



Detail of the Eocene fish *Diplomystus* and *Priscacara* from the Green River Formation, Wyoming.
Yvonne Cooper © Cockburn Museum

Review of Fossil Collections in Scotland Edinburgh and Lothians



National
Museums
Scotland

John Ellerman
Foundation

Edinburgh and Lothians

Haddington Museum Headquarters (East Lothian Council Museums Service)

Almond Valley Heritage Centre (Almond Valley Heritage Trust)

Cockburn Museum (University of Edinburgh Collections)

Anatomical Museum (University of Edinburgh Collections)

Natural History Collections (University of Edinburgh Collections)

Haddington Museum Headquarters (East Lothian Council Museums Service)

Collection type: Local Authority

41 Dunbar Road, Haddington, East Lothian, EH41 3PJ

Contact: elms@eastlothian.gov.uk

Location of collections

The Libraries and Museums Headquarters houses East Lothian Council's stored collections. Areas to display objects from the collections are available at the John Gray Centre Museum, Haddington.

Size of collections

35-40 fossils.

Onsite records

Information is recorded in a Modes CMS with entry forms for most items.

Collection highlights

1. Material from the Lothian Carboniferous shrimp beds, linked to Euan Clarkson.

Published information

Briggs, D.E.G., N.D.L. Clark, and E.N.K. Clarkson. (1991). The Granton 'shrimp-bed', Edinburgh — a Lower Carboniferous Konservat-Lagerstätte. *Earth and Environmental Science Transactions of The Royal Society of Edinburgh*. 82:65-85.

Collection overview

Fossils are in numbered boxes with other geological specimens. They include corals, brachiopods (*Eomarginifera*, productids and fossils labelled as *Atrypa* but probably a type of orthid brachiopod), bivalves (*Edmondia* and modern oyster), orthoconic nautiloids, gastropods (*Straparollus*), crinoids (usually disarticulated in limestone) and 'macaroni rock' (densely packed with coral, perhaps of the Carboniferous coral *Syringopora* from Barns Ness, Dunbar), most of which are Carboniferous. Several specimens of the shrimp *Tealliocaris* from the Carboniferous Granton Shrimp Beds are accompanied by a model. There are also samples of crinoidal and reef limestone showing fossil debris. Plant fossils include *Lepidodendron*, *Calamites* and *Stigmaria*, and several indeterminate fragments, some of which form part of the Spence Collection. Fossils of the MN Shiel Collection include corals labelled as *Lithostrotion* from Aberlady, *?Koninckophyllum* and *?Dibunophyllum* sp., crinoids (many water-worn and all labelled as Lower Carboniferous from Barns Ness 1921), and the brachiopod *Dictyoclostus* (perhaps also from Aberlady or Barns Ness area).

A handling box labelled 'Fossils and dinosaurs' contains large pieces of coral, the Jurassic ammonite *Dactylioceras*, an orthoconic nautiloid, brachiopods, crinoids, trace fossils in micaceous sandstone (the labels suggest *Rhizocorallium* although the identification needs confirming), dinosaur models and wooden cut-outs of dinosaur footprints, and a plaster cast of a complete ichthyosaur (half-size, small-sized adult or juvenile). Labels indicate fossil fish were recently transferred from National Museums Scotland for the handling collection.

Research/collection links

Shrimp fossils mentioning Euan Clarkson highlight a research link with the University of Edinburgh where similar material is located.

Almond Valley Heritage Centre (Almond Valley Trust)

Collection type: Independent

Accreditation: 2016

Recognised Scottish Shale Oil Collection: 2010

Millfield, Livingston, West Lothian, EH54 7AR

Contact: info@almondvalley.co.uk

Location of collections

Originally a watermill and farm, the buildings were saved from demolition in the 1960s and restored as a visitor attraction. Since 1990, the Heritage Centre has been managed by the Almond Valley Heritage Trust. Since 1982, the Livingstone Oil Museum has been the location of a growing heritage collection relating to shale mining and oil production, including the nationally important BP Archive. The Scottish Shale Oil Collection is Recognised by Museums Galleries Scotland as Nationally Significant to Scotland. Fossils are included in the collection and all specimens are on display.

Size of collections

30-40 fossils.

Onsite records

No formal system present.

Collection highlights

1. Vertebrate, invertebrate and plant fossils from the local Lower Carboniferous Oil Shale.

Published information

Smithson, T.R. (1993). *Eldeceeon rolfei*, a new reptiliomorph from the Viséan of East Kirkton, West Lothian, Scotland. *Earth and Environmental Science Transactions of The Royal Society of Edinburgh*. 84:377-382.



Figure 38: Carboniferous plant fossils on display (Almond Valley Heritage Centre)

Collection overview

As the Museum is focused on the shale oil industry in the West Lothian area, the fossils are almost entirely from the Carboniferous locally, specifically the Calciferous Sandstone Series. Plant fossils include *Calamites*, *Lepidodendron*, other fronds and indeterminate fragments (Fig.38). There are several large sections of tree trunk, possibly from the local area. Vertebrates are represented by the fish *Eurynotus*, *Mesopoma* and *Rhadinichthys* among others, with many in split nodules comprising part and counterpart pieces. Additional nodules contain coprolites (Fig. 39). There is also a rare fossil of the amphibian *Eldeceeon rolfei*, on long-term loan from National Museums Scotland. Invertebrate fossils include a eurypterid head, crinoid stem fragments, bivalves and corals.



Figure 39: A coprolite part and counterpart in a Carboniferous nodule (Almond Valley Heritage Centre)

Cockburn Museum (University of Edinburgh Collections)

Collection type: University

Accreditation: 2016

Grant Institute, Kings Buildings, West Mains Road, Edinburgh, EH9 3JW

Contact: Cockburn.museum@ed.ac.uk

Location of collections

The collection dates from Victorian times, after most of the original collection was donated to the Royal Scottish Museum (now National Museums Scotland). The Geoscience department moved from its original location in Old College to the Kings Buildings and Grant Institute in 1932. At the new location curation was undertaken on a voluntary basis by Dr Alexander Murray Cockburn (1901-1959), after whom the Museum was named in 1959. Fossils are stored in cupboards and storerooms in the Grant Institute and a second departmental building on campus.

Size of collections

The collection comprises 130,000 geological specimens, an unknown number of which are fossils.

Onsite records

Cataloguing and data enhancement in recent years has focused on the mineral collections with work on the fossils to follow. Documentation is present for fossil specimens that have been moved or loaned.

Collection highlights

1. Research material from the Pentland Hills, Girvan and wider Midland Valley.
2. Extensive collection of fish fossils, including Devonian and Carboniferous material.
3. Fossils linked to Reverend John Anderson (1796-1864), Charles Lyell (1797-1875), James Powrie (1815-1895), John Smith of Dalry (1845-1930), Arthur Smith Woodward (1864-1944) and James Wright (1876-1957).
4. Research collections attributed to Thomas Jehu (1871-1945) and Robert Campbell (1881-1957).

Published information

- Aspen P. (2018). AM Cockburn, Curator of the Museum of Geology at Edinburgh University. *The Geological Curator*. 10:531-533
- Briggs, D.E.G., N.D.L. Clark, and E.N.K. Clarkson. (1991). The Granton 'shrimp-bed', Edinburgh—a Lower Carboniferous Konservat-Lagerstätte. *Earth and Environmental Science Transactions of The Royal Society of Edinburgh*. 82:65-85.
- Bull, E.E. (1996). *Geology and palaeontology of the Telychian (Silurian), reservoir formation of the North Esk inlier, near Edinburgh, Scotland*. Doctoral dissertation, The Open University.
- Bull, E.E., and D.K. Loydell. (1995). Uppermost Telychian graptolites from the North Esk Inlier, Pentland Hills, near Edinburgh. *Scottish Journal of Geology*. 31:163-170.
- Clarkson, E.N.K., D.A. Harper, A.W. Owen, and C.M. Taylor. (1992). Ordovician faunas in mass-flow deposits, Southern Scotland. *Terra Nova*. 4:245-253.
- Clarkson, E.N.K., D.A.T. Harper, and A.N. Höey. (1998). Basal Wenlock biofacies from the Girvan district, SW Scotland. *Scottish Journal of Geology*. 34:61-71.
- Davies, L.M. (1943). Tertiary Echinoidea of the Kohat-Potwar Basin. *Quarterly Journal of the Geological Society*. 99:63-79.
- Davies, L.M. (1926). Remarks on the known Indian species of *Conoclypeus*, with descriptions of two new species from the Eocene of North-West India. *Recent Zoological Survey of India*. 3:358-368.
- Lyell, C. (1990). *Principles of Geology, Volume 1*. Chicago: University of Chicago Press.
- Jehu, T.J., and R. Campbell. (1917). The Highland Border rocks of the Aberfoyle District. *Earth and Environmental Science Transactions of The Royal Society of Edinburgh*. 52:175-212.

Powrie, J. (1870). On the earliest known vestiges of vertebrate life; being a description of the fish remains of the Old Red Sandstone rocks of Forfarshire. *Transactions of the Edinburgh Geological Society*. 1:284-301.

Woodward, A.S. (1915). Preliminary report on the fossil fishes from Dura Den. *Reports of the British Association for Advancement of Science, Australia*. 84:122-3.

Woodward, A.S. (1920). Presidential address. *Proceedings of the Linnean Society of London*. 132:25-34.

Wright, J. (1950-1960). A monograph on the British Carboniferous Crinoidea. *Palaeontographical Society, London*. 1:1-190; 2:191-347.

Young, G.C. (2005). An articulated phyllolepid fish (Placodermi) from the Devonian of central Australia: implications for non-marine connections with the Old Red Sandstone continent. *Geological Magazine*. 142:173-186.

Collection overview

The fossils form main, research and teaching collections. The main collection comprises examples of many groups found as fossils for primary reference use. Vertebrate fossils include a large number of fish. The Lower Devonian is represented by cephalaspids from disparate origins across Scotland and the UK and numerous acanthodians from Turin Hill and Forfar (*Ichnacanthus*, *Mesacanthus*). A *Mesacanthus* from Turin Hill is among the specimens presented by James Powrie (1815-1895). *Rhamphodolepis threiplandi* is from the Edderton Fish Bed at Blackpark and a rock with fragmentary fish remains is from the Dartmouth Shale, Cornwall. Middle Devonian fish are from localities, many historic, across north east Scotland: Caithness (Achanarras, Thurso), Orkney (Toah), Nairnshire (Lethen/Lethen Bar), Shetland (Exnaboe), Moray (Tynet burn, Dipple Brae) and Gamrie (Banffshire, now included in Aberdeenshire), with fossils including *Stegotrachelos*, *Palaeospondylus*, *Pterichthyodes*, *Cheirocanthus*, *Mesacanthus* and *Osteolepis*. A fossil is labelled as the small Middle Devonian placoderm *Microbrachius dicki* named by Traquair. Fish from the Upper Devonian are from Dura Den, Fife, with specimens of *Bothriolepis* noted from Scaumenac Bay, New Brunswick, Canada, and Shoalhaven River, Araluen, Australia.

A noted fish specimen comprising several articulated and ornamented plates has two labels, the first reading '*Canobius microcephalus* from the Scottish Calciferous Sandstone Series, Broxburn' and the second '*Phyllolepis* Upper Devonian, near Elgin, Scotland' (Fig.40). The *Phyllolepis* identification is more likely, although not the origin, as the specimen matches exactly a *Phyllolepis woodwardi* in the Australian National University Collection, Canberra, figured in Young (2005, fig 2). The figured specimen is a cast of the holotype originating from Dura Den and described by AS Woodward (1915, fig 4). The consistent colour and edges of the specimen in the Cockburn Museum suggest this is also a cast.



Figure 40: The cast of the Upper Devonian *Phyllolepis* (left) and fragments of Middle Devonian *Millerosteus* from Thurso (right) (Cockburn Museum)

Other labels of interest are dated 1810 and 1813, with fish attributed to Prof Stewart (perhaps Sir Frederick Stewart, Regius Professor from 1956-1986). A fish from Caithness was presented by Mrs Gray 1886, several nodules are associated with the note 'Lethen Bar historically important' and others have been examined relatively recently by Bob Davidson. An interesting fossil is of an *Arandaspis* from the Middle Ordovician Stairway Formation of Mount Watt, Alice Springs, Western Territory of Australia. Silurian fish include fossils of *Lanarkia* and *Loganellia* from Muirkirk (Ayrshire) and Lesmahagow (Lanarkshire), a *Thelodus* from Smithy Burn and *Loganellia* from Shiel Burn, Monks Water, in the Hagshaw Hills, and the fragments of fish teeth, spines and scales preserved in the Ludlow Bone Bed from Ludlow, Shropshire.

The Carboniferous is represented by fossils from the 'Scottish Calciferous Sandstone Series' and Coal Measures. These include *Rhadinichthys* in Oil Shale from Broxburn, West Lothian, *Megalichthys*, *Rhizodus*, *Strepsodus*, *Plectrolepis* (*Eurynotus*), *Crenodus* (including a rib), and *Gyracanthus* spines from Gilmerton, Burdiehouse, Wemyss (Fife), Dalkeith and Burntisland among others; a *Gyracanthus* is from the Rag Mine Ironstone Shale of Fenton. Permian fossils are from the Marl Shale of Durham (*Palaeoniscum* and other palaeoniscids), which is equivalent to the Kupferschiefer Formation of Germany, also represented by examples of *Palaeoniscum*. A fossil of the fish *Palaeoniscum wratislavensis* is from the Kohlenkalk of Bohemia with 'Krantz & co in Berlin' mentioned on the label. These specimens are observed with labels for '*Palaeoniscus*', an incorrect spelling of the generic name. There is also a lungfish, *Gnathorhiza* sp., from the Permian Wellington Formation in a tributary of Black Bear Creek, Oklahoma. The teeth of the sharks *Acrodus* and *Hybodus* and scales of *Gyrolepis* are preserved in the Triassic Rhaetian Bone Bed from Tübingen. Other fossils are from the Jurassic Solnhofen Limestone of Germany and Liassic of Lyme Regis, and Eocene Green River Formation of Wyoming (*Diplomystes* and *Priacara*) (Fig. 41), London Clay from the Isle of Sheppey and Monte Bolca of Italy (*Lepisosteus*). Further specimens are from Bohemia, Denmark, Australia and Cornwall.

Other vertebrate fossils are a placodont tooth (Triassic), shark teeth (various ages including Portlandian), fossils from the Jurassic Stonesfield Slate of Oxfordshire, a Jurassic ichthyosaur, several vertebrate casts (notably a pterosaur) and Recent mammal bones (mammoth tooth, horse teeth, jaws and other fragments, fox and dolphin). A large wall-mounted ichthyosaur cast has a label reading 'Ichthyosaur (Ichthyosauria or Ichthyopterygia) Lyme Regis, Dorset, England This is a primary cast of an aquatic reptile from the Lower Jurassic to Late Cretaceous period. The original ichthyosaur formed part of the Cockburn Museum Collection until it was auctioned in 1970'.

Invertebrates are represented by crinoid fragments from the Carboniferous, German Muschelkalk and Jurassic of Dorset. A crinoid specimen labelled as *Woodocrinus liddesdalensis* from Penton Linns, Liddesdale, is attributed to James Wright. Echinoderms include starfish and echinoids mainly from the Jurassic (*Clypeus*), Cretaceous, Cenozoic (Kohat Potwar Basin, LM Davies Collection) and Recent; one specimen comprises the plates and spines of *Archaeocidaris urei* from the Abden Limestone of Kinghorn, Fife. Trilobites are represented by most of the main groups: agnostids, paradoxidids, *Olenellus*, *Trinucleus*, Opisthoparia, asaphids, *Ogygia* and phacopids (*Phacops*, *Dalmanites*, *Calymene*) from localities including Girvan (Ladyburn), Shropshire (Shinerton, Cheyney Longville), Wales (Llandeilo), County Tyrone (Northern Ireland), Ross-shire (*Olenellus*), Bohemia, Scandinavia, Alabama, British Columbia and Iowa. Additional arthropod groups are also represented by the eurypterid *Pterygotus*, fossils of *Aeger*, *Eryon*, *Penaeus* and *Limulus* from the Solnhofen Limestone, and crustaceans from the Isle of Wight. Bryozoans have a wide geological and geographic range with examples of *Fistulipora* from Roscobie (Fife), *Cryptostomata* from Gilmerton and Castleton, *Rhabdomeson* from Ayrshire and *Fenestella* from the Magnesian limestone of Thuringen, Germany, among others. Brachiopods include linguiliforms (mostly *Lingula*, several in core samples) and representatives of the articulated productids, spiriferids, terebratulids and rhynchonellids from as far back as the Cambrian, although later geological periods are better represented. Silurian brachiopods from England and Wales include *Leptaena* from Dudley and *Atrypa* and *Rhynchonella* from the Much Wenlock Limestone Formation. Devonian brachiopods include *Athyris*, *Leptaena*, '*Orthis*' and *Gypidula* from Gerolstein (Eifel), Pattrath, Cologne, and

Gand near Harz (Germany), and several examples of *Cyrtospirifer verneuili* from Trebarwith Strand, near the Delabole Slate Quarry, Cornwall, where they are known as 'Delabole butterflies'. Carboniferous taxa are especially diverse: *Schizophoria* and *Productus* from Beith, *Productus* from Aulm[ar], *Buxtonia* and *Spirifera* from Potmetal (Kirkcaldy), *Pugnax* from Roscobie (Fife), *Syringothyris* from Barrowdale (Carr Collection) and *Pustula* from Crichton and Whitefield. Other stratigraphic levels are represented: the Permian (Magnesian Limestone from Sunderland), Inferior Oolite (*Aulacothyris*, *Plectothyris*, *Lobidothyris* from Gloucestershire and Somerset among other localities), Greensand, Cretaceous Chalk, including the Red Chalk of Hunstanton, the Eocene London Clay and Pliocene-Pleistocene Red Crag. Several drawers of brachiopods contain 'foreign material', with labels for Germany (Muschelkalk), America and Sweden. The collection includes samples of the Entomostrachan Shale.

Named corals are *Thamnastraea*, *Astrea*, *Stylina*, *Asterophyllum*, *Cyclolites*, *Thecosmilia*, *Montlivaltia*, *Heliolites*, *Syringopora*, *Halysites*, *Favosites*, *Thamnopora*, *Alveolites*, *Cyathophyllum*, *Ketophyllum*, *Arachnophyllum*, *Heliopora*, *Diphyllum*, *Omphyma*, *Heliopora*, *Cyathophyllum*, *Acervularia*, *Ketophyllum*, *Phillisastrea*, *Sphenotrochus*, *Isastrea* (Jurassic) and *Turbinolia* (Gault of Folkestone), with other corals from the Red Crag of Suffolk; these cover typical taxa from throughout the geological timescale, especially the Silurian, Carboniferous and Jurassic. One coral has a label 'Epis. Corallien Wilts, F.H. Burier 1892'. Lower numbers of fossils represent stromatoporoids, stromatolites, foraminifera, diatoms, radiolaria and sponges, notably *Raphidonema* and *Barroisea* from the Cretaceous Faringdon Sponge Gravels with taxa from the Jurassic (Lyme Regis), Cretaceous Greensand and Chalk, and Pliocene among others.



Figure 41: The ray-finned fish *Diplomystus* and *Priscacara* from the Eocene Green River Formation, Wyoming (Cockburn Museum). Yvonne Cooper © Cockburn Museum

Mollusc fossils are primarily bivalves with examples from the Silurian, Devonian, Carboniferous (Castleton, *Pterinopecten* from North Staffordshire and *Anthracomya* from Patricroft, Manchester), Permo-Triassic, Jurassic (*Pholadomya*, inoceramids, *Trigonia* from the Oxford Clay at Weymouth and *Astarte* from the Inferior Oolite), Cretaceous (Wealden including *Cyrena* from Netherfield, *Nucula* from the Gault at Folkestone, *Callita*, *Plana* and *Cyprina* from the Upper Greensand at Blackdown, Devon, and *Barbatia* from the Lower Greensand at Atherfield, Isle of Wight). Paleocene

bivalves are from the Thanet Sands, with a wide range from the Eocene Barton Beds of Barton, Hampshire (*Meretrix*, *Ostraea*, *Crassitella*, *Cardium* and *Pecten* among others), Bracklesham Beds on the Isle of Wight, and London Clay of Bognor Regis and Isle of Sheppey. Fossils from the Headon Beds represent the Oligocene and Coralline Crag. Pliocene-Pleistocene Red Crag bivalves *Mya*, *Cardium*, *Tellina*, *Macra*, *Unio* and *Leda* are from Norwich and Suffolk. Gastropod fossils have a similar range with specimens from the Silurian, Devonian, Carboniferous, Jurassic and Cretaceous. Eocene gastropods are from the Barton Beds (*Cassis*, *Natica*, *Pleurotomaria*, *Murex*, *Ancilla*, *Voluta*, *Cancellaria*, *Conus*, *Mitra*, *Paludina* (Isle of Wight) and *Cerithium*). Pliocene-Pleistocene gastropods are from the Red Crag (*Nassa* from Orford Castle, *Nassa* and *Voluta* from Sutton in Suffolk and other non-localised *Natica*, *Neptunea*, *Littorina* and *Cerithium*) with *Buccinum* from the Norwich Crag, *Melanopsis* from the Miocene of Baden near Vienna and a *Planorbis* from an Upper Miocene freshwater lake. The gastropod *Hipporites* originates from localities in the UK and Untersberg on the German-Austrian border. Various geological ages are represented by scaphopods (*Dentalium* from the Eocene Barton Beds) and serpulids (*Serpula antiquata* from the Gault of Folkestone) with several casts of the latter. Cephalopods include goniatites and nautiloids from the Carboniferous of Derbyshire (Castleton) and Yorkshire, nautiloids from other stratigraphic levels, Jurassic belemnites, and ammonites from the Jurassic (Liassic, Oolite) and Cretaceous (Greensand, Gault, Chalk) among other levels.

Plants are almost entirely Carboniferous: *Calamites*, *Asterophyllum* and *Annularia* from Burdiehouse, *Lepidodendron*, *Telangium*, *Alethopteris*, *Sigillaria*, *Stigmara*, *Lipidophyllum*, *Neocalamites*, *Neuropteris*, *Lepidostrobus*, cycads and seed cones, with thin sections and cut rock, coal balls from Burnley and opalised wood from various localities and ages.

Fossils from the collection are presented in themed displays, for example, *Early Life on Earth* shows various Ediacaran (*Charnia masoni* and *Charniodiscus concentricus* from the Precambrian (560 million years ago) of Leicestershire, and *Tribrachidium heraldicum*, *Spriggina floundersi*, several *Dickinsonia*, *Cloudina hartmannae* and *Parvancorina* from the Precambrian (555 million years ago) of the Ediacara Hills, Australia). *Permian Mass Extinctions* shows the early Triassic ammonoid *Flemmingites* sp. from Oman and the crinoid *Encrinurus gracilis* from the Middle Triassic of Recoaro Terme, Vicenza, Italy.

The research collection comprises material accumulated for staff and student projects with some attributed to specific workers and projects, for example, 'Clarke WJ Scots Carb Conodonts', 'Hallum Swett/Ritchie/Brower', 'John Campbell', 'Jehu and Craig Highland Border Series' (Thomas Jehu, Regius Professor 1914-1943), 'John Smith of Dalry specimens' and 'Anderson MORS Caithness fish' (Reverend John Anderson, 1796-1894). Material highlights studies of Precambrian Ediacara, Cambrian trilobites from Wales (Maesgwynne, Llanfawr Quarry), the Cambro-Ordovician of Durness (north Scotland) and France, a comparison of graptolites from Scotland/UK and Australia, Ordovician olenid trilobites, such as *Ogygiocaris*, from the *Ogygiocaris* Shale of Holz, Oslo and other locations in Scandinavia, Downtonian (Silurian) Cowie Formation from Stonehaven and Sally Brow and Foggy Gill (Cautly Zone, Pusgillian), Crossfell Inlier of Cumbria.

Material from the Southern Uplands of Scotland includes Wandel Burn fossils in mass flow deposits (Clarkson et al 1992), graptolites from Dob's Linn (Hartfell shales) and other Lower Ordovician localities, Ordovician of the Girvan area (Starfish Beds at Ladyburn, Barr Group), Caradoc Upper Whitehouse Beds and rocks at Penwhapple Bridge), the Silurian of the Girvan area (Rough Neuk Quarry, Craighead Quarry and Newlands Quarry), Llandovery (Silurian) from Old Cambus Quarry, and the Llandovery Gala Group from the Southern Uplands.

Various faunas are from the Silurian of the Midland Valley: The Patrick Burn Formation 'Shelly Fauna' from the Lesmahagow Inlier, the Hagshaw Hills and Lesmahagow turbidite fauna, and the North Esk Inlier (and perhaps other inliers) in the Pentlands. Other Silurian fossils are from the Starfish Beds in the Cutter Formation, Henshaw Burn Junction and Deerhope Burn in the Pentlands, with the fossil *Pterotheca* noted. Fossils from the Wether Law Linn and Reservoir formations

(brachiopods *Eoplectodonta*, *Dicoelosia*, *Atrypa*, *Skenidioides*, *Leptaena* and *Orbiculoidea*, trilobites, bivalves and ostracods) may be from the same area (Bull 1996). There are fossils of the Knockgardiner fauna from the Wenlock (Silurian) Straiton Grit Formation of Ayrshire. There is an important collection of material with thin sections from the Rhynie Chert of Aberdeenshire, known for primitive plants among other fossils, attributed to Robert Campbell (1881-1957).

Devonian material includes fossil fish from Scotland (Lower Devonian acanthodians, and Middle Devonian *Glyptolepis* and *Pentlandia*) and rest of the UK (*Pteraspis* from the Lower Devonian of England and Wales). Carboniferous material is labelled as being from the Oil Shale, notably the Granton Shrimp Bed (Fig. 42, known for shrimp fossils such as *Waterstonella* and the first fossil revealing the complete conodont animal known previously only from teeth, with extensive bulk material for future processing) and East Lothian Gullane Shrimp Bed (polished vertical sections showing the laminations with further examples of the shrimp *Tealliocaris*). There are multiple examples of the brachiopod *Eostropheodonta himantensis* from the Lower Carboniferous of East Lothian. Fossils include trilobites from the Arnsbergian (Carboniferous) Shunner Fell Limestone/Formation, Yorkshire, attributed to Euan Clarkson with several noted as figured. Material from the Llandovery (Silurian) is from Fauldbog Bay (Kirkcudbrightshire, Dumfries and Galloway) and Kirkton, near Dumfries. Samples of the Coralline Crag from Aldeburgh represent one of very few studies on post-Palaeozoic material. Specimens from beyond the UK are from the Carboniferous of Francis Creek, Illinois, USA. The age and location of several samples is unclear: 'L. Pal Lakes Sheila Bibby' with a second label that possibly reads graptolites, 'Penceris Quarry', 'Caradoc Snow Head' dated 1997 and 'Silurian [Roquemeillere]'.

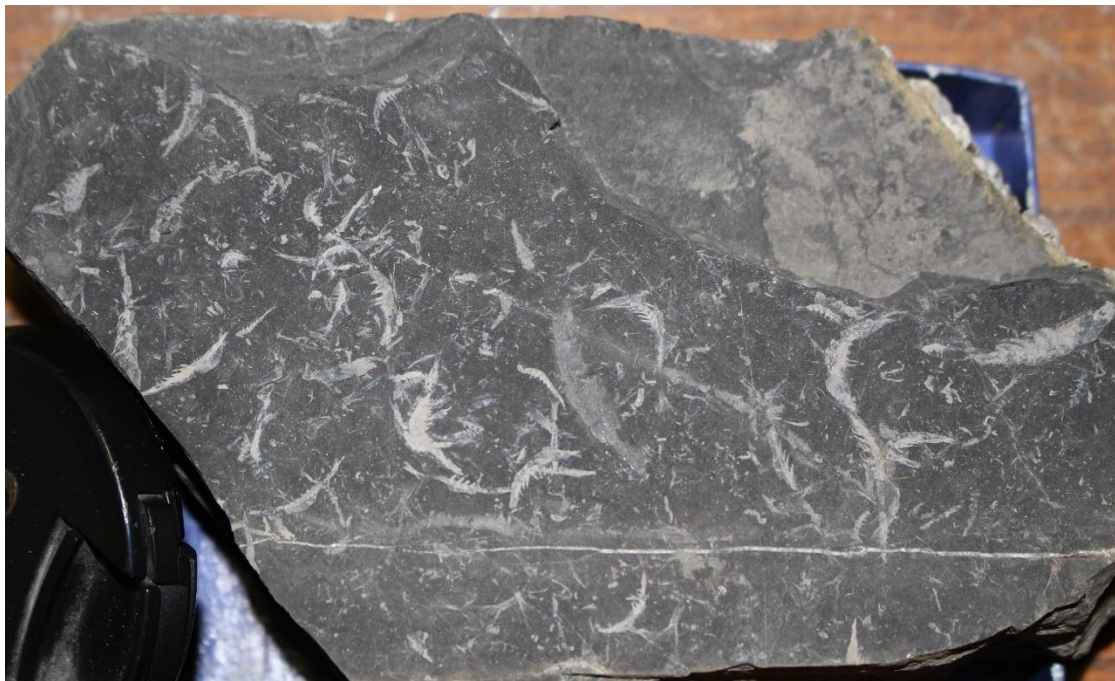


Figure 42: Carboniferous shrimps from the Granton Shrimp Bed, Edinburgh (Cockburn Museum)

Fossils in the teaching collection are recognised by the occurrence of multiple specimens of the same fossil taxa: brachiopods (orthids from the Silurian, spiriferids from the Devonian, productids from the Carboniferous, Jurassic and Cretaceous, rhynchonellids), echinoids, graptolites (mostly *Monograptus*, *Dicranograptus* from the Birkhill shale of Dob's Linn and *Dichograptus octobranchius* from Campbelltown, Victoria, Australia, among others), trilobites (*Harpes*, *Ogygiocarella*, *Agnostus*, *Paradoxides*, *Calymene*, *Dalmanites* and *Bollandia*, etc), gastropods, bivalves and goniatites (*Glyphoceras* from the Carboniferous Limestone of the Isle of Man). Corals are often cut to show

internal detail with examples of *Thecosmilia*, *Syringopora*, *Lophophyllidium* and *Halysites*, and colonial taxa in limestones from the Silurian and Carboniferous. Casts, notably of the trilobite *Calymene*, echinoids and ammonites, are present. 'Bivalves: teaching sets' comprise *Gryphaea*, *Venericor*, *Cyprina*, oysters, *Pteriomorpha*, *Pecten*, *Solen*, *Mytilus*, some in resin for studies of morphological and anatomical features. Other labels indicate primitive molluscs (scaphopods and chitons), cephalopods (modern nautilus, ammonites and gastropods), bryozoans and sponges. Trace fossils show *Helminthoides* from the Alpine Flysch, *Spirophyton* from the Lower Carboniferous Limestone near Dunbar and *Rhizocorallium*. The trace fossil *Kulindrichnus* is a burrow for living in, as opposed to feeding, lined with shells, known only in modern terebellid worms and cerianthid sea anemones; one example is *K. langii* from Camas Malag. Assemblages or groups of fossils from the same deposits highlight palaeontological aspects, such as benthic palaeocommunities (Ashgill (Ordovician) Boda Reef Limestone of Sweden), biofacies and preservation (Lower Carboniferous Granton Shrimp Bed), and case studies (Ordovician/Silurian of Girvan; Silurian of Ludlow; Ordovician tuff fauna from Cwar-Glas, Dyfed, Llandrindod Wells; Ordovician of the Onny Valley, Shropshire).

Research/collection links

Many specimens are historic and/or related to scientific study and are therefore important. There is still bulk material in the collection waiting to be sorted, processed for fossils and studied, providing the potential for future projects. For example, Euan Clarkson has provided a large collection of trilobites (from Wales and Shunner Fell) and rock from East Kirkton and the Granton Shrimp Bed excavated in mass, although fossil content is not known. Some of the trace fossils seem to be rare, notably the fossil labelled *Kulindrichnus*. A summary project on phyllolepid fish – their distribution, preservation and importance, and current location of specimens – would be interesting and could include the cast of *Phyllolepis* in the Cockburn Museum and second in Fife Cultural Trust collections.

Anatomical Museum (University of Edinburgh Collections)

Collection type: University
Accreditation: 2016

Medical School (Anatomy), Teviot Place, Edinburgh, EH8 9AG
Contact: anatomy.edinburgh@ed.ac.uk

Location of collections

The Anatomical Museum is closely linked to the Edinburgh Medical School founded in 1726 and originally located at Old College. With increasing student numbers, a purpose-built medical school was constructed in Teviot Place, which opened in 1880. The Anatomical Museum within this, situated on three floors, opened in 1884. In the 1950s this space was reduced to the upper floor, the site of the current museum. The core of the collection comprises anatomical preparations and donations for medical studies, some dating back to the 1700s. The small number of fossils are stored in a basement room.

Size of collections

10-20 fossils.

Onsite records

Information is currently in Microsoft Excel and a museum card index system, in the process of being transcribed to a Vernon CMS, used more widely for the University collections. Specimens are also included in the Simpson Inventory, a typed list of the collection made in the 1990s by technician Jean Simpson, and the Saunders Catalogue.

Collection highlights

1. Historic specimens.

Published information

Turner, W. (1912). *The marine mammals in the Anatomical Museum of the University of Edinburgh*. Edinburgh: Macmillan.

Collection overview

Most of the fossils are vertebrate: a tooth described as a *Gorgosaurus* (although the shape looks ceratopsian or hadrosaur), a tooth of the rhino *Diceratherium* (without locality but probably from a gravel or cave deposit), a partial horse jaw with the teeth painted white, and an isolated tooth with enamel. Several fossils are from the Mentone bone caves in France (Fig. 43): two teeth and a bear metacarpal with information handwritten directly onto the fossils in French. Fragments of deer skeleton are also labelled as Mentone with additional information noting their donation by Dr Cumming; further teeth may or may not be from the same locality.

The collection includes several casts and models from Damon and Co (perhaps the firm of Robert Ferris Damon (1845-1921) described as anthropological cast makers), including a cast of a *Stegodon elephantoides* (Clift's elephant) tooth and an associated label referring to a family tree diagram for elephants, perhaps on display at the time. A further mastodon tooth has a label affixed reading 'from Beaufort South Carolina, presented by Dr Batty Duke' with a second label stating it is genuine (other associated specimens are noted as casts) and still being researched (Fig. 44). A final specimen is the lower jaw of a whale that is perhaps juvenile. The label describes it as being found 5 metres down in clay soil during excavations for brick-making near Stirling in 1863. Although it is labelled as a fossil, its age and preservation make it a sub-fossil. The collection also includes over 200 casts (mostly skulls, bones and axes) relating to human evolution, for example, *Homo neanderthalensis*, Chappelle-Aux-Saints, Cro-magnon, *Australopithecus africanus*, *Pithecanthropus*, *Sinanthropus*, *Rhodesiensis*, *A. Africanus Taungs*, and Piltdown man, mostly attributed to F Krantz.

Research/collection links

Studies of the mastodon tooth from Beaufort South Carolina, presented by Dr Batty Duke, are suggested. Although the label states it is a genuine fossil, the form of the black-coloured ridges on the processing surfaces and the coating of sandy, yellow-coloured grains suggest that this may be a cast or reproduction. Examination of the specimen could be followed up with further investigation of the collector and the excavations to determine context and whether other material was recovered from the same locality.



Figure 43: Mammal teeth and bone fragments from the Mentone Bone Caves, France (Anatomical Museum)



Figure 44: Detail of Mastodon tooth from Beaufort, South Carolina (Anatomical Museum)

Natural History Collections (University of Edinburgh Collections)

Collection type: University

Department of Zoology, Ashworth Buildings, University of Edinburgh

Contact: See website for email addresses <https://www.ed.ac.uk/visit/museums-galleries/natural>

Location of collections

The Ashworth Laboratory building was opened by Prince George, Duke of Kent, on 15 May 1929 with subsequent modifications to provide teaching space, notably the removal of a wall to incorporate the lower part of the museum into the laboratory. Many of the display cases were moved into the upstairs gallery, now known as the Aubrey Manning Gallery (in honour of the Professor of Natural History from 1973-1997) or department corridors; some specimens are no longer onsite. Parts of the current displays are from the 1920s and include limited fossil material.

Size of collections

5-10 fossils.

Onsite records

Documentation has mainly been undertaken through projects: In 1987 the Community Programme Unit within the Department of Zoology was funded by the Manpower Services Commission to update the displays and digitise the existing catalogue. In 1996 and 1997, Zoology students updated the vertebrate displays and expanded the website by adding a history of the museum and collection, and *Virtual Museum* for the displays in the Aubrey Manning Gallery: <http://www.nhc.ed.ac.uk/index.php?page=493>).

Collection highlights

1. Comparison of modern and fossil specimens of vertebrate groups.

Collection overview

This location was not visited by the JEPC, although the high level of information for the Aubrey Manning Gallery online allowed fossil material to be identified. Fossils are used to illustrate forms of modern groups as they were back in geological time. Vertebrates are represented by the fish *Palaeospondylus gunni*, the fossilised tooth of a large shark, such as *Carcharodon megalodon*, a slab of Upper Devonian sandstone with *Holoptychius* from Dura Den, Fife, and four fossils without visible labels to identify them. Models of fossils are more numerous than actual fossils with reconstructions of *Pteraspis*, *Climatius*, *Pterichthys*, *Osteolepis*, *Elonichthys* and *Eusthenopteron* present with modern fish. There is a cast of a *Pterodactylus* pterosaur from the Jurassic Solnhofen Limestone. Additional fossils are likely to be in the displays of invertebrate material but could not be determined from online resources.