GEOLOGICAL CURATOR

Volume 5 Number 7

GEOLOGICAL CURATORS' GROUP

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

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

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Cover: The Fossil Hall, Natural History Museum, Dublin (*c.*1900), demolished in 1962. See article by Nigel Monaghan on 'Geology in the National Museum of Ireland' (pp.275-282).

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Proceedings of a GCG Meeting
GEOLOGY IN IRISH MUSEUMS
Trinity College Dublin, 21-22 June 1990

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GEOLOGICAL CURATORS' GROUP

February 1992

EDITORIAL

Rarely does the Geological Curators' Group attempt to publish the proceedings of a meeting (although I am always keen to receive submissions of 'written up' versions of talks given at GCG events). The last such occasion followed 'The Conservation of Geological Materials' conference held at the Natural History Museum in London, 1986 (*Geol. Curator*, 4, 375-474). The present issue provides a fascinating overview of the four major geological collections in Ireland, and stems from a meeting organised for GCG by Patrick Wyse Jackson in Dublin, 1990. Patrick successfully lobbied both speakers and editor alike over the need to produce a permanent record of the event, in the form of a dedicated number of *Geol. Curator*. The result amply justifies his confidence in the long term value of such an issue and provides a fitting tribute to all the hard work Patrick put into organising GCG's first overseas meeting.

1 December 1991

Peter R. Crowther

GEMS UNDER GREEN WRAPS

IRISH GEOLOGICAL COLLECTIONS

This volume contains four of the six papers presented at the GCG meeting 'Geology in Irish Museums' held in Dublin on 21 and 22 June 1990 - the first to be held by the Group outside the United Kingdom.

The first day began in Trinity College with talks on the history and collections of University College Galway, the Ulster Museum, and Trinity College itself. The morning was rounded off by a visit to TCD's Museum. After an early afternoon visit to the offices of the Geological Survey of Ireland and a look at some of the collection, the rest of the day was spent in the National Museum of Ireland. A brief résumé of the national collections and the history of the Museum was followed by a tour of the storage facilities and a new preparation laboratory.

A reception hosted by the Department of Geology, Trinity College, preceded a dinner in the University's eighteenth century Dining Hall (recently restored after a fire in 1985). After dinner, Professor Gordon Herries Davies talked on the history of Irish geology, focussing on the often forgotten work carried out by geologists working in Ireland - work which proved significant in the general development of geological science (e.g. way-up criteria in sedimentary rocks, and the importance of fluvial action in moulding the landscape).

The second day consisted of a field trip into the Dublin and Wicklow mountains, principally to examine the nineteenth-century lead/zinc/silver mines at the head of the glaciated valley of Glendalough and to collect from the spoil heaps.

It is appropriate that the first 'overseas' meeting of GCG should have been held in Ireland as her geological museums contain much that originated in the UK. Until now the wealth of material in Irish museums and institutions has remained largely unknown, except to those in whose immediate care the respective collections are held. Although there have been broad surveys of collections, these are often sketchy and sometimes incorrect. Collections and specimens of great interest and importance have already been recognised in Irish museums - no doubt there are many more awaiting 'discovery'.

The fortunes of geological collections in Ireland have improved dramatically in the 1980s. The National Museum of Ireland appointed geologists to its permanent staff for the first time in many years and acquired new storage facilities in Dublin; the Geological Survey of Ireland moved to new premises where the collections can be reunited at long last; the collections of the James Mitchell Museum in Galway are being properly curated and documented with the aid of a Government scheme; and the displays in the Geological Museum of Trinity College, Dublin are being redesigned and fitted. Undoubtedly all this activity will increase our knowledge of the collections and their origins, which in turn will automatically improve their research potential.

The general aim of 'Geology in Irish Museums' was to bring the composition and importance of Irish geological museum holdings to the attention of a wider public and research body. This issue of *Geological Curator* furthers the same ambition.

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16 April 1991

Geological Curator, Vol. 5, No.7, 1992 (for 1989), pp.263-274

THE GEOLOGICAL COLLECTIONS OF TRINITY COLLEGE, DUBLIN

by Patrick N. Wyse Jackson

Introduction

The Geological Museum in Trinity College Dublin has evolved through the amalgamation of a number of collections and museums of which two, the Dublin University Museum and the Museum of the Geological Society of Dublin, are the most important. Its history may be conveniently divided into three periods: 1, origins and the Dublin University Museum (1777-1857); 2, the Geological Museum in Deane and Woodward's Museum Building (1857-1956); and 3, the Geological Museum in modern times (1956-1990). These three stages, together with the acquisition of certain collections, are outlined below; the major collections of the Geological Museum, its present use, displays, and acquisition policies, are also summarised.

Origins and early years (1777-1857)

Dublin University Museum

It is possible that the University of Dublin (Trinity College) had a small geological collection as far back as the late 1690s. John Dunton (a London bookseller), in a curious book called *The Dublin Scuffle* (Dunton 1699), described a visit to the College Library where, together with books and 'handsome folios', he saw the 'thigh-bone of a giant', the face of 'one Geoghagan, a Popish priest executed about six years ago, for stealing', as well as 'manuscripts, medals, and other Curiosities'. It is tempting to think that the latter contained geological specimens. Unfortunately, what they were will probably never be known!

Geological collections were certainly held by Dublin University Museum (Fig.1) - the forerunner of the present Geological Museum. Dublin University Museum was founded on 22 July 1777 by the Board of the College, to house a large collection of Polynesian artifacts collected during Captain Cook's last two voyages (Ball *in* Dublin University Commission 1853; McDowell and Webb 1982). Most credit for the establishment of the Museum lies with Rev. William Hamilton (1755-1797) who is perhaps best known for his *Letters concerning the northern coast of the County of Antrim* (1790), in which he advanced an igneous origin for the Giant's Causeway (Fig. 2). In 1779 Hamilton was elected a Fellow of Trinity at the age of twenty-four and took his M.A. later that year (Praeger 1949). He was one of the founders of the Royal Irish Academy in 1785 and in 1790 became rector and a local magistrate of Clondevaddog, an isolated Donegal parish. He was murdered in 1797 after local unrest; this agitation culminated in the widespread but unsuccessful uprising of 1798. Hamilton left a widow and nine children who were granted monies by Parliament.

Within a decade of its foundation the Museum had acquired some geological material, notably Monte Bolca fish collected by George Graydon (1794). However, the collections did not impress Robert Jameson when he visited the Museum on 30 June 1797: 'Went to the College Museum with Dr Stokes. It is an elegant room, with a few trifling fossils, some Indian dresses &c' (Sweet 1967, p.100).

The College continued to acquire geological collections which were added to the displays. By 1807 the Museum contained a systematic mineralogical collection of 1,089 specimens, a geological collection of rock types, and a geographical collection comprising material from various parts of the world, including Graydon's Vesuvius material and specimens from Ulster (Stokes 1807). Another early visitor to the Museum was Anne Plumptre who toured Ireland during 1814 and 1815 (Herries Davies 1978) and who was more favourably disposed to the Museum than Jameson had been: 'the Museum is a good room, and contains a tolerable collection of Irish minerals, with some specimens of the basaltic columns from the Giants' Causeway' (Plumptre 1817).

Until 1844 Dublin University Museum remained rather stagnant. It had no permanent curator, although Whitley Stokes (lecturer in Natural History from 1816, and United Irishman) was put in charge. One important collection was added during his period: the College purchased a large mineral collection of over 1,000 specimens from Hon. George Knox in 1827 for £500. It was incorporated into pre-existing mineral collections by James Apjohn (one time Professor of Mineralogy) who compiled a catalogue of the same (Apjohn 1850). The 1,994 specimens listed in the mineral collection are today distinguished by small printed red numbers.

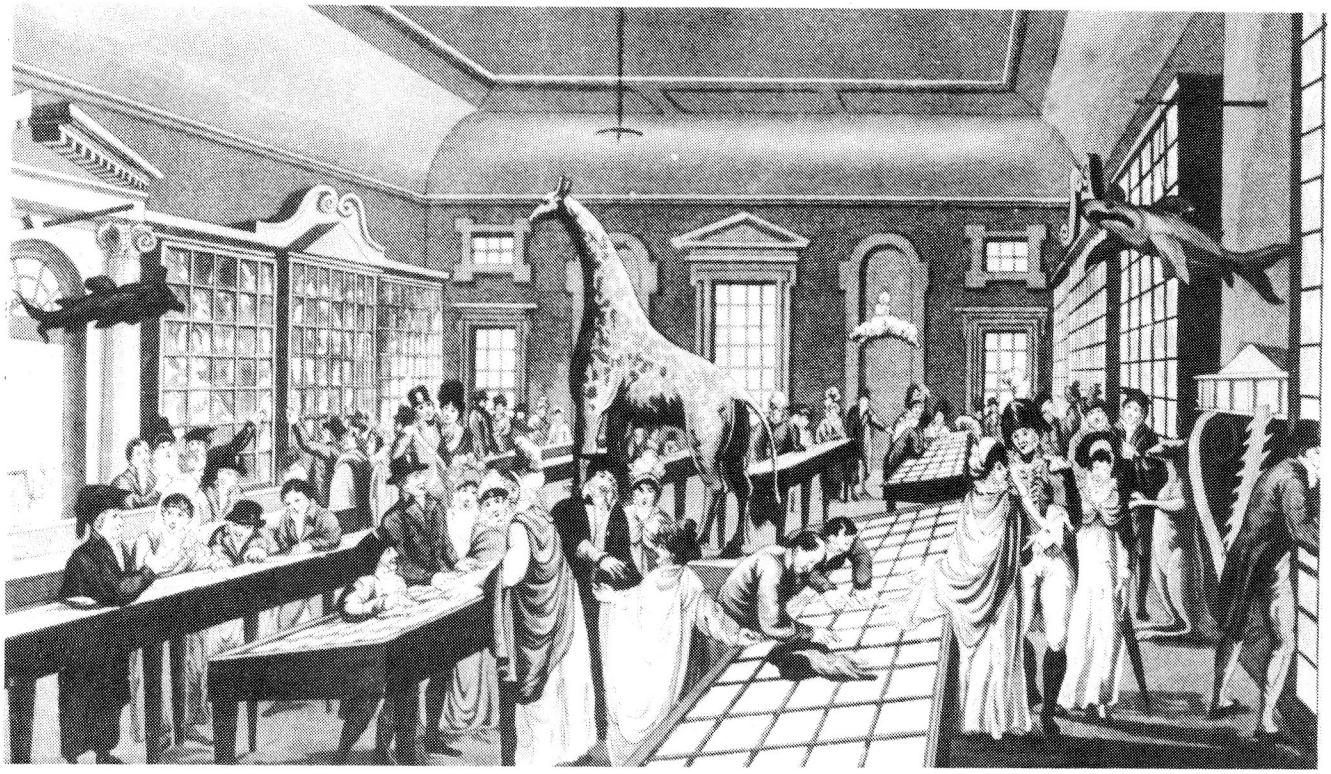

Fig. 1. Engraving of the Dublin University Museum in 1819. Drawn and etched by W.B.Taylor; engraved by R. Havell and Son, from Taylor, W.B. 1819. *History of the University of Dublin.* R. Jennings, London.

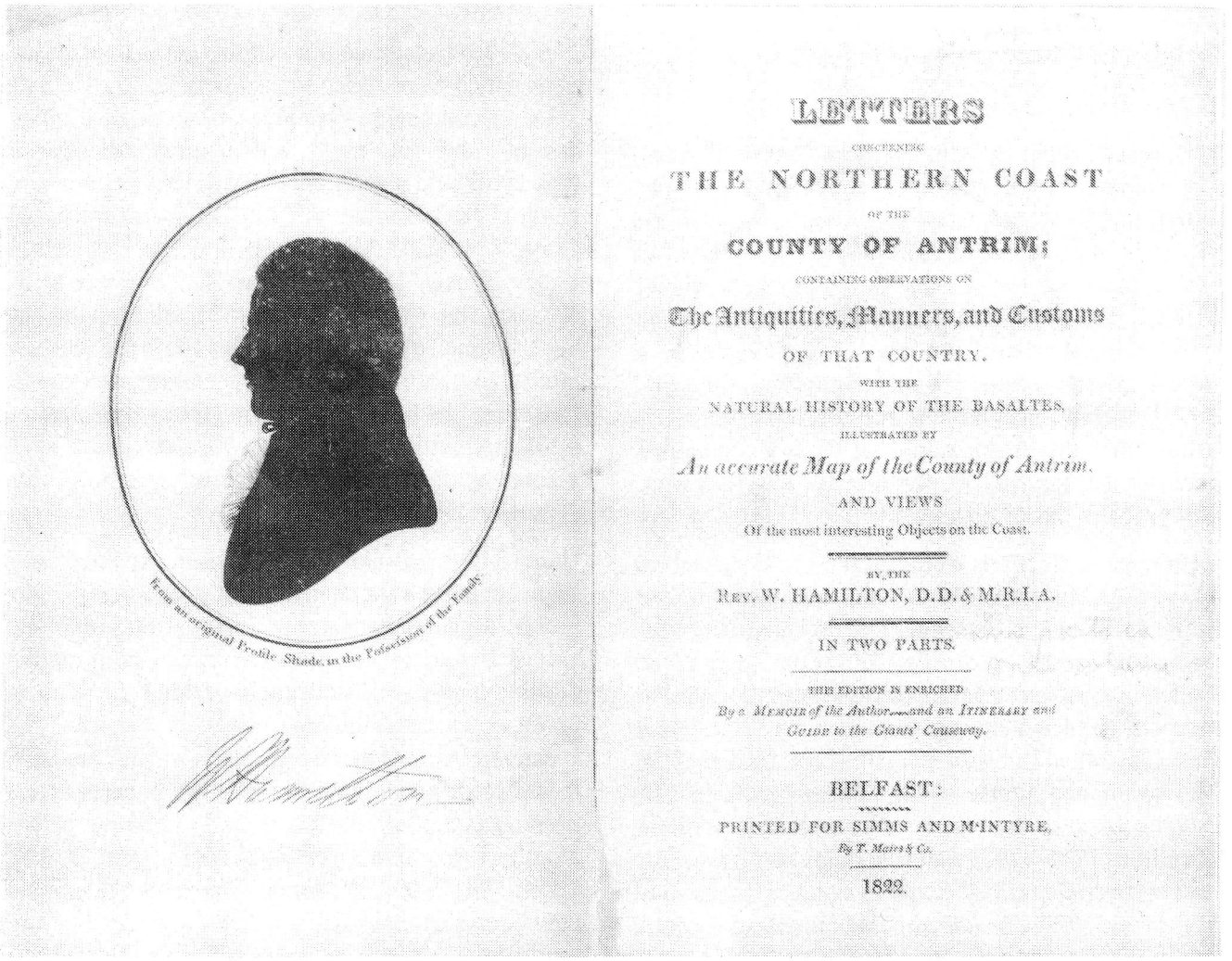

Fig. 2. Frontispiece of William Hamilton's *Letters concerning the northern coast of the County of Antrim* (Dublin 1822, 2nd edition), which bears a silhouette of the author.

The fortune and importance of the Museum increased remarkably through the efforts of the naturalist Robert Ball (1802-1857), who was appointed its first full-time Director in April 1844. He quickly raised the profile of the Museum through public lectures and by the acquisition of worthy collections. These efforts of the Director attracted 14,000 visitors to the Museum in 1852 (McDowell and Webb 1982). Ball donated his own extensive zoological collection of the Irish fauna, comprising over 7,000 species (Ball 1846), and encouraged many geologists and naturalists (including the Earl of Enniskillen, Thomas Oldham, Sir Richard Griffith, John Phillips, Joseph Beete Jukes, Baron Cuvier, and J.D. Hooker) to do likewise (Ball 1846, 1847). Responsibility for the geological and mineralogical collections was largely entrusted to Apjohn and the then Professor of Geology, Thomas Oldham.

By 1850 Dublin University Museum contained a large diversity of collections: botanical, engineering, ethnographical, geological, and zoological. Ball, who was appointed Secretary to the Queen's University of Ireland in 1851, resigned the Directorship in 1856 due to ill health. However, the Ball family connection with Trinity College continued through his sons Sir Robert Stawell Ball (Professor of Astronomy and later Astronomer Royal), Sir Charles Bent Ball (Regius Professor of Surgery), and Valentine Ball (Professor of Geology and Mineralogy and Director of the Museum of Science and Art - now the National Museum of Ireland).

In 1857 the Museum collections were dispersed throughout the College campus, although most were housed in a new purpose-built Museum Building; the Herbarium found a home in the basement of House No. 40. Today the collections are further scattered: the Geological Museum remains in the Museum Building; the zoological collections may be seen in the Zoological Museum; the Herbarium has its own building connected to the School of Botany; and the Ethnographical Collection (including the Polynesian artifacts) was transferred to the National Museum of Ireland in 1894.

The Geological Society of Dublin / Royal Geological Society of Ireland Collections

In the nineteenth-century, geology became increasingly popular and many regional Geological Societies were established throughout the British Isles. In 1831 the Geological Society of Dublin (later to become the Royal Geological Society of Ireland, by Royal consent in 1864) was founded for the 'purpose of investigating the mineral structure of the earth, and most particularly of Ireland' (*Journal of the Geological Society of Dublin*, **1**, (1833), p.xix). Membership reached two hundred Fellows in the heyday of the Society and included many eminent scientists, such as J.E. Portlock, Richard Griffith, Samuel Haughton, Bartholomew and Humphrey Lloyd, J.B. Jukes, W.H. Baily, G.H. Kinahan, and M.H. Close.

For much of its existence the Geological Society of Dublin was associated with Trinity College. In its early years the Society was peripatetic, meeting in various locations: the Royal Irish Academy, Grafton Street, and Sackville (O'Connell) Street. By 1841 the Society had moved to more permanent rooms in the Custom House where a large Library and Geological Museum was arranged. The Museum contained mainly Irish Carboniferous invertebrates, some English Mesozoic material and Italian Pleistocene gastropods, as well as a collection of volcanic rocks from the Rhineland, some minerals, some Irish rocks, and 'a complete collection of Rocks, consisting of 380 specimens, arranged in glass cases, named in English, German, and French' (M'Coy 1841). In 1848 the Society began to meet in the Engineering School of Trinity College, and the contents of the Museum were transferred to the Dublin University Museum (Davies 1965). By 1890 interest in Irish geology had declined, perhaps related to the recent completion of the 1 inch to 1 mile mapping by the Irish Geological Survey (Herries Davies 1983), and the Society was disbanded.

Some specimens from the Geological Society of Dublin collections are still extant: some ichthyosaurs mounted in the present Museum, nearly 100 other fossils, and some minerals, including a representative selection of zeolite minerals from County Antrim (presently on display).

The Geological Museum in Deane and Woodward's Museum Building (1857-1956)

A new Museum Building was first advocated in 1833 but the idea languished for nearly three decades (Blau 1982). After an open competition (and amid some controversy regarding the winner), the Dublin firm of Deane and Woodward was engaged in 1853 to design the building. The Museum Building was erected between 1854 and 1857 at a cost of 24,000 guineas, and has long been regarded as epitomising the principles of design advocated by John Ruskin (Blau 1982; Crook 1987). It accommodated separate Geological and Engineering Museums in large rooms on the first floor. The marble columns and balustrades are of Irish marbles and Cornish serpentinite (Fig. 3). The elaborate floral and faunal carvings on the capitals and on the exterior of the building were carved from fresh specimens by the celebrated O'Shea brothers. The architectural style will be familiar to those who know and work in the Oxford University Museum, which was also designed by Deane and Woodward and

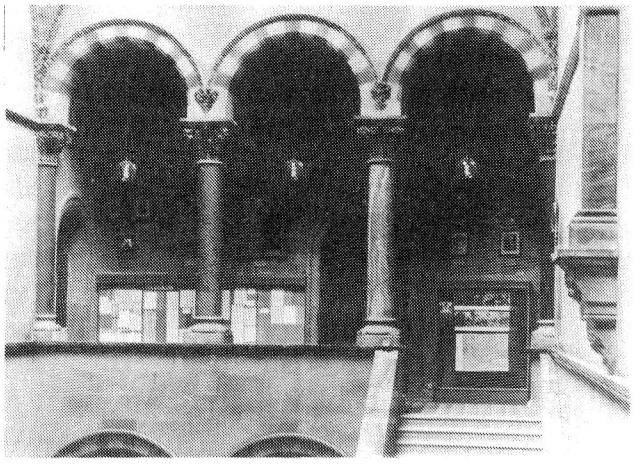

Fig. 3. Interior of Dean and Woodward's Museum Building, completed in 1857. The pillars and stair bannisters are of various Irish marbles.

erected immediately after the completion of their Dublin building.

The Geological Museum was housed in a large imposing room, 88 feet long by 38 feet wide, which contained forty-four floor-cases, many wall-cases and four impressive deer skeletons (Fig. 4; two of the Giant Irish Deer skeletons stand today in the entrance hall of the Museum Building, and a Red Deer skeleton is at the far end of the present Geological Museum).

Responsibility for the new Museum fell to the aging James Apjohn and to Samuel Haughton (1821-1897) (Fig. 5) - cleric, medic (widely-known as 'Hanging Haughton' on account of his calculations based on the weight of a prisoner to allow for a more humane execution by hanging), polymath, dog-lover, and Professor of Geology from 1851 to 1881 (McMillan 1988). Although few specimens were donated to the collections during Haughton's tenure, of particular interest are: some deformed Devonian fossils described by Haughton himself in one of the earliest attempts at strain analysis (Haughton 1860); a collection of rock specimens from Napoleon's island prison of St. Helena, sent by John Haughton (Samuel's first cousin); and the main mass of the Dundrum Meteorite which fell in 1865 - the pride of the large meteorite holding of the present Museum (Ball 1882; Seymour 1951).

In 1881 Valentine Ball was appointed Professor of Geology. Prior to this date Ball had spent many years in India and he brought to Dublin much Siwalik vertebrate material which was initially deposited in the Trinity Museum but later donated to the Museum of Science and Art on his appointment as Director (Lydekker 1884). Ball's successor, William Johnston Sollas, was responsible for the acquisition of the important amphibian material from Jarrow Colliery,

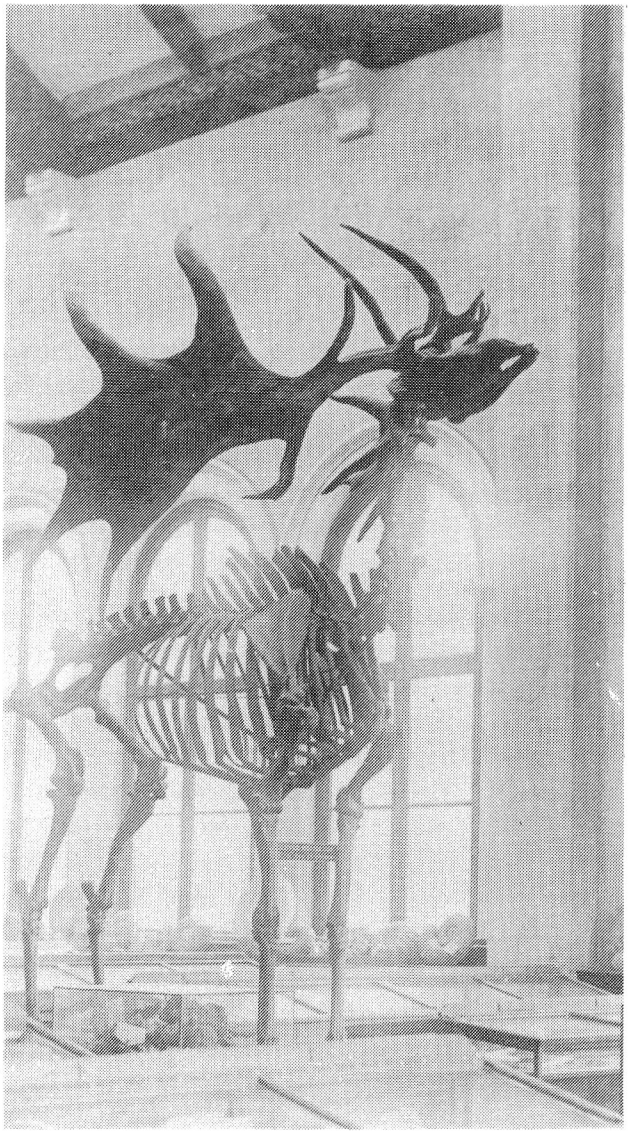

Fig. 4. Interior of the Geological Museum in the early 1900s. Note the ornate decoration on the wooden beams at the top of the walls.

County Kilkenny, as described by Huxley and Wright (1867). Much of this collection was presented to the National Museum on permanent loan in 1959.

For nearly a century the Museum altered little. John Joly, perhaps Trinity's most brilliant scientist (Nudds 1986, 1988*a*), was essentially an inventor (most notably of colour photography) and a geophysicist. His extensive collection of minerals was deposited in the Museum (several specimens are on display in the entrance hall of the Museum Building). Joly is also remembered for his work on radioactivity (Joly 1903) and the age of the Earth. Some of his original slides with mica exhibiting pleiochroic halos are still extant in the Museum.

Joly's successor, Louis Bouvier Smyth (1883-1952), was a quiet unassuming palaeontologist who specialised in Carboniferous corals and stratigraphy (W.E. Nevill, pers. comm. July 1989). He collected exten-

Fig. 5. Caricature of Samuel Haughton that appeared in *Ireland's Eye* on 21 November 1874. J.A. Galbraith was a collaborator in sixteen *Scientific Manuals* on various topics in Physics, Mathematics and Natural Sciences that appeared between 1851 and 1865.

sively, particularly from the Carboniferous of Hook Head, County Wexford, north County Dublin and County Donegal. Smyth undoubtedly spent a great deal of time attending the Geological Museum and curating material (as testified by numerous specimen labels). He initiated a catalogue of type, figured and referred specimens in the collections, but did not commence a catalogue of the general collections. As will be seen later, this lack of good documentation has had serious repercussions. In 1946 plans were set in train for the division of the Museum: the changes were not long in coming.

The Geological Museum in modern times (1956-1990)

In 1953 pressure to release space for student teaching led to the Geological Museum being sub-divided into three laboratories; the collections were moved to a smaller room on a newly-built floor 16 feet above the former Museum (by contrast this room contains only nineteen display cases). At this time an unknown but probably considerable number of specimens were indiscriminately discarded. The people employed for this task had no experience or knowledge of Irish collections - two arrived in Dublin in 1954 at the onset of this work! The policy at the time was to retain a 'museum of type, figured, and reference collections' (Gill 1956). It is now evident (and unfortunate) that many specimens of immense historical interest (such as many of the seismologist Robert Mallet's collection of 684 volcanic rock specimens, and Graydon's Vesuvius material) were dumped; others were removed to a basement store.

Many specimens were incorporated into teaching collections, and labels were removed, thus making it difficult to work out their provenance and history. Nevertheless, it was indeed fortunate that the Museum was not abandoned altogether, considering the attitude prevailing towards such establishments in universities at that time. The present museum retains many of the display and storage cabinets of its larger predecessor, and probably some of its character. Fewtrell (1979) contended that many specimens and catalogues had been discarded in the post-1953 breakup of the Geological Museum. Certainly some specimens were discarded but there is no evidence to suggest that catalogues were too.

The arrival of R.G.S. Hudson at Trinity in 1960 marked a change in the teaching and research directions of the Department of Geology, and in the role and use of the Geological Museum. Prior to 1961 research was largely carried out by individual academics, and few post-graduate students passed through the Department (the first Ph.D. in geology was awarded in the early 1950s). Hudson initiated the post-graduate research programme which continues to the present day. In the mid 1970s the Applied Geology Unit, a research centre within the Department, was established for research into areas of stratigraphy, palaeontology and oil-related topics of offshore Ireland.

These developments have led to a rapid increase in the holdings of the Geological Museum. Most recent accessions are micropalaeontological in nature (conodonts, palynomorphs, ostracods, etc.), but some macropalaeontological, petrological and even mineralogical material continues to find its way into the Museum collections. The Museum underwent considerable change in the late 1960s under Veronica Burns who redesigned all the displays and initiated tours for school parties.

The Geological Museum today

The present Geological Museum is best regarded as a research and teaching museum. Material is freely available for research and loans are frequently made. The Museum is used for the teaching of university students, school pupils, and the general public. Its displays occupy two areas: the entrance hall of the Museum Building, where ten display cases are situated; and the main gallery on the second floor of the building, which contains nineteen display cases [sixteen floor-cases, two wall-cases and one free-standing case] (Fig. 6). At present all the displays are being redesigned and will be in place for the quatercentenary celebrations of the University in 1992. The displays attempt to put forward geological information with clarity and in some depth, but of interest to a broad range of users; text is kept to a minimum.

The displays in the entrance hall consist of: two mounted skeletons of *Megaloceros giganteus* from Lough Gur, and an account of where such remains are found and excavated; a slab with some *Chirotherium* footprints; two large *Titanites* ammonites from the Jurassic of England; the volcano at Santorini and the Minoan civilisation; Kiltorcan land plants; and Ireland's offshore oil and gas.

The main gallery contains displays on: the diagnostic features of minerals; gemstones; quartz and its varieties; zeolites and the north-western Tertiary volcanic province; Irish base metals, industrial minerals and building materials (their extraction and uses); meteorites; Monte Bolca fish; fluorescent minerals; teeth; bone beds; ichthyosaurs and plesiosaurs from the south of England; the history of the collections; and a copy of Griffith's 1855 geological map of Ireland.

Displays to be added include: reef communities; trace fossils; dinosaurs and egg laying (including newly commissioned models); the Devonian Carboniferous transgression in Ireland; Dublin geology; metamorphic facies; and others.

The main specimen storage comprises cabinets in the Museum and in several laboratories, where specimens are stored in cardboard trays on wooden trays. Type, figured and referred specimens (of which there are nearly 2,000) are stored separately in four cabinets in the Museum. Minerals are arranged systematically in sixteen cabinets and the older palaeontological specimens are arranged taxonomically in twenty-four cabinets. Most recent research collections are stored intact. Uncurated material is stored in less than ideal surroundings on trays and in sealed wooden boxes in

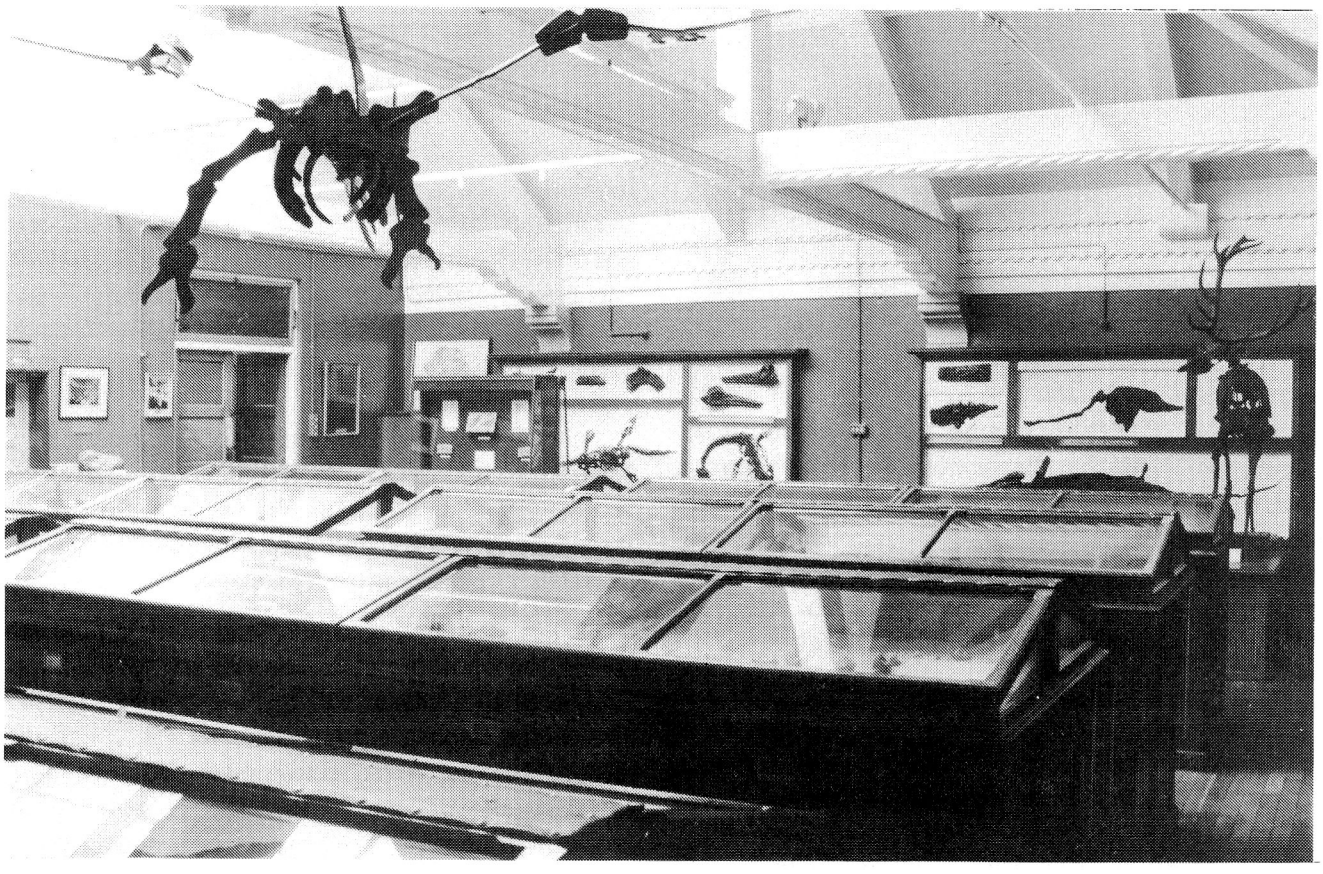

Fig. 6. View of the Geological Museum in 1990. The gallery consists of four rows of display cases, together with wall and free standing cabinets containing meteorites and dinosaur material, wall mounted ichthyosaurs and plesiosaurs and a *Cervus elephus* var. *fossilis hibernicus* (Red Deer) skeleton. The decorated wooden beams in Figure 4 have been painted white.

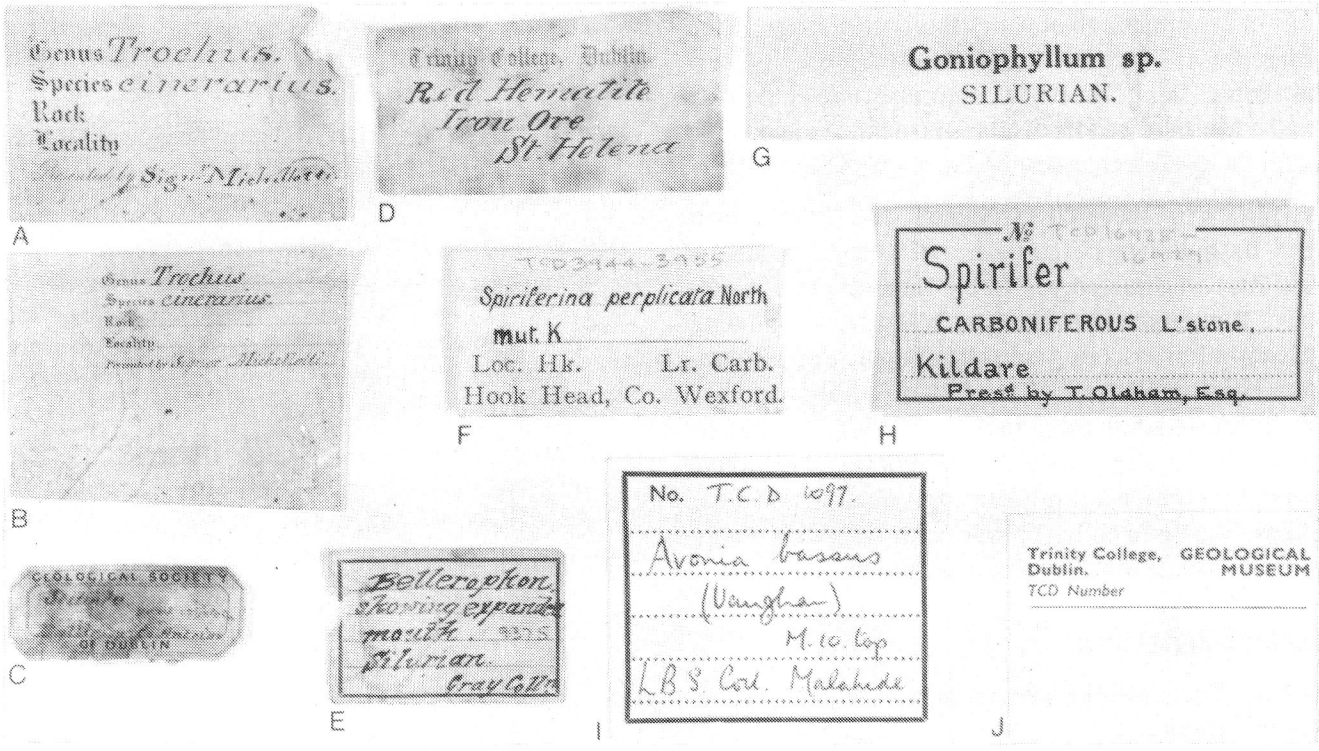

Fig. 7. Specimen, tablet and tray labels associated with the collections in the Geological Museum of Trinity College. A and B, tablet labels of the Geological Society of Dublin Collection; C, specimen label of the Geological Society of Dublin Collection (similar in style to those used by J.E. Portlock - see GCG Information Series: Collector/Dealer Labels No. 8); D, printed TCD specimen label (in red) bearing Haughton's handwriting, dating from 1865; E, specimen label in Grenville Cole's hand, dating from the 1890s; F, specimen label printed for Louis Smyth's Carboniferous fossil collection (1920s) with details inked in by Smyth; G, mid-twentieth-century label printed in the Museum on a hand press; H, general tablet label in Smyth's hand, dating from 1930-1950; I, printed tray label (early 1960s) with details added by M.J. Clarke (now of the Geological Survey of Tasmania); J, present style of tray labels.

the basement of the Museum Building. It is hoped to improve these storage conditions in the near future.

The Museum houses a moderately large collection which comprises *c.*50,000 fossils (50% curated) [46,000 invertebrates, 1,000 vertebrates and 3,000 plants], 7,000 minerals (75% curated) and 15,000 rocks (90% curated). Systematic cataloguing only began in the early 1960s, although some mineralogical catalogues were published in the nineteenth-century. The Museum archives contain early nineteenth-century handwritten catalogues of certain named collections (e.g. Graydon, Knox, Perceval and Mallet) but it is now very difficult to correlate entries with extant specimens. Palaeontological (prefix TCD), mineralogical (prefix M) and petrological specimens (prefix P) are catalogued separately. Hitherto specimen details have been recorded in bound ledgers. An IBM compatible computer-based system for data retrieval and cataloguing of the geological collections is being researched, and data input should commence shortly. A number of catalogues have been published (Apjohn 1850; Ball 1882; Nudds 1982*a*, *b*, *c*, 1983, 1984, 1988*b*, 1989; Seymour 1951; Stokes 1807, 1818).

The acquisition policy of the Museum takes into consideration the rarity and the research potential of the material available. All palaeontological material is retained. Petrological and mineralogical material is retained only when it is unique or difficult to collect. Through this scheme, as well as through undergraduate mapping projects, a large collection of over 15,000 petrological slides has been amassed. In general the Museum does not purchase geological specimens, except where they are needed for teaching. Recently the Museum bought five meteorites, including a carbonaceous chondrite.

Loans of material (for research or display) to any *bona fide* person or institution is encouraged. Loans are for six month periods only, on condition that, if specimens are cited in publications, acknowledgement and the acronym TCD is used.

The Museum has no regular publications. However, a series of inexpensive one-page Information Leaflets for visitors is planned. These will give concise information about such diverse topics as ichthyosaurs, reef communities, building stones of Dublin, and the geol-

ogy of Dublin, for all of which there are displays in the Museum. The first leaflet on *Meteorites* is now available. Publication of a comprehensive guidebook to the Museum and its displays is planned to coincide with the quatercentenary of Trinity College in 1992.

Facilities for research associated with the Museum and its holdings (which are available to academic visitors) are situated within the Department of Geology. Equipment for light microscopy, a Scanning Electron Microscope, and photographic and preparatory equipment are close at hand. In addition, library facilities are good: the departmental library maintains runs of the major geological periodicals, a complete set of Irish 1 inch to 1 mile geological maps, and other maps. The main college library (which is a copyright library) stocks much geological literature.

Acknowledgement

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Appendix 1. Major collections of Trinity College, Dublin

As with many long established museums, Trinity has a large number of collections, some large, some not, some important, and some less so. This listing is not comprehensive. A general taxonomic listing of some palaeontological holdings is added which will be of value to researchers.

Palaeontology

AINSWORTH, Nigel	Mesozoic ostracods from offshore Ireland, the Celtic Sea and Fastnet Basins [much type material: see Ainsworth 1991 and references therein].
CHARLESWORTH, Edward (1813-1893)	Some British Natural History Society material.
CLAYTON, Geoffrey	Palaeozoic palynomorphs from Ireland [some type material].
COLE, William Willoughby, Earl of Enniskillen (1807-1886)	Palaeozoic invertebrates from Ireland and England.

FEEHAN, John	Silurian land plant material from Ireland [some figured material: see Edwards *et al.* 1983].
FOORD, Arthur Humphries (1845-1933)	Carboniferous cephalopods from Ireland [some type material].
GEOLOGICAL SOCIETY OF DUBLIN	*c.* 100 specimens (contrary to Cleevely 1983).
GRIFFITH, Sir Richard (1784-1878) [engineer, geological cartographer, public servant]	Reference collection of Carboniferous fossils described by M'Coy (1844) [many missing; some syntypes].
GRAYDON, Rev. George	Eocene fish from Monte Bolca, Italy.
HAUGHTON, Rev. Samuel (1821-1897)	Kiltorcan Plant material [including types].
HOLLAND, Charles Hepworth	Palaeontological symbionts and Silurian invertebrates from Ireland (Dingle Peninsula, Co. Kerry), England (Ludlow) and China [type and referred material].
HUXLEY, Thomas Henry (1825-1895)	Some non type material from Jarrow colliery.
PORTLOCK, Joseph Ellison (1794-1864)	Ordovician and Mesozoic invertebrates from Ireland (Counties Londonderry and Tyrone).
SIVETER, Derek J.	Silurian trilobites from Ireland (Annascaul inlier, Co. Kerry) [type material: see Siveter 1989].
SMYTH, Louis Bouvier (1883-1954)	Carboniferous invertebrates (especially corals and cephalopods) from Ireland (Counties Antrim, Donegal, Dublin and Wexford) and north Wales (Great Orme's Head) [some type material].
WRIGHT, Joseph (1834-1923)	Carboniferous crinoids from Ireland [some type material].
KILTORCAN PLANT MATERIAL	*c.* 50 specimens [including type material].
BALLYPALADY PLANT MATERIAL	Tertiary flora from Co. Antrim.
PALYNOMORPHS	Keegan, J.B., McNestry, A., and McPhilemy, B. Collections from the Devonian-Carboniferous of Ireland. Mitchell, G.F. Collection from the Pleistocene of Littleton, Ireland.
CARBONIFEROUS INVERTEBRATES	Ball, R., Brennand, T.P., Burns, V., Cox, B.A., Harrison, J., Hudson, R.G.S., Jackson, J.S., Nevill, W.E., Oldham, T., Philcox, M.E., Whitehead, D. Collections from Ireland.
BRYOZOA	Buttler, C.J. Collection from the Ordovician of Ireland and Iran. Bancroft, A.J., Dresser, A.M. and Wyse Jackson, P.N. Collections from the Carboniferous of Ireland and Britain. Jelly Collection from the Recent of New Zealand.
CNIDARIA	Nudds, J.R. and Vaughan, A. Collections from the Carboniferous of Ireland [some type material].
CRINOIDEA	Donovan, S.K. and Sevastopulo, G.D. Collections from the Palaeozoic of Ireland.
FORAMINIFERA	Marchant, T.R. Collection from the Carboniferous of Ireland. Gunn, W.F. Collection from the Recent of Jamaica, Atlantic, and Ireland.
RADIOLARIANS	Challenger Expedition 1875.
OSTRACODA	Ten Have, M.R. Collection from the Carboniferous of Ireland.
GRAPTOLITES	Archer, J.B., Burns, V., Palmer, D.C, and Rickards, R.B. Collections from Ireland.
CONODONTS	Jackson, P., Johnston, I.S., Jones, G. Ll., Lewis, D., Sevastopulo, G.D., Rees, J. and Thornbury, B. Collections from the Carboniferous of Ireland.
FISH	From the Jurassic of Solnhofen, Germany and from the Oligocene of Glarus, Switzerland.

OTHER VERTEBRATES	*Megaloceros giganteus* (two skeletons, some skulls and assorted bones); *Cervus elaphus* var. *fossilis hibernicus* (skeleton); fragments of dinosaur eggshell, Andrews' Expedition, Gobi Desert (Boydell Collection); dinosaur material from Mozambique; some Siwalik material from Doab Canal.

Mineralogy

GRIFFITH, Sir Richard (1784-1878)	General collection from Ireland (may be lost).
JOLY, John (1857-1933)	General collection and radioactive minerals from Ireland, Europe and worldwide.
KNOX, Honourable George [Member of Parliament for Dublin University 1797-1807, before and after the Act of Union of 1800]	General collection of worldwide extent (many no longer extant).
PERCEVAL Robert [first Professor of Chemistry at TCD 1785-1809]	General; specimens incorporated into systematic collection and so difficult to recognise.

Petrology

COLE, Grenville Arthur James (1859-1924) [Professor of Geology, Royal College of Science for Ireland 1890-1924; Director, Geological Survey of Ireland 1905-1924]	European igneous collection (related to route of cycling tours; Wyse Jackson 1989, 1991).
GRAYDON, George	Vesuvius volcanic material (many may be lost).
HAMILTON, Sir William (1730-1803)	Some Vesuvius material.
HAUGHTON, Major Gen. John (1836-1889)	St. Helena material.
MALLET, Robert (1810-1881) [seismologist and engineer]	Italian volcanics (many may be lost).
METEORITES	51 examples, including main mass of Dundrum fall (1865), Adare (Brasky) fragments (1813), and slice of Bovedy Meteorite (1969).

Archives

HANDWRITTEN CATALOGUES	Early collections including Graydon, Griffith, Knox, Mallet, Perceval Collections.
GEOLOGICAL SOCIETY OF DUBLIN / ROYAL GEOLOGICAL SOCIETY OF IRELAND	Minute books and other manuscript items (detailed by Davies 1965).
GRAYDON, George	Diary of travels in northern Italy (*c.* 1792).
GRIFFITH, Sir Richard (1784-1878)	Four copies of his 6 inch to 1 mile Geological Map to accompany the report of the Railway Commissioners; manuscript catalogue of Carboniferous fossils presented to the Dublin University Musem.
JOLY, John (1857-1933)	Diaries, manuscripts, research notebooks, some equipment, cameras, black & white lantern slides, colour lantern slides, Devonian fish paintings, and stuffed parrot.
LESKEAN COLLECTION	Manuscript entitled *Synopsis of the arrangement of the Vulcanic Cabinet annexed to the Leskean Collection in the Museum of the Dublin Society*. Written on paper, watermark dated 1804. Collection acquired by Dublin Society 1792, now in National Museum of Ireland (Monaghan 1992).

Appendix 2. Staff with responsibility for collections

Dublin University Museum

Lecturer in Natural History with responsibility for the Museum	1816-1844	Whitley Stokes
Director	1844-1856	Robert Ball
Curator and Professor of Mineralogy	1844-1856	James Apjohn

Geological Museum

Curator and Professor of Mineralogy	1856-1881	James Apjohn
Curator and Professor of Geology	1856-1881	Samuel Haughton
Curator and Professor of Geology and Mineralogy	1881-1883	Valentine Ball
	1883-1897	William Johnston Sollas
	1897-1933	John Joly
	1934-1952	Louis Bouvier Smith
	1953-1961	William Daniel Gill
	1961-1966	Robert George Spencer Hudson
	1966-1980	Charles Hepworth Holland
Attendant with responsibility for the Geological Museum	*c.*1960-1980	Veronica Burns
Curator	1980-1988	John Robert Nudds
	1988-date	Patrick Nevill Wyse Jackson

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GEOLOGY IN THE NATIONAL MUSEUM OF IRELAND

Nigel T. Monaghan

Introduction

The geological collections of the National Museum of Ireland are wide ranging in terms of their history, geography and geology. Specimens have come from a variety of sources, including nineteenth-century museums, private individuals, state institutions and the collecting activities of museum staff. Some of the history and scope of the collections has already been published (O'Riordan 1983; Monaghan 1984); what follows is a summary which includes information on developments in the last decade and a list of major collections now incorporated into the museum.

The intention is that, during the 1990s, the collections will be fully documented, properly housed, and displayed to the public. These ambitions are now closer to being realised following the promise by the Department of the Taoiseach to accommodate the main collections in Dublin for the first time since the appointment of the present staff in 1981, and the commitment to the first proper geological display since the 1950s.

Early history (1792-1877)

The earliest geological specimens to make a significant contribution to the present collections are in the Leske collection of German minerals and insects (and some fossils) which was acquired by the Royal Dublin Society (RDS) in 1792 (O'Riordan 1983). The Society's museum, of which the Leske collection formed the core, grew into the Natural History Museum in Upper Merrion Street, Dublin. The museum has been refurbished recently and still captures much of the Victorian atmosphere that would have been familiar to those members of the RDS who attended its opening by David Livingstone in 1857, during the Dublin meeting of the British Association for the Advancement of Science.

Material acquired during the days of the RDS museum accounts for about one third of the present collections and includes some of the most significant in terms of type material and historical importance. The Griffith collection of Irish Palaeozoic invertebrates is still regularly consulted, accounting for more than half of all loans and taxonomic enquiries.

Growth of the National Museum (1877-1900)

State funding of the RDS museum allowed it to grow to the stage where it was bursting at the seams with artefacts, antiques and natural history material. Further government support was then sought but, before funding for the new building in Kildare Street was approved, it was agreed that the State should take over full control of the museum, in August 1877. The resulting Museum of Science and Art (MSA) also attracted the collections of the Royal Irish Academy and the short lived Museum of Irish Industry (MII).

The Royal Irish Academy collections include such major archaeological treasures as the Ardagh Chalice and Tara Brooch. The Academy's Quaternary bone collections are not as well known, but include giant Irish deer and red deer which now form part of the geological collections. The MII was founded as the Museum of Economic Geology in 1845 with the intention of housing the collections of Portlock's Ordnance Survey (Tunnicliff 1980; O'Riordan 1981) and the growing Geological Survey. The MII building also housed the teaching staff of the RDS who were each involved in the curation of objects in the Society's museum relating to their own discipline. The teaching functions of the RDS gave rise to the Royal College of Science for Ireland which was itself incorporated into University College Dublin (UCD) in 1926. Many old specimens can still be recognised in the teaching collections of UCD's Department of Geology.

State support for the MSA allowed a number of specialists to be employed to arrange the various collections. The resulting catalogues of fossil vertebrates and Palaeozoic plants are a valuable record for the present generation of curators (Davis 1888; Kidston 1888; Lydekker 1884, 1891). Although the fossil invertebrates were never catalogued, they were arranged systematically and thoroughly labelled. A new registration system was introduced with serial accession numbers which can be matched with the registers. Some collections have limited registration data and pre-1877 collections are rarely numbered or listed. The RDS curators kept a register but did not apply numbers to specimens. This means that definite cor-

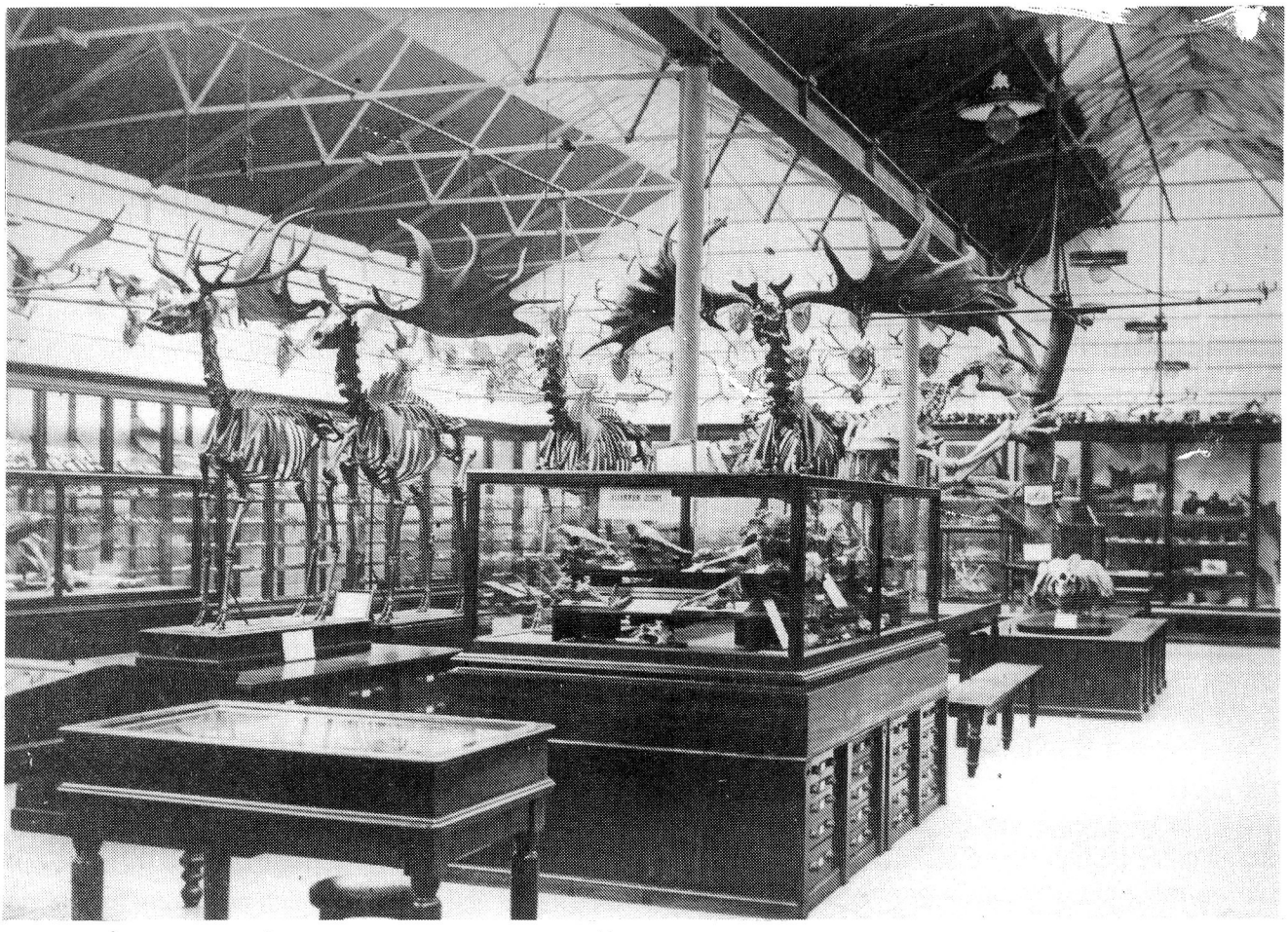

Fig. 1. The Fossil Hall, Natural History Museum (*c.*1900), demolished in 1962.

relation of specimens with the register entries is often difficult.

Decline of the geological collections (1900-1960)

The geological collections were well organised, largely catalogued, and fully displayed at the turn of the century (Fig. 1), but the future was not so promising. The realisation that Irish independence could not be far away, and the expense of the Boer War and First World War meant a reduction in expenditure on such 'luxuries' as museums. The initial boost from introduced expertise of the 1880s was not followed by appointments of staff to look after geology. When the Irish Free State took power, the future of the National Museum (formerly the MSA) was not a priority; even within the museum the Natural History Division came low down the pecking order. Zoologists made little impact on the geological collections, although some significant contributions were made by R. F. Scharff and A. W. Stelfox who identified most of the Pleistocene remains from Irish caves and acquired them for the museum.

In the 1920s the geological wing of the Natural History Museum was closed because public access was considered a security threat to the new parliament sitting in the former RDS headquarters at Leinster House. The whole museum entered a period of decline and geology in particular suffered from a lack of staff - a situation which continued into the 1950s (but cf. Fig. 2). Academic enquiries were handled by the zoology staff. The geological exhibition area was tidied up in the 1950s and reopened briefly to the public. This work was carried out H. J. Seymour, Professor of Geology at UCD, who was employed part-time from 1948 to 1953, listing specimens and producing a catalogue of the meteorites (Seymour 1951). In 1961 the Keeper of Natural History, John Jackson (a geologist, but with overall responsibility for zoology and botany) received an order to evacuate the building - so that the site could be used for a new restaurant and office block for the Dail (the Irish parliament).

The boxed collection (1961-1991)

So in 1961 the geological collections were listed and packed off to the old Royal Hospital at Kilmainham.

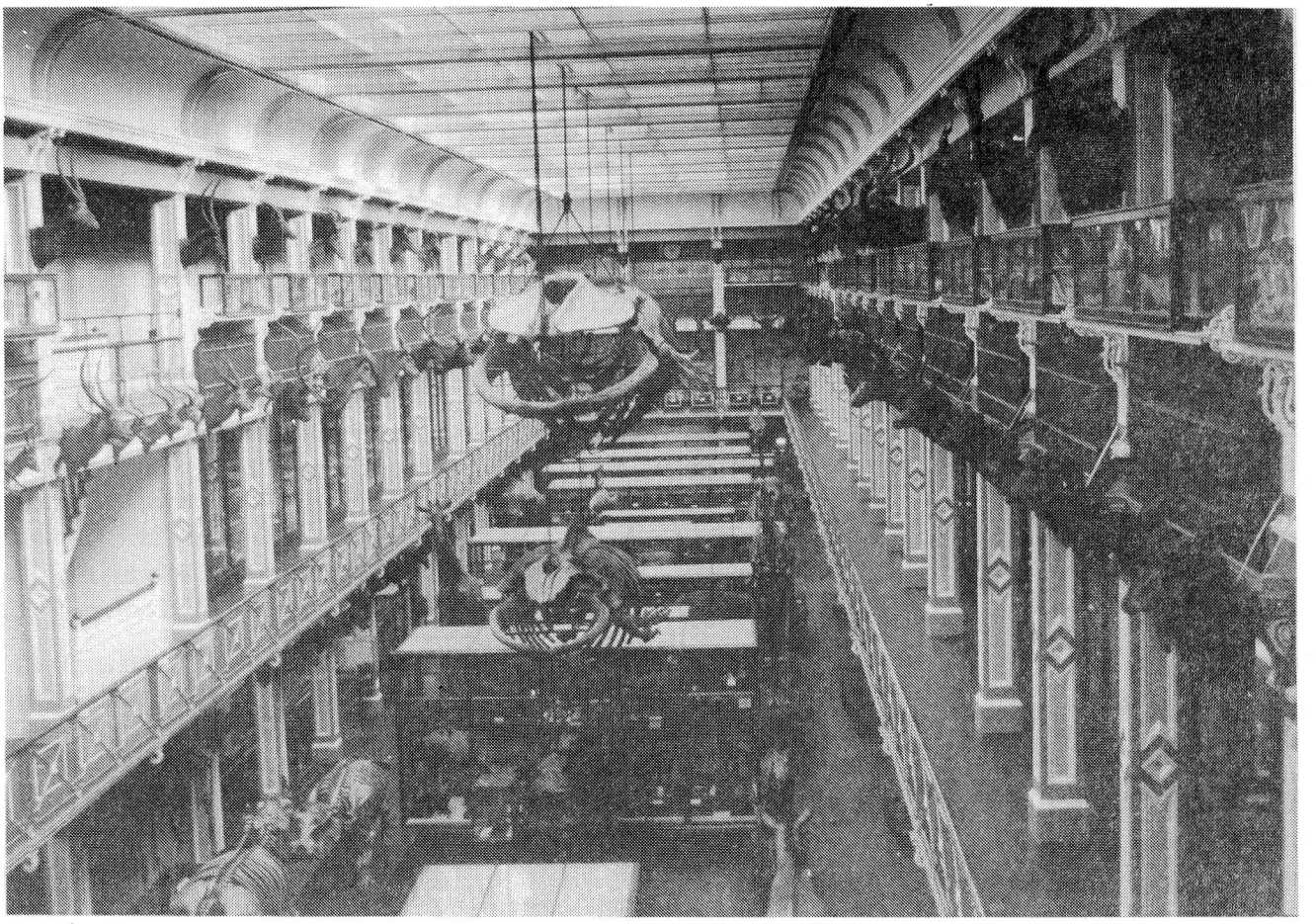

Fig. 2. Upper floors of the Natural History Museum today.

In 1979 even that home was requisitioned by the State for use as an EEC conference centre, and the collections travelled out to Daingean, Co. Offaly, where they are still housed at the time of writing - but are soon to be removed. Derek Felton, the geologist employed by the museum during the move to Daingean, saw the need for a proper resolution of the problems and identified a building in Cabinteely, south Dublin, which could be made available free of charge to the Museum. Felton actively pursued this project, convincing Dun Laoghaire Borough Corporation to allocate the building *gratis*, arranging free architectural reports, plans and estimates, and establishing a group of geologists and designers who came up with a geological museum 'on paper'. Despite ministerial support, this plan has not yet been acted upon. In the interim, however, considerable progress has been made in achieving funding for a secure and convenient store capable of housing the entire geological collection, in a building beside the Geological Survey of Ireland, and just fifteen minutes walk from our present offices on Merrion Row, Dublin.

The last ten years

While Derek Felton was still under contract in 1981, two geologists and a technician were appointed to the staff of the Natural History Division. Eileen Farley was appointed as mineralogist, Grace Griffith as Technical Assistant and myself as palaeontologist. Our efforts in the early years were focussed on registering the collections crated in Daingean. Summary catalogues had been prepared during the two moves of the collections (from the Natural History Museum to Kilmainham, and from Kilmainham to Daingean) and these provided a fairly good estimate of what was in the crates. Approximately two-thirds of the crates have been brought to Dublin over the years and their contents fully documented and re-packed. Important specimens have been added to the basement store in Merrion Row where types, figured specimens, Griffith collection, fish, Leske collection and Irish minerals are kept in drawers (Fig. 3).

The registration system uses numbers on each specimen with full details recorded in registers and on card catalogues. The numbers on the specimens are applied in ink on a dab of white emulsion paint and sealed with 'Paraloid B72' dissolved in acetone. The first computer became available in 1987 and has been used for wordprocessing catalogues and correspondence. 'Headfast' software for maintaining a database to Museum Documentation Association standards was acquired in 1990 but has not yet been customised for

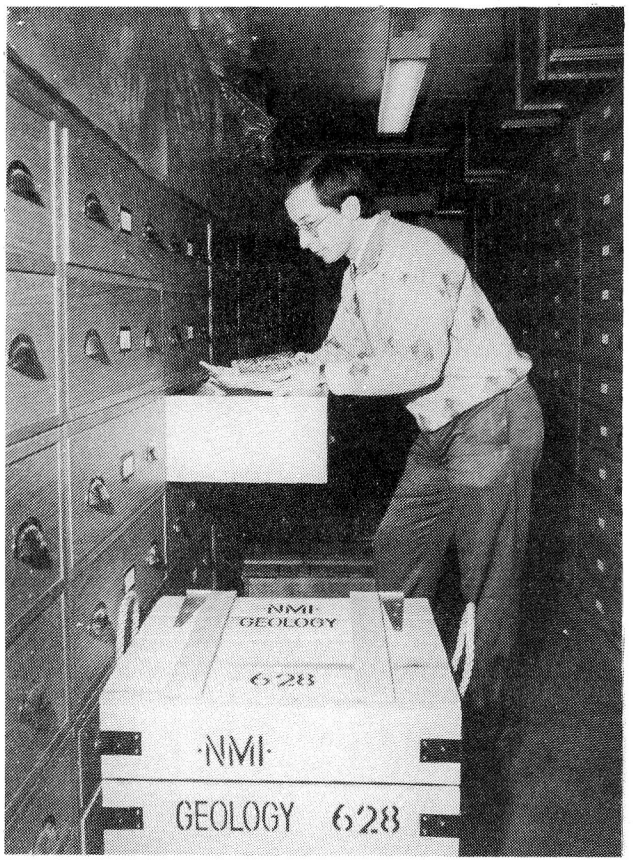

Fig. 3. Nigel Monaghan (Palaeontologist) in the basement store, Merrion Row, Dublin.

object recording. Terminology control has been developed in cooperation with the Ulster Museum and the Geological Survey of Ireland.

Catalogues of type and figured material have been prepared to manuscript level for most of the collection. A major catalogue of the Griffith collection's type, figured and cited specimens is nearing completion. As most loans and academic enquiries relate to the important fossils, these catalogues can be edited on computer to produce versions for loan lists or general information.

A room in the old museum workshops at the rear of Merrion Row has been fitted out as a geological laboratory and boasts a compressed air supply, fume extraction system, airbrasive unit, fume cupboard, cutting and polishing gear, oven and microscopes. Emphasis is placed on conservation rather than investigation, with work on ichthyosaurs and a major plesiosaur taking up much of Grace Griffith's time (Fig. 4).

The ground floor of the Merrion Row building was allocated for use as geological display space in 1989. Up to that time there had been no permanent space available, apart from a small number of display cases and free-standing exhibits in the Natural History Museum. A travelling exhibition called *Introduction to Geology* was prepared in 1984 and toured seven venues. It was also displayed in Merrion Row in various expanded versions and presently occupies the front area. A designer has been approached with a view to expanding the scope and improving the impact of this exhibition. There are several ichthyosaurs and a plesiosaur (Fig. 5) due to be included in the new exhibition, taken from our large collection of marine reptiles from the Lias rocks (Lower Jurassic) of Britain.

Present policies

Access. Any genuine approach to examine material in the collections, library or archive is welcomed. The collection is well documented and I have seen more than half of the specimens and personally dealt with the documentation of 20,000 of them, so most specific enquiries can be addressed quite easily.

Loans. It is the custom of the institution to make loans of material only for research purposes and only to other institutions. Researchers are required to get their loan request endorsed by their Head of Department. This can make the retrieval of loan material simpler, since pressure can be brought to bear on recalcitrant borrowers through their departmental regime (unless of course they are themselves Heads of Departments!).

Acquisitions. Current policy is to acquire any Irish collections which ought to be preserved and properly curated. It is also important to acquire display material and items which fill gaps in the general geological coverage of the collections. There are purchase funds available and these have been used to carry on the former mineralogist's policy of adding mineral species to make the collections more inclusive.

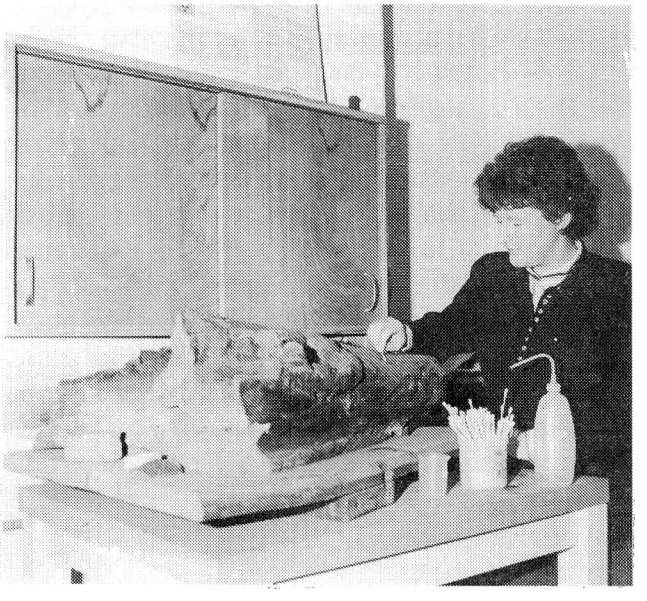

Fig. 4. Grace Griffith (Technical Assistant) cleaning the skull of a plesiosaur, *Rhomaleosaurus cramptoni* (Carte and Baily).

The geological community's image of geology in the National Museum of Ireland has been understandably poor. This has meant that few researchers have been keen to leave us their favourite specimens, so in the past an acquisition policy would have been an academic exercise. Before 1981 many geologists in Ireland (myself included) were unaware that there *was* a national geological collection. Steady promotion of the museum and raising of its profile have brought the plight of the collections to much wider notice. A cautious increase in confidence has resulted in the regular acquisition of recent collections made by UCD research students and staff.

The next decade

The next few years will see further upheaval as collections are brought from various buildings to the new store at Beggars Bush beside the Geological Survey. This building has great potential in that it will allow all geological specimens to be stored under one roof, for the first time since 1961. It will also enable material to be systematically arranged, which is impossible at present. Some collections, such as those from Irish Pleistocene cave deposits, are spread through four buildings. Other collections can be made to appear well organised on paper but need to be put into order in terms of storage. With only two staff to deal with all this (as well as their routine workloads), the project is bound to progress slowly. It should be possible, however, to work more efficiently in the new building and make material available for research with the minimum of fuss.

Acknowledgement

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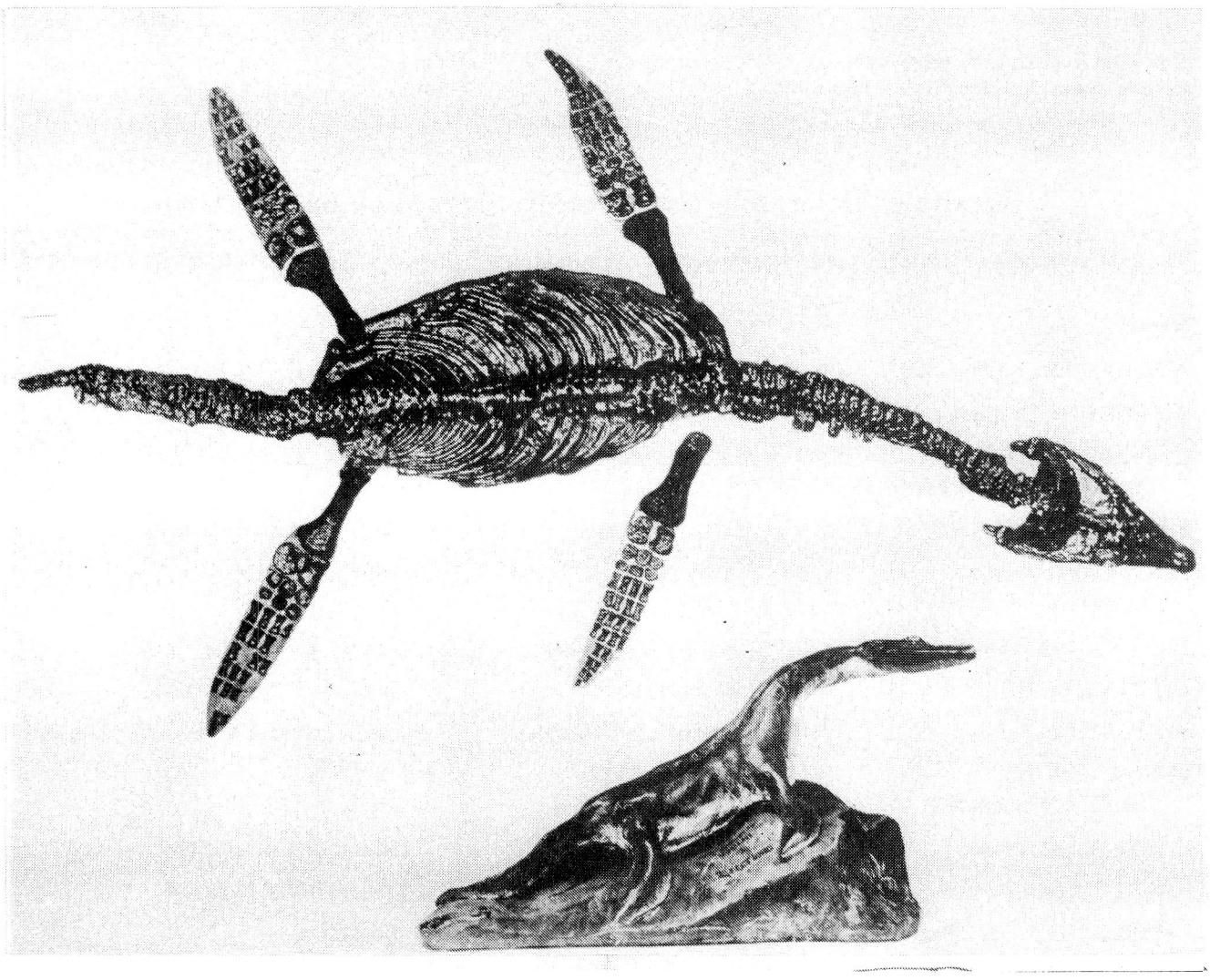

Fig. 5. The 3 metre long type specimen of the plesiosaur *Rhomaleosaurus cramptoni* (Carte and Baily) and a scale model (25cm tall) in plaster.

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Appendix. Major collections of the National Museum of Ireland

The year generally refers to the approximate decade of collection; **, includes types; *, includes figured material.

Name	Year	Contents	Origin
ADAMS, Andrew Leith, MD	1860	echinoids, **mammals	Malta
AITCHESON, Dr Susan	1989	rocks	Norway
BACKHOUSE, James (includes Savin collection)	1880	Lr. Pleistocene *mammals	Norfolk, England
BAILY, William H.	1850	Devonian plants	Kiltorcan, Co. Kilkenny
?BAILY, William H. (could be Geol. Surv. Gt Br.)	1850	invertebrates	Britain
BAKER, General Sir W. E.	1830	Tertiary **mammals	Siwalik Hills, India
BATTERSBY, Dr	1878-9	Devonian corals	Torquay, Devon, England
BELL, Alfred	1910	Quaternary invertebrates	Co. Wexford & East Anglia, England
BREDA, Prof. van (Haarlem, Netherlands)	1860	vertebrates	Germany
CARTE, Dr Alexander	1850	Devonian plants	Kiltorcan, Co. Kilkenny
CAUTLEY, Sir Proby T.	1840	Tertiary *mammals	Siwalik Hills, India
CHARLESWORTH, Edward	1870	Tertiary fossils	England
COLOMB, Philip, RN	1850	Tertiary **plants	Atanekerdluk, Greenland
COPE, Dr R. N.	1957	Lr. Palaeozoic *invertebrates	Co. Tipperary, Ireland
DURAND, General Sir H. M.	1831	Tertiary **mammals	Siwalik Hills, India
EVERARD, Sir Nugent	1870	invertebrates	S.E. England

FARNHAMPRE, Lord	1920	Tertiary insects in amber	
FEILDEN, Col. H. W.	1890	various	Novaya Zemlya
	1903	various	Novaya Zemlya
FOORD, Dr Arthur H.	1880	Lr. Palaeozoic bryozoans	N. America
	1890	Carboniferous **cephalopods	Ireland
GIESECKE, Sir Charles	1810	minerals	Greenland, Iceland & Ireland
GRANT, Charles C.	1910	Lr. Palaeozoic invertebrates	Ontario, Canada
GRIFFITH, Sir Richard	1830	**invertebrates & **fish	Ireland
HARPER, Dr J. C.	1940-60	Lr. Palaeozoic **invertebrates	Ireland
HUGHES, Prof. T. McKenny	1901	Quaternary mammals	Cambridge, England
JACKSON, Dr J. S. (NMI staff 1957-1968)	1940-85	various	Ireland
JACKSON, J. W.	1910	Quaternary shells & mammals	English caves
Jarrow (various collectors)	1860	Carboniferous fish & **amphibians	Jarrow, Co. Kilkenny
JOHNSTON, Prof. Thomas	1910	**Tertiary & *Devonian plants	Ireland
JONES, Admiral Theobald, MP	1868	Carboniferous fish	Co. Armagh
JOY, Baron Henry	1830	minerals	Europe
KELLY, Dr John	1989	Carboniferous corals	Co. Sligo
KENNARD, A. S.	1904	mammals	Igtham fissure, England
LAMONT, Dr Archibald	1940	Palaeozoic invertebrates	Ireland
LEE, William	1850	Jurassic marine vertebrates	England
LEEDS, Alfred N.	1880	Jurassic marine vertebrates	England
LESKE, Nathanael G.	1780	various	Germany
LOMAX, James, & Co.	1906	plant thin sections	Britain
M'CLINTOCK, Sir F. Leopold	1850	**invertebrates & **Tertiary wood	Canadian Arctic
MAJOR, Charles I. Forsyth	1900	Quaternary vertebrates	France & Madagascar
MOORE, Charles	1870	Jurassic invertebrates	S.W. England
MOSS, Edward, RN	1870	*Tertiary plants & Quaternary shells	Canadian Arctic
MURPHY, Gerald J.	1950	Lr. Palaeozoic invertebrates	Co. Waterford
NICHOLSON, A. C.	1904	Quaternary shells	Oswestry, England
PETTYBRIDGE, Dr G. H.	1902	Quaternary mammals	Devon caves, England
SCHARFF, Dr R. F. (NMI staff 1887-1921)	1902	Quaternary mammals	Irish caves
Siwalik (various collectors)	1830	*Pliocene mammals	Siwalik Hills, N. India
SMITH, Dr Stanley	1918	Carboniferous *corals	England
SMYTH, Dr Louis B.	1930	Carboniferous *invertebrates	Ireland
STOKES, Henry, MD	1920-60	Pleistocene giant Irish deer	Ireland
USSHER, R. J.	1901	Quaternary mammals	Irish caves
WARD, Ogier	1860	Mesozoic fish	Europe
WRIGHT, Joseph	1870	**Quaternary microfossils	Ireland & Atlantic

Numerous purchases of fossils and minerals were made after 1877 when the State took over funding of the museum. The following dealers were prominent.

BUTLER, F. H.	1891	Miocene shells	S. Europe
	1892	Quaternary shells	N. Irish coast
CHARLESWORTH, Edward	1870	Tertiary & Quaternary fossils	E. England
DAMON, R. F.	1882	Mid. Old Red Sandstone fish	Scotland
	1886	Devonian fish	Canada
	1888	Cretaceous fish	Lebanon
	1892	Tertiary shells	Sicily
	1900	replicas of hominids	
GREGORY, J. R.	1890	minerals	worldwide
KINNEAR, W. T.	1893	Mid. Old Red Sandstone fish	Caithness, Scotland
	1900	Upr. Silurian fish	Ayrshire, Scotland
FRIC, V. (Prague)	1902	replicas of Quaternary mammals	Europe
KRANTZ & Co.	1845	rocks	Europe
(Bonn and Berlin)	1886	cephalopod models	
(ex MII)	1894	Tertiary insects, some in amber	Rott and Oeningen, Germany; Baltic coast
	1898	Jurassic **pterosaurs	Solnhofen, Germany
	1899	Palaeozoic invertebrates	worldwide
	1901-4	Quaternary vertebrates	Europe & USA
	1910	rocks	Germany
	1910	replicas of hominids	Germany
MARDER, James	1869	Lias fossils	Lyme Regis, England
STURTZ, B. (Bonn)	1890	Tertiary mammals	France
	1897	Pleistocene mammals	Germany
WRIGHT, Bryce M.	1880	minerals	worldwide

The following institutions were also involved:

BRITISH MUSEUM (NATURAL HISTORY)	1880	numerous donations from expeditions, mainly fossil replicas	worldwide
GEOLOGICAL SURVEY (material sent to Irish branch of Geol. Surv. Gt Br.)	1850	duplicates forming representative collection	Great Britain
ROYAL DUBLIN SOCIETY	1877	**entire collection	worldwide
ROYAL IRISH ACADEMY	1890	*Quaternary mammals	Ireland

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THE PALAEONTOLOGICAL COLLECTIONS OF THE GEOLOGICAL SURVEY OF IRELAND

by Andrew G. Sleeman

Introduction

The origin of the Geological Survey of Ireland's Palaeontological Collections dates back to the launch of a geological survey by the Ordnance Survey of Ireland in 1825. The history of geological mapping by the Ordnance Survey and later in the nineteenth-century by the Geological Survey of Ireland has been covered in detail by Herries Davies (1983); only a brief appraisal of this history, based largely on Davies' work, is given here, as it relates to the formation and growth of the Palaeontological Collections.

History of the Collections

The Ordnance Survey of Ireland (1825-1845)

The Ordnance Survey of Ireland began its geological work in the north of Ireland during 1825, under the direction of Thomas Colby. In November 1826 Colby found it necessary to appoint one of his officers, Captain John Watson Pringle, as Superintendent of the Geological Survey. The most significant contribution to the Palaeontological Collections was made under the direction of Joseph Ellison Portlock, who was appointed by Colby to continue the geological work after an interregnum between September 1828 and January 1830 (Herries Davies 1983). The fossils collected under Portlock's supervision were illustrated in his memoir on parts of Counties Londonderry, Fermanagh and Tyrone (Portlock 1843); the Lower Palaeozoic fossils in this collection have been catalogued by Tunnicliff (1980). After much intrigue (see Herries Davies 1983) the geological element of the military Ordnance Survey of Ireland was wound up early in 1845, and the Palaeontological Collections were transferred to the new civilian Geological Survey of Ireland.

Early years of the Geological Survey of Ireland (1845-1852)

The Geological Survey of Ireland was established on 1 April 1845 as part of the newly formed Geological Survey of Great Britain and Ireland, under the overall direction of Henry De La Beche. Captain Henry James was appointed as the local Director, with four Geological Field Surveyors, two Fossil Collectors and one General Assistant. James had formerly been employed under Portlock's direction in the Ordnance Survey of Ireland, and he hoped that the identification of fossils collected would be undertaken by one of his newly appointed staff, Frederick M'Coy. M'Coy was Richard Griffith's palaeontologist and collaboration between the two men resulted in the publication of the synopses of Irish Carboniferous and Silurian fossils (M'Coy 1844, 1862). De la Beche, however, made it clear that identification of the Irish fossils would be the responsibility of Edward Forbes, the Geological Survey's London-based Palaeontologist. Forbes made frequent visits to Ireland to identify the fossils collected and to arrange them in the Museum. He also spent time in the field at many of the more interesting fossiliferous localities.

M'Coy, however, was soon accused of poor geological mapping and, following reprimands from Thomas Oldham (Director from July 1846), he resigned in September 1846. It seems that a feud had raged between Oldham and M'Coy (Herries Davies 1983). There may have been some substance to Oldham's accusation but, in fairness to M'Coy, his prior experience had been entirely palaeontological and neither James nor Oldham provided him with any training in geological mapping. M'Coy was still only twenty-three when he resigned from the Geological Survey. He took up a post in the Woodwardian Museum in Cambridge and in 1849 assumed the chair of Mineralogy and Geology at Queen's College Belfast. He was later to distinguish himself in Australia as Professor of Natural Science at the University of Melbourne.

James' two Fossil Collectors appointed in 1845 were James Flanagan and Thomas Murphy; they were expected to exploit any fossiliferous localities previously located by the field geologists. Flanagan, who had previous experience working for the Ordnance Survey of Ireland as a fossil collector under Portlock, remained with the new Survey until his death in 1859. Murphy's career with the Geological Survey ended in May 1846 with his dismissal, despite satisfactory work, due to financial stringencies (Herries Davies 1983).

Fig. 1. 51 St. Stephen's Green, Dublin, the home of the Geological Survey of Ireland Collections 1846-1890; now the Office of Public Works.

The Geological Survey's first base was in the Dublin Custom House, but it was soon uprooted to 51 St.Stephen's Green (Fig. 1) which had been acquired for both the Survey and Sir Robert Kane's Museum of Economic Geology; the Palaeontological Collections were housed here from October 1846. There was some disagreement between Oldham and Kane as to the ownership of the property moved from the Custom House. It was eventually agreed that the new Museum of Economic Geology should be responsible for everything except material needed by the Survey for its day to day activities, and the fossils, plants and books originating from Portlock's department in the Ordnance Survey of Ireland. The consequent division of the material was completed in July 1847. In 1848 Kane extended the scope of the Museum to include manufactured goods, after which it became known as the Museum of Irish Industry (Herries Davies 1983) and expanded its premises in 1850.

It was understood that the Geological Survey, apart from its main mapping task, would collect rocks and fossils for both the Museum of Irish Industry in Dublin and the Geological Survey Museum at Craig's Court in London. In 1846, however, Oldham was instructed to collect also for the newly formed Queen's Colleges at Belfast, Cork and Galway (Herries Davies 1983). This necessitated trying to find five specimens of each fossil or rock from each locality. The fossils collected were entered in the palaeontological registers or 'Number Books' where, along with the number assigned for each individual fossil, details of its identification, locality, stratigraphy and final repository were all recorded.

Changes of personnel (1852-1877)

John William Salter succeeded Forbes as Survey Palaeontologist in 1852. He soon found, however, that his periodic visits to Dublin allowed insufficient time for identifying all the fossils collected by Jukes and his colleagues. Salter was therefore released from his Irish responsibilities in 1856 and William Hellier Baily was sent over to Dublin to replace him in July 1857. Baily was given the title Senior Geologist (Acting Palaeontologist) and faced an initial backlog of some thirty large boxes and 176 drawers of fossils.

Pierce Hoskins was appointed as Fossil Collector by Joseph Beete Jukes (then local Director) in 1854 but resigned three months later (Herries Davies 1983). Charles Galvan replaced Hoskins as Fossil Collector in 1855. In 1861 Alexander McHenry was appointed

as Fossil Collector to replace Flanagan, who had died; due to his high standard of work, McHenry was later to be given unofficial promotion to Acting Assistant Palaeontologist. In 1877, when Richard Clark was appointed as Fossil Collector in his place, McHenry was appointed as Temporary Assistant Geologist. At his death in 1919, he was almost the last survivor of the Survey team of Jukes' day. McHenry, together with Clark, was one of the few staff members to still be employed when the primary survey was completed in 1889.

New premises (1870-1890)

In March 1870 the Survey took up new premises at 14 Hume Street (Fig. 2), just around the corner from its previous abode. The move was occasioned by inadequate space for the expanding Survey at 51 St Stephen's Green, which was shared with the Royal College of Science for Ireland. The Survey's rock and fossil collections, however, remained in the original building as they formed part of the College's Museum. In 1865 the Museum of Irish Industry, of which the Geological Survey's Collections formed a part, had been incorporated in the Natural History Museum (part of the Museum of Science and Art) and the Royal College of Science for Ireland. New premises to house the Natural History Museum were eventually constructed on part of the new Kildare Street site for the Museum of Science and Art; the Geological Survey's Collections were transferred from 51 St. Stephen's Green to the new building in 1890 (O'Riordan 1983).

Fig. 2. 14 Hume Street, Dublin, the office of the Geological Survey of Ireland 1870-1983.

Geological Survey Collections on display (1890-1896)

The Geological Survey's Collections were arranged in Room IIIE (East) of the Natural History Museum, as illustrated by McHenry and Watts (1895) in their *Guide to the collections of rocks and fossils belonging to the Geological Survey of Ireland.* Advantage of the move was taken to rearrange the Collections. The general scheme was devised by Archibald Geikie (Director General of the Geological Survey of Great Britain and Ireland) and carried out by McHenry and Watts. The fossils were arranged primarily in stratigraphical order, by system; within each system they were organised by phyla and then by locality, as close as could reasonably be achieved. The work was accomplished under the supervision of McHenry, who arranged for the labelling, naming and tableting of specimens; most had been identified originally by Salter or Baily. The Collections also included part of the Portlock Collection (Lower Palaeozoic fossils in display cases 9 and 10 and Mesozoic fossils in cases 36 and 37, as listed by McHenry and Watts 1895) which had been split when the type and figured specimens were transferred to the Museum of Practical Geology in London, probably between 1854 and 1857 (Tunnicliff 1980).

The handbook by McHenry and Watts contains a description of the Irish rocks and fossils displayed and also includes the only extant published catalogue of the Geological Survey's fossils. An earlier catalogue, prepared by Jukes (1866) and referred to by McHenry and Watts (1895), is no longer available (see note by Monaghan 1984, p.536). McHenry and Watts' catalogue listed only the type, figured and described specimens in the collection at that time, amounting to some 94 recorded specimens of which 33 were designated as 'types'. These type specimens were displayed in a special case in the main Palaeontological Gallery of the Museum of Science and Art, together with other Irish type material and separate from the rest of the Geological Survey's Collections. McHenry and Watts recorded the registration number of each fossil and in which case the figured and described specimens were located in the Geological Survey Gallery.

In order to provide extra space for the Art and Irish Antiquities Collections, the Geological Survey's Collections were moved again in 1896 - this time to the curved corridor between Leinster House and the Natural History Museum (O'Riordan 1983).

End of an era

Baily died in 1888, still holding the position of Acting Palaeontologist, but he was replaced by a petrologist, J.H. Hyland. Edward Hull, then the local Director (appointed in 1869), claimed that the Geological Survey no longer required a palaeontologist 'because little now remains to be done in Irish palaeontology except to add to the collections from time to time from new openings' (Herries Davies 1983).

Geological Survey palaeontology (1890-1967)

Most of the palaeontological work done between completion of the primary survey in 1890 and revitalisation of the Geological Survey in 1967 related to the coalfields. The extensive drilling undertaken by the Geological Survey in the Leinster Coalfield after 1919 and in the early 1960s produced a substantial collection of Namurian and Westphalian A bivalves, goniatites and plant fossils. These were left uncatalogued and only identified by footage down the borehole. The non-marine bivalves are accompanied by extensive correspondence between Mr Michael O'Meara (one of the few geologists working in the Survey before the revitalisation, who later became the Assistant Director) and Dr R.M.C. Eagar (Manchester Museum) to whom the fossils were sent for identification. Most of them were returned in 1984, complete with lists of identifications, and have since been numbered and curated.

The disbandment into storage of the Geological Survey's Collections

In 1922 the Geological Survey's Collections displayed in the National Museum of Ireland (formerly the Museum of Science and Art) were closed to the public and shortly after disbanded to make way for clerical staff of the new Irish government. Most of the Collections were removed to the Survey's offices at Hume Street where the majority of specimens remained crated in the former basement kitchen until unpacking began in 1976.

According to a list signed by Michael O'Meara in 1948, the portion of the rock and fossil collections relating to the twenty-six 'southern counties' were packed in sixty-five boxes and another thirteen boxes of 'Museum Stores'. Surplus material that had not previously been on display in the National Museum remained in twenty-two wooden cabinets, although there had been some mixing of specimens. Some type and figured specimens were packed in Box 58 and more were on display in a show case on the third floor of the Geological Survey's Hume Street offices. Specimens relating to Northern Ireland were packed separately.

In a memorandum dated 4 November 1947, the then Director of the Survey, D.W. Bishop, recalled that in 1938 and again in 1946 at the International Congress Committee, representation had been made to restore the Geological Survey's Collections. Bishop commented in his memorandum that the Collections at this time were 'chaotic, and appear to have suffered much damage through the decay or destruction of labels' (Fig. 3).

Fossils relating to Northern Ireland

Following the allocation of a Geological Survey unit to Northern Ireland by the Geological Survey of Great Britain, and drilling in the Tyrone coalfield, a request was made to the Geological Survey of Ireland by Dr Phemister of the British Geological Survey for access to the fossil collections recorded by Hardman (1881) in his memoir of the Tyrone coalfield. It was proposed that the British Survey should send over a Palaeontologist and Assistant for a couple of months to reassess the collections, if they could be made available. S.W. Hester was duly dispatched to Dublin where he compiled a loose leaf *Catalogue of fossils from Northern Ireland* (containing some 14,000 entries) for Dr Phemister in Belfast (S.P. Tunnicliff, pers. comm. 1991). This *Catalogue* was arranged by county (Antrim, Armagh, Down, Fermanagh, Tyrone and Londonderry) with localities ordered alphabetically and grouped under geological formations.

It is probable that at this time, those specimens which had been formerly part of the Portlock Collection (from Londonderry, Fermanagh and Tyrone) and remaining in the care of the Geological Survey of Ireland in 1922, were (with a few exceptions) sent to London for 'safe keeping'; they were subsequently moved to Leeds and after numbering were repatriated to the Ulster Museum in about 1980 by S.P.Tunnicliff. These specimens were subsequently allocated Ulster Museum numbers K4100 -K4400 (S.P.Tunnicliff, pers. comm. 1991).

In 1968 the remaining portion of the Collection covering the six northern counties was donated to the Geological Survey of Northern Ireland. Some eighteen cases of specimens were dispatched on 12 December 1968. These were subsequently housed in the Ulster Museum.

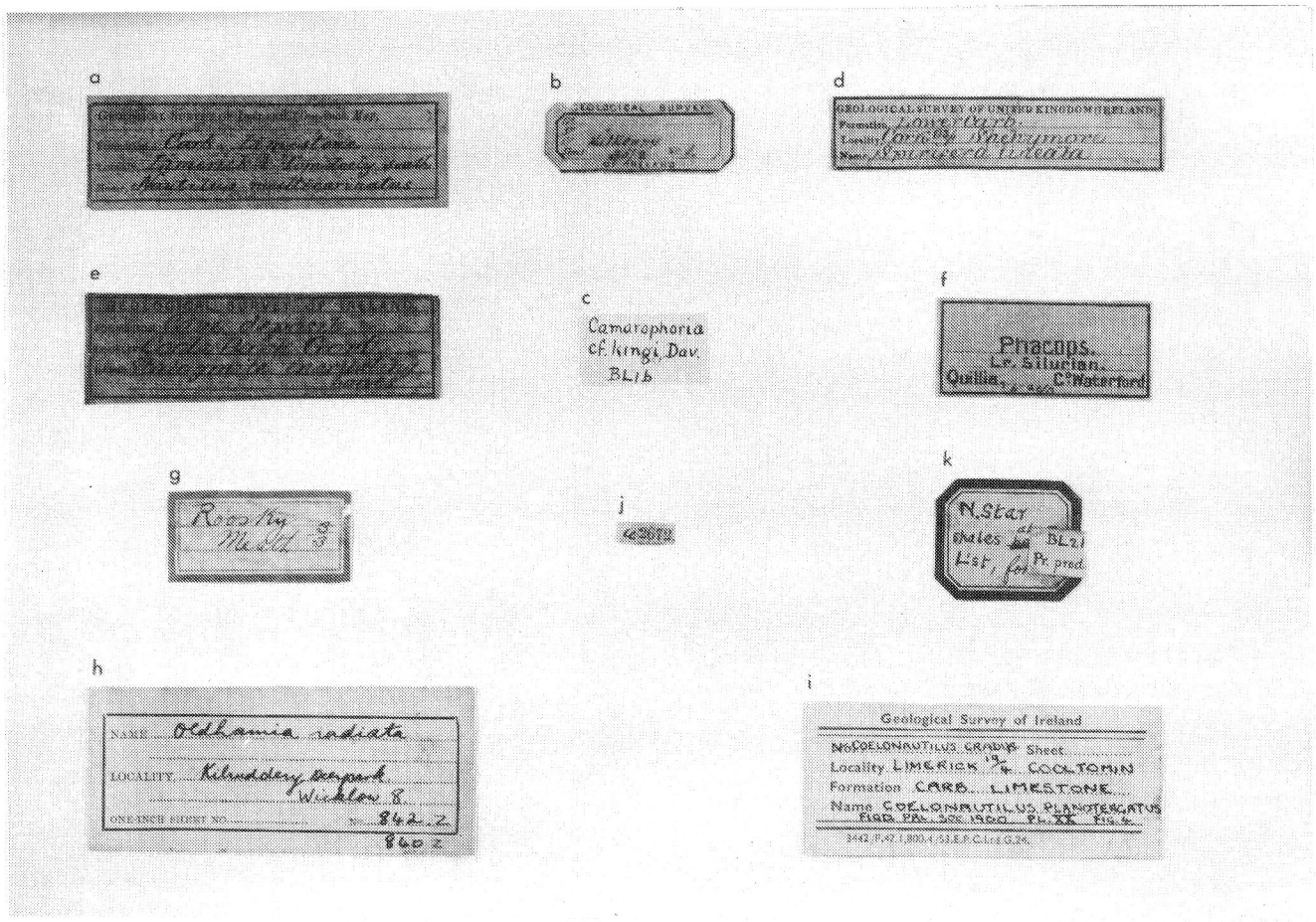

Fig. 3. Tray and specimen labels: *a*, typical nineteenth-century tablet label; *b*, early nineteenth-century specimen label; *c*, specimen label from L.B. Smyth collection, *c*.1922; *d-f*, tablet labels; *g*, specimen locality label, twentieth-century; *h*, tray label usually used for rocks; *i*, recent tray label; *j*, nineteenth-century specimen registration number; *k*, specimen locality label, L.B. Smyth collection.

Revitalisation of the Geological Survey

In 1966 Dr Cyril Williams was appointed Director and charged with the responsibility of revitalising and expanding the Geological Survey to include a complete remapping of the country. By this time some of the collections were available for inspection in drawers in Hume Street or in metal cabinets in the basement of 4 Kildare Street (an ancillary office of the Geological Survey). In 1976 the Geological Survey acquired temporary offices in the old Jacobs Biscuit factory in Bishop Street, Dublin. New metal cabinets were purchased in 1977 and, for the first time since 1922, the Survey had the space to unpack and house its Palaeontological Collections. The crated material was unpacked by Trinity College students employed in the vacations under the supervision of Dr David Naylor (then Principal Geologist in charge of Mapping and later Assistant Director). The specimens were roughly sorted as the crates were unpacked and fossils of each phylum were stored separately. Dr Derek Siveter (then a Post Doctoral Fellow at TCD) sorted and renamed many of the trilobites in the Collections.

The Collections were to move again when the Bishop Street offices were vacated and alternative temporary accommodation found in Baggot Bridge House, Baggot Street, Dublin, in 1979. At this time Dr John Nudds (then Curator of the Geological Museum at TCD) and various students were employed on a temporary basis to sort and catalogue the fossils. The corals were re-examined at this time by Nudds.

The entire Geological Survey moved to the present purpose-built headquarters at Beggars Bush, Dublin, during 1983; the collections were transported from Baggot Bridge House and Kildare Street to the basement of the new premises early that year.

Current state of the Palaeontological Collections

Storage and access

The collections are now totally accessible for the first time since 1922. The metal cabinets are housed in the basement of the Geological Survey (Fig. 4) along with the current collections of rocks (in mobile sliding rack

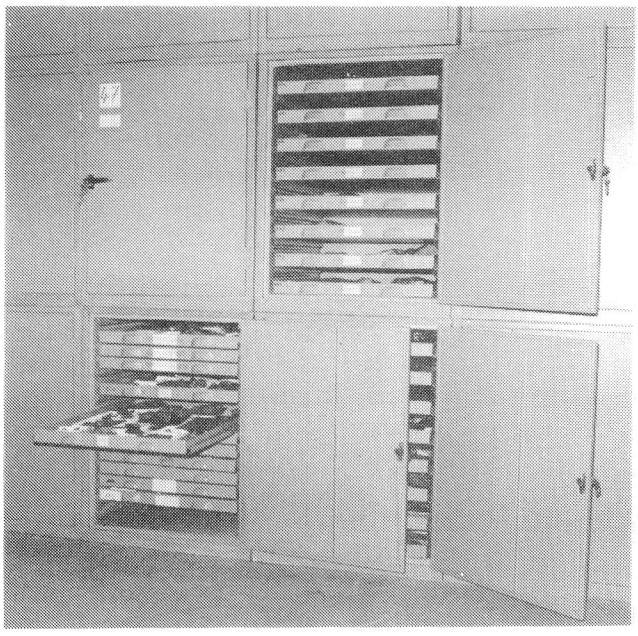

Fig. 4. Part of the metal storage cabinet facility for fossils in the basement of the new offices at Beggars Bush, Dublin.

storage; Fig. 5). The type and figured fossils are stored separately in two metal cabinets along with the original fossil registers in a fireproof room (Fig. 6).

Arrangement. The physical re-arrangement of the collections is not yet quite complete. At the time of the last move, many fossils were mixed in with the nineteenth-century rock collections. These have now been separated and the fossils are being re-arranged primarily by phyla, then by age, and lastly by geographical area.

Missing loans. In 1976 I assumed responsibility for loans of specimens from the collections. Unfortunately many loans of fossils had been made over the years with little or no record being made or kept, and apparently with no single person being responsible for overseeing the loans procedure. Since 1976 a strict policy relating to loans has been implemented and steps taken to recover specimens (some of which were still unreturned after periods of 10-30 years). Several specimens had been re-loaned to third parties, apparently without any documentation being sent to the Geological Survey, while others had been returned to the wrong institution in Dublin.

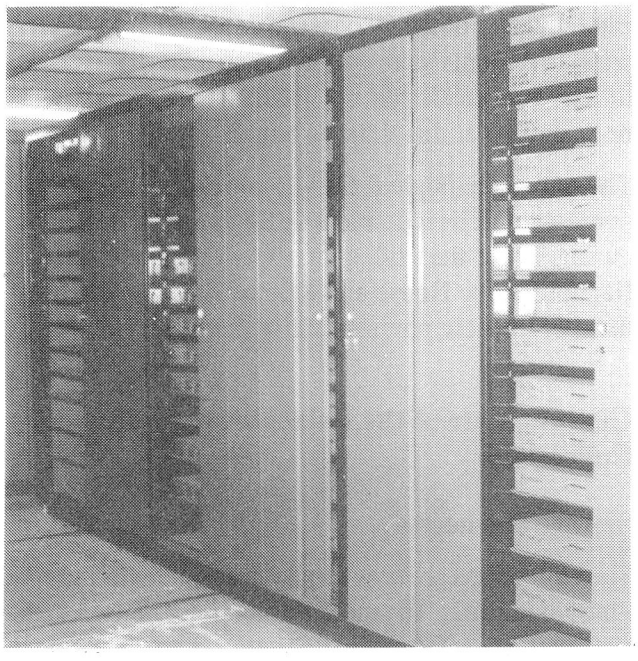

Fig. 5. Some of the new sliding storage facility for the rock collections at Beggars Bush, Dublin.

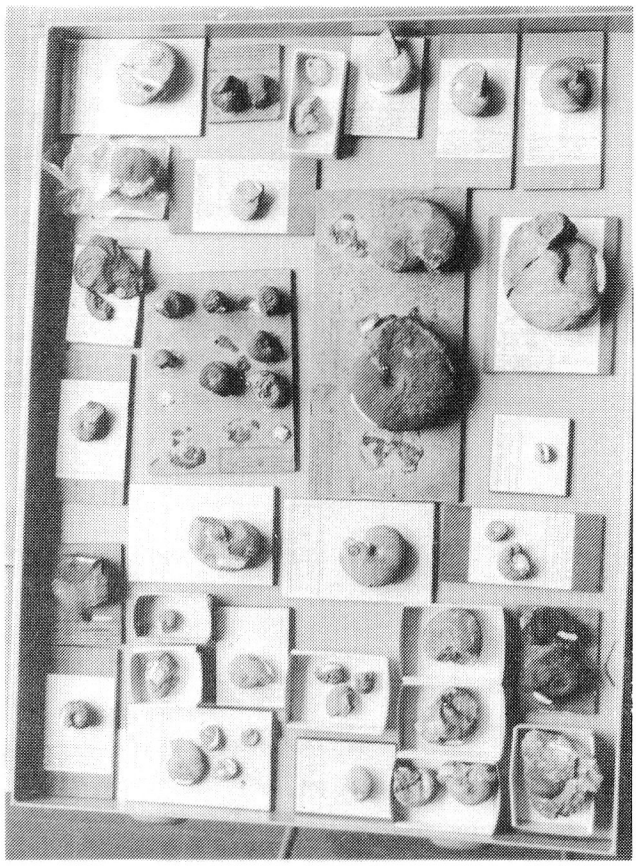

Fig. 6. Figured goniatites (Foord 1897) stored separately with the other type and figured material in a fireproof room.

The unpacking and recuration of the National Museum's invertebrate fossil collections, which Nigel Monaghan began in 1983 (Monaghan 1992), has had the added bonus of unearthing hundreds of Geological Survey specimens (including figured material) unseen since 1922. These have been recurated and returned to the Survey's Collections.

The return of outstanding loans has filled several cabinets with fossils which now await documentation and/or re-assignment of storage space. A few specimens continue to turn up each year. It is still possible that Geological Survey specimens lurk in university museum or geological survey collections outside Ireland. Information concerning the whereabouts of any specimens, particularly type and figured material, will be welcomed.

Documentation

Old registers. The fossil registers cover the period from the formation of the Survey in 1845 to approximately 1908. During this time about 90,000 fossils were numbered. If equal numbers of fossils were dispatched to the three Queen's Colleges in Ireland (now Queen's University Belfast, University College Cork and University College Galway) and to the Geological Survey Museum in London, then there should remain in the region of 18,000 specimens from the nineteenth-century in the Geological Survey of Ireland's Collections. The accuracy of the final destination of each fossil recorded in the registers is somewhat suspect, however, as some recorded as going elsewhere still remain in the Collections. Other specimens are recorded as having been sent to Edinburgh, where some 1,400 fossils were donated by the Director of the Geological Survey to the Royal Scottish Museum in 1870 (and are still extant; W. Baird, pers. comm. 1984). Additional material apparently found a home as far away as Delhi, where four former Survey staff became officers of the Indian Geological Survey after Oldham was appointed Superintendant in 1850 (Herries Davies 1983).

Recent inventory. A manuscript inventory of the contents of each cabinet was made in 1979, but so much of the collections have been re-sorted since then (partly due to the two moves, from Hume Street to Bishop Street and from Bishop Street to Baggot Bridge House) that it is of limited use. The approximate contents of each cabinet and drawer, as they are now, is recorded in a card index.

Size of the Collections. A rough count of the contents of each cabinet indicates that the remaining Palaeontological Collections, including those amassed since the nineteenth-century registers were completed, contain in excess of 18,000 fossils (and probably more than 22,000). There are now about 700 type and figured specimens, including 418 palynomorphs described by Dr Ken Higgs (now of University College Cork).

Recuration. In 1985 I began to recurate the Palaeontological Collections. From the outset, it was intended that recuration would involve computerising the documentation as soon as suitable equipment became available to the Geological Survey, so it was decided to document each fossil on the Museum Documentation Association's 'Geology Cards'. MDA procedures were introduced in 1985 when Colin Reid (now Keeper of Geology, Dudley Museum) was employed in a temporary capacity. At this time, the data standards developed by the Ulster Museum (where Reid had previously worked on the documentation of the Ulster Museum's Collections, also using the MDA system) were followed, with only minor improvements and changes to suit the local situation.

Over 6,600 specimens have so far been fully documented on MDA 'Geology Cards' (about one third of the entire collection). Priority for documentation has been given to fossils going out on (or being returned from) loan, and to type and figured material. The first 'test' batch of fossils documented was a collection of some 600 non-marine bivalves from the Leinster Coalfield, chosen because they had already been fully identified and recorded (apart from accession numbers) by Eagar; the task was largely accomplished by Reid. Another collection of over 1,000 Namurian invertebrates from the Carboniferous of Co. Leitrim, the result of a PhD study by Alan Brandon (now of BGS) and later published (Brandon and Hodson 1984), was donated by Professor Hodson of Southampton University in 1987; this was documented by temporary assistants in 1989.

Computerisation. With the acquisition of an IBM compatible computer network in 1988, it became possible to consider computerising the documentation process. To this end, during 1989 I set up a database using the 'Inmagic' text retrieval package (supplied by Head Computers). 'Inmagic' was purchased by the Geological Survey primarily for other uses, such as bibliographic databases, but it has proved flexible enough to cope with up to fifty indexable fields, as well as the generation of catalogues, indexes and tray labels. Another package, 'Headset', is used for inputting data in a structured form to 'Inmagic'. 'Headset' allows any number of fields to have Authority Files set up to check and verify the contents of those fields. This enables spellings to be verified, allowable concepts to be limited, and keyword fields to be set up and added to if desired. Several hundred records have been input to check and improve the system.

Content of the Collections

The present Survey collections are representative of the stratigraphy and geographical area encompassed by the twenty-six 'southern' counties. Apart from the Portlock Collection (now almost totally dispersed to other institutions) and the Brandon Collection (see below), there are no major named collections, as nearly all the specimens were collected by Survey officers in the normal course of their duties. In most cases it is difficult to establish who collected the individual fossils. The summary below is intended to give an idea of the content of the more important parts of the Palaeontological Collections.

There are large collections of Lower Palaeozoic, Carboniferous Limestone and coalfield invertebrates.

There are particularly good collections of the latest Devonian and earliest Carboniferous non-marine bivalves and plants (some figured by Johnson 1911*a*, *b*, 1912, 1913) and fish (including *Groendlandaspis*) from Kiltorcan, Co. Kilkenny. The Upper Carboniferous, particularly from the Leinster Coalfield, is well represented by goniatites and non-marine bivalves and plants collected from various drilling programmes. Other collections of note include: the Coal Measures crustacean *Limnestheria ardra* (Wright, 1920) from the Ardra Borehole; coelacanths figured by Huxley (1866) from south Cork; brachiopods figured by Davidson (1866-1871) and Harper (1952); nautiloids and goniatites figured by A.H. Foord (1897); trilobites figured by Woodward (1883-1884), Reed (1899), Salter (1867) and Dean (1971-1978); and starfish from Co. Wexford figured by Spencer (1916).

A considerable number of goniatites, bivalves and plants were collected recently by Higgs while re-mapping the Silesian rocks of the Leinster Coalfield. The late Visean and Namurian rocks of Co. Leitrim are represented by the Brandon Collection of invertebrates. Type and figured palynomorphs from Ireland, Britain and the continent, described by Higgs in numerous papers, form a substantial recent addition to the collection (e.g. Higgs 1975, 1984, 1986; Higgs and Beese 1986; Higgs and Clayton 1984; Higgs and Russell 1981; Higgs and Scott 1982; Higgs and Streel 1984; Higgs *et al.* 1988).

A few of the more interesting fossils have been donated to the National Museum of Ireland, notably fish from the Jarrow Colliery described by Huxley and Wright (1867) and a late Devonian isopod from Kiltorcan, *Oxyuropoda ligoides* Carpenter and Swain, 1908.

It is intended to produce a catalogue of all type, figured and cited fossils in the collection as soon as time permits.

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THE JAMES MITCHELL MUSEUM

A MUSEUM OF A MUSEUM IN UNIVERSITY COLLEGE GALWAY

by David A.T. Harper

Introduction

The James Mitchell Museum in the Department of Geology, University College Galway (UCG), was opened in its present form in 1977. The setting, however, on the upper floor of the south-east wing of the main UCG quadrangle, together with its fittings, the oak display cabinets and the majority of the collection, are the products of the early years of Queen's College Galway. The hall is exceptional within the context of Irish geology, preserving much of the atmosphere of a mid-nineteenth-century specialist museum; moreover, it holds the reference material for William King's classic monograph on the Permian fossils of England (King 1850) and currently enjoys the support of an FÁS (An Foras Aiseanna Saothair) 'community response team' assisting with the careful refurbishment and restoration of the Museum, its collections and displays.

The setting

The Museum occupies a pivotal position in the south-east corner of the main quadrangle of UCG (Fig. 1). The quadrangle was built of local Carboniferous Limestone in 1848, at a cost of almost £36,000, prior to the opening of the College on 30 October 1849 (Harper 1988). The main tower is a facsimile of Christopher Wren's 'Tom Tower' in Christ Church College, Oxford, and the original buildings were designed by Joseph B. Keane. The geology Museum is part of a previously much larger complex (Anderson 1899) but nevertheless, in contrast to those elsewhere in Ireland, it has so far survived the constant pressures to dismantle its collections (Fewtrell 1979).

The north wall of the Museum is decorated with a cast of the Maastricht mosasaur skull, while a large plesiosaur from Lyme Regis faces a Holzmaden ichthyosaur mounted above the entrance; these and other large display specimens are supplemented by contemporary labels and slogans. William King's colourful description of geological science dominates the summit of the south-facing wall - 'Geology treats (1) of the materials, intimate structure, order of position, and origin of rocks, composing the crust of the globe (mineralogy, petrology & stratigraphy), - (2) of the physical changes which the surface of the Earth has undergone and is now undergoing (physical geography), - (3) and of the various plants and animals which have tenanted the lands and waters of by-gone periods as well as the order of creation (palaeontology).' The hall, together with its cabinets and displays (Fig. 2), retains its nineteenth-century character - very much a museum of a museum.

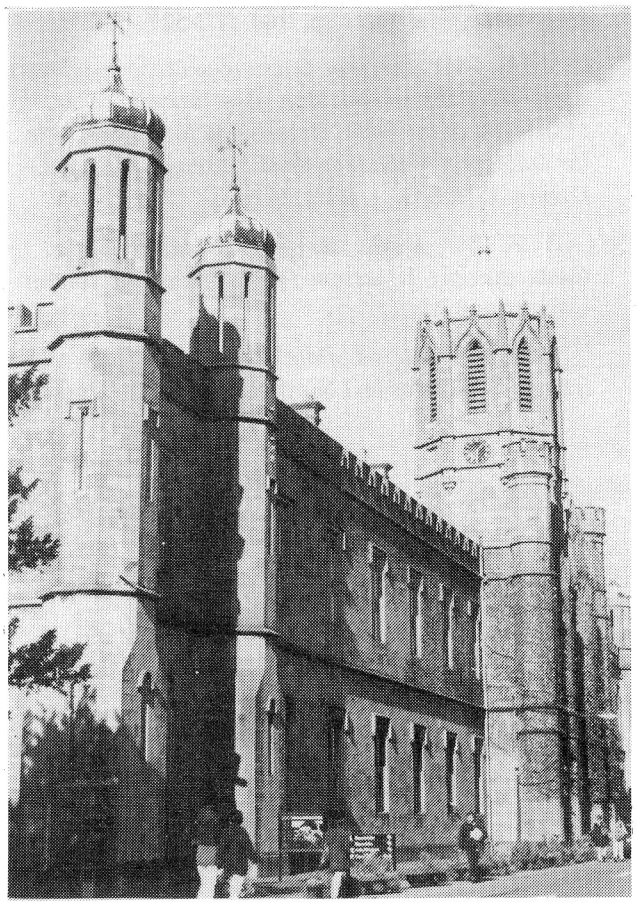

Fig. 1. Main quadrangle of University College Galway; the James Mitchell Museum is located on the first floor of the south-east corner of the building in the foreground.

Fig. 2. Oak display cabinet adjacent to data capture and retrieval area in part of the Museum gallery.

A short history

The Museum was, at its inception, administered by a Museum Committee and established partly out of the funds allocated to the chairs of Natural History and Geology and partly from donations during 1851. The report of the Museum Committee to the Council of Queen's College Galway, dated 15 Bealtaine [May] 1852, specified the material reposited to date. The sixth, seventh and eighth items are of particular interest: item 6 noted the types for King's 1850 monograph, together with a complete suite of fossil plants from the Coal Measures of the north of England, as part of a larger collection of minerals, rock specimens and fossils purchased by the Department of Geology; item 7 specified a valuable collection of plaster casts of fossil vertebrates from, probably, the Servalitk Hills [sic], presented by the Directors of the East India Company through a Dr Melville; and item 8 noted a valuable collection of Tertiary and other fossils presented by Baron de Besterot of Duras, Kinvarra. King, throughout his long association with the College, supplemented these collections with more of his own collections, exchanges, gifts and purchases.

With the appointment of Richard J. Anderson MD to the Chair of Natural History, Geology and Mineralogy in 1883, the Geology and Natural History collections were amalgamated to form the Natural History Museum (Anderson 1899); the collections were housed in five rooms, three for zoological specimens and accessories and two for fossils and minerals. Anderson (op. cit.) noted a number of the more significant specimens: for example, a giant crinoid, the ichthyosaur, plesiosaur, mosasaur skull cast and alabaster models of vertebrates (including a labyrinthodon). More striking, perhaps, is the plaster model of a pterodactyl, based on Richard Owen's reconstruction and probably modelled by B. Waterhouse Hawkins, following the re-opening of the Great Exhibition at Sydenham in 1854.

After Anderson's death in 1914, the chairs of Natural History and Geology and Mineralogy were partitioned within the (by then) University College Galway. Professor Henry Cronshaw's short tenure of the chair of Geology and Mineralogy (1915-1920), during a turbulent period in Irish history, witnessed the disintegration of the museums in UCG, but nevertheless the bulk of the geological collections remained intact in their present location.

The Museum was formally designated the James Mitchell Museum in 1977. Professor James Mitchell was appointed to the Chair of Geology and Mineralogy in 1921 and held it, together with the post of College Secretary and Registrar from 1934, until his retirement in 1966. His considerable contributions to the development of UCG, particularly in teaching through the Irish language, are now recognised in name by the Museum. Nevertheless, and ironically, indifference during much of the time since King's tenure has ensured the conservation of the Museum and its contents. Recent work on the collections, notably the curation of King's Permian material by Pattison (1977) under the direction of Professor David Skevington (Fig. 3), has been summarised by Fewtrell and Ryan (1979). The King collection has featured in

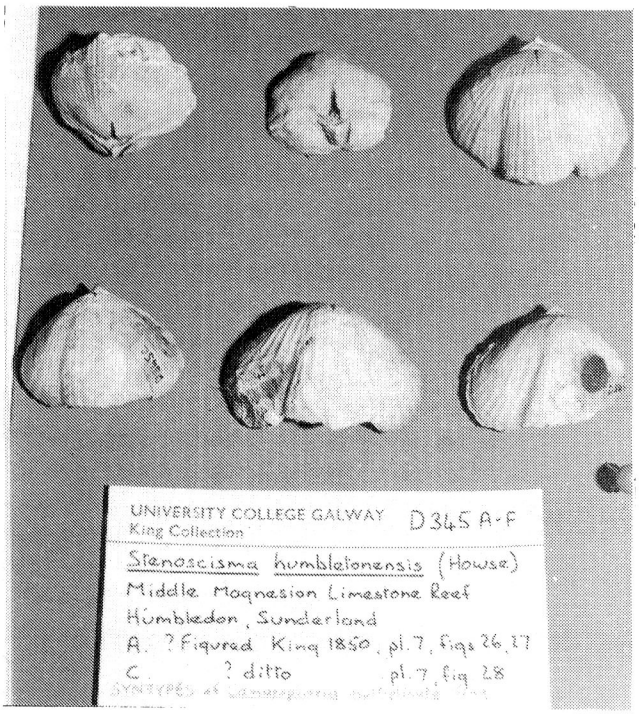

Fig. 3. Type and figured specimens in the King Collection of Permian fossils from north-east England, curated by Dr J. Pattison.

recent revisions of the Permian bivalve (Logan 1967), gastropod (Hollingworth, in prep.), crinoid (Donovan *et al.* 1986) and brachiopod (Harper and Hollingworth, in prep.) faunas; it is one of the few internationally important mid-nineteenth-century collections still entire and remains a significant part of UCG's heritage.

The Collections

The bulk of the collections was assembled by the first Professor of Geology in Galway, William King DSc (1809-1886), a native of north-east England (Pettigrew 1980); after a few stormy years at the Hancock Museum (Turner 1980), King settled in Galway till his death, thirty-seven years later (Harper 1988). Material collected in England and on the continent prior to King's arrival in 1849 was later supplemented by exchanges and gifts, and by purchases from dealers (notably Otto Krantz of Berlin). The scope of the collections reflects a policy to acquire an adequate representation of a very wide variety of fossils. Much of the material within the Museum has been noted by Fewtrell and Ryan (1979).

The core of the Museum is the type and figured material for King's classic work on the Permian fossils of north-east England (King 1850). Virtually all the specimens relating to his monograph survive (Pattison 1977), together with backup collections from the Sunderland area and some comparative Permian material from Germany. The collection is supported by eleven of Dinkel's original lithographs of the Permian fish illustrated in the monograph. The lithographs are of exceptional quality and have recently been restored by staff of the National Gallery of Ireland.

Figured material relating to King's pioneer paper (1856) on the problematic Devonian coral, *Pleurodictyum* (incidentally purchased from Krantz), has also been located in the collections, as have specimens of *Eozoon* which featured in the violent controversy surrounding the origin of the so called 'dawn creature' (Harper 1988). Moreover, King's handwritten catalogues and many of the original specimen labels remain available (Fig. 4).

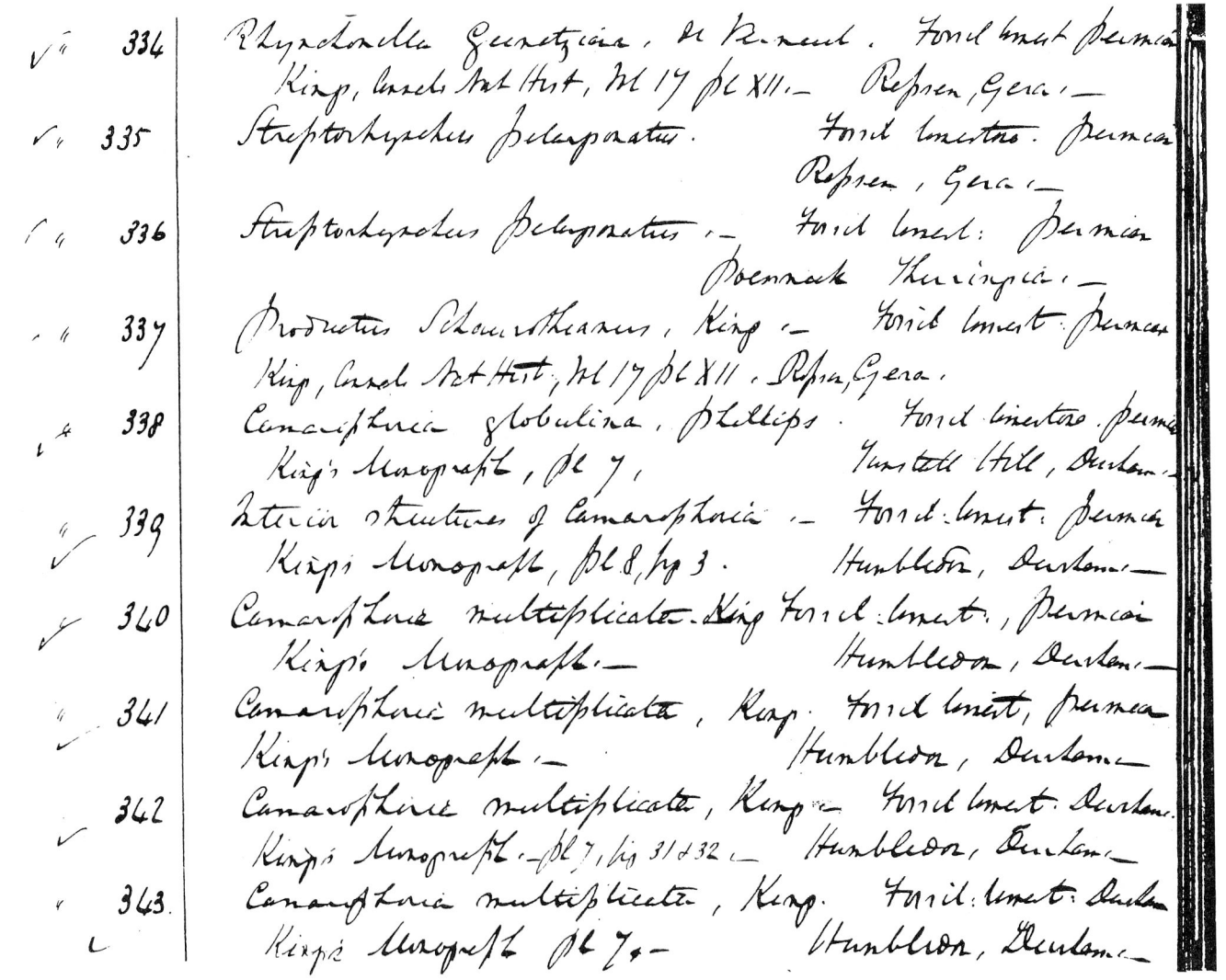

Fig. 4. Part of page 119 of the *Queen's College catalogue of departments* showing Permian brachiopods from the north of England; entries by Professor William King.

Recent interest in the price of fossils (Rolfe *et al.* 1988) has focused on the assessment of the proper cost of legitimately-obtained fossil material and its inflation with time. Regarding the purchase of material for the James Mitchell Museum, reports are sparse in the College records. Nonetheless, as noted above, the report of the Museum Committee to the Council of Queen's College Galway, dated 15 May 1852, recommended purchase of Zoological, Botanical, Geological and Mineralogical specimens to the value of £300, a collection that included King's type and figured material from the Permian of England. Much later, on 19 December 1881, the college sanctioned payment of £12 19s 11d to Dr Krantz of Berlin for a collection of Mesozoic fossils, mainly ammonites, from mainland Europe. The Academic Council thanked a number of individuals for donations to the museum: R.L. Franklin Esq. and Baron de Basterot (26 April 1850), Mr Wright for minerals and Edward L. Hunt for valuable contributions (24 April 1852). Later in the century cheques were issued to individuals for purchases: R. Damon (13 April 1878 - £44 19s; 10 February 1883 - £28 15s 4d; 15 December 1883 - £5), Evelyn Oldham (2 June 1883 - £18 6s), Dr Robert Ball (27 November 1880 - £50). The same records note unsuccessful requests from Professor King for financial support for a visit to the South Kensington Museum in search of specimens for the Museum (20 May 1876) and for the purchase of specimens whilst researching on the continent under the auspices of the Royal Society (12 May 1877).

Despite King's reputation as an avid and voracious collector (Herries Davies 1988), there is remarkably little local material in the collections. Anderson (1899), however, cited displays of local Silurian and Carboniferous fossils in the Natural History Museum, emphasising the excellent preservation of the latter, presumably due to silicification. Small collections of shelly material from Llandovery horizons on the Kilbride peninsula, together with some partially silicified brachiopods and molluscs from the Dinantian rocks near Kiltiernan, County Galway, are extant but poorly localised. Nevertheless, current acquisition policy is focused largely on the collection of Irish material; researchers are encouraged to consider depositing type, figured and cited material in the Museum, from the very varied geology of Western Ireland. Some recent research collections include type and figured Ordovician brachiopods from eastern Ireland (Harper *et al.* 1991), Silurian brachiopods from Ireland and Scotland (Doyle *et al.* 1991), Silurian shelly faunas from western Ireland (Doyle *et al.* 1990) and Recent brachiopods from Galway Bay (Harper 1991). The Eleanor Miles bequest to the Museum of rare and spectacular minerals is discussed elsewhere (Feely and Naughton 1990).

The future

Despite the many attractions Galway and its surrounding countryside has to offer, the city lacks an adequate museum. The James Mitchell Museum has an important part to play in providing not only a summary of the geology and scenery of the surrounding environment but also some more general statements on Ireland's geological history and resources. Moreover, the hall and its fittings gives an unique perspective on the history of the College no longer retained elsewhere on the campus. It is an important part of Ireland's heritage and, if developed, will be of considerable benefit to the community and geology as a whole.

Geology, however, is one of only three academic departments remaining in the main quadrangle. The expanding administrative and executive branches of the college now account for most of the building. Plans, as yet informal, have suggested the relocation of the Department of Geology and the James Mitchell Museum to a new purpose built block elsewhere on the campus. Nevertheless, the important historical dimension to the museum and its traditional setting strongly militate against such a move; rather, its destiny lies as a recreational area within college and as a possible nucleus for an expanded museum involving the heritage of a larger range of departments.

With generous support from the Government agency FÁS, a scheme involving two coordinators and twelve trainees is now in place; the programme for this one year project will permit careful refurbishment and conservation of the Museum and its collections (Cahill and Greally 1990). The programme combines training in geology and life skills with exposure to curation, cataloguing, photography and microcomputers. Firstly, the conservation and curation of all museum, teaching and research material is underway. Secondly, a revised catalogue is in preparation and a comprehensive information system is being constructed around dBASE software. And thirdly, extensive new displays, depicting geological themes 'past and present' (backed up by supplementary educational packs) are planned to cater for the public and more particularly both second and third level students.

The now wide availability of microcomputers and a range of relevant, user-friendly software has encouraged the construction of geological databases around commercial packages. Recently, both Nakrem (1990) and Whalley (1990) have modified dBASE software to solve different housekeeping problems related to

FILE		INSTITUTION
Simple Name		Form
Catalogue number		Previous catalogue number
Identification or full name		
Status		Identifier/date
Stratigraphy: keyword detail		
Age: keyword/detail		
Collection: place name detail		Grid reference
Locality details		
Collection method	Collector	Collection number
Aquisition method	Acquired from	Date
Condition: keyword detail		Completeness: keyword detail
Dimensions		Part or aspect
Bibliographic source		
Notes		

Fig. 5. James Mitchell Museum data card, based on the IRGMA system (see text).

museum and teaching collections. A similar system has been devised for the UCG collections. A wide range of geological information is recorded on a coded data sheet (Fig. 5) based on the IRGMA (Information Retrieval Group of the Museums Association) standard within the guidelines suggested by Brunton *et al.* (1985). The information is entered through a network of BBC microcomputers and ported as ASCII files into dBASE on both IBM and Macintosh systems. Both systems will be linked to the college VAX mainframe computer, with a potential for global access through mainframe networks. To date, approximately 5,000 specimens (about one-third of the Museum's total holdings) have been catalogued. This database will form the basis for a new computerised catalogue and an efficient access and loan system.

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BOOK REVIEWS

Cutler, A., Oliver, P. G. and Reid, C. G. R. 1990. *Wren's Nest National Nature Reserve - geological handbook and field guide*, 30 pp. Dudley Leisure Services Dept. in co-operation with Nature Conservancy Council's Earth Science Division, Peterborough. ISBN 0-900911-26-3. Price £1.00 [from English Nature or Dudley Museum and Art Gallery].

This new guide to the National Nature Reserve at Wren's Nest, Dudley, replaces two previous Nature Conservancy Council publications - the *Geological trail* (Anon. 1970) and the *Geological handbook* (Hamblin *et al.* 1978) - and states that it is principally aimed at 'A' level and undergraduate students of geology. Presented A5 size, the publication contains a general description of the geology of the Dudley area with a more comprehensive section about Wren's Nest itself, including a history of the mining activities. The revised geological trail constitutes a major part of the text and there is a policy statement about the rules governing the collection of fossil material. The three authors have combined their local and geological expertise to produce a full and informative guide which concisely explains the current consensus on the stratigraphy and palaeoenvironmental history of Wren's Nest. The palaeoecology is also discussed with over fifty line drawings of the commoner fossils to be found.

Essentially the publication will be found most useful 'on site'. The revised geological trail is clearly laid out in the text, with straight forward directions on how to proceed from one locality to the next. The photographs contained in the 1978 handbook are not used here (no doubt an economy measure) but they are hardly missed because the explanations of the localities are in several instances greatly enhanced by the presence of uncluttered location sketches illustrating salient features.

The aim to produce a publication suitable for geologists with some training has been achieved, although the text should not be disregarded by non-specialists as there is plenty of simply presented information that would provide an interesting excursion for anyone. Wren's Nest should continue to be a major educational site for schools, following the introduction of the national curriculum, as this 'outdoor teaching laboratory' covers a variety of cross curricular topics and the new guide certainly provides a sound introduction for teachers. Finally, it is gratifying to know that a local council department, a local geological society, and the NCC (now English Nature) can get together to finance and produce a reasonably priced and useful publication - lets hope there will be more to follow!

Anon. 1970. *Wren's Nest National Nature Reserve geological trail.* Nature Conservancy Council, Newbury.

Hamblin, R. J. O., Warwick, G. T. and White, D. E. 1978. *Geological handbook for the Wren's Nest National Nature Reserve.* Nature Conservancy Council, Newbury.

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10 August 1990

Benton, M. J. 1989. *On the trail of the dinosaurs.* Kingfisher Books, London, 144 pp. ISBN 0-86272-498-8. Price £14.95.

I never know whether I'll need the hatchet when reviewing a new 'dinosaur' book. The massed competition poses an exceptionally severe test, and a further complication, not faced by, say, graptolitic tomes, is whether the book is worth stocking in the museum shop. Mike Benton's latest volume, though definitely on dinosaurs *sensu stricto*, manages to pass both tests quite well.

In this 25 cm square format book, Benton has chosen not to repeat the systematic 'encyclopaedia' theme. Instead, as he says, he 'tells the story of how dinosaurs are collected and studied' by means of a good potted history of previous work and an excellent description with plenty of photos of how dinosaurs are prospected, excavated, recovered, prepared, and if necessary mounted for display at the Tyrrell Museum of Palaeontology, Alberta, Canada.

He then 'gives detailed insights into some of the key research problems.... into the 1990s' by means of the thematic chapters on currently dynamic areas in dinosaur research. This is up to date, with discussions of recent work including not just *Baryonyx* but also the implications of late 1980s work on cladistics. With material like this, the book is definitely aimed at the interested but uninformed teenager and adult, and Benton very importantly gives a very balanced view quite absent from, for example, Robert Bakker's *The dinosaur heresies*.

There are plenty of illustrations including relevant, if occasionally technically doubtful, photographs, and a selection of good workmanlike habitat groups. The colour profiles of individual dinosaurs do, however, break up the book's flow somewhat and, in common with some other illustrations, could do with being given dimensions, while a few more labels elsewhere would have been helpful. Also, there's a glossary, pronunciation guide, and a list of selected museums worldwide,

but no reading list. The writing, editing and proofreading have been thorough, with the occasional lapse into self-contradiction (chewing vs. non-chewing dinosaurs, and 6m vs. 13m long ankylosaurs). It was presumably the publishers who labelled a photo of African hunting dogs as wolves!

I *was* going to complain on a matter of principle that Benton had written yet another book on these wretched brutes, and not the poor neglected groups such as pterosaurs, his own beloved rhynchosaurs, and marine reptiles, which are of considerably greater relevance to the average British museum - except that he has just taken care of them in a sister volume, *Reign of the reptiles* (1990).

On the trail of the dinosaurs is, in short, an up to date synoptic look at research today, suitable for a museum library or education section, though not detailed enough for specialists or those tracking down specific information on, say, the local dinosaur. If your museum shop wants to stock only one up-market (£8 and above) dinosaur volume, then what should it go for? The 'industry standard', David Norman's *Illustrated encyclopedia of dinosaurs* (Salamader, 1985) remains stiff competition on size and content for price, and is the better systematic reference, although Benton's book is more up to date in some aspects of current research. You'll need to make your own decision, but my gut feeling is that they complement one another with some overlap. What is clear is that these two are, at their level, the only two well-balanced books about dinosaurs *qua* dinosaurs to come onto the market in the last few years. Is it coincidence that both are written by active palaeontologists, rather than journalists or secondary authors?

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24 December 1990

Mercer, I. F. 1990. *Crystals*. British Museum (Natural History), London, 60 pp. ISBN 0-565-01083-2. Price £4.95.

This attractive book is in the same Natural History Museum series as *Agates*, *Gemstones* and *Britain's offshore oil and gas*; in common with them it is an excellent publication, featuring a large number of high quality illustrations and produced at an attractive price.

The idea of a book about 'crystals' rather than 'minerals', as one might have expected from the Natural History Museum, is a good one as it broadens out the topic to a wider audience. However, on reading the book it becomes clear that it is written by a geologist with the geological community in mind and an opportunity may have been missed to fully explore the technology and materials of our crystal age. Perhaps the Science Museum could be persuaded to fill this gap with a companion publication written by a materials scientist.

The text of *Crystals* is curiously idiosyncratic and is the weakest aspect of the book. The organisation of the information appears erratic and several points are repeated in the different sections: for example, perfect form of crystals is discussed on pp. 6-7, less than perfect crystals on pp. 24-25, and imperfection rules on pp. 50-51. It may have been more helpful to discuss these various aspects sequentially. Likewise, the two sections about synthetic crystals are separated by a section on crystal lore - one wonders why? Minor restructuring would, in my opinion, produce a more understandable and useful book. Domestic Crystals, Wild Crystals and Birth and Survival are examples of section headings that seem to have rather too-light-a-touch and are somewhat irritating if not misleading. Some of the diagrams are difficult to read and, since much emphasis is placed on them relative to the amount of text, it is important that they should clearly deliver the information expected. Figure 7 provides one example of a diagram which is not fully explained in the text and which does not work on its own.

Notwithstanding the perceived imperfections in the organisation and delivery of information, the overall impression of the book is favourable and its purchase represents reasonable value for money.

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15 April 1991

Van Rose, S. and Mercer, I. 1991. *Volcanoes* [2nd edition]. Natural History Museum Publications [in USA with Harvard University Press], 60 pp. ISBN 0-565-01048-4. Price £5.95.

This book, by two eminent past members of the Geological Museum (now part of the Natural History Museum), really is a new book, and a spectacular one too! There are 60 pages of text (almost double the 1974 1st edition), superb colour photographs, and finely drawn colour illustrations of subsurface and surface volcanic activities which are both realistic and informative. The text is written for the lay-reader, is concise and yet retains a freshness and ease of style. However, this is no 'Peles hair' type of text, but one which is full of up-

to-date concepts and data, providing a full introductory review of all you wanted to know about volcanoes.

The first 50 pages describe: types of volcanoes and how they erupt, the role of water in volcanic activity, the distribution of volcanoes and plate tectonics, hot spots, calderas, hot springs and the benefits to man from volcanic activity, the hazards of volcanoes and monitoring them. The last ten pages provide case histories of eight volcanoes around the world, from New Zealand's Taupo to Kraktau and Mount St Helens, each with a map and illustrations. There are text cross-references and an index.

For a book at under £6.00, the design and production are good (although centre margins are a bit skimpy). What at first sight I mistook for some horrible printing error soon resolved itself into a touch of detail: the six pages dealing with eruptions, pyroclastics and dust are printed on pale grey paper with a multicoloured, finely bespotted surface; I remain unsure as to its success. The only design-production failings I noted were the unclear lettering on Fig. 68 and it is difficult to differentiate the two tones of red, indicating areas around Mount St Helens, on the key to the map.

Good as the text is, the illustrations are superb and relevant. There are 111, including the covers, plus seventeen other colour diagrams and maps. 43 of the colour photographs of volcanic activity and its after effects were taken by Katya and Maurice Krafft, both tragically killed by a pyroclastic flow on Mount Unzen, Japan, in June 1991, the month of publication of this book; it is a fitting tribute to their bravery and talent as photographers.

This little book is a treasure and represents great value - despite being about eighteen times more expensive than it was in 1974. Don't miss it!

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Thomas, J. and Ensom, P. C. 1989. *Bibliography and index of Dorset geology.* Dorset Natural History and Archaeological Society, Dorchester, 104pp. ISBN 0-900341-27-0. Price £4.95.

The plethora of geological papers now being published, in both the obvious and the more obscure journals, makes it exceedingly difficult to keep abreast of the current information available in any particular field of interest. Thankfully, every now and then help arrives in the form of a specialist bibliography. As a curator involved with some large Mesozoic collections from the Dorset coast, the appearance of Jo Thomas and Paul Ensom's publication is a very welcome addition to the bookshelf, especially as the last review of research literature for this area appeared over thirty years ago.

The bibliography took ten years to complete and covers the period upto the beginning of 1988. It begins with a short introduction in which the structure and scope of the work is reviewed, followed by the main bibliography. Conservatively, this must contain in excess of 3,500 entries amongst which are 557 unattributed references, mainly gleaned from local newspapers and magazines. Access to the bibliography is gained via the three comprehensive indexes which follow the main section: Stratigraphical, Palaeontological and General, each of which has an extensive system of cross-referencing and lists publications by author and date under each heading and sub-heading. One minor quibble is that, although the cross-referencing generally works well, it is sometimes more extensive and complete working in one direction than the other. As the authors state in their introduction, the ability to think laterally is an asset. However, the inconsistency in no way detracts from the value of the publication.

The final two pages contain three short Appendices which list the 1:50,000 British Geological Survey maps of Dorset and the newspapers and journals searched during the preparation of the *Bibliography*. These last two Appendices also state which issues were *not* searched, although that for the journals just indicates that some early volumes of those asterisked were not covered. It does seem a shame that, after the years of hard work devoted to the production of this work, any references that there may be within these few journals have been omitted.

However, this is an extremely useful and valuable reference source to such a geologically rich area. The publication has been made especially user-friendly through its spiral binding, which allows each page to lie flat while in use - a great asset to those of us who *always* seem to be working on cluttered bench-tops or desks!

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GEOLOGICAL CURATOR

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