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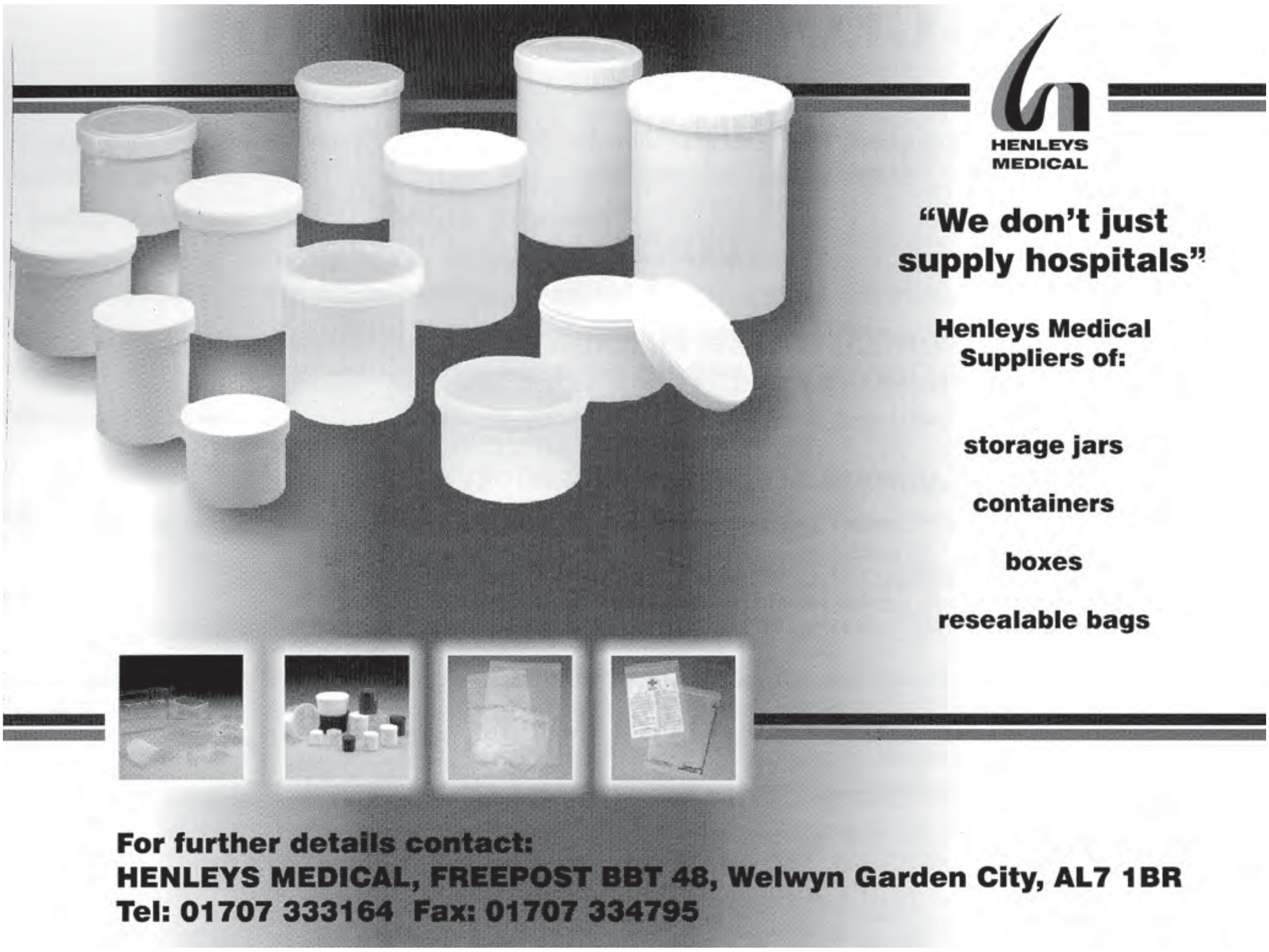

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3rd March 2000
Julie Rhodes

DINOSAUR TRACKS, HELICOPTERS, AND BROKEN BONES

by Neil D.L. Clark

Clark, N.D.L. 2001. Dinosaur tracks, helicopters, and broken bones. *The Geological Curator* 7(5): 163-166.

In January 1996, a number of dinosaur tracks were discovered on a loose boulder at Rubha nam Brathairean, Isle of Skye. These tracks represent the first dinosaur trackway and the first theropod tracks from Scotland. Due to their position on the foreshore immediately above the high water mark, the time of year they were discovered, and the amount of erosion already suffered by the counterpart, it was decided that the tracks should be removed as soon after discovery as possible. A selection of power and manual tools were used to split the boulder along a bedding plane before breaking the slab into more manageable fragments for transporting to the cliff top. During the removal of the tracks, an incident occured that may have safety implications for the use of power tools during palaeontological excavations.

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Received 7th March 2001.

Introduction

Dinosaur fossils of any kind are rare in Scotland. The first evidence of dinosaurs came from the discovery of a single dinosaur footprint from the Lealt Shales Formation (Bathonian, Middle Jurassic), Rubha nam Brathairean in 1982 (Andrews and Hudson 1984). When first described, it was thought to have been a track of a theropod, however it is now thought to be that of an ornithopod (Delair and Sargeant 1985). The new tracks excavated in 1996 had fallen from a cliff of Valtos Sandstone Formation which is also of Bathonian, Middle Jurassic age, but younger than the Lealt Shales Formation. The new tracks form two partial trackways and a number of individual tracks of a small *Grallator*-like track and a slightly larger *Eubrontes*-like track (Clark and Barco 1998).

Dinosaur bone material has also been found in the Valtos Sandstone Formation since 1994, including several cetiosaur bones (Clark *et al*. 1995, Clark and Barco 1998) and a small coelophysid-like caudal vertebra (Clark and Barco 1998). Other dinosaur bones have been found from other formations on the Isle of Skye including a theropod tibia from the Broadford Beds Formation (Hettangian) (Benton *et al*. 1995) and the partial ulna and radius of a thyreophoran dinosaur from the Bearreraig Sandstone Formation (Bajocian) (Clark 2001).

Material

All the tracks were accessioned into the collections of the Hunterian Museum, University of Glasgow. The main block has been broken into 38 pieces and represents the relief (cast) part of the tracks. When assembled, the main block (GLAHM 101273/1-38) measures approximately 15cm thick, and weighs in excess of 800kg. Two blocks with impressions (mould) to tracks 6 and 7 (GLAHM 101274) and track 8 (GLAHM 101275) were also collected. The rest of the impressions were already indeterminate due to being worn by the sea below high water mark. The main surface (GLAHM 101273/1-38) contained nine recognisable tracks on a mud-cracked calcareous mud layer in a Neomiodon-rich bioclastic calcareous sandstone typical of the Valtos Sandstone Formation.

Methods

The main block containing tracks (GLAHM 101273/1-38) was discovered on January 4th 1996 immediately above high watermark just north of the stream entering the bay at Rubha nam Brathairean. In the week prior to this, a rockfall had brought the block down from the overhanging cliffs of Valtos Sandstone Formation (Bathonian, Middle Jurassic). The couterpart to these tracks were found part buried in sediment and boulders a short distance seaward of the main block. The wear on these tracks made some

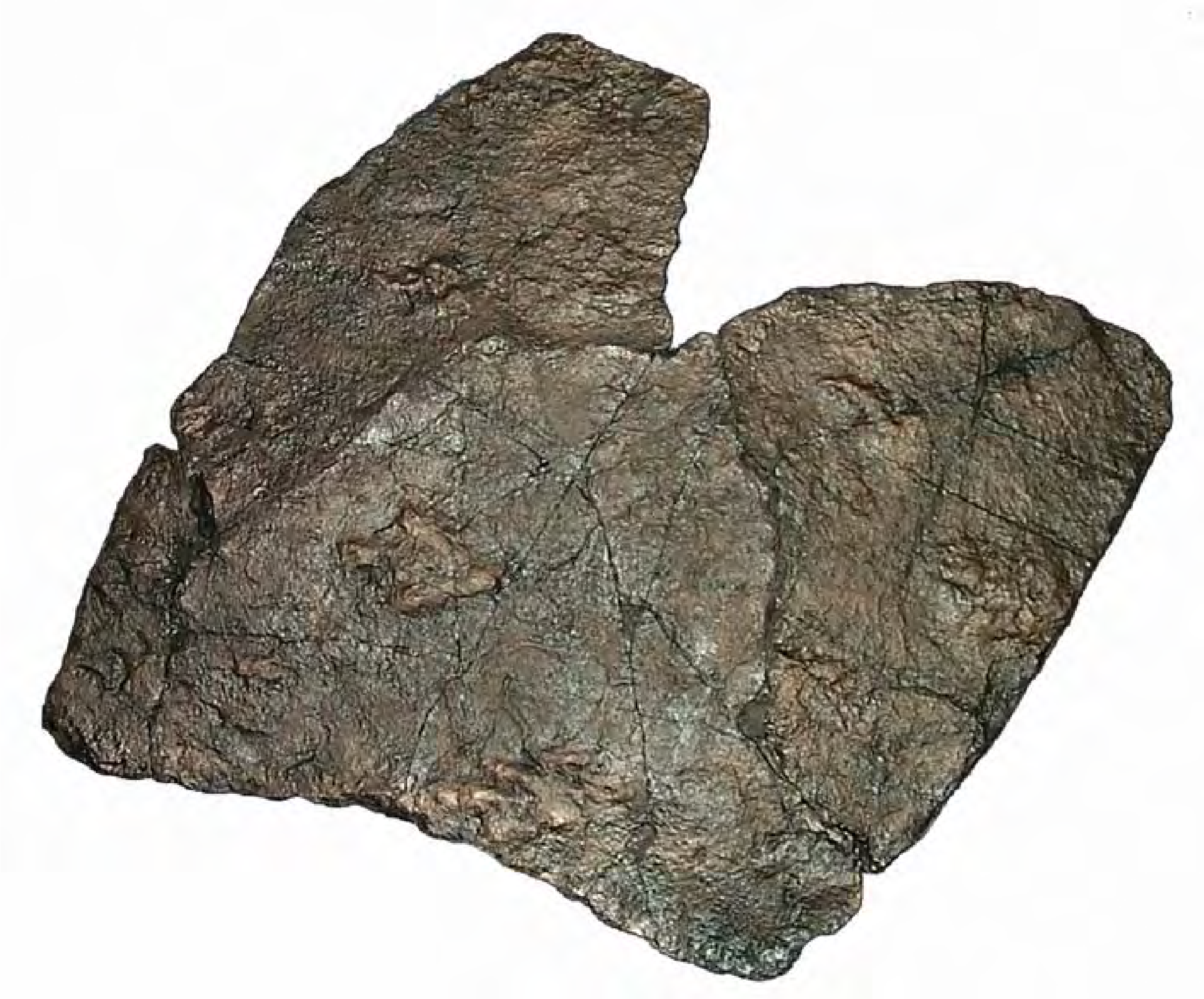

Figure 1. Cast of dinosaur track from the Isle of Skye and plan of tracks 1-9 (see scale on plan of tracks).

barely visible and others worn flat. As the tracks were so close to high watermark, and as storms are common during the Winter months, it was decided that it was imperative that the tracks were removed from the foreshore as a matter of urgency to prevent further erosion.

Initial permission for removal of the trackway block had to be obtained from SNH (Scottish Natural Heritage) as it was found on a Site of Special Scientific Interest (SSSI). On the 15th January a meeting with the landowners (SOAFED) and the Highlands and Islands Regional Council established the other necessary permissions for the removal and transferral of ownership of the trackway block to the Hunterian Museum.

A risk assessment was carried out to identify any possible dangers where accidents may occur concentrating on the fact that power tools were being used. All the usual safety measures were taken regarding clothing, footwear, eye protection, gloves, face masks and so on. The problem with risk assessments is that you cannot take account of the unexpected.

Before the work of removing the tracks commenced, a sketch of the surface was made and an attempt to make latex casts of the tracks was performed. The latex would not harden, even after two full days protected from the weather beneath plastic sheeting. As time was short, it was decided to begin the removal of the surface after a suitable bedding plane was identified. At about 15cm depth, a bedding plane was identified and a rock saw was used to accentuate it before chisels were hammered into place. In addition to the power tools, which included pneumatic drills and rock saws, 10lb sledge hammers and heavy chisels were used to split along the bedding plane. The pneumatic drill was used to make deep holes at the level of the bedding plane to place the chisels. After four days of intense hammering and drilling, the sound of a transmitting crack could be heard spreading along the bedding plane. With careful tapping, the crack continued along the bedding plane splitting the surface in two sections; one disengaged and the other still attached. It was, however, relatively easy to remove the remaining section of trackway from the block. Most of the removal of the trackway surface was done by Jan Wolfe and Chris Mitchell (formerly of the Oystercatcher Restaurant). The team was then joined by Euan McDonald (also formerly of the Oystercatcher Restaurant) to help carry the blocks up to the roadside some 500m along a path up a 70m climb. The weight of the petrol driven generator for the power tools, and the tools themselves, were not insubstantial either and had to be carried carefully down to the shore and up again each day.

Rather than use the rock saw to cut around the tracks, it was decided to let the surface break naturally by hitting the underside of the block with a sledge hammer. This would allow the pieces to fit exactly together again when the tracks were reassembled back in Glasgow. It was about then that the accident occurred.

The Accident

After the trackway surface had been mostly broken to a manageable size, and the team had all sat down to lunch, the I decided to have a closer look at a particular block. On standing up, a numb knock associated with what seemed like a loud crack travelled through the body from the lower right leg. There was little or no pain associated with this, but I could tell by the way the foot was swinging that the leg was broken above the ankle. There had been no unusual pressure applied to the leg prior to this so, at the time, it was a mystery as to why my leg had broken.

Jan Wolfe went up the path to call for an ambulance and the coast guard. After what seemed like an eternity, a helicopter was spotted flying towards the now cheering party from the north. It circled a couple of times and deposited one of its crew on the boulder beach nearby. The crew member radioed for the assistance of one of the paramedics, who had arrived at the roadside, was required and the helicopter left to pick him up. It was when the helicopter arrived back that the worst of the damage was probably done as the wind from the rotary blades caused the broken leg to flap like a flag in a gale. Thankfully my leg was finally supported and I was strapped to a stretcher and hoisted into the helicopter. I had a choice of either Inverness or Stornoway, so for the sake of peace and quiet and to avoid putting friends and relations in the awkward position of feeling obliged to travel to Inverness to visit me, I was soon off to Stornoway with a lung-full of entinox.

The first lesson here is perhaps circumstantial as it is not clear exactly how the leg broke in the first place. It was perhaps a hairline fracture caused by an impact from the drilling or hammering of the trackway block. On standing up, the forces combined to cause a full fracturing of the tibia and fibula. The lesson is to protect the shins as well when more than one person is working on a block of hard calcareous sandstone. The second lesson is that, if you suffer a break, try and secure the broken bone before the helicopter arrives as to not do this may exacerbate the damage.

Display

The block was removed to the Hunterian Museum by Jan Wolfe and Chris Mitchell where it has remained in pieces until recently. Despite the fact that these were of national importance to Scotland, and were reasonably well defined tracks, it has been very difficult to convince staff at the Hunterian Museum of their exhibitability. This year, however, a cast of the tracks was mounted in the new Kelvin Gallery at the Hunterian Museum for the duration of *Walking with Dinosaurs: the exhibition*. It is hoped that after the exhibition is dismantled, the tracks will form part of the core exhibition of the Main Gallery displayed amongst other Scottish dinosaur casts and specimens.

Acknowledgements

I would like to take this opportunity to thank all the staff at the hospitals in Stornoway and Stirling, as well as the helicopter crew and paramedics who helped out. I would also like to thank Jan Wolfe, Chris Mitchell, Paul Booth, and Euan MacDonald for helping me in the field to remove the trackway, and for looking after me. Jeff Liston, Mike Jewkes, Drs John Faithful and Graham Durant helped organise the receipt of the trackway in my absence. This paper was given at a special meeting of the Geological Curator's Group in York, December 2000 organised by Dr Philip Manning.

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A MINERAL COLLECTION IN THE ULSTER MUSEUM MATCHED WITH A LECTURE SYLLABUS OF SIR CHARLES GIESECKE (1761-1833)

by Kenneth James

James, K. 2001. A mineral collection in the Ulster Museum matched with a lecture syllabus of Sir Charles Giesecke (1761-1833). *The Geological Curator* 7(5): 167-173.

Sir Charles Giesecke (1761-1833) was a mineral collector and dealer before becoming Professor of Mineralogy at the Royal Dublin Society in 1813. After his appointment he continued to deal in minerals and he supplied collections to museums in Europe, to Trinity College, Dublin and — it seems — to his students. One such student collection was recently discovered in the Ulster Museum, where it had been stored unrecorded for nearly a century. It was recognised by linking numbered specimen labels to an original lecture syllabus in the museum's archives. The history of the collection was established from a succession of signatures. The uncovering of this early 19th century collection resulted from careful observation during practical hands-on curation.

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Introduction

The German mineralogist Sir Charles Lewis Giesecke (Figure 1) had an extraordinary life: law student, actor, playwright, mineral dealer and collector, culminating as Professor of Mineralogy for twenty years at the Royal Dublin Society between 1813 and his death in 1833. He is remembered especially for his seven-year exploration of Greenland, 1806-1813. During his lifetime, much of his vast collection of minerals was dispersed to various institutions in Europe.

Jorgensen (1996) and Wyse Jackson (1996) have described the career of this remarkable scientist. Especially intriguing is Wyse Jackson's account of the discovery in the Geological Museum of Trinity College, Dublin, of a collection of Giesecke's Greenland minerals. A similar find was made in the Ulster Museum twenty years ago by the author.

The Brennan Collection

In 1973, shortly after joining the Geology Department of the Ulster Museum, my work included labelling the mineral collection. Decades of geological neglect (the museum had appointed its first geologist, Phillip Doughty, only in 1965) had left the mineral collection inadequately documented.

As I worked through the cabinets, I became aware of a succession of small minerals which bore tiny, round, numbered labels (Figure 2). Old display labels, circa 1930s, reading "Brennan Collection" accompanied some of these specimens. This gave me the name of the collection, but a search of the literature for a geologist named Brennan drew a blank. The numbering on the display labels was unforthcoming; it belonged to some obsolete system of cataloguing, of which I could find no record in the museum's archives. In time I counted about 50 "Brennan Collection" specimens scattered throughout the cabinets and noted that there were Greenland minerals present.

Giesecke's *Syllabus*

I uncovered the identity of "Brennan" a few years later, when I was arranging the Geology Department's early books into secure shelving. When moving the books, I chanced upon a small, brown-paper covered volume, on which was gummed a City of Belfast Art Gallery and Museum label, which had written on it: "List of Minerals in S. A. Brennan's Collection. 19/6/1897". It was initialled "CE" in the characteristic hand of Charles Elcock, the museum's Curator. (Belfast Museum was precursor to the Ulster Museum.) The label reminded me of the enigmatic "Brennan Collection" and I opened the pages with anticipation.

Inside there was a title page, dated 1815, which read "*A Syllabus of a Mineral System for a Course of*

Figure 1. Sir Charles Lewis Giesecke (1761-1833) — explorer of the Faeroe Islands and Greenland. He supplied very large numbers of minerals to museums throughout Europe. Charcoal drawing by A. McGoogan (after Sir Henry Raeburn's painting in the Royal Dublin Society).

Lectures — By Professor Giesecke." (Figure 3). This was followed by an introduction and a mineral classification. It is worth noting that this was published only two years after Giesecke's appointment as Professor of Mineralogy at the Royal Dublin Society, suggesting that he set about reorganising the teaching of mineralogy almost immediately. My interest, however, focused on a hand-written, numbered catalogue of minerals, set out on fifty-two pages following the classification. There were 512 minerals recorded, with locality and classification data (Figure 4). It was a world-wide collection: nearly a third were from the British Isles, a substantial number from Europe, and a few from America, Africa and Asia. Forming a noticeable proportion, were 124 minerals from Greenland. This again reminded me of the "Brennan Collection" specimens. A quick check of the numbers revealed that the "Brennan" minerals in the cabinets matched the entries in this list. I had reunited collection with catalogue.

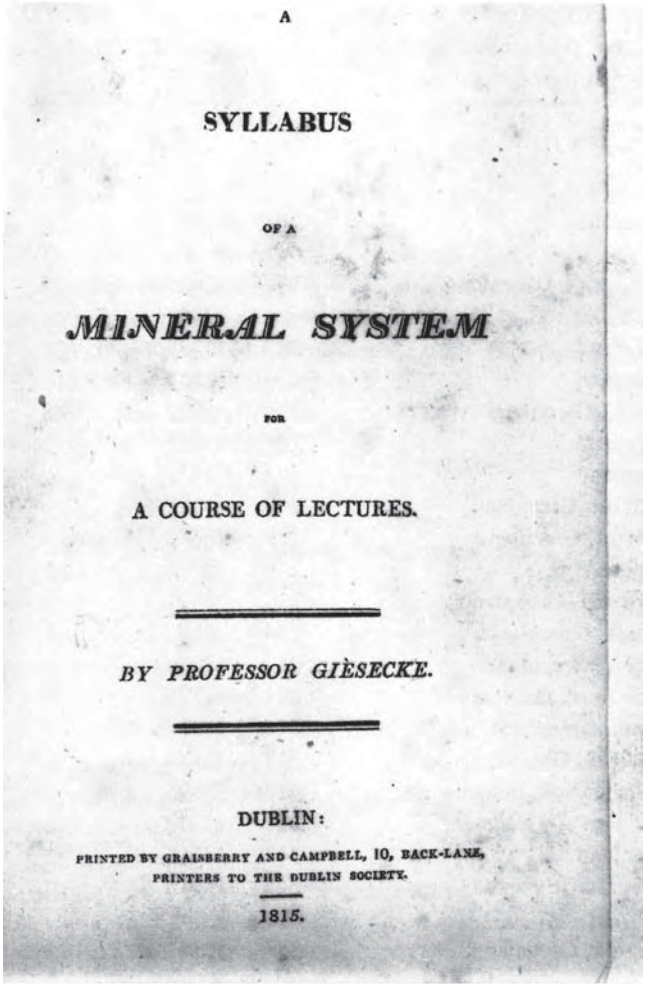
Figure 2. The small round numbered label (here 287) was the original and characteristic label of this collection. This specimen matched the description for entry 287 in the hand-written catalogue: "Aventurin in Feltspar with black Mica, from Kangek, Greenland". (Other numbers are later museum numbers.) BELUM I3079.

Ownership of the collection

The initials, "S. A." enabled me to identify this "Brennan" as Reverend Samuel Arthur Brenan (1837-1908), Church of Ireland Rector at Cushendun, County Antrim, for 20 years. (His name had been misspelt on the label). Brenan, a member of the Belfast Naturalists' Field Club (founded in 1863), was known principally as a botanist who had left his herbarium to the Ulster Museum. The notes with the herbarium contained no clue to explain why Brenan, who had no recorded interest in geology, should have possessed an early 19th century mineral collection. I scoured the museum's register books for 1897 and subsequent years but found no record of the acquisition of the "Brennan Collection" of minerals.

There I left the matter some twenty years ago, with the origin of the Ulster Museum's "Brennan Collection" of minerals still a mystery. Then I read Wyse Jackson's (1996) account of the discovery of Giesecke minerals in Trinity College, which made me determined to find out more about the Ulster Museum's collection.

The *Syllabus* was my only source of information about the collection, so I examined it once again. The book measures 21 x 14 cm and contains 160 pages. After the title page, there is a very brief introduction, in which Giesecke explains that he has based his mineral classification on the Wernerian system, with modifications that he intends to explain in his lectures. This mineral classification is then laid out on the next 18 pages. Giesecke divides the minerals by Class, Genus, Family, Kind and Species (Figure 5). The classification is reasonably scientific and is on a chemical basis. Giesecke's "Kind" corresponds roughly to our notion of mineral species and he lists



A

SYLLABUS

OF A

MINERAL SYSTEM

FOR

A COURSE OF LECTURES.

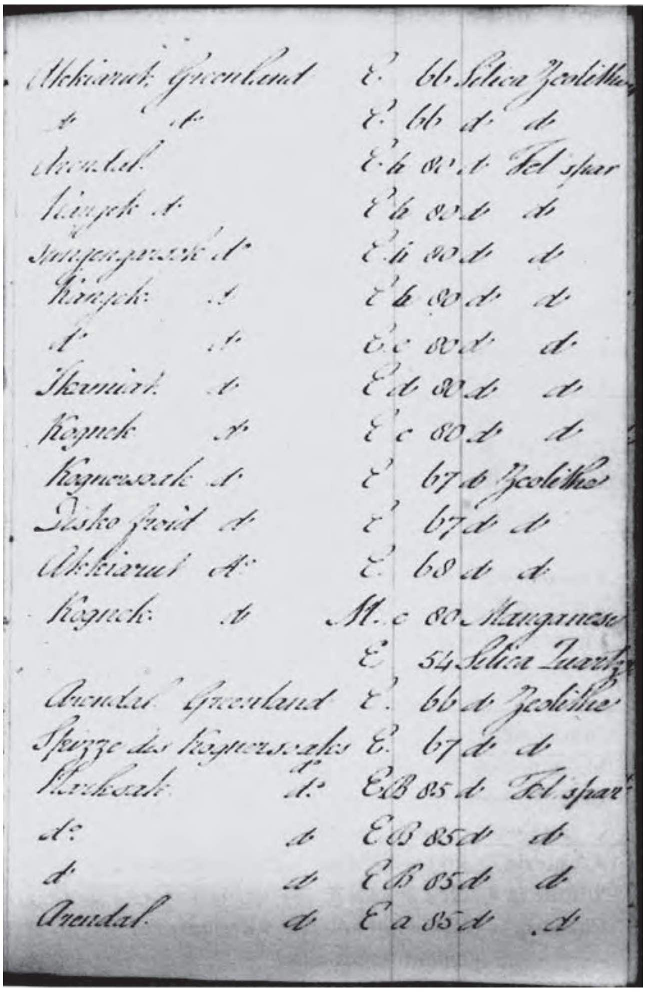
BY PROFESSOR GIÈSECKE.

DUBLIN:

PRINTED BY GRAISBERRY AND CAMPBELL, 10, BACK-LANE,
PRINTERS TO THE DUBLIN SOCIETY.

1815.

Figure 3. Title page of the *Syllabus*. There are 22 printed pages, which contain the title, introduction and mineral classification. The remainder of the *Syllabus* is a block of lined pages for note-taking: the catalogue was written here. Ulster Museum library number 2001-5 G.



Akkiarut Greenland	E 66	Silica Zeolithe
d d	E 66	d d
Arendal	E b 80	d Felspar
Kingek d	E b 80	d d
[illegible] d	E b 80	d d
Kingek d	E b 80	d d
d d	E c 80	d d
[illegible] d	E d 80	d d
Kognek d	E c 80	d d
[illegible] d	E 67	d Zeolithe
Disko fiord d	E 67	d d
Akkiarut d	E 68	d d
Kognek d	M c 80	Manganese
	E 54	Silica Quartz
Arendal Greenland	E 66	d Zeolithe
[illegible]	E 67	d d
[illegible] d	E B 85	d Felspar
d d	E B 85	d d
d d	E B 85	d d
Arendal d	E a 85	d d

Figure 4. A page from the catalogue, showing the localities and classification of minerals. Most of these minerals are from Greenland. The classification is on the right of the page.

316 of them. The remainder of the catalogue is a separate section of lined leaves of paper suitable for note-taking. It is here that the catalogue of minerals has been recorded. Alas, apart from this listing, nothing further is entered on these pages.

However, when I looked carefully at the inside front cover pages and the dust jacket, I discovered three signatures. From their style and position, I was able to place them in chronological order, and when I discovered the identities of the signatories, I was able to establish a history of the collection.

The earliest signature, in a formal calligraphic script on the free end paper, is "G. D. LaTouche". I believe this to be George Digges LaTouche, born in Dublin in 1794, son of the banker Peter Digges LaTouche. George entered Trinity College, Dublin on 5th November 1810, aged 16 years. His academic career was: B.A., Spring 1815; M.A., November 1832; member of the Irish Bar, 1819. I have no evidence that he attended Giesecke's lectures at the Royal Dublin Society, but he was in the right place at the right time to do so.

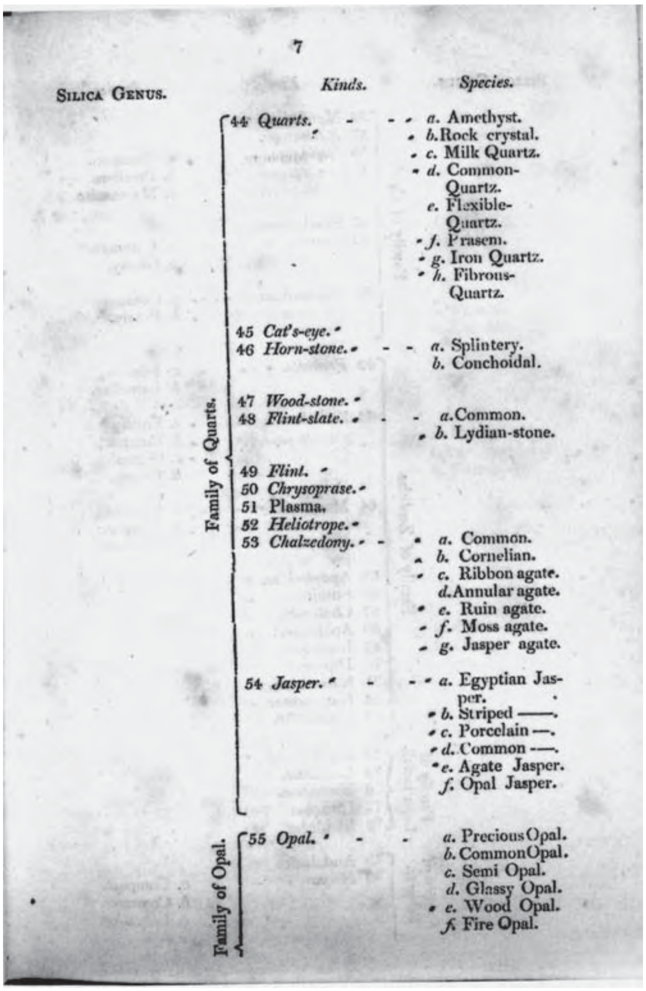
The second signature chronologically appears on the inside of the brown-paper dust jacket — "John Brennan, Esq.", written in a copperplate hand. There was an address beneath the name, now partially obliterated, for it was written on the spine of the dust jacket, which had been worn away. However, enough of the tops and bottoms of the letters survived to allow me to match it to "Kingstown Lodge, Coollock". This house, which still stands, in Coolock, Co. Dublin (near Dublin Airport), was the home of John Brenan, father of the Reverend S. A. Brenan. (The signature really was spelt "Brennan", but we know that the spelling of surnames could be somewhat fluid in the early nineteenth century.)

There is a plausible link between G. D. LaTouche and John Brenan. They were contemporaries and both were in the legal profession — LaTouche was a member of the Irish Bar, Brenan a member of the

Table 1. List of minerals and their localities, in the Brennan Collection in the Ulster Museum, as recorded in the Giesecke Syllabus. [The Brennan catalogue number and Ulster Museum accession number are added. Where appropriate a corrected identification or modern accepted species name is given in italics.]

Minerals	*Locality*	*No.*	*UM No.*
GREENLAND			
Kryolithe [*cryolite*]	Greenland	26	I1061
Olivine, Hyacinth, Zeolithe, Magnetic Iron Sand & titanium [*zircon-rich sand*]	Serguarsoit, Greenland	57	I2030
Woodlike Hornstone [*brown agate*]	Greenland	73	I3805
Epidote in Calcareous Spar	Greenland	223	I5235
Epidote crystallized in 4 sided Prisms	Greenland	234	I2558
Dichroite in yellow Felspar [*cordierite*]	Navicit, Greenland	259	I1005
Lamellar Anthophyllite [*actinolite*]	Greenland	261	I2623
Milk Quartz	Greenland	262	I3530
Precious Garnet dodecahedron [*chrysoberyl*]	Anxiarut, Greenland	269	I4652
Apophyllite in 4 sided Prisms with Mesotype	Kararfut, Greenland	278	I5482
Radiated Stilbite with rose granular Zeolithe	Greenland	279	I4324
Radiated Stilbite with 6 sided tables	Terkeinak, Greenland	280	I2621
Common Felspar Rose Coloured	Kangek, Greenland	284	I6886
Aventurin in Feltspar with black Mica [*orthoclase*]	Kangek, Greenland	287	I3079
Chabasie in Rhomboidal Crystals [*chabasite*]	Disco fiord, Greenland	291	I1576
Glassy Actinolite in Schistose Talc	Fahlun, Greenland	310	I1395
Miemite with Wavellite [*dolomite*]	Kannioak, Greenland	311	I5584
Granular Moroxite [*apatite*]	Sungangarsok, Greenland	316	I5996
Granite with Crystallized Mica	Cape Farvel, Greenland	330	I5038
Aventurin Quartz with Mica [*muscovite schist*]	Greenland	342	I2748
Stilbite in 4 sided Prisms	Iglylsiak, Greenland	348	I4516
Chabasie in pearl white truncated Rhombs in Amygdaloid [*chabasite*]	Karartuk, Greenland	349	I2861
Chabasie in large milk white Rhombs in Brown Iron Clay [*chabasite*]	Ownartorooak, Greenland	351	I1570
Pot Stone [*muscovite schist*]	Disco fiord, Greenland	361	I2752
Chlorite, lamellar, crystallized [*chlorite schist*]	Comwateik, Greenland	362	I6673
Serpentine with Talc	Narksak, Greenland	365	I2802
Brown Spar [*muscovite*]	Alvoiston, Greenland	368	I2747
Elaeolithe or fat stone [*nepheline gemstone*]	Arencak, Greenland	355	I4081
EUROPE			
Brown Stilbite in calcareous Spar [*idocrase*]	Arendal, Norway	295	I5036
Micaceous Scapolithe with Iron Pyrites [*mica*]	Arendal, Norway	301	I2420
Foliated Gold	Hungary	3	I659
Labrador Feltspar [*labradorite*]	Norway	24	I3009
Marled Oxyd of Tin [*cassiterite*]	Saxony	56	I1017
Radiated Antimony [*pyrolusite*]	Hartz, Germany	74	I1019
Amalgam on Cinnebar	Deux Ponts, [France]	83	I8751
Crystallized Cinnebar	Deux Ponts, [France]	100	I2377
Micaceous Specular Iron Ore [*hematite*]	Framont, France	101	I2156
Sulphuret of Antimony [*stibnite*]	Auvergne	102	I738 & I739
Realgar or Red Orpiment	Saxony	134	I2379
Green Crystallized Amphibole or Tremolithe	Zillerthal in the Tyrol	149	I2676
Amianthus in Serpentine [*asbestos*]	Piedmont	152	I3217
Indurated Asbestos [*chrysotile*]	Piedmont	153	I1480
Epidote	Dauphine	158	I5237
Axinite	Dauphine	172	I6674
Andularia or Moonstone [*almandine crystals*]	St Gothard	197	I5119
Fluor Spar with Rock Crystal	Serdoff, Saxony	230	I6306
Common Asbestos	Hungary	386	I2718
SIBERIA			
Mamillary Malachite	Siberia	21	I5870
Blue Carbonate of Copper [*azurite*]	Ilsal, Siberia	30	I5909
Chromate of Lead [*crocoite*]	Beresoff, Siberia	50	I6138

Rose Quartz	Siberia	127	I3315
Fibrous Malachite	Siberia	326	I5858
AMERICA			
Foliated Native Silver	Potosi, Peru	10	I681
Precious Emerald with Bitter Spar [*microcline gemstone*]	Peru	103	I3049
Bol in Rock Crystal [*rutilated quartz gemstone*]	Brazil	123	I992
Labrador Felspar with portion of Crystals [*labradorite*]	Labrador	200	I6812
Fluor Spar & Lead Ore [*fluorite, galena*]	S. America	433	I89
Green Tourmaline in Crystallized Quartz	America	494	I2468
OTHER CONTINENTS			
Cat's Eye [*5 cabochon cut gemstones*]	Ceylon	109	I8018
Jasper with quartz	New South Wales	147	I3748
Rubies [*emerald*]	Oriental	392	I1287
BRITISH ISLES			
Crystallized Tin Ore [*cassiterite*]	Cornwall	163	I2135
Barytes	Cornwall	203	I210
Tourmaline	Cornwall	340	I2498
Alum Slate [*polished agate*]	Hurlett, Scotland	359	I3962
Apatite in Talc [*quartz, mica, feldspar in pegmatite*]	Cornwall	369	I6007
Strontiane [*celestine*]	Scotland	371	I5402
Iron Pyrites & Rich Lead Ore [*pyrite, galena*]	Yorkshire	389	I778
Stalactite	Matlock, Derbyshire	417	I5560
Stalacmite	Pooles Hole, Derbyshire	429	I5988
Brain Stone, Calamine [*hemimorphite*]	Bonsal Lays, Derbyshire	445	I2953
Cawk, lead Ore & brown Spar [*barite, galena, calcite*]	Middleton, Derbyshire	456	I6745
Copper Pyrites 10 Specimens	Derbyshire	464	I6698
Sulphuret of Barytes [*barite*]	Napton, Lancashire	475	I5287
Stream Tin Stone [*cassiterite*]	Dartmoor, Devonshire	505	I6718
Brown Iron Scaly [*siderite*]	Cornwall	506	I5762
Tourmaline	Cornwall	511	I2453 & I2601
Brown reniform hematite	Cornwall	512	I127
Crystallized Zeolithe [*stilbite*]	Giant's Causeway, Co. Antrim	119	I3179
Piramids of Rock Crystal	Giant's Causeway, Co. Antrim	120	I3277
Brown Spar with Rock Crystal on Granite [*dolomite, quartz*]	Dalkey, Co. Dublin	410	I1237
Crystallized Feltspar	Co. Mayo	411	I1188
LOCALITY NOT SPECIFIED			
Lead and Copper with White Spar [*galena, chalcopyrite*]		7	I6744
Calcareous lamelar Spar [*calcite*]		59	I5710
White feltspar [*microcline*]		60	I3038
Aventurin Feltspar [*orthoclase*]		79	I3081
Fluor Spar with Brown Spar [*fluorite, siderite*]		94	I1170
Copper [*native copper*]		96	I6434
Refined Gold [*small smelted pellets*]		122	I1239 & I1240
Refined Silver [*small smelted pellets*]		124	I6452
Oxide of Iron [*hematite*]		205	I4586
Augite, Slaggy		228	I2557
Emerald [*beryl*]		236	I2394
Chalcedony with Quartz		240	I5825
Zirkon in Labrador Feltspar [*pyroxenite*]		247	I2562
Sahlite [*salite*]		248	I6570
Epidote in 6 sided Prisms with Augite		254	I5233
Epidote, massive in calcareous spar		256	I5224
Pyrope		258	I2031
Prasem [*prase*]		260	I3706
Prismatic Selenite		317	I5344 & I5379
Fat Amber [*amber fragments with insect remains*]		335	I13166


7

SILICA GENUS. *Kinds.* *Species.*

Family of Quartz.

44 *Quartz.* - - a. Amethyst. b. Rock crystal. c. Milk Quartz. d. Common-Quartz. e. Flexible-Quartz. f. Prasem. g. Iron Quartz. h. Fibrous-Quartz.

45 *Cat's-eye.*

46 *Horn-stone.* - - a. Splintery. b. Conchoidal.

47 *Wood-stone.*

48 *Flint-slate.* - - a. Common. b. Lydian-stone.

49 *Flint.*

50 *Chrysoprase.*

51 Plasma.

52 *Heliotrope.*

53 *Chalzedony.* - - a. Common. b. Cornelian. c. Ribbon agate. d. Annular agate. e. Ruin agate. f. Moss agate. g. Jasper agate.

54 *Jasper.* - - a. Egyptian Jasper. b. Striped ——. c. Porcelain —. d. Common —. e. Agate Jasper. f. Opal Jasper.

Family of Opal.

55 *Opal.* - - a. Precious Opal. b. Common Opal. c. Semi Opal. d. Glassy Opal. e. Wood Opal. f. Fire Opal.

Figure 5. A page from the mineral classification. Specimen number 287 (shown in Fig. 2) was classified as a feldspar ("Kind" number 80), in the "Feldspar Family", belonging to the "Silica Genus", within the "Earthy Substances".

Court of Chancery. It would not be unusual if they had known each other. I surmise that LaTouche was a student of Giesecke's and the original owner of the *Syllabus* and collection and that he gave or sold them to John Brenan.

In time John Brenan handed them on to his son, whose signature "Samuel A. Brenan" appears on an inside front page. Not being a mineralogist, Samuel probably had little interest in the collection; this would help to explain why he donated it and the accompanying *Syllabus* to the Belfast Museum in 1897, eleven years before his death.

Matching specimens to the publication

To finish my investigation on the "Brennan Collection", I undertook a drawer by drawer search of the mineral cabinets for more "Brennan" material. This brought to light a total of 102 "Brennan" specimens, that is just one fifth of the 512 minerals listed in the *Syllabus* had survived. In composition, this remnant reflected the original collection: one fifth came from the British Isles, a similar number from Europe, and a small proportion from elsewhere — with a significant block of minerals from Greenland. Amongst the Greenland minerals was a specimen of cryolite which, as a source of aluminium, was once extensively mined at Ivigtut, southern Greenland, the only economically worthwhile occurrence of this mineral in the world.

The quality of the specimens was only average. They were mostly small, typically 4 cm in size; there were few good crystals and some of the specimens were quite obscure. There were, however, eight cabochon-cut gemstones. These 102 minerals, which may be regarded as representative of a teaching collection from the Heroic Age of geology, are listed in Table 1.

The most likely source of the Greenland minerals was Giesecke and he must also be regarded as the supplier of the other minerals. This suggests that, as well as lecturing, Giesecke supplied minerals as part of his teaching service. No doubt such dealing augmented Giesecke's income, which would have been welcome as he was impoverished throughout his time in Dublin.

It is clear that this collection can be traced back to a student of Professor Giesecke's in Dublin, in the years just after 1815, and that the minerals were supplied by Giesecke himself, from his own stock obtained through dealing and collecting in Europe and Greenland.

Acknowledgements

I should like to thank Gordon L. Herries Davies of Trinity College, Dublin for information about G.D. LaTouche; T.N. Wilson, Church House, Belfast for information about S.A. Brenan; and Nigel Monaghan, Assistant Keeper, Natural History Division, National Museum of Ireland, for information on Kingstown Lodge. I would welcome further information about G.D. LaTouche and John Bren(n)an, and whether any other copies of the *Syllabus* or textbooks from Giesecke's classes survive.

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LOST & FOUND

Enquiries and information, please to Patrick Wyse Jackson (Department of Geology, Trinity College, Dublin 2, Ireland; e-mail: wysjcknp@tcd.ie). Include full personal and institutional names and addresses, full biographical details of publications mentioned, and credits for any illustrations submitted.

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

Abbreviations:

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

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

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

255. Pleistocene Shell collections from County Wexford and the Dublin Mountains.

Elaine Roche, Geological Survey of Ireland,Beggars Bush, Haddington Road, Dublin 4, Ireland (tel: 01 6041403; e-mail: bedtfa@gsi.ie) writes:

A collection of Pleistocene shells from County Wexford and the Dublin Mountains is currently housed in the fossil collection of the Geological Survey of Ireland. Little information is available with regards to specific locations of these Wexford shells and also with regards to the collector/collectors.

They have been examined by many, but there is little published material available which is specific to them.

I would be grateful if anyone could shed some light on the history of these collections.

THE TREATMENT OF SPECIMEN LABELS AFFECTED BY PYRITE DECAY

by Alison Stooshnov and Caroline Buttler

Stooshnov, A. and Buttler, C.J. 2001. The treatment of specimen labels affected by pyrite decay. *The Geological Curator* 7(5): 175-180.

Valuable historical information can be lost from specimen labels which are exposed to the acidic products of pyrite decay. In addition to disfiguring the surfaces and weakening the structure of the paper, in many cases the documentation can be completely destroyed. Using techniques from the field of paper conservation, damaged labels can be cleaned, neutralised and provided with long-term protection.

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Introduction

Pyrite decay is arguably the most destructive problem that confronts conservators caring for geological collections. It can result in the total destruction of a specimen, and the acidic decay products that are produced can destroy specimen labels and damage storage materials (Figures 1a and 1b).

The decay of pyrite occurs when the sulphide component oxidises to form ferrous sulphate and sulphur dioxide. After further oxidation and hydrolysis, this leads to a variety of ferrous-ferric-sulphate-hydroxide-hydrate phases (Waller 1987). In the presence of water (moderate to high relative humidities), the reaction produces sulphuric acid, and this leads to the damage associated with specimen labels and storage materials (Newman 1998).

Pyrite decay in proximity to paper material can result in any or all of the following:

i) Particulate residues from efflorescence decay products

ii) Staining, burns and holes caused by the presence of sulphuric acid

iii) Brittleness, cracks, and breaks caused by the loss of cellulosic material

Combined with these problems, previous storage or conservation methods may further contribute to the deterioration of the labels. For example, labels which have been folded to fit into storage containers, may develop breaks along the folds when the paper becomes brittle.

While previous attempts to treat collections affected by pyrite decay have mainly focused on treating the specimens, some efforts have been made to treat associated labels. As historical specimen labels can often provide important information about a specimen, there is a need to preserve both the label and the written information. Examples of previous treatments for specimen labels include:

i) Exposure to ammonia fumes (Cornish 1987)

ii) Washing in dilute ethanolomine thioglycollate solution and coating in polymethyl methacrylate emulsion on a tissue backing (Cornish 1987)

iii) Storing in protective envelopes or plastic covers

iv) Repairing with pressure sensitive tape

When pyrite decay is discovered in a collection, the labels are often placed in protective envelopes to avoid further damage. However, this action can have the opposite effect. When labels which have been exposed to sulphuric acid are placed inside an enclosed space, such as a plastic envelope, the acidic products are concentrated around the label and can accelerate the decay of the paper.

For labels which have become torn or fragmented, simple remedies such as adhering fragments with pressure sensitive tape can lead to further problems

Figure 1a. Fossil wood and specimen label (folded in box) affected by pyrite decay.

Figure 1b. Specimen label pre-treatment.

in the presence of pyrite decay products. While the tape may protect the areas that it is covering, the surrounding areas are left exposed and can deteriorate around the tape. When attempts are later made to conserve the labels, the removal of the tape can cause further damage to already weakened paper surfaces.

While these treatments address some of the problems affecting paper labels exposed to pyrite decay, they do not provide a complete solution. To treat damaged labels and to provide further protection it is necessary to:

i) Remove the pyrite decay products

ii) Clean the paper

iii) Neutralise the paper

iv) Provide a stable support

v) Provide long-term protection

By using treatments routinely employed in paper conservation, all of the above steps can be addressed. The following is a treatment procedure devised to treat damaged paper specimen labels associated with pyrite collections.

Method

1. Photocopy

As with any conservation treatment, it is important to make visual records of the pre-treatment condition of the object. For paper labels, photocopying is an easy way to record obverse and reverse surfaces which contain information. While the photocopies serve as a record of the pre-treatment condition of the labels, they are also useful in cases where the treatment accidentally leads to the loss of ink or the disintegration of the paper. Additionally, photocopies are useful guides when fragmented labels need to be reconstructed.

For labels that are too fragile or damaged to be photocopied, other methods such as photography are recommended.

2. Test inks

Before treatment, it is essential to test the solubility of all inks to ensure that they will not be affected during washing treatments. Spot testing the inks with water and cotton swabs allows solubilities to be determined without risking overall damage to the label. If the inks bleed with water, spot testing with IMS is recommended. If the inks are insoluble in IMS, a 50:50 mix of water and IMS can then be used for washing. If the inks are found to bleed in both water and IMS, gentle surface cleaning with an approved eraser (for example white plastic eraser) is recommended before non-aqueous deacidification.

3. Remove excess residues and previous repairs from surfaces

To maximise washing treatments, excess surface material should be removed from labels before washing. For example, efflorescence residues and other pyrite decay products can be carefully brushed from label surfaces. For labels severely damaged by pyrite decay products, it is essential that the actual paper surface is revealed before treatment in order to allow a full condition assessment to be made.

Pressure sensitive tape previously applied to specimen labels to hold together tears or fragments should be removed from surfaces, as the adhesive can become an agent of deterioration as it degrades. The described conservation treatment involves mounting the labels onto a support of Japanese tissue paper, therefore it is not necessary to keep the tape on the labels as a support. In many cases, pressure sensitive tape can adversely affect weakened labels by pulling off inks and paper layers from the damaged labels.

In some instances, it is possible to remove pressure sensitive tape using hot air from a hairdryer, which causes the adhesive to soften. Tweezers can then be used to pull off the tape by pulling it tightly at an acute angle from a corner edge. Care should be taken to ensure that the adhesive is adequately and evenly heated to avoid damaging the paper surface and

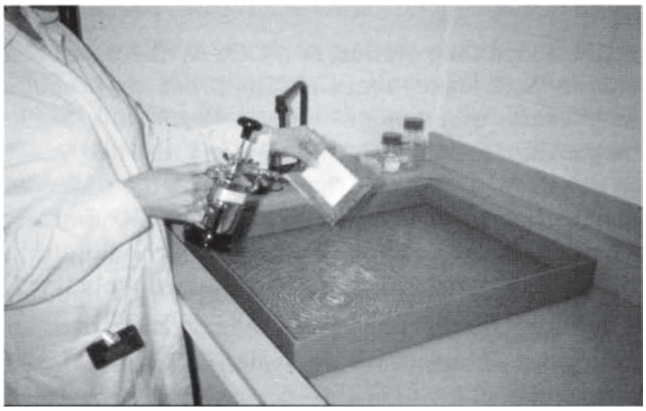

Figure 2. Relaxing label onto melinex support using gentle spray.

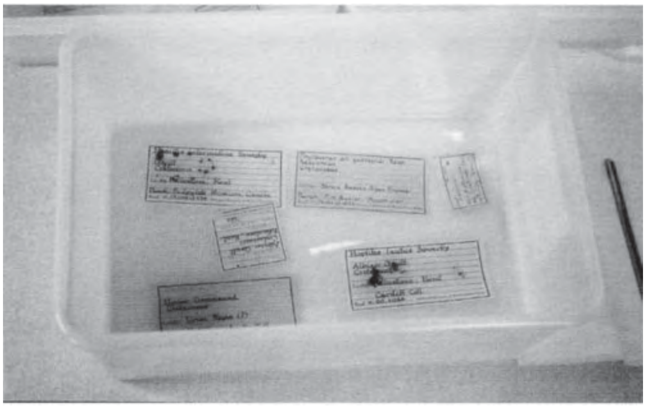

Figure 3. Washing labels in water.

removing any ink. If the tape proves difficult to remove, or the paper surface is particularly damaged, swabs with solvent are an alternative. For areas where adhesive residues are left on the paper surface, crepe rubber can be used to remove any excess by gently rubbing over the surface area.

It is advisable to remove tape from stained areas carefully, as it will tend to come off quickly and as a result ink or weak areas of the paper may be accidentally removed. Hot spatulas can cause tape adhesive to migrate into paper, and are therefore not generally recommended. In cases where adhesive has migrated into the paper fibres or cross-linked, it will be necessary to consult with a paper conservator.

4. Relax paper

Immersing dry paper into water causes severe stresses to the paper fibres. To avoid this problem, paper should first be relaxed using a spray of water. Place the label onto a piece of melinex for support and then use a spray bottle with a gentle or fine mist (Figure 2). For thicker paper, it may be necessary to spray both sides with water. After spraying, the labels should be left for a few minutes on a flat surface to allow the water to be fully absorbed by the paper. Care should be taken to avoid over-watering when relaxing paper, as this can have the same effect on the paper as full immersion.

5. Wash

Once the paper is relaxed, the labels can be washed or bathed in shallow trays of water approximately 2 cm deep (Figure 3). Before using tap water, it is advisable to carry out tests to ensure the water is suitable for treatment. Water which is high in chlorine should be avoided, while water which is high in magnesium and calcium is desirable, as both are beneficial to the cellulose chains of the paper. If the available tap water is found to be unsuitable for use in treatments, deionised or distilled water should be used.

To prevent labels floating to the surface during bathing, glass sticks can be used as weights. Alternatively, a small amount of IMS (which cuts down on surface tension) can be added to the water, except in cases where the inks are soluble in IMS.

After soaking for 30 minutes, the bath water will have become acidic from acids leached from the paper and should be changed. This process is repeated at least 3 times. When changing the bath water, the labels should be removed from the trays and then replaced in the new water.

Labels, which are too fragmented or fragile to be washed in trays, can be individually rinsed on blotting paper. Place the label face up on damp blotting paper, and then place the damp blotting paper directly on top of dry blotting paper. Spray the label surface with water and leave to dry. This process can be repeated several times, by replacing the bottom layer of blotting paper when it becomes too damp. This method of washing works through capillary action by drawing out the moisture from the label, and as a result acids in the label can be removed without causing damage to the paper.

6. Dry

After washing, the labels and their melinex supports are placed on blotting paper (Figure 4) or wire mesh racks and left to air dry. While the paper may cockle or curl during drying, this is not a concern for labels which are going to be later relaxed and mounted. To avoid cockling, the labels can be dried between pieces of release paper and blotting paper and placed under gentle pressure.

7. Deacidify

Although washing removes the majority of the acids in the paper (and some of the staining), to prevent further decay, it is advisable to neutralise or deacidify the paper. It should be noted that for this project the

Figure 4. Drying labels on blotting paper.

aim was to stabilise the paper rather than remove all of the staining.

Deacidification of paper labels can be achieved by a variety of methods. The following are the two that were considered to be the most suitable for this project:

i) Magnesium bicarbonate solution (aqueous)

ii) Methoxy magnesium methyl carbonate solution (non-aqueous)

For labels with insoluble inks, an aqueous method of deacidification such as magnesium bicarbonate solution is suggested. Labels with soluble inks are more suited to deacidification by non-aqueous methods, for example deacidifying sprays. Before using a deacidifying spray, spot tests are necessary to ensure that the spray solution will not affect any of the inks.

i) Magnesium bicarbonate solution

Magnesium bicarbonate solution deacidifies paper by reacting with the sulphuric acid that is produced during the decay of pyrite in order to produce stable magnesium sulphate:

$$Mg(HCO_3)_2 + H_2SO_4 \quad MgSO_4 + 2H_2O + 2CO_2$$

A residual buffer of magnesium carbonate is also produced when the water evaporates.

Method: Add 1.5 g magnesium carbonate to 1 L distilled water, and allow time for the solution to settle. Place the solution in a CO_2 cylinder or soda siphon and leave overnight in order to produce magnesium bicarbonate. When ready, mix 50:50 magnesium bicarbonate solution and distilled water in a shallow tray. Relax the labels with tap water (as above), then place in the tray and soak for 30 minutes. Remove the labels from the tray and dry on blotting paper. If the labels are going to be immediately lined, it is not necessary to let them dry completely.

ii) Methoxy magnesium methyl carbonate solution

Deacidification solutions (such as Wei T'O®), work to neutralise the acids that have affected paper materials. By impregnating the paper with a solution of methoxy magnesium methyl carbonate, the acids in the paper are neutralised and a buffer is left which absorbs migrating acids from other sources. Deacidification solutions are generally available as both non-aqueous liquids and aerosol sprays. Wei T'O® Spray No.10 is recommended for papers with sensitive or soluble inks, and was selected for use in this project.

Method: Follow the instructions on the spray can and the Hints for Better Spraying sheet (which is available from the supplier) in order to saturate the paper surface with the spray. For ease of spraying, place the labels on an angled mesh surface in order to avoid blowing the labels during spraying. Once saturated, the labels are left to dry.

To prevent spray cans from clogging with solution during storage, it is important to ensure that the following procedures are performed. After use, the can should be turned upside down and sprayed until no more solution is released. Keeping the can upside down, the nozzle should be removed and then both the nozzle and the attachment area rinsed with warm water (nozzle not replaced during storage). Place the lid on the can, and then store the can upside down until required.

8. Prepare wheat starch paste

To provide a support system for weakened labels, in particular those which have become torn or fragmented, it is advisable to mount the labels onto a backing support of Japanese tissue paper. While the mount provides support, it also allows for easier handling of the labels. For a safe and reversible adhesive, wheat starch paste is recommended as it provides a secure bond and is soluble in water.

Details of how to prepare wheat starch paste can be found in the literature (Horie 1994), and paper conservators generally use variations of this standard recipe. The following is the recipe used to prepare wheat starch paste for this project:

Mix 10 g wheat starch in a small quantity of water (100 ml) to form a cream. Heat the mixture in a double boiler with continual stirring for 25 minutes. Simmer until thickened (approximately one hour) and then decant the solution into sterile containers. Leave to set as a firm gel or paste.

Once made, the prepared paste is repeatedly worked through a fine-mesh sieve until evenly smooth. The paste is then mixed with water until it reaches a consistency between double and single cream (C. Mackay pers.comm. 2001). While this process is time consuming, it is worth the effort, as the more the paste is worked the better the adhesive properties.

9. Mount

When lining or mounting paper materials, Western paper conservators usually choose traditionally made Japanese paper as a support or repair paper because it is lightweight, flexible, translucent and the 'bast' fibre length can be more than double that used in European paper, resulting in stronger paper (C. Mackay pers.comm. 2001). For this project, a Minogami Usukuchi paper made from Kozo fibres was selected for use. The 25 GSM weight was considered suitable for the project, as it would provide adequate support to the labels. If this paper is lightly fingered, it will be felt that one side of the paper is rougher than the other. This difference is a result of the fibre formation during manufacture, and the rougher surface provides a better bond when used as the paste interface.

When mounting labels onto Japanese tissue paper, either the label can be pasted onto the Japanese tissue paper or vice versa. If there are many labels to be mounted, the simplest method is to trim off the edges of a sheet of Japanese tissue paper and relax it onto a large board or flat surface. The edges of the paper are then taped down to the board. A label can be relaxed face down onto a melinex support before being pasted out with a very fine film of wheat starch paste. Using the melinex support, the label is then placed onto the surface of the Japanese tissue paper and pressure applied through the melinex to ensure an even bond. Starting from the strongest corner of the label, the melinex is rolled back from the label surface. Several small labels can be placed on one sheet of Japanese tissue paper in this way, leaving margins approximately 3-4 cm between each one. Care must be taken to ensure that the support paper remains evenly relaxed during this process, and an occasional spray may be necessary to maintain even moisture. Provided the working environment is not too hot and dry, the label and Japanese tissue paper can be left in this position to dry over several days.

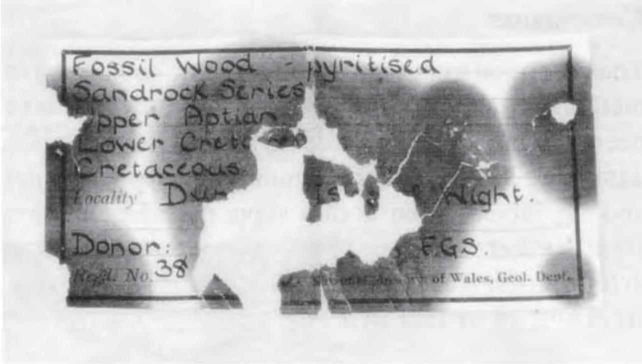

Figure 5. Specimen label post-treatment (before edges trimmed).

An alternative method of mounting which is more satisfactory for severely damaged labels, is to paste the lining paper rather than the label. For this method, both the label and the Japanese tissue paper should be relaxed onto melinex supports. A fine film of wheat starch paste is applied to the lining paper which is then placed down onto the label and pressure applied to secure the bond. This package is then turned over and the melinex removed first from the label side and replaced with a release material (for example Bondina or Hollytex). This is repeated for the Japanese tissue paper side, and the 'sandwich' is then placed between blotting paper and dried under gentle pressure. As paper loses moisture at a slower rate than it absorbs it, to aid drying the blotting paper should be changed regularly. When the paper feels dry to the touch, the weights can be increased and the blotting paper changed daily to prevent any mould developing. Once the treatment of the label is complete, the support tissue is trimmed to approximately 1 mm of the label edge (Figure 5).

Occasionally when labels are removed from the drying stack, the edges may begin to curl up. This can occur due to a variety of reasons, including too much adhesive or unequal moisture between the label and the Japanese tissue paper due to different amounts of water from the relaxing process. However, this curling does not adversely affect the labels, and the labels can be kept flat for storage by placing them in envelopes.

10. Insert in envelope

Before labels are returned to storage with pyritised objects, it is important to ensure that the label and specimen will be kept separate in order to avoid any future damage. To achieve this, the labels are placed in protective envelopes, of either archival quality paper or melinex, and a photocopy of the label placed with the specimen. Pyrite decay can only be prevented through careful environmental control, therefore it is vital that treated labels and specimens are returned to suitable conditions.

Conclusion

The described treatment offers a simple and effective method of treating paper specimen labels which have been affected by pyrite decay. Once treated, the damaging acids have been removed from the paper and the labels given both a support and protection from further damage. This prevents any further deterioration from occurring and preserves both the label and its written information.

Acknowledgements

We are very grateful to Christine Mackay (Paper Conservator, NMGW) for her invaluable help and advice throughout this project. We would also like to thank Alberto Campagnolo and Sandrine Decoux for their helpful suggestions and practical assistance.

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WALLER, R. 1987. An experimental ammonia gas treatment method for oxidised pyritic mineral specimens. *Triennial Report, ICOM Committee for Conservation*. London: ICOM, 625-630.

Appendix 1

Suppliers

Crepe rubber

Available from shoe repair shops.

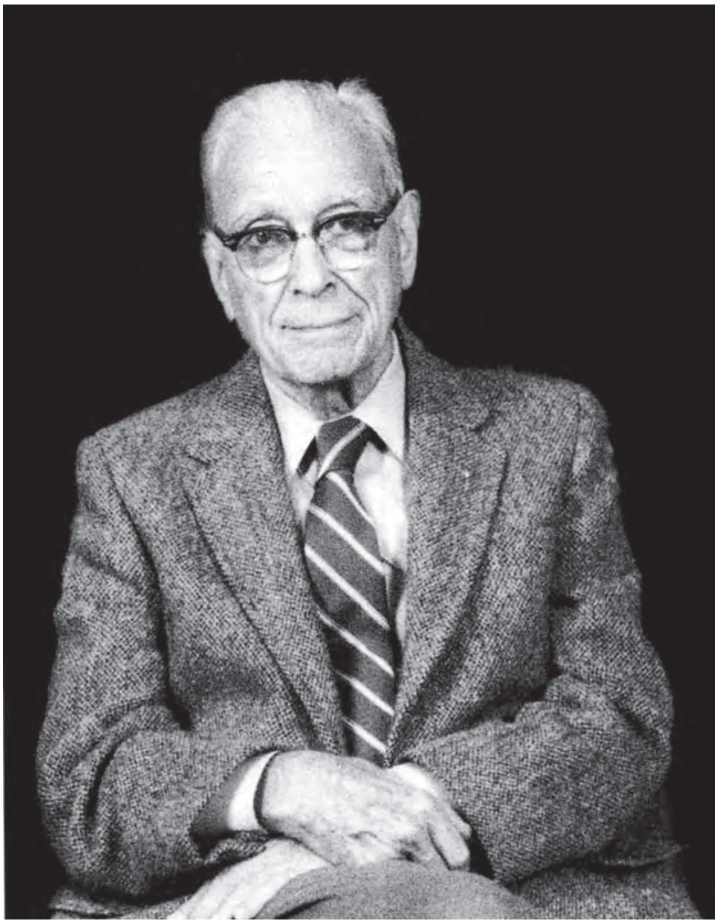
Melinex, Release paper, Blotting paper, Wei T'O® deacidification spray, Wheat starch

Preservation Equipment Limited
Vinces Road
Diss,
Norfolk IP22 4HQ
UK
Tel: 01379 647400

Japanese tissue paper

Conservation by DesignTimecare Works
5 Singer Way
Woburn Road Industrial Estate
Kempston
Bedford MK42 7AW
UK
Tel: 01234 853555

GUSTAV ARTHUR COOPER 1902-2000



Dr G.A. Cooper (aged 83) at the Natural History Museum, London in 1985.

Gustav Arthur Cooper, known as Arthur to his family, Coop to his professional colleagues and to many brachiopod devotees around the world, and Gus to some of his older friends, was born on 9th February 1902 in New York State; he died on 17th October 2000 at the retirement home in North Carolina where he and his wife Josephine lived for 13 years. Cooper graduated at Colgate College and gained his doctorate at Yale where his talent was spotted by Charles Schuchert, with whom he published the first of his very many publications. These spanned the entire stratigraphical column, from Cambrian to the Recent, and some were vast volumes of immense length, especially his study with the late Dr Richard Grant, on the Permian brachiopods of the Glass Mountains in west Texas, of almost 3000 pages and over 760 plates. The illustration of brachiopods was one of Cooper's delights and talents; he developed, in the corner of his room at the National Museum of Natural History, Washington, DC, a quarter plate camera system with which he took thousands of superb photographs, commonly at the specimen's natural size on the negatives. He used lead shot effectively to hold the most delicate silicified specimen in the chosen position for photography, and occasionally these small spheres could be seen through holes in brachiopod shells in some of his published photographs.

The Glass Mountains project was typical of Cooper. He put a huge amount of energy, over a period of more than 20 years, into this study, yet encouraged colleagues and students to join him in the field where they experienced working with an expert collecting and documenting specimens and bulk samples with great care. Cooper described more brachiopod genera than anyone else, but he was also a great curator. When he moved to the US National Museum of

Natural History in Washington, officially in 1930, he found poorly represented and documented collections in the Palaeobiology Department. At first he had an interest in trilobites and enhanced these collections, but it was his enduring love for brachiopods which led him to seek examples of every described genus world-wide for the collections. This, together with his own prodigious collecting, made the NMNH brachiopod collections superior in their coverage and curation to any other in the world. Even though it lacked the historical and older type material of, for example, the Natural History Museum, London, it was the place in which to see and study well curated fossil or Recent brachiopods.

Over the years Cooper, and his supportive wife Josephine, held open house and entertained geologists and palaeontologists galore. In these relaxed but stimulating surroundings, or out in the field, Cooper's quiet wit, great honesty and generosity shone out. He was unexpectedly modest for one having such a wealth of knowledge about brachiopods, and it is good that the first International Brachiopod Congress in Brest, France, in 1985 was dedicated to him. This was one of the few occasions on which he left the United States briefly. Other trips were to South Africa with its safari parks and to New Zealand where he could indulge his interest in the photography of wildlife, and especially plants. At 85 he retired fully from Washington and moved with Josephine to a retirement complex in North Carolina where, typically, they encouraged visitors to stay with them, – it enabled them to keep in touch with the academic world – and they could talk about brachiopods!

The "Cooper Room", at the NMNH contains his extensive library and some archival materials, and we must hope that the collections he so devotedly built and maintained will continue to be preserved and curated to the high standard he achieved. The delicate and irreplaceable (for it is highly unlikely that anyone will again set out to extract such a set of faunas over a similar period of time) nature of the vast acid extracted silicified faunas from Texas will deteriorate rapidly if allowed open access to all. The handling of such material is a delicate art and even vibration can destroy fragile internal structures, turning what were exquisitely preserved specimens into a heap of small, unrecognisable, silicified slivers.

There is so much potential research work to be carried out on the Smithsonian brachiopod collections; faunal comparisons, ontogenetic studies and the earliest growth of all sorts of poorly known internal structures, shell-structural surveys of the non-silicified collections, etc. Cooper will be sadly missed both as a fine person and as one of the principal sources of information about brachiopods in the twentieth century.

Howard Brunton

BOOK REVIEWS

Whybrow, P.J. (ed.) 2000. *Travels with the Fossil Hunters*. The Natural History Museum and Cambridge University Press, 212pp. Hardback. ISBN 0 521 66301 6. Price: £19-95.

This is a book to recommend to people in person and on general reading lists. It is a book to have on sale in a museum shop. Of course it is also nice to have on your own shelf, but I feel that this is the sort of book many palaeontologists or geological curators would like to give as a present. Part travel, part fossil collecting, the stories told give the travel a purpose and meaning and therefore more interest.

Whilst the 12 contributions are all from exotic places, the short foreword by Sir David Attenborough, and a longer one from Richard Fortey put an accurate spin on them, to bring alive the excitement of discovery and the global nature of geology, and in particular palaeontology. Whilst most of us will not necessarily get to collect on foreign expeditions, the descriptions and stories will strike chords with local sites, experiences and excitements.

Peter Whybrow has edited (and contributed to) the collection well. If one had to find fault, one or two authors jumped around in their narrative a bit too much for my liking. However, the contributions retain their individual flavour and style, not having been made bland by the need to maintain a general style and accessibility throughout the book. It achieves the difficult task, I believe, of writing comprehensibly about the technical ideas and background to the stories without jargon or expectation of previous knowledge.

The contributions range from Tibet, China, India, Pakistan, through Abu Dhabi to several African countries and on the icy cold of Antarctica. Two tales, one from Latvia and one from Gibraltar carry equal fascination to the more distant or unfamiliar cultural settings. Whilst travel today is a more common experience for people generally, the stories address places and situations beyond the scope of most readers. Logistics alone make them expeditions rather than visits, and the debt to local colleagues is clearly acknowledged. However the fact that this a British book by British authors with the perspectives that brings is acknowledged in the Afterword. The book is well illustrated with numerous colour photos, nicely balanced between places, scenery and local culture, fossil collecting, fossils themselves and other specific material.

This is the sort of book that could inspire a dreaming vision in an enthusiastic youngster, or give your granny a thrill. A good read for anyone.

Matthew Parkes, Geological Survey of Ireland, Beggars Bush, Haddington Road, Dublin 4 Ireland. 1st January 2001.

Stanier, Peter, 2001. *Stone Quarry Landscapes - the industrial archaeology of quarrying*. Tempus Publishing, 160pp. ISBN 0 752417517. Price: £16.99.

As geologists we are always looking at rocks - the foundation of the landscape. The methods of extraction, the uses to which they are have been put and the remnants of past extractive processes are the basis for this book.

This is the latest offering by Peter Stonier who penned the Shire Album on Quarries and Quarrying some 15 years ago. This new book helps bridge the gap between those interested merely in the product and those drawn to the evidence for the methods of production.

With 20 chapters the author uses the opening four to introduce the topic, then devotes a chapter each to 16 English case studies. Of these, 11 are in the South. The expected centres of Portland, Purbeck and Bath rub shoulders with Peak Millstones, Wiltshire Sarcens and Clee Hill Roadstone; Honister Slate, Ham Stone, Cornish granite and slate are covered, as are the important Chalk-based lime industries of South East England.

These studies vary in length with a piece on the National Stone Centre a couple of pages long, the micro-granite of Threlkeld in Cumbria has 4 pages, whilst that on Hills and Holes, of which Barnack in the East Midlands is the most well known, has 5. The author gives away his origins with an eight-page section on the Moorstones of the Southwest, as well as eight pages on the deeper granite quarries of Haytor. As a native of Dorset I appreciated the use of 27 pages to examine the extensive Portland and Purbeck stone industry in my home county.

The text includes detailed descriptions for some localities and annotated maps so that the interested reader can visit the relevant spot to examine the remaining evidence. As a minor point the individual site maps do have a scale but lack an orientation arrow so one assumes that North is towards the top of the page! However, I will definitely visit the Museum of Bath at Work when next in the city and will also attempt to trace the line of the 18th century incline on Bathampton C,own,

There are 6 pages of very useful references for those who would like to read a little deeper, as well as a 3-page index. With 95 well-chosen black and white illustrations and 30 excellent colour plates one cannot argue with the quality of reproduction.

The only criticism I have is with the cover - a two-view affair utilising two colour plates from inside. They look good on the quality paper inside, but on the card cover they do not do the contents of this interesting, informative and very readable book any favours!

I am also of the opinion that the design of the cover will not win the publishers any prizes either!

However, one does not judge a book by the cover and this title will be a useful addition to the shelves of geologists, local historians and industrial archaeologists alike.

Tony Cross, The Curtis Museum, Alton, Hants, U.K. 4th March 2001.

Sharpe, T. and McCartney, P.J. 1998. *The papers of H.T. De la Beche (1796-1855) in the National Museum of Wales*. National Museum of Wales, Geological Series No. 17, Cardiff. 260 pp. ISBN 0 7200 0454 3. Paperback. Price: £25.00.

The name of Frederick John North (1889-1968) is less prominent in our memory than it deserves to be. He was a devoted student of the history of British geology at a time when such an enthusiasm was rare. He was also Keeper of Geology in the National Museum of Wales. There he assembled one of the great MS archives of British geology: the papers of Sir Henry Thomas De La Beche (1796-1855). The archive contains more than two thousand items, and over the decades many a scholar has visited Cardiff to experience the thrill of leafing through that magnificent collection. Now, well housed and carefully curated, the collection is one of the glories of the Museum's Department of Geology. There readers of the archive have always received a warm Welsh welcome. From thirty years ago I recollect the then custodian of the collection making special provision for me so that I might continue my studies one Saturday afternoon, despite the fact that it was the occasion of a home international at Cardiff Arms Park.

The archive served North himself as a quarry from which he frequently drew materials for his own historical writings. Indeed, the archive allowed him to complete a book-length biography of De La Beche, but that work never found a publisher. During the 1970s the archive became the foundation of a short life of De La Beche written by Paul McCartney (edited by Douglas Bassett) but there has yet to be erected upon the archive that full-scale assessment which De La Beche so richly deserves. He was the greatest empire builder that British geology has ever seen. He founded four institutions: the Geological Survey of Great Britain and Ireland (1845); the Museum of Economic Geology (1837); the Mining Records Office (1839); and the Government School of Mines (1851). He died two years after the birth of Cecil Rhodes. The rationale and eventual fates of the their respective empires might make an interesting comparative study.

This handsome volume compiled by Tom Sharpe and Paul McCartney now becomes the essential key to the Cardiff archive. It will be a much thumbed vade mecum among those who may strive to restore De La Beche to life, but the volume possesses a significance transcending the ambitions of his would-be biographers. De La Beche was a pivotal figure in British geology over the years following 1832, and anyone concerned with the history of that science during the earliest decades of Victoria's reign will neglect this archive at their peril.

The core of the volume consists of an alphabetical listing of the 2283 items constituting the archive. Most of the items are letters addressed to De La Beche, and for each of these epistles, Sharpe and McCartney offer a neat and often appetite-whetting precis of the contents. Among the correspondents there are present most of the leading geologists of the day from Louis Agassiz to Thomas Weaver. There are even two items originating from the Queen herself. To assist us in our grazing of this rich pasture the compilers provide us with comprehensive indexes to personal names, to place names, and to subjects. As a bonus, we are also given eighteen pages featuring reproductions of sketches, maps, and photographs contained within the archive. The result is an invaluable volume which must take its place in any library, either personal or institutional, which aspires to reflect the Heroic Age in British geology. To apply to the volume adjectives such as 'gripping' or 'compulsive' would be to fly into the realms of hyperbole. After all, the work aspires to be little more than a catalogue. But, that conceded, to anybody familiar with the dramatis personae of British nineteenth-century geology, the excellence of the item-precis here offered does give to the volume unexpected readability. It possesses all the fascination that a fine wine-list holds for the connoisseur. Within its class this volume deserves to be relished as a vintage offering.

In only one respect did the bottle disappoint me. In 1818 De La Beche married Letitia Whyte from County Down. The union was unhappy and the couple separated in 1825. Letitia shortly came under 'the protection' of Colonel Henry Wyndham, a veteran of The Peninsula and Waterloo. That liaison also ended disastrously. I would like to have found in the archive some correspondence between De La Beche and Wyndham. There is none, but for that out two skilled bottlers can hardly be held responsible.

Gordon L. Herries Davies, Trinity College, Dublin 2, Ireland. 30th May 2001.

Gratzer, Walter (ed.). 1996. *A Bedside Nature: Genius and Eccentricity in Science 1869-1953*. (Foreword by Stephen Jay Gould). Macmillan Magazines, London, xiii+266 pp. Paperback. ISBN 0 333 651316. Paperback

It has taken some time for this volume to make the journey from publisher to editor to reviewer. However, the nature of this book is such that its content is no more dated for the delay. This volume is a collection of brief articles and letters from the pages of *Nature*, selected to entertain as well as educate. The contributors range from the famous - Charles Darwin, T.H. Huxley, Lord Kelvin, H.G. Wells, J.B.S. Haldane, Werner Heisenberg, Watson and Crick all have their say - to the obscure.

With a distinguished group of contributors, it goes without saying that *A Bedside Nature* is particularly well-written. The editor has included the original diagrams associated with articles, as well as numerous other illustrations from contemporary contributions as 'fillers' on pages where there would otherwise be a blank space. Many of the fillers beg explanation and it is a shame that explanatory captions couldn't have been included with them. There are altogether too many members of the great and the good in this volume to include a full biographical appendix, but the editor has included brief notes on most contributors by way of introduction. The index is adequate.

This book is highly entertaining and provides a wonderful sampler of the changing interests and debates of scientists during the first 84 years of publication of *Nature*, the termination of this volume at 1953 being determined by the publication of Watson and Crick's paper on the structure of DNA. As is often the case, those contributions that are now discredited or forgotten, such as Paul Kammerer and his midwife toads or discussions of n-rays, are perhaps even more interesting than those theories that now form part of everyday scientific knowledge. At one time or another all manner of speculations and ideas were regarded as major questions worthy of discussion in the pages of Nature, peppered with vitriolic letters and reviews. As just one example of an article that particularly caught my eye, I was fascinated to read that the taste of beer is affected by drinking it from a glass and that a gold-lined silver mug is to be preferred (p. 84). Some comments contain more than a grain of truth - "The amateur has been the glory of English science; there is now little place for him" (1915; pp. 154-155) (as noted by the editor, displaced by "the arrival on the scientific landscape of the joyless professional", such as your reviewer) - whereas others reek of prejudice - "... Irish immigrants in the industrial towns of England are not the most desirable specimens of their race" (1911; p. 136). In the latter vein, the treatment of Jewish scientists in Hitler's Germany, including the attitudes of Nazi correspondents, makes poignant reading.

I recommend this book to anyone with an interest in the debates, mechanisms and byways of science. There is nothing of direct relevance to geological curation or conservation, but there is much to interest anyone who has ever wielded a geological hammer, looked down a microscope or conducted an experiment. If you're interested in Piltdown Man, the Nazi atomic bomb programme or the sense of humour of animals, then *The Bedside Nature* will reward your browsing.

Stephen K. Donovan, Nationaal Natuurhistorisch Museum, Postbus 9517, 2300 RA Leiden, The Netherlands. 9th July 2001.

George, William H. 1999. *Sir Antonio Brady (1811-1881) civil servant, fossil collector and philanthropist of West Ham, Essex.* W.H. George Publications, 36pp. ISBN 0 9534092 0 2. Price: £1.50 + 50p post and packing.

George, William H. 2000. *Dr. Richard Payne Cotton (1820-1877) Physician and collector of Ilford fossils.* W.H. George Publications, 24pp. ISBN 0 9534092 2 8. Price: £1.00 + 40p post and packing.

In a previous issue Simon Knell reviewed a booklet published by William George on the fossil collector W. Gibson. From the same pen and publishing house come two further booklets that outline the lives and interests of two amateur palaeontologists. These booklets are warmly recommended. They are available from W.H. George, 11 Sterry Road, Barking, Essex IG11 9SJ, U.K.

Patrick N. Wyse Jackson, Department of Geology, Trinity College, Dublin 2, Ireland. 20th March 2001.