GEOLOGICAL CURATOR

Volume 10 Number 3

GEOLOGICAL CURATORS' GROUP

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

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

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Cover: Photograph of micromineral pumpellyite. See paper by Carles Curto Mila inside.

THE GEOLOGICAL CURATOR

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EDITORIAL

The wheels of progress grind very slow at times. The last issue (Volume 10 Number 2) was accompanied by a questionnaire about how subscribers really want to have this journal delivered to them in future. Whilst we had a good response from some people (my grateful thanks to you all!), I am making a fresh appeal here for input from those who haven't responded to the research. The questionnaire is included here again in paper form, and can be filled in and posted to the Editor. It can be filled in, scanned and emailed to the editor. There is also an online version on the GCG website (www.geocurator.org). **If you have not responded to our survey yet, please make time in your busy schedule to spend only 2 or 3 minutes to give us the data we need to inform decisions that may be the agenda for the next few years or even decades**.

Whilst we have a good few responses, it is not really sufficient to make a definitive judgement on how best to meet competing demands. We clearly have a cohort strongly in favour of paper printed journals and there is no doubt we will continue producing a 'hard copy'. Equally there are sufficient numbers who would prefer a pdf or other digital version of the journal that we must also cater for them and changing expectations. Finding the most pragmatic and cost effective solution for a small voluntary society is the issue.

Some people commented on ways to improve the journal but there were also numerous positive endorsements which were gratefully received. Many people have papers in planning, draft or final throes - you may be one of them. Please make every effort you can to complete those manuscripts and to submit them, to keep the flow of papers steady, and the content varied and interesting for you the reader, and all our colleagues.

Whilst I have a strong commitment to and 'parental' interest in this journal, it is really YOUR journal, for all of our small community - so please make use of it and foster it in whatever way you can. I am always keen to hear of prospective contributions, or ideas to develop the journal.

Matthew Parkes
July 2015

AN UNEXPECTED JOURNEY: THE FALL AND RISE OF *ICHTHYOSAURUS ANNINGAE*, FROM FOSSIL TO PLASTER CAST TO HOLOTYPE

by Nigel R. Larkin and Dean R. Lomax

Larkin, N.R. and Lomax, D.R.. 2015. An unexpected journey: the fall and rise of *Ichthyosaurus anningae*, from fossil to plaster cast to holotype. The Geological Curator 10 (3): 107-119.

An ichthyosaur specimen (DONMG:1983.98) in the palaeontology collection of Doncaster Museum and Art Gallery, England, comprises a nearly complete skeleton. Although the museum deliberately purchased the fossil as genuine in 1983 it was later mistaken for a plaster cast and used as such before being re-identified as real. Furthermore, it was recently recognised as a specimen new to science and is now the holotype of *Ichthyosaurus anningae* Lomax and Massare, 2015. To enable the taxonomic study of the specimen, a diverse range of work was required. This included: tracking down its provenance and age (Lower Jurassic, Pliensbachian) which had not been known when it was bought; cleaning, conserving and partially re-preparing the specimen so that it could be determined exactly which of the forefin bones were in situ and which had been artificially placed before the specimen was sold to the museum; and comparing the skeleton to hundreds of other ichthyosaur fossils before its final determination as a new species. Local media and public interest in the specimen was a constant feature of the project but the subsequent publication of the new ichthyosaur species engaged media attention worldwide and highlights the importance of communicating palaeontological discoveries to what is clearly a receptive audience. In the process, whilst the news media unexpectedly concentrated on the fact that the specimen had lain in a museum collection 'unrecognised' for 30 years, the relevance of museum collections was highlighted and their profile collectively raised, which further highlights the importance of communicating scientific research. This story also demonstrates the need for specialist input in museums at a time when the role of the specialist curator is under increasing threat.

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Introduction

In 2008, DRL began to undertake palaeontological research in the collections of his hometown museum, Doncaster Museum and Art Gallery (DONMG), soon discovering that it unexpectedly comprised roughly 12,000 individual fossils (Bowden *et al.* 2014). Prior to this work, the last palaeontologist to be affiliated with the museum (previously called Beechfield House) was Mr Henry Culpin. Culpin was one of the first people to understand and describe the geological outcrops and fossils to be found around Doncaster and he was a key instigator behind the creation of a museum in the town, to which he donated many of his own specimens (Lomax 2014). After he passed away in 1912, the collection was curated by geologists with no specialist paleontological knowledge, the last of whom retired in the 1990s. Since Culpin's death in 1912, no scientific research or publication had been undertaken on the palaeontology collection, although palaeontological specimens were still donated to the museum. The rediscovery of the fossil collection at DONMG in 2008 resulted in a small exhibition, several publications (e.g. Lomax 2010a; Lomax 2010b; Lomax *et al.* 2011) and ultimately a large-scale £80,000+ externally funded project called CIRCA to conserve and re-curate the collection, funded by the Esmée Fairbairn Foundation (Robinson and Bowden 2013).

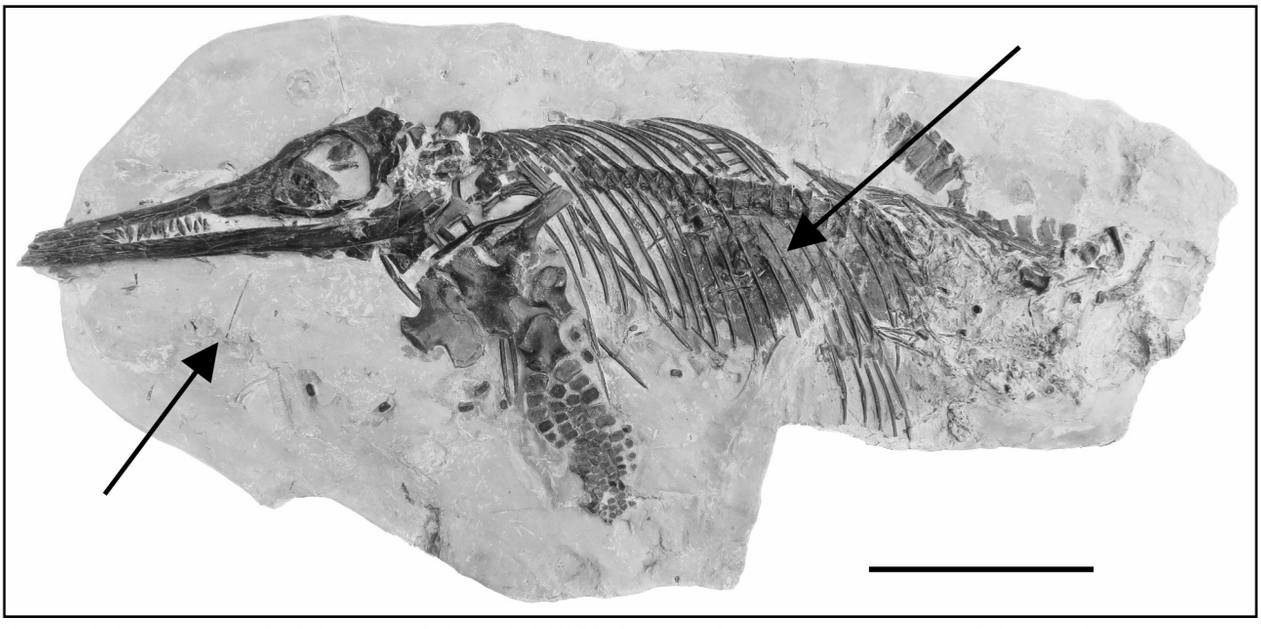


Figure 1. The conserved ichthyosaur skeleton DONMG:1983.98. Left arrow points to the belemnite* Bairstowius junceus*. Right arrow points to the gastric contents. Scale bar measures 20 cm.

This report focuses on the curatorial, research, conservation and preparation work that was undertaken to enable publication of the museum's most scientifically significant fossil specimen, DONMG:1983.98 (Figure 1), as the holotype of *Ichthyosaurus anningae* (Lomax and Massare 2015), and the only holotype in this palaeontology collection. This includes investigation of the specimen's hidden history, identification of its original provenance, and the preparation and conservation work undertaken to enable its correct taxonomic identity and ultimately its description. It also discusses the public interaction with the specimen including the media attention the story received upon publication.

History of the specimen: real, copy, real

As part of his initial research on the collection in 2008 a nearly complete ichthyosaur (Figure 1) stored in the education collection was presented to DRL as an "exceptional cast". Recognising the 'cast' was an original specimen,and discussing its originality with Dr Joe Botting and Mr Byron Blessed (DRL pers. comm. 2008), he initially identified the preserved gastric contents (Lomax 2010b: see below) and continued to study the specimen further. He tracked down the accession information and other museum records which suggested that the specimen was probably discovered during the late 1970s or early 80s, as it had been documented at the time of accession as being "found within the last five years" (DRL pers. obs. Doncaster Museum accessions register), and also that the specimen had been purchased from Hilary Corke Minerals in Surrey in 1983, with the aid of a 'Science Museum Grant' (£1,250 towards the total cost of £2,500), which was identified as a grant from the PRISM fund administered by the Museums Libraries and Archives council (DRL pers. obs. Doncaster Museum index card records). It was purchased by the museum through the efforts of the Curator of Geology Anne Pennington-George (Bowden *et. al.* 2014) who had previously purchased mineral and gem specimens from Hilary Corke. The specimen was accessioned in the museums register as DONMG:1983.98, recorded on 20.04.1983. On behalf of Pennington-George, Terry Manby (Curator at Doncaster Museum, 1974 - 1992) subsequently contacted the Palaeontology Conservation Lab of the Natural History Museum, London, for advice regarding cracks that were present on the specimen. Mr Manby received a letter from Frank Howie (Conservator in the NHM's Palaeontology Conservation Lab) dated 24 March 1983, outlining his conservation assessment based on photographs of the specimen.

Within a year of the ichthyosaur being purchased for the museum, Pennington-George moved from being Curator of Geology to Education Officer and the ichthyosaur was actively used in the education department. Pennington-George left the museum in 1997 and it seems that it is after this point that the ichthyosaur began to be misidentified as a cast, perhaps because a cast of a plesiosaur is present in the collection. Its status remained as 'plaster cast' for about a decade until 2008 when DRL began his research at DONMG.

Preserved stomach contents and more

The first paper published on the specimen (Lomax 2010b) recorded the gastric contents and was the first report of a British Jurassic ichthyosaur with gastric contents published in just over 40 years (the previous report being Pollard 1968). The gastric contents (Figure 2) comprise a large, dark mass consisting of numerous cephalopod hooklets initially identified as belonging to belemnoteuthids (Lomax 2010b), but they were later re-identified as more likely belonging to phragmoteuthids (Lomax and Massare 2015). The hooklets were found to represent at least four types of hooklet shape and this suggested the ichthyosaur was either feeding on different species of phragmoteuthid, or that the hooklet shape changed along the cephalopod tentacles (Lomax 2010b). An isolated fish scale was also found slightly offset from the gastric contents. Lomax (2010b) mentioned possible coprolitic material associated with DONMG:1983.98, but these have since been thought more likely to be bromalites (Lomax and Massare 2015); a single cephalopod hooklet was found in one of these. Hooklets were also found distributed on the matrix outside of the gastric mass, and one was preserved on a bivalve.

Determination of provenance and age

Initial investigatory work in the museum archives by DRL in 2008 suggested that the specimen's provenance and age was unknown and unrecorded. However, having seen other ichthyosaur specimens across the country and in books, he suspected from its appearance that the specimen may have come from the Dorset coast. Usefully, fossils in the matrix surrounding the ichthyosaur included bivalves and belemnites, including a complete belemnite that lay next to the skull of the ichthyosaur. Hoping that this belemnite may represent an index fossil he had the specimen identified by Dr Peter Doyle (Lomax 2010b) and Dr Tarquin Bolton (DRL pers. comms. 2011) who both agreed it was *Bairstowius junceus* (Phillips 1867). Because this species of belemnite has only ever been reported from a single horizon in the UK, this identification fortunately allowed Lomax (2010b) to determine that the belemnite and its associated ichthyosaur skeleton derived from the Lower Jurassic Stonebarrow Marl Member of the Charmouth Mudstone Formation, specifically Bed 110, the *polymorphus* subzone of the Genus *jamesoni* Zone (lower Pliensbachian). The precise geographical location could not be determined from this, but the possibilities were narrowed down. Bed 110 is found at three locations, all in the Charmouth area: Black Ven, Westhay Cliff, and on the foreshore west of Seatown (Figure 3; Lomax 2010b Fig. 1). At the two latter locations, Bed 110 crops out nearer beach level so they are more likely spots for an articulated skeleton to be discovered.

After publication of Lomax's (2010b) study and

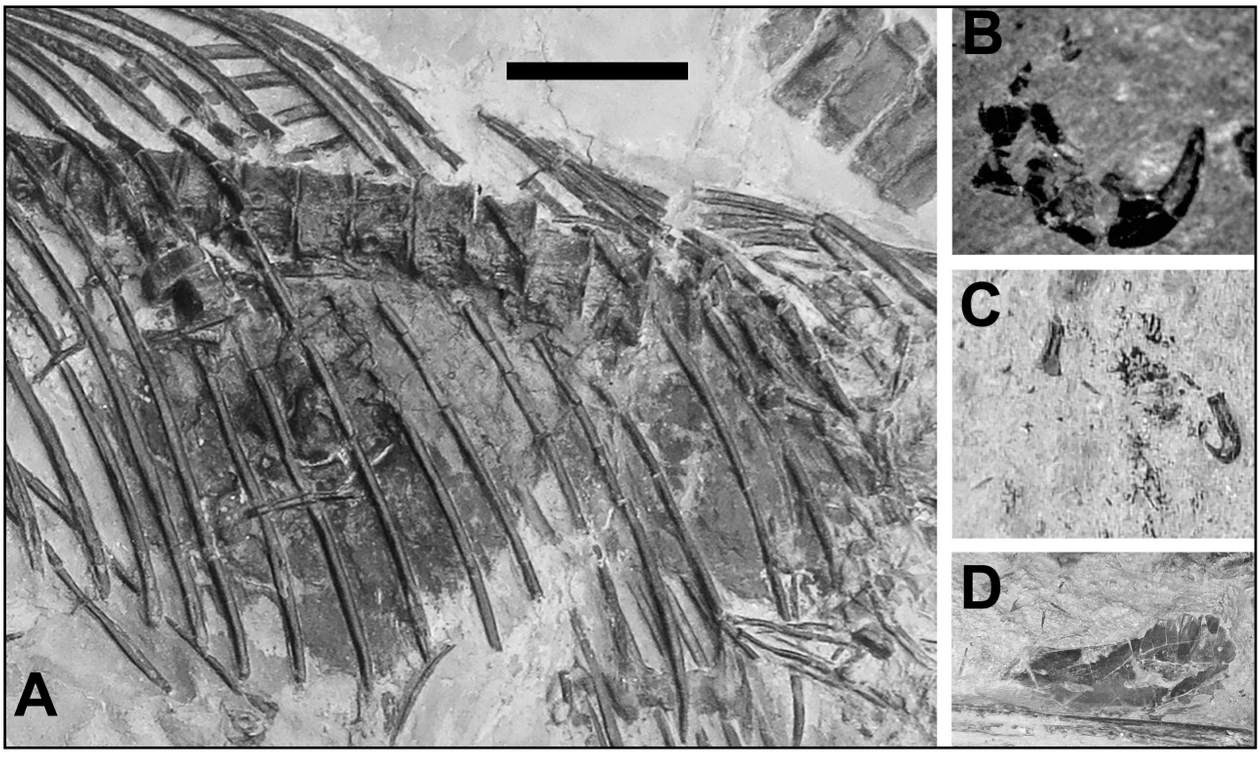


Figure 2 A. Close-up of the gastric contents of DONMG:1983.98, within which can be found identifiable remains such as cephalopod hooklets (B and C) and nearby an isolated fish scale (D). Scale bar measures 5 cm.

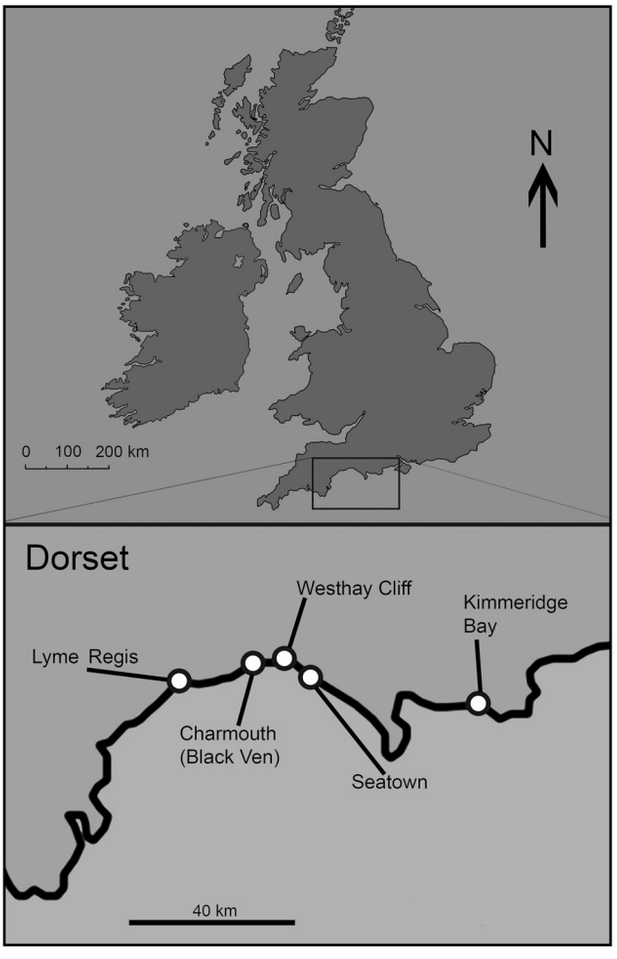


Figure 3 Map showing the locations of the three exposures (Black Ven, Westhay Cliff and west of Seatown) of the Lower Jurassic Stonebarrow Marl Member of the Charmouth Mudstone Formation, specifically Bed 110, the* polymorphus *subzone of the* jamesoni *Zone (lower Pliensbachian) that the belemnite* Bairstowius junceus *is known from (modified from Lomax and Massare 2015). Courtesy of Reece Davies.

identification of the belemnite to track down the original provenance and age of the specimen, new information regarding the ichthyosaur was uncovered at DONMG. The old index card relating to the specimen was found and this contained information regarding its apparent provenance. It was indeed recorded as coming from Dorset, but apparently from Upper Jurassic deposits at Kimmeridge, as detailed by Hilary Corke when it was bought.

In an attempt to find corroborating original documentation that would help to resolve the issue of provenance, or the identity of the original collector of the specimen who could be interviewed, NRL tracked down Emma Corke, the daughter of Hilary Corke (who died in 2001, see Appendix for his obituary) to ascertain if any of her father's notebooks or financial records etc might hold a clue. She was keen to help and although no relevant records were found it turned out that she used to accompany her father on many of his trips to Dorset and recalled various days spent on the cliff and beaches East of Charmouth with a couple of local collectors who sold specimens to her father:

> 'I'm pretty sure that I remember this specimen - my father didn't often have things as spectacular as this…. During the 1970s we used to go down to Lyme Regis/Charmouth every spring to collect pyritised ammonites (and other things) which had come out of the cliffs during winter storms.… My father got to know a group of local men who collected there. They had located a stratum in the cliff (about 20-25 feet up as I remember) which contained these ammonites, and from which they/we extracted them in matrix… Some fine specimens were found, and my father sold some of them for the group (and also advised them about preparation I seem to remember - they had over-cleaned before). They also found quite a lot of calcitic ammonites that my father sold (some to museums). It was a bit later that the ichthyosaur appeared (on sale or return from the finders). I am fairly sure that they wouldn't tell my father exactly where it was from - the usual business of trying to protect a site from other collectors I think, not that it had been removed illegally. They had been reluctant to share the ammonite location too, until my father had known them for some time. But I have the impression that he at any rate thought that it came from somewhere on the Charmouth cliffs - and from the same sort of location as the calcitic ammonites (the matrix looked the same). I'm afraid that after all this time I have completely forgotten the names of the collectors (and in any case I only knew them by their first names). I have an uncertain memory that my father thought that the location given to him by the finders was erroneous (because the matrix was wrong) - but that he couldn't get them to change it.'

Emma's recollections fitted perfectly with the evidence of the belemnite so her memory of the situation and Hilary's suspicions are both correct. Pliensbachian exposures, from which the *Bairstowius junceus* belemnite is exclusively known, are not found in Kimmeridge or Kimmeridgian exposures (Lomax and Massare 2015). Furthermore, both authors visited the area between Charmouth and Seatown in 2013, and took photographs (Figure 4) of the cliffs to send to Emma Corke who recalled:

Figure 4 The cliffs east of Charmouth and just west of Seatown where specimen DONMG:1983.98 is thought to have been found.

'It was some way to the east - a bit beyond where most beach-goers went. The stratum [that these particular collectors targeted] was about 20-30 feet above the beach (possibly less - I was quite little), and could only be reached where the cliffs had fallen. It was quite a scramble to get there - they were dubious about letting me do it. When you got up, the band where the ammonites (in particular) were was just about at the level where the cliff-fall stopped (the scree) - which was why they went there of course. I think that it was just below one of the thick hard bands visible in the photos - a bit below the bottom one I'd say… [in Figure 4] you can see the level that the scree rises to - higher on the right. I think that the band they looked for was about at the highest level that the scree would let you get at.'

Possible new species? Preparation and assessment required

Once the provenance of the specimen was proven beyond all doubt (to the three possible exposures in the Charmouth area) despite the scarce and conflicting documentation, Lomax and Massare (2015) examined the record of Pliensbachian ichthyosaurs. Pliensbachian ichthyosaurs are rare and only a handful of specimens have been recorded (see Lomax and Massare 2015). They subsequently determined that DONMG:1983.98 is the world's most complete ichthyosaur skeleton from this time interval (Lomax and Massare 2015). Whilst examining the specimen in 2011, Lomax and Massare noted that the morphology of the visible humerus appeared to be unusual (a potentially diagnostic feature). They also noted that the majority of the forefin was set into a plaster-like material, and that the most visible humerus seemed also to be set into this. They had to be clear exactly which bones were in situ and which - if any - had been introduced (i.e. from other specimens). Therefore the current positions of the forefin bones (including the humerus) were recorded, the paint was removed, the exact outline of the filler recorded and the filler removed (Figure 5) along with any 'introduced' bones. This work was undertaken by NRL as part of the CIRCA project (Robinson and Bowden 2013).

Firstly, the positions of all the bones in the forefin were photographed (Figure 6.A) and the bones were numbered. An airabrasive unit using compressed air lightly laced with sodium bicarbonate was used to remove the varnish on the bones and to remove the paint on the matrix and on the filler so that the bone, the matrix and the filler could all be distinguished from one another more easily and the exact extent of the filler assessed and recorded (Figure 6.B). The filler was then gently removed with scalpels and vibrating preparation pens and the numbered bones embedded within the filler were removed and stored, placed on a life-sized print-out of a photograph of the forefin, leaving only those in situ (Figure 6.C). The bones removed included most of the proximal phalanges and one humerus, leaving only some distal phalanges in situ along with the second humerus.

Figure 5 NRL Extracting the filler and emplaced humerus and forefin of DONMG:1983.98, using a pneumatic preparation tool.

Some of the filler was kept for analysis as the identity of collector and the preparator of the specimen was still unknown but it would be useful to track them down to find out more about the specimen's discovery. The type of filler used could help with this as people often stick to materials they know and some workers can be identified by the materials they use (NRL, pers. obs.). X-ray diffraction analysis (Figure 7) revealed that the filler is a mixture of quartz, calcite and cristobalite but it has yet to be determined what product has these constituent parts (it did not have the texture of plaster or of resins such as epoxy or polyester, etc).

Whilst the visible humerus upon which the determination of the new species partly relied was found to be embedded entirely within filler and therefore remained suspect, the other humerus was fortunately deeply embedded within the matrix. However, this meant that it was difficult to determine if the humeri matched one another to make a perfect symmetrical pair. Therefore, although the second

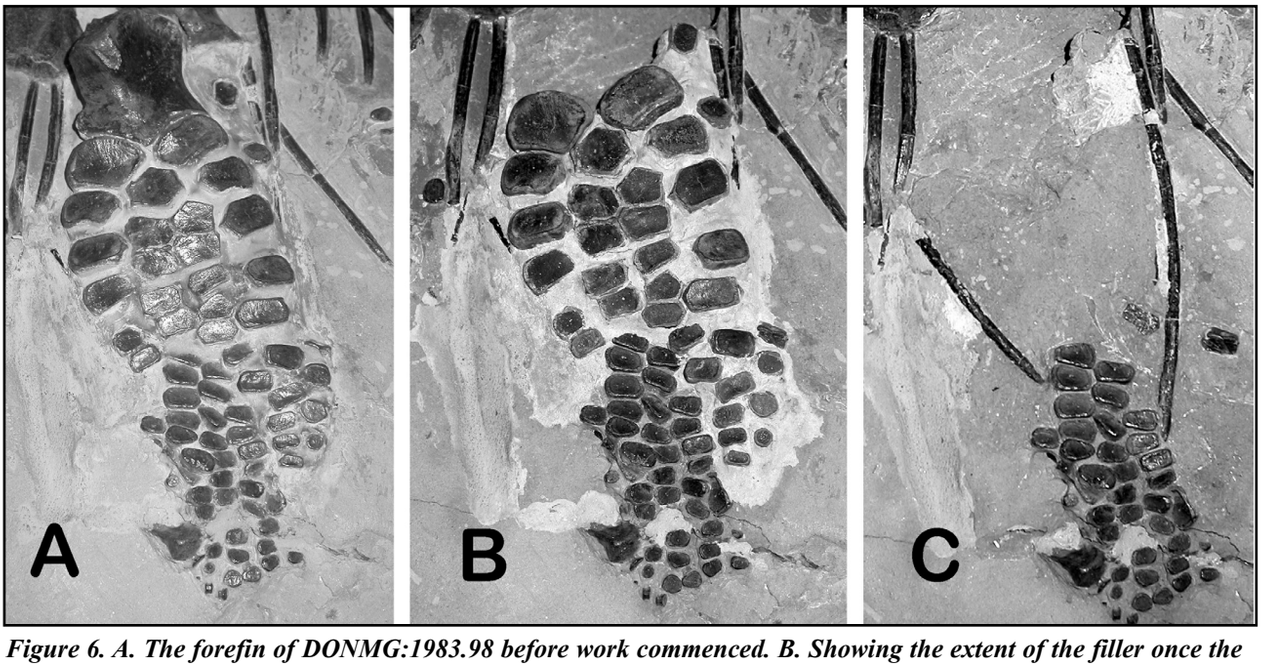


Figure 6. A. The forefin of DONMG:1983.98 before work commenced. B. Showing the extent of the filler once the paint and the humerus were removed from the forefin. C. The forefin after all the bones embedded in the filler had been removed, including one humerus.

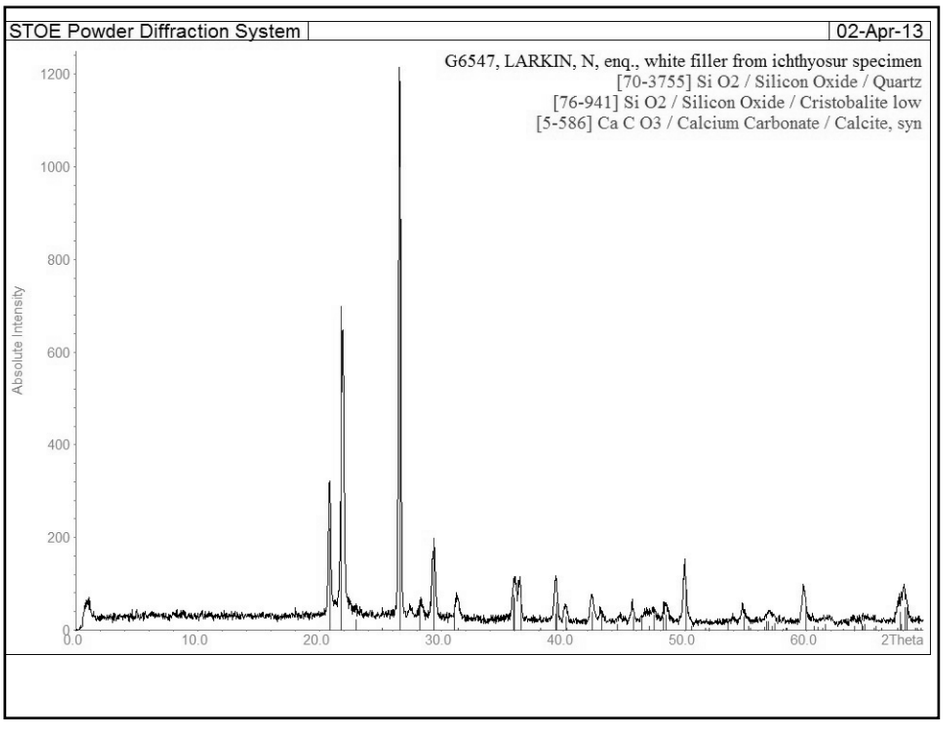
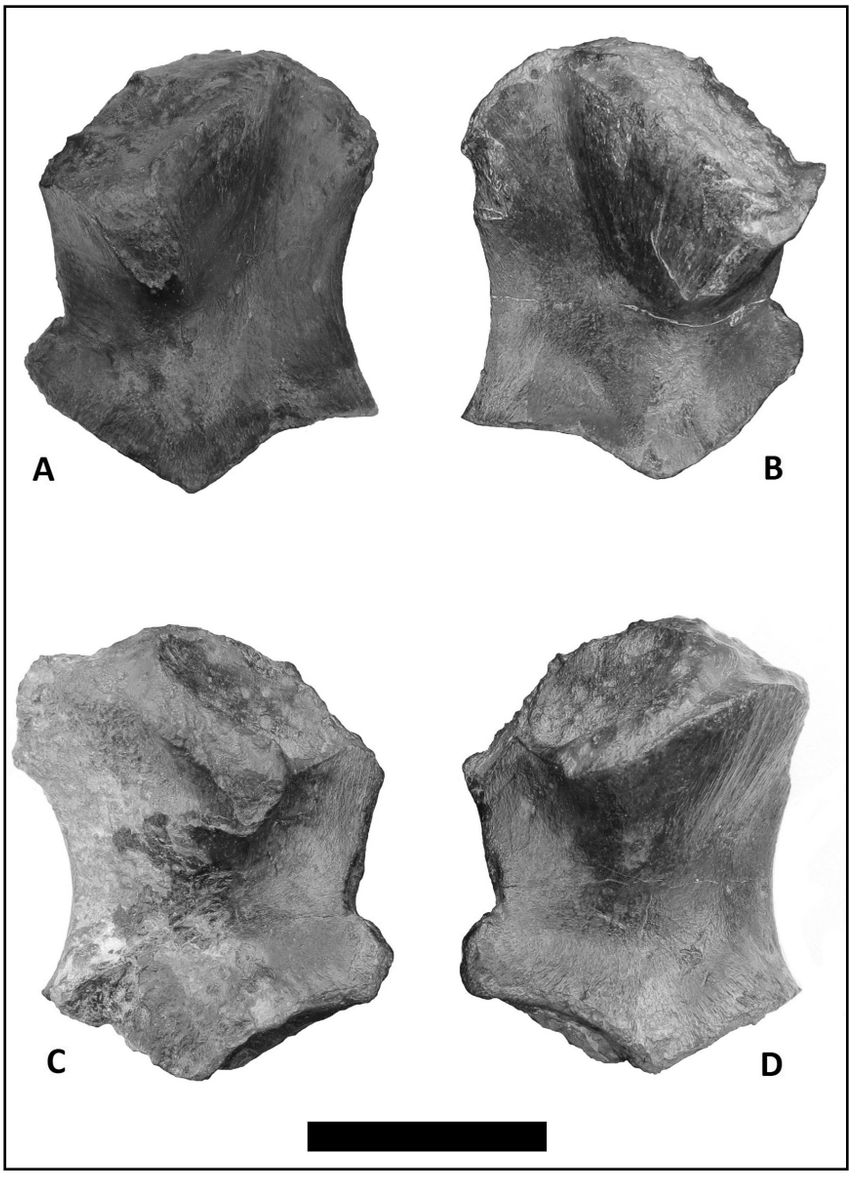


Figure 7 The results of the XRD analysis of the filler material showing it comprises a mixture of quartz, calcite and cristobalite.

Below Left: Figure 8. Left and right humeri of DONMG:1983.98. A. Right humerus in ventral view, anterior to the left. B. Left humerus in ventral view, anterior to the right. C. Right humerus in dorsal view, anterior to the right. D. Left humerus in dorsal view, anterior to the left. Scale bar measures 3 cm.



humerus was positioned tightly against some of the surrounding bones, it had to be mechanically prepared enough to enable its morphology to be assessed. So, pneumatic preparation pens with long and strong reciprocating needles were deployed and the bone was eventually completely removed and prepared.

The removal of both humeri enabled their examination in three dimensions and they were found to be a perfect match in size and morphology. Therefore although one was found within the artificial filler, there is no doubt that that they belonged together and that both are from the same individual. As the morphology of the humeri was to be a very important feature of the soon to be described new species, before replacing them within the specimen the opportunity was taken to record them in every possible way. To assist with their immediate study the two bones were photographed (Figure 8) and they were also videoed whist rotating on a turntable. This data was immediately sent via

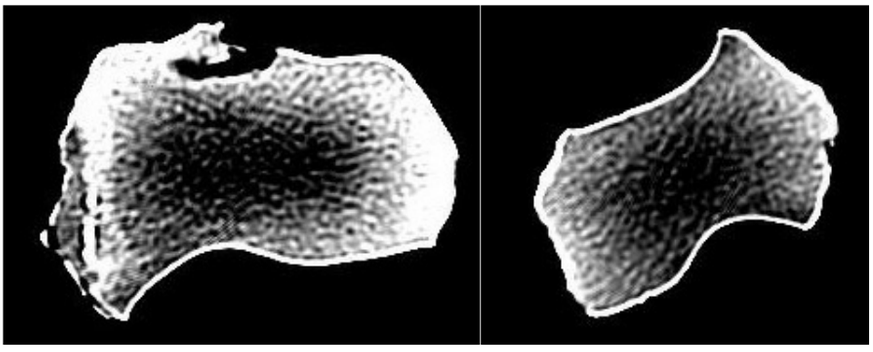


Figure 9 Just two of the many dozens of CT slices of the humeri now available for study - Courtesy of Dr John Hutchinson, Royal Veterinary College London.

Dropbox by the preparator (NRL) to the authors describing the specimen, one of whom was in Doncaster (DRL) and the other in NY, USA (Judy Massare), so that they could assess the bones and describe them in more detail. To assist with this further, the two bones were then also Computer Tomography (CT) scanned (Figure 9), illustrated (Figure 10) and moulded to make high quality casts (Figure 11). The CT scanning data was also sent via Dropbox to the researchers and casts were posted to them so that they each had 'hard copies'. DRL then visited NRL to examine the removed humeri and describe them in more detail. Casts of both humeri are now accessioned and stored with the specimen at DONMG. One set of casts of the humeri were taken by DRL to various museums in order to assist with comparing the humeri of DONMG:1983.98 to those of other ichthyosaurs (see below). The femur was not removed from the specimen but the exposed portion was moulded and a cast produced.

Such a variety of ways of recording the two humeri for the benefit of current and future researchers were used because the two bones are not only important diagnostically, but because the bones had to be carefully replaced in their original positions within the specimen along with all the other forefin bones that had been removed, and as such had to be recorded as fully as possible before being placed 'out of reach' of researchers again. The varieties of ways the bones have been recorded have been and will be used in publications, posters, talks and exhibitions as well as in future research. Thus, recording them in such a variety of media was time and money well spent. CT scanning in particular has been used for decades for palaeontological research and for guiding the preparation of fossils but the further benefits of CT scanning regarding conservation, exhibits and the broad and/or rapid dissemination of data are becoming more apparent (Tembe and Siddiqui 2014).

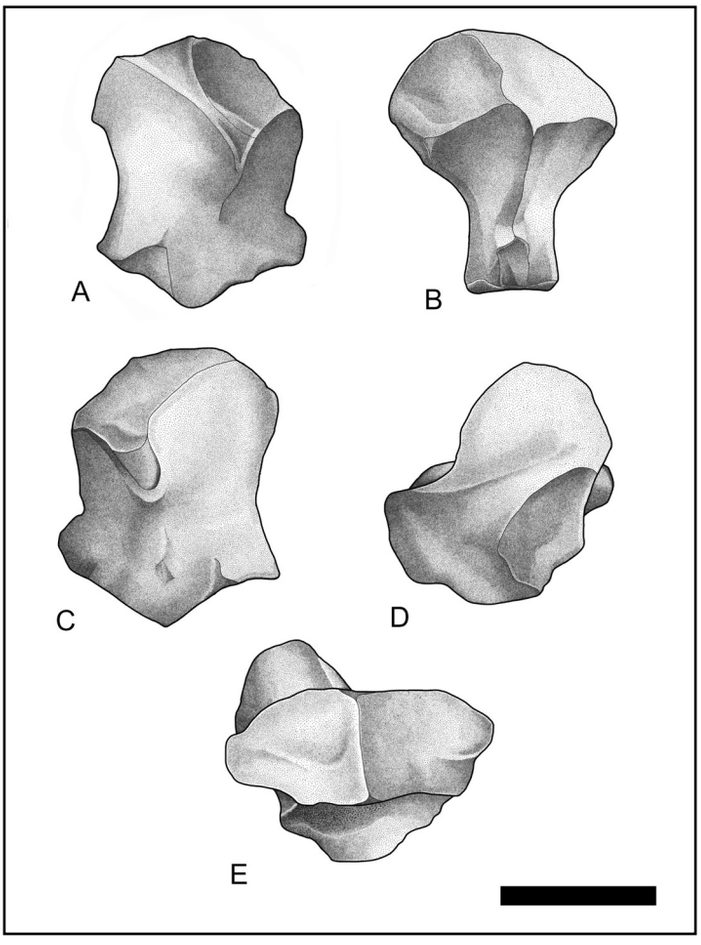


Figure 10 Illustrations of the right humerus. A. Dorsal, B. Anterior, C. Ventral, D. Proximal, E. Distal views. Modified from Lomax and Massare (2015). Courtesy of Elizabeth Hall. Scale bar measures 3 cm.

Before the bones were placed back into position, further exploratory preparation work was undertaken in this area to determine if any other forefin bones had been preserved unseen in situ in the matrix but only one other small phalange was found. Photos were taken of this prepared area as a record. After this, both the humeri and all the other ex-situ forefin bones were set in plaster of paris in their original locations and orientations. The plaster was painted out with artists acrylic paints to match the surrounding matrix.

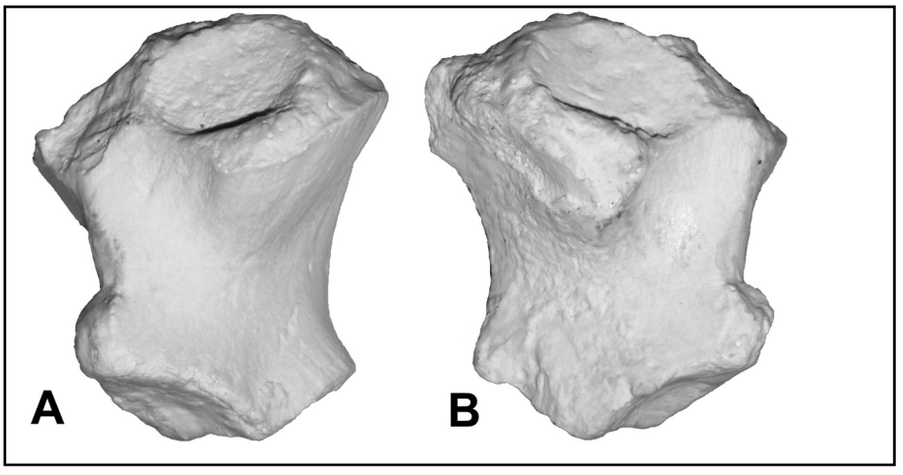


Figure 11 Casts of the two humeri of DONMG:1983.98 (accessioned as DONMG.1983.98.A) displayed in slightly anterodorsal view: A. Left humerus. B. Right humerus.

Confirmed as a new species: *Ichthyosaurus anningae* Lomax and Massare *2*015

DONMG:1983.98 was originally identified by Lomax (2010b) as *Ichthyosaurus* sp., pending a complete taxonomic study, however, this was the first occurrence of the genus in the Pliensbachian. Upon publication, Lomax continued to examine the morphology of DONMG:1983.98 and began collaborating with Professor Judy Massare (State University of New York, USA). They examined the specimen in detail, which led to the identification of potentially unique features not yet reported in the genus *Ichthyosaurus*. Over the course of the next four years they visited many museum collections across the UK, Europe, and the USA, comparing the features in DONMG:1983.98 to numerous *Ichthyosaurus* specimens. They determined the features found in the study specimen were diagnostic and represented a new species, which they named in honour of Mary Anning (Torrens 1995) of Lyme Regis, *Ichthyosaurus anningae* (Lomax and Massare 2015). The diagnostic features of *I. anningae* revolve around the humerus and femur and are as follows: a short, robust humerus with prominent deltopectoral crest much larger than the dorsal process, and covering more than half the length of the shaft; anterior edge of humerus shaft much shorter than posterior in ventral view; circular depression on the articular surface anterior to the dorsal process of humerus; dorsoventral constriction in the humeral head; humerus length more than 1.7 times the length of the femur; and a femur almost as wide proximally as distally with a relatively short shaft (Lomax and Massare 2015).

Lomax and Massare (2015) also identified four additional specimens that they referred to *I. anningae*. They included a subadult and three juveniles which allowed for examination of the ontogenetic variation in the species. These include: one specimen at the National Museum of Wales (NMW G.1597) and three specimens at the Natural History Museum, London (NHMUK OR 35566; NHMUK OR 120; and NHMUK OR10028). One group displayed all of the diagnostic features of the holotype humerus (the former two specimens) and the others showed all of the autapomorphies except for the diagnostic features of the humerus (the latter two specimens). Upon examination of the record of limb morphology differences between males and females in extinct and extant reptiles, Lomax and Massare (2015) determined that the differences within the new species probably represent sexual dimorphism. This demonstrated that at least in this species it may be possible to differentiate between males and females in humeral morphology, something that had never before been applied to ichthyosaurs. The results suggest that DONMG:1983.98 is probably an adult male.

Engaging the public

Public engagement and science communication are of utmost importance for a subject such as palaeontology (Bates *et al.* 2009) and through various public interactions this ichthyosaur has become one of the most popular and iconic specimens at DONMG, cherished by local members of the public (DRL pers. obs., Doncaster Museum guest book and public interaction [conversation]).

In 2008, DRL first examined the specimen as part of a general review of the palaeontology collection at DONMG, with the focus on selecting specimens for a small temporary exhibition (Lomax 2010a). The ichthyosaur was removed from the education department and placed as the centrepiece of the exhibition in 2009. As part of the exhibition, DONMG held a competition called 'name the ichthyosaur'. The name selected from over 250

entries was 'Fizzy', put forward by a local family with the naming attributed to a 6 year old girl. The name was taken from the words 'fish lizard', the literal translation of the Greek words that make up the name 'ichthyosaur'. A new exhibition (titled 'Fossil Wonders: A Hidden Collection Awakened') detailing the importance of examining Doncaster Museums 'hidden' palaeontology collection was installed in June 2015 due to 'demand' from schools and the local public to see *Ichthyosaurus anningae* on permanent display, along with other rediscovered material in the collection. DONMG:1983.98 was placed as the centrepiece of the exhibition.

Since the creation of the first exhibition in 2009 the local newspapers and radio stations were always interested to learn more about the ichthyosaur. The local news media have consistently followed the story of the specimen from 2009 through to present day. However, with the publication of Lomax and Massare's (2015) study, the media interest in the rediscovery and naming of the specimen went global. This included appearances by DRL on television (BBC Breakfast and evening news programmes, BBC World News, CBBC's Newsround and ITV News); interviews on countless local and national radio stations (including Radio 4's Today programme); numerous stories in national and local papers and countless news and specialist science websites worldwide; and even interviews with news and radio companies in North America. Many positive comments were made by the public on news websites such as: "*Importance of museum collections and people looking at them well illustrated*"; "*When replicas are real*! *Fascinating discovery what was thought to be a cast was in fact new sp. of Ichthyosaur*"; "*I have a very happy 15yr old. He shouted "there is hope" after seeing your piece on the news. He wants to be a palaeontologist too.*" Such wide and positive coverage and genuine comments are good for museums and for palaeontology in general. It demonstrates that a variety of audiences have been reached and the information is understood.

Despite the extensive media interest, the general 'hook' that the story was hung on was not the discovery of a new species through seven years of intensive research, nor, most disappointingly, the naming of the ichthyosaur after a woman active very early on in the science of palaeontology (Mary Anning), nor DRL's quite different route into the science of palaeontology (i.e. opting for experience over attending university in his early career), but instead the story was spun to concentrate on the fact that the specimen had been (as they collectively saw it) 'in a store cupboard for 30 years and thought to be a replica'. Although this was certainly not the focus of the press release and was the angle the authors of the paper thought the least important, it is probably the case that without it the story would not have reached a fraction of the audience that it did. It is clear there is a choice of three options to be made when preparing a press release for the media and dealing with the interviews: 1) either stick to the science only and no doubt reach a smaller audience (or even have your press release deemed un-newsworthy); or 2) give lots of background and context in the hope that 'they' in 'the media' will find a not-too-inappropriate hook to hang the story on; or 3) consciously give the media a useful and easy hook for the story (which may simply be a really engaging and unusual image) or even several, and try to smuggle in what science and appropriate context you can in your 50 seconds of screen and/or radio time. Despite this story taking a slightly unexpected tack and some of the main reasons for the press release being largely ignored, the importance of the specimen was recognised, as was - to an extent - the importance of all museum collections by association. It no doubt raised interest in museums, museum collections, the Jurassic Coast and British palaeontology. Although so far this has not yet resulted in the original discoverer of this skeleton being identified, many workers in small museums and individual collectors who saw the news stories have been in touch with the paper's authors to give them details about specimens in their collections that have yet to be studied and identified, many of which would not normally have been on anyone's 'radar'. Therefore the effect of mass media interest in such a story is not just a one-way street communicating interesting scientific stories from museums and researchers to the public, but can elicit genuinely useful information in response. In this case it will certainly lead to further useful research and possibly, in turn, to more new species and more headlines.

Conclusions

The amount of time spent undertaking the conservation and preparation work on this specimen (eleven days including the moulding, casting, CT scanning and some conservation work not described here) was easily justified as this ichthyosaur is the single most important specimen in the palaeontology collection of Doncaster Museum and Art Gallery and was in the process of being described as a new species. The specimen was enhanced by this work because a much greater knowledge was gained of the exact arrangement of the in situ bones of the forefin and in particular how the ex-situ humerus (in plaster) related to the in-situ humerus, leading to a greater

confidence in the identification of the specimen within its wider taxonomy. Preparing and removing these bones was the only way of achieving this because the bones concerned were too small and too close together to resolve the issue by X-raying and/or CT scanning the bones in situ, especially considering the density of the matrix, the plaster and the wooden frame they were all surrounded by. If the preparation work described here had not been undertaken, determining the specimen as a new species would have been exceedingly difficult, if not impossible.

The palaeontological collection at DONMG prior to this discovery and the CIRCA project was unknown to the wider palaeontological community. However, as a result of these projects, and DRL's investigatory work, nine papers in peer-reviewed journals have been published on specimens within this collection so far, with more to follow. Some of the other discoveries and publications have made headlines in their own right and all of them (but particularly the story of *Ichthyosaurus anningae*) demonstrate the importance of closely examining museum collections of all sizes. Both the local and wider media and public interest in the Doncaster specimens demonstrate that making the effort to communicate palaeontological discoveries is time well spent: the relevance of museum collections in general and the science of palaeontology in particular have their profile raised, as does the work museum staff do 'behind the scenes'. At a time of budget cuts and staff downsizing such stories help to remind people of the relevance of museum collections and museum staff and demonstrate the need for specialist input in museums at a time when the role of the specialist curator is under increasing threat.

References

BATES, K. T., FALKINGHAM, P. L., HODGETTS, D., FARLOW, J. O., BREITHAUPT, B. H., O'BRIEN, M., MATTHEWS, N., SELLERS, W. I. and MANNING, P. L. 2009, Digital imaging and public engagement in palaeontology. *Geology Today* **25**, 134-139.

BOWDEN, A., LOMAX, D. R., ROBINSON, P. and LARKIN, N. R. 2014. The History of Palaeontology at Doncaster Museum. *The Geological Curator* **10**, 27-45.

LOMAX, D. R. 2010a. Fabulous Fossils exhibition at Doncaster Museum and Art Gallery. *Deposits* **21**, 23-25.

LOMAX, D. R. 2010b. An *Ichthyosaurus* (Reptilia, Ichthyosauria) with gastric contents from Charmouth, England: First report of the genus from the Pliensbachian. *Paludicola* **8**, 22-36.

LOMAX, D. R., LAMSDELL, J. C. and CIURCA, S. J. Jr. 2011. A collection of eurypterids from the Silurian of Lesmahagow collected pre 1900. *The Geological Curator* **9**, 331-342.

LOMAX, D. R. 2014. Henry Culpin (1861-1912): a Yorkshire geologist and palaeontologist, and his collection in the Doncaster Museum and Art Gallery. *Proceedings of the Yorkshire Geological Society* **60**, 85-90.

LOMAX, D. R. and MASSARE, J. A. 2015. A new species of *Ichthyosaurus* from the Lower Jurassic of West Dorset, England. *Journal of Vertebrate Paleontology*. DOI: 10.1080/02724634.2014.903260.

PHILLIPS, J. 1867. A monograph of the British Jurassic Belemnitidae. Part 3. *Monograph of the Palaeontographical Society*, p.53-88.

POLLARD, J. E. 1968. The gastric contents of an ichthyosaur from the lower Lias of Lyme Regis. *Palaeontology* **11**, 376-388.

ROBINSON, P. and BOWDEN, A. 2013. Taking Stock, Effective Collections, Esmée Fairbairn and the natural science collections at Doncaster Museum. *Journal of Natural Science Collections* **1**, 8-26

TEMBE, G. and SIDDIQUI, S. 2014. Applications of computed tomography to fossil conservation and education. *Collection Forum* **28**, 47-62.

TORRENS, H. 1995. Mary Anning (1799-1847) of Lyme; 'The greatest fossilist the world ever knew'. *The British Journal for the History of Science* **28**, 257-288.

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Appendix

Obituary: Hilary Corke.
October 11, 2001, Friday.
The Independent (London)

Byline: Anthony Thwaite Corke: an odd life

There was a time, in the 1950s and early 1960s, when it seemed one could hardly pick up a copy of such periodicals as the Listener, London Magazine, Encounter, Spectator, TLS, Botteghe Oscure or the New Yorker without finding some contribution by Hilary Corke: poems, book reviews, stories, television criticism, pieces of polemic.
The poems were highly individual and very various, difficult to characterise: lyrical, satirical, elegiac, richly contrived, always well made. Several of them went into the anthologies of the time - Springtime, edited in 1953 by Iain Fletcher and G.S. Fraser, and also including the young Amis, Larkin, Gunn; Fraser's Faber anthology Poetry Now (1956); Kenneth Allott's revised Penguin Book of Contemporary Verse (1962). Five of Corke's poems were even included in Robert Conquest's second so-called "Movement" anthology, New Lines 2 (1963) - surprising, in that Corke had at an early stage poured scorn on the supposed merits and claims of this "Movement", in a contemptuous essay in Encounter (June 1955), "The Bad Old Style". The one full-length book of his own poems, The Early Drowned, was published by Secker and Warburg in 1961.

This book is divided into two sections, "Earlier Poems" (1953-57) and "Later Poems" (1958-59); and in a brief prefatory note Corke remarked: 'Had the late book-world been "normal" I imagine that I should by now have published some half-dozen volumes, whose styles would show a progression if not a progress'.

As things turned out, there were to be no more books of his own poems, though in 1969 his Corke's translations of Valery's complete prose poems, Poems in the Rough, were published as the second volume of Jackson Mathews's edition of The Collected Works of Paul Valery.

Hilary Topham Corke was born in 1921 in Malvern. He went to prep schools there and in Surrey, and won an entrance scholarship to Charterhouse. (Many years later he wrote an exasperated and very funny note for the Old Carthusian News: he was fed up with meeting Old Carthusians who assumed he had had a wasted life.) He won a Foundation Scholarship in Mathematics to Christ Church, Oxford, going up in 1940; but he in fact chose to read English, 1940-41, for a so-called Wartime Degree. He served in the Royal Artillery from 1941 to 1945, partly in the Orkneys and Shetland, and ended up as a Captain. He returned to Christ Church to complete his degree, 1945-47.

He then went to Fuad I University, Cairo, as a Lecturer in English, joining a staff which included the young aspirant novelists P.H. Newby and Robert Liddell. Another contemporary, Denys Johnson-Davies, recalls how they first came to know each other better through being fellow paying guests of an eccentric Latvian painter in her roof-top flat in downtown Cairo. Here I first came to know Hilary's diverse interests and skills outside of literature when he was able to assist our landlady artist to fulfil an order she had from a local Pasha for glasses that were innocently decorated on the outside with roses which occluded the erotic scenes on the inside. I also remember Hilary constructing a ball made out of various pieces of wood which, he said, could be easily taken to pieces and reassembled by merely working out the mathematical principle on which it had been put together. It defied all attempts by his colleagues to solve its mystery.

In 1951 he was appointed Lecturer in Medieval European Studies at Ediunburgh University. It was here that he met Shirley Bridges (granddaughter of the former Poet Laureate), who was a colleague. They married in 1957, by which time Corke had resigned from the university and (in 1955) set out to work as a busy freelance writer. His wit and erudition, and his capacity for hard work, recommended him rapidly to a variety of editors: J.R. Ackerley, Stephen Spender, John Lehmann, Alan Pryce -Jones.

I first met him in 1960, when he and William Plomer and I were corralled together as editors of the annual Hutchinson/P.E.N. anthology, which became New Poems 1961. I was to begin with, I think, rather disinclined to like him: I was a sort of junior Movementeer-by-association, and I didn't forget those asperities Corke had written about "The Bad Old Style". But, after a few initial skirmishes, we found we got on very well, in shared literary enthusiasms (Stevie Smith, and even Larkin) and in Corke's passion for knowing about and collecting "objects" - everything from coins and medieval pottery to minerals.

We lived in the same county: Shirley and Hilary had

moved to a 16th-century farmhouse in Abinger Hammer, my wife Ann and I were in Richmond. We each had four children; and soon there were visits in both directions, the Thwaite children fascinated by the marvellously untidy antiquarian jumble of the Corke house, yet even more by the fact that the Corke children didn't go to school but were taught everything, from maths to music, by their parents.

A little later, when I became literary editor of the Listener, I was happy to go on giving him a great deal of work. His fiction reviews, in particular, were sparkling and trenchant, provocative but good-tempered. But, some time in the 1960s, a bad depression overcame him, in a way hard to understand and therefore hard to explain. He needed to change his life. In 1964, he founded Hilary Corke Minerals, technical geological suppliers, specialising at first in Scandinavian minerals, then expanding to include the rest of the world. He had always been a keen traveller, often on his own and sometimes in difficult and remote places: he liked to say that he had climbed the Matterhorn and crossed portions of the Western Desert with one man and a camel.

As the depression lifted, Corke's activities as traveller and collector of minerals expanded. As a fellow collector commented "His understanding of physics, chemistry and geology became invaluable when his interest in minerals grew to the extent that he became a knowledgeable and reasonably successful dealer as well as a collector, personally collecting much of the stock that he sold" (in Norway, Sweden, Finland, many other parts of Europe, and Morocco). His character came out again in his very fair pricing policy as a dealer, his pleasantly laid-back approach contrasting with the "money is everything" attitude so prevalent these days.

Corke had always been a knowledgeable musician, composing from time to time; and in the 1990s he composed several hundred songs, mainly settings of Tennyson, Hardy, Betjeman, Pound, and Andrew Young. A selection received their first public performance at the Purcell Room at his 80th birthday concert in July 2001.

In that same decade of the 1990s he began again to write poems, prolifically; he seldom attempted to publish them, but a few appeared in the Spectator and elsewhere - poems as sprightly, witty and moving as any of the earlier ones. He was also writing and revising his "Memoirs of my Military Life and Times" which, while purporting to be a conventional history of his time in the Army, is in fact a characteristically wide-ranging work.

It was an odd life, in its indirections, its firm emphases, and its occlusions. Hilary Corke was supremely happy - and fortunate - in his family life; a keen and active person in the life of Abinger Hammer too. His best poems (my own favourites are "Rosslyn Chapel", "Pompeii" and "Children Playing") deserve to survive.

Hilary Topham Corke, writer, composer and mineralogist: born Malvern, Worcestershire 12 July 1921; Lecturer in English, Fuad I University, Cairo 1948 -51; Lecturer in Medieval English Studies, Edinburgh University 1951- 55; married 1957 Shirley Bridges (one son, three daughters); died Abinger Hammer, Surrey 3 September 2001.

BUILDING A FUTURE: THE MICROMOUNT COLLECTION-LABORATORY OF THE MCNB

by Carles Curto Milà

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Created in 1990, the Micromount collection of the Natural History Museum of Barcelona (MCNB) currently (May 2013) contains nearly 10.000 registered samples, including near 900 well identified mineral species and an interesting amount of well represented type localities.

In 2014 the MCNB has integrated the Masoliver collection, with a little more than 7000 samples, an important content of species considered rare and very rare, a noticeable contribution on type localities and an excellent representation of Spanish and Catalan mineral localities.

In the general background of the MCNB's mineralogical heritage, the collection is destined to grow as a major resource in Mineralogy, especially concerning aspects such as the correct identification of the species, well represented localities (with a special emphasis on type and Iberian localities), a complete description and images. The digital collection has been uploaded to the net in 2014.

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The Micromount collection-laboratory, an idea, a target

With a wide tradition in the North-American mineralogy (Benge 1904; Beck 1914; Manchester 1931; Wills 1931; Speckels 1965; Learned 1968; Fuller 1970; Anderson 1981; Briggs 1988; Dunn 1990; Peters and Pearson 1990; Roe 1990; Grim 1991a, 1991b; Wight 1993; Smith. s/d) and, more recently, in the European one (Hanauer 1965, 1979-1980; Henstchel 1972; Kipfer 1972; Bois D'Enghien 1977; Argentini 1979; Gatel 1983; Vollstädt, Voigt and Vogel 1988), a micromount collection is formed of small mineralogical samples that need to be observed under a binocular microscope, between 20x and 60x magnification.

This kind of collection needs preparation of the sample that includes a complete cleaning (under the binocular microscope the organic matter and the powder used to be really noticeable and hinder the observation and further identification), often a trimming (that must be carefully done to avoid the destruction of crystals) and the process of mounting, in the strict sense, implying the inclusion of the piece in a neutral plastic box (used, at the same time, to individualize and preserve the sample, and as a support to its basic documentation). All this makes easier the manipulation, storage and quick ocular identifications.

Micromounts often havee a varied, heterogeneous documentary content (Rich 1976; Rosemeyer 1991; Wight 1993) but what makes them really interesting and useful from the museological point of view is their thematic specialisation and a high documentary rigour. In this sense, defining the master lines of the collection and the quality of its documentary standards is especially important, fixing some main thematic axes and doing a very selective choice of every sample.

Examples of complete studies about precise localities that hand-samples do not permit include Manchester (1931), Kraissl (1982), Hentschel (1983) and Abellaand Viñals (2012) or about conserving mineral species that are rare or very rare or simply inexistent as macro samples (Wise 1978).

Understood some years ago as simple complementary collections and added as a support for a "main collection" (the classic collection of hand-samples) or even as a simple mineralogical amusement (Anderson 1983-1984; Peters and Pearson 1990; Roe

1990; Rosemeyer 1991), micromount collections have been progressively acquiring a strategic character as a basic source of information for an increasing demand with scientific purposes, and as a reservoir of lithological material for research groups or for single user interest.

Public museums with their professional curators, assuming a continuous scientific activity through time, can (and must) be centres of reference for this kind of collections (Oswald 1971), being ideal, due to their characteristics and endowment of specifically devoted personnel, as a documentary repositories and points of habitual consultation (both in-person and online) for all kind of users.

Currently, due to the typology of their contents, the delicate process of mounting and the amount of documenting that they require and generate, micromount collections transcend their role of simple mineral collections and acquire the more complex character of a collection-scientific laboratory.

The collection of the MCNB, the beginning

The MCNB's micromount collection was created in 1990 after a suggestion from two prominent collaborators of its Department of Mineralogy, Dr. Manuel Masoliver and Mr. Carmelo Sánchez.

At the beginning, it was just conceived of as a complementary branch of the major hand-samples collection on the MCNB but as it was growing it progressively acquired its own identity, building a context of reference for classic species and localities, mineral systematics and, specifically, as a representation of mineral species from the Iberian (mainly Catalan and Spanish) localities.

First steps of a singular collection

Further to a simple compilation of "small" or "binocular" samples, the first step to develop the collection was defining, in 1990, some main objectives and intentions to mark a style and the rigour as well as the internal and external projection of the collection.

One of the first activities dealing with the collection was an exhibition (Figure 1), in the year 2001, called "Els micromuntatges: minerals en miniatura" ("Micromounts: miniature minerals"). This exhibition included a case explaining the process of selection (from Nature to the laboratory), trimming, cleaning, orientation and mounting of each sample and the necessary materials to do all this. There was also an

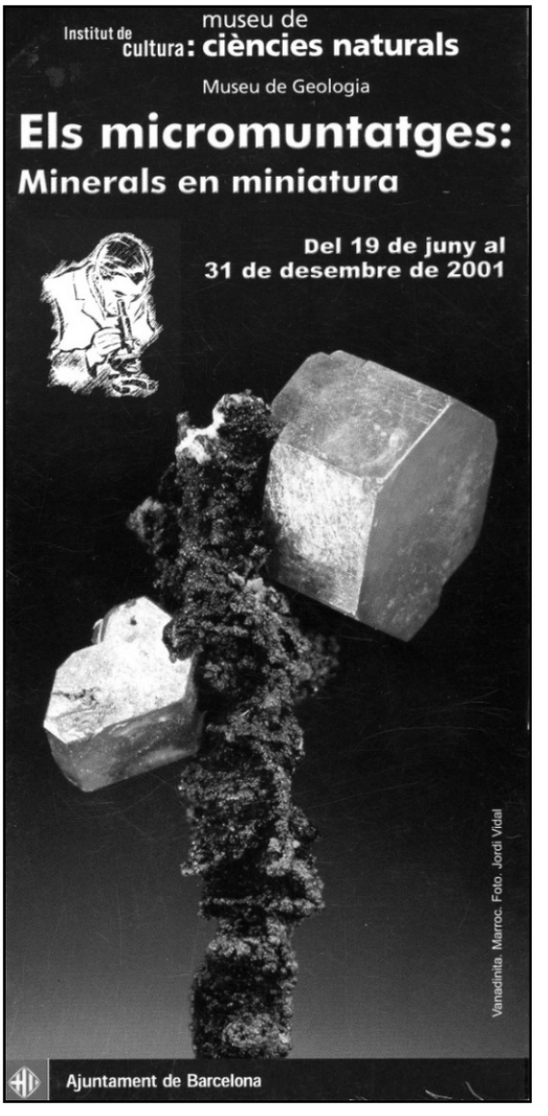

Figure 1. Front of the leaflet on the exhibition.

exhibition of big size pictures of some of the most impressive MCNB's micromount collection samples and a battery of binoculars with a selection of different minerals (systematic, local minerals, copper minerals…). The success of this exhibition forced the museum to extend it until 2003. As soon as it was possible (1995), a single room (Figure 2) was devoted to work with micromounts. The museum decided to name it Espai Masoliver (Masoliver Room) honouring Dr. Manuel Masoliver, collaborator of the Department of Mineralogy and responsible for the mineralogical data, supervised by the present curator (and author of this note).The space was then equipped with the necessary furniture, PC terminals, a hydraulic press, binoculars and lighting equipment.

Once the Micromount room was installed (Figure 3), the main items were fixed. In the beginning (1990-1995) the first intention was simply to complete and complement mineral data on the heritage content that the mineralogical collection (hand samples devoted

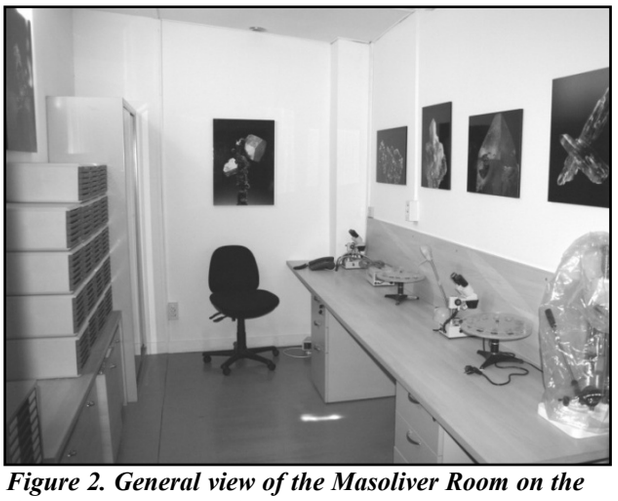

Figure 2. General view of the Masoliver Room on the Geological Museum (MCNB).

Figure 3. Work surface with basic equipment.

both to scientific and exhibition purposes) but this could not happen, due mainly to the lack of a specimen purchase budget.

This led to a basic focus on the two original reasons of the collection:establishing a close view on both the most interesting or rare mineralogical specimens in the hand collection, and on the samples from Catalan and Spanish localities of the hand collection. It required an opened and active data base, Microsoft Access in the beginning (1990-2000), and Microsoft Access and MuseumPlus (Zetcom Co.) since 2001 to deliver this and thus:

- The use of alpha-numeric systematic codification (Weiss 2008) with a monthly (Lapis Mineralien Magazin) and a general annual revision (IMA new minerals).

- A deep revision of the mineral localities (especially the oldest locality names which were very frequently erroneously transcribed or simply obsolete).

- The correct identification of doubtful or clearly misclassified species.

Defining a new policy and new perspectives

Focused on the immediate future as the main source of mineralogical information for the MCNB and its professionals and external users, the progress of the collection is being both theorized and practiced in spite of a menacing future for them, due to negative socio-economic perspectives in Europe and Spain.

Even considering this reality, the special characteristics of the Micromount collection allows continued work to proceed in spite of the worst possible hazards. In fact, it doesn't occupy a great situation but it is still possible to develop it with a scarce budget and just with an essential bibliography as well as optic, photographic and informatic equipment. In parallel, to establish a good planning and policy is just a question of imagination and rigour.

The project will continue the immediate and future work in three main items:

1. Initial collection: with more than 2000 samples, it is correctly stored and documented and labelled with the corresponding individual register number agreeing to the Weiss code (2008-2012). The names of species are databased in Catalan, Spanish and English to make the search easy. The data are compared on a monthly basis to Neue Mineralien, Lapis Mineralien Magazine and IMA new species. The initial collection, first independently registered, was later integrated (2004) in the general register (Mineralogy Dept.) in order to work on the general documentation of both collections (micromount and hand-sample collection) as a single one.

2. Masoliver collection: with almost 7000 samples arrived to the Museum in November 2014 through Dr. Manuel Masoliver, owner of the collection and collaborator of the Mineralogy Department. The update and revision of this permanently increasing collection has been made both at the home of the owner itself and in the MCNB's Mineralogy Department. A progressive and selective incorporation of small clusters of samples from this collection could be a good way to work with it, allowing the progressive incorporation of data to the net, according to definitive official register numbers.

3. Future collection: the rich contents of the current collection of the Museum and the added Masoliver collection will allow the design of a very well defined and selective policy of growth and documentation.

Due to its characteristics as collection and as a source of documentary data and mineral repository, and due also to the interrupted work on it, the Micromount Collection, including both the Masoliver and the initial collection, has been reconsidered as Micromount Collection and Laboratory and created as a resource for geodiversity (mineral materials for knowledge, research, mining heritage and diffusion) in the Museum.

The collection is especially rich in three key areas:

- Iberian species: a lot of well represented localities of Catalonia and Spain.

- Geodiversity: a wide content in mineral species (a lot of them considered as rare or very rare) and a good content of new species (IMA new species 2009-2012).

- Type localities: containing near 900 samples from their type locality, with nearly 400 type localities represented.

Those aspects reinforce the intention to build a solid documentary body based in:

- Basic documentation: database, complete description, bibliography…

- Bank of images: creation of a solid background of image information, not only as source of identification of each sample but also as a representation of morphologic and crystallographic diversity. Approximately 90% of the samples of the Masoliver collection are actually photographed as low resolution pictures.

- Implementation of external data bank: meeting other public (or private) data base to compare and complete mineralogical information.

- Ongoing review and discussion: about the documentary and collection contents and the revision needs.

- Permanent information: devoted to both professional and amateur publics.

Growth policy

The main interest of the Micromount Collection and Laboratory is to be continuously active and in permanent growth. Following the main issues and concepts previously expressed, it is now focused on a basic and selective increasing with:

- Common or rare mineral species related to the main geological traits of the Iberian Peninsula, especially Catalonia and Spain (mineral topography).

- Type localities: samples representative of type localities.

- Local collections: to define restricted clusters of species from specific mineral localities is specially significant to the documentation point of view (Manchester 1931; Kraissl 1982; Hentschel 1983; Abella and Viñals 2012).

- Rare or very rare species (mineral geodiversity).

- New species: described and accepted by the IMA in recent years (IMA new species 2009-2014) (mineral geodiversity).

All kind of possible administrative actions to acquire new samples are contemplated, with these being the most common:

- Donation: accepting singular pieces of complete collections from private individuals or institutions.

- Creation: of a net of single fellow donors, considered as collaborators.

- Prospection: programming selective collecting visits to specific localities.

- Legacy: occasional (as in the case of the Masoliver collection).

- Purchase: always selective and focused on the major traits previously expressed (but mainly dedicated to new and rare or very rare mineral species).

- Exchange: with private individuals, societies of micromounters, universities and museums.

- Deposit: temporal deposits can be accepted in function of their interest or documentation contents.

- Change of location: those samples in the General collection (hand collection or macro) that being not strictly micromounts are very small (some small crystal diamonds, for example) could be integrated into the Micromount collection (it represents a simple exchange of attribution in the database.

The projects that need to consolidate a specific annual budget or investment (i.e. prospection and purchase) could begin in 2015 depending of the eco-

nomic and administrative conditions, while the other items remain plentiful active. We note that a budget for purchase in the actual mineral market allows the "low cost" and we can affirm the same for accessing and working in near mineral localities.

The team

The project requires the tasks of a basic team that includes:

- A mineral curator: not devoted full time to the collection.
- An assistant curator (or an external documentation person specialised in mineralogy): devoted to the Micromount Collection.
- One or more collaborators (without direct economic cost).

Documenting

Documenting is a specific key word to define the objectives of the Micromount Collection and Laboratory and for the success of its development and existence. All decisions about the content of the different documentation aspects (species name, locality, collection of precedence, systematic position, description…) inform the final intention of the collection being consulted by a wide range of users.

In order to create a source for internal and external consulting of mineral data, to elect good and stable data-base software is necessary. For any agile work, listings, quick consultations etc., the most common commercial software (as Microsoft Access or FileMaker Pro) is very useful. The MCNB's Mineralogy Department is currently working in parallel, at the same time, with Access (Microsoft) and MuseumPlus (Zetcom Co.), a specific programme (Figures 4, 5) devoted to museum heritage, but it is not as useful and agile as the other cited programmes. FileMaker Pro has been proposed, for the near future, as the main database platform for daily work.

The systematic thesaurus (Figure 6) is based in the mineral codification of Weiss, S. 2008 (Das grosse Lapis Mineralienverzeichnis, 5 auflage), with monthly revisions in Lapis Mineralien Magazine (Christian Weise Verlag) until May 2015. It is comfortably agile for incorporating new species (IMA new species 2009-2015), noting obsolete, erroneous or doubtful mineral names and furnishing new or changing data. The Strunz-Nickel codes are assigned in parallel (Strunz and Nickel 2001).

Mineral species (and varieties) are registered with their Catalan name (as principal) (Garrido and Ybarra 2010) with their synonymies in Spanish (Díaz Mouriño 1991), English (Back 2014) and, for significant cases, in German (Weiss 2008), French and Italian, all of this in order to make research easy.

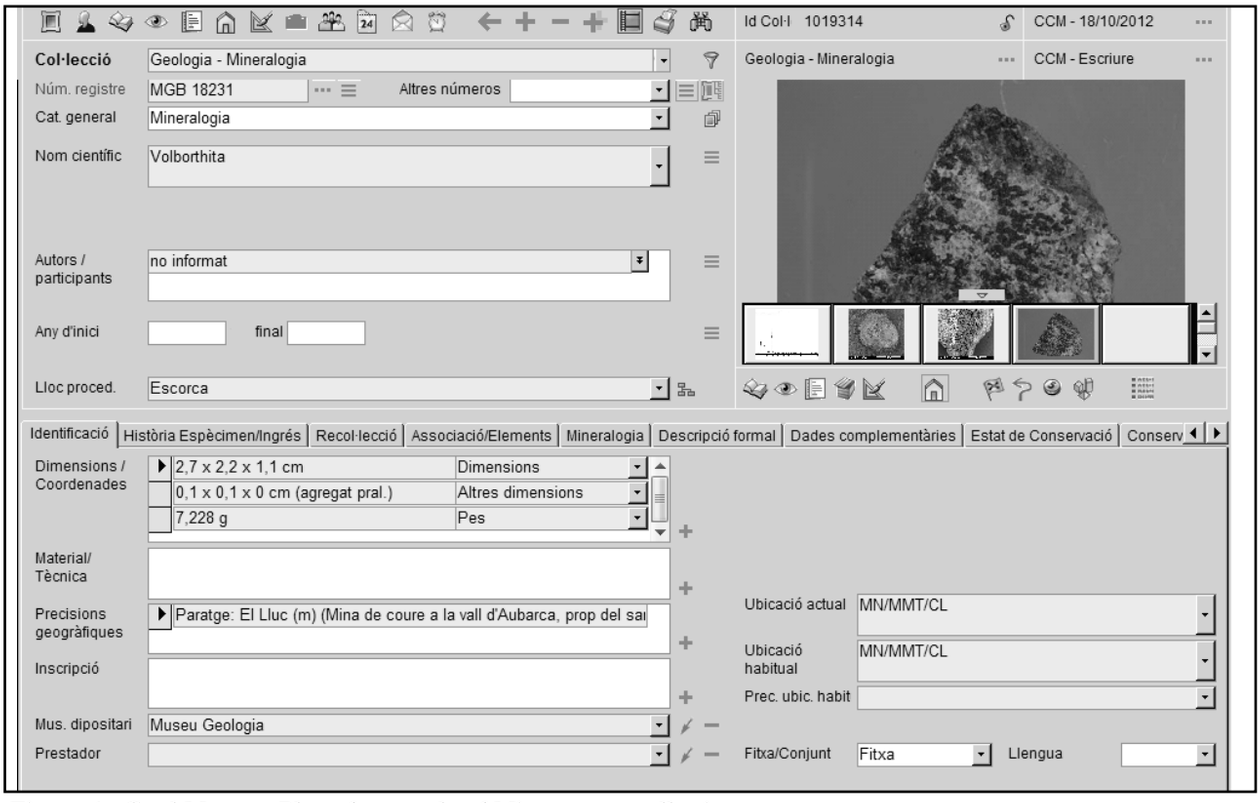

Figure 4. Card MuseumPlus of a sample of Micromount collection.

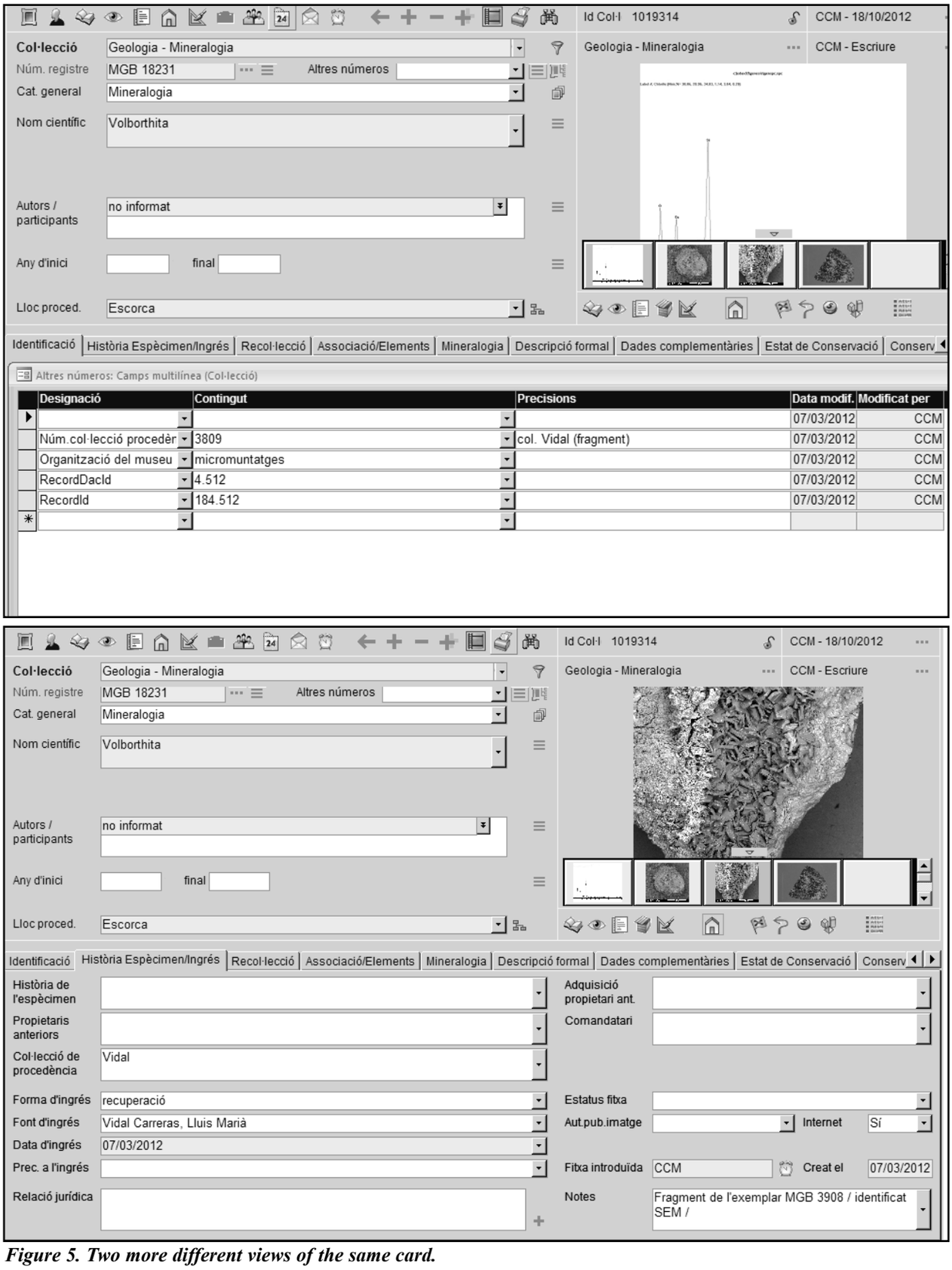

Figure 5. Two more different views of the same card.

In the cases of the species considered new by the IMA but not yet added by Weiss, a temporal code is assigned to the sample. The definitive code is applied once assigned by Weiss.

The thesaurus of localities is based (and revised) after the major official administrative divisions for each county to facilitate consultation. The most detailed divisions, as mines, quarries, sites, etc., are also expressed as branches of the thesaurus and thus, consultable.

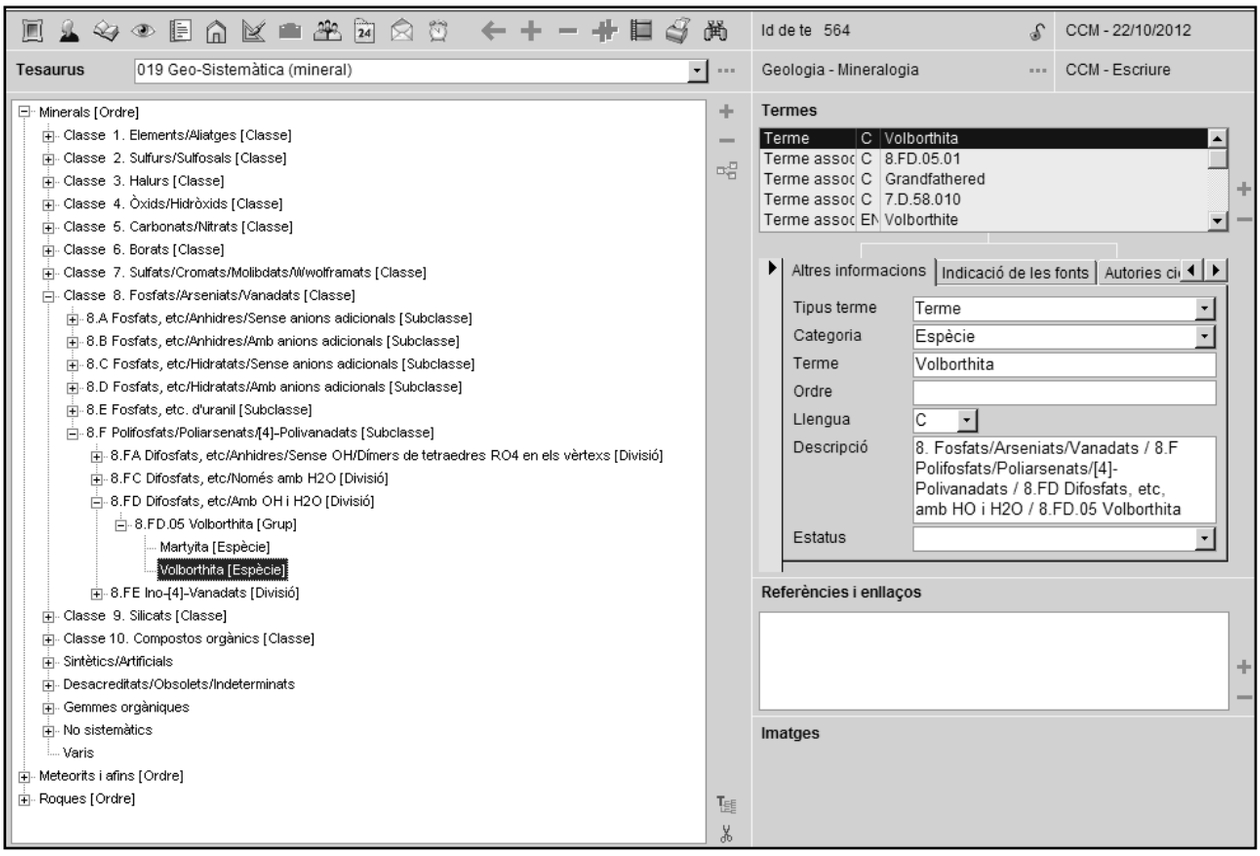

Figure 6. A view of the systematic thesaurus.

A lot of idiomatic variations, local spellings and historical toponymic forms are being added to the thesaurus in order again, to make the consulting easy and rich. Although the variations create additional work, it is good to incorporate them into the thesaurus, considerably enriching its content and context.

Finally it adds some no-systematic mineralogical categories as rocks (including meteorites), mining materials and products, synthetic and artificial products and indeterminate, discredited, or obsolete mineral names as well as organic gem material, ivory, coral, bone...).

The Micromount Image Bank

If nowadays the image is considered as an important resource of any online mineralogical database, they are essential for micromounts (Hanauer 1979-1980; Gatel 1983; Harker 1984; Betz 1990; Benkhe 1991).

The creation of a solid background of image is necessary not only as a source of comparison for identification but also as a graphic representation of the morphologic and crystallographic diversity and as a photographic bank for museological diffusion and for education purposes and to illustrate scientific or educational articles, books, leaflets, etc., both in and out the Museum.

It has been considered basic to choose optical equipment that allows the capture of images of enough quality to be published, with optic resolutions that macro-photography does not cover, nor the photography applied to the usual microscopes, due, basically, to the difficulties of working with a sensitive field depth.

Figures 7 to 12 illustrate a few of the specimens in the micromount collection.

Needs for a new space and equipment

La Col·lecció-Laboratori de Micromuntages (Micromount collection and laboratory) is considered as integrated on the mineralogy working area and, thus, the spatial standards and the equipment (excluding the general storage area and furniture of the mineralogical general collection that, for their volume and characteristics, need a separate treatment) are not exclusively devoted to micromounting.

The proposed future dedicated surface (including the office of mineralogy and the collection-laboratory of micromounts) has been estimated as requiring a minimum of 50 square metres (for four people) divided in two areas: dry and wet.

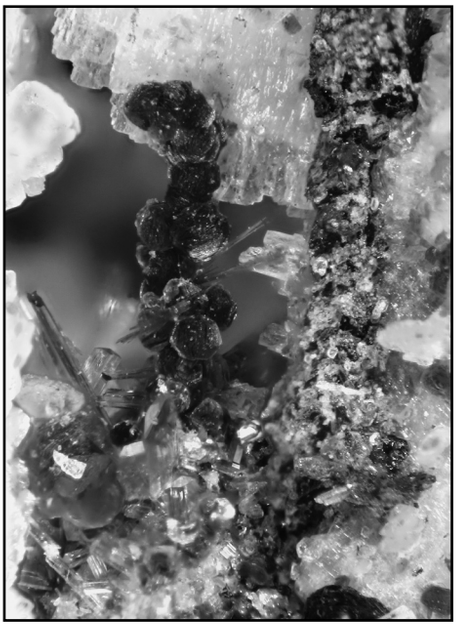

Figure 7. Chlorite fromToras, Spain.

Figure 8. Synchisite from Trimouns Mine. Luzenac, Midi-Pyrénees, France. Crystal is 2.5 mm long.

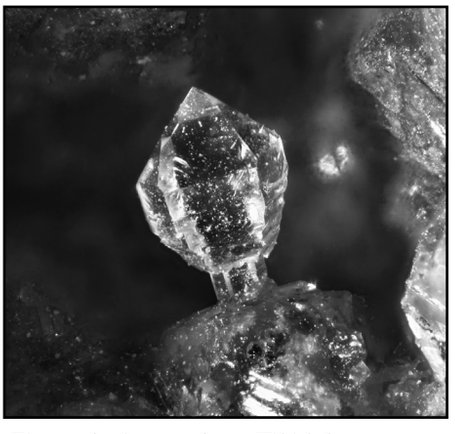

Figure 9. Quartz from Tibidabo, Barcelona City, Catalonia, Spain. The crystal is 1mm long.

Figure 10. Lengenbachite from Lengenbach quarry, Binntal in Switzerland. The specimen is 5mm in width and was found in 1978 by T. Imhof.

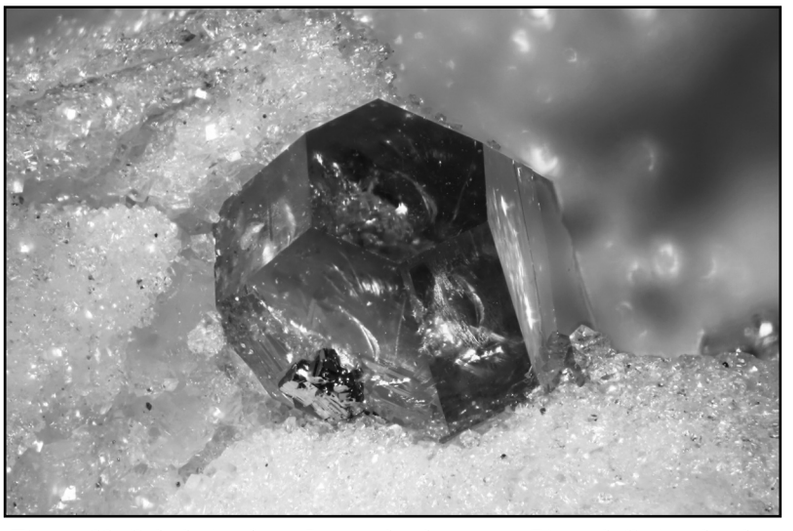

Figure 11. Sphalerite from Lengenbach quarry, Binntal, Switzerland. Crystal is 2mm long.

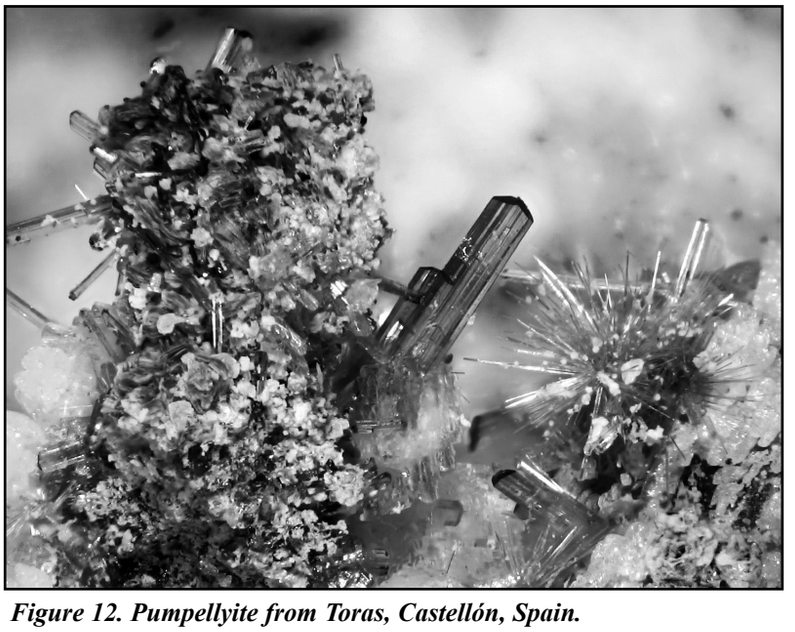

Figure 12. Pumpellyite from Toras, Castellón, Spain.

Basic implementation

Local water services

- Ceramic sink 150 x 50 cm (with ceramic outlets)
- Cold and warm water.
- Tap and outlet for ultrasound equipment.
- Work surface(acid resistant) 400 x 60 cm.

Furniture

- Desks 280 x 70 cm. (minimum 4)
- Cupboard for tools and products (glass door). 170 x 100 x 40 cm.
- Cupboard for samples on process (glass door). 170 x 100 x 40 cm.
- Cupboard for clothes and personal belongings (opaque door) (2 cupboards) 170 x 100 x 40 cm.
- Low furniture with sliding doors (as a support of the furnitures for micromount collection storage).
- Plastic furniture of booths to store the micromount collection.

Informatic equipment

- PC terminals with the adequate software (including usual net programs).
- Telephone supply devoted to voice and net connection.
- Image caption software connected to PC terminal.

Optic equipment

- Nikon binocular SMZ-10 (10x to 60x) (detailed observation).
- IMCOT binocular (or similar, for quick observations and mounting process).
- Field microscope Peak 20x / NA 0.06 (punctual observations, field trips or visits to other collections).
- UV lamp UV-Leuchte LS-4 (220V/50 Hz): (long and short ultraviolet wave).

Mechanic equipment

- Maestra 500 hydraulic press (separate and prepare pre-samples).
- Zuber MP5 press (separate and prepare definitive samples).
- Reininger EMMMI 20 ultrasound equipment (260x150x220 mm/150W) (initial cleaning of samples before their definitive preparation and mounting).

Other materials

Plastic boxes: currently samples are prepared in transparent plastic boxes 3x3x1 cm. We may consider and discuss using some other alternative sizes. If a unique model assures a low cost and a standard storage and minimizes the risk of misplacement, different models would allow a wider range of sample sizes and reduce the trimming effects and the danger of fracture or disappearance of crystals.

Final remarks

In the near future an increasing demand for information and solid mineralogical materials for a wide range of scientific research, educational and even industrial needs will justify the existence of the museum collections and reserves. At present, the micromount collections, as a future reservoir of mineral knowledge, are not yet really significant in most of the main European museums but there are a lot of very advanced and local collectors all over the world involved in building important collections of this kind, following a wide range of policies: localities, species, concrete systematic groups…, really a wide background of mineral heritage.

In the next years, a lot of these collections could be integrated in major or local museums… if they are prepared to receive them. With this aim, to understand their real potential and begin to build and develop micromount collections in the museums is not a nonsense (or minor) task. To develop policies of knowledge and cooperation with individual collectors (and, of course, with other museums) should be an interesting line to catch private collections for the future. The hidden force of this type of collections should be the attractive point for an immense baggage of mineral knowledge that "hand collections" are not always able to include.

Acknowledgements

I wish to thank my gentle colleague Jaume Gallemí for his conscientious revision of the English text. Also thanks to Angela Jiménez-Sanz for her assistance with language translations. Joan Rosell Riba kindly provided the micro-mineral images.

References

ABELLA, J. and VIÑALS, J. 2012. Nous minerals de la mina Eureka: metamunirita, schrökingerita, boltwoodita i gordaïta, Castell-estaó, La Torre de Capdella, Lleida. *Mineralogistes de Catalunya* **11**(1), 14-18.

ANDERSON, V. 1981. Microminerals. *Mineralogical Record* **12**, 44.

ANDERSON, V. 1983-1984. Le monde fascinant des micromounts. Monde et Minéraux. 52, 53, 54, 56 58 / 60: / 62: Microminerals. Gener-febrer 1983 /

juliol-agost 1984.
ARGENTINI, G. 1979. Guida alla collezione dei micromounts. *Edizioni Calderini*. Bologna. 59pp.
BACK, M.E. 2014. *Fleischer's glossary of mineral species 2014*. The Mineralogical Record Inc. 420pp. Tucson.
BACK, M.E. and MANDARINO, J.A. 2008. *Fleischer's glossary of mineral species 2008*. The Mineralogical Record Inc. 345p. Tucson.
BECK, C. 1914. The Binocular Microscope Of The Past, And A New Form Of Instrument. *Journal of the Royal Microscopical Society*, 1914.
BENGE, E. 1904. Minute mineralogy. *The Mineral Collector* **11**, 129-133.
BENKHE, D. 1991. Microminerals: photomacrography of minerals. *Mineralogical Record* **22**, 171-476.
BETZ, V. 1990. High magnification mineral stereophotomacrography. *Mineralogical Record* **21**, 475-480.
BOIS D'ENGHIEN, R. 1977. Micro-échantillons. *Minéraux et Fossiles* **26**.
BRIGGS, N. 1988. Of micromounts and other things. *Micromounters of New England Newsletter* **3-7**.
GARRIDO, J.L. and YBARRA, J.M. 2010. Nomenclàtor de les espècies minerals. Grup Mineralògic Català. Barcelona. 376p.
DÍAZ MOURIÑO, C. 1991. *Diccionario de términos mineralógicos y cristalográficos*. Alianza Editorial. Alianza diccionarios. Madrid.
DUNN, P.J. 1990. Specialization in mineral collecting. *Mineralogical Record* **21**, 511-513.
FULLER, B. 1970. *Micromounts. (a The complete guide to Rocks, gems and minerals)*. Petersen Publishing Co., Los Angeles. 32-40.
GATEL, P. 1983. *Les micromontures (micromounts)*. Fédération Française Amateur de Minéralogie et Paléontologie. Coll. Géologie. Paris. 84pp.
GRIM R.I. 1991a. Mounting popularity. *Lapidary Journal* **45**(12), 21-25.
GRIM R.I. 1991b. *The international directory of micromounters*. Fifteenth edition. Baltimore Mineral Society. Baltimore. 70p.
HANAUER, A. 1965. Mikro-Mount: Die Schaustufe in der Streichholzschachtel, das Museum in Persilkarton!. *Der Aufschluss* **16**, 76-79.m
HANAUER, A. 1979-1980. Micromounts: Die Kleinstufen für den Sammler. *Lapis Mineralien Magazin*. (en tres parts) **4**(3), 11-13. **4**(6), 12-14 i **5**(3), 24-25.
HARKER. M. 1984. Macrophotography. *Australian Gem & Treasure Hunter* **94**.
HENSTCHEL, G. 1972. Kleinstufen ("Micromounts"), eine zeitgemässe Form Mineralien zu sammeln. *Der Aufschluss* **23**, 364-368.
HENTSCHEL, G. 1983. *Die Mineralien der Eiffelvulkane*. Christian Weise Verlag. Munich. 153p.
KIPFER, A. 1972. *Der Micromounter*. Ott Verlag. Thun. 212p.
KRAISSL, A.L. 1982. Micromounts from the Franklin-Sterling Hill area. *Rocks& Minerals* **57**, 207.
LEARNED, E.M. 1968. Micromounting. Mineral Information Service. California Division of Mines and Geology. 33-34.
MANCHESTER, J.G. 1931. The minerals of New York city and its environs. *Bulletin New York Mineralogical Club* **3**, New York. 168p.
OSWALD, D.L. 1971. The Jefferis Micromounts at Carnegie Museum. *Mineralogical Record* **2**, 163-164.
PETERS, J.J. and PEARSON, C.L. 1990. Clarence S. Bement: the consummate collector. *Mineralogical Record* **21**, 59.
RICH, C.C. 1976. An easy-to-build micromount cabinet. *Rocks & Minerals* **51**, 435.
ROE, A. 1990. Through the 'scope: history of the Neal Yedlin Memorial Micromount Symposium at the Tucson Gem and Mineral Show. *Rocks & Minerals* **65**, 56-57.
ROSEMEYER, T. 1991. Through the 'scope: Milton L. Speckels inducted into the Micromounters' Hall of Fame. *Rocks & Minerals* **66**, 492-493.
SMITH. H.T. s/d. Micromounts-Minerals in miniature. *Cranbrook Institute of Science. News Letter*. Bloomfield Hills, Michigan. **30**(3).
SPECKELS, M.L. 1965. *The complete guide to micromounts*. Gembooks. Mentone, California. 97p.
STRUNZ, H. and NICKEL, E.H. 2001. *Strunz mineralogical tables*. E.Schweizerbart'sche Verlagbuchhandlung (Nägele u Obermiller). 870 p. Stuttgart.
VOLLSTÄDT, H., VOIGT, G. and VOGEL, A. 1988. *Micromounts: Arbeitsbuch für Mineralsammler*. Springer Verlag. Berlin. 193p.
WEISS, S. 2008. *Das grosse Lapis Mineralienverzeichnis. 5. Aufluge.* Christian Weise Verlag. Munich.
WIGHT, Q. 1993. T*he complete book of micromounting*. Mineralogical Record. Tucson, Arizona. 283p.
WILLS, L.C. 1931. The preparation of micromounts. *Rocks & Minerals* **6**.
WISE, W.S. 1978. Parnauite and goudeyite, two new copper arsenate minerals from the Majuba Hill Mine, Pershing County, Nevada. *American Mineralogist* **63**, 704-708.

GALLERY REVIEW

ELEMENTS IN THE ULSTER MUSEUM, STRANMILLIS ROAD, BELFAST

by Matthew Parkes

This gallery was opened in March of 2014, and forms a hub entrance to the galleries on the third floor covering the Natural World. So, from it one enters galleries to the left covering meteorites and planetary geology, mineral treasures, evolution and the natural history of Northern Ireland, and to the right the geological story of Northern Ireland

The exhibition Elements, subtitled 'from Actinium to Zirconium' occupies a large gallery space about 18 m by 14 m with three entrances. Wall cases from floor to ceiling contain the bulk of the object based exhibition, with two central island cases in addition. Other major elements, such as interactive components occupy wall spaces between cases. Two inviting sofas are also present in the spacious gallery although one could fall over them if engrossed in the displays because they are the same colour black as the flooring. They allow one to sit back and reflect on the headlines on the cases after looking at the detail within.

Passing a historical painting of alchemists in introduction leads to an eye-catching display of the Periodic Table with all elements represented by a sample encased in Perspex blocks, about 10 x 10 cm each in size. Eye catching is a term you could use throughout the exhibition because there is such an array of integrated but disparate objects included. The elements of the Earth and its place in the universe are addressed in the rest of the case.

A large sponsored interactive map of the World allows you to press buttons and discover where many different important elements are mined in the world, with lights indicating the countries - simple but effective. Another interactive follows with jigsaw pieces on a wall mounted board that allows you to combine elements to make compounds. The wear and tear on the pieces suggests this is well used. It works as long as the gallery staff regularly decouple and randomise the pieces after they have been combined, so the next person can have a fresh start. Within the same general zone is a panel of Local Heroes that records some key scientific figures with Irish associations, and notes their contribution to our understanding of the chemistry and physics of elements.

Following in a circular fashion is a large case exploring the themes of colour and light, with a large variety of objects whose colour relies on specific elements to provide them. As well as many surprising items, a rich variety of glass features strongly. The

Figure 1. The introductory case with the Periodic Table and physical specimens of each element (where feasible to include).

Figure 2. The Atomic Energy Lab.

numerous elements involved in transmitting lights in gas lamp mantles, light bulbs of all sorts, lasers, fibre optics etc are all well explained and presented. Alongside the case is a wall mounted solar panel and a box to deposit an evaluation form for the exhibition.

The next large case is entitled 'Wealth, fashion, fission and fusion' and includes a fascinating juxtaposition of objects made with elements of financial value and of decorative or aesthetic value in society. Despite the Curators' successful efforts in borrowing or purchasing many high value objects, he could not persuade anyone to sponsor or loan a stack of gold bullion bars, and a photo substitutes! Half of the case explores topics under the fission and fusion heading, again providing unexpected surprises. One new object, only recently introduced, and something that catches the attention of many, is an Atomic Energy Lab toy set from the 1950s, full of radioactive elements for experimentation - so much more than the chemistry sets I played with as a child. Adjacent to this is another interactive screen set up that allows the user to choose any particular element in the Periodic Table, and to see a set of further information including films of manufacture or reaction behaviour of the chosen element. This is also available as an app, Elements in Action, from iTunes.

Figure 3. The display case addressing Death.

Figure 4. The Technology case.

Each of the two cases in the middle of the room is split, giving four themes: Life, Death, Progress and Technology. 'Life' looks at the elements involved in the making of body parts, with an enormous spider crab making a dramatic entry. Much of the 'Death' case involved poisons of all sorts both human and animal. The 'Progress' case tackles key elements as fundamental to progress of human society, focusing on silicon from stone age to silicon age, copper and communications and iron and the industrial revolution. The displays are object and element focused rather than conventional linear history. An end of case also covers some historical medicine usage of specific elements.

'Technology' is a further interesting mix, with many objects linked to Belfast's industrial past. Metal melting temperatures are exemplified by a melted engine block from a car that went on fire. The shiny metal had flowed and solidified in a long irregular ingot. It was only when talking to the attendant in the gallery that I was told that this was a special piece of Belfast history, from the Troubles (although in fact it is not). Indeed, the enormous enthusiasm and pleasure of the staff member when she declared that she thought it was the best exhibition they had ever had, was remarkable. I was told how much she enjoyed working in there, and how positive was the public reaction to it.

Figure 5. An overview of one half of the Elements exhibition layout.

Overall, the exhibition is a fantastic, different and original approach. Mike Simms, the palaeontology curator whose concept and effort has been brought to fruition in this exhibition, obviously viewed the entire NMNI collections as potential resources in the development. Although there are excellent geological specimens of rocks, minerals, meteorites and fossils used to good effect, there is such an eclectic mix of decorative arts, social history, archaeological, technological and natural science objects that each is of interest in the overall story. Very many have local connections or stories that can only resonate with visitors' own experiences.

Of course, amongst all these positive statements, it is only fair to note the opposite, if required. Any museum case design has to reach a compromise between legibility and trying to squeeze as much as possible into the story, but I would have liked larger font and labels for reading comfort. Mike Simms has maintained a direct connection between text information and an object or small group of objects, but if you are interested there are also numbers tied with a smaller text panel giving much more object and specimen details. These are at floor level but may have already been raised up somewhat by the time this is published. As a tall person I had to bend down in many places to read the text on small panels that are mounted vertically on the furniture in the cases. These could have been mounted with an angled wedge to make them easier to read for short and tall alike. However, these are very minor criticisms of what is genuinely an excellent exhibition gallery.

Although it had an original date for closure in 2015, this has already been extended to 2016 and I could see the exhibition remaining as a 'permanent' gallery. I believe it should.

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GEOLOGICAL CURATORS' GROUP

40th Annual General Meeting

40th Annual General Meeting of the Geological Curators' Group.
The Beaney, Canterbury. 3rd December 2013.

1. Apologies for absence.
Tom Sharpe, Mick Stanley, Sue Turner.

2. Acceptance of the minutes of the 39th AGM held at Leicester.
Agreed. No amendments.

3. Matters arising.
No matters raised.

4. Chairman's report.
I am afraid that 2013 has been yet one more difficult year, in many ways a continuation of 2011 and 2012. At my first AGM in Leeds I talked about vanishing curators in the Earth and Natural Sciences. The story of the Ulster Museum has been mirrored in many other museums around the country with the continuation of the trend of replacing specialist geological curators with generalist Natural Sciences curators. Warwick Museum is a typical example, and I believe there is only one local museum left with a true specialist geological curator. More concerning has been the adoption of this practice at a national museum - the National Museum of Wales. Whilst there are areas of grave concern, I believe there are also some areas of optimism, and I would like to consider these further.

a. The Campaign for Good Curatorship.
I commented last year on the general lack of support for geological and natural sciences curators from the Museums Association, but that Dr Tim Ewin had talked on the importance of good curation at the Collections Link's Open Culture 2012 Conference in June. The resulting "Campaign for Good Curatorship" was being supported by the Collections Link. I am very pleased that Tim has been part of today's programme.

b. English Geodiversity Forum.
The GCG has been represented by Kate Riddington on the working party developing the English Geodiversity Forum and Charter, intended as a parallel development to the Scottish Geodiversity Forum. Kate has had some important input with suggestions of museum based case studies.

c. Twitter, Facebook and blogs.
The GCG now has Twitter and Facebook accounts, thanks to the hard work of Emma Bernard. These compliment the GCG website, which continues to enjoy a high Google ranking. Many thanks to Hannah Chalk for keeping the website fresh and up-to-date. Thanks also to Giles Miller for his work on blogging about success stories within the museum community. Assembling such case histories in a single place should prove invaluable in the future.

d. JISC - GB3D type fossils online.
The JISC-GB3D type fossils online project is a partnership between the British geological Survey, the National Museum Wales Cardiff, the Sedgwick Museum Cambridge, the Oxford University Museum of Natural History and the geological Curators' Group. GCG is representing the many other museums around the country. The project is building a web-based database of the fossil types in the partner museums, including high-quality images, stereo anaglyphs and some 3D digital models produced by laser scanning the fossils. The website (www.3d-fossils.ac.uk) was launched at the Lyme Regis Fossil festival in May, with a higher profile press launch in August. Although the database will not be fully populated until the New Year, the website is starting to raise the profile of many of our museum fossil collections.

e. NatSCA - Natural Sciences Collections Association
With the gradual replacement of many local geological curators by natural science curators, it is not surprising that as GCG membership and turnouts have slipped, NatSCA turnouts have remained strong, with over 100 attending their AGM in York early in the year. The future must include closer collaboration with NatSCA and I am pleased that we are exploring areas where we can collaborate. Joint meetings and workshops are clearly important, plus possibly a reduced price joint membership. A joint Memorandum of Understanding with NatSCA and SPNHC (Society for the Preservation of Natural History Collections) is under consideration.

f. Chairman's working groups
At the January 2011 AGM/EGM/Committee meeting, I outlined my intention to establish working parties on the development of a strategy to

responding to proposed cuts, publicising success stories from museums and raising the good news profile, and 'Citizen Science' projects, bringing amateurs on board. Unfortunately, time pressure on members and the committee has continued to delay formal progress on these. The cuts have made it harder for many committee members to devote as much of their time to GCG. Never-the-less, the 'Campaign for Good Curatorship' may help to address the first issue; Giles Miller's blog and the JISC funded GB3D type fossils online are contributing towards the second issue and the GB3D database may underpin future citizen science projects.

g. The Committee

Finally, I should like to thank the Committee for all their hard work over the past year. In particular, I should like to thank our new Programme Secretary, Jim Spencer for stepping in and organising a full programme. I should also like to thank all the other committee members that I have not already mentioned, including Helen Kerbey, secretary & Coprolite editor; John Nudds, treasurer; Tony Morgan, minutes secretary; Matthew Parkes, journal editor and Guidelines project manager; and the other committee members, Giles Miller, and Steve McLean who stepped down during the year. I should like to thank the co-opted members too, including the webmaster, Hannah Chalk; the membership Secretary, Cindy Howells; Tom Sharpe, and our ICON representative, Adrian Doyle, who also stepped down during the year.

Proposed: Cindy Howells. Seconded: Giles Miller.
Accepted.

5. Secretary's Report.

We have now set up an advisory group for the Committee containing some knowledgeable Members most of whom are ex-Committee for when we need extra input. Often the Committee has a range of different members on it covering different types of collections, and with different skills, however this will give us extra experience when we need it. For example during the year Tom Sharpe assisted us in agreeing a new Terms of Reference with the Geological Society.

The new Constitution has been accepted by the Charity Commission and is available on our web site: geocurator.org Our web site and our social media continue to grow and I would like to thank Emma Bernard for doing such a good job with the twitter and Facebook accounts and Hannah Chalk for continuously updating the web site with jobs and newsletters etc. Giles Miller has also started a blog highlighting the importance of geological collections at http://geocollnews.wordpress.com/.

We are still involved in the Lapworth re-development, and the Doncaster review. The Isle of Wight Council has decided not to dispose of the Dinosaur Isle museum which is good news. We are frequently asked to provide representation at different group meetings.

Kathryn Riddington has been representing us on the English Geodiversity Forum.

I am aware that museum are going through a major change with a lack of funding and a lack of collection orientated ideals. I have recently heard of museum resorting to using volunteers for anything geological (including their new displays) when they used to have skilled curators. I hope that in the next year we can be even more proactive and start to make ourselves known as a useful group to help museums like this.

Proposed: Giles Miller. Seconded: John Nudds.
Accepted.

6. Treasurer's Report

This year's balance of almost £15K still includes approximately £4K from the JISC grant of £9K awarded for the 'GB/3D type fossils online' project described by your Chairman earlier. If we consider the balance without this grant, it will be seen that we actually have around £11K in our reserves, and as I explained in my report last year, our annual balance has been close to this figure now for the last six years since year end 2008. There is still no cause for concern and I recommend that subscriptions remain at their current level for at least another year. Once again this year's Gift Aid is a welcome addition to our income, and if you have not signed a Gift Aid form, can I encourage you to do so.

Workshop income more than matches workshop expenditure which is good news as we encourage meeting organisers at least to cover their costs. Expenditure on most items is similar to other years (2 volumes of Geological Curator and 3 editions of Coprolite). Once again it is a sad fact of life that committee expenses continue to rise, and I encourage committee members to make advance purchases of travel tickets which can help us considerably. Please book tickets now for the 21st January committee meeting in London if you haven't already done so!

The American dollar account stands at $ 3.041.42 ($ 2,791.42 last year), and the European account stands at □36.57 (□210.60 last year). I record my thanks to

Tiffany Adrain and Matthew Parkes for looking after these respective accounts, and once again to Caroline Buttler and Christian Baars (NMW) for careful auditing of the accounts.

Questions:
Giles Miller - How much is postage? John Nudds. No figure to hand. The newsletter is produced as a package and includes postage. Postage costs for the journal are saved by Matthew Parkes traveling to northern Ireland to take advantage of UK postal rates.

Giles Miller - Do we spend the US Dollar account and has PayPal been looked at? John Nudds. Not at present, awaiting favourable exchange rates. The Euro account is used by the Journal Editor. Both accounts (US Dollar and Euro) are useful for receiving subscriptions from overseas members without having to change currencies. Cindy Howells. PayPal has been discussed. The company would take a small percentage of each subscription. In order to retain income levels a charge for the facility may have to be applied if used.
Proposed: Phillip Hadland. Seconded: Helen Kerbey. Accepted.

7. Membership Secretary's Report
Personal UK 140 (+17)
Personal Overseas 22 (+2)
UK Institutions 36 (+13)
Overseas Institutions 17 (+7)
Honorary 5
Total 220 (+ 38 ˜ 258)
These figures give the actual paid subscriptions, with assumed additions for those who have not yet paid, in brackets. The final figure for the year is likely to be somewhere between 219 and 258, but to report it as 220 would be to give a falsely low number. I prefer to be more optimistic!

Very sadly, this year three very long-standing members died. Phil Doughty (our fourth Chairman), Bob King (Brighton Medallist from 1995) and also John Gibson from Scotland.

This year has seen the inevitable few cancellations as curators retire, or are made redundant. However, we have also managed to pick up 6 new members, so not all bad news. However we must continue to promote the Group to our colleagues and institutions as the only specialist group, (and affiliated to the Geol. Soc.), dedicated to geology curation and collections. In this time of budget cuts and general belt-tightening, it is really important that collections are protected, and their importance is recognised. We might not
be able to do much about protecting jobs, but we can assist non-specialist curators who find themselves in charge of a set of geology specimens they know nothing about. Looking at the figures published in the first State and Status report in 1981, it seems we are now in a far worse situation than we were then. When GCG was first founded in 1974, the membership grew rapidly. After the first year we had 83 members, and this doubled by the next AGM. At this time there were many geological curators in museums and GCG was seen as a way of providing support, discussion and training across the profession. Last year I did a rough count of the number of geological curators employed in the UK, and I'm really sorry to say that the numbers are lower now than they have perhaps ever been.

Outside the few National Museums and a couple of University Museums, there are now almost no dedicated geological curator posts left! It's not really surprising that our membership figure is so low. So, please do everything you can to promote the group and encourage even non-specialist curators to join, in order that they, and their collections, might benefit from our support.

I will accept next year's subscriptions anytime, cheque or cash. Don't forget we now have an optional £10 rate for the unwaged, so it's no excuse to tell me you're retiring!
Proposed: Giles Miller. Seconded: Emma Bernard. Accepted.

8. Programme Secretary's Report.
A number of meetings were held during 2013. The first of these was to Guernsey on the 25th and 26th April. This meeting took place despite Guernsey's sea-fog making arrival on the island much more difficult than anyone expected. Participants arrived in dribs and drabs as re-scheduled flights permitted, and proceedings began at the Museum on Thursday afternoon rather than the morning as intended.

The Museum Director, Jason Monaghan, gave an introductory talk about the Museum and its status on the island. This was followed by a talk on the history and formation of the geological collections by Alan Howell, Senior Curator, and Clive Martin, Operations storerooms, returning later for a wine reception back at the museum.

On Friday John Renouf, a local geologist, gave a conducted tour of the island, in which we were joined by a number of Guernsey geologists. The weather was beautifully sunny but chilly. A fuller report of

this meeting appeared in Coprolite No. 70 (June 2013).

A proposed joint meeting with the Royal Microscopic Society, scheduled for May, had to be postponed to 2014 due to serious illness of one of the organisers. The 22nd SPPC meeting was held in the Grant Institute of Edinburgh University on Tuesday 27th August, with an attendance of around forty people. There were seven presentations during the morning (with two posters) and a visit to the NMS stores in the afternoon. A summary of the proceedings was given in Coprolite No. 71 (November 2013).

Many thanks to Alan Howell and the staff at Guernsey Museum for the interesting visit to the island, and to Vicen Carrió and other members of the Edinburgh planning team for organising the joint GCG / SPPC meeting.

Preview of 2014 Programme - Although these details should be regarded as provisional at this stage, here is a summary of the programme being planned. The GCG Committee have been actively investigating the possibility of joint meetings with other societies with similar aims and objectives. In this context one meeting is proposed in April with NatSCA, at the Oxford Museum of Natural History, on "Hazards in Collections."

Secondly it has been tentatively agreed to become one of the collaborative sponsors for the 29th Annual Meeting, in Cardiff, of the Society for the Preservation of Natural History Collections (SPNHC) in June next year. There will be opportunity to have a stall in the foyer with posters and promotional material. In addition, GCG will be organising a fieldtrip on the final day, to run alongside the ones that SPNHC offer. We hope that members will be able to attend this at much reduced rates. Attendance at the full meeting is expensive, but GCG members will be given the concessionary rate. NatSCA are also sponsors and may be hosting a session of talks.

On September 2nd there will be the 23rd SPPC in York (with the 62nd SVPCA on September 3rd to 5th). This is followed on September 11th by the deferred joint meeting with the Royal Microscopic Society on "Geo-materials Sample Preparation for Microscopy". Finally, in December, there will be the 41st GCG AGM.
Proposed: Tim Ewin. Seconded: John Nudds.
Accepted.

9. Journal Editor's report.
No report received.

10. Newsletter Editor's report.
Three editions of Coprolite have been successfully printed this year. I am continually grateful to the news, meeting reports and information that members send me for inclusion. An electronic version is put on our web site at geocurator.org soon after the issue is printed. Coprolite is a great way to share information about exhibitions, projects, and job moves. I will be sending out a request for Musical Curators in January as I think we have missed mentioning quite a few retirements and job changes in the last year. Since we now have a Programme Secretary there should be more information about meetings going into the next few issues. Also - meeting reports! If you've been to a meeting and learned something please tell us about it.
Proposed: Cindy Howells. Seconded: Giles Miller.
Accepted.

11. Collection Officer's report.
Matters covered in Chairman's Report above.

12. Web Officer's Report.
Full details circulated at the AGM.

DATA FOR WEBSITE: 2013 to date.

Total Sessions Served 2013 to date. 86173
Total Hits. 483664
Total Page Hits. 85850
Total Non Page Hits. 397814
Total Session Duration. 7758607s
Total Transferred. 106.52 GB
Server Activity Averages 2013 to date
Total Sessions Served. 86173
Average Hits Per Session. 5
Average Page Hits Per Session. 0
Average Session Duration. 90s
Average Transfer/Session. 1.27 MB
Page views per session breakdown.
Time spent per session breakdown
SEE TABLE NEXT PAGE
Proposed: Tim Ewin. Seconded: Cindy Howells.
Accepted.

13. NatSCA Representative's Report.
It has been a year since I was elected onto the Committee and have enjoyed having a more active role. I have set up a Facebook group (https://www.facebook.com/groups/376700195784835/) and Page (https://www.facebook.com/GeologicalCuratorsGroup).

Page views per session breakdown

Number of sessions	Requests
39288 (45.6%)	0
33356 (38.7%)	1
12214 (14.2%)	2-5
726 (0.8%)	6-10
320 (0.4%)	11-20
236 (0.3%)	21-50
39 (0.0%)	51-100
7 (0.0%)	101+

Time spent per session breakdown

Number of sessions	Minutes
75164 (87.2%)	0
2275 (2.6%)	1
3370 (3.9%)	2-5
3050 (3.5%)	6-15
1675 (1.9%)	16-30
326 (0.4%)	31-45
120 (0.1%)	46-60
206 (0.2%)	61+

The group is slowly increasing in numbers (roughly 1-2 per week) with 126 "likes" of our page and 154 members of our Facebook Group. People are now more actively engaging with them through posting stories, comments or links to Geology/Natural History related stories and research.

Twitter is also progressing nicely with different "followers" than Facebook. We currently have 121 followers and again this is slowly growing, but we can do more. Please contact Emma Bernard (e.bernard@nhm.ac.uk), if you would like the password so you can tweet as GCG. I would encourage members to join both and become more involved in the social media side.

I have set up a Googlemail account for the group, mainly to deal with the social media, but it can be used for various things if needed. The address is geologicalcuratorsggroup@gmail.com Contact Emma Bernard if you would like the password.

A LinkedIn group has just been set up and again it would be great if people can start posting comments, having discussions and sharing the group. Search "Geological Curators' Group.

I have started liaising with NatSCA, and we aim to hold a joint meeting once a year from 2014 onwards. The first meeting will take place in April 2014 in Oxford on the subject of Hazards in Natural History Collections.
Subjects out forward for this so far are:

- Historically treated collections (Zoology/Botany)
- Fluid collections
- Geological, radiation, toxic minerals

If anyone would like to suggest more topics, particularly if you know someone who would be willing to talk or provide course materials please contact Emma. The costs have yet to be fully explored and also the breakdown of money.
Accepted.

14. Election of officers and Committee for 2013 and election of Auditors.
Election of officers.
Chairman. Giles Miller (NHM) has been proposed by the Committee. Seconded by Helen Kerbey.
Election agreed.

All other Committee officers have agreed to remain in post for another year. There were no further nominations.
Ordinary members of Committee. Two are needed this year. Sarah King and Tim Ewin have expressed an interest. Proposed: Mike Howe.
Co-opted members will be discussed at the first Committee meeting in January 2014.
Agreed.

Election of auditors.
The current auditors, Caroline Buttler and Christian Baars have agreed to continue in this role. Agreed.

15. Any other business.
1. Representatives from other groups. Adrian Doyle asked if the group would like another representative from the Institute of Conservation (ICON) on Committee. Committee sees this as a worthwhile and important contact so would welcome any input. Adrian Doyle is happy to assist in finding a representative. Other members of Committee are involved with groups such as the Mineralogical Society, the Russell Society and the History of Geology group, although we do not have formal links to these groups. It was also suggested that we invite Mick Stanley (GeoConservation UK) to be part of the GCG advisory group.

2. Honorary members. Cindy Howells reminded the meeting that the new Brighton Medallist will now be

an honorary member of the group.

14. Date and venue of the next Annual General Meeting.
To be confirmed.

Mike Howe thanked all the organisers of the meeting for their work and hospitality. Giles Miller thanked Mike Howe for his work as Chairman over the last three years.
Meeting ended at 17.15.

BOOK REVIEWS

Mineralogy: An Introduction. . Published by Dunedin Academic Press Ltd, June 2014. £25, paperback, x+ 206 pages. ISBN 978-1-78046-015-4.

The latest book in the Introducing [Science topic] series from Dunedin Press is Introducing Mineralogy, written by John Mason, an honorary research fellow at the National Museum of Wales, Cardiff. The publishers describe this book as a scientifically sound overview of mineralogy for the interested adult, and as a book that can be used as a short and friendly text for a student-level subsidiary course. And along those lines it does what it says and can be recommended on that basis. The friendliness of the text comes across both in the clarity of the various explanations and definitions and in the fact that the author book-ends the main text with personal stories (in a prologue and epilogue) and sprinkles the book with a light salting of side comments, quotes, short anecdotes and occasional popular turns of phrase that would not be found in a more high-level text. All of which makes the book a very pleasant read.

What topics are covered? The book is roughly comparable in length, size, and layout style to Graham Park's contribution to the series, *Introducing Tectonics, Rock Structures and Mountain Belts* (2012), which means that topics and depth of coverage is, perforce, limited and introductory. Thus, there are only seven chapters: The basics of mineralogy; Typical mineral occurrences; Atypical concentrations of minerals; Mineral collecting: where science and leisure overlap; Studying mineral assemblages and parageneses; Uses of minerals; Minerals and the environment. And there is the now-characteristic blue-text glossary, which I found to be well thought out and one that beginners will appreciate (though it is surely redundant to define 'greasy ' lustre as one having a 'greasy appearance'), and a short page on Further Reading. This latter feature, within the context of the defined readership, I found not quite as well thought out: why include Greg and Lettsom's 1858 *Manual of the Mineralogy of Great Britain and Ireland* when that book is not only hard to find but is, in any case, completely incorporated within Andrew Tindle's fabulous, easily accessible, and also recommended *Minerals of Great Britain and Ireland* (2008)?

What this book is not, is a book on minerals. While the reader will get an easily digestible introduction to the science and uses of mineralogy, if one wants a book on how to identify minerals or on what the different types of minerals are, then one will need a supplementary text. I feel that if Mason's book is complemented with a beginner's book on minerals themselves, the combination of the two would prove interesting, stimulating and just the thing for the beginner. Which is why I think that the Further Reading list could have been more appropriate: one or two well-chosen 'popular' books on minerals themselves at a level comparable to this book would have been very useful - going straight to Paul Ramdohr's *Ore Minerals and their Intergrowths* might be too big a jump.

The book is described as "lavishly illustrated", and some of the illustrations are quite mouth-watering. A closer look reveals that there are cases where the one specimen is 'reused' to illustrate different things (e.g., Figs 1.6 and 1.17; Figs 1.14 and 4.8). And a beginner might not easily see some of the properties or aspects described in the figure captions for the specimen used to illustrate them, e.g., the minerals illustrating the hexagonal, tetragonal and monoclinic crystal systems could have been better chosen (the hexagonal vanadinite is twinned and perhaps an apatite or beryl would have been clearer; the tetragonal wulfenite is far too small against its backdrop to see clearly; and, though the picture is very beautiful, no beginner is going to see monoclinic symmetry in the linarite group shown). Similarly, it is difficult to see the subhedral crystal shape of the pictured haematite (it could as easily be anhedral); and the beginner will, I think, struggle a little to distinguish between the figured imperfect cleavage of the bournonite and the lack of cleavage in the tetrahedrite. The cover of the book itself is suitably dramatic, with a backdrop of azurite and malachite against which are four smaller pictures. One of those pictures is the very same baryte specimen that was used on the cover of Andrew Tindle's book (and I did not find a credit for it in the acknowledgments).

As regards actual errors and typos, there are inevitably a few, though readers may not spot all of them, e.g., in very small type within the periodic table (Table 1.2) are to be found 'alakli', 'Yttersium', 'Gadolinum' and 'relativ'. There are, however, quite a few errors involving brackets, mostly of the missing variety in chemical formulas. However, the most serious is the incorrect choice of bracket style for the crystallography section in Chapter 1. Mason uses curly brackets, which have the specific meaning of denoting crystal forms in crystallography, when he should have used normal brackets (i.e., parentheses) which are used to denote individual crystal faces. And when labelling various mineral phases in many of the figures, he uses often unconventional mineral abbreviations. Nowadays, the abbreviations originally defined by Ralph Kretz and then refined and amplified by Whitney and Evans (American Mineralogist, 2010) are becoming well established, and authors of technical papers are discouraged from going off on abbreviation solo runs, and certainly not to use element symbols for mineral names [Mason infringes this latter convention on several occasions, the oddest being his use in Figure 5.8 of 'Ba' which is not even used for baryte but for barytocelestine]. And why do these things matter? Because not only do internationally agreed conventions - now fixed for things like crystallographic bracket style, or 'strongly advised' for mineral abbreviations - help promote harmony of meaning and universal understanding, but, for readers of this introduction, if they go on to explore fur-

ther, they will discover that things are a little different out there in the real world of mineralogy from what was in their introduction.

However, putting these, and some other, quibbles aside, I do recommend this book. I especially liked the chapter on mineral collecting, which I found to be a very good overview of the joys, the pitfalls, and the uses of collecting minerals and of putting it all in a museum/posterity context: amateur rockhounds should read this chapter. Mason doesn't even shy away from the 'Kingsbury fraud' case, which readers of the *Geological Curator* will know something about. This book could certainly be placed for sale in museum shops, for example, though not in the children's section. I myself am currently involved in saving, curating and researching the University College Dublin mineral collection, and I am very fortunate to have some keen volunteers help in that work. I would be happy to advise them to purchase a copy of Introducing Mineralogy for basic theory and background - this book does fill a gap in that market. However, for the complete package, one would have to supplement it with a good, basic, mineral identification book. Perhaps placed beside it in the museum shop.

Patrick Roycroft, National Museum of Ireland - Natural History, Dublin, Ireland.
22 June 2015

Introducing Sedimentology by Stuart Jones Dunedin Academic Press Ltd. Published January 2015. £14.99 Paperback, 118 pages. ISBN 978-1-78046-017-8.

The letter from the Publisher with the review copy of this book states that it is 'written for students, amateur enthusiasts and professional geologists'. Does it live up to the claim? Insofar as I have a bit of each of those in me, I felt that it succeeded in doing so, and it did it well. I thought that whilst being quite succinct in its treatment of the various topics within sedimentology, it does provide a thorough introduction to the science. The examples of different features and processes are well chosen and in general, beautifully illustrated with photographs and diagrams in full colour. Whilst there are stunning photos of superb exposures from a global palette, there are others of accessible sites in the UK, giving a sense of realism, which counterbalances the exotic locations.

The publisher's letter notes that the books in this Introducing [Sciences] series 'are intended for three main groups of readers. They are scientifically sound overviews of their subject for the interested adult'. This is a book I would recommend having in your museum bookshop if you have room, or as a potential gift for any adult, old or young, with the slightest interest in rocks and landscape and how they were formed. If your museum exhibition or displays address any aspect of sedimentology, which is not always an easy science to present in any process or sedimentary environment based way, then this is good book to have in the shop for 'further reading'. If you have any kind of discovery zone or reading corner with books available to the public to browse, then I suggest you add this one to the titles. I will be doing that in our museum.

'They may be useful as course texts for those taking a short course option in the subject (especially as a 'minor'); and as an overview for aspiring scientists thinking about their degree course options'. I would have loved to have this book many years ago when I did 'O' and 'A' Level geology, and through to final year of a degree, it would have been a handy primer. At £14.99 it is also reasonably priced for student textbooks. In my opinion the publisher's target audience is well served by this book.

And just in case you have followed any of my other reviews of Dunedin titles in the Introducing series, this one comes in the larger of the two formats (220 by 220 mm) but the content level is perhaps more akin to the smaller format titles, and a little less technical than for example, *Introducing Tectonics, Rock Structures and Mountain Belts*. In short, it is a book I can wholeheartedly recommend.

Matthew Parkes, National Museum of Ireland - Natural History, Dublin, Ireland.
May 2015

ROGER FRANK VAUGHAN (1948 - 2015)

It is with deep sadness I have to report that Roger Vaughan has peacefully passed away at Gloucester Royal Hospital aged 66. He was until his retirement in August 2013, the Curator of Geology at Bristol Museum & Art Gallery. Roger had a lifelong love of geology and was well respected within the geological community, especially in the west of England where he spent most of his geological career. He considered himself one of the lucky people who managed to turn his hobby into a job.

Born in Gloucester, Roger began his working life as a mechanic in the family's garage business and also spent some time working in a department store in Cheltenham. His interest in geology took him to studying with the Open University (B.A) and graduated with a Geology degree (B.Sc. Hons) from Bristol University in 1985. He became a Geological Site Recorder with Bristol Regional Environmental Records Centre in 1987. A year later he was involved in the excavation and processing of material from the SSSI Hornsleasow Quarry in the Cotswolds as part of a project with Gloucester and Bristol Museum and Bristol University. Hornsleasow is a key site in the reconstruction of an ancient sea that covered much of present-day Gloucestershire and Oxfordshire during Middle Jurassic times. He worked with many museums over the years including Cheltenham Art Gallery & Museum - undertaking projects to document and improve the geological collections, Swindon Museum - creating geology-focused galleries and Dudley Museum - creating a computer documentation system amongst many other things.

In 1989 he became the Keeper of Collections at the 'Geological Museum' in Bath, (now the Bath Royal Literary and Scientific Institute) where he produced an inventory of items in the collection there at the time - valuable and important work that was essential in helping to preserve this wonderful collection of fossils, rocks, minerals ethnographic items. His time at Bath was some of the most enjoyable years of his working life.

In 1993 he took up post with Bristol Museum firstly as Geological Conservator and later in 2008 as Curator when he was left as the only trained geologist. The value of continuity and overlap between successive curators is often underestimated. He was integral in the excavation and preparation of the Westbury Pliosaur II (*Pliosaurus carpenteri*); a project he often joked took ten years to complete, and his back! He was always welcoming and helpful to visiting academics, students and volunteers alike and could put his hands on specimens and navigate Bristol Museum's archive with ease in a matter of minutes. In 2008 Roger became the sole geologist at Bristol Museum overseeing the 500,000 specimens

of this designated collection until his retirement in August 2013.

Even in retirement he maintained his interest in geology and was a regular volunteer at Stroud Museum working on the mineral collections. He was also keen on visiting geological collections at museums close to his Quedgeley home, most recently Gloucester Museum in April 2015.

Outside geology Roger had many interests. He collected Victorian and Edwardian photographs and carte-de-visite, maintaining a website dedicated to their research. He also often gave lectures on the subject of historic photographs, especially focusing on dating images from costume. He was very interested in the life of Victorian naturalist Leonard Jenyns and was an avid oil and watercolour painter. Roger was also an expert on the tea-shops of the west of England!

A dedicated family man; he will be very much missed by his partner, three children and three grandchildren. A service in his memory was held on 30th June 2015 at Gloucester Crematorium. Donations in lieu of flowers were accepted for the Friends of Bristol Museum.

Deborah Hutchinson: Curator of Geology, Bristol Museum and Art Gallery
Debbie.Hutchinson@bristol.gov.uk

Publication List: (Taken from Roger's personal website)

R.F.Vaughan Cotswold Dinosaur Excavation, *Geology Today*, Sept-Oct 1988; pp 150-151.

R.F.Vaughan The Excavation at Hornsleasow Quarry, Interim Report No1. 1988, pp.65, City Museum & Art Gallery Gloucester. England.

R.F.Vaughan Book Review of Geology and the Local Museum, *Modern geology*, 1990, Vol.**15**, pp.124-127.

J.D.Delair & R.F.Vaughan The First Record of Portlandian Plesiosaurs from the Portlandian of Swindon. *Wiltshire Archaeological and Natural History Magazine*. Vol. **85** (1992) pp121-127.

S.Metcalfe & R.F.Vaughan et.al. A New Bathonian (Middle Jurassic) Microvertebrate Site, within the Chipping Norton Limestone Formation at Hornsleasow Quarry, Gloucestershire. *Proceedings of the Geologists Association* Vol **103**, part 4 1992, pp.321-342.

R.F.Vaughan Some Interesting Letters to the 19th Century Naturalist, the Rev.L.Jenyns. *Botanical Society of the British Isles News*, December 1992. No. **62** pp.32-3

R.F.Vaughan Exhibition Booklet "Relaunch" Bath Royal Literary and Scientific Institution (Relaunch on 4-5th May 1993) pp.19.

R.F.Vaughan 1846-1996. Geology of the Cotswolds and Environs, and the National Contribution made by our Members. *Proceedings of the Cotteswold Naturalists' Field Club*. Vol. XLI, (I). 1996. pp. 69-74.

R.F.Vaughan The Cotteswold Naturalists' Field Club: Biographical Notes on the Geologists, *Cotteswold Naturalists Field Club* Vol. XLI (II).1998. pp. 196-221.

R.F.Vaughan Biographical entries on John Leonard Knapp (author of Journal of a Naturalist), Edwin Witchell geologist of Stroud, and The Rev.Leonard Jenyns (later Blomefield) for the New Dictionary of National Biography

Roger F. Vaughan 2004. Biographical entries on: John Leonard Knapp, Edwin Witchell, Leonard Blomefield and Hugh Edwin Strickland for Thoemmes Dictionary of Nineteenth-Century British Scientists

Roger F. Vaughan, in 'Leonard Jenyns, Darwin's Lifelong Friend, A Victorian Naturalist & His World' Edited by Ian Walace, Part One: Leonard Jenyns 1800 - 1893, pp. 15-23. *Publications of the Bath Royal Literary and Scientific Institution*. Hardback 372 pages. 2005.

THE GEOLOGICAL CURATOR

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

Notes to authors
Articles should be submitted as hard copy in the journal style, on good quality paper (A4 size) double spaced, with wide margins, and on disk (although e-mail submissions are also accepted). Three copies should be sent to the Editor, Matthew A. Parkes, Natural History Museum, Merrion St., Dublin 2, Ireland (tel 353-87-122-1967; e-mail: mparkes@museum.ie). Line drawings should be prepared in black ink at the desired publication size. Photographs for halftone reproduction should be printed on glossy paper. Both drawings and photographs should be proportioned to utilise either the full width of one column (85mm) or two (175mm). References in the text follow the Harvard system, i.e. name and date '(Jones 1980)' or 'Jones (1980)'. All references are listed alphabetically at the end of the article and journal titles should be cited in full. Authors will normally receive proofs of text for correction. Major articles are refereed. Copyright is retained by authors.
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2. Use italics rather than underline for latin names and expressions, journal names and book titles. Use bold for volume numbers in references.
3. Line spacing. Your hard copy should be double spaced. If possible, single space your copy on disk. Use a single (hard) carriage return at the end of each paragraph.
4. Single space-bar between words, double space-bar between sentences.
5. Do not attempt to format your article into columns. Use a minimum of tabs and indents.

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LOST AND FOUND enables requests for information concerning collections and collectors to reach a wide audience. It also contains any responses to such requests from the readership, and thereby provides an invaluable medium for information exchanges. All items relating to this column should be sent to the Editor (address above).
FACT FILE contains basic information for the use of curators. All items relating to this column should be sent to the Editor (address above)
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GALLERY REVIEW comprising short pieces on new museums or exhibitions.
CONSERVATION FORUM helps keep you up to date with developments in specimen conservation. Information on techniques, publications, courses, conferences etc. to Dr Caroline Buttler, National Museums and Galleries of Wales, Cathays Park, Cardiff CF10 3NP, Wales, UK.
BOOK REVIEWS contains informed opinion about recently published books of particular relevance to geology in museums. The Editor welcomes suggestions of suitable titles for review, and unsolicited reviews (of 500 words maximum) can be accepted at his discretion. Publishers should submit books for review to David Craven (see inside front cover for address).
INFORMATION SERIES ON GEOLOGICAL COLLECTION LABELS consists of loose A4 size sheets, issued irregularly, which carry reproductions of specimen labels usually written by a collector of historic importance. The aim of the series is to aid recognition of specimens originating from historically important collections. Contact the Editor.

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All enquiries to the Treasurer, John Nudds, Department of Earth Sciences, University of Manchester, Oxford Road, Manchester M13 9PL, U.K. (tel: +44 161 275 7861; e-mail: john.nudds@manchester.ac.uk).

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