbank Press, 216 pp. ISBN 1 873551 11 8. Paperback. Price: £9-99.

Hot on the heels of Lakeland rocks and landscape and Yorkshire rocks and landscape, this third geological field guide, published by the Yorkshire Geological Society, follows much the same easy-to-use format, and is a welcome addition to the series.

Editor, Colin Scrutton, goes to some pains in his Introduction to stress the importance of safety in the field and the need for conservation of sites, which is always a worry when publishing this type of information.

Following an introductory chapter on the geological history of Northumbria, the guide comprises seventeen field excursions, five in the border regions, seven in Northumberland and five in County Durham. For me, fond memories are evoked particularly by those to Holy Island and Bamburgh (Bert Randall & John Senior), the Roman Wall (Mick Jones), Weardale and Nenthead (Brian Young), the Wear Valley (Tony Johnson) and Upper Teesdale (John Senior). Hundreds of Durham undergraduates will also have covered this ground and the authors write with the authority of these years of experience. A glossary, short bibliography and a useful list of Northumbrian geological museums completes the text.

Each of the excursions follows a similar format and begins by explaining the purpose of the excursion, followed by remarks on logistics. These are particularly useful and include such information as the recommended size of parties, distances covered and severity, permission, parking, refreshments, toilets, tides and other safety factors. This is followed in each case by a list of relevant maps (O.S. & B.G.S.), and brief remarks on the geological background.

Then comes the real meat of the guide, the excursion details, where each locality, identified by a 6-figure grid reference, is described accurately, but leaving interpretation largely to the user. Jargon is used only where absolutely necessary and is then identified in bold type and defined in the glossary. Maps and sections are plentiful, clearly drawn and consistent in format, making the excursions details easy to follow. And it's not just of local interest; I have recently sent a copy of excursion 15 (Wear Valley) to a coral colleague in Queensland who informs me that the baptismal font in Brisbane Cathedral is carved from Frosterley Marble!

The book comes in pocket-size with a tough linen cover, ideal for field use and is not over priced at £9.99. Colin Scrutton is to be complimented for his editorship of this volume which will bring these vast and beautiful areas of England to a larger public, however tempting it might be to keep them to ourselves!

John Nudds, Manchester Museum, Oxford Road, Manchester M13 9PL, U.K.

Toghill, Peter and Beale, Susan. 1994. *Ercall Quarries, Wrekin area, Shropshire. Geology Teaching Trail.* Geologists' Association Guide No. 48, 21 pp. ISBN 0 900717 47 5. Price: £3-50.

Shropshire displays as rich a range of geological phenomena as any county in Britain, and over the years many guides to part or all of the county have been published. This new Guide is relatively modest in the area that it covers and the scope of its subject, but it was written with a special purpose: subtitled "Geology Teaching Trail", it was written in order to describe a permanent geological trail set out in the Ercall Quarries and authorised by their owner now that the quarries are disused. Within a small area a variety of geological features are easily accessible and admirably exposed, and the trail is described in such a way as to give an easy half-day's study or a more advanced and extended one-day outing.

The Guide takes you to localities in the Precambrian Uriconian Volcanic Group, associated with intrusive rocks, the Ercall Granophyre, and the unconformably overlying Wrekin Quartzite and Lower Comley Sandstone, of early Cambrian age. It describes each locality briefly but clearly, with cross references to what is seen at other localities on the Trail and references to recent literature. "Additional Localities Nearby", described in brief on pages 18 and 19, extend the Trail to Tremadoc rocks with a lamprophyre sill and Lower Carboniferous sandstone and limestone with basalt lavas. A clear map and large field sketches illustrating the geology are supplemented by attractive colour photographs on the front and back covers of the booklet that form an integral part of the Guide.

The booklet is well produced and printed, with ample use of bold-face type to help the user in the field to pick out the references to each locality; bold and italic type is used to emphasise safety and conservation aspects. A minor technical comment is that few would nowadays regard the problematical *Moberella* as a brachiopod (pp. 4, 13). Furthermore, the age of the base of the Cambrian (as recently defined by the world stratotype in Newfoundland) is now more widely accepted as about 545 Ma than the 570 Ma date mentioned on p. 3. Therefore the first line on p. 4 would read more correctly as "the local base of the Cambrian".

The Trail is stated to be ideal for teaching geology at all levels, and indeed, with demonstrable faults, unconformities, sedimentary structures and contrasts between various rocktypes, there is much to see. I suspect, however, that the relative beginner might find the language of the Guide, clear and well written though it is, a little too terse and technical; they would get more from the Trail if guided by a more experienced geologist - who would, I am sure, be able to use the present Guide to very good effect.

A.W.A. Rushton, British Geological Survey, Keyworth, Nottingham NG12 5GG, U.K. 11th October 1995.

Giles, J.R.A. (ed.) 1995. Geological Data Management. *Geological Society Special Publication* 97, 185 pp. ISBN 1 897799 34 X. Hardback. Price: £55-00.

The management of large amounts of geological data calls for careful consideration and planning prior to setting up a digital database management system. This, and advocating consistency in describing (and coding) data elements are the most important messages given in this book, resulting from two meetings (in 1992 and 1993) organized by the Geological Society's Geoscience Information Group.

The 19 chapters in the book are divided into three broad sections: Database design (8), database management (7) and 4 case studies. The majority of authors are from the British Geological Survey (BGS), or connected with consultancy and oil companies, and rather few are from academic institutions. As far as can be judged, museums curators are absent, which is strange considering the increased use of digital management of museum collections.

The introductory chapter by the editor, J.R.A. Giles outlines the contents of the volume, and presents six important points to be considered by a data manager. These are discussed in the ensuring chapters, thus : -

- What objective will the database meet ?

- Why is a digital database being considered ?

- When, if ever, will the cost and effort of creating the database be repaid ?

- How will the database be designed and created ?

- Where are the users ?

- Who will be responsible for maintaining the integrity of the database ?

Despite having different reasons and objectives for designing geological databases, the authors arrive at the same conclusions with advice to database managers:

- Effort (time, labour and money) spent on thorough modelling and designing, prior to implementing expensive hard- and software, pays back in the long run.

- Data dictionaries and data normalization (terms) should be used to leave as little ambiguity as possible.

- Common software standards and dictionaries reduce the risk of losing data, e.g. when transferring project data between systems.

- Metadata ("data about data") is one area of access for external users.

- Improve the status of the data manager (curator or collection manager) in order to re-use data already gathered and to maintain its integrity.

- Outdated data for one company may represent value for others; data brokers may exchange such data. This is a reminder for the distribution of non-commercial museum data.

Computer jargon is often crowded with acronyms, but with few exceptions, all those used in this book are well defined. One notable exception is the "decoding" of SQL as "sequential query language" (instead of "structured query language") on page 123. The book contains a comprehensive index, where most terms and key words can be found. Several well-known software products and systems are discussed in the text, but for some reason, dBaseIV, Microsoft Access and the Petrotechnical Open Software POSC are not.

The references are generally well up-to-date including entries for 1994 and 1995. Otherwise, the subject is part of a fast evolving industry and yesterdays truths are not necessary the same today. Thus the price of hard disks (page 165, with reference to a 1990 publication) is given to be USD 20 per Mb, but at the time of writing (January 1996), the "street price" is probably less than USD 0.50 per Mb. The illustrations all follow the required standards used for modelling relational databases. Exceptions, however, are the poor "black text on black background" reproductions on pages 167 and 171.

Although museum case studies are lacking in this book, it should still be read by museum staff prior to designing and implementing a computer based collection management. The often tedious work of modelling and designing instead of trying superficial ad hoc methods will be well rewarded when structured information is searched for and successfully retrieved.

Hans Arne Nakrem, Palaeontological Museum, University of Oslo, Sars gt. 1, N-0562 Oslo, Norway. 1st February 1996.

Owens, R.M. and Bassett, M.G. 1995. *Catalogue of the Type, Figured and Cited fossils in the National Museum of Wales: Supplement 1971 - 1994,* 250pp. National Museum and Galleries of Wales, Geological Series No. 12, Cardiff. ISBN 0 7200 0422 5. Softback. Price £34-50.

This A4 softback book is a substantial publication, of 250 pages, reflecting a very large amount of work, both by the Catalogue authors and by the workers whose material is now deposited in the National Museum of Wales Geology Department, and forms the raison dítre for this supplement. It also reflects a significant curatorial input by several NMW staff, who are duly acknowledged. Having worked, albeit briefly, in the Geology Department, I know that the catalogue has had to be typed, edited and produced manually, rather than simply downloaded from a database.

A concise introduction by the Keeper of Geology, Mike Bassett outlines the organisation of the catalogue which follows the 1972 original, and justly notes the publication also reflects continuing effort to maintain and promote curatorial standards. The sheer size of the catalogue reflects the need for this supplement, which dwarfs the 1972 edition. Although additional pre-1972 type material since identified is included, and there are older collections acquired from university departments, the vast majority is newly collected and donated material. This partly reflects the vigorously healthy research relationship developed with the University College Cardiff Geology Department. It also results from an active research programme within the Museum.

There are 4 appendices. Within A can be found the details of major collections acquired from individuals, institutions and thesis collections, Appendix B is an alphabetic listing of all other accessions than those in C, which were collected officially by departmental staff. Appendix D is a phylum based list of all primary types, a total of 121 species; and there are 10 pages of references. Perhaps the simplest portrayal of why the catalogue is timely is Figure 1 showing the growth in collections, which increased from about 100,000 specimens in 1968 to over 750,000 in 1994.

The main body of the catalogue is clearly organised and easy to use, with good stratigraphical and locality information, and useful remarks where appropriate concerning previous, errors or details. The main difference between this and the 1972 edition is the addition of figures throughout the text illustrating the primary type specimens. As you would expect from the NMW Geology Department, the photographs are all excellent.

The catalogue is well produced, well illustrated and welcome. I have only two reservations. One is the price, which I feel is high enough to deter some potential purchasers. The second is that possibly the use of a slightly smaller font size would perhaps have reduced the number of pages, and hence the cost, without being detrimental to the overall catalogue.

Matthew Parkes, Geological Survey of Ireland, Beggars Bush, Haddington Road, Dublin 4, Ireland. 6th March 1996.

Herries Davies, G.L. 1995. *North from the Hook: 150 years of the Geological Survey of Ireland.* Geological Survey of Ireland, Dublin, pp. xi + 342. ISBN 1 899702 00 8. Price IR£35-00 (available from the Geological Survey of Ireland, Beggar's Bush, Haddington Road, Dublin 4).

Croke, F. (ed.). 1995. *George Victor Du Noyer 1817-1869: hidden landscapes.* The National Gallery of Ireland, Dublin, pp. 88. ISBN 0903 162717. Price: IR£7-00 (available from the National Gallery of Ireland, Merrion Square, Dublin 2).

1995 was marked by celebration in Irish geological circles for the 150th anniversary of the foundation of the Geological Survey of Ireland and the Queen's Colleges of Cork (now University College Cork), Galway (also now titled University College) and Belfast.

The Geological Survey of Ireland marked its sesquicentenary in a number of ways, but most notably through its publication of a history by Gordon Herries Davies, and its association with an exhibition of watercolours by G.V. Du Noyer (1817-1869), one of its finest geologists, held in the National Gallery of Ireland during June through August.

North from the Hook, Herries Davies' comprehensive history of the Geological Survey tells the often troubled, turbulent and

triumphant events surrounding the mapping of Ireland's rocks from 1845 until the present today. Physically the book is large: in an A4 format, but yet is easy, and pleasing to handle. It is liberally illustrated with 15 colour plates and over 100 half-tones.

In 1824 the Ordnance Survey under Lieutenant-Colonel Thomas Colby (1784-1852) began to survey the country and produced the first large scale topographical maps of the country. The Ordnance Survey published one parish report in 1837 and six years later Joseph Ellison Portlock's bulky memoir on the geology of Londonderry, and of parts of Tyrone and Fermanagh. Two years later in 1845 the Geological Survey was established under the Directorship of Thomas de la Beche and the Local Directorship of Henry James. For the next forty five years the officers of the Geological Survey in Ireland were engaged in producing a geological map of the country. The first maps they published depicted the geology of various counties at a scale of one inch to two miles; subsequently from 1856 maps were published at the preferred scale of one inch to one mile. The Geological Survey produced total of 205 such map sheets with accompanying memoirs before their task was completed. The importance of the Geological Survey to Irish geology at this time cannot be overstated. It employed in men such as Edward Hull (1829-1917), Joseph Beete Jukes (1811-1869), George Henry Kinahan (1829-1908), George Victor du Noyer (1817-1869) and Thomas Oldham some of the most eminent geologists to work in Ireland. Under Jukes an ambitious regime of field mapping began that resulted in an average of about 1,000 square miles geologically surveyed per year between 1850 and 1870. However, the mapping programme did not always proceed smoothly: Edward Hull's interpretation of some of the geology of southern Ireland was questioned by his officers, and he fell out with some of them, particularly with Kinahan. The conditions endured by the geologists were not always pleasant; in some cases the adverse conditions led to a breakdown in health. Of the thirty two geologists employed between 1845 and 1890 seven died.

After 1890 when the the final map in the Geological Survey's mammoth series of one inch to one mile maps, was published, the Survey's staff was drastically reduced. In the next three decades some important work, particularly in the area of glacial geology, was carried out under the leadership of George William Lamplugh (1859-1926) who took charge from 1901 until 1905. In addition memoirs relating to some of Ireland's economic deposits were published in the first two decades of this century.

Since the early 1960s the state of Irish geology and the health of the Geological Survey of Ireland improved enormously. This was largely due to the discovery of base metals and hydrocarbons in or around Ireland. In 1960 the Government passed the Petroleum and Other Minerals Development Bill which allowed for the exploration of parts of Ireland and its surrounding continental shelf, and in in 1963 a major base metal deposit was located in County Galway. The Geological Survey was consequently upgraded and took on increased numbers of staff, who were able to service and encourage such economic developments. In the last five years the Geological Survey of Ireland has commenced publication of a series of geological maps of the country at the scale of 1:100,000.

Gordon Herries Davies' book is a wonderful exposition and illustration of cartographic and institutional history. Often such tomes are dry and crusty - *North from the Hook* is full of flavour, and a joy read from start to finish. I will, no doubt, dip into, or reread it many times again. It is warmly and strongly recommended to all interested in the history and social background of government geologists.

George Victor Du Noyer 1817-1869: hidden landscapes, a slim, beautifully illustrated, book was published by the National Gallery of Ireland to accompany the exhibition of Du Noyer watercolours. It contains six essays that focus on the life of the artist and his many interests: antiquities, geology, zoology and botany which are reflected in his paintings. Gordon Herries Davies pens a portrait of Du Noyer while Petra Coffey discusses his observations made on Irish life and people. Jean Archer describes Du Noyer's geological illustrations which range in size from tiny sketches made on the corners or reverse of his field sheets to larger watercolours. Nigel Monaghan shows how Du Noyer was equally at home producing lithographs for the palaeontological monographs of Portlock and M'Coy.

Struck down with scarlet fever at a relatively early age, Du Noyer has left behind a rich legacy of printed and painted works which until recently was hardly known or appreciated. Through the efforts of Jean Archer and others Du Noyer's talents are now more widely recognised. This volume does them justice; the editor and contributing authors deserve congratulations for this fine production.

Patrick N. Wyse Jackson, Department of Geology, Trinity College, Dublin 2. 3rd April 1996.

GEOLOGICAL CURATORS' GROUP

21st Annual General Meeting

30th November 1994 at the National Museum of Wales, Cardiff.

1. Apologies for absence

Received from Diana Hawkes, Mick Stanley, John Cooper, Tristam Besterman, Simon Knell, Roy Clements, Rosemary Roden, Steve McLean, Stuart Ogilvy, and Steve Thompson.

2. Minutes of the 20th Annual General Meeting 1993

The minutes were approved as a true record of the meeting; proposed by Gill Weightman, seconded by Tom Sharpe.

3. Matters arising

There were none.

4. Chairman's Report from Paul Ensom

The year of 1994 has been a milestone for the Group, celebrating the 20th Anniversary of its formation back in the 1974. That was a time of many causes to fight for, and a very different museum culture to the one in which most of us operate today. The intervening years have seen great changes, many of a positive nature, though as John Martin summed up in his report of the Northampton Meeting in *Coprolite*, 'we still have as big a fight now as we ever had'. We must be as vigilant now as were those who set the Group on its course 20 years ago, ensuring that the geological collections for which we care, directly or indirectly, are not squandered by a headlong rush to embrace the market-place economy in museums. Peter Crowther in his penultimate editorial (*The Geological Curator*, 5, (8), p.302) writes of the conflicts which exist and which ultimately 'rule our professional lives'. For better or for worse we have to respond to change and with these conflicts in mind we look forward to the International Conference on the Value and Valuation of Natural Science Collections to be held in Manchester in April 1995. GCG is a sponsor of the meeting and has agreed to provide financial assistance for a limited number of places (see *Coprolite* No 15, p.6).

For the present I return to the past. For the celebratory Northampton meeting I would like to pay special thanks to Simon Knell who undertook the onerous task of arranging both the meeting and the very successful Anniversary Dinner where we were pleased to see many senior members of the profession alongside those just setting out. It was a great pleasure to welcome Hugh Torrens as our guest and after dinner speaker - a task which he accomplished with great panache. There was a call for similar events in the future, to which your committee will give due consideration. Sterling support was given by Dr Diana Sutherland who led the field trip the following day. We were hosted in style by the Northampton Museum and thanks to Sheila Stone and her staff for that. The venue was of course most apposite - the Northampton Museum had after all been a significant catalyst in the chain of events which saw the birth of our Group. The Group was pleased to see that real progress was being made on their important geological collections thanks to the positive attitude of the museum's management, the dedication of members of their staff and Rosemary Roden.

The day was the more memorable for the launch of the Group's latest publication, the *Directory of British Geological Museums* (*Geological Society Miscellaneous Publication* No.18), compiled and edited by John Nudds and published by the Geological Society Publishing House. John Cooper and Nigel Cunningham should also be thanked for their involvement in its production.

Collections without 'keepers' have continued to concern the Group, and here I pay tribute to Simon Timberlake and Steve Thompson who were closely involved with the 'Orphan Collections' seminar in Brighton. The Museums Association must also be thanked for their enlightened approach to the hosting of meetings like this. This theme is one which we hope will find further expression at the Manchester symposium next April while in the meantime continuing to tax members of the committee.

I am of course especially pleased that we have (or certainly should have) received 4 parts of *The Geological Curator* since the last AGM. My thanks go to Peter Crowther for seeing the last two parts of Volume 5 through, to Monica Price who has dealt with the page make-up, to Cath Bates who saw to their printing and to John Martin and his team at Leicester who have dispatched them to us for the last 10 years. (Peter acknowledges all those involved in his last editorial, *The Geological Curator*, 5, pt.9). At the Glasgow AGM Patrick Wyse Jackson was elected Editor and we are delighted to see Volume 6, parts 1 and 2 issued already. I hope that you will all keep your ears and eyes open, watching for potential contributions and channelling them to our new Editor.

The publication of the new edition of *Thumbs Up* and the successful distribution of thousands of copies to museums around the country was the result of a great deal of hard work by Colin Reid, and a most effective distribution system through our Secretary and Manchester University. The costs involved were generously met by British Gas Exploration and Production, The Curry Fund of the Geologists' Association, Rockwatch and the Geological Society. Our intention is to reprint this popular and important leaflet in the new year taking, account of the new telephone codes and incorporating any necessary revisions.

During the year, and at remarkably short notice, the Committee responded to the call for comments by the DNH

on their Policy for Museums and Galleries. We hope that the review they are undertaking will see the development of a more rational and supportive approach to museums by Central Government.

The aim to hold a meeting at the Seckenberg has lapsed - at least for the time being. There is still a desire by Committee to follow the road to Europe and the right opportunity is being watched for. The Committee would like to thank John Cooper whose idea it originally was, and for his efforts to get it off the ground.

At the beginning of the year the Committee invited Dr Bob Symes to join them as a co-opted member and were delighted when he accepted. During the year Rosina Down who had been BCG representative for at least the last 10 years handed over to Steve Thompson. We thank her for her loyal support and regular attendance during that time. I would like to take this opportunity to thank all the Officers, who will be reporting to you in their own right, and Committee members for their support and hard work. The Group as a whole owes much to Tom Sharpe and Monica Price who continue to see that we are supplied with a wide variety of information through Coprolite. Thanks to all those who contribute voluntarily or have their arms twisted! The Terminology Working Party under the leadership of Roy Clements continue to deliberate and we look forward to their first offering. Kate Pontin has remained in her role as corresponding educationalist and has been a great help with the machinations over the National Curriculum. The Group is fortunate to have seen its last Chairman, John Cooper, invited to join the UK Systematics Forum. His presence will doubtless be of value.

Personal thanks go to Di Hawkes for all her hard work as Minutes Secretary for well over ten years.

The time has come in my chairmanship (*The Geological Curator*, 5, (8), pp. 331-332) to invite 'informal suggestions (with supporting written statement) for possible [A G Brighton] medalists' to be sent direct to me. You will, I am sure, remember that the award is made on the basis of the 'counselled choice of the Chairman'. This appeal is the start of the selection procedure which culminates in the presentation of the Medal at next years AGM.

Finally, on behalf of the Group I would like to thank all our speakers, leaders, and hosting organisations who through their co-operation and contributions have made the last year such a good one.

5. Secretary's Report from Mandy Edwards

The Committee have met four times in 1994: 13th January, London; 16th May Leicester; 28th September, Manchester and 29th November, Cardiff. The ethics of collecting and the use of collections have been discussed by committee in 1994 and we are looking forward to a culmination of these thoughts at the Value and Valuation Meeting in Manchester in April 1995.

The group still has two working parties in operation - on terminology and uncurated collections. The terminology working party have met once this year and have identified some initial targets and have some documents in draft form. We wait to hear from the working party on uncurated collections who will have reported to committee yesterday!

Three seminars were held: The very enjoyable 20th Anniversary meeting in Northampton on 17th May. Thank you to Simon Knell as local secretary and everyone at Northampton. A meeting hosted by the Museums Association Conference in Brighton on 12th September on Orphan Collections organised by Simon Timberlake and Steve Thompson. And finally the meeting today in Cardiff on Geological Display - new directions in interpretation.Thank you to Tom Sharpe as local organiser. The meeting on University Collections had to be cancelled at short notice due to local circumstances. Thank you to all of the people who have helped in the organisation of meetings.

Sue Rainton has been requesting material all year from committee members for the groups archive which is now steadily growing. If anyone has anything for inclusion in the archive please see one of the committee members.

The publicity leaflet and the new edition of *Thumbs Up* have generated a lot of interest. The group have sent out replies to 64 people. Steve Mclean has very generously been helping send out membership packs to people. The group is still receiving requests for copies of *Thumbs Up* from all over the world.

I have taken over the organising of the seminar programme from Colin Reid and it has been a lot harder to do than Colin makes it look. However we have 4 meetings and 2 workshops planned for 1995 - details to follow in the new year. Anyone who has any ideas for meetings or offers of venues please let me know.

The Group have agreed to assist up to 5 people to attend the conference next year on the Value and Valuation of Collections . Please see me if you do want help in attending this conference.

6. Treasurer's Report from Andrew Newman

Finance

The accounts for the period 8/12/93-30/11/94 are attached. The Geological Curators' Group has total assets of £12,737.37. Income over the past year has been made up mainly of subscriptions and sponsorship. I wish to record my thanks to the membership for generally prompt payment and to our sponsors CJC Burhouse, British Gas and The Geological Society for their help with particular projects. Expenditure has been in excess of previous years because of the publication of three numbers of *The Geological Curator* and the decision to send *Coprolite* to all subscribers. The Group has been more active over the last year, publishing and distributing leaflets, for example. There was also a cost associated with the 20th anniversary meeting at Northampton. The net result of the extra activity is that the Group has a deficit over the year of £2765.12. This situation is clearly untenable in the

medium term so I propose to increase subscriptions by £3.00. This will mean that for 1995 onwards subscriptions will be as follows: Personal UK: £10; Institutions UK: £13; Personal Overseas £12; Institutions Overseas: £15. This increase will cover the projected costs for 1995. The situation will remain under review.

Membership

Group membership has benefited considerably from the publicity leaflet. The total membership comprises of:

UK personal members	291
Overseas personal	55
UK institutions	102
Overseas institutions	59

Total subscriptions of 507. This represents an increase of 38 during the year. I would like to thank Steve Mclean for his help in dealing with enquiries generated by the leaflet.

There was a query as to how much deficit was due to theThe Geological Curator. The Treasurer stated that it was a major factor, and that we could be in the red in the next two and a half years if we did not raise subscriptions. We now need more income as the group is more active with publications. Subscriptions have not gone up since 1989. Paul Ensom agreed that it was not unreasonable to increase the price of subscriptions as we do lag behind in the prices of the other specialist groups. The intention to mail out abstracts from the Value and Valuation conference in Manchester would take a large proportion of the funds.

The accounts were adopted by the meeting.

7. Editor's Report from Patrick Wyse Jackson

A week after agreeing to be your editor it began to sink in just how much work lay in the future. My predecessor Peter Crowther pulled the *Curator* up by its boot strings and left behind a high quality journal, and he deserves the grateful appreciation and thanks of the Group for his long term and hard work as Editor.

I have made a number of modifications to his formula, which I believe improve the journal further. For example abstracts are now published with all major articles. I have attempted to increase the number of book reviews without adding to the length of the journal by reducing the font size.

This year has seen the publication of 4 issues of *The Geological Curator*: Volume 5, Parts 8 and 9 and Volume 6, Parts 1 and 2. The issues of Volume 5 were the responsibility of my predecessor Peter Crowther, while I have been responsible for the issues of Volume 6.

Volume 6 Part 1 pp 1-45; published 22nd April 1994; Volume 6 Part 2, pp 46-113; published 8th November 1994.

Part 1 contains a thematic set of 4 papers from the 1992 Symposium for Palaeontological Preparators and Conservators, one other paper, 2 notes, the minutes of the 18th and 19th Annual General Meetings, notice of the award of the Brighton Medal to Charles Waterston, Reviews of 3 books, and Lost and Found. Part 2 contains 6 papers from the 1992 Museums and Fossil Excavation meeting (these were edited in conjunction with Simon Knell, one other paper, one note, the first Fact File, reviews of 12 books, Lost and Found, and the correct accounts for 1992!

I thank all those who submitted papers, those who reviewed books and in particular those who refereed submitted papers. Issues are now completely produced in Dublin. Typesetting is done by me using the template produced by Monica Price. My wife Vanessa proof-read both issues, which were printed by ColourBooks Ltd of Dublin. The printers are quick (three weeks from submission of CRC to delivery of finished journal) and very helpful. The quality of the illustrations is for the most part excellent. A small number of less than perfect illustrations appeared (particularly in 6(2)), which were reproductions from colour transparencies. If authors require good quality illustrations they must submit them as good black and white prints. All the packing was done by Charlotte Ni Bhroin in TCD. Many thanks.

At present I have three manuscripts in hand which have been accepted for publication, and another two which were submitted some time ago and which were returned to the authors for revision.

The Geological Curator can publish upwards of 12 papers per year, where the papers are 8-10 printed pages long. While I would encourage the submission of these shorter papers I do not preclude publishing longer submissions. I am not keen to publish preliminary papers nor working documents for consideration by the membership. Turnover rate of papers can be as fast as two months depending on when the papers are submitted and the amount of revision required. Please submit papers!

8. Recorder's Report from John Nudds

This year has finally seen the publication of the long awaited GCG *Directory of British Geological Museums*, published by the Geological Society of London as Miscellaneous Paper No.18. The Directory was launched on May 17th at the 20th anniversary meeting of the Group at Northampton Museum and thanks must go to Mike Collins of the Geological Society Publishing House in Bath for succeeding in delivering the first 20 copies literally hot from the press to Northampton for that memorable occasion. I must also express my gratitude to Mike and to John Cooper, whose brainchild this *Directory* was, for their joint efforts in steering the *Directory* through its final publication stages so quickly and so efficiently - after exhaustive checking I can find only four errors, all of them trivial. Thanks are also due to all the contributors without whom there would have been no publication.

The *Directory* has been well publicised by the Geological Society and has been very well received with complimentary reviews appearing in *New Scientist* (Doug Palmer), *UK Journal of Mines & Minerals* (Dave Green), *Palaeontology Newsletter* (Barrie Rickards) and several other journals. The Geological Society appears pleased with its sales and I am

hopeful that we will produce updated editions. Copies are available today at the reduced price to GCG members of £9.95.

This year has also seen the preliminary preparation for a major international conference being organised jointly by the GCG, BCG and Manchester Museum on the Value and Valuation of Natural Science Collections, to be held at Manchester University from April 19th-21st 1995. This conference will examine the scientific, cultural and financial value of collections and has already received responses from over 100 delegates representing over 20 different countries. Keynote papers will be given by the Earl of Cranbrook, Professors Gary Carnegie and Peter Wolmizer (Deakin University, Victoria, Australia) and Charles Pettitt (Manchester Museum. The deadline for registration at reduced fees (£100) is 16th December 1994, although GCG members can register up to 19th March 1995 at a special rate of £90. In addition the GCG committee is offering 5 assisted places to members; anyone who feels that they have a deserving case should apply in writing to the committee as soon as possible. The deadline for receipt of abstracts has now passed and the provisional programme will be published in the next edition of *Geoscientist*; members will note that geology is well represented in this programme and the conference promises to be of relevance to all concerned with collections of natural sciences. Several interesting social events are also planned.

9. Publicity Officer's Report from Colin Reid

Colin thanked Mandy Edwards for taking over the seminar programme which he had previously organised.

The new GCG leaflet appeared to be a success and Colin has now distributed 70,000 including through the Geological Society and the Museums Journal, there has been a good international response. The 'Thumbs Up' leaflet had to be redrafted completely; a limited print-run of new leaflets was done because of the changes in telephone numbers in April 1995 and unawareness of parallel use of old and new numbers. A second run of leaflets will be done after April and sponsorship will be required for this.

Colin expressed concern over the lack of GCG response at special events such as at the Geological Society or the Geologists' Association Reunion and stated we need more presence. Bob Symes said that we had had a poster at the Reunion and that the GCG had taken part in the Fossil Day in Dudley.

10. National Scheme for Geological Site Documentation Coordinator's Report from Mick Stanley

Mick had hoped to report that after 14 years of being the co-ordinator he would be able to give up but he was willing to continue for the time being. There had been one meeting of the ad-hoc Steering Group earlier this year and one due next week at Peterborough, therefore more to report after this meeting. Mick will be seeking information back from Record Centres for the Annual Report. Some centres are very active with RIGS (Regionally Important Geological Sites) involvement, others no so, but RIGS generally has galvanised many into action. 15 organisations, mainly Record Centres, have GD2 installed and working and hopefully more will follow.

Paul Ensom stated that the role of the NSGSD will be reviewed next year.

11. Election of Officers and committee

John Crossling was proposed as Minutes Secretary.
Bob Symes was elected to the Committee.

12. Election of Auditors

The re-election of Ken Sedman and Peter Davies as auditors was proposed by John Martin, seconded by John Nudds and approved.

13. Any other business

There was a query about whether the Group intended to have a meeting further afield abroad in the future. Paul Ensom replied that this was what the GCG hoped to do.

14. Date and venue of next AGM

29th November 1995 at the Ludlow Museum.

The Chairman Paul Ensom proposed a vote of thanks to the hosts at the National Museum of Wales for such a good meeting, and, in particular to Tom Sharpe and Cindy Howells who had helped with the arrangements

Annual Accounts 1994 (8 December 1993 - 30 November 1994)

	1994	1993
Current Account Income		
Subscriptions	3651.78	2058.00
Sale of backnumbers	112.75	248.00
Advertisements/Sponsorship	2000.00	500.00
Meetings fees	524.00	151.00
Committee lunch	28.75	-
Transfer	3100.00	-
Refund bank charge	-	4.60
Sec. Exp. not cashed	-	50.00
MA refund	-	35.00
Balance	978.68	1268.72
	£10395.96	£4315.82

	1994	1993
Premier Interest Account Income		
Interest	491.24	705.81
Transfer	-	116.00
Balance	14523.81	13702.00
	£15015.05	£14523.81

A.G. Brighton Funds in Premier Interest Account	
Income (interest)	53.00
Balance	1465.73
	£1519.33

	1994	1993
Current Account Expenditure		
Geological Curator		
Printing - 5(8), 5(9), 6(1)	2654.81	-
Postage	969.35	-
Meetings		
Committee	261.00	131.85
Univ Manc	250.00	-
Geol. Soc. Tea	59.98	-
MGC	59.00	-
General	699.25	209.50
Coprolite		
Print and distribute	1804.91	892.83
Brighton Medal		
Engrave	-	11.00
Other expenditure		
Postage	11.82	17.46
MGC	-	12.00
Univ. South	-	114.00
County Comp. Supplies	20.15	-
Archive	48.18	-
HPL4 Toner Cartridge	97.53	-
Publicity Leaflet		
Slide	-	17.50
Photo	-	35.00
Design	-	213.22
Print	-	1544.00
Post	-	22.78
Dist. Reingold	352.50	-
Dist. Geol. Soc.	293.75	-
Trans.	-	116.00
Balance	822.32	978.68
	£10395.96	£4315.82

	1994	1993
Premier Interest Account Expenditure		
Transfer to current account	3100.00	-
Balance	11915.05	14523.81
	£15015.05	£14523.81

Total Income	6808.52	3752.91
Total Expenditure	9573.64	3337.14
	£(2765.12)	£415.77

[signed] A. Newman *GCG Treasurer*

[signed] P.S. Davis and K. Sedman *Auditors*

THE GEOLOGICAL CURATOR

Publication scheme

Two issues of *The Geological Curator* are published for each year (in the Spring and the Autumn); a complete volume consists of ten issues (covering five years) and an index.

Notes to authors

Articles should be submitted as hard copy in the journal style typed on good quality paper (A4 size) double spaced, with wide margins, and if possible on disk (preferably formatted for a Macintosh in Microsoft Word or MacWriteII, although other disk types will be accepted - please quote system type and wordprocessing package used). Three copies should be sent to the Editor, Patrick N. Wyse Jackson, Department of Geology, Trinity College, Dublin 2, Ireland (tel 01 6081477; fax 01 6711199; e-mail: wysjcknp@tcd.ie). Line drawings should be prepared in black ink at the desired publication size. Photographs for halftone reproduction should be printed on glossy paper. Both drawings and photographs should be proportioned to utilise either the full width of one column (85mm) or two (175mm). References in the text follow the Harvard system, i.e. name and date '(Jones 1980)' or 'Jones (1980)'. All references are listed alphabetically at the end of the article and journal titles should be citedin full. Authors will normally receive proofs of text for correction. Fifty reprints are supplied at cost. Major articles are refereed. Copyright is retained by authors.

If submitting articles on disk please note the following:

1. Do not 'upper case' headings. **Keep all headings in upper and lower case.**
2. **Use italics** rather than underline for latin names and expressions, journal names and book titles. **Use bold** for volume numbers in references.
3. Line spacing. Your hard copy should be double spaced. If possible, **single space** your copy on disk. Use a **single (hard) carriage return** at the end of each paragraph.
4. Single space-bar between words, **double space-bar between sentences.**
5. **Do not attempt** to format your article into columns. Use a minimum of tabs and indents.

Regular features

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

FACT FILE contains basic information for the use of curators. All items relating to this column should be sent to the Editor (address above)

NOTES comprising short pieces of less than two pages are particularly welcome. Please send contributions to the Editor (address above).

CONSERVATION FORUM helps keep you up to date with developments in specimen conservation. Information on techniques, publications, courses, conferences etc. to Christopher Collins, Sedgwick Museum, Department of Earth Sciences, University of Cambridge, Downing Street, Cambridge CB2 3EQ (tel. 0223 62522)

BOOK REVIEWS contains informed opinion about recently published books of particular relevance to geology in museums. The Editor welcomes suggestions of suitable titles for review, and unsolicited reviews (of 500 words maximum) can be accepted at his discretion. Publishers should submit books for review to the Editor.

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

Advertisement charges

Full A4 page	£60 per issue
Half A4 page	£40 per issue
Quarter A4 page	£25 per issue

Discounts for space bought in three or more issues. Further details from the Editor.

Inserts such as publishers' 'flyers' can be mailed with issues of *The Geological Curator* for a fee of £60. 550 copies of any insert should be sent to the Editor.

Subscription charges

UK Personal Membership	£10 per year
Overseas Personal Membership	£12 per year
UK Institutional Membership	£13 per year
Overseas Institutional Membership	£15 per year

All enquiries to the Treasurer/Membership Secretary, Andrew Newman, Department of Archaeology, University of Newcastle, Newcastle-upon-Tyne NE2 4PT (tel/fax. 091 222 7426).

Backnumbers

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