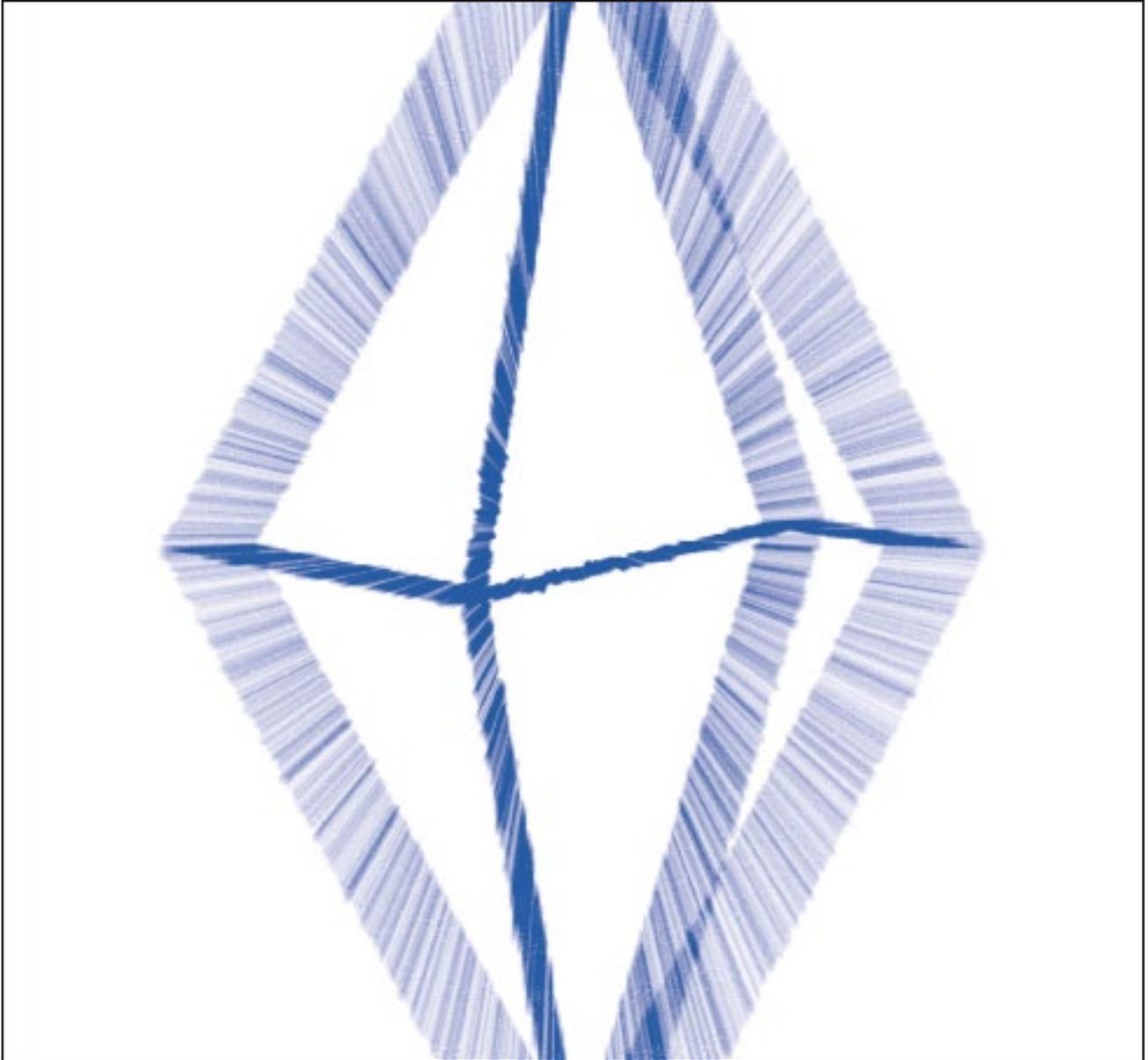




The Russell Society Newsletter



Number 75
September 2019

The Russell Society is a society of amateur and professional mineralogists which encourages the study, recording and conservation of mineralogical sites and material.

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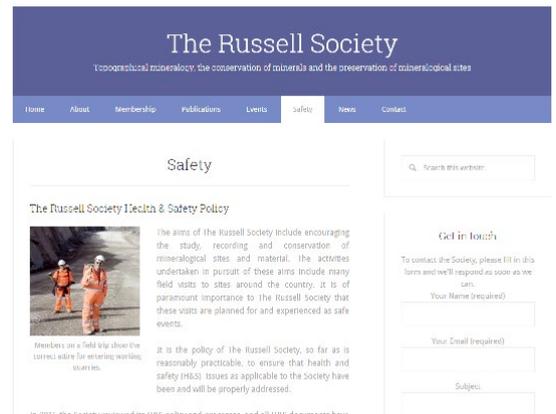
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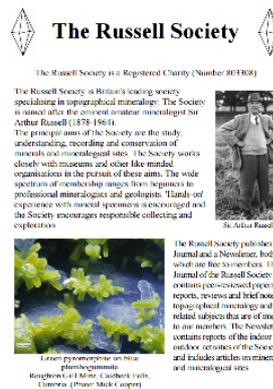
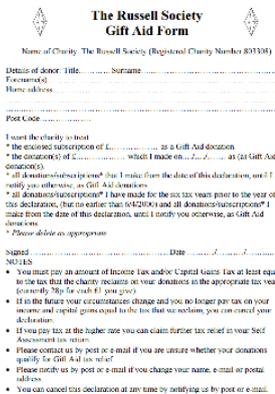
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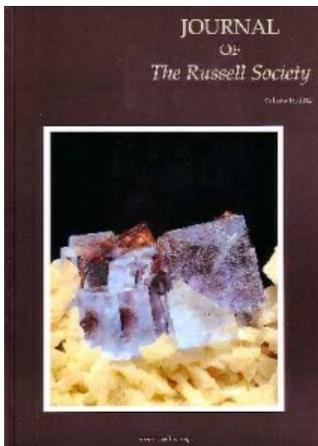
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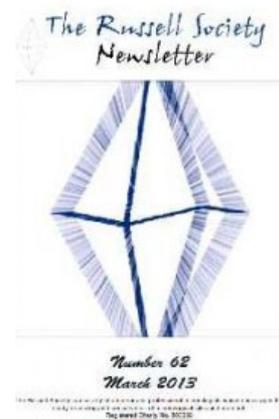
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Few



Clicks!



The Russell Society website has been changed & updated. Be sure to check it out!

Russell Society Newsletter

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The Russell Society Health and Safety Policy.

Adopted by Council

- It is the policy of the Russell Society, so far as is reasonably practicable, to ensure that health and safety issues as applicable to the Society have been and will be properly addressed.
- All members of the Society are to take reasonable steps for the Health and Safety (H&S) of themselves and others who may be affected by their acts or omissions.
- All members of the Society are to co-operate with the Society, so far as is reasonably practicable, to enable the Society to comply with any duty or requirement imposed on it.
- In the event of an accident or injury, members of the Society should seek the appropriate medical attention and notify Society officials who will properly document all details.
- Any member of the Society can bring to the attention of Society officials any suggestions or ideas which could improve safety and prevent accidents.

One of the aims of the Russell Society is to encourage the study, recording and conservation of mineralogical sites and material. Among the various activities undertaken in pursuit of this aim, members make many field visits to sites around the country and attend many lectures and other indoor meetings. The Russell Society promotes a high degree of responsibility amongst its members in the achievement of its aims, especially with regard to H&S matters.

It has	A Health and Safety Policy	A Field Leaders Indemnity Form
	A Risk Assessment Form	An Incident Report Form
	A Guide to Good Practice	A Field Visit Check List

These documents are to encourage enjoyable and interesting visits and meetings that are educational, involve conservation and recording, and are incident free. They also show the responsible attitude that the Russell Society and its members have to health and safety issues.

The Society holds Public Liability Insurance with a limit of Indemnity of £5,000,000 (extended to include Member to Member) and Personal Accident Insurance. A copy of the certificate of insurance is available upon request from the General Secretary.

H&S Review 2018.

The views and opinions expressed in this Newsletter are those of its correspondents, and are not necessarily agreed with or shared by the Editors, the Council, the Russell Society or its Members. The accuracy of submissions is the responsibility of the authors or Society branches and will not necessarily be checked by the Editor for validity.

“Thoughts from the Editor’s Chair”:

Well, the year rolls around and here we go with another Newsletter. In this issue you will, as always, find a mixture of news and information, including preliminary information about the Society’s ASM next year. I keep telling you that the ASM weekend is a great event which you should support by your presence. I hope that the reports from this year’s ASM events will inspire you to sign up for the next one.

You will notice some changes on the rear cover as Branch organisations change to adjust to the new Constitution which requires less structure and less formal procedures in the regional groups. The Council hopes that the changes will make it easier for these groups to continue to function. You will also find a range of other interesting topics, including a report on recent developments at the NHM and contributions on the recurring theme of mineral labels and labelling. This edition closes – as they all do – with various reports from the Society’s recent site visits and collecting trips.

I know that the last of these is a major element in many people’s enjoyment of the Newsletter. In this context I must draw your attention to two items in the “Society Notices” section which relate specifically to our field activities. One relates to an incident of unauthorised collectors (not RS members as far as we know) damaging a grouse moor in Scotland. We have been specifically requested by the landowners to publicise this notice. The second refers to the sale of specimens collected on our field visits. I don’t think we have any massive issues here but a Society such as ours – which depends heavily on the continuing goodwill of a range of landowners and other organisations for access to mineralogically productive and interesting sites - needs to be seen to maintain a high standard of compliance with the “terms and conditions” attached to our privileges. Please (as they used to tell me at school) “read, learn and inwardly digest”.

In your mailing envelope you should also have found two additional items. One is a new version of the Society’s membership list. Be aware that this list is not complete. At the time of writing, there were 36 members who had formally opted out of being included and a further 50 who had not given consent to be included. We hope, nevertheless, that you will still find this useful. The second item is a flyer for the Sussex Mineral & Lapidary Society show at Haywards Heath in November. This is one of the best shows in the UK and deserves the support of all those interested in minerals, featuring as it does a mix of high-quality displays, a huge range of mineral specimens to suit all interests (and pockets) and a range of displays and activities suitable for all ages. Why not treat yourself to a day at Haywards Heath? I should perhaps mention that other shows are available – including the Hampshire Mineral Show organised by the Southampton Mineral and Fossil Society (7th September) and of course the great “Rock Exchange” held in Bakewell on 13th – 14th October. If these are not in your diary – they should be. A list of other UK mineral shows over the next six months or so can be found in the central “events” insert.

At about the same time as you receive this chunk of paper, you (or at least those of you for whom we hold a valid e-mail address) will receive the PDF version of the Newsletter. Introducing this and hearing your reactions to it has been one of the more interesting aspects of the last few years for me. I remain convinced that the E-Newsletter is the future and that, at some point (and notwithstanding the powerful sensual allure, for some of you at least, of bits of paper), the Society will move to a PDF-only mode. “Girls you’ve gotta know when it’s time to turn the page” – Tori Amos, American singer-songwriter. Please make sure that Neil Hubbard, our Membership Secretary, has your correct, up-to-date e-mail address.

As you know, this has been my last effort in the Editor’s Chair. By my count, it is my 19th issue and it has been produced with a great deal of input and support from Susan Tyzack, who will take over as Editor from the next issue. I have to say that I have enjoyed my role over the past (nearly) ten years and I hope that you have enjoyed the outputs. I would like to thank everyone who provided information and articles for publication – even if I had to nag you a bit to get them – without you and your contributions there is no Newsletter. I do have to say a special and heartfelt “thank you” to my indefatigably eagle-eyed proof readers – Frank Ince and Roy Starkey – without whom the error count would have been much higher. Thanks are also due to Tim Hobbs and his colleagues at Printed Solutions in High Wycombe who have consistently produced a product of excellent quality. I’m glad to say that they will continue to be our printers under the “new management”.

I know that the operation is in good hands and I very much hope that you will support it by providing information, ideas and articles in the future. May we all long continue to enjoy what is in every respect **our** Newsletter.

Michael Doel

From the President:

Well what a great ASM weekend we had, hosted by and thanks to the Southern Branch. I really enjoyed it - a superb venue, an excellent day of talks on the Saturday and a really good range of field trips. It was also nice to catch up with everyone and a real privilege to present the Russell Medal to Christine Critchley for her outstanding work at various shows around the country encouraging young people's interest in minerals. I am already looking forward to the next ASM weekend, which will be hosted by Wales and West Branch, and hope that you will come along to enjoy and support it too.

We did have some difficult business to conduct at the AGM, with the Branch changes, understandably, not being to everyone's liking. The motion was passed however, and the new Branch structure is now in place and working without too much disruption to field trips and local activities. Council is very grateful to all those who are now helping to run the new Branch system. As ever, without your hard work and enthusiasm there would not be a Russell Society to speak of. Part of the aim of the new structure is to make it easier for members to set up new Branches that might better serve their local needs. I am thinking particularly of our Scottish and Home Counties members, where new branches would help reduce the geographical spread of our existing branch offer and create something closer to your own doorsteps. So come on, give it a go, there is nothing to lose, a lot to gain and Council is there to help you.

The AGM also saw David Aubrey-Jones become our new Vice President. Welcome David, Council is looking forward to working with you.

On a housekeeping note our Membership Secretary's already busy life is being made more complicated than it needs to be due to chasing members for subscriptions. Please make sure that you pay your subs promptly in the future or set up an automatic renewal payment if you are the type that forgets these sorts of things. I will be suggesting to Council that we should tighten up this area in the future.

You will have seen my earlier pleas for people to step forward ready to take on future roles at both Council and Branch level. We need to plan ahead and have a succession strategy where people are willing and ready to take up future roles rather than having to be chased down. Following Roy's further request on this matter in the last Newsletter not a single response was received. It's quite simple really, if the membership continues to keep its head down there will not be a Society for it to be a member of! So, please put your hand up and say to Roy 'I would like to help on Council in the future' or 'I would like to help out at Branch level in the future.' The more that do this the easier things will be for everybody.

It has been a while since we last issued a membership list. The list is a great way to learn who lives where and how to get in touch with them. The list included this time round is shorter than before because some members want to withhold their personal contact details. Of course, this is their right, but I think that the ability to know who is a member and to be able to make contact when you travel around the UK is one of the great benefits of belonging to the Society.

Many of us have found the list invaluable. New members joining now will find it much harder to make new contacts and build relationships with other members, particularly with the demise of most evening meetings, so please think again about including your details on the next list (and remember, this list is only issued to our own members, no third party gets to see it).

At the time of writing England have just won the Cricket World Cup after 44 years trying, and what a way to win it! On a much lesser scale this reminded me of how difficult it is to find good mineral specimens in the British Isles and that persistence is the name of the game. After a dozen or so fruitless trips, and despite a fair amount of digging and hammering, I had reached July without adding a single self-collected specimen to my collection. I was beginning to wonder if I'd ever collect anything decent again. The last few trips, however, have been very productive so I am back on track at last.

I hope you have had a good collecting season to date and, if not, stick at it and rewards will surely come...

Steve Warren
President

SOCIETY NOTICES

A Summary of the Society's 2019 AGM, held at Buckfast Abbey Conference Centre, Buckfastleigh, Devon on Saturday 13th April 2019.

The meeting was attended by 51 members and was quorate in accordance with the requirements of the Constitution of the Society. The minutes of the 2018 AGM were accepted.

The Hon. President Steve Warren thanked Southern Branch members and the organising committee for putting together the ASM weekend. Steve explained that the main focus of Council over the last year has been on the proposed changes to our Branches and Constitution. The former Northern and South East Branches closed due to member apathy and a failure to fill committee posts. This is not a problem that will go away and the amalgamated North and Southern Branches face a clear risk that they may not be quorate in the future. Council has consulted with Branches and members over the past year and has put forward proposed changes to the Constitution for members to comment on. Council is very clear that it believes the proposed changes are the best way forward for the Society as a whole.

Succession at Council and Branch level is critical to the future of our Society at both Branch and Council level. We have a number of changes on Council occurring this year - after 10 years as Vice President and a Trustee of the Society Christine Critchley is stepping down to be replaced by David Aubrey-Jones. Steve thanked Christine for her energy and enthusiasm which have been a great boost to our Society. As part of the proposed Constitution changes Council has identified that there is no obvious reason why the Journal Manager should be required to be a Trustee of the Society. Frank Ince will therefore step down as a Trustee but will continue in his role as Journal Manager. Steve thanked Frank on behalf of the Society both for his efforts as a Trustee over the years and his seemingly endless ability to keep producing our Journal.

To keep the succession ball rolling, Roy has 'convinced' Phil Taylor that he will make a great Membership Secretary. Phil will therefore shadow Neil over the next year and replace him as Membership Secretary at the 2020 AGM.

Our Field Trip Leaders remain very effective at getting into sites, despite continuing issues around 'protection' and health and safety. Our publications remain strong and we have new blood emerging in both, with David Green and Susan Tyzack easing into their future roles. Membership numbers appear to have broadly stabilised, although the long-term trend is likely to remain one of gradual decline.

Consideration is being given as to how we might deploy some of our significant financial reserves to further the enjoyment and understanding of British minerals, possibly working more closely with, and providing financial support to our professional colleagues in museums.

Retiring Vice President Christine Critchley provided the usual overview of field trip attendance and Health and Safety. A total of 33 incident-free trips, with a total of 254 person visits were reported, something of a decrease on the previous year. The insurance documents for this year have been forwarded to Branch Secretaries and Field Trip Officers, and the new FLIF and Guide to Good Practice have been forwarded to FTOs and are on the web page.

General Secretary Roy Starkey explained that his major focus over the past year has been work on society and branch organisation. Extensive consultation and discussion has been undertaken with the membership and branches and much time spent on the development of the documentation and constitutional amendments needed to facilitate the proposed changes. Roy has also been developing ideas for succession planning and identifying potential candidates to take on Council positions. The General Data Protection Regulation (GDPR) came into force on May 25th 2018 and the Society has addressed the various requirements of the new regulation. Roy also drew attention to Michael Dunmore who continues to keep the website updated and running smoothly - his help is greatly appreciated.

Hon. Treasurer Mary Starkey provided a summary of Society finances. At the end of 2018 the Society had accumulated funds of £41k, including £2k advance payments for the 2019 ASM. Income from subscriptions remains static. The introduction of online banking has proved enormously beneficial. It facilitates prompt payment of expenses, provides easy 'real-time' tracking of receipts, and in the future, will help to streamline management of Society finances. Total income remains under the £25k threshold at which an independent verifier is required by the Charity Commission. The 2018 accounts and budget for 2019 were unanimously accepted.

Membership Secretary Neil Hubbard provided an overview of membership numbers and trends. The rate of decline in membership numbers seems to have stabilised and Neil reported that as at 10 April we had 348 paid-up members, 13

new members and 20 members who have not yet renewed their subscriptions. It seems probable that we may finish up with a slight increase in numbers. However, only 60% of our subscriptions are gift-aided and members are encouraged to do this if they pay UK income tax.

None of the Journal Team were able to be present at the meeting so Roy Starkey presented the report on their behalf. The situation is healthy and we can look forward to another substantial issue for the coming year. The layout for JRS No. 22 will be undertaken by professional typesetter Robert Preston (formerly with Mineralogical Magazine). Frank Ince will continue as the contact with the printer and manage non-member gifts, subscriptions and sales.

Newsletter Editor Michael Doel reported on the two issues of the Newsletter that have been produced since the last AGM. Costs were successfully managed within the agreed budget, and it is planned to pay the printer to envelope and distribute the Newsletter in future. Susan Tyzack has already begun to involve herself in the production process and her involvement will increase through the remainder of 2019. The plan is for her to take over fully as Editor in 2020.

Conservation Officer Tom Cotterell reported that whilst no analyses have been conducted for members at Cardiff University during the period April 2018 to April 2019 due to instrument failure, he had continued to run the occasional Powder X-ray Diffraction analysis (PXRD) at the National Museum of Wales on behalf of members, subject to time constraints at work. Advice had been provided to three field trip organisers to assist them in contacting conservation bodies (Natural England and Natural Resources Wales) and quarrying companies for access to Sites of Special Scientific Interest (SSSIs) and quarries.

Honorary Officers and Trustees were appointed as follows: President - Steve Warren; Vice-President - David Aubrey-Jones; Treasurer - Mary Starkey; General Secretary - Roy Starkey; Membership Secretary - Neil Hubbard.

General Secretary Roy Starkey outlined the background to, and reasons for, the proposed changes to the Constitution, which have been widely communicated and discussed over the past year, before inviting comments and questions from the floor. After a lengthy discussion, with a number of additional contributions from the floor, the General Secretary drew the discussion to a close and put the proposed constitutional amendments to a vote by those present. The proposed changes were approved by a large majority with four votes against and three abstentions.

Council and all those present thanked the Southern Branch for all their hard work in organising a very enjoyable weekend.

The 2020 ASM will be hosted by the Wales and West Branch, from 3-5 April 2020. The venue will be the Cheltenham Chase Hotel, Shurdington Road, Brockworth, Glos. Further details about the event and a booking form will be circulated to members towards the end of 2019.

A full copy of the 2019 AGM Minutes is available online at <http://russellsoc.org/wp-content/uploads/2019/04/2019-AGM-Minutes-FINAL.pdf>

Roy Starkey
General Secretary

New venue for 2019 Maisemore Event.

This is a reminder that the Wales and West Branch's popular "Maisemore event", held in collaboration with the Cheltenham Mineral and Geological Society, is being held on Sunday 20th October 2019. Please note that this year it will be held at a different venue - the Millennium Hall at the Social Centre in Bishop Road, Shurdington, Gloucestershire, GL51 4TB.

The usual range of talks, displays, swaps, raffle and food will be in evidence, with this year's theme being the "United Nations International Year of the Periodic Table of Chemical Elements". Talks will include "Rare Earth Elements" by Dr Michael Doel. Our displays will include "minerals in smartphones" as well as a 'shopping basket'



Shurdington Social Centre - the Millennium Hall is on the left

of minerals and their uses in everyday items.

This event is usually well supported and a very enjoyable and interesting day. Please try to attend if you can.

Tom Cotterell
W&W Branch

The Russell Society Annual Society Meeting 2020.



Cheltenham Chase hotel - venue for the 2020 ASM.
Photo: Trip Advisor.

The Society's Annual Society Meeting (ASM) for 2020 is being hosted by the Wales and West Branch. It will be held at the Chase Hotel, Shurdington Road, Brockworth, Cheltenham, GL3 4PB from Friday 3rd to Sunday 6th of April. We hope that as many members as possible will be able to attend.

The main theme will be "New Mineralogical Discoveries in Great Britain and Ireland" and there will be the usual wide range of displays and talks as well as opportunities for mineral exchanges and "freebies".

As anyone who has attended in the past will know, these meetings provide an unparalleled opportunity to catch up with people you have not seen for some time and to talk minerals late into the night. Don't miss it.

Fuller details, along with registration forms will be sent out to members with the November issue of the Journal but, for now, please put these dates in your diary. We look forward to seeing you there.

Tom Cotterell
W&W Branch

Glenbuchat elbaite locality – important update.

Given our website's visibility within the wider mineral collecting community, the Society has been asked to publicise the following notice from the Glenbuchat Estate in Scotland:

"Please note that with immediate effect no one will be allowed to visit this site between the months beginning April until the end of September. Visitors will be able to visit ONLY during the period October to the end of March. This restriction is being imposed due to the unscrupulous actions of some visitors walking across the moor, disturbing and in some cases destroying grouse nesting areas."

"The moor is heavily monitored daily and throughout the day by gamekeepers who are all in radio contact. Anyone seen on this part of the moor during the restricted period will be stopped, questioned and asked to empty their bags of specimens. Anyone refusing, their vehicle will be photographed and then they will be prosecuted under the terms of mineral theft.

"There will be no exceptions to this notice."

While there is no suggestion that any Russell Society members have been involved in irresponsible activities at Glenbuchat, it is a reminder that:

- Permission to collect minerals is a privilege, not an entitlement
- Permission should be obtained in advance
- All rules and restrictions must be followed.

Please share this important update with other collectors as appropriate.

Russell Society Council

Policy Statement: Sale of specimens.

Important reminder re specimens collected on Russell Society Field Trips.

This matter has been raised previously, but once again we have been alerted by a landowner that mineral specimens (this time from South Terras Mine in Cornwall) are being offered for sale. Furthermore, a letter written to the owners of the land, Boconnoc Estates, alleges that the specimens were collected on a recent Russell Society field trip. At the time of publishing we have not identified the seller, nor whether they are a member of the Society. However, if it is established that the seller is a member, Council will take appropriate disciplinary action.

The Society and its Field Trip Organisers work hard on behalf of the membership to build relationships with landowners, estate managers and quarry operators to secure permission for field trips. These relationships are built on trust and our undertaking that members will behave responsibly - and, crucially, that material collected is for private study and will NOT be offered for sale. Please do not think "this does not apply to me" and/ or "I only sold it for a couple of quid". Thoughtless and irresponsible actions by one or two members could be all it takes to see the Society prevented from having field meetings at important localities and, given the small world in which landowners and the extractive industries work, this in turn could result in our ability to access other sites being compromised or withdrawn entirely.

There is a specific statement on the Russell Society Field Leaders Indemnity form which is signed by everyone attending any field trip: To remind you, it states that **"we agree that any specimens collected on this visit are for personal use and will not be offered for sale."**

If you know or suspect that any of our members are selling specimens collected on a Society field trip please ask them to stop, and notify a member of Council.

Roy Starkey
General Secretary

Members' Displays at Shows.

Several years ago, we invested in some desktop mineral cabinets to hold displays intended to liven up our stand at mineral shows around the country.



Steve Warren's display of North Pennine minerals at Leyburn Mineral Fair 2019.

From the feedback I have received this has been a great success and forms a good talking point at our stand.

The only problem is that all but one of the displays have been put on by myself, with Roy Starkey doing the other one.

Now, I've seen many of your collections and I've seen what you've been finding and buying so I know there are lots of you out there who could easily put on a display for our stand.

We need some members to make the effort and agree to putting on a display, starting with the Bakewell Show this autumn.

If we can get together a dozen or so people willing to participate this will keep us going for a few years.

The cabinets are locked and guarded so your specimens will be safe. Labelling can be as minimalistic or complex as you want. Please get in touch!

Steve Warren

Proposed Southern Branch Symposium in 2020.

A one-day symposium with a wide range of mineralogical presentations is being planned for early 2020, on Saturday 8 February. The symposium will be held at Somerset Earth Science Centre in Somerset, located adjacent to Moons Hill Quarry close to the village of Stoke St Michael, BA3 5JU. For more information see <https://www.earthsciencecentre.org.uk/>

It is proposed to arrive from 10am to start around 11am then have a couple of presentations before lunch. Lunch will be an opportunity to chat with friends and catch up about collecting trips planned later in the year followed by more presentations and then closing later in the afternoon. We also plan to have a mineral swaps area and some displays of recently collected material to show what gems have come out of the “wider” Mendips quarries. A small contribution will be required for lunch but apart from that all you have to do is turn up!

This is a new initiative from the Southern Branch and is open to all Society members. Numbers are limited so if you are interested it is important to reserve a place early. Please express your interest in attending or if you have any suggestions please contact me.

Chris Finch

Ron Cleevely Award for Best Journal Article.

The 2018 Ron Cleevely Award for Best Journal Article has been awarded to a team of five - Richard Bateman, Peter Briscoe, John Chapman, David Green and David McCallum – for their remarkable paper entitled “Mineralisation in the Coal Measures of Yorkshire and adjoining areas.”

The article, published in Volume 21, was written in memory of collector Steve Uttley who died in 2017. The project started from the examination of just 20 specimens Steve had collected from 14 South Yorkshire coalfield localities.

From this modest beginning, using Steve’s field notes and documentation and the authors’ own extensive research, the mineralogy of the coal measures was brought to life over an impressive 66 pages.

The award was established in appreciation of Ron Cleevely, a Senior Scientific Officer in the Department of Palaeontology at the Natural History Museum in London, thanks to a generous donation from his widow, Ros. Society members who attended the ASM weekend in Devon voted for their favourite from four articles published in the most recent edition of the Journal, with the criteria to consider including novelty value, bibliographic rigour, quality of the illustrations and contribution to British mineralogy.

Ron was passionate about the importance of preserving historical data. Although primarily an eminent palaeontologist, Ron’s fame lay more in his exceptional knowledge of 18th and 19th century collectors, their specimens and associated natural history works. He undertook extensive research into the Sowerby family and published a fascinating account of the development of early mineralogy in South-Western England - “Collecting the New, Rare and Curious – Letters selected from the Correspondence of the Cornish Mineralogists Philip Rashleigh, John Hawkins and William Gregor.”

Editor



Russell Society President Steve Warren presenting the 2018 Ron Cleevely Award to three of the winning team at the Yorkshire Mineral and Fossil Fair in Leyburn. Left to right: David Green, Peter Briscoe and Richard Bateman. Photo Neil Hubbard.

NEWS ITEMS:

Visit to the Museo de Minerales in Peru.

Situated in the old city centre of Lima is a privately collected and funded museum, Museo de Minerales Andres del Castillo just off Plaza San Martin. I spent an enjoyable half day here, it houses not just a fine collection of Peruvian minerals but also collections of pre-Hispanic ceramics, art and textiles.

The building itself is a magnificent piece of early 19th century Spanish colonial architecture and has been amazingly well rebuilt. The collections of Andres del Castillo and his family were formally opened to the public in 2008 and have continued to be added to.



**A section of the mineral display room at the museum.
Photo Rob Bowell.**



A fine specimen of pyrite and sphalerite with quartz from Cerro de Pasco, Peru. Photo Rob Bowell.

I enjoyed wandering about the textiles, art and ceramics but know little about them so spent just over an hour on those galleries and a happy three hours in the various mineral galleries. The minerals are almost all Peruvian except for an excellent Tsumeb diopside and Canadian silver in the lobby of the museum.



**Part of the museum's fluorescent mineral display.
Photo Rob Bowell.**



A fine specimen of rhodochrosite from Uchucchacua Mine, Oyon Province, Peru. Photo Rob Bowell.

The specimens are displayed according to size and the major mineral. Native elements are housed together in one cabinet. The labelling is all in Spanish, but the locality is readily apparent. The cabinets are well lit and the specimens easy to view and photograph. It was difficult to pick just one favourite but the Uchucchacua Mine rhodochrosite, Mina Chiurucu rhodonite and the Ayacucho gold all stand out. However, you cannot fail to be amazed by the size and precise crystals of the many wonderful sulphides from the Lima and Pasco departments. There is also a very nice room for fluorescent minerals, with a timed light show covering visible as well as short and long wave UV light.

There is an interesting gift shop that sells some excellent and inexpensive minerals (I got a great rhodochrosite for the equivalent of £12) which also sells books, maps, postcards, mineral and textile art. The price to enter is 10 sols (about £2) and comes with a free guidebook - and if you speak a little Spanish there is a guide who will follow you around and

tell you the history of every specimen, or it seems that way! Definitely he was enthusiastic and in love with the collection and who can blame him?

The museum is open 9am - 6pm most days and its website can be found at <https://www.madc.com.pe>

Rob Bowell

UK Mining Snippets

a) UK Government Backs Study into UK Lithium Industry

The UK government is sponsoring a £500,000 feasibility study by the Faraday Battery Challenge into the potential of developing a UK-based lithium industry. The study, "Lithium for the UK" will involve the start-up company Cornish Lithium, the Natural History Museum and consultancy Wardell Armstrong. Cornish Lithium has been using 3D modelling to find sources of the lightweight and energy-dense metal in the geothermal fluids that exist throughout Cornwall.

Lithium-ion batteries are key to - and form a large part of the cost of - electric vehicles. The Natural History Museum recently warned that the UK would not be able to meet a target for all cars to be electric by 2050 without investment in raw materials extraction.

"The UK itself has potential for some of the metals needed for these new vehicles, but currently we do not have a clear measure of that local potential," academics led by Richard Herrington, head of earth sciences at the Natural History Museum, said. "Society needs to understand that there is a raw material cost of going green."

The UK and mainland European car industry is currently reliant on Asia for supplies of lithium-ion batteries. Over the past few years Chinese companies have expanded rapidly into the full battery supply chain, buying up lithium mines in Australia and building large battery factories in China. This dominance of the battery supply chain has raised concerns among officials and companies in Europe and the US.

"It is undoubtedly a recognition that building a battery industry in the UK without a supply chain is an error, especially when there's potentially one on your doorstep." Cornish Lithium chief executive Jeremy Wrathall said.

b) UK Gold Prospects Continue to Glitter.

The various gold prospects around the UK continue to produce encouraging news. A number of positive reports have emerged over the last six months or so.

In April, reports on various websites pointed out that Scotgold had reported that exploration work has identified possible mineralised extensions to the known orebody at Scotgold's Cononish Mine in the Grampian region of Scotland. These previously unidentified anomalies are associated with off-setting faults and structures in the immediate vicinity and will guide the company's future drilling programme. In addition, as part of an expanded stream sediment survey, the drainage area around the known Beinn Udlaigh anomaly was covered and shown to be a prospective gold target. Scotgold is now planning follow-up soil and induced polarisation programmes over this area. The company expects that the Cononish Mine will become "cash-positive" in 2020.

It was reported on the *Mining Journal* website in May that Alba Mineral Resources had received encouraging results from a programme of soil sampling at its Clogau gold project in North Wales. These have apparently confirmed significant mineralisation across a six-mile stretch of the Dolgellau gold belt in North Wales. The programme had identified seven new mineralised zones in total which were not associated with the historic mine workings in the area. Gold mining in the area dates back to Roman times and it was the focus of a gold rush more than 150 years ago. There are about 300 old mine workings across the gold belt. The fact that the average grades for these new zones exceeds the equivalent grades obtained over the famously high-grade Clogau-St David's mine itself was described as "genuinely exciting."

Similarly, in Northern Ireland, Galantas Gold was reported to be planning to increase production from its Omagh Mine. It is expanding the capacity of the processing plant with the goal of producing 2,000-2,500 ounces of concentrate per month in the 2020-21 financial year. The company, which was already running an extended dayshift, planned to add a second shift late in the June quarter and more shifts in the September quarter. The plant produces gold and silver concentrate using a non-toxic, froth-flotation process on a batch basis from a stockpile of underground vein material and additional feed from on-vein development operations. It has set itself a production of 2,000 to 2,500 troy ounces of gold concentrate per month.

c) Deep Coal Mining Back From the Grave?

At a time when the very word “coal” can raise eyebrows – and the thought of burning it sends a good proportion of the population into a swoon – an unexpected item on the Mining.com website caught my eye. Headlined “Coal mining comes back to the UK with \$218 million project” it described how West Cumbria Mining plans to open the country’s first new deep coal mine next to the site of the former Haig Colliery in Whitehaven, which closed down three decades ago. The last deep mine in the UK, Kellingley Colliery in North Yorkshire, shut in 2015.

The new mine, to be called Woodhouse Colliery, has been unanimously approved by Cumbria County Council. It promises hundreds of jobs, but also faces protests by environmental activists who say – unsurprisingly – that it will harm the UK’s efforts to reduce CO₂ emissions and contribute to global warming. The mine would exploit anthracite seams extending out under the Irish Sea. Once operating, West Cumbria Mining plans to extract and process around 2.5 million tonnes of metallurgical coal a year for five decades, to supply UK and European steel-making coal plants. These currently import around 45 million tonnes from the USA, Canada, Russia and Australia annually.



Soon to see new life? The old Haig Colliery in Whitehaven. Mining.com photo.

To mitigate some of the impact of the plant on the environment, the owners have agreed a deal for a 50 MW solar farm nearby to provide about a third of the project’s energy needs. The mine is due to begin production in around two years, subject to environmental certificates. It is expected to employ 500 people, with an estimated 2,000 more jobs created in its supply chain.

An interesting one to keep an eye on, I think.

Leadhills Mining History Conference.

Members, particularly those with interests in mining history and Scottish mines, may find this upcoming event of interest.

The Leadhills Heritage Trust and Historic Environment Scotland are holding a one-day conference entitled “Mining history and archaeology in Scotland: towards a research strategy” on Saturday 19th October at the Hopetoun Arms Hotel, Leadhills.

The conference runs from 10.30am until 3.30pm with speakers including Dr John Crawford and Ken Ledger from Leadhills Heritage Trust, Dr Peter Cloughton, National Association of Mining History Organisations and Dr Miles Oglethorpe from Historic Environment Scotland. For further information contact leadhillsconf@outlook.com.

The Marsh Award for Mineralogy.

The Marsh Awards recognise unsung heroes who have made a major contribution to the promotion of palaeontology or mineralogy in the UK and abroad. Three awards are presented: The Marsh Award for Palaeontology, The Marsh Award for Mineralogy and The Marsh Award for Best Earth Sciences Book of the Year.

The Palaeontology and Mineralogy awards recognise contributions made in the UK, which include popular publications, websites, collecting and donation of natural history collections to museums, superb preparation or conservation of specimens in public collections, artistic or technical innovations. The Best Earth Sciences Book of the Year award recognises the achievements of authors who have published outstanding scientific or academic books in the field of Earth Sciences in the UK or abroad.

Nominations for 2019 are now being accepted for these three categories of Marsh Awards in partnership with the Natural History Museum. See the website for more details and how to nominate a candidate for an award:
<https://www.nhm.ac.uk/events/the-marsh-awards-for-palaeontology-mineralogy-earth-sciences-book.html>

A certificate and £1,000 prize is awarded for each award. The awards ceremony will be held in the Flett Theatre of the Natural History Museum in London on 13 December 2019.

So – what are you waiting for? **Get those nominations in now!**

Editor

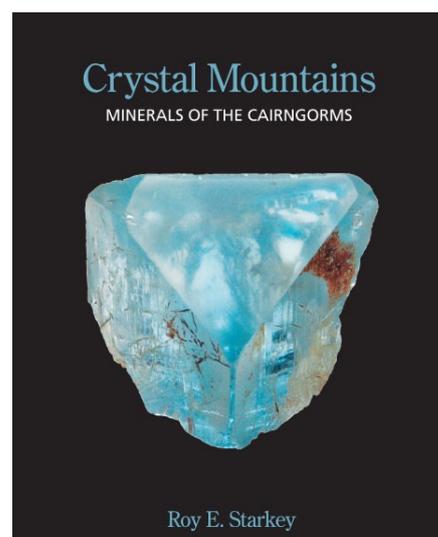
‘Crystal Mountains’ Hits New Pinnacle of Achievement.

Russell Society General Secretary and accomplished author Roy Starkey’s book “Crystal Mountains – Minerals of the Cairngorms” has reached the dizzying heights of 1000 copies sold worldwide, a remarkable achievement for a self-published work.

Completed in 2014, Crystal Mountains tells the story of the early crystal hunters who roamed the mountains and glens of the Cairngorms during the 18th and 19th centuries in search of Scotland’s most famous gem – the smoky quartz or cairngorm. Roy was fortunate to have unprecedented access to both private and public collections, resulting in the inclusion of numerous previously unpublished photographs of mineral specimens, gemstones and artefacts made from them.

The 184-page book has 229 colour photographs, 4 colour maps, 2 colour diagrams, 17 monochrome images and over 300 references. Roy said: “The Cairngorms are my favourite place, and Crystal Mountains was my first foray into book writing and publishing, so it holds a special place in my heart. There are just a few copies left so please get in touch if you would like one – once they’re gone, they’re gone!”

Crystal Mountains softback edition is £25 plus postage and packing but Roy would be happy to drop off a copy at an upcoming show or event. Please contact him if you would like to arrange this.



New British Geological Survey Director Appointed.

Karen Hanghøj will take up the role of Director of the British Geological Survey (BGS) in October 2019.

Karen’s background is in both business and academia. She was a consultant to the minerals exploration industry for more than 20 years and worked for the Geological Survey of Denmark and Greenland.

She has carried out extensive research into geological processes in the lower crust and mantle and their associated mineral deposits. She spent more than ten years in the US as a research associate at Woods Hole Oceanographic Institution and was a research scientist at Columbia University.

She is a member of a range of international advisory boards including the High-Level Steering Group of the European Innovation Partnership for Raw Materials, a range of H2020 projects and the United Nations Framework Classification for Resources (UNFC) Minerals Working Group.

Karen, who has a PhD in Geology from University of Copenhagen will be the first woman to hold the post.



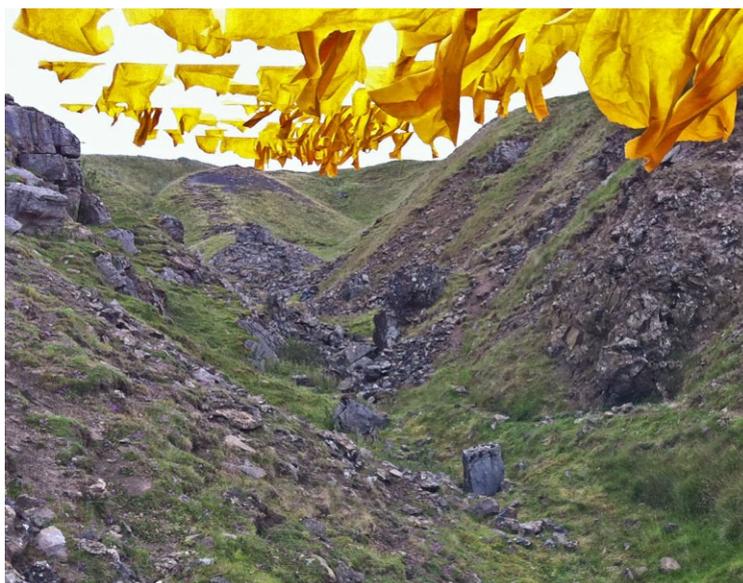
Karen Hanghøj, the new Director of the British Geological Survey.
Photo: [Twitter.com](#).

Hush...

Not an injunction to stop talking, though this was one of the effects of a temporary work of art highlighting the way mining has influenced the landscape of the North Pennines.

As we collectors know a hush is, well, a hush. Specifically, in this case Bales Hush, one of a number of grooves in the landscape west of Coldberry Gutter in northern Teesdale. This year the North Pennines AONB Partnership commissioned landscape artist Steve Messam to produce 'Hush', an outdoor installation inspired by the geology, mining history and landscape of the area. Supported by the National Lottery Heritage Fund and Arts Council England, it was on show for 17 days, between 19 July and 4 August.

The artwork used five kilometres of saffron-yellow fabric, suspended on 'washing lines', and was visible for miles around (coming as something of a shock at first sight). Just what is that huge crocus-yellow streak on the hillside? For anyone with a love of colour, the walk beneath the fluttering saffron flags was a joyous experience. Saffron on a monumental scale providing a disjunct with the muted green and grey landscape of the North Pennines.



Saffron flags above Bales Hush on the Raby Estate in northern Teesdale. Photo David Green.

David Green

Coming up in the next edition of the Journal...

Volume 22 of the Journal of the Russell Society, which will drop through letterboxes at the end of November, continues to record all that is new and exciting in the mineralogy of the British Isles. Starting (geographically) on Ben Loyal in the far north of Scotland, a recent discovery of amazonite rivals the best collected in the nineteenth century by Matthew Forster Heddle.

Scottish locations are a perennial favourite with members and there are two stops in Aberdeenshire. Manganite was rescue-collected from old workings at Laverockbraes in 2016. Its history, geology and specimen mineralogy are surveyed. The site has since become a suburb of the Granite City.

On the eastern edge of the Cairngorms, microcrystalline orange wulfenite is reported with quartz and fluorite at Roar Hill. Depending on how they are 'counted' there are currently about two dozen wulfenite localities in Scotland. The best known are probably those in the Leadhills–Wanlockhead area. The last stop on this year's Scottish tour is Whyte's Cleuch near Wanlockhead where the first British occurrence of the rare lead silicate ferrisurite is reported.

Pseudomorphs and epimorphs are among the most engaging of mineral specimens, each telling its own geochemical story. Pseudomorphs and epimorphs of quartz, carbonate minerals and goethite after fluorite are described from the Northern Pennine Orefield. Moving to the west, the journal continues its sporadic affair with mineral localities in the Caldbeck Fells, describing the Smale Gill trials, little-known localities with a diverse



Manganite crystals up to 1 mm in length with a striated prismatic habit coated in thin films of an unknown chocolate-brown manganese oxide. Michael McMullen collection, photo John Chapman.

supergene mineralogy. Derbyshire receives an honourable mention with a description of the rare copper sulpharsenide enargite from the famous (but almost entirely unrecorded) vein system exploited at Ladywash Mine. There is also a review of the third edition of the late Trevor Ford's excellent volume Derbyshire Blue John.

Welsh localities feature strongly in recent editions of the JRS and volume 22 is no exception. An article held over from last year while the authors scratched their heads describes pale amethyst-purple muscovite from Benallt Mine, Gwynedd, Wales. A dull-but-worthy companion piece looks at the way the muscovite formulae are calculated. The editor apparently intended it as an appendix, but it appears to have got out of hand.

If things go according to plan, Jean Spence and her mineral collection will be remembered in the final contribution to the journal. Jean amassed a fine collection with remarkable specimens from many British localities. Tynagh Mine in Ireland, with its beautiful supergene species, was a particular favourite. And remaining in Ireland, a description of the fluorite and other minerals from Lettermuckoo Quarry in Co. Galway completes JRS 22.

David Green
Journal Editor

The Geologists' Association Annual Conference 2019.

The Geologists' Association (GA) conference this year is on the theme of "Geological Resources in the North-West - Past, Present & Future" and will be held at the University of Manchester and Manchester Museum from 18th - 20th of October, 2019.

The programme includes a visit to Manchester Museum's Minerals & Palaeontology section. There will also be a series of talks and posters at Manchester University campus with titles including "Geology of the North West", "Geothermal energy prospects of the Cheshire Basin" and "Minerals of the Peak District". There will also be a number of field trips to sites including the Apedale Geotrail and Heritage Centre (with optional underground visit) and a coal mine tour in Staffordshire.

Contact the GA for further information or to register.

www.geologistsassociation.org.uk or email conference@geologistsassociation.org.uk



Elongated orange wulfenite, 0.9 mm in length, with horizontally striated curved prism faces terminated by a well formed pinacoid, overgrown by minutely drusy pyromorphite, from the trackside exposure on Roar Hill. Michael McMullen collection, photo John Chapman.

SHORT REPORTS & PAPERS.

Update from the Natural History Museum: 2018-2019.

It's been a year or so since I last gave an update to the Newsletter. At that time I had mentioned that the expectation was a return to normal curation after our involvement in the re-imagining of the Hintze Hall and the redisplay of the iconic gem cabinets in the Earth's Treasury. Well, that was premature! The success of these projects inspired our engagement teams to push ahead with other display improvements, which have taken a lot of time for the curation team.

The atrium area in the ground floor of the old Geological Museum, known to us as 'the portholes', was looking a little tired. This area is filled with important geological samples from across all geological disciplines, with minerals dominating. Gems and Minerals curator Robin Hansen co-ordinated the redisplay, conservation and remounting project across all science departments and was instrumental in getting it completed to such a high standard. Two new specimens were acquired to upgrade the display: a large amethyst geode that was bigger and of better colour than the original and a pyrite with fantastic lustre replacing one that was showing signs of pyrite decomposition. All in all, there are nine new specimens to look at with improved signage, mounting and lighting.

The 'portholes' were not the only area to get some TLC - the other 21 table-top cases in the Earth's Treasury have also been cleaned, the lighting upgraded (as much as possible) and the inside of the cases replaced with more appropriate materials on which the specimens can be placed and mounted. A few tweaks to the specimens and their layout alongside a clean of all the gemstones has significantly improved the display. Any upgrade like this allows for the large interpretation panels to be revisited, which is important since installation was over 20 years ago and nomenclature does change. A new, more user-friendly mount to hold the interpretation panels has been designed and at the time of writing, the specimens are back in and we are waiting for the new interpretation panels to arrive which include those for the three cases I mentioned last year. The upgrades to this gallery won't end here however. A final phase of cleaning of the other cabinets and objects in the gallery alongside the introduction of better dust seals will be completed by the end of the year.



The 241 carat calcite gemstone now on display in The Vault. Photo: Mike Rumsey - permission granted by the Trustees of the Natural History Museum.



Front and rear views of the large amethyst geode being mounted in the Museum's engineering labs. Photo: Mike Rumsey - permission granted by the Trustees of the Natural History Museum.

The work in the Earth's Treasury has meant only a few changes in the Mineral Gallery. The Azurite 'sun' from Malbunka mine in Australia - the largest in a public museum - alongside another new acquisition, an apatite from Medina in Brazil have been installed in a standalone case in the front of the gallery. Because a number of specimens from The Vault are still on tour (now in Quebec) a few new specimens have been installed in there as well, the highlight of which is a 241 carat calcite gemstone, expertly cut at specific angles to make the most of a twin plane, maximising fire (see image above).

Due to uncertainties around import and export in the run-up (or not) to Brexit, the NHM did not display at St Marie this

year and will not be displaying at Munich either. However, displays were taken to Tucson 2019 and Munich 2018. For those who've not seen Tucson Show reports online and in other magazines, the theme was "Wulfenite" and we brought along the best of British! As most of you will know, the best of British wulfenite is all micro, so it was an educational display quite different from the aesthetic eye-candy brought by many of the other museums. It was fun to bring something a little provocative and different and to inform the visiting collectors that not everywhere produces great wulfenite, which in turn showcases just how amazing the specimens from the Arizona region really are.

At the beginning of the year, long term volunteer John Crocker decided it was time to take a step back from volunteering and enjoy his retirement. I'd like to extend my own thanks and that of everyone in the department to him for his many years of support for the NHM petrology and mineralogy collections. With the departure of John, we welcomed Nick Hawes as a regular volunteer alongside long-term volunteer Austin Woodbridge, I'd like to thank them both for their time and support, it is invaluable.

The NHM hosted the Marsh Awards ceremony this year and it was a pleasure to see Steve Rust win the award. Next year will again see the awards hosted at the NHM and I look forward to welcoming any members who are able to come along for the awards ceremony.

Mike Rumsey
Senior Curator & Collections Manager, NHM

Veils, Ghosts and Haloes - The Strange Case of the Copperthwaite Fluorite

The Pennine orefields have supplied colourful fluorite specimens to collectors' cabinets for more than two centuries. Specimens from the Copperthwaite area in Swaledale have an interesting crystallography and display remarkable concentrations of colour. Colour, which is interpreted as 'supergene', occurs in haloes around oxidising pyrite and in veils in recent cleavage planes. A similar purple colour, which may be primary, forms ghosts just below crystal surfaces and outlines crystal edges. A few simple observations are used to develop a speculative hypothesis to account for the colouration.

Introduction

Articles in the forthcoming issue of the *Journal of the Russell Society* are linked by that most appealing property of minerals: colour. Colour banding very similar to that in Blue John is described in fluorite from Roar Hill on the eastern edge of the Cairngorms National Park in an article by Michael McMullen. The accompanying photos show intensely purple bands in otherwise colourless crystals.

In its pure state, calcium fluoride is a colourless ionic crystal. Colours in the natural mineral are most commonly associated with defects in its crystal lattice. These may be produced by vacancies, where one or other of the atomic building blocks is missing; by atoms which have been displaced from their normal equilibrium positions or by impurities such as rare-earth elements, which alter the local charge balance. Different types of defect produce different colours. The dark blue to purple of Blue John is associated with electrons trapped in vacancies in the crystal lattice, producing so-called F-centres (Nassau, 1983).

A vacancy containing a trapped electron is effective at absorbing visible light, even if it is present at only one atomic site in ten thousand. As the energy of the electron in a vacancy is quantised it is only able to absorb photons at particular wavelengths. This is the reason for the characteristic colour of Blue John.

Specimens

A note in a recent edition of the *British Micromount Society Newsletter* describes fluorite in the Charles Lamb collection from Copperthwaite near Reeth in Swaledale (Green and Chapman, 2019). In general, Yorkshire is something of a 'poor relation' when it comes to North England fluorite, its specimens lacking the 'kerb appeal'

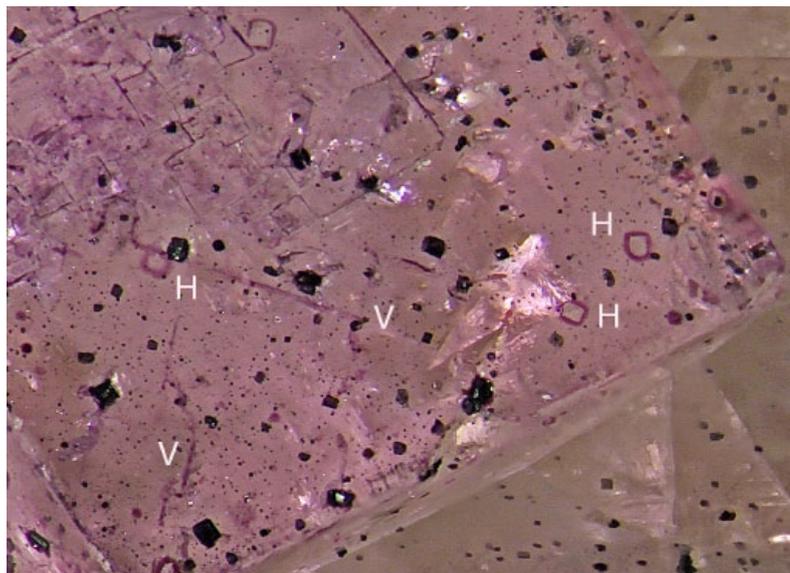


Figure 1. A small but well-developed colourless fluorite crystal, about 0.75 mm on edge, showing conspicuous modifications to the crystal corners and edges. The forms appear to be the cube {100}; tetrahedron {210}; hexoctahedron {410}; and trapezohedron {211} (Green and Chapman, 2019). Charles Lamb collection, photo John Chapman.

of those of neighbouring counties. They are not, however, entirely devoid of interest. Many of the small crystals from Copperthwaite have well developed tetrahedral chamfers to the cube edges (Fig. 1) a noteworthy habit.

Copperthwaite crystals come in two 'varieties.' Those with tetrahedral modifications are almost always small, usually less than about 3 mm on edge, and transparent. Simple cubic crystals, which they commonly accompany, may be up to 20 mm on edge. They typically have mosaic patterns on their crystal faces and tend to be cloudier and less lustrous than the tetrahedra. The small crystals are mostly colourless to pale yellow, but the larger cubes often have a distinct purple colouration. The colour tends to be concentrated in veils, ghosts and haloes (Fig. 2) at or near crystal surfaces and forms the subject of the speculative note.

Under a microscope, the purple colouration is often seen to be associated with crystals of pyrite. Purple colour zones commonly surround oxidising pyrite crystals and if a crystal has become detached its former presence is betrayed by a halo. Purple colouration which fades to wispy edges forms veils which commonly lie within recent near-surface cleavage planes [mostly on (111)]. Purple colour is present on the faces of some crystals and is also commonly concentrated in a thin plane just below their outer surfaces, forming a ghost, which appears only when the crystals are viewed edge on. Colour may be concentrated along crystal edges and at vertices, a feature also noted at Roar Hill (McMullen, 2019). It also occasionally 'stains' irregular etch pits, presumed to result from the acid degradation of pyrite, providing evidence that some, though not all, of the colour is 'supergene'.



Figurer 2. Haloes (letter H), veils (letter V) and an inconspicuous ghost on the surface of a cubic fluorite crystal from Copperthwaite. Note that the pyrite inclusions are generally oriented parallel to the cube {100} or dodecahedron {110} forms. Veils within the crystal extend along octahedral cleavage planes {111} near the surface. There is a faint and incomplete ghost parallel to the cube face at the bottom left. Charles Lamb collection, photo John Chapman.

Discussion

At first glance the presence of haloes around altered pyrite might seem to suggest that oxidation is producing some kind of purple pigment. After all, many iron-rich compounds (think of Prussian blue) are strongly coloured. The absence of coloured haloes on any of the other minerals at Copperthwaite, and the lack of any discolouration in bleach (an oxidising agent which would attack organic pigments) or alkaline dithionite (which would reduce Fe(III) in pigments) suggests otherwise.

The fact that all the colouration seems to be affected by long exposure to sunlight suggests that a colour centre is involved. Ionising radiation from weakly radioactive hydrothermal solutions is advanced as an explanation for the purple colour of Blue John and may well be the cause of the banding in fluorite from Roar Hill (McMullen, 2019) and of some of the ghosts at Copperthwaite. However, it seems unlikely to account for the colour around oxidising pyrite. Unaltered pyrite inclusions sealed within fluorite crystals are never surrounded by purple colour zones. If slightly radioactive pyrite was the cause of the colour, some colouration would be expected there as well.

Nonetheless, the association between concentrations of colour and oxidising pyrite suggests some form of causal link. Pyrite oxidation is a complex process (Baars, 2019). Seven electrons must be added to the reduced sulphur in a pyrite crystal lattice to change a sulphide ion into a sulphate ion. Significant acidity is generated in the process.

Is it possible that a flow of charge along the surface of the crystals, generated by changing redox potentials during oxidation, could supply the electrons required to populate defects in the crystal lattice and produce a purple colour? Such a contention is entirely speculative. The energy involved in such an electrochemical process is much less than that associated with ionising radiation. It is known, however, that purple fluorite can be produced if colourless crystals are placed in an electric field at elevated temperatures (Nassau, 1983: p. 185).

The flow of electric charge which occurs as orebodies oxidise is little studied. It may be that the delicate veils and haloes represent the traces of former conduction paths. Discharges also tend to concentrate at corners and edges, as anyone

who has played with an electrostatic generator can confirm. Might this offer an explanation for colour concentrations at crystal edges and vertices? Once again this is pure speculation.

It is clear that more conventional reasoning, such as long exposure to non-penetrating ionising radiation, provides a better explanation for the purple ghosts in the Copperthwaite crystals. They seem likely to have formed late in the primary paragenesis (as with the colour in Blue John). However such an explanation cannot easily account for the colour concentrations around oxidising pyrite crystals (but not those that are unaltered), along what appear to be recent cleavage planes, and in etch pits generated by the acid degradation of pyrite. This colour appears to be associated with recent supergene oxidation.

Might some form of experimental test be possible? Much of the 'action' in mineralogy is on timescales that are challengingly long. However, increasing the mean molecular energy by elevating temperature can be used as a proxy for time in some systems. Passing a small electric current through a specimen might provide a way to examine the hypothesis.

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Postscript

As well as veils, ghosts and haloes, fluorite crystals from Copperthwaite contain epitaxial inclusions of pyrite. In some cases, the cube faces of fluorite and pyrite are parallel; in others the cube face of the pyrite lies at 45° to the cube face of the fluorite, and is parallel to the dodecahedral {110} form. This epitaxial arrangement (Fig 2) means that there was registration at an atomic scale between the unit cells of pyrite and fluorite when the crystals formed. This close contact might have a bearing on electrical properties of the composite structure. The authors would be interested to know of any other sites at which such epitaxial overgrowths are present.

John Chapman
David Green
Charles Lamb

Isaac Walker Collection Labels.

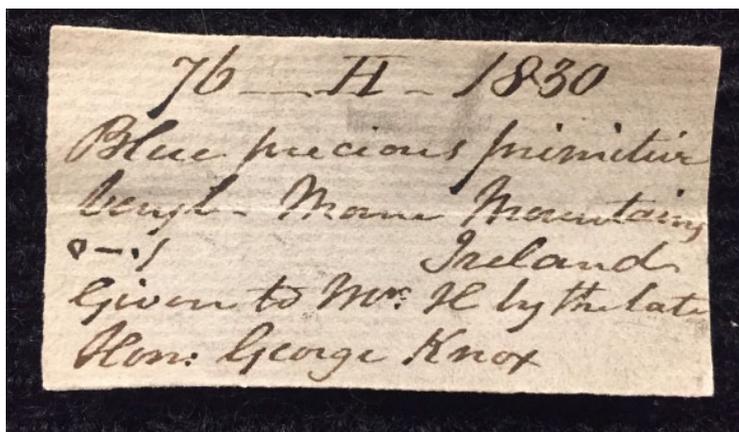
In Newsletter 73 there was a note which contained a reference to the Isaac Walker collection labels and a mention of the codification or cipher that can be found in the bottom left corner being representative of how good the specimens were. Although this is broadly accurate, it was actually a pricing code. It seems like a good opportunity to set the record straight on this as there has been some speculation in the past regarding what the codification stood for. The labels are collectable and anyone in possession of an original Isaac Walker label should be particularly happy about it! I reproduce below an edited extract from the Mineralogical Records Biographical Archive, put together by Wendell Wilson with regard to Walker and the codification.

“Isaac Walker (II) a wealthy British landowner, brewer and mineral collector, was born in St. Pancras Parish, Middlesex on March 20 1794, the son of Sarah “Sally” Chorley and John Walker (1766-1824). He lived in the Arnos Grove estate that had been purchased in 1777 by his grandfather (Isaac Walker I, 1725-1804; a prosperous Quaker linen merchant) now sited in North London. The family had a governess and 11 household servants as of 1851. Isaac Walker married Sarah Sophia Vickris Taylor in 1823 and together they 12 children.

Walker purchased much of his fine mineral collection from Henry Heuland (1778-1856), including specimens from Heuland's private collection and from many others including the collection of Lady Louise Aylesford (1761-1832). According to his labels, he made his first purchases from Heuland in 1808 when Heuland was selling the Jacob Forster collection - Walker was just 14 years old. Subsequent purchases were made in 1813, 1816, 1817, 1818, 1821, 1826, 1827, 1829, 1830, 1832, 1833, 1834, 1835, 1836, 1837, 1838, 1839, 1840 and 1842 (and possibly other years). He noted a one-letter code on his labels indicating which collection the specimen had come from, “H” indicating Heuland's personal collection, “F” indicating the Forster collection, and other letters, e.g. T (James Tennant?), C (Alexander Crichton?), R, S, B, and L, representing other collections, some via Heuland. Walker also noted a code in the lower left-hand corner for the price he paid for most specimens: “O”, “I”, “—”, and “.”. British Museum curator Peter Embrey was of the opinion that

“O” stood for 1 pound. The others supposedly stood for guineas, shillings and pence, though it is hard to believe that Walker paid only three or four pence for some specimens from Henry Heuland!

When Walker died on October 9, 1853, his collection passed to his sons, who may have added to it, keeping it at the family mansion; in 1912 the collection was acquired from the Walker family by London mineral dealer Samuel Henson (1848-1930), who subsequently sold many fine specimens from it to the British Museum (Natural History). The museum also acquired Walker specimens via F. N. Ashcroft who purchased them from Henson and later donated them to the museum. Much of Walker’s non-British material was sold to Krantz of Bonn”.



An example of an Isaac Walker label showing his price code marking at centre-left. This specimen was apparently one pound eleven shillings and sixpence! Mike Rumsey photo - permission granted by the Trustees of the Natural History Museum.

A while back when interrogating the registers here at the NHM, I found a very useful note in the corner of one of the registers, finally settling what the codification stood for. Written by Leonard Spencer in 1912 (and relating one presumes to the first time the BM purchased significant portions of the Walker Collection from Henson) is the following explanation:

ϕ = £10
 x = £5
 o = £1
 - = 10/- (10 shillings)
 l = 5/- (5 shillings)
 . = 1/- (1 shilling)
 / = 6d (6 pence)

The most monetarily significant individual purchases included “the finest yellow topaz known” purchased for £100 from Henry Heuland in 1833, and now on display in the Vault at the Natural History Museum (perhaps still the finest example known), an etched beryl (aquamarine) from Coimbatore, India also purchased for £100 and an Andreasberg pyrrargyrite for £40, the latter two specimens both once in the Lady Aylesford Collection and also acquired via Henry Heuland. Although the mineral registers are generally devoid of personal comments, the beryl from Coimbatore (BM 1912,486) has “[!!! L.J.S.]” indicating, one presumes, the surprise of seasoned curator Leonard Spencer at the value once given to this specimen.

Although it is not recorded how Spencer determined the cipher, one can assume that it was either through correlating a number of the specimens with annotated Heuland catalogues or it was known to Henson – the dealer who processed the collection - who passed on the information.

Mike Rumsey
Senior Curator & Collections Manager, NHM

More Notes on Mineral Labels.

Thanks to Tom, our Society Conservation Officer for producing a comprehensive note on labelling techniques in the last newsletter - to build on that I thought it would be a good opportunity to share how we do it at the NHM which may be of extra interest to the community. For those of you who are really interested there are other labelling best practice documents available online from SMMP.

Inks

In the last 15 years, the NHM has moved away from Rotring pens, they are excellent – but maintenance is painful and they do have a tendency to leak. A number of ad-hoc light-fastness tests were performed on other more user-friendly pens readily available in the UK to test for a pragmatic solution that both sped up and cleaned up the process of label-writing without sacrificing quality. We have found that the fibre-tipped archival PIGMA MICRON pens worked very well – the archival ink is waterproof, lightfast and acid-free. For the labels that are affixed to specimens in the mineral

collection (what we call ‘tickets’) which are just a number e.g. BM 1967,130 we generally use the 01 (line width 0.25mm) or the 005 (line width 0.2mm). For paper labels that go into the trays with the specimen, we variously use the 01 or 005 for the smaller writing, but write species name, number and location using the 08 (line width 0.5mm) so that it is more readily visible. Varying the size or ‘emboldened’ nature of the text is another useful practice that collectors may wish to consider; certainly it is something that I find very useful in curating the collection here. To echo Tom’s really important point, writing in capitals to increase legibility is taken as standard, as is the use of simpler sans serif, a less flamboyant style of lettering.

Although many institutions and individuals are moving towards printed labels for the sake of efficiency, this must be done with caution - a pitfall can be the type of ink and the type of printer. Some printer inks are not lightfast and are not of the same archival quality that specific archival pens are. It is always worth investigating this before moving down the printed label route. It is worth noting that although it is excellent to preserve some of the flair and personality of the specimen owner or curator through handwritten labels this is not something that the NHM expects to be doing for much longer. Indeed, the mineral collection is still only using pens due to some technical difficulties with the information we want to extract from the database and have on a label so that the formatting is consistent with our older handwritten labels.

Consistency

As I write the above, I realise that I should note consistency as its own thing. Perhaps it’s obvious, but one of the most important things in labelling a collection is consistency in style, information and nature – that allows for all the interesting connections to be made in the future and can even help retrieve lost information. A distinctive and consistent numbering system will tie a specimen to a specific individual when all other information is lost, this may then tie it to a catalogue and the information is rediscovered. For a real-life example, it was thought that much of the locality information with the Ludlam collection was lost according to the old Museum of Practical Geology registers and therefore by consequence, the NHM database. However, by finding a consistent style of number label on collection pieces in addition to the Ludlam number, we have been able to link a great many specimens to the much earlier ‘Levy’ Catalogue (from 1827) which contains all the locality information that was thought to be missing. Great!

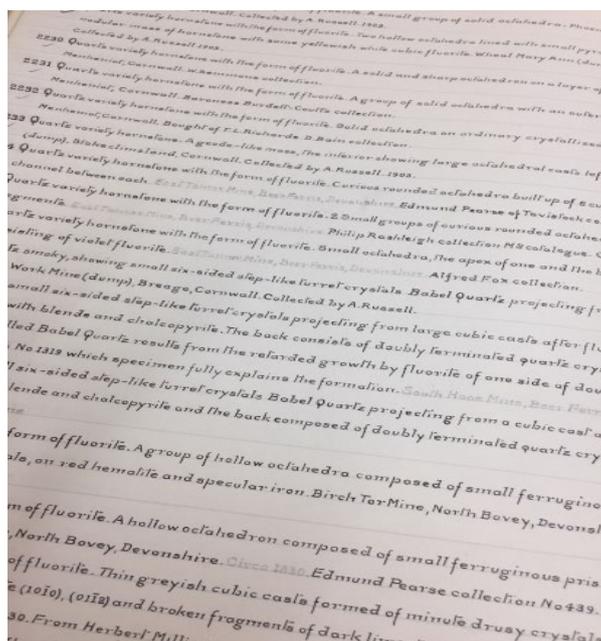
If there is a change in style or methodology at some point it is prudent, if possible, to change the whole - although I appreciate there is also argument for adopting the change from a specific point forward as it can be used later as a chronographic tool. For those of you familiar with Mick Cooper’s excellent work on mineral dealers, the style of mineral label that comes with the specimen is an indicator of the date of the sample. However, if pertinent dates are already recorded on the label this becomes unnecessary and is ultimately just ‘interesting’ and of more social history / cultural relevance.

With a mineral collection as large as that at the NHM (200,000+ specimens) it is not possible to go back and alter everything consistently, so when information, style or method changes are made, that change must be recorded somewhere (often in the front of a catalogue or appropriate register) so that there is an explanation for the change and the date from which it was done. This is to avoid confusing the researcher 200 years from now who thinks “hang on, this doesn’t look like all the other labels from the NHM that I’ve seen, is it really from there, is my data accurate?” For a lesson in consistency I point any reader to Sir Arthur Russell’s (unfortunately incomplete) hand-written catalogue and wonderful labels.

Paper

Something that has not been mentioned is the type of paper to be used. Paper seems a pretty innocuous substance, but if you are curating minerals, then chemistry is important and it is worth checking that the paper is acid free, which also means it’s sulphur free. Thankfully most paper is now acid free as standard, but if you are using something a little different it’s worth checking. This is most important in a humid environment or if your collection ever suffers from water ingress.

Other considerations are the weight, flexibility and fibre composition of the paper. For tray labels, we have traditionally used 100% rag paper, this is paper that is sourced from cotton rather than wood-pulp and is used for its superior



How it should be done. A section of Sir Arthur Russell’s catalogue. Mike Rumsey photo, permission granted by the Trustees of the Natural History Museum.

durability and its increased ability to absorb ink over wood-pulp based paper. At one point the NHM used a 100% rag and it's my understanding - from curator heresay - that with other additions, a waxy coating essentially made it equivalent to banknote paper. For the 'tickets' and for anyone thinking about using information labels that attach to specimens, the flexibility of the paper is also extremely important. Unfortunately, the unobtrusive parts of mineral specimens are often the bits that are not flat, and affixing a label to an undulating or bumpy surface can be difficult without using a lot of adhesive which can often detract from the specimen and label. To keep adhesive to a minimum and guarantee a long-lasting bond to the specimen we use a very thin rag paper (which looks and feels a bit like cigarette rolling paper, although it is actually quite different). The waterproof and lightfast ink is written on the paper 'ticket', allowed to 'set' and then the whole 'ticket' is dabbed onto a slightly damp cloth, the paper absorbs a little water giving it increased flexibility and is only then pressed on to the specimen using an appropriate adhesive. This allows the paper to contour with the liquid/gel adhesive to the natural undulations and imperfections of the specimen surface.

There are some amusing (or apocryphal) stories about collectors, curators, dealers and preparators trimming specimens to fit trays and drawers, and using the off-cuts for personal gain - perhaps the most famous being Count de Bournon and his 'little hammer', but the same consideration needs to be realised for labels. If you are going to use a standard size tray or box, then don't make the tray label bigger than the receptacle. Create a tray label design that allows for insertion into the smallest tray size you expect to use without folding or 'trimming' the label, this will add longevity to the label. For some collections at the NHM there is the ability to create the same standard label style and layout at different scales, to satisfy consistency as much as possible. This functionality is easily replicated when using printing methods as almost all word processors, picture or design software allows us to print something at a set percentage of its original size.

As Tom has already indicated, labels that are attached to the specimen should be as unobtrusive as possible, but it is still worth considering consistency. In many historic examples, it is sometimes the shape, composition or size of the label as much as it is the handwriting that allows a future researcher or collector to identify the previous owner. At the NHM we have a partially printed standard sized ticket which is always an oval - and we deviate from that only when there is not enough space to affix the ticket in an unobtrusive way to the specimen. When that occurs, the oval is truncated, so as to still be partially consistent. In rare cases, the oval shape is modified completely to a specific shape - e.g. a gemstone facet, but we keep this to a minimum in order to preserve consistency. Regardless of size and shape the paper is always the same rag composition and with the exception of very tiny gemstone facet tickets, the printed 'BM' always remains.

Description.

It's somewhat traditional to have a description on a specimen label, but it is worth reflecting on why we do this. In Tom's note, it was mentioned that the description is 'what each [specimen] looks like to the untrained eye'. This is key, and is perhaps not what people might expect of a national collection - so it's important to understand why that is the case also at the NHM.

The specific 'mission' of each collector and collection is different and that may lead to different interpretations of what a description should contain. But fundamentally for most collections, where the majority of specimens reside quietly in drawers for most of their life, the tray label is another curation tool, the sacrosanct link between information and object and one that facilitates regularly occurring collection management processes. In this case it doesn't have to contain intensifying adjectives (as Henry Heuland would have) about just how 'wonderful', 'magnificent' or 'matchless' a specimen is, nor the minutiae of chemical or crystallographic nomenclature (as I might have, before Peter Tandy explained to me why this was not useful). These are snippets of information best preserved in a catalogue or display interpretation, they do not facilitate collection management processes. Yet a simple description of size, colour, form, habit, overall physical condition etc... does. This allows anyone, not just the knowledgeable curator or individual to quickly identify a specimen that is out of place - removing the pre-requisite that one needs to have an intimate knowledge or memory of each individual piece. Something that becomes very important when your time as temporary custodian of an object comes to an end. A label reading "a small specimen with tiny pink crystals on a white rock" found in the same tray as a lump of massive galena is a good indicator of a problem to anyone, whereas "a remarkable crystal fragment showing cleavage along 001 with an oxidation tarnish" is not - and requires quite a bit of knowledge.

Multiple labels.

For some it might be prudent to think about multiple labels for different purposes. This helps with consistency and allows the curators and collectors of the future to isolate more information. If cleverly done, a subtle change in label can provide significant insight. Well known examples are the Barstow green and Barstow white labels. These provide a particularly useful distinction for 'collector-dealers' - green broadly relating to more regular 'stock' and white being those that were considered at one time part of his collection, perhaps before being moved to 'stock'. At the NHM, there are basically two types of collection management label. One for the specimens in the registered collection, i.e. those formally acquired into the collections and given a number called a 'Permanent Label' or 'PL', and one for anything that was not deemed significant enough for registration and so put into the duplicate collection. The duplicate collection

is all the material that is not registered and is therefore within the control of the curators to use for completely destructive research, exchange or disposal.

This duplicate label clearly indicates that the sample is from the duplicate collection at the NHM (or BM(NH) if on an older label). For an institution like the NHM this is very important as it legitimises the removal of the specimen from the collection as something that has been approved by the curators and institution. In times gone by, when exchanges were made of material from the registered collections, a process that required specific sign-off and approval from the museums trustees, the PL was 'retired' if the whole sample left the museum collection so that any specimen appearing on the market with such a label was known to be stolen or counterfeit. So there should be no NHM PLs 'out there'.

Perhaps when printing technology was less readily available, these were sensible security distinctions to be made, but now to have such a system that one could use for legitimising the source of a material is almost impossible and label fraud is unfortunately rife – and really should be the subject of yet another short article in its own right. It is interesting to note that there was a time when the internal policy at the NHM was never to allow even a photo of the PL, so as to guard against counterfeiting.

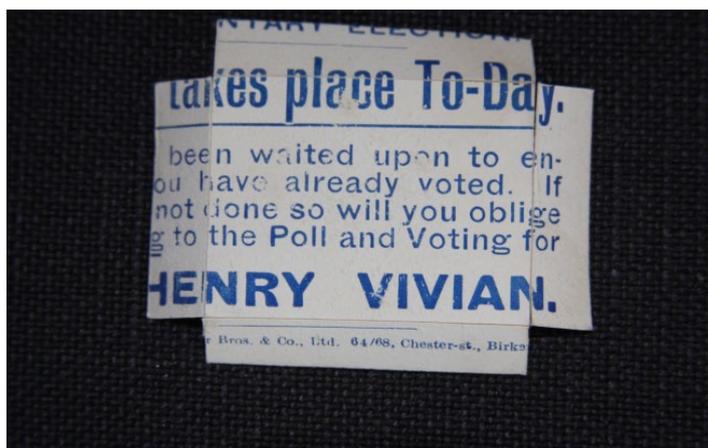
Mike Rumsey.
Senior Curator & Collections Manager, NHM.

Every Card Tray Tells a Story

An article by mineral enthusiast and part-time volunteer curator John Cooke entitled “An Investigation into Dating Remedial Actions Affecting Old Mineral Collections”, originally published on the Geological Curators’ Group blog, brought back memories of volunteering at the Hunterian Museum in the early 1980s.

My role was to go through the drawers in the Scottish section, do a general dust and replace any dodgy card trays with smart new ones while I was at it. This was rather a slow process as there were many wondrous things that simply had to be looked at (a perk of the job). An added but less thrilling task was the careful removal of deceased spiders and moths for examination by another volunteer, a keen entomologist.

Although most of the drawers and their contents were in reasonable condition, some had clearly not been opened for a very long time. In one drawer - almost impossible to pull open - not one specimen had survived the ravages of time. Labelled pyrite from a locality near Paisley, all that was left were rotten lumps, cardboard scraps and a lot of greasy dust. Nothing to re-box there sadly!



Card tray made from an election pamphlet.
 Photo copyright John Cooke.



Card tray made from a business card.
 Photo copyright John Cooke.

John’s article (see <https://geocollnews.wordpress.com/2019/07/03/an-investigation-into-dating-remedial-actions-affecting-old-mineral-collections/>) describes an investigation into the materials used by collectors to produce “home-made” card trays and demonstrates that even something as humble as a card tray can add real value to the historic and scientific story of a mineral collection. It’s also a timely reminder – if one is needed – that it’s never too soon to check your pyrites.

Susan Tyzack

Branch Meeting and Field Trip Reports

Friday 9th November, 2018. North Branch Meeting and Presentation “Ivigtut (Ivittuut) Greenland: The world’s only cryolite mine” by Dr Michael Doel.

Reporter: Christine Critchley.

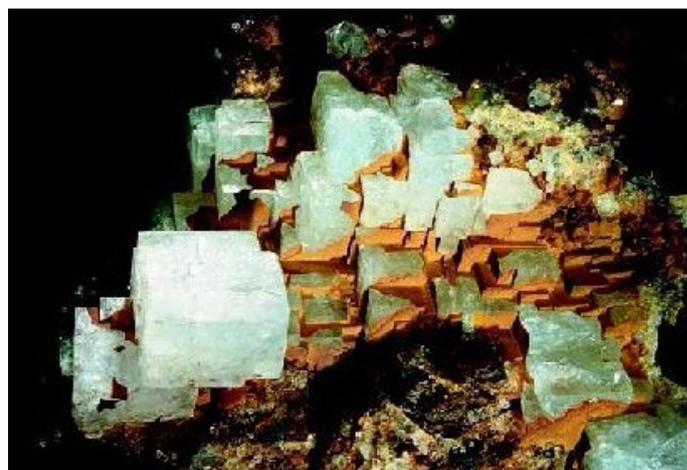
Ivittuut, (formerly Ivigtut, meaning “grassy place”), is an abandoned mining town near Cape Desolation in southwestern Greenland, in the modern Sermersooq municipality. It is sited near the ruins of the former 10th century Norse “Middle Settlement”. It is also the only place in the world so far discovered to have a natural and economically viable occurrence of cryolite (Na_3AlF_6 , sodium aluminium fluoride), an important agent in modern aluminium extraction.

The cryolite deposit was discovered in 1794 by the Danish geologist Karl Ludwig Gieseke, but the first mining efforts targeted the veins of silver-bearing lead surrounding it. Danish engineers began mining the cryolite itself in 1859 and, in 1864, the Danish Kriolit Mine og Handels Selskabet was granted a monopoly on its extraction. These early mining efforts processed the cryolite for its direct aluminium content. It was also sold to the Pennsylvania Salt Manufacturing Company, which used it to make caustic soda.

The deposit covers a very small area and consists of highly alkaline rocks, intruded into an old gneissic host rock. A halo of breccia surrounds a granite outer layer, which itself surrounds zones of cryolite with siderite, cryolite with fluorite, and a solid mass of pure cryolite. The minerals of Ivittuut include sulphides and sulphosalts (including vikingite and eskimoite), silicates (including quartz, topaz, nepheline and muscovite) and some sixteen unusual and rare fluorides, including the cryolite for which the mine was famous.



**The Ivittuut Cryolite Mine in the 1960s.
Taken from an old postcard.**



Exceedingly rare - well formed crystals of cryolite from the Ivittuut Mine. Photo: GEUS.

Aluminium has been considered a ‘miracle metal’, being light, strong and corrosion resistant (due to an oxide coating). It also readily forms alloys to provide an even larger range of useful properties. It is however very difficult to isolate. Today, aluminium is extracted by an electrolytic process, which needs the alumina (obtained from the ore bauxite) to be in a liquid form. As alumina melts at 2047°C this was ‘difficult’. The Hall-Heroult Process, established in 1884, removed the need for such high temperatures by dissolving the alumina in molten cryolite and, with a melting point of only 950°C this is much easier to achieve! The molten cryolite and dissolved alumina can then be electrolysed to form molten aluminium, though the high currents needed usually mean the plant has to be serviced by locally produced hydro-electricity. This development greatly increased the importance of the Ivittuut deposit and although only 80 m deep the mine was once known as the single most important hole in Greenland! The Ivittuut mining operations were a major factor in the American occupation of Greenland during World War II. After the war, the cryolite was mined by the Danish firm Kryolitselskabet Øresund, and revenues from their operations helped fund the establishment of Grønlandsfly, which became today’s Air Greenland.

Synthetic cryolite eventually became available, reducing the importance of the mine. Production became uneconomical and was discontinued in 1987 with the deposit essentially worked out. The community was abandoned soon after and the population, in its heyday around 100, is now down to close to zero. There was, for a time, a hotel and a mineral museum (which has now been relocated to the capital Nuuk) and present-day activities in the area include walking, whale watching, fishing, and - still - mineral collecting.

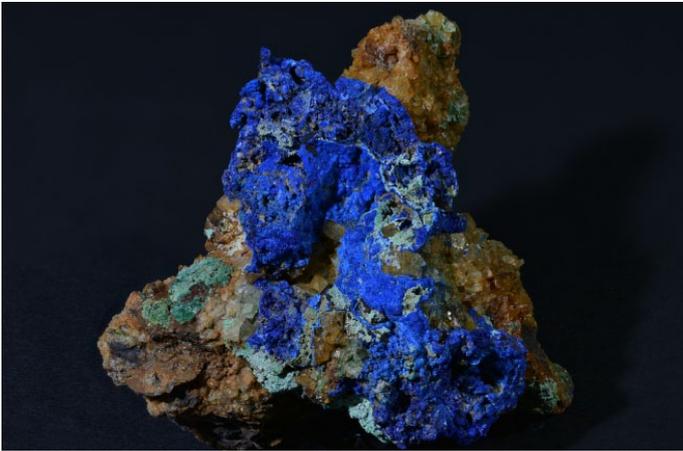
An excellent, well illustrated presentation with a display of minerals and memorabilia (stamps, photographs, coins) for all to browse through afterwards during refreshments. Many thanks Michael.

Friday 11th January 2019. North Branch Meeting and Presentation “ Minerals of Yorkshire - The Askrigg Block” by RS President Steve Warren.

Reporter: Christine Critchley.

To a rather full house (no snow this year), Steve Warren gave the Branch a really interesting and very well illustrated presentation about the minerals of the Askrigg Block. Initially he looked at the locations to be covered and suggested 'classic' books for further information on the area. Then we were told about the geology of the area and the differential weathering and how this gives the landscapes we see in the Dales today.

Distribution of the primary mineral ores (of lead, copper and zinc) and the later deposits of fluorite, baryte, calcite and witherite were explained using maps and diagrams. There was a discussion about the deposits occurring, namely veins, scirms, pipes, and flots/floats/flats. Steve delved a little into the economic mining history of the area, from Pre-Roman to recent past, and the changes seen through to the time when, due to cheaper galena being obtained from locations abroad, the mines closed for a period in the 1860s. Later extraction to re-work dumps etc continued through to present day.



Azurite on fluorite. Great Sleddale Copper Trial, Muker, North Yorkshire. Photo: Steve Warren.



Large hemimorphite crystals. Buckden Gavel Mine, Craven, North Yorkshire. Photo: Steve Warren.

The highlight of the presentation was undoubtedly a dale by dale tour, mine by mine, showing the sites, minerals of the area which Steve had collected or acquired and some of the wildlife including the Common Blue butterfly. This started off with the rather unknown location (to those without children) of Greendale but soon went onto the Dales proper! The best way of showing this is via some of Steve's images!

Saturday 9th March 2019. Southern Branch Visit to Durnford Quarry [ST 535 714].

Leader: Chris Finch. Reporter: Ross Whittaker.

Thick grey rain clouds on my drive south from Shropshire did not augur well for the day's outing, and I was wondering why I bother getting up so early and driving all that way to get a soaking. Anyhow I arrived at the quarry at just before 08:00 allowing enough time for the sun to come out, a coffee and to get changed into the usual 'Hi-Viz' orange ensemble.

Other members started to arrive including Roger Robinson, Tony House, Alistair Napier, Steve King, Michael Doel, Peter Bainbridge, Lisa Priest, David Aubrey Jones and Tony Brook and once all assembled, we were introduced to Otto Karhunen, the quarry manager, by Chris Finch, our leader for the day. After the usual health and safety warnings/reminders, we were escorted on foot into the quarry by Otto.

We started at the bottom of the quarry as the management had kindly left a large pile of loose rock and mud for us to all have a poke around in. The tapping of hammers could soon be heard. From what I saw, and before things were squirreled away into backpacks, some nice rhodochrosites and manganese stalactites were found. This material had been exposed due to the dumps being re-profiled and were remnants from the area where rhodochrosite had been found in earlier years.

Having had enough we made our way up to the track to the next level and en route had the opportunity to pick over another pile kindly left by the management. Here, just as Chris called everyone for a group photograph with the words “everyone say rhodochrosite” in the air, I hit a rock open to find my first ever piece of pink, proving timing is everything. Not a great piece of rhodochrosite, but I found it.



Durnford Quarry, the Team at the “rhodochrosite pile”.
Photo: Chris Finch.



Rosettes of pink baryte to 5 mm on goethite.
Photo: Chris Finch.

We then made our way to one of the higher levels where thick clay formed part of the bunds. Steve King noticed a large single calcite lying in the sun on the bund. This coincided with calcite being found in the thick clay that made up part of the bund and soon most of us were at work pulling apart the clay to extract the plentiful calcites.

These looked promising and having stashed a dozen or so in my bag it was not until I got home that disappointment set in as they were all heavily etched, of a dull grey-brown colour and with dings here and there. I think I preferred them with the clay on, at least they were still full of promise! Anyway, yet more free rocks for the kids at the Oxford Show.

At about 12.30 we made our way out of the quarry. All in all, it was a good day out, the sun shone on us all and I found a bit of rhodochrosite.

Our thanks go to Otto Karhunen, the quarry manager for agreeing to our visit, generously coming to work to escort us on his day off and providing much suitable material for the visit. Thanks also to Tarmac for supporting mineral collecting at their sites.

Saturday 16th March 2019. Central Branch Mini-Symposium: The Minerals of Derbyshire. Woodhouse Community Hall, Leicestershire.
Reporter: Roy Starkey.

About 25 members gathered at Woodhouse Community Hall for what proved to be an interesting and enjoyable day. Attendees were treated to tea/coffee and biscuits on arrival, and a programme of three illustrated talks and a number of table displays.

The theme of the meeting was The Minerals of Derbyshire, and first up was Roy Starkey with ‘Hidden Treasures of Derbyshire’, giving a glimpse into specimens ‘behind the scenes’ in various museum collections that he had studied during the course of research for his recently published book – Minerals of the English Midlands.

Next, John Jones called upon his sharp memory and well-maintained notebooks spanning more than half a century to recount the tale of ‘Derbyshire Enigmas: Brown, Black and White’, providing an overview of his quest to discover the source of the famous ‘black baryte’ and the story of mimetite from Derbyshire (or not). John had kindly brought along some of his field notebooks for members to browse.

After a tasty buffet lunch, we were due to hear Stephen Seymour-Smith talk about ‘The Characteristics of a Derbyshire Deposit’, but unfortunately, he was rather delayed. Fortunately, his slides were available on Frank Ince’s laptop and it was decided to run the presentation as a discussion session, inviting contributions from the floor as we worked through the slides which documented the working of the Tearsall Farm Opencast on Bonsall Moor.

Just as proceedings were drawing to a close, Stephen arrived, dismayed that he had missed his slot! However, the

audience agreed for him to run through the slide set again, adding specific detail where he felt it to be important.

In addition to the presentations, table exhibits were provided by Lionel Burch and Roy Starkey. Copies of the new edition of Trevor Ford's book on Blue John were also available courtesy of Tim Colman.

Thanks to everyone who helped with the organisation of the event, the catering team, the speakers and to those who provided displays. We look forward to seeing even more of you next time.

Saturday 23rd March 2019. Southern Branch Field Trip to Hampstead Farm Quarry, Chipping Sodbury, Gloucs. [ST 724840].

Leader: Chris Finch. Reporter: Steve King.

A cool foggy overcast morning as expected for late March greeted seven members for our visit to this ever productive and interesting location. After a safety briefing and update re quarry workings we were fortunate to be allowed a vehicle for the visit, making the prospect of retrieving larger specimens more attractive.

First stop was a brief check into the Brimsham Quarry to the north of the Hampstead Farm Quarry. The area at the lower level saw piles of fresh loose blast material, this seemed to yield very little mineralisation other than some microscopic sphalerite in calcite veins. A large boulder at the side of the access road contained a rich vein of very clean, almost certainly argentiferous galena, enough for most to collect some representative samples.

We then made our way in to the main Hampstead Farm workings, this had been subject to some clearing and general tidying by machine. Fortunately, this revealed some fairly promising specimens of pyrite vein material, some in a nodular habit and others with a 'snakeskin' appearance.

The most interesting material recovered from fresh blast boulders on the day were specimens of barium-rich celestine in the form of spheres and nodules displaying a 'velvety' subtle pink and grey appearance. Natural fractures revealed a delicate radiating structure, with some covering calcite crystals and others having 'bow tie' clusters on the surface. It was a challenge to collect an undamaged specimen as the limestone matrix was of a composition that seemed to frustratingly absorb any chisel work. Nevertheless, some superb examples were removed.



**Specimen of barium-rich celestine on calcite.
Photo: Chris Finch.**

As ever we can't thank Hanson UK and the Hampstead Farm team enough for their continuing support and trust in allowing us permission to collect.

Saturday 30th March 2019. Central Branch visit to Snelston Copper Mine, Ashbourne, Derbyshire. [SK 154 414]

Leader and Reporter: Neil Hubbard

Snelston Copper Mine (erroneously called Isolation Mine) is a small copper and lead mine which worked an ore deposit at the contact of the Triassic Sherwood sandstones and the underlying dolomitised Dinantian limestones until the early 1920s. The mine site is on the edge of a small quarry which has been backfilled with waste from a nearby instant coffee factory and is overgrown with mature trees.

A small group of us made our way around the edge of the quarry to the mine, the most obvious feature of which is "The Mound", a large heap of mine waste. Several trial holes were dug into this but only small fragments of malachite impregnated sandstone were found. Elsewhere, digging produced similar results until an area of dump was found where there were larger blocks of sandstone, some with fractures lined with crusts and sprays of malachite crystals. Nearby, Steve Warren started finding blocks



Steve Warren on the hunt for wulfenite.

of coarsely crystalline calcite, one of which produced a couple of tiny wulfenite crystals.

We would like to thank the site owner, Nick Thornley, for permission to visit.

**Saturday 6th April 2019. Southern Branch Visit to Whatley Quarry, Mells, Somerset. [ST 733 483].
Leader: Chris Finch. Reporter: Michael Dunmore.**

An early-rising group of 12 Society members were prepared for a 07:30 safety briefing before starting an ascent of the benches of the quarry, beginning at the bottom level eight. We were fortunate that Justin Collis and Andy Cox of Hanson Aggregates transported the group to the different levels of the immense quarry throughout the visit.

Mindat lists nine minerals plus "limonite" for the location, including baryte, calcite, fluorite, goethite, pyrite and quartz. Based on this visit, this list of minerals could also include amethystine quartz and lepidocrocite, assuming no confusion between lepidocrocite and goethite.

At the bottom (Level eight), there was sulphide mineralisation at the north-west corner, but nothing worth collecting. However, Michael Doel found fluorescent calcite specimens for his collection.

Contract crushing was taking place at the southern face of level seven, and so we drove past this to an accessible area of the southern face which provided very rich goethite, some quartz and a little amethyst. On the southern edge there was black rock limestone where one of the bunds included purple fluorite in a calcite/baryte matrix within the limestone. Steve Plant retrieved many large vein sections of the iron mineralisation and Alistair Napier collected an attractive fluorite specimen. But despite a great deal of searching by group members, no one discovered completely-formed fluorite crystals.

Level seven proved to be the most productive for collecting on the day. For level six, a recent blast had resulted in a lot of black rock limestone at the southern side with a few cavities containing lepidocrocite. We found nothing on level five or the levels above it.

We thank Hanson Aggregates for allowing access to the quarry and particularly Justin Collis, Production Manager, and Andy Cox for their help and good humour throughout our visit.



Specimen of banded goethite collected on the latest trip. Photo: Chris Finch.

Tuesday 9th April 2019. RS ASM 2019 special field trip to VC Quarry, Lundy Island, Torridge, Devon. [SS 13891 45352].

Leader: David Ifold. Reporter Gary Morse.

There had been some uncertainty whether this trip would take place due to the nationally publicised "mechanical problems" affecting Lundy Island ferry the MS Oldenburg. Fortunately for the four of us booked to sail on the 9th April, the ship was fully operational and we assembled early in the morning at Bideford quay to embark on the 2 hour crossing to Lundy Island which is some 12 miles off the coast of North Devon, where the Atlantic Ocean meets the Bristol Channel. We disembarked on the eastern side of Lundy in a considerable swell and biting cold north-easterly wind and made our way up to the path that would lead us north and round the coast to the VC granite quarry. The quarry is named after the Victoria Cross in memory of Lance Corporal John Pennington Harman who was awarded the medal, posthumously, following his brave deeds at the battle of Kohima, British India, on, coincidentally, April 9th in 1944. To commemorate the 75th anniversary of Lance Corporal Harman's death, a short act of remembrance was performed by the Devon County British Legion whilst we were at the quarry. The quarry houses a large, inscribed granite memorial placed there by the Harman family, former owners of the island.

Lundy Granite is a coarse-grained rock, typically with large feldspar crystals, trending towards pegmatite with prominent aplite veins. It is about 240 million years younger than Dartmoor Granite. It represents the southernmost example of igneous rocks associated with the initial formation of the North Atlantic Ocean around 60 Ma.¹ The eastern seaboard of Lundy Island has numerous quarries. Stone was cut for use as facing material for buildings in London and waste rock was discarded down the steep slopes. This discarded rock includes material with miarolitic cavities (crystal-lined,

irregular cavities found in granitic pegmatites) which may contain beryl and topaz with minor fluorite and indistinct apatite.

As we approached the quarry site, we were most surprised to find four large piles of granite boulders that had been recovered from the steep slopes and deposited on the path edge. It was subsequently discovered that these had been raised by Armed Forces volunteers and that they were intended for use as coastal protection on the island. This fortuitous operation had saved us the considerable effort of collecting on the slopes ourselves and as David Ifold had discovered a rather large radiating group of beryl crystals on the very top of one pile, we decided to inspect every boulder in the largest pile by moving it a couple of metres to one side.



Tom Goodland standing on top of "his" pile of rocks.



David Ifold holding the large block of granite containing the spray of beryl crystals shown in the inset.

Tom Goodland worked his way through the pile of rock, rebuilding the cairn on an adjacent area. Inspection of every boulder only revealed some minor interesting minerals including fluorite and some small, corroded, pink to red almandine garnets. Rupert Harrison concentrated his efforts on another pile and discovered a very large coarse granite boulder with fine grained aplitic material attached. The coarse granite surface of this was liberally covered with some good beryl crystals and small, but beautiful, water clear topaz crystals. On another pile I found a boulder with an exposed cavity that was lined with small crystals of black and brown smoky quartz.

Permission to collect on Lundy Island excluded the use of hammers and thus we had to carefully wrap each large block of granite and pack it into our rucksacks and carry them back to the jetty, via the Marisco Tavern, and then trim to size when we got home.

Our thanks go to Natural England and the Landmark Trust and in particular Dean Woodfin-Jones, senior Lundy resident warden for permission to collect on the island. Thanks also go to the volunteer squaddies who carried all that rock up the steep slopes and saved us the effort.

References:

1. Devon Geology Guide – Lundy Granite: Phil Stephenson, Devon County Council.

Friday 12th April 2019. ASM Weekend: Visit to Exeter Museum Store.

Leader: Christine Critchley. Reporter: Roy Starkey.

This visit provided a rare opportunity for members to view the mineral collection of the Royal Albert Memorial Museum, Exeter (RAMM), which is not on public display. Our group of enthusiasts included Tom Cotterell, John Cooper, Michael Milward, Harry and Christine Critchley and Roy and Mary Starkey. Our host for the afternoon was Holly Morgenroth, Collections Officer at the RAMM.

We had no idea what to expect as none of us had any prior knowledge of the collection and I think it is fair to say that we were more than pleasantly surprised. Holly was delighted by our interest and the enthusiastic comments as we gradually opened box after box of specimens, now all beautifully catalogued and organised after years of effort by Holly and her volunteers.

The museum can trace its origins back to 1813 when the Devon and Exeter Institution attempted to establish a museum

at their premises on Cathedral Green, Exeter. This venture was constrained by a severe lack of space and the collections later formed the nucleus of the RAMM in 1864. The geological collections have grown substantially since those early days and now number 40,000 – 50,000 specimens ranging from microfossils and microscope slides to macrofossils, rocks and minerals.

We were particularly impressed by the amount of curatorial data accompanying specimens, with well-preserved old labels and notes on previous owners providing many interesting potential leads for historical research. Names such as G.W. Ormerod, Mrs R.L. Berry, J. Clench, Dr L. Shapter, W. Vicary, Dr J.G. Croker, W.H. Reed, F.R. Rowley and F. Ash were all new to the writer.

Particularly interesting items were a couple of axinite specimens and a pyromorphite from Terrace Hill Quarry, Lostwithiel, presented by Sir Arthur Russell; a very early example of baryte from Peak Hill, Sidmouth (possibly from the original find), dating back to 1920, and a really nice deep blue plumbogummite from Roughton Gill, Cumbria.



Museum specimen of baryte on calcite from Peak Hill, Sidmouth, Devon. Photo: Roy Starkey.



The RS group examining some of the material in the Museum store. Photo: Roy Starkey.

We spent a happy couple of hours in the store and were treated to tea and biscuits before resuming for a final half-an-hour. We were sorry to have to leave when the time came and to say good bye to Holly. We have, however, offered our assistance for any future mineralogical queries which she might have.

Our thanks go to Holly for hosting the visit, David Ifold for doing the initial liaison work and setting up the visit, and to the staff and management of the RAMM for granting permission.

**Friday 12th April 2019. ASM visit to Bampfylde Mine, Heasley Mill, North Molton Devon. [SS 738 328].
Leader and Reporter: Rupert Harrison**

Kind weather prevailed as twelve Society stalwarts assembled in the parking area, just below the western tips of Bampfylde Mine, situated in the deep, wooded valley of the River Mole. Greetings exchanged and safety brief completed, those present quickly dispersed across the site, and within minutes, the familiar sound of distant hammering echoed across the valley.

Although not largely visible from the road, Bampfylde is quite an extensive site, occupying a significant acreage on both flanks of the valley, and also taking quite a bite out of the high pastures above. My search began on the broad eastern tips, and I immediately noted that some sizeable movement of material had occurred since the previous year's trip. Over the past 25 years, the estate has excavated a significant part of the eastern tip material, presumably, for improving tracks around the estate. I guess you could now say that they are literally 'paved with gold!'

On this occasion, it was noted that the northern section, near the site entrance had been recently graded-off. Scouring the surface of this freshly turned-over material I picked up, what appeared to be a typical specimen of micaceous haematite on milky quartz. On closer inspection I noted that, instead of the usual flat-laying lamellae, the crystals on this specimen were separated, scale-like and upstanding. Many were at right-angles on the quartz crystals in the vug, more akin to a specular hematite specimen. Nick Hawes and Nick Eastwood also reported good specimens of the more 'typical' form, seen from this site (see Fig.1).

I also recovered a number of green copper-containing specimens from here in the form of small pieces of shillet (a local term for slate), with thin coverings of dark greenish-blue botryoidal pseudomalachite. Both skill and luck play a good part in mineral recovery, and Susan Thompson emerged triumphant from the eastern woods with a splendid hand specimen of pseudomalachite, which she found literally sitting on the surface! (see Fig.2).

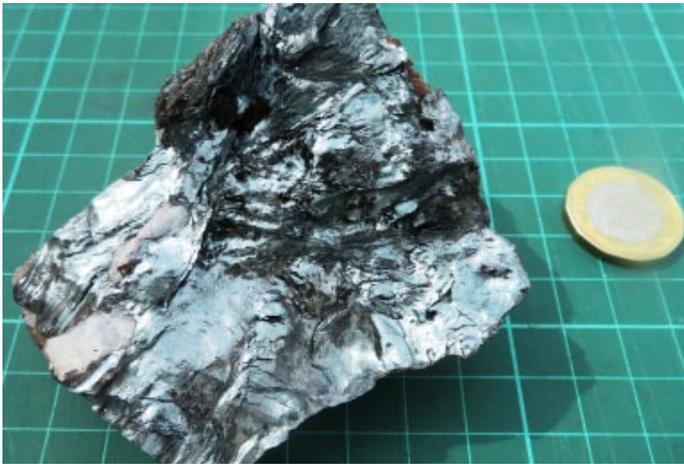


Figure 1. Good specimen of micaceous hematite collected during the RS visit.



Figure 2. Susan Thompson's pseudomalachite specimen.

Satisfied that I'd given enough attention to the eastern dumps, I made my way back across the river and down the road, to explore the dump exposure at the top of the steep western tip above the car park, an area where I had previously made some good discoveries. In a short time, I'd recovered a number of likely-looking green copper-containing specimens from the steepest section, and stowed them away for later cleaning and examination.

It would be fair to say that many discoveries from Bampfyld, particularly at the micro-level, are made after the laborious task of separating recovered specimens from the tenacious red hematite, which when washed, seems to pour out of even the tiniest specimens in an unending stream. One of the green coppers I cleaned up was a 50 mm flat, heavy vein section mix of chalcopyrite and bornite. One of the flat surfaces is covered in crusts of tiny bladed brochantite crystals (see Fig.3).



Figure 3. Vein section comprised of chalcopyrite and bor-



Figure 4. Fine specimen of prismatic malachite crystals.

By far the most extraordinary green copper specimen I recovered here, comprises a 25 mm 'nugget' of radiating fans of very coarse emerald-green, prismatic malachite. Many of these crystals are lustrous, transparent and square in section. Several of the vugs are spanned by these transparent crystals, which is quite spectacular under the microscope. I have never seen anything quite like this from here before so I will need to seek more qualified appraisal of it. Either way, I would have been happy if this had been my only specimen recovered that day. I couldn't capture this as well as I'd hoped, with my limited photographic options, but I managed to get a shot with some reflections from the prismatic crystals (see Fig.4).

Pseudomalachite was certainly the flavour of the day, and Michael Dunmore, David Aubrey-Jones and Nick Eastwood

also reported good discoveries of the species. Nick caught up with me on Sunday's Virtuous Lady trip, and showed me his lovely, preliminarily-cleaned hand-sized specimen. It displays numerous botryoids and stalagmites of goethite richly coated with pseudomalachite (see Fig. 5). Michael Dunmore also reported a possible langite.

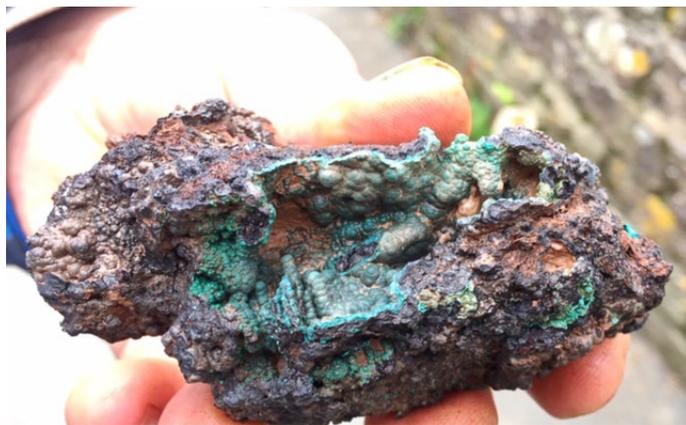


Figure 5. Nick Eastwood's fine specimen of pseudomalachite.

By late afternoon, weary collectors were returning to the car park to clean up and chat. One-by-one, we departed in the direction of Buckfastleigh, with a heightened sense of anticipation for the weekend ahead, and a good day's searching achieved. I am delighted to report that, following extensive cleaning and examining of the specimens I found, I have identified another microscopic flake of native gold. I believe that many interesting and good quality specimens were recovered on this trip and I definitely look forward to my next visit to the site.

The Society wishes to thank the Elms Estate for their kindness in granting permission to visit the site and collect samples.

Friday 12th April 2019. Russell Society ASM visit to the area around North Shaft, South Terras Mine SSSI, St. Stephen in Brannel, Cornwall [SW 935 524].

Leader and Reporter: David Ifold.

South Terras was chosen for a visit as it is so very different to mines in other parts of the British Isles. Throughout most of its active period it was a uranium mine that also produced radium and polonium from the processing of concentrates. A total of five ASM delegates attended the meeting plus Steve Rust.

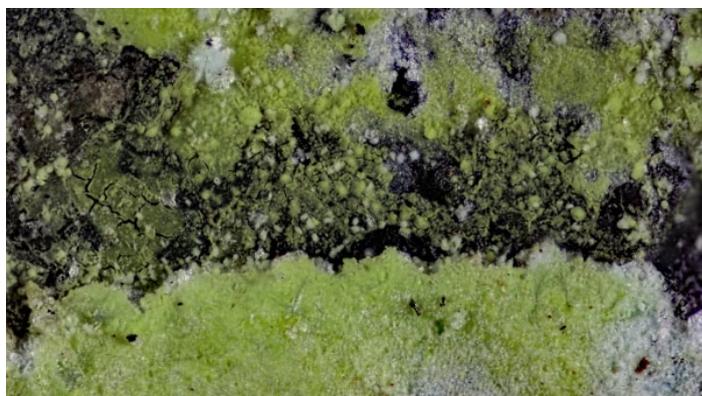
Ownership of the SSSI is split between three land owners. Richard Morris, Estate Manager for Boconnoc Estate (part of the much larger Fortescue Estate), gave us permission for a visit to the area around North Shaft after checking our risk assessment and insurance policy. As there is limited parking on the grass verges that can be very soft early in the year, some of us met in the public car park next to the St. Stephen Social Club. As it happened the verges were firm.

The area around North Shaft is getting quite a reputation for producing very photogenic micromounts. All parts of the dump are radioactive and even the public highway has raised levels. Most attendees had Geiger counters and once on the dumps proper, most material was found to be radioactive. As a quantitative example, my digital Geiger counter when at home records 0.5 cps but once on the dump individual lumps of material showed a maximum of 1,200 cps.

Most of the mine buildings, although lacking roofs, are still standing. Obviously, the site has been stripped of anything that can be sold but there is still a lot of industrial archaeology left. You can even find the sluices that carried radioactive liquid waste straight into the River Fall!



Beautiful micro-crystals of brochantite on material collected during the RS visit. Steve Rust specimen and photo.



Micro-crystals of zippeite on an unknown white material. Steve Rust specimen and photo.

Minerals recorded on this visit included apatite, autunite, bertrandite, brochantite, chalcophyllite, cuprite, jarosite,

pitchblende, torbernite and zeunerite. Most samples were extremely small with confirmation by visual identification. To see the complete set of mineral photographs for both this year and our previous visit, please visit Mindat.

Subject to the agreement of Boconnoc Estate and Natural England, a further visit is proposed for the end of September 2019 as there is considerable potential for those prepared to break down samples into tiny fragments and examine everything with a microscope.

The whole site is becoming increasingly overgrown with a threat from a clump of Japanese Knotweed on the edge of the SSSI. Trees are also well established with ivy covering the ground. Material not collected or recorded in the next ten years may be lost due to the developing surface soil horizon.

Many thanks to Richard Morris of Boconnoc Estate and Miriam Harrison of Natural England for their agreement to survey this site.

**The Russell Society Annual Society Meeting (ASM), 12th to 14th April, 2019.
Buckfast Abbey Conference Centre and Northgate House, Buckfastleigh, Devon.
Reporter: Michael Dunmore.**

Organised superbly by the Southern Branch, the 2019 ASM was a great success. Not just because it was a sell-out event held in beautiful surroundings - but because it combined a splendid balance of social activities, mineral swaps (and freebies), interesting presentations, fine accommodation and productive field trips. This article summarises the activities at our base, Buckfast Abbey, with details of the field trips, awards and AGM elsewhere in the Newsletter.

Following a diverse range of field trips and excursions, Friday night in the bar and restaurant was the first opportunity for attendees to try local ales and the fine food and service provided by the friendly people at Northgate House. Conversation included enthusiastic storytelling of the visit to Lundy Island by some participants earlier in the week and collecting specimens – including topaz - conveniently stacked near a quarry. The evening concluded for many people following a rather challenging general knowledge quiz created and facilitated by Steve King.

Early risers on the Saturday had 'first dibs' on swaps and freebies. There was little left on the tables by the end of the day. The generosity of members included a wide variety of free specimens from Ian Dossett, including fluorite and azurite from UK locations. Fuelled by freebies and a full-English, it was then time for delegates to enjoy a series of presentations as part of the Saturday symposium.

The first two presentations were linked to field trips held over the weekend. David Ifold spoke about recent research into north Devon phosphate occurrences and Courtenay Smale looked at South Terras mine and its radioactive minerals.

Those members looking forward to visiting High Down Quarry (or Heddon Quarry) on the Sunday would have found David's presentation particularly relevant, taking in as it did not just the classic locality but also other north Devon spots he is currently exploring in search of wavellite and related phosphate minerals.

Courtenay's presentation included an exploration of the history and minerals of South Terras Mine, as well as truly concerning examples of products containing barium and marketed as beneficial for human health. Glowing complexion anyone?

During refreshment breaks, delegates could also enjoy displays of minerals put together by members. These included Alistair Napier's and Rupert Harrison's self-collected specimens from the Mendip Hills area, more self-collected specimens by David Aubrey-Jones, Steve King and Barry Pitt from the Virtuous Lady Mine, plus specimens and photos of South Terras Mine by Courtenay Swale and wavellite specimens from David Ifold. A selection of specimens from the English Midlands highlighted Roy Starkey's presentation, and provided a further opportunity for members to enjoy the richness of Roy's recently published book.

Back to the presentations and David Roe told a cautionary tale for those either investing in mines or trying to dig wealth out of the ground, weaving together the histories of Drakelands Mine at Hemerdon Bal and the Dragon Mine in Wales. Both mines have histories of consuming large amounts of investors' capital, and 'promises' of large returns that were not delivered. Conversation after David's presentation included lively discussion of how to overcome the 'clay clogging' problem at Drakelands Mine and get it up and running again. Apparently an investment of a further £30 million is all that's required.

Following Roy Starkey's presentation on minerals of the English Midlands, we returned to something more local with Owen Baker highlighting the history and minerals of classic mines in Devon, including Bovey Tracey tourmalines, wavellite from north Devon and world-famous siderite specimens. Owen's well-illustrated presentation was the last of the day, giving time for everyone to prepare for the AGM.

The AGM was followed by more socialising, a very enjoyable dinner, presentations of greatly-deserved awards and prizes and, of course, the auction. Lots knocked down this year by Roy Starkey included some fine fluorites. This just left time for further refreshments before an early start for Sunday's field trips.

So, a hugely successful and well-organised ASM by the Southern Branch – and with particular thanks to Gary Morse, Alistair Napier (and Alistair's wife Wendy), Chris Finch, David Aubrey-Jones and Steve King for making it so. Now we can look forward to the ASM 2020 being organised by the Wales & West Branch for the weekend of 3 – 5 April at Brockworth, Gloucestershire.

Sunday 14th April 2019. ASM Weekend Visit to Heddon Quarry, West Buckland, Devon.

[SS 652 289].

Leader and Reporter: David Ifold.

Some of you will have spotted my use of the name Heddon Quarry for the site often called High Down Quarry. Research has shown that several sites around High Down Hill also produce wavellite and/or variscite and one of them, a quarry to the west is directly behind High Down Cottages which at best is confusing. I have yet to find a genuinely old label saying High Down Quarry and if there is such an item, to which quarry does it refer?



Figure 1. Broken wavellite hemispheres to 12 mm showing internal structure with smaller complete examples. Fluorescent across most of the specimen. Collected during the ASM trip. Photo: David Ifold.

We gathered at Heddon Quarry at 11.00 and set about finding wavellite. The western section of this quarry is one of the quarries marked on an estate map dated about 1785 preserved in the Fortescue archive in Exeter. Several quarries known to produce wavellite date from this period and this is about the time when the oldest specimens were collected. Today, Heddon Quarry is filled with laurel and conifers as cover for pheasants with large amounts of leaf litter.

There is considerable potential to find good wavellite specimens. Unfortunately, undergrowth, leaf litter and scree make exposing wavellite difficult. Luck is also required to find joints that open wide enough for hemispheres of wavellite to fully develop.

Members had varying results. Chris Finch collected from a productive spot and I worked a few metres from him finding wavellite quite unlike material I've ever found before. It is very much a hit or miss site.

Many thanks to Sam Kirkness (Estate Manager) and the family at Castle Hill for their continuing support in allowing visits to the estate. Thanks also to Nick Packer of Natural England for permission to remove research material from the SSSI.

Sunday 14th April 2019 ASM Weekend visit to Virtuous Lady Mine, Buckland Monachorum, Devon.

[SX 473 698].

Leader and Reporter: Barry Pitt.

Virtuous Lady Mine is one of the most famous mineralogical sites in Britain, historically noted for a range of well crystallised minerals and famous as a source of unique mineral forms, especially siderite pseudomorphs after barite ('Lady's Slippers'), fluorite ('Miner's Boxes') and 'capped quartz' crystals.

After meeting at St Andrews School as usual, eight members made their way along the narrow lanes and assembled for the field trip at the top of the valley in the parking area. We all kitted up and made the long walk down hill to the mine. The main area by the river has been picked over by countless collectors over the years, so myself and Steve King headed up river a bit to a different part of the extensive tips, leaving the others to their own devices on various parts of the tips.

I spent about an hour demolishing a very large boulder and was rewarded with about eight very good siderite and quartz specimens and a box epimorph from the underside of the boulder as well as a lovely triple pyrite specimen to 25 mm, chalcopyrite and arsenopyrite crystals to 7 mm. Steve had the same amount of luck in the new area with finds of arsenopyrite, brookite, cassiterite, an unusual elongated pyrite cube, siderite and polysynthetic quartz.



Rupert Harrison's purple fluorite specimen, collected on the visit.

Meanwhile on another part of the tips Rupert Harrison found a superb (and rare for the site) purple fluorite specimen. Susan Thompson picked up another very rare specimen, a cube of cuprite to 1-2 mm. I have seen only two other specimens of this quality including one excellent specimen which I found many years ago.

Towards the end of the day people started to drift back up the long climb out of the valley, while three of us remained and were rewarded with more purple fluorite specimens and I also picked up a very good and large clear quartz specimen from a recent dig by others.

After leaving the site as we found it, apart from the specimens we had found, we loaded our rucksacks and finally made our way back up to the vehicles, all very happy with another very good day's collecting at such a lovely location. A big thank

you is due to David Aubrey-Jones for getting us permission and the owners of the estate for allowing us access to the site.

Minerals found on this trip were anatase, arsenopyrite, brookite, cassiterite, chalcopyrite, cuprite, fluorite (purple and clear), pyrite, quartz (clear, mlky, amethyst and citrine) and siderite. Three box epimorphs were collected. By visual identification only, possible apatite and baryte were noted, along with an unidentified yellow mineral, possibly sulphur.

**Sunday 18th April 2019, ASM visit to Frank Mills Mine, 2 miles south of Christow, Devon. [SX 836 820]
Leader and reporter: David Aubrey-Jones.**

It was not the most favourable start to the day, with cloud and possible rain forecast, as we left the comforts of Buckfast Abbey and headed off to the Teign valley. Our first stop was Frank Mills Mine, which was active between 1854 and 1880, and exploited the same two north/south lodes as Wheal Exmouth. The lodes were generally around 2 to 4 feet wide and converged with depth, becoming narrower and less productive, but in places widened up to 30 feet. They were reported to contain argentiferous galena, blende, baryte, calcite, quartz and fluorspar, with cerussite, siderite and limonite. Small amounts of stibnite were also reported. In its deeper levels the lodes were cut by a number of east-west striking iron lodes.

Production reported between 1857 and 1880 was 14,813 tons of 66% lead ore and 248,530 ounces of silver. In 1876-77, 873 tons of barytes were produced, and from 1872-80, 422 tons of iron ore. In 1880, 176 tons of fluorspar were also recorded.



Interesting rock artwork observed on the Frank Mills dumps.

After a short briefing we all headed up the huge elevated mountain of dump material to the south where the spoil consists of rocks amongst dark reddish sand. Towards the top a previous visitor with an artistic eye had created a masterpiece design in the form of an ammonite out of variously coloured rocks – see photo.

Unable to match this, and to try and warm ourselves in the cold wind we got to work digging and splitting any promising looking rocks. Weathered siderite was in abundance, some containing some nice lenticular crystals. Working in the shelter of a gully David Roe was rewarded for his efforts by some nice jackstraw cerussite crystals. Steve Plant found a rich piece of ore full of malachite and some linarite. Others found patches of galena and tetrahedrite amongst quartz.

Together we had collected most of the species for which the site is noted.

After an hour or two when rain started to threaten us a few decided to call it a day, while most of us decided it was time to move on to our next site, Wheal Exmouth.

Many thanks to the ASM organisers for arranging the visit, and to Peter Preston of Hyner Farm for kindly giving us permission to collect.

**Sunday 18th April 2019, ASM visit to Exmouth Mine, 1.5 miles south of Christow, Devon. [SX 839 830]
Leader: David Aubrey-Jones. Reporter: Ian Dossett**

Despite being cold, windy and threatening rain, we were fortunate that the rain held off for the duration of our visit.

The mine is in metamorphosed Culm Measures shales and cherts with intrusions of greenstone. Two principal shafts were constructed along with a drainage adit commencing near the river. Two lodes were present with most of the development being on East Lode down to 72 fathom level.

The lode is reported to carry galena, sphalerite with barite, fluorite and calcite and a little cerussite. In addition, some copper sulphides are reported. The mine reported raising 11,573 tons of 65% lead ore and 118,000 oz of silver from the lead, from 1851 to 1874.

The tips straddle the road and run from the river up the hillside. Based on some information about what has been found in the past, most of us moved uphill towards the converted buildings near the top. Along the way we noted and avoided the water sedimentation traps installed by the Environment Agency to help control river pollution.

After searching the higher tips not much was being found so we gradually migrated downwards. Near the road David has a spot for fawn coloured micro mimetite coatings and some specimens were collected for further study.

Eventually we all ended up on the lower tip by the river which seems to have been used for off-road driving. This proved to be good news as it had created gullies in the tip, exposing fresher material to examine. Modest examples of galena, tetrahedrite, and covellite were collected.



Steve Plant and Ian Dossett collecting on the massive dumps at Wheal Exmouth.

After this visit we retreated to Canonteign Falls tearoom for refreshments.

Many thanks to the ASM organisers and David for organising the trip, and to the Canonteign Estate for permission to collect.

**Sunday 18th April 2019, ASM visit to the Teign Mine, ¾ mile north of Christow, Devon. [SX 844 863]
Leader and reporter: David Aubrey-Jones**

Hot soup and drinks at the nearby Canonteign Falls country park helped revive us. At this point some decided it was time to head off on the long journey home, while the last intrepid five headed to the Teign Mine, a small manganese mine, otherwise known as the Doddiscombsleigh Mine or Scanniclift Mine. This worked on and off around the turn of the 19th century, and finally closed in 1875 with no recorded output. Devon Wildlife Trust has now turned the area into a nature reserve. After parking our cars, we headed up a track then across a couple of fields. Further up the hill we entered a beautiful wood carpeted in bluebells and white garlic flowers, and the sun started to come out.

The workings of the Teign Mine are well hidden in a copse near the top of a hill, and were not easy to locate. At first we followed a track and saw signs of some exploratory workings. Then when these petered out, we decided to re-trace our steps and abandon the track heading higher still. Finally, in a heavily overgrown area, we spotted a rough gully leading up to the mine. The setting was very atmospheric and reminded me of the jungle setting of an Indiana Jones movie – see photo below!



Collecting in the jungle! The heavily overgrown Teign Mine dumps.

Large cave like entrances lead into the mine, but these are now fenced off to help protect the bat population that have taken up residence since the miners left. However, there are plenty of manganese-containing rocks and ore from the mine lying around.

We cracked a few of these rocks open and it didn't take long before we were rewarded with manganese mineralisation. From a quick visual inspection this appeared to include massive rhodonite, manganosite, and possible rhodochrosite and pyrolusite. We collected a few samples and then all decided to head back down the hill to our cars. It had been another successful trip, and we had explored three different mines in the Teign Valley.

Many thanks to the ASM organisers for arranging the visit, and to Andrew Baker of Devon Wildlife Trust for kindly giving us permission to visit the site and collect mineral samples.

Saturday 27th April, 2019. North Branch visit to Coldstones Quarry, Greenhow, North Yorkshire. [SE 125 641]

Leader and reporter: Steve Warren

Nine members turned up for the trip on a day when Storm Hannah was due to move in from the south. Quarry manager Richard Green was on holiday so our host for the day was Dougal Simpson. We started on the lower benches of the quarry and gradually moved upwards, exploring the current working on the north face of the quarry as we went.



Specimen of baryte on galena collected on the visit. 100 x 180 mm. Photo: John Davidson.

Nothing of note was seen in the older areas of the quarry and previous excavations on Sun Vein were well covered over. In the current area of working a baryte/fluorite/galena vein had been exposed showing as a rusty brown streak through several benches. The vein pinches and swells with a good amount of material having fallen out of the face of a bench about half way down the quarry. A good number of specimens of fluorite, baryte and galena were collected here (see John Davidson photo) before moving up to the next bench. The vein again showed strongly, though was mainly of baryte with galena this time. Baryte cockscombs to small football size were seen and careful breaking up of the galena lumps yielded cerussite to around 10 mm. It was difficult to be sure but this vein is possibly a continuation of the stringer that we had found at higher levels several years earlier. Either way it looks as though current workings on the north side of the quarry

look will expose more of this vein as they are expanded.

Storm Hannah held off pretty well, setting in just enough to dampen things down on our walk out of the quarry. This was probably a relief to Ian Dossett who looked in danger of overheating due to the weight of his rucksack combined with the steep gradient. Hopefully Ian's knees have recovered by the time he reads this.

Our thanks go to Richard Green for giving permission for the trip and to Dougal for being an excellent host on the day.

Friday 10th May, 2019. North Branch visit to Dolyhir Quarry, Old Radnor, Powys. [SO 242 584].

Leader: Ian Dossett. Reporter: Steve Plant.

A small select party of five RS members attended this trip. After a brief safety introduction, we were transported into the quarry to the more recent workings. As this was a working day the aggregate plant was busily crushing and sieving and vehicles were excavating and transporting roadstone. This restricted our access but fortunately our prime interest was

towards the N-NNE corner where the unconformity between the Pre-Cambrian Strinds and Yat Wood formations and the Silurian limestones is currently exposed.

Here in previous visits we have come across primary and secondary copper mineralisation and this day we were not disappointed. After leaving the Landrover we walked up a gentle slope and examined various outcrops in the freshly advancing face, mainly dominated by volcanoclastic sediments, overlain by a bed of limestone. Occasional mineralised faults were observed but the main infill seemed to be baryte. As we neared the N-NNE corner more prominent faulting was observed which appeared to be mineralised (see Fig. 1). Unable to approach the face directly we were able to access the top of the faulted zone via a safer route and examine the partly exposed fault line from the top, one area of which appeared to reveal malachite staining. A further more prominent mineralised copper-containing vein was also



Figure 1. Mineralised fault observed in the quarry wall.



Figure 2. Exposure of copper veins in the mineralised area.

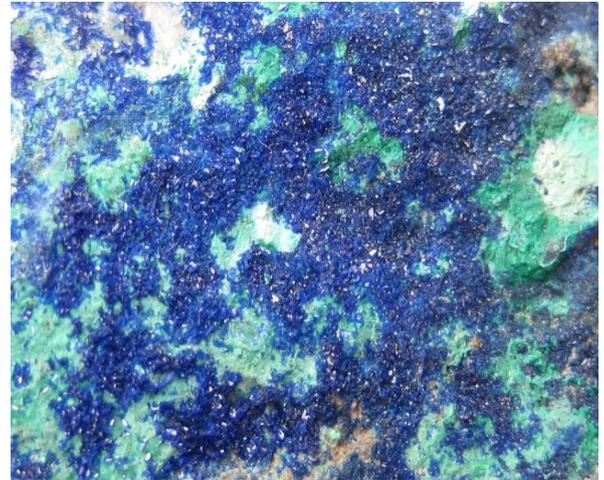


Figure 3. Coating of malachite and azurite covering surface.

exposed within the Silurian limestone a few yards away from the face shown in Fig. 1. Fig. 2 shows the copper-containing vein(s) exposed in situ. A set of ramifying djurleite/chalcocite veins were revealed which had superficial coatings of malachite and crystalline azurite (Fig. 3). Solid ore veins of djurleite/chalcocite to 2-2.5 cm thick traversed the limestone in a network of veins up to 30 cm in width before pinching out in depth. The host limestone had been partially altered/dissolved to yield small vugs in which crystalline azurite occurred. A pod of mineralised limestone was extracted by Ian, approximately 15 cm in dimension containing massive djurleite with azurite cavities to 5 cm in width. No tennanite or secondary arsenate minerals were observed. Fresh exposures of limestone and black shales were exposed in the N-NNE corner but no further copper veins or any other mineralised veins were in evidence.

Having fully explored the top levels we descended to the sump level where fresh faces had been revealed by recent quarrying. Rocks of the Yat Wood formation were now in evidence. Grey-green micaceous sandstones were found to contain thin (3 mm in width or greater) mineralised calcite veins. Splitting the veins in section revealed patches of galena to 5 mm in diameter and pale brown sphalerite with occasional euhedral crystals to 1 mm. Orange and yellow spherules of hydrocarbons were also deposited within the vugs of calcite crystals. South-east of the partly deconstructed ramp leading down to the sump level, further veins of white calcite/barytocalcite/baryte were observed in the new faces but most were largely inaccessible. Steve King came across a large lump of brecciated shale cemented with calcite and partially altered barytocalcite from material in the bund. Most of the white vein material turned out to be calcite, possibly after barytocalcite, in euhedral crystals of secondary baryte had formed within the vugs with crystals up to 5 mm in length.

Further minerals recorded that day included chalcopyrite, pyrite, harmotome, realgar and primary baryte.

Our many thanks go to Dan Sylvester of Tarmac for permission for the visit and for escorting us on the day.

Saturday 11th May 2019. Central Branch visit to Breedon Quarry, Breedon on the Hill, Leicestershire [SK 406 236].

Leader and Reporter: Neil Hubbard.

A torrential thunderstorm the day before had left the bottom of the quarry under a sea of liquified mud which blocked off the main collecting area which has yielded nice calcites, some with chalcopyrite or malachite, in recent years. We all



Galena crystal (25 mm) with a crust of wulfenite and cerussite crystals.

dispersed trying to find new areas to collect in or to rework previously exhausted areas.

Some effort in the area which had previously produced galena again produced a few small samples, some with coatings of pyramidal wulfenite and cerussite or with an occasional thin tabular plate of wulfenite associated.

Elsewhere, small groups of calcite were collected, some with included chalcopryrite, but these were not as good as those found previously. Those who ventured perilously close to the sea of mud (with clearance from our guide Stuart!) to collect from the productive cavity found at the end of last year's visit reported that there was very little left to collect.

Not a great day collecting but at least we were not in the quarry when the thunderstorm hit.

We would like to thank Stuart Shrimpton for allowing the visit, looking after us while we were there and for the lift out.

Saturday 25th May 2019. Central Branch Visit to Milldam Mine, Great Hucklow, Derbyshire [SK 175 781].

Leader: Neil Hubbard. Reporter: Michael Dunmore

A small group of six members were fortunate to enjoy fine spring weather as they assembled to receive safety equipment and a briefing before walking for approximately 20 minutes on a descent into the mine.

Members who have visited Cavendish Mill will be familiar with the material extracted from Milldam Mine and processed at Cavendish Mill. This material typically includes purple-coloured fluorite, calcite, baryte and sphalerite. However, visitors to the 2019 Russell Society ASM may also have seen grey-coloured fluorite specimens from Ian Dossett on his 'giveaway' table, and which your reporter has not found at Cavendish Mill. So, expectations for interesting finds were high.

Even before walking into the mine, there was an opportunity to inspect a pile of limestone and calcite boulders. This yielded large specimens of galena and ribbons of sphalerite in calcite. Your reporter has not found secondary minerals on specimens collected at this location but others found small crystals of cerussite and anglesite. There were also some thin powdery yellow coatings of cadmium sulphide.

Our group was escorted to a large 'cavern'; a short distance from an area currently being worked for fluorite. This cavern would soon be the location for waste material from the active part of the mine. We could just see the roof of the area we could explore with our torches and feel a regular flow of water coming through the roof. This kept us refreshed (drenched) as we explored the most productive areas.

One wall in the cavern yielded many specimens of calcite and fluorite. However, great care and collaboration were needed to ensure safe collecting from exposed surfaces without the risk of unsettling adjacent areas of rock.

Several large vugs yielded many large specimens of calcite, which typically had a dark-green hue. Particularly notable was a large specimen collected by Nick Millett. The slow walk back to the mine entrance, which took nearly 30 minutes, was prolonged by the weight of specimen bags carried by group members, and the need to stop for short rests along the way.

We also collected fluorite specimens; typically formed of small cubes with sides of up to 10 mm and mostly of a light or deep-purple colour. Your reporter collected one hand-size, grey-coloured specimen. Some fluorite specimens included coatings of powdery baryte or small crystals of calcite.

We would like to thank the team at Milldam Mine and British Fluorspar for allowing us to visit their mine and for ensuring a safe and productive field trip.

Saturday 25th June 2019. North Branch Visit to Diana Maria Mine, Frosterley, County Durham [NY 0096 3819].

Leader: Ian Dossett. Reporter: John Davidson.

The Rogerley and Diana Maria Mine is located within an abandoned quarry of the same name, just east of the village of Stanhope in Weardale. The Diana Maria mine been developed in the Rogerley Quarry extension.

The first work at what was to become the Rogerley Mine was done in the early 1970s by the Cumbria Mining and Mineral Company. This company had recently been formed by mineral collecting partners Lindsay and Patricia Greenbank, along with Michael and Brenda Sutcliffe with the intention of mining mineral specimens on a commercial basis.

The source of the fluorite specimens was found to be cavities in an N-S trending vein and associated flats exposed on the wall in the eastern section of the quarry. This vein is split into two stringers separated by about one meter where exposed on the quarry face. It was named the Greenbank Vein by Sir Kingsley Dunham. Work initially focused on cavities, which occur at the "High Flats Horizon" near the top of the Great Limestone, a competent rock unit that supports the wall of the quarry.

A second vein, named the Sutcliffe Vein (Fisher and Greenbank, 2000) can be seen on the face of a western extension of the quarry, several hundred meters west of the Rogerley Mine. This vein trends to the northeast and it is likely that it intersects the Greenbank Vein somewhere to the north of the Rogerley Mine. It is here that the Diana Maria Mine is being developed on the Sutcliffe Vein by UK Mining Ventures with two parallel drives, one on each side of the vein.



General view of the Diana Maria Mine site.

The mineralisation is within 6 to 8 meters of the surface; overburden was stripped off to explore the vein and a collapsed flat was then discovered, containing several pockets of excellent fluorite. Running between the two drives is a cross cut that is being developed that will intercept River Catcher Vein and explore the ground in this vein. In the limestone below the fluorite in River Catcher Vein can be seen colonial fossil corals. On the external wall of River Catcher Vein can be seen pockets of mineralisation that will be explored from the cross cut.

The amount of work being done is impressive and is been carried out by a team of ten miners in a professional way. The mine is railed out to allow the waste rock to be moved to the tip in an efficient manner. If any rails or points are needed, they have to be made on site and taken into the mine and fitted.

Diana Maria specimens and Rogerley fluorite (like much of that from other Weardale mines) is highly fluorescent, turning a bright bluish-white under long wave ultraviolet. The fluorite will also take on a purplish colour in sunlight. It has been speculated that this intense fluorescence is due to elevated rare-earth element (REE) content of the fluorite (Bill *et al.*, 1967; Dunham, 1990), and recent analyses of Rogerley Mine fluorite (Falster *et al.*, 2001) have confirmed elevated levels of a suite of REEs, including yttrium, cerium, lanthanum, samarium, and neodymium.

On our visit to Diana Maria Mine we were escorted by Keith who works at the mine in a geophysical role. Keith explained how they think the fluorite veins are associated with vertical cracks and located in discontinuous flats. He showed us example of large fluorite crystals that showed several stages of growth from yellow, purple through to green.

We were allowed to collect from the large tips of mine waste rock that littered the mine site. Samples of fluorite in the large boulders were encountered and collected. The fluorites ranged in colour from green, purple and yellow. Some of the fluorite was partly covered in white aragonite. Also, small octahedral galena crystals were seen on the backs of some of the fluorite specimens collected.

We extend our thanks to Keith who looked after us on the day, Vitek Urbanski for permission for the visit and of course to Ian Bruce for his support and authorisation for the visit. We would also like to thank Ian Dossett for organising such a fantastic trip.

References.

Bill, H., Sierro, J., and LaCroix, R., (1967). Origin of coloration in some fluorites. *American Mineralogist*, **52**, 1003-1008.
Dunham, K. C., (1990). *Geology of the Northern Pennine orefield, v. 1*, 2nd Ed. British Geological Survey, London, 299 pp.
Falster, A.U., Fisher, J.E. and Simmons, W.B. (2001) REE content and fluorescence in fluorite from the Rogerley Mine, Weardale, County Durham, England. *Rocks and Minerals*. **76(4)**, 253.

Thursday 30th May 2019. Wales and West Branch Visit to Nant Helen Opencast Coal Site, Abercraf [SN 812 113].**Leader and Reporter: Tom Cotterell**

This was our first visit to the site for a number of years, but operational conditions have now changed and the site is now fully active again. The group were briefed by Celtic Energy's Mine Manager Wayne Evans who explained to us which parts of the opencast were accessible to us.

Unfortunately, the main extractive operations were taking place in the lower parts of the opencast where the mineralogically productive sandstone beds associated with the Nine-Foot Seam were exposed. This area was therefore inaccessible to visitors but we were able to investigate the upper levels in the opencast. Our first stop was an area of backfill high up in the south-east corner of the site overlooking the main pit. The rock was largely shale with evidence of a few plant fossils, including a large section of tree trunk, but nothing of mineralogical significance.

A blast was scheduled for the south-west corner so we assembled to watch, what was in the end, a rather 'underwhelming' series of explosions: the rock is merely loosened rather than being projected upwards. From here we were able to go and investigate the freshly blasted rock (the Penny Pieces Seam), but once again it was apparent that we were still far too high up in the geological sequence, well above the interesting sandstone beds. A few compact clay ironstone nodules were evident and more sections of fossil tree were found, but little else of consequence.

The group were able to walk down the southernmost haulage road observing the high wall of the south side of the open pit from a distance. No minerals were noted although many small 'flying saucer' shaped clay ironstone nodules were to be seen amongst the various rock piles on route.

Eventually, we arrived at an area of backfill comprising predominantly sandstone blocks and it was clear that these were from the lower horizons where large well-formed quartz crystals are common. A few blocks coated with quartz crystals up to about 4 cm in length were found, some with rhombic ankerite crystals in association, but all of the crystals were heavily abraded from having been moved and dumped on top of each other.

Our thanks go to Celtic Energy and in particular Wayne Evans, for once again allowing us permission to visit their site.

Friday 7th June 2019. North Branch Visit to Silvertop Quarry, Hallbankgate, Cumbria [NY 586 606].**Leader and Reporter: Frank Bouweraerts.**

This quarry is owned by W & M Thompson Quarries Ltd and is closed at weekends, hence the weekday visit by, on this occasion, four members. The quarry produces mainly aggregate from the Four Fathom Limestone and is very close



General view of the Silvertop Quarry collecting area.
Photo: John Davidson.



Specimen of aragonite collected on the RS visit.
Photo: John Davidson.

to the line of the Stublick Fault, a major fracture that runs east-west. Although the fault is mineralised in many places, further east, the quarry only shows traces of weak mineralisation.

Our last visit was four years ago and the location from where we collected good specimens of aragonite had since been cleared of the large blocks of limestone in which it occurred. However, the quarry still kept a stockpile of similar material for use as rock armour and, after much searching, we found further examples of this mineral. It was less plentiful than last time but John Davidson found the best bits, as his photograph shows. It was quite reminiscent of the material found at Closehouse Mine in recent years.

This year we were given access to another part of the quarry to the west that is slowly being back-filled with unwanted material. We could trace some weakly mineralised joints and from loose material found some baryte, malachite and/or rosasite and calcite impregnated with a blue colouration that could also be rosasite. As we all know, limestone is a very hard rock and a lot of energy was used just to obtain some representative specimens. However, this is a location that is worth a visit every few years to see whether further mineralised areas have emerged.

The quarry management were extremely accommodating and we need to record our thanks to the manager, Gary Nixon and his deputy, Grant, for facilitating our trip.

The group departed the quarry about 15:00, just ahead of Storm Miguel's arrival.

**Saturday 8th June 2019. Central Branch Visit to Ecton Hill, Staffordshire [SK 096 583].
Leader: Neil Hubbard. Reporter: Roy Starkey.**

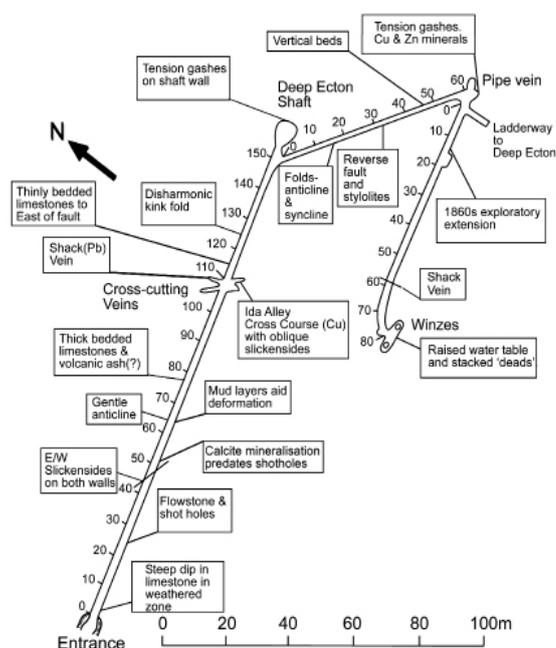
A group of five members including our leader and host for the visit gathered in the lay-by in the Manifold valley, just south of the mine. The attendees had all driven through torrential rain but arrived in good time at the venue. After kitting-up for our underground visit we walked the short distance up to the Field Centre, housed in an interesting building adjoining the well-known folly.

Tim Colman outlined the activities of the Ecton Mine Educational Trust (which owns the G. A. Cox Centre and the mine) and the Ecton Hill Field Studies Association, of which he is the chair, (whose volunteers guide school and other groups into Salts Level and over Ecton Hill) and gave us a comprehensive tour of the field centre and its facilities, which include laboratory equipment, geological and mineralogical specimens, display panels and a library. A welcome coffee was available upon arrival, and after an introductory chat about the history of the mine Tim led us underground into Salt's Level, which is accessed via a 'Harry Potter style' door in the rear wall of the centre (photo).



**Members preparing to enter Salts Level.
Photo: Roy Starkey**

Salt's Level is a haulage level driven to access the main shaft (323 m deep but flooded below river level 30 m below Salts Level) which hoisted ore from the extensive pipe workings within the hill. The ore was trammed to surface so that it 'came to grass' above the mill, thus facilitating gravity-fed processing of the ore. Tim showed us range of underground features including tightly folded beds of limestone, thinly bedded cherts, faults, thrusts and thin mineral veins before finally reaching the impressively proportioned Deep Ecton pipe.



**Diagram of Salts Level features.
Photo: Roy Starkey.**

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On the east wall of the cross-cut at 107 m from the entrance our eagle-eyed leader spotted some bright pink efflorescences on the wall rock and this was tentatively identified (visually) as erythrite, probably resulting from traces of cobalt in the manganese oxides (see photo).

We retraced our steps to the Field Centre and spent some time looking through the drawers which house specimens from the former collection of Staffordshire University, presented to EHFSA some years ago.

We were grateful to be able to eat our sandwiches in the warm and dry surroundings of the Field Centre, whilst the rain continued. It had originally been planned to walk up onto the top of Ecton Hill to examine the spoil heaps of Waterbank Mine, but there was general agreement that the weather was too wet to be conducive to a worthwhile afternoon and we decided to call it a day.



Pink efflorescence found on the wall of a cross-cut. Possibly erythrite? Roy Starkey photo.

Tim very kindly agreed to take a late arrival underground for a quick tour whilst the rest of the party returned to the cars for a wet drive back home.

Our thanks go to Neil Hubbard for arranging the visit, EMET and EHFSA access to the mine and use of the centre facilities and to Tim Colman (Central Branch Member) and our host for the day on behalf of EHFSA.

You can find out more about EMET and EHFSA at <https://www.ectonhillfsa.org.uk/index.html> and <http://www.vmine.net/ecton2013/index.asp>.

ERRATA. Issue 74 (March 2019)

In the article on Steve Rust's Marsh Award (p. 14), the picture caption wrongly identifies Austin Woodbridge as "Austin Lockwood." We apologise to Austin for this confusion.

In the caption to the picture accompanying Steve Warren's "From the President" notes (p. 4) the locality information for Adelaide Level should say "Swaledale" and not "Wensleydale". Apologies to anyone confused by this.

THE PICTURE GALLERY

Please send in your own pictures for future editions.



Figure 1. Crystals of aragonite up to 20 mm in cavities in slightly altered dolomite, Reedy Cliff, Port Quinn, Cornwall. David Green photo.



Figure 2. Small sprays of aurichalcite on calcite. From Wet Grooves Mine, Aysgarth, North Yorkshire. Steve Warren photo.



Figure 3. Crystals of fluorite from the Escoe House Level, Elbolton Mine, Craven, North Yorkshire. Steve Warren photo.



Figure 4. Crystals of childrenite to 1 mm on typical killas matrix. From Crinnis Mine, Carlyon Bay, Cornwall. David Green photo.

The Russell Society Newsletter is produced twice a year, in **March** and **September**.
Material for inclusion should be sent to the Editor:

The deadline for copy is **15 January** for the March issue and **15 July** for the September issue. Please send contributions, however short, by e-mail, preferably as attachments in MS Word or as .txt. files. Thank you.