COMMISSION ON MUSEUMS

AMGUEDDFA CYMRU

MINERALOGY AND MUSEUMS 10

Programme and Abstracts

Mineralogical Society of the UK and Ireland

Amgueddfa Cymru -
Museum Wales, Cardiff
12–13 August 2024

WELCOME TO CARDIFF!

As long-time supporters of the Mineralogy and Museums series of conferences, we are delighted to welcome the 'family' of museum mineralogists to our home patch in Cardiff. It is great to be getting together with friends and colleagues to discuss matters of common interest and to share our latest developments so that we can all work towards better collections and to better service to our communities of professional and amateur mineralogists and to the public. We're sure you'll agree that we have assembled an exciting programme of presentations, both oral and poster. For the first time at 'Mineralogy and Museums', we welcome remote delegates/presenters.

Our thanks to colleagues at Amgueddfa Cymru - Museum Wales, Cardiff for hosting our conference. We have also benefited from extensive support from our colleagues on the committee of the IMA Commission on Museums. Supporting this year's event is the Mineralogical Society of the UK and Ireland; Society staff have helped with logistical arrangements and we are grateful to them for it.

We encourage you to make the most of your visit to Cardiff. There is much to see and do.

Jana Horák, Tom Cotterell, Andy Haycock, Dan Cox

PROGRAMME

Sunday 11th August

14.00-17.00	Collection Visits, Museum Wales	
17.00–19.30	Registration and Welcome reception at Temple of Peace	

Monday 12th August

08.30	REGISTRATION	
08.40-08.45	Welcome from Convenors	J. Horák, T. Cotterell, A. Haycock, D. Cox
08.45-08.50	Welcome from Museum Wales	
08.50–08.55	Welcome from IMA-CM	M. Rumsey

Session 1: Mineral Museums and Mining Schools

08.55–09.00	Introduction	J. Rakovan
09.00–09.20	Inspiration vs education: which goal dominates in your displays	J. Rakovan
09.20-09.40	Increasing Visitor Appreciation and Engagement through a Diversity of Revenue Streams at a University Mineral Museum	P. Cobin
09.40-10.00	Sustaining the Legacy and building the future of the A.E. Seaman mineral museum of Michigan Tech	J. Jaszczak
10.00-10.20	**BREAK**	
10.20-10.40	Safeguarding Mineral collections through targeted Acquisition and disposal policies	S. Mills
10.40-11.00	On the purpose of a mineralogy collection at Paris School of Mines	R. Bolzoni (Remote)
11.00-11.20	Yale's minerals, mineralogy, and mineral collections through the ages	S. Nicolescu (Remote)
11.20-11.40	Co-evolution of formal and informal educational engagement at a small university-based mineral museum	E. Pyle
11.40-12.10	**The State and Status of Mineralogy in UK Museums**	**J. Faithfull (Keynote, Remote)**
12.10-13.20	**LUNCH**	

Session 2: Using Mineral Collections for Exhibition

13.20-13.40	Placelessness, Situatedness: Displaying Minerals in the Museum	E. Armstrong

13.40-14.00	From the past to the future: the new exhibition of the Mineralogical collection of the Florence University Natural History Museum and its relocation to the "La Specola"	V. Moggi-Cecchi (remote)
14.00-14.20	Mont Saint-Hilaire - A national treasure: A new Exhibit at the Canadian Museum of Nature	P. Piilonen
14.20-14.40	Gems and Mineral Education at the Royal Treasure Museum, Lisbon	R. Galopim de Carvalho
14.40–15.00	Mineral museums as platforms for mineral outreach: examples from the Smithsonian NMNH	G.A. Farfan, C. Whitney (remote)

15.00-15.10 **BREAK**

Session 3: Best Practices in Mineral Collection Management

15.10-15.30	Modernising a Historical Meteorite Collection	N. Almeida (remote)
15.30-15.50	An investigation of material changes occurring within mineral collections	K. Royce
15.50-16.10	Good things come in small packages: how to curate a micromount collection	N. Gabriel
16.10-16.30	Hazardous collections and Hazardous Storage – the perils of a mineral curator	R. Hansen
16.30–16.50	Cataloguing geo-mineralogical heritage in museum contexts through national standards. The Italian scenario	G. (remote)

17.20-18.00 **POSTERS**

Tuesday, 13th August

Session 4: Digitisation in Mineral Collection Management

9.00-9.20	A comparison of Collection Management Systems used by mineral museums	C. Im
9.20-9.40	Digital mineral data for museums – problems and solutions	J. Ralph
9.40-10.00	Preserving Earth's History: Curatorial Practices and Digital Initiatives at the Mineralogical and Geological Museum, Harvard University	R. Gnieski
10.00-10.20	Making Museums Victoria's mineralogy and petrology collections digitally accessible on AusGeochem - Australia's FAIR geochemical data platform	O. Lindenmayer
10.20-10.40	Digitization and Discovery: Addressing Collection Loss in Historical Museum Collections	R. Walcott (Remote)

10.40-11.10 **BREAK**

Session 5: Mineral Collections & Societal Issues

11.10-11.30	Mines, Metals, Magnets, Museums. The Importance of Mineral Collections in the Search for Critical Resources	B. Gooday (Remote)
11.30-11.50	Batteries and Beyond: Why Lithium Matters. Conveying societies' needs for minerals in exhibitry	M. Felch
11.50-12.10	Mineralogical museums as a place to teach the need of raw materials	M. Junge (Remote)
12.10-12.30	Using mineral collections to evaluate the environmental impact of mining in the Arctic	H. Friis
12.30–12.50	Secondary tellurium minerals and the importance of well-maintained Museum collections	O. Missen (Remote)
12.50-13.40	**LUNCH**	

Session 6: History of Mineral Collections and Mineralogy

13.40-14.00	Researching Ruskin's Rocks	R. Starkey
14.00-14.20	The global significance of the Ludlam (Heuland-Forster Mineral Collection at the Natural History Museum in London	M. Rumsey
14.20-14.40	William Thomson; Lessons Learned from a Thrice-Forgotten Benefactor	E. Brown
14.40-15.00	A review of the early history of copper- and iron-arsenate minerals in Cornwall and the necessity in preserving early mineral collections intact	T. Cotterell
15.00-15.20	The influential role of museum collections in advancing mineralogical research	Totaro, K. C. and Philippo, S.

15.20-15.40	**BREAK**

Session 7: Mineralogical Research

15.40-16.00	Discovering vargite – a new mineral in the newly installed akrochordite mineral group from the Långban Mn-Fe deposit, Filipstad, Värmland, Sweden	J. Langhof
16.00-16.20	Rare and problematic secondary minerals in the Furnas Formation, Paraná Basin, Paraná, Brazil	D. Atencio
16.20-16.40	MnhnL: Research and new species	S. Philippo (remote)
16.40-17.00	Raman spectroscopy as an important analytical method in a mineralogical collection	M. Kaliwoda
17.00-17.20	The importance of 'depth' in a mineral collection for research – implications for collaborative digitisation efforts and disposal strategies	M. Rumsey

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POSTERS

• Sunday Stones of Tyneside collieries	S. Humphrey (Remote)
• The H.G. Dines collection of the Natural History Museum, London	P. Milner
• Collectible Minerals of Jiangxi, China	G. Liu
• The Musée national d'histoire naturelle de Luxembourg: collection priorities and research projects	S. Philippo
• The O'Reilly-Griffin Mantle Xenolith Collection and the Storage Issues of Acquiring Large Volumes of Samples	A. Smith
• Scientific Mediation, Research and Teaching Within The Sorbonne University Mineral Collection	E. Boulard
• Conflict minerals in exhibitions – an opportunity for education	D. Kleinschrot
• Guided tours and projects for children and young people on the topic 'How was the moon actually formed and what other phenomena are there in space?' (no abstract)	M. Kaliwoda*, M. Junge F. Joseph, J. Hahn, F. Hentschel, W.W. Schmahl

Inspiration versus education: which goal dominates in your displays

Rakovan, J., McNamara, K., and Connolly, C.

New Mexico Bureau of Geology and Mineral Resources Mineral Museum, New Mexico Institute of Mining and Technology, Socorro, New Mexico, 87801, USA. John.Rakovan@NMT.edu

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The New Mexico Institute of Mining and Technology (originally the NM School of Mines) was established by the territorial legislature in 1889 (23 years before statehood), and in its charter is the mission to “provide mineral and geological cabinets [collections] for….”. From the very beginning of the institution a museum has housed the collection. Based on this charter, we have defined the museum's mission: to procure, display, and curate geological and mineralogical materials, primarily from the State of New Mexico, for the purposes of education, research, posterity, and enjoyment for the citizens of the state. Recently, we added to the mission: We seek to inspire and act as a gateway to a love of science and other STEAM (science, technology, engineering, art, and math) fields. Inspiration and education are both critical to our mission. However, in the spirit of the original meaning of the museum, or its root - mouseion (Temple of the Muses), we endeavour to display as many minerals as is aesthetically reasonable; with a focus on inspiring our visitors. This, of course, decreases the space we have for educational content. We are interested in developing significantly more content associated with the displays, especially for displays with specific themes that strengthen our mission. These include mineral forming processes and ore deposits, important mining districts in New Mexico, including to some extent mining history, and topics that strengthen our relevance today such as critical minerals and sustainability. We hope to get feedback on the best ways to distribute that content outside the museum, while keeping a strong connection to the displays. Methods include online content connected with QR codes to displays; print and electronically distributed publications like the NMBGMR Earth Matters ® and Lite Geology ®, and teacher training programs run by the Bureau.

Increasing Visitor Appreciation and Engagement through a Diversity of Revenue Streams at a University Mineral Museum

Cobin P.F.[1], Bornhorst, T. J.[1] and Jaszczak, J.A.[1]

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Most museums need to establish revenue streams to supplement donations and/or endowments, to help to contribute to the institution's growth and longevity. Revenue opportunities can increase visitor engagement and could include experiences/events, memberships, and sale of donated and wholesale-purchased material. These revenue streams can also cultivate interest in a topic, in this case, mineralogy and geology, and hopefully inspire individuals, especially younger generations, to learn more and consider a STEM career.

The various past, present, and potential revenue streams of the A.E. Seaman Mineral Museum of Michigan Tech University will be discussed. The museum has long experimented with a gift shop, which started in the 1995. Substantive changes were made in 2004 to become an extension of the museum by means of attractive displays, product information cards, and products appropriate for the focus of the museum, including high quality and fair-priced minerals for sale. The construction of the new museum building in 2010 provided an opportunity to finish transformation of the gift shop to further reflect the ambiance of the museum gallery exhibits and to attract visitors.

For over 20 years the museum has offered collecting events for a fee on old mine poor-rock piles but was stopped recently for logistical limitations. Museum memberships offer unlimited access to the museum alongside other special educational and engagement events. Although admission was free for decades, the modest fee in place today is also an important revenue stream. Other options will be highlighted that are in use or have been considered but not developed due to various constraints.

Different revenue options have been developed to completement the museum to help encourage long-term interest and awe of mineralogy and the earth. By supporting the financial stability of the museum and increasing visitor engagement in the museum, mineralogy and earth sciences, varied revenue streams can help a university mineral museum to accomplish its mission.

Sustaining the Legacy and Building the Future of the A.E. Seaman Mineral Museum of Michigan Tech

Jaszczak, J.A.[1] and Cobin, P.F.[2]

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[2]A.E. Seaman Mineral Museum

The A.E. Seaman Mineral Museum was founded at the Michigan Mining School (now Michigan Technological University) over 120 years ago using specimens acquired for education and display. The school was founded in 1885 to educate mining engineers and geologists in support of the booming native copper mining industry in Michigan's Keweenaw Peninsula. Named in honour of its founder, the museum is now in its 5th home, a purpose-built facility on the university's campus.

The museum continues its mission to inspire and educate people about the beauty, science, and importance of minerals through its collections, exhibits, programs, and research, and to curate its world-class collections for the benefit of present and future generations. The museum cares for over 37,000 specimens in its collections, including the University of Michigan collection, and displays over 4,000 objects. The museum is renowned for having the world's finest specimens from Michigan's Upper Peninsula. We participate in regional and national mineral shows, presenting lectures, giving tours, and contributing to scientific research. In 2023, the museum served a record ~17,000 visitors.

After introducing the museum and its history, we will review steps being taken to sustain the museum's legacy, build its vitality, and demonstrate its relevance into the future. After recently updating the museum's mission, vision, and values statements, we are now developing a strategic plan to expand the museum's reach, guide its growth and development, and promote its increasing relevance into the next decade. The framework of this plan is based on four points. The first three are key foundations: (1) Collections, (2) People, and (3) Resources. Point (4) is the museum's Inspirations, which are the things the museum does with its three foundations to achieve its mission. We are hopeful that this framework will lead to a strategic approach to a strong future and serve as a model for other mineral museums to prosper.

Safeguarding mineral collections through targeted acquisition and disposal policies

Stuart J. Mills

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In modern collections, space is now a rare commodity and looking after collections has become expensive and time-consuming. Collections are no longer growing as curiosity cabinets, in that every museum or collection should contain one of everything. Over the past several years institutions have begun looking at their collections and considering if all the material is appropriate to keep and house for future generations. Are the specimens of good quality? Are they properly localized? Are they safe to handle? Do they meet the mission of the institution? Most of these questions can be answered with well thought out and grounded acquisition and deaccession policies. In fact, collections can be enhanced by deaccessions, and in turn, resources can instead be used to fulfill exhibition or teaching mandates. One method of transparently deaccessioning collections is through publicly open auctions where the entire process is public, and the aims and goals of the institution can be shared and utilized for the benefit of the collections. This way funds raised can be used for targeted acquisitions which better match the goals and aspirations of the institution.

On the purpose of a mineralogy collection at Paris School of Mines

Romain Bolzoni[1], Eloïse Gaillou[1]

REMOTE

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Created in 1794, the mineralogy collection of Paris School of Mines was originally called the Cabinet des Mines, with the mission of gathering "all the productions of the globe and all the productions of the Republic arranged according to the order of localities." From its inception, its objective was strategic, aimed at inventorying the potential resources of nature for their use in industry. Currently, it is among the most comprehensive and spectacular in the world, with 100,000 samples in the collection, of which 5,000 are on display, representing more than a thousand mineral species. Beyond minerals, it also includes meteorites, rocks, gems, and artificial materials. The samples are thus the result of nearly 230 years of collections, constituting an inventory of the geodiversity of our planet, while showcasing their strategic interests.

Over the last fifteen year, the question of having such a large museum, occupying almost 1,000 m² of the Paris School of Mines in its location in the heart of Paris, has been raised several times. The existence of the museum itself was called into question. The museum had to find its legitimacy when space is requested to welcome more engineering students that are not taught geology and mineral exploration anymore.

Our museum is now redefining itself: it offers public outreach around topical issues related to environmental and sociological issues (such as the low carbon transition) and the alternative mining that is necessary to support the transitions. With limited budget, the outreach is nowadays mostly done through guided tours. But in the near future, the museum will add written and graphic information within the systematic collection to present such important issues that defines the purpose of the collection and its museums within the School of Mines.

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Yale's minerals, mineralogy, and mineral collections through the ages

Stefan Nicolescu[1], Jay J. Ague[1,2] and Wendell E. Wilson[3]

REMOTE

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[3] The Mineralogical Record, 4631 Paseo Tubutama, Tucson, Arizona 85750, USA, minrecord@comcast.net

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The third oldest higher education institution in the USA started in 1701 as The Collegiate School (of the Connecticut Colony). In 1718 it was renamed Yale College. Although the first microscope was acquired in 1734, science wasn't part of the Yale curriculum until the hiring in 1802 of America's first science professor, Benjamin Silliman.

In 1802 Yale only had a few minerals, with no information, easily fitting into a candle box. Through Silliman's resourcefulness, by 1825 Yale's mineral collection was the best and largest in America. Yale became *the school* were those interested in Mineralogy and Geology went to study. Silliman also started meteoritics in America, and the oldest meteorite collection outside Europe. He also was instrumental in the establishment of the Yale School of Medicine, and of Yale University's Art Gallery (another first among American universities).

James Dwight Dana, Benjamin Silliman, Jr., George Jarvis Brush and Othniel Charles Marsh were among those that, under Silliman's tutelage, received a Yale degree in what today we call Earth Sciences. Dana's seminal *A System of Mineralogy …,* first published at the "advanced" age of 24, in 1837 (and its subsequent editions up to 6th) was based on the Yale collection.

The 1866 establishing of the Yale Peabody Museum of Natural History (today's Yale Peabody Museum; YPM), with Mineralogy as one of its three initial departments, added a new dimension to the collection: visibility. The Blum Pseudomorph Collection, the Brush Collection, and the Lazard Cahn Micromount Collection are important components of YPM's mineralogy holdings.

The Mineralogy collection today is nearing 100,000 specimens. To these, one must add another roughly 100,000 petrology collection specimens, around 3,000 meteorites (by locality), a sizeable Economic Geology Collection; and more.

After the transformative renovation completed in March 2024, the public mineral galleries entice visitors with over 200 majestic specimens on loan from the legendary collection assembled by the late Barry Yampol, as well as hundreds of the *crème de la crème* specimens from the museum's own holdings.

Co-Evolution of Formal and Informal Educational Engagement at a Small University-Based Mineral Museum

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The interface between formal and informal learning experiences has traditionally been confounded by differences in educational goals, timing, resources, and focus. University-based museums are especially impacted by this apparent mis-alignment, needing to reconcile the needs of formal primary/secondary and tertiary audiences with informal audiences across adulthood. This presentation represents the co-evolution of learning experiences and assignments with the development of programming for a small university-based mineral museum. Described first in the presentation is *Critical Minerals of the Ancient World*, an adjunct hallway display developed in parallel to the displays of antiquarian weapons for the on-campus museum of fine arts and art history. Second, students in a solid Earth materials course (combined mineralogy+petrology), many of whom will become secondary teachers, were engaged in an *Adopt-a-Case* assignment, whereby they were to research and subsequently share with the rest of the class mineral compositions, emplacement mechanisms, uses, and occurrences, with the subsequent purpose of organizing this material for visitor interface. Third, students in a capstone Earth science selected one *critical mineral* commodity then investigate not just the geological aspects of the mineral, but also the market and economic forces for that critical mineral, the social and regulatory function related to extraction and use, and governance and stability aspects related to supplies of the mineral. A specialized display, useful for both school groups and general audiences will be the result of this effort. In the near future, each of these information sets will be integrated into a downloadable app for both student and visitor use. The learning outcomes of each of these tasks will serve as the basis for the development of evaluation frameworks, including student comments, app metrics, and digital surveys, generating metrics critical for both funding proposals as well as communicating the value of mineral museums to educational policy-makers.

The State and Status of Mineralogy in UK Museums

J. Faithfull (Keynote)

REMOTE

No Abstract

Placelessness, Situatedness: Displaying Minerals in the Museum

Armstrong, E. S.[1], Oromeng, K. V.[2]

[1]University of Leicester, UK

[2]University of Delaware, USA

During our workshop ‘Unearthing the Collection’ which has been delivered in the University of Delaware (2022) and New York University (2024) we have explored how themes and lenses can offer a way into reimagining mineralogical collections in museums. We have already explored how labour can act as a central theme for organising reconceptualising what publics can learn from mineralogical collections ([1]; see also our zine ‘Labours of Unearthing the Collection’ in collaboration with Sophie Wang).

In this paper, we explore *place* as a second salient lens for unpacking mineralogical galleries. Drawing on the activities we undertook in the workshop, and the responses of students in the course, we look at how situatedness and placelessness function in galleries and narratives about extraction. We argue that where aesthetics of placelessness – achieved through colour schemes and lighting, displays that echo multinational commercial sites – are short hands for modernity that requires displacement of geographical relations for its success. However, where situatedness is created in the aesthetics of the gallery through memorialisation, specific futures, and living communities, a different narrative about land uses emerges.

We present case examples that demonstrate how norms of cultural and scientific museums around situatedness and placelessness in mineralogical collections give access to plural imaginaries of how minerals and geology, extraction, and the museum are intertwined.

References:

[1] Armstrong, E.S. and Oromeng, K.V., 2024. Labours of Excavation: Reflections on “Unearthing the Collection.”. *Journal of Natural Science Collections*, *12*, pp.19-36.

From the past to the future: the new exhibition of the Mineralogical collection of the Florence University Natural History Museum and its relocation to the 'La Specola'

Moggi Cecchi, V. [1], Fabrizi, L. [1], Barbagli, F. [1], Nistri, A. [1] and Benvenuti, M. [2]

[1] Museo di Storia Naturale “La Specola”– Sistema Museale dell’Università di Firenze

2 Sistema Museale dell’Università di Firenze

The Mineralogy and Lithology Collection of the Florence University Natural History Museum represents, in terms of origin, quantity and quality of the specimens owned, one of the most important mineralogical collection in Italy [1]. Its relocation within the La Specola Museum represented therefore a considerable challenge from a museologic and museographic point of view, that was overcome through an approach respectful of the characteristics of the other parts of the Specola complex [2]. The exhibition starts with a fascinating environment in which specimens of meteorites are exhibited, to remember the origins of the Earth. It continues illustrating the development of our planet during its life. A connecting room shows some old instruments and the scientific figures that have characterizing the history of mineralogy at the “La Specola” museum. In the next room the fundamental concepts of the general mineralogy are presented, like the evolution and differentiation of rocks and going on with the concepts of crystal growth, habit, polymorphism and isomorphism, the principles of crystallography and the properties of minerals. The systematic collection is also exhibited here. Another connecting room displays exceptional pegmatitic specimens from Minas Gerais, Brasil. The path continues showing the historical carved stones belonging to the Medici Collection and of the precious stones. The next room is dedicated to regional collections, first of all the worldwide famous “Elbana” collection, with its extraordinary polychromatic tourmaline specimens, considered the oldest in the world for these species. A corner of this room is dedicated to fluorescent minerals glowing in the dark. The final part of the itinerary is dedicated to the exploitation of mineral resources and the consequences of this human activity from a social and environmental point of view.

References:

[1] Pratesi G. (2012). Il Museo di Storia Naturale etc. FUP, Firenze. 336 pp.

[2] Moggi Cecchi V. et al (2022) Museol.Sci.Memorie, N. 22/2022: 148-152

Mont Saint-Hilaire – A national treasure: A new exhibit at the Canadian Museum of Nature

Paula C. Piilonen

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The purpose of national mineral collections in museums world-wide is to preserve our natural heritage for the future, use these specimens for displays and in programming to educate the public about our natural history, geology and mineralogy, and to provide research material for scientists not only at the museum, but from scientific institutions across the globe. As many amateurs and professionals alike realize, only a small percentage of a collection is accessible publicly at any given time, whether that is in a permanent or rotating display, or through a traveling exhibit. As museum mineralogists, it is important to us to highlight major acquisitions and to make them accessible to the public. The newly acquired Haineault Mont Saint-Hilaire collection at the Canadian Museum of Nature is one that offers a cultural, historical, and scientific perspective on one of Canada's most important mineral localities. In 2022, plans began to create a new, permanent Mont Saint-Hilaire exhibit within the current Earth Gallery that would highlight not only the mineralogy of alkaline rocks and rare minerals, but also the citizen science that is critical to research that museum mineralogists do. Sponsored by Robert and Brenda Beckett, passionate Canadian mineral collectors, the new exhibit contains (1) an introduction panel with three bilingual videos, (2) a main, permanent case containing 35 specimens and 13 gemstones, highlighting some of the many iconic and famous specimens for which Mont Saint-Hilaire is famous, and (3) a section whose content and specimens will rotate on an annual basis. The content will alternate between Mont Saint-Hilaire mineralogical research and the citizen science behind many of the contributions to the scientific study. The current story highlights Gilles Haineault, who amassed one of the finest of all Mont Saint-Hilaire collections in the world, which now calls the Canadian Museum of Nature home. It contains a short biography and a selection of 20 specimens and 8 gemstones highlighting the decades of collecting and work by Haineault. The new exhibit opened on April 27th, 2024 at the Victoria Memorial Museum Building in downtown Ottawa.

Gems & Mineral Education at the Royal Treasure Museum, Lisbon

Galopim de Carvalho, R.[1]

[1]Museu do Tesouro Real, Cal. Ajuda, Portugal info@ruigalopim.com

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Art and history museums often keep collections of decorative arts made of materials that are protagonists at Natural History or Earth Science museums. Typically, in art and history museums the narratives used to educate the visitors hardly explore the fascinating world of earth sciences, mineralogy in particular. The new Royal Treasure Museum in Lisboa, where the Portuguese Crown Jewels are now at permanent display since 2022, is plentiful in items made of precious metals and gem materials, including mineral gem varieties (e.g. diamond, ruby, emerald, aquamarine), mineral aggregates (e.g. nephrite jade, agate), rocks (e.g. lapis lazuli) and biogenic gems materials (e.g. pearls, tortoiseshell, precious coral)[1]. The very first section of the exhibition was inspired in the original Natural History collection commissioned in 1768 by the king to Domenico Vandelli (1735-1816) and in the posterior concerns about mineral education of José Bonifácio de Andrada e Silva (1763-1838), mineralogist and General Superintendent of Mines and Metals of the Kingdom [2]. In this section, there are Brazilian gold nuggets, one of which is over 20 kg, a 35.80 carat diamond crystal showing resorbed surfaces and sedimentary-related dirt in surface reaching cracks, and a large round c. 1,710-carat aquamarine pebble that was once purportedly announced as a diamond, known in the literature as the "Braganza Diamond"[3].

Apart from this section where the main focus is made on minerals, the vast jewellery collection was subject to a detailed gemmological study in order to collect not only the usual descriptive data that visitors read in the labels, but also to characterize the relevant gemmological aspects that can be used as interesting facts and storytelling subjects to add value to the experience of the visitor in the guided visits offered by the museum and in the gemmological visits that are occasionally organized. Decorative art collections, notably jewellery, that are usually only enjoyed from an historical, provenance and artistic points of view, can also be protagonists for earth science education in the light of the history of the use of gem materials, the history of mining, mineralogy and ever fascinating gemmological facts that generate engagement in the public.

References:

[1] Ribeiro J A, Scaraffia G (2024) *Braganza's Crown Jewels: The Royal Treasure of Portugal at Ajuda Palace*. Franco Maria Ricci Editore, Fontanellato,152pp.

[2] Galopim de Carvalho R (2022) "O Ouro e os Diamantes do Brasil" in Ribeiro, J. A. (coord.), Museu Tesouro Real – Palácio Nacional da Ajuda: Catálogo. Imprensa Nacional – Casa da Moeda, Lisboa, pp. 36-43 (in Portuguese)

[3] Galopim de Carvalho, R (2006). The Bragança "diamond" discovered? *Gems &Gemology*, 42(3):132-133

Mineral museums as platforms for mineral outreach: examples from the Smithsonian NMNH

Gabriela A. Farfan, Coralyn Whitney

Curator of Gems and Minerals, Smithsonian National Museum of Natural History, Washington, DC

As mineral museum professionals, it is our duty understand the importance of minerals to science, society, and more—and to convey that importance to the public. Our classic, public-facing exhibits continue to inspire and educate, while behind-the-scenes research collections ensure the preservation of priceless specimens well into the future. Beyond the inherent role of museums showcasing minerals as natural history objects via ever-evolving exhibits, the growing world digital media is craving accurate and professional content—something that mineral museum professionals could offer more of as a way to highlight the continued relevance of minerals and mineral museums to society. Since the COVID-19 pandemic, the Smithsonian's National Museum of Natural History has been embracing new ways to connect with digital audiences. From social media posts, to online articles, to podcasts, to video programs and YouTube clips catered to schools, there are many new ways that museum professionals can connect with broader audiences than ever before. This may be especially impactful for underrepresented groups who may not otherwise have the chance to visit a museum in person. Further, these methods may even help curators to showcase the impact of their geological collections to museum leadership, donors, and prospective museum visitors. In this presentation, I will explore some examples and lessons from digital outreach strategies at the NMNH from the last five years.

Cataloguing geo-mineralogical heritage in museum contexts through national standards. The Italian scenario

Giovanni Pratesi[1], Annarita Franza[1]

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Natural history museums are home to valuable mineralogical and geological collections representing a country's geo-mineralogical heritage. Collaboration between scientists and museologists is crucial in preserving, studying, and enhancing this irreplaceable evidence of our past.

Despite the nearly century-long international standardization of descriptive cataloguing in other cultural contexts (e.g., libraries), natural history museums have not yet adopted worldwide recognized standards for documenting their collections. The goal of this presentation is to provide an overview of the current progress in cataloguing the Italian geo-mineralogical heritage in accordance with the national catalographic standards issued by the Central Institute for Cataloging and Documentation (ICCD), which is part of the Italian Ministry of Cultural (MiC).

After outlining the ICCD guidelines for cataloguing mineral, rock, and meteorite collections (i.e., BNM, BNPE, and BNPL standards), this presentation delves into a few case studies sourced from the General Catalogue of Cultural Heritage website, a database managed by MiC offering open access to cataloguing records of the Italian cultural heritage.

This presentation will highlight the importance of cataloguing the Italian geo-mineralogical museum collections based on the ICCD national standards. It will be shown that this catalographic system is effective in properly preserving and enhancing this unique heritage from different perspectives.

In conclusion, this presentation will briefly introduce the new ICCD standard for cataloguing disused manufacturing sites (SPD), which will shed light on a lesser-known part of the national heritage, such as former mining sites.

Modernising a Historical Meteorite Collection

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Scientists at the Natural History Museum have studied meteorites for over 200 years. The meteorite collection has grown over this time and is one of the finest in the world, with particular specialisms in meteorite falls and British meteorites.

Unlike many petrological and mineralogical collections, meteorites require a high level of contamination control. This is owing to their extraterrestrial origin and the unique opportunity they present to study the early Solar System and how meteorites have delivered material to Earth, for example exogenous water and organics e.g. [1]. Terrestrial signatures can overprint the intrinsic extraterrestrial characteristics, with contamination sources coming from the atmosphere during re-entry, the surface prior to retrieval, or indeed, the museum/collection/laboratory environment and the materials used for handling, sampling and storage [e.g. 2, 3, 4]. Thus, their curation requires close consideration.

Whilst the ultraclean laboratories designed for samples returned from space missions, e.g. at the National Aeronautics and Space Administration (NASA) and the Japan Aerospace Exploration Agency (JAXA), are out of reach of many museums, there are affordable measures that can be taken to protect these specimens in perpetuity and enable clean sampling and storage, given our modern understanding of collections care. I will present the current status of the NHM Meteorite Collection, describing our storage methods and equipment, conservation and efforts to digitise.

References:

[1] King, A. J. et al (2022). The Winchcombe meteorite, a unique and pristine witness from the outer solar system. *Science Advances*, *8* (46).

[2] McCubbin, F. M. et al. (2019). Advanced Curation of Astromaterials for Planetary Science, Space Science Reviews, 215: 48

[3] Tunney, L. D. et al. (2020). Organic Contamination on the Surface of Meteorites as a Function of Space and Time: A Case Study of the Buzzard Coulee H4 Chondrite. Meteoritics & Planetary Science, 55: 1899–923.

[4] Garçon, M.,et al. (2016). Nitrile, Latex, Neoprene and Vinyl Gloves: A Primary Source of Contamination for Trace Element and Zn Isotopic Analyses in Geological and Biological Samples. Geostandards and Geoanalytical Research, 41: 367–80

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An Investigation of Material Changes Occurring within Mineral Collections

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According to the literature [1 and citations therein], at least 10% of currently identified mineral species are susceptible to deterioration within the museum setting. This primarily occurs through changes in hydration and oxidation state. There is a question, however, of whether such responses are overrepresented. Data for other reaction types are far fewer and generally more qualitative. Light-induced reactions are a poignant example: details such as illuminance, length of exposure, and distance from the illuminant are often missing, effectively making the reports little more than anecdotal. Physical examinations of mineralogical collections were thus deemed necessary to determine:

whether there is agreement between the material changes experimentally reported and what occurs within collections, and

whether there are any unreported species demonstrating deterioration within the museum context.

The systematic mineral collection at Oxford University Museum of Natural History (OUMNH) was surveyed to investigate the above. 13,716 specimens belonging to 1,049 species from all mineral groups, including silicates, were examined. Results suggest that the aforementioned reaction types are indeed prevalent in museum collections and are likely not overrepresented in the literature. However, museum collections may also contain more species susceptible to other reaction types (e.g., photo-induced) than recorded. The nature of museum storage makes these species difficult to identify, especially without repeated surveying. Yet of foremost importance is the susceptibility of minerals to physical forces. About a quarter of OUMNH mineral specimens have been affected by physical forces to some degree. All other potential reaction types occur in less than 10% of specimens. These results act as a reminder that—whilst it is indeed important to identify a species' susceptibility to temperature, moisture, light, and pollutants—one cannot ignore physical forces altogether.

References:

[1] Royce K (2023) *Assessing the Stability of Mineralogical Collections in Museums*. DOI: 10.5287/ora-d5dagxd4g

Good things come in small packages: how to curate a micromount collection

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A micromount is a mineral specimen that is best examined using a microscope. The specimen is mounted in a labelled plastic box and can range from a single, isolated crystal to a fragment of matrix containing several associated minerals. The small size of micromounts has many benefits: a large collection does not occupy much storage space, the minute crystals tend to be more well-formed compared to larger ones, and they can reveal a wealth of mineralogical information because their diminutiveness means that they have to be more closely examined than larger specimens. Micromounts are quite popular among private collectors, and there is a significant network of clubs, societies and conferences dedicated to this subject across the globe [1]. Trevor Bridges (1935-2015) was a chemist and a prominent member of the Russell Society and the British Micromount Society. He had a large collection of around 6000 specimens, which included a significant number of micromounts. While some specimens were sold at auction, many were donated to museums in England, Scotland and Wales. The Natural History Museum, London received 2424 of Trevor Bridges' specimens, and these now form the first specific micromount collection for the museum. Alongside the descriptive micromount labels, Bridges' personal spreadsheet database provides a wealth of mineral species and locality information, making this diverse British collection particularly scientifically significant and valuable.

Curation of this collection involved writing mineral descriptions, cleaning up specimen data for import into the collection management system (Axiell EMu), and devising unique methods to store over 2000 micromount boxes of varying sizes in Bisley cabinets while balancing both specimen safety and browsability. This presentation will explore how curation methods and approaches were continually tested and refined, and also provide a statistical summary of this collection and its history.

References:

[1] Wight Q (1993) The Complete Book of Micromounting, Mineralogical Record

Hazardous collections and hazardous storage – the perils of a Mineral Curator

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Mineral collections are known for their hazards – radioactive and asbestiform minerals, and toxic elements. Mercury is a well-known toxic element existing as elemental mercury in liquid form, as well as in the chemical composition of over 100 different mineral species such as cinnabar and calomel. Whilst precautions are taken when handling mercury-containing specimens, such as wearing gloves, it is important to also consider the accumulation of mercury in vapour form. The first part of this talk presents the initial findings of a study on the accumulation within display cases and collection storage of this hazardous element in vapour form.

Collection storage is a vital part of the preservation of mineral collections, however storage, particularly historical cabinetry, can in turn be hazardous to the specimens. Wooden cabinetry is known to release volatiles such as acetic acid. The wide variety of compositions found in mineral species means that some minerals are susceptible to acids. Additionally, many mineral collections include organic materials in the form of gems, such as pearls and pearl shell, which are similarly at risk. The second part of this talk will present a study to trial the use of carbon as an absorption material within wooden drawers, to maintain a neutral environment for these sensitive specimens.

A comparison of Collection Management Systems used by mineral museums

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Mineral museums, like other museums and institutions, manage diverse data types beyond mere text, including photos, provenance, loans, and research information. Traditionally termed "databases," these systems are now more accurately referred to as "collection management systems" (CMS) due to the complexity and variety of the information they store. Mineral museums face unique data challenges compared to some other institutions. Key among these is the need for a robust and flexible world geography system capable of accommodating vague localities, historical sites that no longer exist, and the errors inherent in manual data entry. Other needs of mineral CMS are the tracking of conservation and repair records, provenance and historical collections data, and research information.

Various museum CMS are employed globally, differing in support and sophistication. The specific needs of mineral museums' collections systems range widely. Some prioritize research capabilities, while others require public accessibility and online search functions. Some institutions rely on simpler but less capable solutions like Excel documents because of limited IT resources. Financial considerations also significantly influence CMS selection. Most museums utilize commercially available CMS, whether their collection consists of 1,000 or 1 million specimens. This talk examines the various collection management systems used by members of the Society of Mineral Museum Professionals (SMMP), as discussed in an earlier online forum. It explores the differences, advantages, and disadvantages of the different CMS employed by these institutions.

Digital mineral data for museums – problems and solutions

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Mindat.org has provided for many years an important resource of information on mineralogical nomenclature and mineral localities that has been used to help curators improve the metadata for collections. This presentation highlights the data available within mindat.org and how best it can be used to assist curators and digitization staff in their work.

The new mindat.org Application Programming Interface (API) allows systems such as museum catalogue tools direct access to mindat.org data sets for the first time, speeding up data entry, data cleaning and improving content for data sharing.

The problematic issues of data consistency between differing data sets will be covered along with potential solutions, such as how to deal with historical usage of species names differing from current names, and ensuring data sets shared by your institution are fully interoperable with other mineralogical data to comply with the FAIR principles of data sharing (Findability, Accessibility, Interoperability and Reusability) for full compliance with current Open Access requirements.

Preserving Earth's History: Curatorial Practices and Digital Initiatives at the Mineralogical and Geological Museum, Harvard University

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For over 200 years the Mineralogical and Geological Museum at Harvard University (MGMH) has been collecting and curating specimens, resulting in one of the world's most important collections of minerals, gems, meteorites, rocks, and ores, but not all collections are curated equally. The Rock and Ore Collection was not incorporated into the museum until 1977. The sudden addition of thousands of specimens which, unlike the other collections, are primarily research samples collected during field expeditions, lead to uneven levels of curation. As is common among university museums, these collections were curated by individual researchers, which, combined with a lack of museum-quality standards for metadata collection and inconsistencies in transferring specimens into the museum's collection, caused these unique, extensive scientific collections to fall behind best curatorial practices.

To emphasize these collections' importance, the Rock and Ore Collections have become collectively known as the Earth Archive Collection (EAC); it consists of objects that tell Earth's history. Based on its curatorial needs, it is divided into three subcollections: Legacy, Emeritus, and Active. Legacy Collections hold historical significance to the geologic discipline and are often associated with collectors who are no longer alive, making their metadata at higher risk of being lost. Emeritus Collections are those collected by now emeritus faculty and/or students who are still reachable, with some even remaining active. Active Collections are those currently being developed by faculty members who are building collections and creating a repository.

This presentation will showcase our different approaches to curating each of these subcollections and our digitization vision. In adherence to the FAIR (Findable, Accessible, Interoperable, and Reusable) guiding principles, our aim is not only to curate and preserve these collections, but also create a robust database in which researchers can easily find and request samples. By making these materials available we hope to further the study of the history of Earth and life over the past 4 billion years.

Making Museums Victoria's mineralogy and petrology collections digitally accessible on AusGeochem - Australia's FAIR geochemical data platform

Oskar Lindenmayer

Collection Manager, Geosciences, Museums Victoria

AusGeochem is an online geochemical data sharing platform developed by AuScope, a non-government organisation focussed on developing shared infrastructure for Australia's geoscience research community. The platform, which launched publically in October 2021, is aimed at making Australian-generated geochemical data FAIR (Findable, Accessible, Interoperable and Reusable). Following a memorandum of understanding between AuScope and Museums Victoria signed in June 2022, a collaborative project was initiated to make a large portion of Victoria's State geosciences collections discoverable on AusGeochem. A data model was workshopped, and an automated process was developed to export newly entered or edited data from the Museum's EMu database each month. In December 2022, two Museums Victoria data packages, Mineralogy and Petrology, were launched on AusGeochem including over 43,000 specimen records.

Exported records can be browsed and searched spatially, by registration number, and by mineral species or rock name. They can also be viewed alongside specimen records and analytical data from other institutions, and in context with a variety of base-maps. Early analytics indicate approximately nine times the online interaction compared with the Museum's pre-existing online catalogue.

Digitization and Discovery: Addressing Collection Loss in Historical Museum Collections

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A major role of museums is to preserve specimens in collections. Yet, no major museum collection can claim to locate every single specimen that has entered it. In fact, specimen misplacement (or loss) is such an accepted reality that, until recently, this issue was not seriously addressed by most museums. Recent events at the British Museum have highlighted the impact of disregarding this issue. The questions now are: What are the major dangers of collection loss, and how best can we mitigate this?

These questions are becoming easier to answer through the digitization of collections. Digitized collections not only reveal how many specimens can be located but also provide an opportunity to detect where and when collection loss happened and to assess the drivers of collection loss. These are first steps in devising measures to avoid such future loss.

The Earth System collection of the National Museums Scotland is an excellent case study for this issue. With a history spanning over 250 years, the collection comprises tens of thousands of minerals, rocks, meteorites, gems, and other items, the basic details of which have now been largely digitized. The collection has endured many threats, including use as a university research collection, surviving two world wars, several relocations, and periods when the collection was managed by either by specialists with an excessively narrow focus, or by non-specialists. Unfortunately, the latter issue affects many mineral and rock collections these days.

Here, we present a quantified examination of the relationship between significant collection loss and historical events and conditions.

Mines, Metals, Magnets, Museums. The Importance of Mineral Collections in the Search for Critical Resources

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Mining and resource exploration have a vital role to play in the transition to a greener economy. Solar panels, batteries, magnets, and high-performance alloys all rely on the extraction and processing of critical metals.

In 2023 the UK Critical Minerals Intelligence Centre identified a number of geological locations in Scotland that are 'potentially prospective' for critical raw materials [1], including lithium, strontium, the platinum group elements (PGE), and the rare-earth elements (REE). While this does not mean these areas are necessarily likely to see mining activity, they are ideal sites for further academic research into mineralisation processes and critical raw material distribution.

The Earth Systems Collection at National Museums Scotland holds geological specimens from all of these areas. Many of these places are classic mineralogical localities where scientifically useful specimens have been lost to centuries of collecting, or areas that have already been mined/quarried. While field-based studies of these vitally important localities may be made difficult by lack of available material or the cost and logistics of fieldwork, museum collections provide an ideal alternative for geological and mineralogical study.

A well-curated museum collection will provide critical raw materials researchers not only with specimens for study, but also useful historical and geographical data, mineralogical expertise, and possibly also sample preparation and analysis facilities. At the National Museums Collection Centre at Granton, north Edinburgh, the NMS Earth Systems Collection is housed on the same site as an analytical lab facility providing X-ray diffraction (XRD), X-ray fluorescence (XRF), analytical Scanning Electron Microscopy (SEM) and a variety of sample preparation and microscopic facilities.

References:

[1] Deady, E, Goodenough, KM, Currie, D, Lacinska, A, Grant, H, Patton, M, Cooper, M, Josso, P, Shaw RA, Everett P, and Bide T. Potential for Critical Raw Material Prospectivity in the UK British Geological Survey CR/23/024

Batteries and Beyond: Why Lithium Matters — Conveying society's needs for mineral resources through exhibitry

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Education through engaging exhibitry is a fundamental feature of any museum. In today's world, mineral museums can play a critical role in conveying the use and significance of mineral resources in our daily lives.

A potentially world-class spodumene pegmatite deposit, Plumbago North, was reported ~15km north from the Maine Mineral & Gem Museum (MMGM) in the town of Newry [1]. The (re)discovery of this deposit sparked much discourse in the state, even prompting an amendment to the state's current metallic mining laws.

Because lithium is an important contemporary issue in Maine (hyper locally near MMGM), in the USA and beyond, our goal was to create a dynamic exhibit that that was free to the public, which could serve as a springboard for visitors to learn about this critical resource. Topics in the exhibit include an overview of the element, many of the minerals that contain it, the types of resources that are exploited to extract it, the range of everyday products that use it, the burgeoning and complex global supply chain that has developed to produce lithium-ion batteries, and the concept of a closed loop supply chain (recycling: using batteries as ore).

Objective exhibits about the extraction of mineral resources and their use inform the public and create room for conversations surrounding a contemporary and somewhat controversial issue that nearly everyone on this planet is connected to — Lithium-ion batteries.

Exhibits can serve as an educational backbone to programming that provides guided interpretation, further inquiry, and avenues for learning. For an exhibit to be truly effective it needs to engage visitors beyond its content presentation.

References:

[1] Simmons W.B., Falster, A.U., Freeman, G. (2020) The Plumbago North pegmatite, Maine, USA: a new potential lithium resource: Mineralium Deposita, v. 55, no. 7, p. 1505-1510.

Mineralogical museums as a place to teach the need of raw materials

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Public awareness of the importance of critical raw materials for our society has increased significantly in recent decades thanks to numerous media reports. These media reports may present questionable information about mining and the commodities market, which can lead to confusion. Mineralogical museums offer an ideal environment for knowledge transfer about the connection between minerals and their application in our everyday lives. Due to the political and social development towards low-carbon energy production, topics related to raw materials are also becoming an important part of school education. Workshops for students in a museum, as an extracurricular activity, are very useful learning techniques to deepen the knowledge of the young generation. In addition to workshops, museums also use exhibitions on topics related to raw materials. One concept of these exhibitions is to visualize a direct connection between the mineral and the application. Museum educators usually have to be creative in order to include raw materials in exhibitions that at first glance have nothing to do with raw materials. These exhibitions can then reach new audiences who have the opportunity to learn about the importance of raw materials in our daily lives.

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Using mineral collections to evaluate the environmental impact of mining in the Arctic

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Material from the abandoned cryolite mine at Ivigtut in South Greenland is well represented in mineral collections worldwide. Initially, the site was explored for extracting silver from galena and later became the only mine in the world for cryolite. Ivigtut is the type locality for 17 minerals of which 12 are fluorides and five only occur here. With nearly 100 species known, many of which are secondary in nature alongside an abundance of sulphides at Ivigtut, it is surprising that the only previously recorded secondary minerals after sulphides are cerussite, malachite and wulfenite.

The waste rock from Ivigtut was used to build infrastructures along the shoreline of the Arsuk Fjord. Environmental monitoring programs dating back to the 1980s have shown elevated concentrations of Pb and Zn in the marine ecosystem in the fjord, due to leaching from the mine site and waste rock. Over time, the monitoring program has revealed a reduction in both Pb and Zn in the fjord, with the reduction of Pb being greater than that of Zn.

Fieldwork at Ivigtut in 2013, 2016 and 2019 has revealed nearly 20 secondary minerals derived from sulphides not previously described from Ivigtut. The discovery of many secondary minerals new to the locality raises two questions: 1) are the secondary minerals formed post-mining? and 2) could they affect the release of toxic elements into the fjord?

To explore question one, a systematic investigation of Ivigtut minerals in the collection of the Natural History Museum in London was carried out. This sample suite includes samples from before mining started at Ivigtut in 1856 and throughout the main mining period until the company was dissolved in 1987. The mineralogical findings and their implications for environmental issues will be presented.

Secondary tellurium minerals and the importance of well-maintained Museum collections

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REMOTE

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Exactly 100 tellurium-oxygen (Te-O) minerals have been described and accepted by the International Mineralogical Association [1] as at the end of 2023. Most of these minerals only form crystals less than 100 µm in size and are found from fewer than three localities globally. Thus, preserving the specimens on which these minerals are found is key for keeping a scientific record of these rare but crystallographically and chemically diverse minerals. Tellurium is one of the rarest non-radioactive elements in Earth's crust (abundance ~1 ppb) but is the most mineralogically diverse of all elements when relating number of described minerals to abundance [2].

One recent new Te-O mineral is wortupaite, a mineral which was first observed 125 years ago, investigated in the 2000s and finally characterised and published in 2023 [1]. Wortupaite was found coating the nickel telluride mineral melonite ($NiTe_2$) on historic specimens from the Wortupa gold mine, a small locality in the northern Flinders Ranges, South Australia. A green coating was noted in the first descriptions of material from the mine, but was not characterisable at the time: synchrotron radiation was required for the determination of the crystal structure. Had the specimen not been deposited in the collection of the National Museum of Victoria in 1900 (as the modern day Museums Victoria was then known), the new mineral would likely never have been described, emphasising the importance of well-maintained Museum collections in the description of new minerals.

Museum collections have assisted with either the description, redefinition or (occasionally) discreditation of numerous secondary tellurium minerals in the past decade. From only 70% of Te–O minerals being well-defined in 2015 (56 out of 80), 90% are now well-crystallographically characterised (90 out of 100, i.e. 14 existing species were re-examined and re-classified and 20 new species were described). Among the re-described minerals are cesbronite [3], fairbankite [4] and montanite [5], and among the new minerals described are millsite [6], müllerite [7], tomiolloite [8] and tombstoneite [9].

References:

[1] Missen OP et al. (2023) Mineral Mag 87: 908-915; [2] Christy AG (2015) Mineral Mag 79: 33-50; [3] Missen OP et al. (2018) Acta Cryst B74: 24-31.; [4] Missen OP et al. (2021) Am Mineral 106: 309-316. [5] Missen OP et al. (2022) Phys Chem Mineral 49: 21; [6] Rumsey MS et al. (2018) Mineral Mag 82: 433-444; [7] Mills SJ et al. (2020) Can Mineral 58: 413-419; [8] Missen OP et al. (2022) Am Mineral 107: 2167–2175.; [9] Kampf AR et al. (2023) Mineral Mag 87: 10-17.

The influential role of museum collections in advancing mineralogical research

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The mineralogical collections of our museum play a central role in promoting scientific research and expanding our understanding of geological phenomena. This presentation will highlight the main themes of our collection and their crucial role in local and international research. Our collection is organized around several major axes [1]:

- Luxembourg and Greater Region
- Democratic Republic of Congo (DRC)
- Brazilian Pegmatites
- Systematics (classification of minerals based on their chemical composition and crystal structure)

Collection work and field trips support these axes, ensuring the acquisition of high-quality and representative samples. The data and samples collected during these expeditions are essential for ongoing and future research projects.

One outcome of our collection activities is the initiation of the research project on Brazilian pegmatitic phosphates. The goal of this project is to study phosphates from LCT-type pegmatites, contributing to a broader understanding of pegmatite formation, phosphate mineralogy, and their potential economic exploitation.

This presentation aims to highlight the symbiotic relationship between museum collections and scientific research, demonstrating that specimens preserve geological heritage and advance mineralogical science.

References

[1] Simon Philippo, 2004, 150 Joer Musée national d'histoire naturelle Luxembourg. N° ISBN 2-919877-07-0.

Researching Ruskin's Rocks – rediscovery of a Victorian mineral collection

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John Ruskin (1819–1900) was born in London, the only child of John James Ruskin (1785–1864), a sherry importer, and Margaret Cox, formerly Cock (1781–1871). He became a towering figure in the latter half of the nineteenth century, well known as an art critic, architectural commentator, author and social thinker. He published some 250 works on a broad range of subjects, gave countless lectures, wrote diaries, and thousands of letters, many of which have been published.

He developed an interest in geology from an early age, encouraged by his father who purchased a small set of minerals from the dealer Daniel Crosthwaite (1776–1847) of Keswick, Cumbria for five-shillings. This gift had a profound effect on the young Ruskin, who wrote some fifty years later "No subsequent possession has had so much influence on my life".

As a student at Oxford in 1837, Ruskin attended William Buckland's lectures on geology and mineralogy. His diaries record specimen purchases in the 1860s from Bryce Wright, James Tennant, and Richard Talling, and some of the surviving correspondence makes entertaining reading [1].

However, although there is a vast literature analysing and commenting on many aspects of Ruskin's life [2], his mineralogical interests have been largely neglected. As one might expect, Ruskin was drawn to the beauty, colour and form of natural crystals, viewing his specimens with the eye of an artist, but also questioning what he saw and wondering about the processes that had produced such treasures of nature.

This presentation will review a current research project, follow the detective work in tracing Ruskin's specimens and provide an insight into his mineralogical interests, drawing on several thousand specimens from Ruskin's mineral collection which are preserved in museums and private collections both in the UK and overseas.

References:

[1] Starkey, R.E. (2012) The Herodsfoot mine, Lanreath, Cornwall, England. *The Mineralogical Record*, **43**(4), 411–486.

[2] Hilton, T. (2002) John Ruskin. Yale University Press, New Haven, Connecticut. 947 pp.

The global significance of the Ludlam (Heuland-Forster) Mineral Collection at the Natural History Museum in London

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The Ludlam Collection consists of 16000 samples that constituted the majority of exhibition quality minerals in London's Museum of Practical Geology (MPG). The MPG evolved into the Geological Museum and a large portion of the collection was still on display in the 1990s, until it was partially integrated with the Natural History Museum (NHM) next door.

Since then, the collection has been largely off display, undergoing curation, which has presented the first opportunity to assess the collection for its historic relevance since its arrival in 1881.

The collection is not well known outside of the UK and its name, after its last owner Henry Ludlam, (1824-1881), namesake of the mineral Ludlamite, does not reflect its importance for historic and cultural mineralogy, particularly the evolution and growth of collecting and dealing.

When acquired, it was the finest private collection in the UK, second only to the vast holdings of the NHM. It had grown through the acquisition of individual specimens from primary dealers in Europe during the 1860s-1870s and through the acquisition of entire collections, notably the William Nevill collection (which included the most extensive private collection of meteorites in the UK), and the mineral collection of Charles Hampden-Turner.

The Hampden-Turner collection was itself considered the UKs finest mineral collection in the 1820s-1830s having been a specially curated private collection of one of the greatest mineral dealers of all time, Henry Heuland (1778-1856).

This is not the origin story however, Heuland records that the core upon which he built was the private collection of his uncle, Jacob Forster (1739-1806), who preferred a smaller specimen aesthetic for this private collection and is considered one of the first truly international mineral dealers.

A large portion of the Heuland collection remains intact, representing a snapshot of the finest smaller-specimen aesthetic available in the 1820s. The presentation covers collection history, key specimens, the curatorial challenges and the historic potential of this important collection.

William Thomson; Lessons Learned from a Thrice-Forgotten Benefactor

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William Thomson (1760-1806) stands as one of National Museums Scotland's most generous benefactors, having donated 10,000 specimens and bequeathing a substantial sum for the advancement and teaching of mineralogy. Despite this, practically no trace remains of him in the modern-day collections.

Thomson began his career in medicine, training at the University of Oxford and the University of Edinburgh before becoming an anatomy lecturer at Oxford. His tenure at Edinburgh connected him with prominent thinkers such as James Hutton, Rev. John Walker, and Joseph Black, igniting his passion for geology. This interest flourished during his time at Oxford.

However, a scandal early in his career forced Thomson into exile from the UK. He eventually settled in Naples, where he continued his geological research, collaborating with eminent Italian geologists on the study of volcanism, particularly at Vesuvius. During this period, Thomson amassed an extensive collection of volcanic rocks and minerals. Despite his scientific respectability and ongoing connections, including with James Macie (later James Smithson), the circumstances of his exile and the political climate at the time lead to him being largely forgotten.

This neglect extended to Thomson's collection in Edinburgh, where biases, particularly those of curator Robert Jameson, led to its marginalization. Presently, the "Thomsonian Collection" comprises 50 specimens, none of which originate from Thomson's original donation. These remaining specimens, acquired through Thomson's bequest, were often misattributed by curators to other scientists, further erasing Thomson's legacy.

This presentation will explore the rediscovery of William Thomson's collection as a case study to address the broader issue of knowledge loss within institutions. By examining the factors that led to Thomson's erasure and the subsequent neglect of his contributions, this talk aims to highlight the challenges and importance of preserving historical scientific legacies and specimen data within accessible and easily searchable institutional archives.

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A review of the early history of copper- and iron-arsenate minerals in Cornwall and the necessity in preserving early mineral collections intact

Tom Cotterell

The English county of Cornwall is famous for its history of tin and copper mining. One offshoot from mining was the discovery of weird and wonderful new mineral species and never was this more apparent than during the late 18th and early 19th centuries. Mineralogy in Britain was very much in its infancy, but mineral specimens attracted the miners and a flourishing trade in specimens developed with their export around the world. Local wealthy landowners often developed an interest in mineral collecting too, and some assembled fine representative collections that provide a snapshot in time.

These collections were often ephemeral. Some were recycled through sales, some hidden away, or lost, but a few survived the test of time and remain largely intact.

Philip Rashleigh (1729-1811) of Menabilly, Cornwall, was one such collector. He famously collected not for scientific curiosity, but for the beauty of minerals. Ironically, of all his contemporaries, his collection has become the most important scientifically. The reason is his methodology, for, unlike other collectors, he meticulously documented the provenance of individual specimens. Like many, this was in the form of a catalogue, but his was different, an 'organic' document that allows the sequence of discoveries to be resolved. In this respect his catalogue is unique.

Rashleigh's collection was split, but most of his specimens can be traced to the Royal Cornwall Museum (RCM) in Truro and the Natural History Museum in London, where they form part of Sir Arthur Russell's collection of British minerals. A study of Rashleigh's catalogue at the RCM, and specimens, has shed new light on the localities where copper- and iron arsenate specimens were found and has raised concerns over modern curatorial and collectors' practices.

Evidence presented here shows that Russell made errors in reinterpreting the provenance of Rashleigh specimen, but his foresight in recording his reasoning allows these to be spotted and addressed. Importantly, Wheal Gorland was not the only source of well-crystallized copper- and iron arsenates. Indeed, we need to revisit the importance of Carharrack mine in the story and Tincroft mine too has an important role to play.

Discovering vargite – a new mineral in the newly installed akrochordite mineral group from the Långban Mn-Fe deposit, Filipstad, Värmland, Sweden

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The new mineral vargite $MnCu_2Mn_2(OH)_4(H_2O)_4(AsO_4)_2$ together with akrochordite [$MnMn_2Mn_2(OH)_4(H_2O)_4(AsO_4)_2$] and guanacoite [$MgCu_2Mg_2(OH)_4(H_2O)_4(AsO_4)_2$] constitute the newly established akrochordite group, approved by IMA-CNMNC. The general structural formula of the group members is $M1(M2)_2(M3)_2(OH)_4(H_2O)_4(AsO_4)_2$. In vargite, Cu atoms are ordered onto the octahedrally-coordinated site designated *M*2. Akrochordite from the original type specimen contains Mg, about equally distributed over *M*1 and *M*2, but it is not the predominant cation species at these sites.

Vargite – named after the Swedish miner Erik Gustaf Varg (1886–1970), who collected the type specimen, was found in the Långban Palaeoproterozoic Fe-Mn deposit. The specimen containing the new species was discovered during investigations of old collection material. It occurs in open cavities in a brecciated and later leached carbonate groundmass, in association with hausmannite, calcite, rhodochrosite, baryte, a serpentine-group mineral, yarrowite and galena. Paragenetically, it is a late-stage mineral, formed as a result of the interaction between an As- rich hydrothermal fluid and Mn-oxide(s) and Cu-sulphide, under low *P*- and *T*-conditions. Vargite forms bright green, semi-spherical aggregates up to 0.5 mm across, consisting of numerous thin, lath-shaped crystals, elongated along [100] and with a maximum length of 200 µm. The crystal structures of vargite and the isotypic mineral akrochordite have been refined in the space group $P2_1/c$ from single-crystal X-ray diffraction data to $R1$ = 3.07% and 2.46%, respectively, giving the following sets of unit-cell parameters: a = 5.6251(14), 5.6832(11) Å, b = 17.452(5), 17.631(5) Å, c = 6.905(2), 6.8417(19) Å, β = 100.21(5)°, 99.51(4)°, and V = 667.2(3), 676.1(3) Å^3 with Z = 2.

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Rare and problematic secondary minerals in the Furnas Formation, Paraná Basin, Paraná, Brazil

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Rare and problematic secondary minerals occur as superficial white crusts in quartz sandstones of the Furnas Formation, Paraná Basin, Paraná state, Brazil.

Sasaite [1], $(Al,Fe)_{14}(PO_4)_{11}(SO_4)(OH)_7.84H_2O$, and an unnamed dehydration product occur in the vicinity of the Metamorfose and Chapadinha I shelters, in Piraí do Sul. “Sveite” [2], $KAl_7(NO_3)_4(OH)_{16}Cl_2{\cdot}8H_2O$, was found in three caves (shelters) in the municipalities of Ponta Grossa and Piraí do Sul. The mineral name is in quotation marks because several isostructural minerals are so called. In one of the X-ray diffractograms, the association of a more hydrated species was verified. Semiquantitative chemical analyses by EDS verified predominance of Cl over SO_4, similar to what was observed in the original occurrence of sveite, but different from what occurs with other occurrences. Preliminary data also suggest low K values and NH_4 richness. Other Al-rich nitrates have been recorded, but the X-ray diffraction patterns do not match any known mineral or chemical compound.

Rossiantonite [3], $Al_3(PO_4)(SO_4)_2(OH)_2(H_2O)_{10}{\cdot}4H_2O$, was collected in Bela Vista do Rigatoni cave, Ponta Grossa. It contains part of a small invertebrate trapped during the mineral precipitation. This is the second worldwide occurrence of the mineral.

A mineral was identified as tinsleyite [4], $KAl_2(PO_4)_2(OH){\cdot}2H_2O$, in Ponta Grossa and Piraí do Sul, but preliminary chemical analyses indicate low values of K and richness in NH_4, which could therefore be the mineral ammoniotinsleyite, $(NH_4)Al_2(PO_4)_2(OH){\cdot}2H_2O$.
Taranakite [5], $K_3Al_5(PO_3OH)_6(PO_4)_2{\cdot}18H_2O$, was identified in two samples from Piraí do Sul, but low K values and richness in NH_4 may indicate that it is the phase $(NH_4)_3Al_5(PO_3OH)_6(PO_4)_2{\cdot}18H_2O$, known only synthetically.

References:

[1] Martini J. (1978) Min Mag 42: 401–404; [2] Martini J (1980) Trans Geol Soc South Africa 83: 239-241; [3] Galli E et al. (2013) Am Min 98: 1906-1913; [4] Dunn P et al. (1984) Am Min 69: 374-376. [5] Hector J. and Skey W. (1865) Reports Jurors, New Zealand Expedition, pg. 423.

MnhnL: Research and new species

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In this oral presentation, we would like to review the last discoveries of new species in the collections of the *Musée national d'histoire naturelle de Luxembourg (MnhnL)* and during our field missions. Particular emphasis will be placed on the systematic study of samples from historical collections and new donations. As an introduction, we will present all the holotypes and cotypes preserved in our collections.

Our collections mainly come from Central Africa, Brazil or Luxembourg and surrounding countries. It is therefore only natural that the last 6 new species [1 to 6] described come from these regions. Until recently, our mineralogy department was limited to one person. For this reason, we now have a number of collaborations, notably with colleagues form Liège, Nancy and Prague universities.

The second part of this presentation will detail the way in which our holotypes are preserved in our collections: from the place in which they are stored, the type of packaging box and their advantages. How samples are placed and presented (base sample, polished section, needle-mounted single crystal, etc.). But also the direct link and presentation with publications and related scientific data..

References:

[1] Hatert F. et al. (2010) Eur.J. Mineral. 22: 459-467
[2] Hatert F. et al. (2017) Eur.J. Mineral. 29-5: 923-930
[3] Philippo S. et al. (2020) Eur.J. Mineral. 32: 449–455
[4] Plášil, J..et al. (2021) Min. Mag. 85
[5] Plášil, J..et al. (2022) Min. Mag. 86
[6] Hatert F. et al. (2023) Eur.J. Mineral. 35: 1075

Raman spectroscopy as an important analytical method in a mineralogical collection

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At the Mineralogical State Collection Munich (MSM), Raman spectroscopy plays a key role in characterizing meteorites. Our focus extends to lunar, Martian, Vesta meteorite samples and chondrites, aiming to unravel their mineral composition, high-pressure phases, potential glass components, and inclusions. Furthermore, we investigate new meteorite material and try to characterize micrometeorites.

By leveraging Raman spectroscopy, we delve into the geological history and thermal evolution of these bodies, drawing parallels to Earth's formation and early history. We are also expanding our existing Raman database with meteorite materials which plays a key role in future extra-terrestrial missions and training of astronauts.

For instance, our research examines into meteorites like NWA11266, classified as lunar feldspar breccia. Through Raman spectroscopy analysis, we identified main minerals such as mafic olivines, pyroxenes, anorthitic feldspar, graphite, and minor metallic components, alongside accessory phases like apatite and zircon. Such investigations shed light on the geochemical structure and history of the Moon, aiding in understanding its geological processes, including volcanic activity, impact events, and differentiation. Moreover, our studies extend beyond lunar meteorites to encompass other extra-terrestrial bodies, including Mars, Vesta, pallasites, and various chondrites. Through comparative analysis with Earth's interior rocks like mantle xenoliths and ophiolitic mantle rocks, we aim to glean insights into planetary formation processes and compositional diversity.

In addition to the study of meteorites, the Raman is also used to characterize minerals and to constantly supplement the in-house database. Furthermore, the MSM has a heating/cooling table with which in-situ measurements are possible. Temperature ranges of -160 to plus 600°C are achieved here.

In summary, our interdisciplinary approach, combining Raman spectroscopy with electron microprobe and SEM analyses, contributes to a deeper understanding of composition, evolution, and geological processes of our measured material.

The importance of 'depth' in a mineral collection – implications for collaborative digitisation efforts and disposal strategies

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Four recent research projects utilising mineral collections at the NHM in London are reviewed; studies of hydrocerussite from Torr Works (Merehead) Quarry, Somerset; secondary minerals from Ivigtut, Greenland; liroconite from Wheal Gorland, Cornwall; and a 'classic' fluorite-bearing mineral assemblage from Trevaunance, Cornwall.

Each project has significantly benefitted from and was to some extent only possible due to the extraordinary 'depth' of the mineral collections at the NHM. In this context, the term 'depth' is used to represent multiple samples bearing the same mineral from the same geological location often sourced at different times through different channels. It is a relevant observation that in the collector and dealer environments, 'depth' is often reinterpreted as 'duplicate'.

Museums have different mission statements, scopes and priorities. However, at a time where justifying continued operation is becoming harder, there is no doubt that a collection currently contributing to scientific or cultural research, particularly that of an enduring foundational or transitory societally relevant nature, has a better ability to champion its worth.

This stimulates investigation into exactly how mineral collections contribute to research, and how to grow, access and curate them to facilitate this.

In showing that 'depth' is one key facilitator of research, we must 1) promote 'depth', with the recognition that not every museum has had, or will have the ability to form the vast collections like those at the NHM, and 2) responsibly manage the retention of 'depth' in collections where there is a pressure to dispose of 'duplicates' to the commercial or private sector.

Effectively achieving 1 could hinge on the mineralogical community having a strong enough voice on the global digitisation movement so that the digital data acquired from our collections is the most relevant for research and allows for 'depth' to be accessed effectively, but virtually, across collections. Achieving 2 likely relies on a constant reactive refinement of community-wide standards or guidance on aspects of disposal and a definition of 'duplication'.

Sunday Stones of Tyneside collieries

Humphrey, M.S.

REMOTE

The Great North Museum: Hancock, Newcastle upon Tyne NE2 4PT

Sunday Stones have been defined as:
'A calcareous deposit formed inside pipes carrying waste water from collieries. It is composed of alternating dark and light bands corresponding to the day and night shifts and a broader light band corresponding to Sunday.' [1]
We have several examples of Sunday stones from local Tyneside collieries in the collection of the Great North Museum: Hancock. A recent lock-down project presented the opportunity to examine the material more closely and undertake a literature search to learn more about its origin and formation. In addition to calcareous material, the Tyneside Sunday stones have been shown to be rich in baryte (barium sulphate) [2] [3] [4] [5], and in some cases iron [3] [5].
Further investigation is envisaged.

References:

[1] Arkell W J and Tomkeiff S I (1953) Oxford University Press
[2] Richardson T (1863) Journ Soc Arts: 54
[3] Wallace Young J (1865) Note to the editor Geol Mag 16: 475-476
[4] Dunn J T (1877) Chem News xxxv: 140
[5] Clowes F (1889) Proc Roy Soc xivi: 368-9

The H.G. Dines collection of the Natural History Museum, London

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The Natural History Museum (NHM) in London holds over 400,000 specimens in its Mineral and Planetary Science collection, of which around 19,000 specimens make up the Ores collection. Held within this is the H.G. Dines collection, a group of samples exhibiting ore mineralisation and associated country rock from nearly 200 different mining sites in Southwest England, primarily Cornwall and Devon.

Henry George Dines, the donor of the specimens, was a member of the British Geological Survey (BGS) who during the late 1930s started work on his seminal publication *The Metalliferous Mining Region of South-West England*. It was during this work that the samples now residing in the NHM's Ores collection were gathered. The journey of the specimens into the collection is complex, and their historical importance was only realised in 2022.

Through evaluating labels, registration numbers, and information held in a notebook belonging to H.G. Dines, over 600 specimens were linked to his work in the Southwest of England. Many of these had not previously connected to H.G. Dines in the collections management system of the NHM. Curation efforts have brought together all of these specimens to improve their accessibility for future research and reference.

This poster will step through the discovery, identification and curation of the H.G. Dines collection.

Collectible Minerals of Jiangxi, China

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Jiangxi Province of China is globally renowned for its rich and diverse mineral resources. The province boasts an impressive array of 139 identified minerals. Notably, Jiangxi ranks among the top five provinces in China for its reserves of copper, tungsten, uranium, tantalum, gold, silver, and rare earth elements, collectively known as the "Seven Flowers of Jiangxi." Additionally, its exquisite mineral specimens have captivated numerous mineral enthusiasts and collectors.

Geologically, northern Jiangxi belongs to the Yangtze Plate, while central and southern Jiangxi are part of the South China Plate. The Pingxiang-Dexing and Yushan regions mark the collision zones of these plates. The diverse tectonic units and prolonged geological evolution have led to multiple phases of mineralization, resulting in a wide variety of minerals.

In northwestern Jiangxi, the Jiujiang area is notable for its distinctive minerals. The Qingjiang Mine in Wuning County is world-famous for its perfect, large, and brilliant stibnite crystals. The Chengmenshan Mine in Jiujiang County yields superb specimens of copper minerals such as native copper, chalcopyrite, and malachite. Additionally, the fluorite aggregates and octahedral crystals from Dean are highly prized by collectors and museums.

The Shangrao area in northeastern Jiangxi is also rich in polymetallic deposits. The green fluorite specimens from Shangrao County and the copper minerals such as native copper, malachite, and azurite from the Dexing Copper Mine are classic collectible minerals from this region.

Yichun, in central-western Jiangxi, is home to Asia's largest lepidolite mine. Notable specimens from this area include lepidolite crystals from Yifeng County, tantalite-columbite from Yuanzhou District, and kaolinite from Fengxin County. Gem-quality brownish-red sphalerite discovered in the Wanguo Gold Mine, Yifeng County, in 2023 has garnered significant attention from mineral enthusiasts and collectors.

Fuzhou, situated in central-eastern Jiangxi, features minerals primarily from the Dongxiang Copper Mine. These include native copper, chalcopyrite, calcite, and hematite-coated quartz clusters, known for their beautiful and aesthetic specimens.

Ganzhou, located in southern Jiangxi, is the province's most diverse and rich area for minerals. The Xihuashan Mine in Dayu County is especially renowned for its world-class scheelite, cassiterite, and molybdenite clusters. Additionally, occasional discoveries of purple-blue fluorite, red apatite, and spherical pyrite further enhance the area's mineralogical significance. The green fluorite, gem-quality golden barite, and their combination specimens from the Xiefang Mine in Ruijin City are among the finest in the world.

The Musée national d'histoire naturelle de Luxembourg: collection priorities and research projects

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The mineralogical collections of the Musée national d'histoire naturelle de Luxembourg began in 1850 as a cabinet of curiosities attached to the 'Société de Sciences naturelles de Luxembourg', founded at the same time.

Our institution's current research projects are historically linked to our collections and our related field trips.

These research axis are :

+ Inventory of minerals of the Grand Duchy of Luxembourg, particularly polymetallic deposits [1] [2] [3] [4].

+ Study of our foreign collections, mainly in Brazil, Mozambique and the DRC [6].

+ Study of rare minerals in the collections [5].

These research projects based on our collections and linked to field trips have led to numerous mineralogical / geological publications and the discovery of new species.

We invite you to review these research topics through our collections and field missions.

References:

[1] Philippo S. et al. (2007) Ferrantia 49: 152pp

[2] Filella M. et al. (2009) Sc of Total Environ 407: 6205-6216

[3] Philippo S. & Hatert F. (2018) Ferrantia 77: 113pp

[4] Marignal C. et al. (2023) Int J Earth Sciences 112-6 : 1771-1801

[5] Baijot M. et al. (2013) Can. Min. 52: 373-397

[6] Cassedanne J. & Philippo S. (2015) Minerals and Gems deposits of the eastern Brazilian pegmatites : 674pp

The O'Reilly-Griffin Mantle Xenolith Collection and the Storage Issues of Acquiring Large Volumes of Samples.

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The Natural History Museum (NHM) petrology collection contains approximately 126,000 rocks from around the world covering the past 250 years. The mantle xenolith collection is one of the most important and comprehensive among the NHM petrology collection. This collection provides excellent worldwide coverage and its importance attracted Professors Sue O'Reilly and Bill Griffin to donate their mantle xenolith collection following their retirement from Macquarie University in Sydney, Australia. This acquisition is an important and valuable addition to the existing NHM mantle xenolith collection as it contains xenoliths that can no longer be collected, as well as the largest mantle xenolith ever found (a lherzolite from Liverpool Range, New South Wales, Australia).
The O'Reilly-Griffin mantle xenolith collection is a large acquisition consisting of 11 pallets, 820 boxes, and over 12,000 specimens. Whilst large scientifically important petrology acquisitions like the O'Reilly-Griffin collection are valuable, it highlighted the issues of acquiring such volumes of samples. Due to their size, weight, and volume, providing adequate space for large collections can be challenging in museums. There is a current collection development project underway at the NHM which is determining the 25-year expansion requirements of the petrology and ore collections and the feasibility of deep storage. This project is determining how these collections are growing and providing solutions to ensure that both historic samples and newly acquired samples can be stored in an appropriate manner.

This poster will showcase the O'Reilly-Griffin mantle xenolith collection and outline the work of the 25-year expansion requirements and the feasibility of deep storage study for the NHM petrology and ores collections.

Scientific Mediation, Research And Teaching Within The Sorbonne University Mineral Collection

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[2] Pôle Collections scientifiques et patrimoine de la bibliothèque Sorbonne Université

The Sorbonne University mineral collection now accounts for about 16,500 minerals divided between a permanent exhibition and a collection reserved for research and teaching purposes. The permanent exposition brings together approximately 1,500 specimens, which is open to the public. There are 5,659 mineral species known to date and the collection comprises of more than 1,700 species.

Created in 1823 by François Sulpice Beudan, successor to Abbé René-Just Haüy as chair of mineralogy at the Sorbonne, it is one of the oldest mineral collections in France. It welcomes several thousand people per year, including a large proportion of students, teachers and researchers who visit in the frame of educational and scientific programs. As a university collection, its primary objectives are research and teaching, to which scientific mediation is naturally added thanks to the presence of a gallery, logistical and legislative frameworks allowing the reception for the general public. The collection also relies on the “association des amis de la collection de minéraux de la Sorbonne” (A.Mi.S), an association that aims to preserve, develop and promote the collection.

We present here the main actions carried out by the collection over the last three years in terms of i) scientific mediation: through temporary thematic exhibitions, ii) research: through the enrichment of the sample catalogue available to research studies in the physicochemical properties of minerals and iii) teaching: through training initiatives for primary and secondary school teachers.

Conflict minerals in exhibitions – an opportunity for education

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The most beautiful exhibits are in the showcases of our museums and attract numerous visitors who want to see these original objects from locations all over the world. The permanent exhibition can be visited during opening hours and gives visitors time and space to learn more about the objects or to deal with a specific topic.

Temporary exhibitions are useful for showing current scientific or socially relevant topics.
In the Mineralogical Museum of the University of Würzburg we have created a temporary exhibition based on a bachelor's thesis from 2019 entitled "Mineral raw materials in smartphones – analysis, potential for conflict and approaches to sustainability". Why create an exhibition on this topic? First argument is: The smartphone, our daily companion, can do almost everything and the number of users is increasing. Second: In surveys with students, we learned that less than 20 % of them know what raw materials their smartphone is made from. They also didn't know what conflict minerals were. Third argument: The curriculum in schools. In nearly all types of school in Germany the responsible handling of a Smartphone is part of the teaching material. In the upper level of high school, students learn about raw materials and their availability.

In the Mineralogical Museum of the University of Jena normally two times a year temporary exhibitions complement the permanent exhibition area. Where do the themes for the special exhibitions come from? The topics often develop from the scientific projects at the institute. During previous exhibitions, visitors often asked questions about raw materials and their origin for cell phones and computers. In 2021 the collection showed e temporary exhibition about "Raw materials – from smartphones to electric cars".

In both museums the team conveys the complex content in easy-to-understand exhibition texts, organizes lectures, action Sundays for families and hands-on stations in order to reach a broad target group and, above all, to introduce young people to science and to this important subject.

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