

SIXTH INTERNATIONAL CONFERENCE

M&M6

MINERALOGY AND MUSEUMS

Golden, Colorado

U.S.A.

September 7–9, 2008



PROGRAM

&

ABSTRACTS



2008 — SIXTH INTERNATIONAL CONFERENCE
MINERALOGY AND MUSEUMS
COLORADO SCHOOL OF MINES • GOLDEN, CO

**PROGRAM
&
ABSTRACTS**

SEPTEMBER 7-9, 2008

The Organizing
Committee gratefully
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GENERAL INFORMATION

Meeting Venue

All technical sessions (oral and poster) will be held at the Cecil H. & Ida Green Graduate and Professional Center on the campus of the Colorado School of Mines in Golden, Colorado. The Center is representative of the blending of technology and humanity. The facility is designed as both a place for the study of science and technology, and a place for meetings, the arts, and social events. The Green Center is located at 924 16th Street in Golden. The opening reception will be held at the Geology Museum on the Colorado School of Mines campus. It is located at 1310 Maple Street.

Registration

Registration will take place on Sunday, September 7, in the Geology Museum on the Colorado School of Mines campus between 3:00 pm and 6:00 pm. Registration on Monday and Tuesday will be in the lobby of the Green Center.

Messages

A message board will be available near the Registration Desk in the Green Center. Attendees may also receive messages through the Office of Special Programs and Continuing Education. Please advise callers to clearly indicate that they are attempting to reach an MM6 guest.

1-303-273-3321 **1-800-446-9488, ext. 3321** **1-303-273-3314 (fax)** **space@mines.edu**

Wireless Internet service will be available in the Green Center throughout the Conference. Attendees will be provided a specific username and password to use.

Campus Parking

Parking on campus is free of charge in lots designated for students and visitors. Attendees MUST display the parking pass that was provided with the confirmation materials. The most convenient lot to the Green Center is on 17th Street between Washington Street and Arapahoe Street, one block south and east of the Green Center. Please be advised that the SPACE Office cannot be responsible for parking tickets issued to vehicles parked in reserved spaces. Additional passes are available at the Registration Desk should a replacement be required.

Public Transportation

Public Transportation is very limited in the Golden area. Please be advised that taxi service may require up to an hour for the taxi to arrive, so plan accordingly. The physical address to request taxi service from the Green Center is 924 16th Street GOLDEN (There is also a 16th Street in Denver, so it is important to stress Golden!) We suggest that attendees request the taxi service to meet you at the corner of 16th and Arapahoe.

Metro Taxi: 303-333-3333 **Yellow Cab:** 303-777-7777 **Freedom Cab:** 303-444-4444

Transportation will be provided to and from the Dinner on Tuesday, September 9, at the Denver Museum of Nature and Science.

Denver Gem and Mineral Show

The 41st Annual Gem and Mineral Show "Minerals of Colorado" is scheduled for September 12-14, 2008 at the Denver Merchandise Mart Expo Hall, 452 E. 58th Avenue, Denver CO.

Visit their web site at: www.denvermineralshow.com/index.htm

SCIENTIFIC INFORMATION

Oral Presentations

Oral presentations are scheduled for Petroleum Hall in the Green Center. Each presentation is limited to 20 minutes in length, including time for questions and answers. There are no concurrent sessions. It is requested that for those presenters who have not previously uploaded their presentations on the conference computer, we ask that this process be completed on the morning of the presentation, prior to the start of the day's events.

Poster Presentations

Posters will be set up in the Lobby of the Green Center. Each poster has been given a number corresponding to the number on the poster board. Supplies such as tacks and Velcro will be available at the Registration Desk.

Set-up:

Monday, September 8: 8:00 - 9:00 am and 10:30 - 11:00 am; and limited time during the lunch hour.

Take-down:

Tuesday, September 9: 3:00 - 3:30 pm and 4:50 - 5:30 pm.

Posters will be on display throughout the Conference.

Specific poster times:

Monday, September 8: Afternoon Break and 5:00 - 7:00 pm

Tuesday, September 9: 8:00 - 9:00 am and during Morning and Noon Breaks

Presenters are requested to attend their posters for discussion during the allotted times.

Special Events

The Society of Mineral Museum Professionals will sponsor a Reception in conjunction with the Poster Session Monday, September 8 from 5:00 to 7:00 pm in the Lobby of the Green Center.

The Denver Museum of Nature and Science will sponsor the Closing Banquet on Tuesday, September 9 from 6:30 to 9:00 pm at the Museum.

Commission Meetings

The Commission on New Minerals, Nomenclature and Classification (CNMNC) will meet on Monday, September 8 at 5:00 pm in Petroleum Hall of the Green Center.

The Commission on Museums will meet on Tuesday, September 9 at 5:00 pm in Petroleum Hall of the Green Center.

TECHNICAL SESSION PROGRAM

6th International Conference on Mineralogy and Museums • September 7-9, 2008
Green Center, Colorado School of Mines, Golden, Colorado USA

----- SUNDAY, SEPTEMBER 7, 2008 -----

3:00 pm – 6:00 pm **Registration**
CSM Geology Museum

6:00 pm – 8:00 pm **Welcoming Reception**
CSM Geology Museum

----- MONDAY, SEPTEMBER 8, 2008 -----

8:00 am **Registration and set up of poster papers**

9:00 am **Welcoming Remarks and Announcements**

Session I: Chair, Dr. Lydie Touret

9:10 am **Influence of Clay in Pyrite Oxidation/Hydrolysis and Implications for Storage**
Chris Tacker, USA

9:30 am **Agents of Deterioration**
Jean DeMouthe, USA

9:50 am **Moving Specimens**
Penny Williamson, Australia

10:10 am **Expanding Collections Access: The Online Sample Curation System**
Carl Francis, Kerstin Lehnert, & Charles Langmuir, USA

10:30 am **Coffee Break and set up of poster papers**

Session II: Chair, Dr. Carl Francis

11:00 am **Amazing New Minerals: Freak of Nature or the Key for Solution of Nature Enigmas?**
Igor Pekov, Russia

11:20 am **Flashes of Colour: Stones and Wines of Legend**
Gian Carlo Parodi, Agnes Fougeron, & Gérard Ferriere, France

11:40 am **Finish set up of poster papers**

12:00 **Buffet Lunch**

1:00 pm **Group Photo**

Session III: Chair, Dr. Jeffrey Post

1:20 pm **From "Green Earth" and "Green Sand" to Celadonite and Glauconite - Almost 200 Years of Mineral Concept Evolution**
Erzsébet Toth, Tamás Weiszberg, & Dana Pop, Hungary

1:40 pm **The Relationship Between Phosphofibrite and Meurigite**
Anthony Kampf, Uwe Kolitsch, USA

2:00 pm **Crystal-Chemical Relationships Between Beta-Fergusonite-(Y) and Related Phases from Mount Cervandone and Genetic Implications**
Alesandro Guastoni, Fernando Cámara, & Fabrizio Nestola, Italy

2:20 pm **Mineralogical and Geochemical Features of Romanian Gold**
Dana Pop, Bogdan Constantinescu, Mihály Pósfai, Péter Pekker, Adrian Vasilescu, & Daniele Ceccato, Romania

2:40 pm **Coffee Break**

Session IV: Chair: Dr. Tony Kampf

3:10 pm **Synchrotron X-ray Diffraction Study of the Structures and Behaviors of Phylломanganates**
Jeffrey Post & Peter Heaney, USA

3:30 pm **Gold-Bismuth-Tellurium Mineralization at Maldon, Victoria, Australia: A Classic Locality Revisited**
Cristiana Ciobanu & Bill Birch (*presenter*), Australia

3:50 pm **21st Century Brazilian Minerals**
Daniel Atencio, Brazil

Session V: Chair, Dr. Bill Birch

4:10 pm **The IMA-CNMNC Dominant-Constituent Rule Revisited and Extended**
Frederick Hatert & Ernst Burke, Belgium

4:30 pm **New Minerals Related to Tourmaline and Possible Implications on Nomenclature**
Stuart Mills & Lee Groat, Canada

4:50 pm **Memorial to Dr. Joseph A. Mandarino**

5:00 pm – 7:00 pm **Poster session and SMMP Reception**
Reception sponsored by The Society of Mineral Museum Professionals (SMMP)

----- **TUESDAY, SEPTEMBER 9, 2008** -----

8:00 am **Poster session**

Session VI: Chair, Dr. Bruce Geller

9:00 am **Fluorescent Properties of Minerals From Darai-Pioz Massif, Tien-Shan Mts, Tajikstan**
Dmitriy Belakovskiy, Natalia Pekova & Viktor Rasulov, Russia

9:20 am **Spreading the Gospel of Glow**
Paul Carr, Earl Verbeek, Richard Bostwick, & Tema Hecht, Australia

9:40 am **Report of the 2007 German Antarctic Meteorite Expedition to Queen MaudLand, East Antarctica**
Jochen Schlüter, Germany

10:00 am **Evolution of a Museum Gemstone Research Project, Over 35 Years of Technological Advancement: The Story of Barrington Ruby Mine, Australia**
Frederick Lin Sutherland & Gayle Webb, Australia

10:20 am **Coffee Break**

Session VII: Chair, Dr. George Harlow

10:30 am **The Argyle Diamonds Pink Diamond Collection at the Western Australian Museum**
Peter Downs & Alex Bevan, Australia

10:50 am **Building Stones in the City of Bonn – A Project of the Mineral Museum of Bonn, Germany**
Renate Schumacher & Ingo Braun, Germany

11:10 am **The Royal Museum Project**
Vicen Carrio & Peter Davidson, UK

11:30 am **Museum Web Outreach Combining Research with Collections**
George Harlow, USA

11:50 am **Buffet Lunch, Poster Session**

Session VIII: Chair, Dr. Tamás Weiszbürg

12:50 pm **Long Term Viability of Small Mineral Museums, Step 1: Building a Constituency**
Virgil Lueth, USA

1:10 pm **The Afghan Geological Survey Museum – A Phoenix Rising from the Ashes**
Brian Jackson, UK

1:30 pm **The Beginning of Mineralogy in Eastern North America**
[presenter] Lydie Touret, France

Session IX: Chair, Dr. Virgil Lueth

1:50 pm **Natural History Museum in Magadan, Russia and Its Role In Region's Life**
Anna A. Plyashkevich & Lidia A. Trushnina (*presenter*), USA

2:10 pm **Field Trips in Transbaikal and Baikal Regions: for Mineralogists, Gemologists, and Museums**
Maria Alferova & Brian Jackson, Russia

2:30 pm **Two Major Discoveries Concerning the “French Blue” Diamond at the MNHN in Paris: A Forensics Tracing of the “Hope” Diamond**
Francois Farges, Scott Sucher, & Jean-Marc Fourcault, France

2:50 pm **Coffee Break and Begin Poster Removal**

Session X: Chair, Dr. Jean DeMouthe

3:20 pm **GIA's Edward J. Gübelin Memorial Gem Database: A New Gemological Resource**
Mark Mauthner, Elise Misiorowski, & James Shigley, USA

3:40 pm **Robert B. Ferguson Museum of Mineralogy: Past and Present**
Anton Chakhmouradian & Ekaterina Reguir, Canada

4:00 pm **The Camillo Gualteroni Collection: A Time Capsule from one Century Ago**
Federico Pezzotta, Renato Pagano (*presenter*), & Alessandro Guastoni, Italy

4:40 pm **Announcements, Closing Remarks, & Poster Removal**

5:30 pm **Reception and Dinner at the Denver Museum of Nature and Science**
Buses leave from the Green Center

----- **ADDITIONAL PICK-UP TIMES & LOCATIONS** -----

5:40 pm Table Mountain Inn
5:45 pm The Golden Hotel
6:00 pm Hampton Inn
6:30 pm Reception
7:00 pm Dinner
8:00 pm Viewing of Gems & Minerals Collection
9:00 pm Depart Museum – return to pick-up locations

~ Reception and Dinner sponsored by: Denver Museum of Nature and Science ~

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ORAL PRESENTATION ABSTRACTS

Field Trips in Transbaikal and Baikal Regions: for Mineralogists, Gemmologists and Museums

Maria Alferova¹ and Brian Jackson² - alferova@fmm.ru

¹Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russian Federation;

²National Museums Scotland, Edinburgh, United Kingdom

The Transbaikal and Baikal regions in Russia attract museums, mineralogists, and gemmologists from all over the world for their significant list of gemstones, collection mineral specimens, decorative and ornamental stones. The region was known as a gem-producing one in ancient times, and despite its long mining history, it remains the same until nowadays. While the old deposits and mines are exhausted, the new ones are discovered. The origin of the gemstones at the deposits represent a wide range of processes from magmatic to post-magmatic, metasomatic, and metamorphic ones.

A review obtained during a joint gemmological and mineralogical collecting field trip to the Transbaikal and Baikal regions, including mines at Malkhan, Sherlova Gora, Spokoininskoye, Orlovka, Adun-Chelon and Slyudyanka deposits, held in 2006. The trip itinerary covered a large region between Lake Baikal on the northwest and the Russian-Mongolian and Russian-Chinese borders, and included up to 10 mineral localities from small pits to huge active deposits.

The data presented are considered in scope of collecting: modern state of objects, i.e. mines and quarries current accessibility, gem and mineral stuff availability and quality, mining equipment required for collecting, material suitability for museums and local mineral museums, collectors and cutters.

An accent made on Transbaikal deposits: Malkhan granitic pegmatites with polychromatic tourmaline, hambergite, spessartine, Adun-Chelon National resort with classic granite pegmatites, Sherlova Gora post-granite metasomatic rocks with gem beryl and topaz, and Orlovka deposit with peculiar amazonite. For each one there is given brief geological background, description of minerals of interest, their location and genesis.

Baikal region deposits visited during the field trip covered the source of collection specimens of apatite at Slyudyanka mine, the red spinel locality at the Pereval marble quarry, and the Malo-Bystrinskoye deposit of lapis-lazuli.

Besides the main deposits and localities visited, there are briefly described local geological and mineralogical museums and exhibitions such as Geological museum in Chita and Zhigalov's private mineral museum in Slyudyanka.

Maria Alferova is a mineralogist and gemmologist from the Fersman mineralogical museum in Moscow. Her area of interest is gemstones collection, testing, and teaching. She was a lecturer of gemmology at Moscow State University during last five years and an organiser of mineralogical and gemmological field-trips to different parts of Russia. Maria gave talks and presented posters at IMA-2002, 32IGC-2004, MM5 and was invited as a guest speaker to Gem-A branch conferences in 2005 and 2006.

21st-Century Brazilian Minerals

Daniel Atencio, *Mineralogia e Geotectônica, Instituto de Geociências – USP, São Paulo, Brazil*
datencio@usp.br

Until the end of the 20th century, 39 Brazilian valid type minerals were known. 20 of these were published before the existence of IMA: chrysoberyl (1789), euclase (1792), palladium (1803), joséite (1853), goyazite (1884), derbylite (1895), tripuhyite (1897), senaite (1898), florencite-(Ce) (1899), gorceixite (1906), brazilianite (1945), souzalite (1947), scorzalite (1947), frondelite (1949), faheyite (1953), moraesite (1953), barbosalite (1954), tavorite (1954), arsenopalladinite (1955), and uranmicrolite (1957). After the CNMMN (today CNMNC) – IMA was established (1959) and before 2001, 20 mineral species were approved and 19 remain valid: tantalaeschynite-(Y) (IMA number 69-043), atheneite (73-050), isomertieite (73-057), bahianite (74-027), whiteite-(CaFeMg) (75-001), whiteite-(MnFeMg) (75-001), palladseite (75-026), bariomicrolite (pyrochlore-group nomenclature system), lanthanite-(Nd) (79-074), minasgeraisite-(Y) (83-090), parabariomicrolite (84-003), lanthanite-(La) (rare-earth minerals nomenclature system), zanazziite (86-054), arupite (88-008), yanomamite (90-052), quintinite-2H (92-028), serrabrancaite (98-006), fluornatromicrolite (98-018), and dukeite (99-021). Staringite (69-010), the first Brazilian mineral approved by IMA, was officially discredited in 1992. The redefinition of arsenopalladinite was published in 1974 with CNMMN – IMA approval. The number of type minerals from Brazil approved in the last five years (2003 to 2007) greatly increased: 11 (2.2 per year) against 19 from 1959 to 2002 (0.43 per year). The 21st century Brazilian minerals are: coutinhoite (2003-025), lindbergite (2003-029), oxykinoshitalite (2004-013), atencioite (2004-041), kalungaitite (2004-047), matioliite (2005-011), menezesite (2005-023), arrojadite-(PbFe) (2005-056), ruifrancoite (2005-061), guimarãesite (2006-028), and bendadaite (98-053a, co-type, approved in 2007). The complete description of fluornatromicrolite was never published. Probably this mineral and also uranmicrolite and bariomicrolite will no longer survive due to the new nomenclature rules for pyrochlore-group minerals currently under construction. In this case the number of valid species from Brazil will decrease to 47. Unfortunately in 2003 two mineral names were introduced in the literature for ill-defined materials without IMA approval. The Brazilian type mineral arrojadite became a group of minerals in 2005. Recently the doubtful minerals giannettite and lewisite were officially discredited as identical to hainite and Ti-bearing roméite respectively (IMA 06-C).

Daniel Atencio is a professor of mineralogy at the Geoscience Institute of the University of São Paulo, Brazil, and the Brazilian representative on the CNMNC - IMA. The mineral name atencioite honors Daniel Atencio. He is author of chernikovite, coutinhoite, lindbergite, matioliite, menezesite, ruifrancoite, footemineite, guimarãesite and bendadaite.

Fluorescent Properties of Minerals from Darai-Pioz Massif, Tien-Shan Mts, Tajikistan

Dmitriy Belakovskiy, Natalia Pekova¹, and Viktor Rasulov²
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Darai-Pioz massif located at the merge of Alay, Gissar and Zeravshan Ranges of South Tien-Shan Mts. in Tajikistan carries unique alkaline mineralization. It is a type locality for a number of endemic minerals (darapiozite, tienshanite et. al). A number of minerals known in other places were found here in exceptional quality specimens (stillwellite-(Ce), sogdianite, baratovite, hyaloteckite etc.). For the last decade more than a dozen new mineral species have been discovered here by the Fersman Museum staff. A remarkable feature of the Darai-Pioz massif is an abundance of brightly fluorescent minerals. By that this place can compete with well known sources of fluorescent minerals such as Franklin, NJ, USA or Langban, Sweden. Different combinations of fluorescent minerals provide beautiful multicolored specimens. The spectra of fluorescence (380-830 nm) were obtained using SVD-120 UV lamp and laser LGI-505 with a wavelength 337.1 nm for more than 30 fluorescent species from Darai-Pioz. For many of them (berezanskite, shibkovite, kapitsaite-(Y), turkestanite and others) those spectra have been collected for the first time. Most of specimens from which the data were taken from are from the Fersman museum collection. For all investigated minerals the colors of fluorescence for different wavelengths are given along with luminogen elements where determined. In some cases the xenogenic fluorescence was detected (reedmergnerite, some baratovite). The types of associations and associated fluorescent minerals are described. The data obtained are being used for developing a fluorescent exhibit at the Fersman Mineralogical museum RAS.

Dmitriy Belakovskiy was born in 1957 and graduated from Moscow Geology-Prospectal Institute in 1979. From 1979-1989 he did research and taught as the chair of mineralogy and mineralogical museum of Geology-Prospectal Institute (now Vernadskiy State Geological Museum). From 1989 to the present he has been curator of the Fersman Mineralogical Museum RAS, Moscow, Russia.

Spreading the Gospel of Glow

Paul Carr¹, Earl Verbeek², Richard Bostwick², and Tema Hecht²

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²Sterling Hill Mining Museum, Ogdensburg, New Jersey, USA

Whether we are mineral professionals, amateur enthusiasts, or museum visitors, most of us clearly remember our first view of a fluorescent mineral display. Almost invariably, we recall seeing samples that in white light are basically unattractive, but which under ultraviolet light are transformed into fascinating, glowing, brightly-colored objects. Fluorescent minerals are not only visually engaging, but they have also been the hook that launched many an earth-science career. Even the technology-savvy youngsters of today who are accustomed to the gadgetry of a PlayStation® or Xbox® are fascinated and impressed by the transformation induced by a simple change in light-source. The spectacular and magical change does indeed test the adage that “seeing is believing”.

Apart from the specimens, the most important feature of any display is lighting. This is particularly important for fluorescent minerals because displays may require lamps that produce both visible light and one or more wavelengths of ultraviolet light. Until recently, fluorescent displays were limited to lamps emitting either 254 nm shortwave ultraviolet light or 366 nm longwave ultraviolet light. Display lamps emitting ~300 nm midwave ultraviolet light, and 350 nm longwave ultraviolet light are now available, and for some minerals these additional wavelengths produce markedly different fluorescences. In addition, filters on shortwave ultraviolet lamps have much longer life than in the past, and advances in fluorescent tubes have led to more powerful display lamps capable of illuminating large displays at distances of several feet.

Perhaps the most exciting recent developments are the introduction of LED lamps that emit light at almost any desired wavelength of longwave ultraviolet light, and the promise of LED lamps emitting light of shorter wavelengths soon coming into production. As the technology evolves, such LED display lamps will become widely available and will provide exciting possibilities for fluorescent displays. The number of displayable fluorescent minerals should greatly increase because many minerals fluoresce brightest in some wavelength that conventional ultraviolet light lamps cannot produce, and so are not currently exhibited. In addition, these LED lamps can be configured to illuminate a broad area or provide a narrow beam, the latter allowing for illumination of individual specimens in a display. Most appealing of all, however, is that LED ultraviolet light sources eliminate the need for filters, currently the most expensive (and perishable) component of conventional display lamps. The next decade promises to be an exciting time for aficionados of fluorescent minerals.

Paul has spent over thirty years in the University system undertaking teaching and research in geology with particular reference to minerals and their formation

The Royal Museum Project

Vicen Carrió and Peter Davidson

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The Royal Museum is part of the National Museums of Scotland and houses collections of national and international significance, which illustrate the richness of world cultures, art & design, natural sciences and science & technology.

However, our National Collections no longer have an adequate home in the Royal Museum; valuable exhibition space is given over to storerooms and is closed to visitors; displays have become dated; the building has restricted access, and circulation is poor throughout.

The Royal Museum Project (RMP) will:

Create a new entrance at street-level with a shop, restaurant and schools facilities

Develop new displays to make the collections more accessible with an enlarged Special Exhibitions space to house international quality exhibitions

Facilitate Discovery Centres for Natural History and Art & Design and a Learning Centre with lecture theatre, three learning studios and break-out spaces directly linked to the main galleries

An Information Centre and café on the first floor North balcony which will link with a new Research Library on the 1st floor West Wing.

22 new galleries are in process of being created in this project from which 6 are Natural World Galleries.

The reorganisation will create two strong vertical gallery stacks: gallery stack 7 will be Amazing Earth: making sense of the planet, and gallery stack 8 will be Amazing Life: diversity, evolution and adaptation in the natural world.

Earth in Space occupies the ground floor of stack 7, and introduces the origins of the Earth and the universe. Directly above, on the first floor, is Earth Works, about our dynamic and habitable planet. On the second floor, families and school groups will find the discovery gallery Adventure Planet.

Gallery stack 8 features the dramatic Life Links array of specimens in its central atrium; visitors can observe this three-dimensional display of the diversity of animal life at close range as they move upwards in the gallery stack. The animals are interpreted within the context of each of the three galleries: on the ground floor as animal adaptations in Life Works, in Animal Senses and Communication on the first floor, and in the context of Survival on the second floor. The first- and second-floor galleries have perimeter displays housing additional specimens and interactives. Large-scale live-action ‘Animals in Action’ film footage, visible from all floors, animates the Life Links array with dynamic images of the different movements, functions and behaviour of animals.

Vicen Carrió, originally from Spain, landed in Scotland temporarily for 6 months and but has now been working in the geology section of NMS for 14 years! Vicen works in conservation and preparation and was involved in the development of the Museum of Scotland in 1997-98. She is now heavily engaged in the development of the new Royal Museum Project due to open in 2011.

Robert B. Ferguson Museum of Mineralogy: Past and Present

Anton Chakhmouradian and Ekaterina Reguir
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The history of Robert B. Ferguson Museum of Mineralogy at the University of Manitoba can be traced back to a collection of some 1100 specimens of minerals and rocks donated to the University by Joseph W. Spencer in 1918. In addition to Spencer's donations, some of which date back to the 1870s, the Museum is home to some 250 vintage specimens from Franklin, Cumberland and several other long-inactive mining districts, which were donated by F.L. Nason, W.J. Trethaway and several other prominent geologists in the late 1920s. This collection received museum status in 1971 and some twenty years later was renamed in honor of Professor Emeritus Robert Bury Ferguson, who was instrumental in organizing and displaying the Museum collection, and led mineralogical research at the University of Manitoba through four decades of rapid growth to its present level of excellence recognized far beyond Canada's borders. Since its inception, the Museum collection has grown to become the largest non-private mineral collection in central Canada, comprising about 7800 specimens representing 1,000 mineral species. The collection has been growing principally through private donations, purchases, exchanges with other institutions and selective addition of specimens brought back by our students and staff from their field trips. About 15% of the mineral collection makes up a systematic exhibit in the hallway of Wallace Building (Fort Garry campus). The exhibit, which was initially developed by Iva and Petr Černý, consists of 30 display cases where minerals are arranged from the most chemically and structurally simple to progressively more complex. The displays also provide information on the crystal morphology, structure, occurrence and practical significance of the most common and most interesting minerals. The primary purpose of this exhibit is to assist students in learning the undergraduate course material (mineralogy, petrology, mineral optics and gemology) and to introduce casual visitors to the diversity and beauty of the mineral kingdom. Large display cabinets in the atrium of Wallace Building house some of the most spectacular pieces from the collection, including "oversize" specimens of pegmatitic minerals from the Tanco mine (Manitoba) and the recent donation of zeolite specimens from the Deccan traps from the Hasler family. In addition to the systematic collection, the Museum is also home to two thematic paragenetic collections, "Granitic Pegmatites" and "Alkaline Rocks, Carbonatites and Kimberlites", which are used for research and instruction in graduate courses.

Anton Chakhmouradian obtained his PhD from St. Petersburg State University in Russia in 1997. Presently, he is Associate Professor of Mineralogy at the University of Manitoba (Winnipeg, Canada) and Curator of the Robert B. Ferguson Museum of Mineralogy, which is the largest non-private mineral collection in central Canada. Anton's expertise is in the area of alkaline rocks, carbonatites, kimberlites, collection management, and gemstone deposits.

Gold-Bismuth-Tellurium Mineralisation at Maldon, Victoria, Australia: A Classic Locality Revisited

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Australia's first new mineral species was discovered in the Maldon goldfield in central Victoria during the 1860s. However, since George Ulrich's original 1870 description and naming of maldonite, Au²Bi, there has been no detailed systematic examination of the complex mineralogy of the quartz reef system in which it occurs. In part this is due to the small amount of preserved material representative of the original mineral assemblages. Various mining companies have attempted to reopen the old underground workings but have failed to discover the rich mineralisation of early times.

The Maldon goldfield is located within the contact aureole of the Late Devonian Harcourt Granite, and consists of quartz reefs hosted by Ordovician metasediments. The extent to which granite intrusion has remobilised any earlier Au-Bi mineralisation in the quartz reefs has been the subject of some discussion. The present authors have reinvestigated museum specimens collected during the original mining and have found a much more diverse Au-Bi-Te assemblage than previously recognised. Dominant native gold and bismuth are accompanied in variable proportions by maldonite, joséite-A, joséite-B, bismuthinite, jonassonite, aurostibite, hedleyite and unnamed Bi₃(Te,S)₂. These minerals occur as millimetric patches within quartz veinlets and adjoining chloritised host rock, with maldonite, in particular, occurring mainly as relicts within coarse symplectites of Au and Bi; the latter are considered the result of maldonite breakdown below 113 °C. However, the preservation of larger masses of unaffected maldonite adjacent to such symplectites suggests either (i) the presence of two structural modifications, i.e., high- and low-T; or (ii) the breakdown of maldonite is not a down-T reaction as shown on the Au-Bi phase diagram. Transmission electron diffraction will be employed to check the structural status of maldonite in these samples.

The interpretation of textural relationships in the light of knowledge of the experimental Au-Bi-Te system leads to the conclusion that an original reduced Au-Bi-Te-S assemblage that formed by exsolution of melts from fluids was remobilised during contact metamorphism. This event, in which bismuthinite clearly replaced former Bi-minerals, may also account for an enrichment in S-bearing Bi-minerals, e.g., joséite-A, joséite-B and jonassonite, in the associations.

William (Bill) Birch is Senior Curator in Mineralogy & Petrology at Museum Victoria, where his main research has focused on the secondary mineralogy of oxidized zones, in particular that of Broken Hill, NSW. The diverse mineralogy of Victorian occurrences, including their historical aspects, also provide him with inspiration. Descriptions of 28 new minerals and 6 Victorian meteorites are amongst his diverse publications. Bill also has ongoing roles with the International Mineralogical Association and the Geological Society of Australia.

Agents of Deterioration

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A cool, dry, pest-free, secure, and stable environment is crucial for the long-term storage of any geologic collection. Geologic collections may seem to be more stable and less susceptible to deterioration than other types of natural history collections, but there are a number of factors that can contribute to the degradation of some specimens or entire collections.

Deterioration of objects and materials can be divided into three basic categories: physical, chemical, and biological.

Physical deterioration includes changes in shape (shrinking, swelling, warping) and various forms of structural damage, such as breakage, tearing, or abrasion. Some minerals and rocks are particularly susceptible to moisture and light damage. Improper handling and inappropriate storage can also cause physical damage.

Some minerals are prone to change through chemical reaction. Metals may oxidize or tarnish, and photochemical reactions may alter some substances. The addition or removal of moisture from a specimen may affect its appearance, structure, and long-term stability. Pollutants, in the form of gases or particulates, may also react with some minerals and storage materials.

Biological deterioration is caused by the activity of animals like rodents and insects, and by the presence of fungi (mold, mildew). Pests may not be attracted to geologic specimens, but they can cause damage to documents and other ancillary collections. Their presence can also produce chemical changes in storage environments.

Some agents of deterioration work together to cause damage. Although temperature alone may not affect a mineral, it does affect how much moisture a mass of air can hold. Warm, moist spaces are more likely to attract pests and promote the growth of fungus. Moist air and/or heat can accelerate some chemical processes such as corrosion and oxidation. Light often comes from sources that also produce heat.

The ideal environment for one mineral may not be ideal for others. Metals are best kept very cold and dry, while other species are better off in a warmer and slightly moister climate. So museum storage often involves compromise. Extremely sensitive specimens can be isolated in micro-climate containers or cabinets.

The stability of the environment is in some ways even more important than achieving the ideal temperature and humidity levels. Rapid changes in environmental conditions over a period of time can cause significant damage to a collection.

Jean DeMouthe is Senior Collections Manager for Geology at the California Academy of Sciences in San Francisco, where she has worked for over 30 years. She also teaches collections management and specimen conservation in the graduate Museum Studies Program at San Francisco State University and works as a consulting engineering geologist.

The Argyle Diamonds Pink Diamond Collection at the Western Australian Museum

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Diamond discovery in Western Australia has had a long and sporadic history. The first alluvial diamonds were discovered in 1895, at Nullagine, in the Pilbara region of Western Australia. But it was not until the discovery of the diamondiferous Argyle (AK1) lamproite pipe in the Kimberley region, in October, 1979, that Western Australia rose to world prominence as a diamond producer. The Argyle Mine is famous for its pink diamonds of various hues, which are highly valued gems. In 2003, a representative collection of several hundred coloured diamonds was generously donated to the Western Australian Museum by Argyle Diamonds. This collection comprises twenty-eight parcels of faceted pink and other coloured stones from the Argyle Mine, weighing 13.73 carats in total. Twelve large pink diamonds, with individual weights between 0.16 and 0.58 carats, form the focal point of the collection. These stones have been cut in a variety of shapes including, Brilliant, Oval, Marquise, Emerald and Triangular, and range in colour from light or pale pink to purplish pink. A few of the stones are brownish pink, and two are pink 'champagne' in colour. The largest diamond is an intense brownish pink, pear-shaped diamond containing an inclusion. Four rough pink diamonds (octahedral crystals) of different hues are also included in the collection, along with several hundred pink melee diamonds, each less than a few points in weight, that range from strongly coloured to faint pink in hue. The addition of two white diamonds and two champagne-coloured diamonds, at either end of the intensity scale, means that the collection is representative of the full range of colours present in the Argyle diamonds.

The current total market value of the stones is more than \$AUD 200,000, although their actual value as a collection of pink and comparative diamonds far exceeds the sum of their individual parts. The collection, representing the largest of its kind in any public museum in Australia, went on display in the "Diamonds to Dinosaurs" Earth sciences gallery at the Western Australian Museum in October, 2006.

Peter Downes is the Edward Simpson Curator of Minerals and Meteorites at the Western Australian Museum in Perth, Western Australia. His research interests include kimberlites and associated alkaline igneous rocks, and secondary minerals from the oxidised zones of Western Australian mineral deposits.

Two Major Discoveries Concerning the “French Blue” Diamond at the MNHN in Paris: A Forensics Tracing of the “Hope” Diamond

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During the new inventory of the mineral collection of the Muséum national d'Histoire naturelle in Paris, we found a previously unknown lead model of the “French Blue”, the mythic blue diamond of the French Crown Jewels. Until 2008, this diamond was known only from a 1749 drawing of the emblem of the Golden Fleece of King Louis XV of France. This diamond was unfortunately stolen in 1792 during the French Revolution and illegally exported to London. Then, the diamond is believed to have been recut into the “Hope” diamond, which appeared in 1812. To prove this, 3D models of both models are required to verify this assertion.

Unfortunately, the previous models of the “French Blue” cannot be accurate because of the clear distortions in the 1749 drawing. Those distortions can well be detected in the other gems shown in this drawing, mainly the “Cote de Bretagne” 107 carat “ruby” (in fact, a spinel). In contrast to the “French Blue”, this spinel has been recovered intact from the robbers, in 1815.

Accordingly, the analysis of the lead model reveals differences in the cut (facet pattern, and girdle, crown, and pavilion thicknesses) that could not have been inferred from this drawing. The model shows much more faces than the drawing, resulting in a much more complex gemstone, highlighting the masterpiece cut by Pitau, Louis XIV's Court gem-cutter.

The diamond was virtually reconstructed using the latest 3D CAD rendering and optical technologies by using the color profile of the Hope diamond. For the first time, this mythic gem is accurately recreated. We also virtually reconstructed the emblem of the Golden Fleece of King Louis XV of France, the masterpiece of the French Crown Jewels, which held the French Blue diamond.

Finally, the Muséum label for this model, donated by Charles Achard, the highest authority in Paris about gems at this time, clearly mentions that Henry Philip Hope possessed the “French Blue” diamond, i.e., before it was secretly re-cut into what will later become the “Hope” diamond. This information is not at variance with previous reports, suggesting that the London jeweler Daniel Eliason was the first owner of the recut diamond. Re-analysis of those ancient documents demonstrates that, in fact, no owner is clearly established for this diamond. This second set of discoveries then suggests unsuspected connections of Henry Philip Hope with the “French Blue” diamond.

Francois Farges is professor of environmental mineralogy at Stanford and at the Muséum national d'Histoire naturelle in Paris where he is the curator in charge of the French national mineral and gem collection. Scott Sucher is an expert lapidarist and historian of past cutting techniques from New Mexico, running the museumdiamond.com web site. Jean-Marc Fourcault is the collection manager at the Muséum in Paris.

Expanding Collections Access: The Online Sample Curation System

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The Department of Earth & Planetary Sciences of Harvard University holds distinct collections of minerals, gems, igneous and metamorphic rocks, sedimentary rocks, ores, building stones, and meteorites that have separate histories and methods of numbering and cataloguing specimens. The mineral collection of ~ 70,000 specimens is the most significant and best documented. Mineral specimens are catalogued in an electronic database that was established in the 1980s and completed by 1997, replacing older card files and ledgers. Since its initiation, the catalog database has migrated across six different software programs on four different computer platforms. It currently resides in a relational database (SuperBase) on the curator's laptop. In its present state, the database is not networked, and can only be accessed by the curator.

In order to expand access to the database not only to the entire Harvard University community, but also to the general public, we are collaborating with the Geoinformatics for Geochemistry (GfG) program of Columbia University to develop an Online Sample Curation System (OSCS). The main advantages of this solution over commercial databases are lower costs, especially the annual licensing fees, the benefits of working in a professional geoscience environment, and the services of the GfG Program, which will provide operation and maintenance of the OSCS database and the public and administrative web interfaces, including server maintenance and risk and contingency management. The department will not need to maintain any information technology infrastructure (hardware, software, staff for database and web site administration) beyond desktop or laptop computers with an internet browser.

The project stages for the OSCS development consist of building the sample database, migrating the specimen data, building a public web interface, and finally building an administrative web interface for adding and editing records. The project will continue by expanding the database to incorporate all of the Harvard collections of geological specimens, especially rocks and ores.

All specimens in the OSCS database will be registered with the System for Earth Sample Registration SESAR, www.geosamples.org to obtain International Geo Sample Numbers (IGSN) as globally unique sample identifiers and to make specimen information available at the SESAR Global Sample Catalog.

A prototype of the OSCS will be demonstrated at the meeting.

Carl Francis received his Ph.D. in mineralogy from Virginia Polytechnic Institute & State University in 1980. He has curated the Harvard University mineral, gem and meteorites collections since 1977 and recently taken responsibility for the rock and ore collections. He also teaches in the Harvard University Extension School's Museum Studies program.

Crystal-Chemical Relationships Between Beta-Fergusonite-(Y) and Related Phases from Mount Cervandone and Genetic Implications

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An arsenic-rich beta-fergusonite has been collected at Mount Cervandone (Verbano-Cusio-Ossola, Devero valley, Western Alps, Italy). Its crystal structure has been determined by single crystal X-ray diffraction, space group I2/a with unit-cell parameters $a = 5.1794(14)$, $b = 11.089(3)$, $c = 5.1176(14)$ Å, $\beta = 91.282(8)^\circ$, and $V = 293.87(14)$ Å³. Its chemical composition analyzed by Electron Microprobe is $(Y_{0.70}Dy_{0.07}Er_{0.05}Ca^{2+}_{0.05}Gd_{0.02}Tb_{0.01}Yb_{0.01}Th^{4+}_{0.01}U^{4+}_{0.02})_{\Sigma=0.94} (Nb^{5+}_{0.68}As^{5+}_{0.27}W^{6+}_{0.06}Ta^{5+}_{0.01}Si^{4+}_{0.01})_{\Sigma=1.03}O_4$. It occurs as pseudo-bipyramidal crystals up to 1 mm length, green-yellow in colour. Beta-fergusonite-(Y) shows an extended solid solution of arsenic in the beta-fergusonite structure, while the complete substitution leads to a different structure in chernovite-(Y). The study of the crystal structure also sheds light on the stability of the monoclinic polymorph of fergusonite and formanite-(Y).

Beta-fergusonite-(Y) is associated with orange-yellow barrel-shaped pseudo-hexagonal synchysite-(Ce) $[Ca(Ce, La)(CO_3)_2F]$ crystals, up to 2 mm in length. Beta-fergusonite-(Y) occurs in alpine fissures which intersect pegmatite dikes, hosted in two-mica fine-grained leucocratic gneisses of Mount Cervandone, which can be described as metamorphosed leucogranitic-aplitic rocks. The pegmatites show an unequivocally strong NYF (niobium-yttrium-fluorine) geochemical signature represented by the occurrence of a unique mineralogy including aeschynite-(Y), agardite-(Y), Nb-rich anatase, cervandonite-(Ce), chernovite-(Y), crichtonite-senaite group minerals, fergusonite-(Y), fluorite, gadolinite-(Y), monazite-(Ce), paraniite-(Y), Nb-rich rutile, synchysite-(Ce), and xenotime-(Y) (Guastoni et al., 2006).

Alessandro Guastoni is Museum Curator at the Department of Geoscience at the University of Padova. His field of research is focused on mineralogy and geochemistry of pegmatites mainly occurring in the Alps.

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Museum Web Outreach Combining Research with Collections

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Museum collections are under constant scrutiny concerning their utility and relevance to society as well as to museums. Likewise, curators must balance collection activities with science, exhibition and programs. As museums market themselves to wider audiences, the web has become an important vehicle for outreach that mineral curators struggle to employ, typically because of limited resources rather than limited interest. To bridge the gap between minimal content and complete web access to an online collection database and integrated scientific content, we have begun some pilot projects to develop websites to present a combination of specimen information and scientific research. The goal is to build platforms to test the presentation of integrated collections, research, scientific, and contextual content. After "publication" we will assess the success of these platforms and make changes to address our own critiques and those of the public. We will then use the improved platforms as templates for expanding the content with the expectation of growing to on-line access to some of the database. Two initial projects are under development:

Jade Research and Collections: As part of an NSF-funded project on the petrogenesis of jadeitites from Guatemala, the outreach portion includes development of a website to present the research results as well as inform the more general public about jadeite rock, jade, and its context. A platform is being developed which will present an overview of the project, pre-publication results in a running poster-like format, some expedition travelogues, and an integration of sample information. Samples will be presented with macro-, micro-, BSE, and CL images, location keyed to maps, compositional information from trace-element, mineral, whole-rock, and isotopic analyses. A pathway will be developed for researchers to log in to request samples that we have finished first-pass studies.

Mogok Gem Tract, Myanmar: An analogous approach is underway with some 600+ samples in the Mineral collection from Mogok, even though research has not been supported by extramural funding. By using the "Jade" site as a partial template, we can build a site without as much financial investment.

A preliminary tour through one of the sites will be presented.

George Harlow is Curator of Minerals and Gems in the Department of Earth and Planetary Sciences at the American Museum of Natural History. His main areas of research are the mineralogy and petrogenesis of jadeitites, the mineralogy of the Mogok Stone Tract, Myanmar, and the crystal chemistry of large-ions in high pressure minerals. He is the curator of the major traveling exhibition *The Nature of Diamonds*, has participated in exhibitions on *Gold and Global Warming*, and co-authored several books on minerals and diamonds.

The IMA-CNMNC Dominant-Constituent Rule Revisited and Extended

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The criteria for the definition of a new mineral species currently used by the IMA-CNMNC involve what should now be called the rule of the dominant constituent: a mineral is a distinct species if the set of dominant constituents at the sites in the crystal structure is distinct from that of any other mineral with the same structural arrangement. The term 'constituent' may designate atoms (cations or anions), molecular groups, or vacancies.

The current dominant-constituent rule is applied in most approved new-mineral proposals. On the one hand, this rule has sometimes been applied rigorously, thus leading to some proliferation of new mineral species. On the other hand, new nomenclature systems for minerals of the arjadite and epidote groups have recently been approved by the CNMNC which do not follow the current definition of the dominant-constituent rule.

The aim of this study is to clarify, revise and extend the dominant-constituent rule, taking into account the recent problems encumbering or prohibiting a strict application of the rule. The nomenclature of members in complete solid-solution series remains in principle determined by the application of the dominant-constituent rule, but the rule has been extended with the dominant-valency rule by considering a group of atoms with the same valency state as a single constituent. The old dominant-constituent rule (with only atoms, molecular groups or vacancies as constituents) can merely be applied without problems or errors to solid-solution series involving only homovalent substitutions or singular coupled heterovalent substitutions. The extension with the dominant-valency rule is imposed by all cases of coupled heterovalent/homovalent substitutions. The application of the old dominant-constituent rule in such systems is a possible source of problems or errors, as illustrated by examples given in this study. The extension with the dominant-valency rule is necessary to establish charge-balanced end-member formulae for solid-solution series with complex substitution mechanisms.

The existence of end-members with valency-imposed double-site occupancy, produced by heterovalent substitution mechanisms, is now allowed by the new guidelines, as well as the grouping of sites with the same crystal-chemical behavior.

Frédéric Hatert is Associate Researcher at the National Foundation for Scientific Research, Belgium. He actually works at the Laboratory of Mineralogy, University of Liège. His research topics concern the crystal chemistry and stability of phosphate minerals, the systematic mineralogy of Belgium, and mineralogical nomenclature. Frédéric Hatert is Vice-Chairman of the IMA-CNMNC since 2006, in charge of nomenclature proposals.

The Afghan Geological Survey Museum – A Phoenix Rising from the Ashes

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Like other Afghan government institutions, the Afghanistan Geological Survey (AGS) was severely weakened during more than two decades of military conflict, and suffered from a lack of investment and skills development, and an inability to perform an active work programme. During the fighting between Mujahideen factions following the withdrawal of the Soviets in 1989, the AGS office stood in the front line of firing and was severely damaged. Throughout this period of conflict and during the later rule by the Taliban, the staff of the AGS salvaged and protected documents, maps and samples, often at great personal risk to themselves and their families. After the Taliban left Kabul in December 2001 these precious data were returned to the Survey.

Since 2005 a British Geological Survey project funded by the UK Department for International Development involved the institutional strengthening of the AGS. Part of this project involved the reinstatement of the AGS Geological museum and the National Museums Scotland was asked to manage this and assist in education.

The museum and the collections were to be rehabilitated and exhibitions organized for the public, schools and university students. Education of the younger generation now in Afghanistan, and those returning to Afghanistan, is of the highest importance to the country and to the future understanding of Afghan geological heritage.

AGS museum staff have not had the benefit of training and the use of up-to-date methods of collections management and conservation. For the last two decades, they have not been in contact with their colleagues around the world and the exchange of ideas and methodology that goes along with this contact.

A program of documentation was put in place and specimen handling training given. Exhibits to show the natural resources of Afghanistan were established alongside exhibits on basic geological processes and principles. An eye-catching fluorescent minerals exhibit was installed: the first in Afghanistan.

Afghanistan is an important source of gemstones and the infrastructure for gem testing and gemmological education was also established within the AGS framework.

Brian Jackson is Principal Curator and Head of Mineralogy at the National Museums Scotland, Edinburgh. He has over 40 years experience in developing exhibitions, collections management and education. During this time he has been involved in several international collaborations.

The Relationship Between Phosphofibrite and Meurigite

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Phosphofibrite, $\text{KCuFe}^{3+}_{15}(\text{PO}_4)_{12}(\text{OH})_{12} \cdot 12\text{H}_2\text{O}$, was first described from the Clara mine, Black Forest, Germany by Walenta and Dunn (1984). When Birch et al. (1996) described the new mineral species meurigite, $\text{KFe}^{3+}_7(\text{PO}_4)_5(\text{OH})_7 \cdot 8\text{H}_2\text{O}$, from the Santa Rita mine, New Mexico, they recognized the strong similarities between the species; however, they were unable to obtain phosphofibrite type material for a comparative study. They concluded that the species were probably distinct because of some differences in their powder patterns (no 14 Å line for phosphofibrite), crystal symmetries, and chemistries.

A subsequent detailed study of the possible equivalence of the species (Kolitsch, 1999) concluded that they were probably the same. In 2007 Kampf et al. determined the atomic structure of type meurigite (C2/c, $a = 29.018(5)$, $b = 5.1892(6)$, $c = 19.695(3)$ Å, $\beta = 106.987(1)^\circ$) and proposed the ideal formula $[\text{K}(\text{H}_2\text{O})_{2.5}][\text{Fe}^{3+}_8(\text{PO}_4)_6(\text{OH})_7(\text{H}_2\text{O})_4]$. They also reanalyzed phosphofibrite using the original probe mount (NMNH #150230) and showed how this as well as other subsequently published analyses for meurigites were compatible with their ideal formula. Their findings suggest an empirical formula of $[\text{K}_{0.43}\text{Ca}_{0.04}(\text{H}_2\text{O})_{3.03}]_{\Sigma 3.50}[\text{Fe}^{3+}_{6.91}\text{Cu}_{0.45}\text{Al}_{0.24}]_{\Sigma 7.60}(\text{PO}_4)_{5.41}(\text{AsO}_4)_{0.09}(\text{OH})_{6.35}(\text{H}_2\text{O})_{6.65}$ for type phosphofibrite, i.e., with < 0.5 K pfu. All previously reported X-ray powder patterns for phosphofibrite and meurigite were found to be consistent with the pattern calculated from the meurigite structure data.

We conclude: (1) phosphofibrite is isostructural with meurigite and (2) phosphofibrite is the alkali-deficient member of a series with meurigite. Taking into account the recent approval of the Na analogue of meurigite (meurigite-Na; IMA 2007-024) and the renaming of type meurigite to meurigite-K, it might be argued that these three closely related species should be named phosphofibrite-[], phosphofibrite-K and phosphofibrite-Na; however, we do not propose such renaming in the absence of a more complete study of phosphofibrite type material, involving structure analysis or at least water determination.

Dr. Kampf is curator and head of Mineral Sciences at the Natural History Museum of Los Angeles County. He joined the museum in 1977 after receiving his Ph.D. in mineralogy and crystallography from the University of Chicago. Dr. Kampf's research is principally in the areas of descriptive mineralogy, crystal chemistry and structural crystallography focusing on the characterization of new or inadequately described minerals. He was recently appointed as the U.S. representative to the Commission on New Minerals, Nomenclature and Classification.

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Long-Term Viability of Small Mineral Museums, Step 1: Building a Constituency

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The ability of a small museum to weather changes in administration, funding cycles, and current "popularity" determines the long-term viability of the collections. Most small (and sometimes large) public and private museums have very little money or political clout. Accordingly, these collections are always in danger of being sold or traded to meet financial obligations or the perceived "changes in direction" at many host institutions. This program will highlight the efforts of a number of small museums to build their constituency.

The best defense against collection "raids" is a large group of supporters, of all ages, professions, and interests. The gathering of a support group requires time and ingenuity, but will pay great dividends if collections are considered for liquidation. Constituency building is a long-term effort that requires constant adaptation and should conform to the strengths of the collections.

Local mineral hobby groups make the first, and most obvious, resource. Accordingly, museums need to "see and be seen" at local mineral shows and events. Outreach into local and regional school districts is also important. Positive educational programs customized for kindergarten through senior citizen groups should be implemented to help establish a support group not limited by age. Whenever possible, museum activities should also be provided at most local/regional events, not necessarily mineral related. Small museums should strive to provide an "event" (a show or symposium) that has an impact on local business. Local tourism programs and accessing local lodger's tax grants can help in building a successful local event directly associated with the museum. Access to local and regional "tourist" publications boosts attendance, donations, and visibility.

A proactive museum identifies its constituents and then strives to broaden the group. The larger, broader, and more educated the group, the more difficult it is for someone or some entity to "fix something that's not broken."

Virgil Lueth is the Senior Mineralogist/Economic Geologist and Curator of the Mineral Museum at the New Mexico Bureau of Geology and Mineral Resources. He received his BS in Geology at the University of Wisconsin – Eau Claire and both MS and Ph.D. at the University of Texas at El Paso. He has also worked as a field geologist for the Wisconsin Geological and Natural History Survey, United States Geological Survey, and an associate professor at Tarleton State (Texas) University. He has published over 35 articles in popular magazines and scientific journals, mainly on topics in mineralogy and geochemistry of ore deposits and edited six geologic guidebooks. His most recent research involves the geochronology and isotope geochemistry of acid sulfate minerals. He is also the general chairman of the 29th Annual New Mexico Mineral Symposium held in Socorro every November.

GIA's Edward J. Gübelin Memorial Gem Database: A New Gemological Resource

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In 2005, the Gemological Institute of America (GIA) acquired the important gem collection of the renowned Swiss gemologist, Dr. Edward J. Gübelin. This collection—consisting of over 2800 pieces, representing at least 225 gem materials and mineral species, including both important and rare gem species—was assembled by Dr. Gübelin over much of his 70-year career as of one of gemology's leading researchers. Among the conditions of the acquisition was the understanding to keep the collection intact, to use it for the benefit of the gemological sciences and to share it with members of the gemological community. To partially fulfill these obligations, the GIA has undertaken a project to fully characterize the majority of the gemstones and to make the resulting data available in a useful way via the World Wide Web. While the project was inspired in part by web sites such as that of the University of Arizona's RRUFF project, we recognized that, at present, no comparable resource of detailed information on gemstones exists on the Internet. What makes the study unique is a) the unity of its collected data, in that the same specimen was characterized by both standard gem testing methods as well as a range of analytical chemical and spectroscopic techniques, and b) that the sample is housed in a reliable, permanent repository so that with the introduction of new technology the same specimen would be available for further analysis. So far, the collection's 151 corundum (ruby and sapphire) gems have nearly been completed and work is well underway for spinels (114 stones). Some analyses have also been performed on the rare "collector" gems, but this work remains to be completed. The planned GIA web site will present data on gems from the collection in a format intended for use by the lay person and the serious researcher. All data will be presented, with raw data for the analyses downloadable, where appropriate. Once the study of Dr. Gübelin's entire collection is completed, the GIA plans to include additional significant gemstones, particularly those with excellent locality data, from the rest of its Museum collection, and to invite other institutions to participate in the creation of this important gemological resource so that significant gemstones in their holdings are more fully characterized and this information is made available to gemologists and researchers worldwide.

Mark Mauthner is currently a research curator at the Gemological Institute of America's Museum. His specialties include mineralogy, (of gold in particular) and collection information management (database design).

New Minerals Related to Tourmaline and Possible Implications on Nomenclature

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Recent investigations on fibrous minerals from a number of locations worldwide including the Mt. Cleveland Sn mine in Tasmania, Australia, have revealed phases related to the tourmaline structure type. These phases crystallise in the monoclinic system, space group Cm, with $a \approx 10.4$, $b \approx 16$, $c \approx 7.2$, $\beta \approx 117$. The crystal structure of these minerals shows cation ordering, resulting in lowering of the symmetry and creation of multiple Y, Z, B and T sites (3, 2, 3 and 2 sites respectively).

Cation-ordered monoclinic and possibly even triclinic dark tourmalines have also been confirmed from the greisen deposit Ehrenfriedersdorf, Germany by single-crystal structure refinements (Kolitsch & Ertl, pers. comm., 2008).

The occurrence of these tourmaline-type compounds leads to a number of possible nomenclature considerations. Firstly, should these compounds be considered within a tourmaline nomenclature scheme and are these minerals tourmaline *sensu stricto*? Should minerals such as these be considered tourmalines, but with the addition of a prefix to the existing rhombohedral mineral name (e.g. clino-), a suffix (e.g. -1M or -1T) or does this open a new door for a set of root names to be introduced into the literature, which is specific to monoclinic variants of the tourmaline structure-type. It is also important to consider which sites should be considered when naming variants due to the proliferation that can occur from having multiple sites within this Cm structure-type.

Recently, Shtukenberg et al. (2007) reported an elbaite-liddicoatite tourmaline from the Transbaikalia region, with the probable space group R1, which potentially adds a third layer of structures, sites and nomenclature problems for consideration.

Several approaches may be taken, but it appears as fibrous species are being examined more closely using single crystal techniques, that more varieties related to the phases reported here will become known.

Stuart Mills is a Postdoctoral Research and Teaching Fellow in the Department of Earth and Ocean Sciences at the University of British Columbia, Canada and the incoming Secretary of the Commission on New Minerals, Nomenclature and Classification of the IMA.

Flashes of Colour: Stones and Wines of Legend

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An unusual exhibit : « Eclats de Couleurs : pierres et vins de légende » ("Flashes of Colour: Stones and Wines of Legend)" was held in the Science Garden at the Parc de l'Arquebuse of the city of Dijon, Burgundy, France. The exhibit, which ran from June 29 through December 9, 2007, compared the true colors of wine, with the infinite nuances offered by fine and invaluable minerals.

The show was produced in partnership with the French Muséum national d'Histoire naturelle (MNHN, Paris) and the Bureau Interprofessionnel des Vins de Bourgogne (Interprofessional Chamber for Burgundy Wines), as well as the Jules Guyot Institute (a technical school for future winemakers) and the UNESCO Chair of Wines and Culture (a cultural and scientific networking body).

In addition to the loan of fabulous mineral specimens by the MNHN in Paris, Bill Larson (from « Pala International »), Alain Martaud (from « Alain Martaud Minéraux ») and other passionate collectors contributed gem and mineral specimens. In conjunction with the exhibition, a wine tasting was held, focusing on "light and color experiments" as well as workshops on sensory perception, conferences, and much more.

We report the main highlights of this exhibit, whose intriguing title invites the MM6 audience to visit it a posteriori and to enjoy it « with no moderation ».

Prospectives are underway to extend this discussion to many other fine wine regions, worldwide.

Dr. Parodi is Assistant Professor of Mineralogy, Muséum national d'Histoire naturelle, Paris, France.

Amazing New Minerals: Freak of Nature or the Key for Solution of Nature Enigmas?

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Many new minerals are amazing, in chemical or structural features, from the standpoint of classic geochemistry, mineral crystal-chemistry or thermodynamics of minerogenetic processes. Many researchers consider them as scientifically insignificant things, a freak of Nature. This opinion seems wrong: any mineral, even the rarest and tiny one, reflects conditions of its formation. A mineral of unusual chemistry or structure is a fine indicator of unusual physical or chemical parameters of mineral-forming medium. Some such minerals also seem important in crystal-chemical aspect: they have quite new crystal structures or brightly demonstrate the affinity of a structural type to certain chemical elements. It can be illustrated on the examples of some minerals discovered by us in last seven years.

Pautovite, CsFe_2S_3 , shows chalcophile behaviour of cesium in late-stage peralkaline systems and extremely strong affinity of rasvumite-type structure to Cs. Wilhelmsramsayite, $\text{Cu}_3\text{FeS}_3 \cdot 2\text{H}_2\text{O}$, is a bright example that natural hydrous sulfides were formed mostly after alkali sulfides, in result of replacement of alkali-metal atoms by water molecules. Magnesiotantalite, $(\text{Mg,Fe})(\text{Ta,Nb})_2\text{O}_6$, a mineral with "geochemically impossible" Mg-Ta combination, is the best indicator of the contamination of rare-element granitic pegmatite by matter of host ultrabasic rocks. Voloshinite, $\text{Rb}(\text{LiAl}_{1.5})(\text{Al}_{0.5}\text{Si}_{3.5})\text{O}_{10}\text{F}_2$, a Rb-analogue of lepidolite, shows that the mineral-forming system is extremely rich in rubidium. Chesnokovite, $\text{Na}_2[\text{SiO}_2(\text{OH})_2] \cdot 8\text{H}_2\text{O}$, the first sodium orthosilicate mineral and the only natural silicate with two vertices of Si tetrahedron substituted by (OH) groups, is a geothermometer and fine indicator of CO_2 activity. Chukanovite, $\text{Fe}_2(\text{CO}_3)(\text{OH})_2$, rare Fe^{2+} -analogue of widespread malachite, indicates specific conditions: it was formed as a result of low-temperature alteration of native iron necessary not only as reagent but also reducing agent. Niveolanite, $\text{NaBe}(\text{CO}_3)(\text{OH}) \cdot 1-2\text{H}_2\text{O}$, the only natural beryllium carbonate, a representative of new structural type, with broad zeolite-like channels, is an important indicator of strong late-stage influence of CO_2 on a peralkaline pegmatite. Podlesnoite, $\text{BaCa}_2(\text{CO}_3)_2\text{F}_2$, has original crystal structure demonstrating transition from the aragonite-type carbonates to structurally related fluorocarbonates. Shirokshinite, $\text{K}(\text{NaMg}_2)\text{Si}_4\text{O}_{10}\text{F}_2$, shows that sodium can selectively occupy the site in the octahedral sheet in micas and demonstrates that K and Na can completely separate to structural sites with strongly different characteristics if a mica crystallizes in the system significantly enriched with both these alkali cations.

Igor V. Pekov, b. 1967, PhD (1997), DSc (2005), leading researcher (Dept. of Mineralogy, Geological Faculty, Moscow State University, Moscow, Russia). Fields of interest: general and genetic mineralogy; crystal chemistry of minerals; mineralogy of alkaline rocks and granitic pegmatites; mineralogy and geochemistry of rare elements; history of mineralogy; mineralogy of Russia and other countries of former Soviet Union. Author or co-author of 67 IMA-approved new mineral species. Special interest is systematic mineral collecting, collection management and databases.

The Camillo Gualteroni Collection: A Time-Capsule from One Century Ago

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Camillo Gualteroni (1861–1908) was a gentleman from the Bergamo area in northern Italy, born in a well-to-do family with extensive farmland holdings. Camillo graduated in law at the University of Padua, but his lifetime interest was mineralogy. He died an early death, leaving his wife, three small children and a significant mineral collection.

Fortunately the collection, which was kept in the family house in Ornica, a small mountain village north of Bergamo, was passed on through three generations mostly intact, and complete with Gualteroni's handwritten catalogs, his mineral-related correspondence, his small library and miscellaneous instruments, crystal models etc. The whole collection, including some of the fine cabinets in which it was kept, was acquired by the Natural History Museum of Milan in 2007.

Gualteroni was not a field collector, and acquired specimens mainly by correspondence with various sources. Through the help of his connections with the University of Padua, Gualteroni made contact with the main European dealers of his times, from which he regularly purchased specimens and equipment. His contacts included the Vienna dealers L. Eger and J. Böhm but were especially active with the Krantz company of Bonn, who supplied many of his specimens, mostly during the 1890s.

Another important contact was that with Count Giulio Pullè, a mining engineer and entrepreneur from the Isle of Elba, who supplied Gualteroni with specimens from the famous pegmatites.

The Gualteroni collection was hosted in five wooden glass cases with inclined shelves, on which the specimens rested in labeled cardboard boxes.

The collection includes about 2000 specimens, generally not larger than 6×4 cm. Some of the specimens from classical localities are very pleasing even by today's standards, while others can be considered mainly of systematic or topographical interest. A very interesting feature of this acquisition is that the specimens, the catalogs and the correspondence integrate very nicely, and give us a very good picture of a collector in the last decades of the 19th century: his tastes, his sources, his collecting targets.

The Gualteroni specimens are now part of the collections of the Museum of Natural History of Milan, Italy. While it is not unusual for museums to host collections as old, and often much older than the Gualteroni collection, private collections normally do not survive in their entirety for over a century after the death of the collector. Thus it will be kept intact as it was assembled by Camillo Gualteroni: a real time capsule from over 100 years ago.

Federico Pezzotta got his Ph.D. in 1993, after three years of work in geochemistry and petrology of igneous rocks at the laboratories of the University of Milan and the CNR of Pisa, Italy. He has headed the Mineralogy and Petrography Section of the Natural History Museum of Milan since 1996, while being active in various research projects in Italy and Africa, mainly dealing about the mineralogy and the petrogenesis of rare minerals and gem-bearing pegmatitic rocks.

Renato Pagano, after getting a Doctor of Electrical Engineering degree from the University of Genoa, Italy in 1963, did graduate work at the Rennselaer Polytechnic Institute, Troy, N.Y. and pursued a career in the electrical and electronics international business. A keen mineral, books and instruments collector, he actively supports the Milan Museum as collection management and acquisition consultant.

Natural History Museum in Magadan, Russia and Its Role in Region's Life

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Natural History Museum of North Eastern Interdisciplinary Scientific Research Institute of Far Eastern Branch of Russian Academy of Science (NEISRI FEB RAS) opened in 1977, on International Museums Day. It was created as a geological and mineralogical museum. Collections were divided into big areas: "Stratigraphy and Paleontology," "Magmatism and Metamorphism," "Natural Resources," "Systematic Mineralogy," "Meteoritics" and "Semiprecious stones of the Far East." Two unique finds of 1977, Kyrgylyah mammoth and Aliskerovo meteorite were the beginning of the "Mammoth Corner" exposition and of the meteorite collection. After a period of collection acquisition, the museum began to fulfill its main functions as storage and source of geological information.

During the 1990s, a period difficult for Russia, when the opportunities for adding to exhibits were scarce and there were fewer visitors as well, the museum was fulfilling its functions based on the local demand – first of all on the students of various educational institutions. When Russian borders became more open, the city and the region began to interest our foreign geologist colleagues, official representatives of various levels and tourists. Omolon pallasite and a fulgurite were added to the collection, systematic collection acquisition was continued, and a new division was opened – archeology and ethnography.

We preserve all systematic collections and add to them. "Natural resources" collection plays an important part because it represents various gold, gold-silver, tin-wolfram, quicksilver and other types of ore from regional deposits. "Archeology and Ethnography" collection has materials of most archaeological cultures of the Stone Age and Early Metal epochs of North Eastern Asia, and also materials on Alaskan archeology. These are the artifacts of wide range of age and also culturally, from the end of Pleistocene to the second half of Holocene. The pride of the museum is definitely our meteorite connection, in which there are main masses or meteorite fragments and also the regional stone collection used for carving, which consists of agates and chalcedonies, amethysts and jasper from 17 deposits.

The museum is alive and is developing and our main goals - new materials acquisition and exposition renewal, and a modern way of presenting information as well. The city develops, children and young people study here, businessmen and tourists visit, and our museum is popular. There is hope for the future of the Natural History Museum of NEISRI because it is an important fragment of the city educational museum complex and a tourist attraction.

Anna Plyashkevich is currently museum director of Natural History Museum in Magadan, Russia and Lidia Trushnina is her daughter who lives in Boulder, CO.

Mineralogical and Geochemical Features of Romanian Gold

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Romania was one of Europe's main gold-producing areas since antiquity, especially through the ore deposits in the "Golden Quadrilateral" of the Apuseni Mountains (Western Carpathians). The Mineralogical Museum of the Babeş-Bolyai University in Cluj-Napoca hosts a gold collection consisting of about 500 samples, most of them from Roşia Montană (Apuseni Mountains). The museological survey of this collection, using optical microscopy, provided new data on crystal and aggregate morphology and mineral assemblages. The geochemical investigation of Romanian gold by using micro-nuclear methods (SR-XRF and PIXE) is currently in progress; some preliminary results point to interesting features.

For the Apuseni Mountains, the increasing order of frequency shown by the main crystal/aggregate habits is as follows: euhedral crystals, filiform (often skeletal), moss-like, dendritic, and lamellar (scaly/platy). The euhedral crystal forms, from the rarest to the most frequent ones, are: tetrahedron {210}, (rhombohedral) dodecahedron {110}, cube {100}, octahedron {111}, and combined {100} + {111}. The most spectacular aggregates (both loose and on host-rock) consist of single or several partly overlapping rolled plates ("leaves"), of total lengths up to 90 mm, showing triangular octahedral faces. As a rule, several crystal and/or aggregate habits co-exist on the same sample, rendering morphological classification difficult and pointing to the presence of several successive generations of gold.

Elemental maps of gold samples from various Romanian occurrences were obtained via PIXE analysis. These were complemented by nuclear microprobe point analyses in selected areas of the mapped gold crystals. At Roşia Montană, PIXE mapping evidenced a peculiar microfabric consisting of mm-sized laths of a Zn-S rich phase (with minor Cu and Fe). Based on micro-nuclear data, Au content shows a wide compositional range: (36–57) %; ASEM has indicated, in other samples, up to 76 % Au. A clear chemical inhomogeneity of the Au/Ag ratio, as well as of the local concentration of other elements (Cu, As, Sb, Te, Pb, Fe etc.) was noticed at submillimeter scale. The presence of associated mineral phases (such as Cu, Ag, chalcopyrite, galena, sphalerite, arsenopyrite, pyrite/marcasite and non-metallic minerals) at microscopic scale could be thus illustrated, completing the macroscopic data on gold assemblages. The presence of arsenopyrite was also confirmed by ASEM data. The HRTEM investigation on pyrite crystals associated with gold from Roşia Montană has evidenced periodical sequences of planar "marcasite-type" defects.

Dr. Dana Pop is the curator of the Museum of Mineralogy of the Babeş-Bolyai University in Cluj-Napoca, Romania since 1990. She took part in three previous editions of the M&M conference series and she considers the group of mineralogical museums curators as her genuine professional and soul affiliation. Her main scientific interest concerns green clay minerals (glauconite and celadonite), but occasionally she has also approached some other mineral groups, of specific importance for Romania, such as gold. As the secretary general of the IMA2010 meeting, to be held in Budapest in August 2010, she invites you all to join the museum-related sessions and programmes that will be offered on that occasion.

Synchrotron X-Ray Diffraction Study of the Structures and Behaviors of Phylломanganates

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Phylломanganate minerals such as ranciéite (Ca-rich), birnessite (Na-rich), and busserite occur in a wide variety of geological environments. In many cases they apparently form as a result of biological oxidation of Mn, e.g. Ca-busserite-like phases associated with coal mine runoff in Pennsylvania and Tennessee. Mn oxide minerals having the birnessite/busserite structures readily participate in cation-exchange and oxidation-reduction reactions, and because they typically occur as coatings and fine-grained aggregates with large surface areas, even small quantities can significantly affect the chemical composition and behavior of sediments and associated aqueous systems

The interlayer region in phylломanganates is occupied by water molecules and cations such as Ca²⁺, along with Na⁺, K⁺, and Ba²⁺, etc., in natural samples; additionally, phylломanganate phases have been synthesized that have a wide assortment of other interlayer cations. The chemical activity exhibited by phylломanganates is, at least in part, due to the apparent ease by which the structure adjusts to accommodate a range of interlayer water and cation compositions. A more complete understanding of the structure is relevant to many of its proposed uses (e.g., as catalysts and cation-exchange agents) and to understanding its role in geochemical systems.

We investigated the structures and behaviors of synthetic and natural Ca-rich phylломanganates and related phases using synchrotron powder X-ray diffraction and analytical scanning electron microscopy. In situ, temperature-resolved synchrotron X-ray diffraction and the Rietveld method were used to investigate the cation-exchange and dehydration properties of various synthetic phylломanganates. The X-ray diffraction data were collected in air at beam line X7B of the National Synchrotron Light Source, Brookhaven National Laboratory, using a MAR345 full imaging plate detector. Rietveld refinement of the ranciéite crystal structure revealed that the interlayer H₂O molecules occupy sites half-way between the Mn₂O octahedral sheets. The Mn sites in the octahedral sheets have 10% vacancies, and the mean Mn-O distance indicates that all Mn is tetravalent (Mn⁴⁺). The interlayer Ca cations are located above and below the Mn vacancies and are octahedrally coordinated to 3 O atoms in the octahedral sheet and 3 H₂O molecules in the interlayer. The heating and cation-exchange experiments revealed a complex series of behaviors correlated to the specific types of interlayer cations.

Dr. Jeffrey Edward Post, a native of Wisconsin, received Bachelor of Science degrees in geology and chemistry from the University of Wisconsin - Platteville, and his Ph.D. in chemistry, with a specialty in geochemistry, from Arizona State University. Prior to joining the Department of Mineral Sciences at the Smithsonian Institution in 1984, he was a Postdoctoral Research Fellow for three years in the Department of Geological Sciences at Harvard University. He is a research mineralogist and Curator of the U.S. National Gem and Mineral Collection.

Report on the 2007 German Antarctic Meteorite Expedition to Queen Maud Land, East Antarctica

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During November and December 2007 a team of three German scientists and a field guide from Switzerland conducted a reconnaissance survey for meteorites in Queen Maud Land, the Antarctic territory opposite South Africa.

Queen Maud Land was still a pristine region for meteorite searches. Until 2007 only the 10 kg iron meteorite Lazarev was known from this region, it was found during geographical and geological investigations by Russian scientists in 1961.

During the 2007 German Antarctic meteorite expedition, blue ice fields in an unnamed region of eastern Queen Maud Land between 72°12'/72°23' S and 15°57'/16°12' E were searched for meteorite concentrations. This led to the discovery of fifteen stony meteorites, weighing between 2 g and 454 g and an iron meteorite of 31 kg.

The expedition was a collaboration of the Federal Institute for Geological Sciences and Resources (BGR), Hannover, the Alfred-Wegener-Institute for Polar and Marine Research (AWI), Bremerhaven and the Mineralogical Museum, University of Hamburg.

Dr. Jochen Schlüter is curator and head of the Mineralogical Museum at the University of Hamburg, Germany, since 1988. He studied Mineralogy focusing on Economic Geology and Petrology and worked in several exploration projects on metals in Canada, Chile, Austria and Germany. Jochen Schlüter's main research interests include Descriptive Mineralogy, Meteoritics and Gemmology. He is the author of several new mineral descriptions and he took part in meteorite recovery projects in Mongolia, Niger, Libya and recently Antarctica.

Building Stones in the City of Bonn – A Project of the Mineral Museum of Bonn, Germany

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The museum's project on the building stones of the city involves two round trip geology walks through the pedestrian city center of Bonn with emphasis on the mineralogy and geology of the rocks used. In this context, building stones from 26 buildings, a fountain and a monument were investigated. The results were presented in an exhibition in the city hall of Bonn, followed by the publication of a book. Each tour covers a distance of 1 to 1.7 km, respectively and can be booked either at the museum or carried out self-guided. The purpose of the project is to increase the public's interest and knowledge in geoscientific aspects of the buildings that surround them.

Some of the described buildings are historic and mirror relatively short distances of transportation. They reveal geological aspects of building stones quarried in the near-by Siebengebirge and Eifel (trachyte from Drachenfels, basalts and tuffs from the East Eifel volcanic field). Representative sample material is abundant in the museum's rock collection. In contrast to this, other building stones, more recently used for shops and banks, come from all over the world. A local stone dealer, established in Bonn for two generations, provided rock material and trade names of these building stones. Sample material of all building stones was used for thin-section investigation.

The exhibit and the book give information about the mineralogy, origin, age and genesis of the rocks. In addition, photographs of the buildings and rocks as well as photomicrographs are used to reveal information about macroscopic and corresponding microscopic details. Microscopic details include the presence of sillimanite and cordierite in S-type granites, deformation textures in the "Otta Phyllite" from Norway, schiller effect in larvikite with corresponding exsolution phenomena and exsolution in inverted pigeonite of a gabbro from the Bushveld layered intrusion.

With this project we follow the example of other cities, for example Denver. We are also part of the network "Steine-in-der-Stadt" www.steine-in-der-stadt.tu-berlin.de/, initiated by J.H. Schröder (Technical University of Berlin). Some aspects of this network will be presented including the organization of a "Day of Building Stones in towns and cities" and the preparation of a book introducing walks close to train stations in 18 German cities.

Renate Schumacher is curator of the Mineral Museum at the University of Bonn. She studied geology and mineralogy in Kiel (Germany), Edinburgh (Scotland) and Amherst (Massachusetts) and finished her Ph.D. on metamorphic rocks from central Massachusetts at the University of Bonn in 1986. Stations of her professional life are the Universities of Kiel (twice), Muenster and – since 1997 – Bonn.

The Mineral Museum of Bonn, originally founded as a natural history museum in 1818, is one of the most significant museums of its kind in Germany. Because of its internationally recognized collection, the museum has been invited numerous times to show displays at the Denver and Tucson Gem and Mineral Shows.

Evolution of a Museum Gemstone Research Project, Over 35 Years of Technological Advancement: The Story of Barrington Ruby Mine, Australia

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Gemstone samples came into the Australian museum mineral collection from an enthusiastic prospector in the 1970s-1990s. A Museum research project started on ruby, sapphire and zircon shed from the large eroded Barrington basalt field. Gemmological microscope and electron micro-probe studies confirmed true ruby and its metamorphic nature through its inclusions (sapphirine) and also separated the corundum suite into two distinct groups. A special electron diffraction X-ray fluorescence method then provided improved trace element data and linked it into the range of corundum colour spectra. It also showed Cr and Ga contents were a key in discerning the original corundum genesis prior to its intermediary delivery by basalts after its extraction from the hidden source rocks. The data allowed its comparison with other corundum suites from Australian and SE Asian basalt fields. Next, associated gem zircons were dated by fission track and sensitive high resolution ion micro-probe analysis to constrain timing of gem delivery and earlier formation limits. This led to new modelling of sapphire crystallisation and mantle melting processes. More precise trace element data was gained by particle-induced X-ray emission analysis on the initial samples and combined with oxygen isotope data on Barrington corundum for more comprehensive comparisons with other gem fields. Distinct geochemical attributes emerged between Barrington and other geographic fields. Recently, laser ablation-inductively coupled plasma-mass spectrometry analysis was utilised on the twice earlier analysed Barrington samples to further improve the element array and include Mg content, now a known genetic indicator, and elements like Be, Sn, Ta, Nb, now known to appear in some corundum suites. The latest data reveals Barrington corundum includes two separate metamorphic, an intermediate and a magmatic grouping and is a polymodal suite. Over the life of the research project, the Barrington gem field was upgraded by exploration companies from a minor find into a prospect, then into a test mine and finally a full mining and jewellery market venture in 2005. A change in ownership has now stopped production. The long running research project on the Barrington gem field involved many Australian and overseas collaborators and institutions and has yielded a host of international and local publications, many conference presentations, a field guide, a book and media (TV, radio, newsprint) publicity. Barrington became a ruby mine and a Museum mineral research bonanza.

Frederick (Lin) Sutherland is a Senior Fellow in Geoscience at the Australian Museum in Sydney, Australia, which he joined as a Curator of Minerals in 1973, after working in Tasmanian Museums. He has published extensively on Australian and SE Asian minerals, rocks and gemstones, particularly those from volcanic terrains, and has written four books on these topics. He was involved in the installation of the Planet of Minerals and Chapman Mineral Collection galleries in the Australian Museum and has served on the International Mineral Association Commissions on Museums and on Gem Materials. He has travelled extensively to geological conferences and collected on field trips around the world, having attended previous M & M meetings in Toronto and Melbourne.

Influence of Clay in Pyrite Oxidation/Hydrolysis and Implications for Storage

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Controlled humidity experiments have been conducted on polished sections of pyrite and pyritized bone in order to examine oxidation/hydrolysis kinetics, reaction paths and reaction products. Four conditions (relative humidity (RH) of 33%, 43%, 58% and 75%) were imposed by saturated salt solutions in closed containers. Experiments were examined at 19 months, 3.1 years, and terminated at 5 years, with analyses by e-SEM-EDA, polarized and reflected light microscopy, and XRD.

After 5 years, pyritized bone at 75% RH showed pitting plus orange, then blue tarnish under reflected light microscopy. Grain size was a minor factor in tarnish progress. Adjacent sections of pyrite-clay-quartz matrix reacted within 19 months to produce halotrichite + melanterite + jarosite ± römerite. Reaction of clays is indicated by Al in halotrichite and Na and K in jarosite. Halotrichite occurs 15% RH lower than determined by other studies. Preliminary results of 2 year experiments at 58% also show jarosite and iron sulfates forming in the pyrite-clay-quartz matrix, centimeters from pyrite in bone which shows only tarnish.

XRD showed the presence of a 7Å clay, kaolinite or halloysite-7Å. Specimens coated with kaolinite failed to react within five years, suggesting that halloysite is present. Halloysite-10Å is capable of donating two loosely held waters to initiate oxidation/ hydrolysis of pyrite, which becomes self-perpetuating with participation of hygroscopic clays and sulfate minerals. In such a case, overall relative humidity may be less important than co-existing minerals.

It is possible to lower ambient humidity to dehydrate the Fe±Al sulfate minerals. However, this creates a hygroscopic powder that can readily spread pyrite "disease" to other specimens via airborne means. Experiments are now underway to "seed" unreacted pyrite with dehydrated Fe-Al sulfates, and to examine the reaction of different clays with pyrite.

This experimental method offers a faster and inexpensive way to evaluate long-term stability of pyritic materials. Saturated solutions of NaCl impose RH 75%, accelerating possible decay. Unstable specimens can be isolated or identified for further treatments.

Dr. Chris Tacker is a mineralogist, geochemist and experimental petrologist with degrees from the University of North Carolina at Chapel Hill, the University of Maryland, and Rice University. For the past eleven years he has served as the Research Curator of Geology at the North Carolina State Museum of Natural Sciences. The North Carolina State Museum was founded in 1879, and many specimens in the Geology Collection originated with Geological Survey studies that predate the Museum. Dr. Tacker's other research projects include apatite group minerals and the Ediacaran fauna of North Carolina.

From “GreenEarth” and “Green Sand” to Celadonite and Glauconite – Almost 200 Years of Mineral Concept Evolution

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Celadonite and glauconite obtained their current mineralogical definition 10 years ago (IMA: Rieder et al., 1998; also AIPEA: Guggenheim, 2006). Although clear chemistry-based nomenclatures existed for 3 decades, usage of the two names remained confusing. We present a historical overview of the evolution of the two terms, demonstrating also the roots of that confusion.

Celadonite (mostly basalt-related earthy bluish green material, chemically corresponding to the current definition of celadonite) had a practical application from antiquity as a green pigment. Glauconite (mostly sedimentary, mid-to dark green, fulfilling the current definition of glauconite) got into the focus of earth scientists (first geologists, then mineralogists) only since the beginning of the 19th century.

Creta viridis (Latin, “green chalk”), meaning a green pigment, is probably one of the earliest references to celadonite by Marcus Vitruvius Pollio, (1st century B.C.). The most famous historical localities, Monte Baldo (near Verona, Italy) and the Troodos Massif (Cyprus), were still mined in the 20th century. Due to its continuous use, that “green earth” appears already in the earliest systems of mineralogy (e.g. Wallerius, 1750; Cronstedt, 1758). The term celadonite (“Seladonites pictorum”) was introduced by Glocker (1847).

Sedimentary green grains appeared first in geological descriptions as “green sands”. Jameson (1816) mentions that green earth may tint sandstones green, so this might be the first mineralogical allusion to glauconite. The first chemical analyses of green grains are supposed to be those of Berthier (1820, 1821). The term glauconite (“Glaukonit”) was given by Keferstein (1828) to the green grains.

Even in classical mineral systematics (e.g. Dana, 1868, 1892), under the name glauconite, earthy and granular green materials were often handled together. Hintze (1897) proposed to separate the two species upon formation (celadonite of volcanic, glauconite of sedimentary origin). The idea was adopted by Doelter (1926), too. New systematics (Bailey, 1980, 1986 and Rieder et al., 1998) use solely crystal chemistry for classification. Though some routinely applied identification protocols (broad/sharp IR peaks; d060) are crystal chemistry-related, it is important to point out that they do not fit the currently valid nomenclature.

Erzsébet Tóth works as Curator at the Eötvös Museum of Natural History at the Eötvös Loránd University in Budapest, Hungary. Her MSc thesis focussed on asbestos applications in Hungary, while her PhD thesis, defended in 2007, was devoted to the dioctahedral iron-rich layer silicates celadonite and glauconite. She is a member of the International Organising Committee of the 20th General Meeting of IMA, to be held in 2010 in Budapest, Hungary.

The Beginning of Mineralogy in Eastern North America

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Historically, one of the important groups of minerals from the New World in the mineral collection of the Ecole des Mines de Paris is that from New York.

Colonel Gibbs was the first to provide a certain amount of samples as a donation. Later on, real mineral dealers like L. Semann, A.E. Foote or Krantz from Heidelberg, Germany, arrived on the market with specimens from New York. Some specimens are of outstanding size or aesthetic quality, such as the graphite from Ticonderoga or the spinel from Monroe, and many are accompanied by abundant related documentation: old labels, manuscripts, correspondence, etc. All this bears witness to the extremely active relationship between French and American scientists at the time of the birth and development of mineralogy and mining sciences in the United States.

Dr. Lydie Touret is Curator of the Mineralogical Museum -Ecole des Mines de Paris, and Chairperson CM of the IMA.

Moving Specimens

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Handling and moving specimens are tasks that can be described as necessary evils. They are often necessary but because they have the potential to promote damage, should not be undertaken lightly. Every specimen is unique and possesses properties which may make it susceptible to damage. Specimens must be carefully handled, to prevent damage. This talk will indicate best practice procedures for handling and moving specimens and introduce a possible risk assessment policy. Transporting material will also be described, illustrated with examples of misadventure.

Handling and moving specimens should only be performed by people familiar with them and their properties. Before handling a specimen, an assessment of potential risks needs to be undertaken to ensure that human interference is not going to damage it. We do this subconsciously all the time because we are used to looking at specimens and knowing if they are robust or fragile or whatever. Handling large specimens will be different from small specimens. Radioactive specimens require different procedures again. Some specimens are less important than others and these are possibly more at risk as we consciously assess the important ones.

I am not proposing a formal risk assessment for everything that gets moved or we'd never actually achieve anything. I am suggesting that we exercise conscious thought to the properties and therefore the potential danger to the specimen or individual by handling it. Once a specimen has been perceived to be important, for whatever reason, undertaking and documenting a risk assessment is necessary to raise the awareness, not only for the specimen but also for the person handling it.

Always have identification with the specimen, whether a label or identifying mark on the specimen, when it is moved. If the specimen does not have identification or the correct label with it, the provenance is not guaranteed. Digital cameras have made it so easy to photograph most specimens with the label prior to moving them.

Specimen movement must be documented. Minimum data include date, place to be moved to, person who approved the move, reason for move and the potential length of time removed.

Specimens should be packed appropriately for the move. Many different packaging materials and ways of packing specimens are readily available. Different specimens require different materials and methods. They must also be packed to prevent movement during transport. Package materials should be environmentally friendly and disposed of appropriately.

Penny has been a geological curator in Australian universities for over 30 years. Her specific area of interest is in mineral displays and mineral heritage.

POSTER PRESENTATION ABSTRACTS

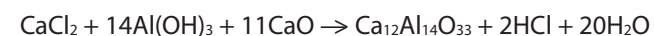
The Origin of a Mineral Association with Acharandite, Talnakh Region

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The grossular, vesuvianite and acharandite locality discovered in 2001 at Otdel'naya Mountain (Talnakh region) located in the north-western edge part of the Siberian platform is similar to that in the Wiluy river valley by its mineral composition. The latter was first described in 1821 by Karl Laksman. Until nowadays acharandite has been a so-called mineralogical enigma – a pseudomorph after an unknown mineral. The aim of this work was to find the possible proto-mineral after which acharandite was formed using research and experimental data.

The mineral associations are supposed to be of skarn origin, however mineral paragenesis, IR data, fluid inclusions data and experimental data obtained testify about more complex process which consisted of at least two stages: a high-temperature skarn stage and a low-temperature post-skarn stage.

During the high-temperature stage augite and perovskite were formed which can be observed as mineral inclusions in the central parts of vesuvianite crystals, and as the central parts of the vesuvianite crystals themselves. Also at this stage the proto-acharandite was formed. As a result of multiple series of experiments we obtained trigon-tristetrahedral crystals of mayenite according to the chemical reaction:



During the low-temperature stage the paragenesis: grossular, hydrogrossular (containing over 10 wt.% of Cr_2O_3 and TiO_2), B-containing vesuvianite, amesite, diopside, Al-bearing magnesiochromite, titanite, troilite, chlorite, serpentine was formed. These are typical minerals of the prehnite-pumpellyite facies of low-grade metamorphism. At this stage proto-acharandite (mayenite) was transformed into the pseudomorph consisting of an aggregate of hydrogrossular, grossular, serpentine, and calcite.

According to our idea, the mineral that was later replaced by acharandite, was initially formed during a specific high-temperature skarn process with chlorine-based pneumatolytic impact. Grossular and proto-acharandite – mayenite are both structurally and chemically related to each other, and this has caused many scientists to consider grossular to be the proto-mineral of acharandite. However, the supposed proto-mineral for acharandite – mayenite corresponds to the character of a process: 1 – mayenite was first discovered in post-magmatic fluid-rich lava derivative, 2 – mayenite found in the burnt dumps of Chelyabinsk coal basin was formed as a result of man-caused fumarole process, 3 – synthesis of mayenite was held in a 'dry' system, after the experiment the excess of HCl was recorded, 4 – transformation of hibschite into wadalite was performed by using chlorine gas phases on hibschite.

Maria Alferova is a mineralogist and gemmologist from Fersman Mineralogical Museum in Moscow. She is dealing with the low-grade metamorphic mineral associations containing various garnets - uvarovite, demantoid and grossular. Maria is a co-author of the second acharandite locality in the world in Talnakh region, NE Siberia, and was involved in the experimental study of the possible proto-phase of this 'mineralogical enigma'.

Potassic-Ferropargasite, a New Member of the Amphibole Group, from Japan

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Potassic-ferropargasite, ideally $(K,Na)Ca_2[(Fe^{2+},Mg)_4Al]Si_6Al_2O_{22}(OH,F)_2$, is a new member of the amphibole group occurring in schistose, calcareous, metamorphic rocks from Kabutoichiba, Kameyama, Mie Prefecture, central Japan. The mineral data and mineral name have been approved by CNMNC (No. 2007-053). The mineral name is in accordance with the current nomenclature for amphiboles. The amphibole occurs as black subhedral to anhedral crystals, up to about 700 μm in length, associated with titanite, biotite, chlorite, meionite, calcite, K-feldspar and plagioclase. Its Mohs hardness is 6, D (calc.) 3.34 g/cm³ for the observed empirical formula and Z = 2. Optically, potassic-ferropargasite is biaxial negative, with α 1.680(2), β 1.690 (calc.), γ 1.698(2), 2V 80-90° and $Z \wedge c$ 20°; pleochroism X pale green, Y green and Z bluish green. The mineral is monoclinic, space group C2/m, with refined unit-cell parameters a 9.937(5), b 18.108(5), c 5.335(4) Å, β 105.30(3)°, V 926.0(9) Å³, Z = 2. The three strongest lines in the X-ray powder-diffraction pattern [d in Å (l) (hkl)] are 2.72 (100) (151), 8.48 (81) (110) and 2.61 (59) (061). Electron-microprobe gave SiO₂ 38.08, TiO₂ 1.92, Al₂O₃ 15.12, Cr₂O₃ 0.44, FeO 19.96, MnO 0.22, MgO 6.22, CaO 11.73, Na₂O 1.57, K₂O 2.74, F 0.13, Cl 0.00, H₂O (calc.) 1.87, O = F + Cl -0.05, total 99.95 wt.%, corresponding to $(K_{0.54}Na_{0.42})_{\Sigma 0.96}(Ca_{1.95}Na_{0.05})_{\Sigma 2.00}(Fe^{2+}_{2.59}Mg_{1.44}Al_{0.67}Ti_{0.22}Cr_{0.05}Mn_{0.03})_{\Sigma 5.00}(Si_{5.91}Al_{2.09})_{\Sigma 8.00}O_{22}(OH_{1.94}F_{0.06})_{\Sigma 2.00}$ on the basis of 24 anions. Fe³⁺ contents (0 apfu) were calculated on the basis of the minimum ferric estimation. The structure, which is that of clin amphibole, was refined to an R of 6.5 %.

Dr. Banno was born in 1966. He graduated from Nagoya University. He works as senior researcher at Geological Survey of Japan, AIST. He is also concurrent research staff as curator of minerals, Geological Museum, AIST.

40 Years of Enriching and Preserving Alberta's Geological Heritage

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In 2007, the Royal Alberta Museum celebrated 40 years of collecting, preserving, and interpreting Alberta's heritage. Throughout those years, the Geology program has played an important role in preserving geological heritage and promoting geological education in Alberta. From comparatively modest beginnings, the Geology collection has developed into an exceptional and diverse array of gemstones, minerals, rocks and fossils, now numbering some 21,000 specimens. Its mineral collection is one of its great strengths, with representative specimens from many important localities worldwide. Canadian localities are also well-represented, with several specimens designated as Canadian cultural properties. These include a superb smoky quartz sceptre from the Yukon and a suite of gold specimens from the Bralorne mine in British Columbia.

The public can enjoy the Geology collection by visiting two long-term galleries in the Museum that are dedicated to showcasing some of the best and most representative specimens. Opened in 1994, the "Treasures of the Earth" exhibition is a spectacular display of more than 800 minerals and gemstones from different regions across Canada as well as beautiful examples from well-known locations elsewhere. In "Reading the Rocks", visitors can explore hands-on exhibits and learn about the nature of the geologic cycle and the geological history of Western Canada. Museum-run educational programs take place in these galleries throughout the school year. One of the most popular programs, "Mysteries in Stone", attended by almost 20,000 students since 2001, teaches Grade 3 students about the geologic cycle and rock identification. Other components of the collection have been featured in many temporary and traveling exhibitions, including displays focused on salts (2004), reefs (1991), meteorites (1984), and the oil sands (1986).

The Geology program has been active in the field and in the community since its inception and continues to find new ways of public outreach. Program staff members have collaborated with earth science professionals from other local organizations and institutions in many outreach initiatives, including rock identification clinics, walking tours focusing on local building stones, and a "geoscape" poster highlighting the geology of Edmonton. The Geology program played a central role in the compilation of an extremely popular book, "A Traveller's Guide to the Geological Wonders of Alberta", which is now in its third printing.

Melissa Bowerman has recently joined the Royal Alberta Museum and is responsible for their Geology Collection. Before working at the Museum Melissa gained experience in both research and exploration in the Canadian Shield, Arctic, and Cordillera.

Mineral and Ore Specimens of the Nambu Ore Collection of the Geological Museum, AIST

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The Geological Museum of Geological Survey of Japan, GSJ, was established in 1980 and now belongs to the National Institute of Advanced Industrial Science and Technology, AIST. Roughly 400,000 geological specimens are housed in the museum. Among them, approximately 110,000 items are mineral specimens, which were partly donated from collectors or researchers. The Nambu Ore Collection contains 1,500 ore and mineral specimens collected by Dr. Matuo Nambu, professor of Emeritus of Tohoku University, Sendai, Japan. The collection is characterized by representative ore specimens from many ore deposits in Japan, which were self-collected by Dr. Nambu in the course of his roughly 40 years of research on ore deposits until his retirement in 1981. In this respect, the collection differs from many other mineral collections such as those assembled for covering as many specimens as possible or for boasting superb crystals and/or aesthetic minerals. The most valuable in the Nambu Ore Collection is the manganese minerals from the bedded manganese deposits (and their oxidation zones) hosted by Paleozoic to Mesozoic sedimentary rocks mostly in Tohoku district and from the hydrothermal manganese deposit in the Green Tuff region. They account for approximately 35 percent of the whole collection and form a unique set of minerals not only in Japan but all over the world. In addition, the skarn ore specimens from both the Kamaishi and the Akagane mines of northeastern Japan form comprehensive sets for those mines. Epithermal and Kuroko-type Au, Ag, Cu, Zn, and Pb ores from the Green Tuff region constitute considerable part of the collection. Also included are iron oxide and hydroxide minerals, which triggered the discovery of the new mineral akaganeite, from oxidation zones of the ore deposits. Specimens of the nine new minerals from Japan are also included. Five were first described by Dr. Nambu (akaganeite, jokokuite, kozulite, manjiroite, and takaneite), two were named after him (nambulite and natronambulite), and the other two were haradaite and suzukiite. All the descriptive data on the Nambu Ore Collection have been digitized and stored in the computer database and will serve for future research and education.

After finishing his graduate course at the Mineralogical Institute, University of Tokyo, 1971, Dr. Bunno was engaged as a researcher at the University Museum, University of Tokyo until 1981. In 1981 he moved to the Geological Museum, Geological Survey of Japan, as a curator of minerals. From 1994 to 2003 he was director of the Museum. As a curator of mineral collections in two museums, he published more than 15 catalogues as follows; The Wakabayashi Mineral Collection (1974), The Imayoshi Mineral Collection (1982), An Illustrated Guide to the Rocks and Minerals of Japan (1992), The Okamoto Mineral Collection (1998), The Kinoshita Mineral Collection (2005), etc. As a researcher, Dr. Bunno described five new minerals: potassicadanagaite, potassic-magnesiosadanagaite, magnesiosadanagaite, protomangano-ferro-anthophyllite, and wadalite. Photographs in the colour plates of the catalogues were all taken personally by Dr. Bunno with a film camera (not a digital one!).

The Importance of Mineralogy for Deciphering the Evolution of Alkali-Basaltic Magmas: A Case Study of Dotsero Volcanics (Eagle County, central Colorado)

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The Dotsero scoria cone and lava flow, located along the Colorado River east of Glenwood Canyon, are the youngest volcanic occurrence in Colorado, dated from charcoal as 4150 years BP. These volcanics were emplaced through Proterozoic basement and Phanerozoic sedimentary rocks and contain abundant xenoliths of shale, sandstone, gypsum and transparent quartz xenocrysts known as "Dotsero Diamonds". Texturally, the rocks range from massive flow-banded types to highly vesicular scoria, but these different types are remarkably similar in composition. All of the examined samples correspond to potassic hyalo-trachybasalt (Na/K = 1.0-1.1) enriched in large-ion lithophile elements (particularly, Ba and Pb) and relatively depleted in Ti. Texturally, the rocks consist of (micro)phenocrysts of olivine (Ol), augite (Aug), plagioclase (Pl) and magnetite (Mgt) set in a glassy matrix containing smaller crystals of the same four minerals. The Ol phenocrysts are zoned from a kite-shaped Mg-rich core (75-81 mol.% Fo, < 0.3 wt.% MnO, < 0.2 wt.% CaO) to a skeletal rim enriched in Fe, Mn and Ca (67-75 mol.% Fo, 0.4-0.9 wt.% MnO, 0.2-0.5 wt.% CaO). Groundmass Ol is compositionally identical to the phenocryst rims. One exception is oxidized varieties of scoria, where phenocrysts are rimmed by Mg-rich Ol (80-84 mol.% Fo) plus hematite. Aug shows oscillatory zoning superposed over hourglass zoning involving significant variations in the sum proportion of Tschermak components (12-28 mol.%) and diopside (48-64 mol.%) between the sectors. Pl phenocrysts are zoned toward Na-rich compositions (80-65 mol.% An); the K and Fe contents increase concomitantly with Na. Groundmass Pl is similar to the phenocryst rims. Mgt microphenocrysts are enriched in Mg, Al, Ti, V (+/-Cr), and exhibit diverse exsolution textures reflecting different cooling histories of their host rocks. The whole-rock and mineral-chemistry data were used to model potential evolutionary paths of trachybasaltic magma. Fractionation of Ol, Pl, Mgt and Aug will drive the chemistry of residual melt to shoshonitic and then potassic phonotephritic compositions. This calculated trend is in general agreement with the presence of nepheline-normative phonotephritic and tephriphonolitic glass in some samples. However, the alkali content of the glass is higher than the predicted content, indicating that the Dotsero magmas were modified by assimilation of crustal material. Further evidence of assimilation includes the presence of rhyolitic glass and Aug corona around quartz xenocrysts.

Anton Chakhmouradian obtained his PhD from St. Petersburg State University in Russia in 1997. At present, he is Associate Professor of Mineralogy at the University of Manitoba in Winnipeg, Canada. He is also Curator of the R.B. Ferguson Museum of Mineralogy, the largest non-private mineral collection in all of central Canada. His area of expertise includes alkaline rocks, carbonatites, kimberlites, collection management, and gemology. In 2005, Anton has been awarded the Young Scientist Medal of the Mineralogical Association of Canada for his research on alkaline rocks.

Collection Assessment

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In order to plan a program of collection improvement, it is necessary to have a thorough knowledge of the state of the collection. An efficient way to do this is to develop a series of categories that describe the state of specimens in the collection, and then go through everything to determine how many specimens or lots fall into each category.

The categories should be kept simple, but be specific enough to provide useful data. There should be between 5 and 10 categories. More categories make the process too time-consuming, and fewer will fail to yield enough detailed information. When developing the categories for assessment, it is also important to factor in the staff time available for this work, and any deadlines that may be involved.

For example, a 5-category system for a mineral collection might contain the following levels:

1. specimen needs no work (has good labels, good data, records are in database, no conservation issues, well-housed)
2. specimen is in good condition, has good data, records are in database, but needs new label and/or rehousing
3. specimen is in fair to good condition, has data, but records are not in database, needs new label and/or rehousing; may need minor conservation
4. specimen needs significant conservation or cleaning, plus databasing, label & rehousing
5. specimen is in poor condition, or has no accompanying data; suitable for deaccession & disposal

Tests can be done to determine the amount of time it takes to bring specimens in each category up to the ideal level. The times for each are then multiplied by the number of specimens in each category. Added together, this will yield the total time needed to bring the entire collection to the desired level. Supplies needed can be calculated in the same way.

Detailed information obtained through a collection assessment will provide the documentation necessary to justify funding requests, both in-house and to outside agencies. This information will also be useful in collections planning and management.

Jean DeMouthe is Senior Collections Manager for Geology at the California Academy of Sciences in San Francisco, where she has worked for over 30 years. She also teaches collections management and specimen conservation in the graduate Museum Studies Program at San Francisco State University and works as a consulting engineering geologist.

Special Features of the Collection of Mineral Deposit Samples at the Federal Institute for Geosciences and Resources (BGR), Germany

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The geosciences collection of the Federal Institute for Geosciences and Resources (BGR) was accumulated mainly during Prussian times between 1878 and 1945. The available material consists of about 850 filled cabinets and is divided into several thematic collections; one of which is the collection of mineral deposit samples.

The dates when samples were collected, obviously document the connection between exploration for raw materials, political situations, and events as there are samples from Tsumeb and other famous ore deposits of the former German colony "Deutsch Südwest" (today Namibia) before 1914, samples from the Balkan region during World War I, and a large number of samples from the ore, spar and salt rich regions in the south of the GDR collected during GDR times.

Today none of the ore deposits are exploited in Germany. Most of the former deposits are well documented with typical mineral associations in our collection. Such is not only interesting as historical evidence but also for their geoscientific value. In view of the price increases of several raw materials, re-exploration could be of interest for further investigations.

The samples (about 1000 in number) from Tsumeb and other famous deposits in Namibia have not yet been investigated and may allow one to discover a treasure trove.

Dr. Ehling has been head of the Geoscientific Collection of the BGR since 2005. Her Ph.D. thesis, 1999, from the University of Hannover, Germany, was on Cretaceous Silesian Building Sandstones. She has been at the Federal Institute for Geosciences and Natural Resources, Hannover-Berlin, Germany, since 1990, working on applied mineralogy and Building/ornamental stones. From 1985-1990 she was with the Geological Survey (Berlin) of the German Democratic Republic, and from 1980-1985, was in Studies on Geology, University Greifswald, Germany [Diploma].

Web Resources of the Mineralogy and Gemology Collections at the MNHN in Paris

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The French national mineral and gem collection, located at the Muséum national d'Histoire naturelle (downtown Paris) is now enriched by two new web sites illustrating the specimens and the recent activities around those collections. The first web site is the blog of the Collection. Opened in 2007 shortly after FF's arrival as a curator in charge, the blog displays all news of importance concerning the Collection, from the new acquisitions and donations to the scientific or museologic valorization of the Collection. It is bilingual, French-English. Its address is www.mnhn.fr/blogmineralogie.

The second web site shows a selection of the best specimens of the Collection, based on state-of-the-art quality pictures from L.D. Bayle and A. Dahmane. The site is using extensive computer technologies to facilitate the online browsing among the specimens. Pull-down menus provide texts explaining various physical, chemical and geological aspects for each sample shown. Additionally, some samples can be viewed in 3D (using QuickTime VR) and zoomed in and out. Each VR file is composed by 24 shots, carefully realigned together before the VR movie is produced. In this very first version, 200 different species are shown (360 specimens), focusing also significantly on French mineralogy. The web site will open in June 2008 but it is impossible, at the time of the submission for MM6, to release its final web address. Also, the English version of the site is nearly completed and will be posted soon online. This web site is sponsored thanks to the Corporate philanthropy of Total, the French oil company.

François Farges is professor of environmental mineralogy at Stanford and at the Muséum national d'Histoire naturelle in Paris where he is the curator in charge of the French national mineral and gem collection.

Scientific Valorization of the Mineral Collections: The MNHN Perspective

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Recently, the French authorities decided to continue redynamizing research around the French national Earth sciences collections. After the arrival of a nanoSIMS at the meteorite collection in 2003, a Gandolfi micro x-ray diffraction has been finalized in 2006. Thanks to its two precessions, reliable x-ray diffraction intensities can be collected for a sample measuring a few dozen microns. The diffraction is collected simultaneously for any angles comprised between 5 and 70° thanks to a 4096 array detector. Comparison between macroscopic standard x-ray diffraction and this new equipment suggests that cell parameters can be measured down to the 0.005 Å accuracy level. Special care was given to check for potential diffraction "artifacts" such as small angle and diffuse scatterings, as in metamict minerals.

Then, a scanning electron microscope with variable pressure (Tescan VEGA II LSU) was obtained in late 2007. This SEM was chosen because of its excellent optical properties (resolution of 3 nm at 30 kV) but also because of its capacity to work under various pressure environments. This includes the standard "high vacuum" mode but also an environmental mode and an "half-way" mode called "low vacuum". This last mode is the preferred mode because the samples do not require carbon coatings. The microscope is optimized for hydrated minerals, soils, gemstones, documents, chondrites... Voltage can be adjusted between 200 V to 30 kV, ensuring depth-dependant studies (a few dozen nanometers to a few microns). A Si-drift (SDD) Bruker x-ray emission detector with a very large aperture (30 mm²) enhance the ensemble. All available software suites from Bruker were purchased, allowing quantitative chemical estimations, automatism of the data collection and many more features. The machine is therefore particularly dedicated to the new domains in mineralogy, such as cosmomineralogy, environmental mineralogy, biominerals, medical mineralogy...

A fourth category of instruments includes various X-ray absorption spectrometers and microscopes that we recently commissioned at various synchrotrons worldwide. This includes the X-ray absorption fine structure (XAFS) 11-2 beamline at SSRL (Stanford), the environmental Scanning Transmission X-ray Microscopy at the ALS (Berkeley); LUCIA, the XAFS beamline at SOLEIL (Saclay) and two other XAFS beamlines near Zürich: X05 and SuperXAFS. These instruments provide speciation information (including quantitative redox) at the nanometer/micrometer scales. This ensemble of instruments defines our new platform of expertise in nanomineralogy that is now available at the MNHN.

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The Current “Boom” of Mineralogies and Their Impact on Displays

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Mineralogy currently experiences a major “boom” in scientific output. This boom is mainly driven by the development of environmental mineralogy, cosmomineralogy, virtual mineralogy, nanomineralogy, biomineralogy and medical mineralogy. The current explosion of metal mining also stresses what was kept of our past mineralogical knowledge, which has suffered, at least in Europe, the consequences of various economical, financial and political dumping, resulting in lesser interests from the authorities, the main economic actors and the students.

Nowadays, the situation appear to change and a new mineralogy faces out, thanks to the use of larger-size-, more complex instruments dealing with isotopes, environmental imaging and speciation at the nanometer scale. Examples of such research will be given, such as the formation of biogenic uraninite and its beneficial consequences for nuclear waste remediation, the formation of minerals within biogenic thin films or the speciation of various toxic elements in the environment, from super-critical melts to weathered metamict minerals; from traces of metals in quartz to the surface of corundum.

Application of that knowledge to a new museologic concept to display minerals and gems at the MNHN results in a current reorganization of our showcases, particularly our Trésor (Vault). We decided to stop showing minerals by chemistry, which does not carry any obvious natural science concept. In contrast, we focus on particular minerals, which mining/exploration either valorize the mining activities but also promotes the conservation/preservation of the natural geotopes. Protecting the environment, making bacteria to work metals for us, understanding how the geodiversity combines itself with biodiversity, impact of minerals on human health and much other concepts will be discussed through specific selected geotopes : placers, kimberlites, sediments, pegmatites and skarns. Particular geotopes are highlighted such as Guyane, California, South Africa, Madagascar, Brazil, Pakistan, Myanmar and others. In those environments, the production of mineral values compensates more or less rigorously the destruction of the biotopes or human rights. Therefore, we will focus on a natural history, in which the anthropic interferences are highlighted through conservation/preservation and/or economic or artistic valorization, instead of keeping a strict Strunz classification, which has little pedagogic impact on a young audience for instance.

François Farges is professor of environmental mineralogy at Stanford and at the Muséum national d'Histoire naturelle in Paris where he is the curator in charge of the French national mineral and gem collection.

Revision of the Chemical Formula of the Dimorphs Epididymite and Eudidymite: Two Hydrated Sodium Beryllium Silicates

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The IMA list of minerals, the RRUFF project and the American Mineralogist Crystal Structure Database report a wrong chemical formula of epididymite and eudidymite: NaBeSi₃O₇OH. Based on the unusually high temperature of dehydration observed for epididymite (T>830°C), Robinson and Fang (1970) suggested that epididymite contained OH- groups, and not H₂O. The crystal structure of eudidymite was later investigated by Fang et al. (1972) and described with the ideal chemical formula: Na₂Be₂Si₆O₁₅•H₂O (Z=4). Two natural samples of eudidymite and epididymite, selected for a multi-methodological investigation, were collected in a miarolitic granitic-pegmatite hosted by A-type peralkaline granites of the Zomba-Malosa pluton in southern Malawi. These pegmatites host an exotic mineralogy which include aegirine, arfvedsonite, fluorite, quartz, K-feldspar, niobophyllite, xenotime-(Y), zircon and many exotic phases like REE-carbonates, Nb-Ta-Y-Th oxides, Be-Na-Zr-Ba-Y silicates.

Energy dispersive X-ray spectroscopy, thermo-gravimetric analysis and inductively plasma-optical emission spectroscopy were performed to define the chemical composition; neutron diffraction experiments at ambient condition were performed in order to refine the site position of the Be/Si framework and to describe the real topological configuration of the water molecules (or hydroxyl-groups) of these minerals. The analysis of the difference-Fourier maps of the nuclear density confirms the presence of extra-framework water molecules in both the dimorphs (Gatta et al., 2008). The chemical analyses show that a low, but significant, amount of Al and Fe (likely substituting Si in the tetrahedral sites) and K (substituting Na as extra-framework cation) occurs in both the two dimorphs.

Based on this study, the real chemical formula of epididymite and eudidymite can be re-written as: Na₂Be₂Si₆O₁₅•H₂O (Z=4).

Alessandro Guastoni is Museum Curator at the Department of Geoscienze at the University of Padova. His main field of research is the study of mineralogy and geochemistry of pegmatites, in particular Alpine pegmatites and alkaline pegmatites of Mount Zomba-Malosa pluton, Malawi.

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The Color Origin and Quantitative Characterization of the Turquoise in Zhushan, China

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146 turquoise samples ranging from sky blue, green, to yellow selected, a comprehensive study was given to these samples from Zhushan, Hubei Province regarding their color mechanism and quantitative characterization. It indicates that red samples contain relatively more Mn^{2+} (0.041%). With the use of EPMA line scanning, chemical element analysis (to obtain the ion content of Fe^{2+} , Fe^{3+}) and Colorimeters (with CIELAB Uniform Chromaticity Model), it is discovered that the high content of Mn^{2+} and the low content of Cu^{2+} together lead to the red color, and that the color of sky blue (b^* from -4.78 to -9.64) in turquoise is decided by Cu^{2+} (from 6.175 to 6.696 in the chosen samples), while green (a^* from -19.13 to -34.50) by Fe^{2+} (from 0.23 to 0.54 in the chosen samples) and yellow (b^* from 4.55 to 11.27) by Fe^{3+} (from 3.36 to 3.83 in the chosen samples). The lightness is affected by Fe^{2+} , Fe^{3+} and Cu^{2+} , in positive correlation with Fe^{3+} and negative with Fe^{2+} and Cu^{2+} . Besides the coloring ions, water has impact on the color of turquoise. The Hue Angles of the five samples range from 172° to 194° , and the Saturation is from 13° to 31° . The Saturation of the most brilliant turquoises in the market is more than 30. At last, the quality evaluation system is provided comprehensively with consideration of other factors, such as iron line, texture and cut.

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The Inside-Water Impact on Turquoise's Blue and Green

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The aim of the paper is to find out the inside-water impact on turquoise. Water sorption measurement is to leave the samples in water within same amount of time and use the Colorimeters to measure the Color Scale Data at each stage. With the increase of the absorbed water, the Hue, Saturation and the Lightness are changed especially in 1.5 hours. Within 36 hours, the Color Difference (CIE 2000 Difference Formulas) of blue group is between 4.20~7.26, while green group is between 1.28~5.49. In dewatering measurement one sample is divided into two pieces: one is made to do the Differential Thermal Analysis, and the other is made into slice (1cm diameter, 2mm thickness). Through the Differential Thermal Analysis we can get the temperature of dewatering of the Absorption Water, the Crystal Water and the Structural Water, 150°C, 350°C and 530°C respectively. The total water loss is 17.78%~19.57%. Crystal Water is the highest, about 10%, Absorption water 5% and Structural water 4%. After heat-treatment for the slice, the Color Scale Data is measured. It is discovered that the most important effect of the dewatering of Absorption Water is the hue of the green color (a^* from -12.06 to -4.57) and the Saturation (C^* from 17.55 to 12.32). When Structural Water is deprived, the turquoise is destructed and becomes yellowish gray color powder. To observe the difference of appearance and microscopic structure before and after the loss of inside-water, we use SEM to observe the turquoise deprived of Absorption Water and some Crystal Water (230°C). It's found that the crystal particles becomes bigger and profile clearer. The hand sample becomes greenish gray and waxy luster is turned into earthy luster. When Structural Water is deprived (700°C), the border of the crystal becomes round. The samples selected have same character of the Infrared Absorption Spectroscopy, including position and strength of the absorption band. The Infrared Absorption Spectroscopy shows that 2926 cm^{-1} absorption peak appears when Absorption Water and some of Crystal Water (230°C) are lost; 2924 and 1853 cm^{-1} absorption peak appears, PO_4^{3-} stretches and bend vibration are damaged when Structural Water absorbed. The samples selected have basically same Raman Spectroscopy in vibration frequency and strength. With the temperature increasing from 200°C to 1480°C, there is only left 250 cm^{-1} vibration peak. If the temperature continues to increase, Raman Spectroscopy cannot distinguish.

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Collections Online: Google Mapping Geoscience Collections at Museum Victoria, Melbourne, Victoria, Australia

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Over the past 20 years the amalgamation of the large geological collections of the University of Melbourne and the Geological Survey of Victoria with the Museum's collection has made Museum Victoria the sole repository for geological collections in the State. The geology collections contain over 100 000 specimens of minerals, rocks, meteorites and tektites.

Resources within the Mineral, Petrology, Meteorite and Tektite collections include:

- an extensive systematic mineral reference collection (51 000 specimens)
- an extensive range of mineral species (over 2700 species)
- a global reference mineral collection
- Australian mineral type-specimens (42 specimens)
- significant suites of rocks and minerals from Victoria
- significant suites of rocks and minerals from Australian mineral deposits
- some unusual meteorites
- a large collection of impactites

Recently, Museum Victoria has made its Natural Science collections available on the Web collections.museumvictoria.com.au/search.php. The data are harvested from Darwin Core fields in a KeEMu database. The data is refreshed every few hours to reflect any changes in the data. The Mineral, Meteorite and Tektite collections data are fully computerized and now available and searchable. The Petrology collection is currently being computer registered.

Queries can be conducted on the basis of mineral species although shortly this will also allow for mineral groups and chemical classification searches. The Meteorite collection can be searched according to name, class, group or type and the tektites can be searched according to tektite names. Pull-down Lookup Tables are available on the searchable fields.

Complex queries involving the above parameters in combination with geographic location data can be made. Where latitude and longitude data are available the search results can be plotted on Google Maps. The search results also include acquisition data. So, for example, specific sub-collections within the Geoscience collections may be searched, (e.g. the Baker tektite collection or the Amess gem collection). The results will also return images of the specimen, if available.

The availability of the Geoscience collections on the Web has already attracted comment from collectors and researchers who have been able to provide corrections or embellish data within the collections. The plotting of data on Google Maps readily highlights any inconsistencies in geographic information. The maps have all the functionality associated with Google Maps (e.g. zooming in, satellite imagery etc). Clicking on the points plotted provides detailed specimen information.

Further work is being undertaken to include narratives on the individual collections and to increase the range of images available.

Dermot Henry has worked at Museum Victoria since 1982 in a variety of roles within the Geosciences collections. Since 2000 he has been Manager of Natural Science collections. Dermot has published on a variety of mineralogical, petrological and meteoritical topics and has edited and contributed to three books on Victorian mineralogy. Dermot is also the editor of the Australian Journal of Mineralogy.

A New View of Minerals in the Mantle and Crust

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Quantitative mineralogy is a new development in minerals research that utilizes electron-beam techniques to map mineral distributions in materials, and enhanced software capabilities to sort, assess, and report these data. This technique provides a new view of minerals in that false-colour digital x-ray images capture compositional, modal, and textural information that enables the user to readily understand the mineralogy of the sample. The new Advanced Mineralogy Research Center at Colorado School of Mines opened in April 2008 with a laboratory featuring QEMSCAN® technology www.intellectioncorp.com. QEMSCAN® utilizes a scanning electron microscope platform with four energy dispersive x-ray spectrometers, allowing for fast acquisition of backscattered electron and x-ray signals to determine mineral abundances in dust- to rock-size samples. The system was initially developed for the mining industry by the Australian research institution CSIRO some 25 years ago. Mining applications include examination of the distribution of economic minerals in surrounding materials and the determination of their optimum recovery methods based on mineralogy. In the AMRC, quantitative mineralogy is also being applied to the oil and gas sector in the examination of oil shales and pore throat mineralogy, as well as to coal, environmental, planetary, medical, and other applications where mineralogy is a key factor in material characterization.

This poster presentation will illustrate the quantitative mineralogy technique using a range of rock and mineral examples from the earth's mantle and crust. Mantle peridotites from the Premier diamond mine, South Africa, reveal the distribution of olivine, orthopyroxene and clinopyroxene and show the importance of the secondary metasomatic minerals phlogopite, amphibole, and diopside; kimberlites from Letseng, Lesotho, show volcanic features, multiple magmatic phases, and the distribution of xenocrysts and magmatic alteration that impact diamond extraction. Crustal gold and copper ores from Nevada and Utah exhibit alteration and sulfide mineralization features that enable better understanding of mineralization processes. Granites from the Scottish Highlands illustrate how small changes in plagioclase composition can be quantified. Other examples of current research in the AMRC include soils, planetary materials, and organic materials such as bone and tissue. The resulting images from every study are also beautiful examples of the diversity of mineral occurrences in the earth.

Karin Hoal is the Director of the Advanced Mineralogy Research Center at Colorado School of Mines. She has degrees in geology from St Lawrence University, McGill University, and the University of Massachusetts, and was a Post Doctoral Fellow at the University of Cape Town. Her background is in diamonds and geometallurgy, and she has worked for 25 years in industry, government, and academia.

The Micromount Collections of the Denver Museum of Nature and Science

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The DMNS has three micromount collections. The Paul Seel collection of 10587 mounts including 1754 diamonds. The Shorty Withers collection of 3769 mounts. The supplementary collection which includes some Paul Seel material that he never got to mount and other specimens acquired by the museum since 1989. In these collections are 870 species.

These collections are on our computer and also exist as 8 printed booklets of 500 pages each. Sample pages of these booklets will be shown on this poster.

James F. Hurlbut has been a 20-year Volunteer as acting Curator of Micro Minerals at the Denver Museum of Nature and Science. He has an MA in Nuclear Physics, with 3 years at Los Alamos and Mercury NV. Jim has been an Instructor at University of Colorado, Denver, Center for Continuing Education, for 20 years, teaching a class in rocks and minerals of Colorado. He has been President of Spectrum Techniques for 55 years.

Synthetic, Simulated, and Treated Gems in Your Collection: Implications and Examples

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Synthetic gems have the same mineralogy as their natural counterparts, while simulated gems (imitations) are made in whole or in part from other materials. However, even gems from natural sources are often treated. Polished gems are often donated to collections, and information as to their nature may not accompany these pieces. Even gem mineral crystals ("gem rough") can be treated, synthetic, or imitated.

It is obviously important that synthetic and imitation gems be recognized by museums. The correct identity affects the value of donations and insured exhibits, but more importantly it addresses the authenticity of a piece. However, recognition of gem treatments can also matter for additional reasons.

The first concern is durability. Some treated gems change with time and "benign" conditions: oiled or filled emeralds can dry out, and some gem dyes fade. "Solid" fillers in gem fissures may cause brittle gems (in storage?) to crack with temperature changes.

Another concern is radioactivity, which has been known for a century to change the color of some gemstones. Although many gemstones treated by radiation are now practically harmless, some continue to emit significant amounts of radiation, including green to blue-green to black irradiated diamonds, dark brown irradiated chrysoberyl cat's-eyes, and irradiated African rubies.

Finally, if treated gems are mounted in jewelry, repair may be needed at some point. Many diffusion-treated corundums have their color (or asterism) close to the surface, so will lose color if they are repolished. Steam cleaning can remove fissure-fillers and may damage filled diamonds and other gemstones. Repair of gem mountings can also damage treated stones.

Curators should be aware of (at least) beryllium-diffused "padparadschah" sapphires, fracture-filled Paraiba tourmalines, large fracture-filled diamonds, polymer filled "B" jadeite, and imitation diamond crystals made of CZ, glass, or topaz. To avoid unpleasant mistakes, museums should have access to a gemologist who stays aware of the current gem literature.

Dr. Johnson is principal of Mary Johnson Consulting, a natural history services company. Formerly the Manager of Research and Development at the Gemological Institute of America in Carlsbad, California, she was educated at Caltech and Harvard and has worked at UCLA and Caltech on minerals, high pressure, and outer-solar-system projects. She has worked with collections at Caltech, Harvard, the GIA, and the Natural History Museum of Los Angeles County.

Gemstones for Teaching - The Historic Collection of Duke Carl August Bought and Compiled Under the Guidance of J.W. Goethe

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Carl August (1757-1828), Duke of Saxony-Weimar, bought a typical natural history collection in 1779. To this collection he added parts of his private mineral and gem collection and so he laid the foundation for the today's Mineralogical Museum of the Friedrich-Schiller-University of Jena /Germany. But Carl August didn't only found the museum, he took an interest in the development of the collection and all the time and subsidized the first curator and director of the museum, Joann Geog Lenz. Lenz had been employed by J.W. von Goethe who had been in position of a minister at the court of Carl August. Lenz got into mineralogy as an autodidact after the system of Abraham Gottlob Werner. Because of his publications and his work in the museum he became the first professor of mineralogy in Jena in 1794. In the same year he published his famous "Mustertafeln der bis jetzt bekannten einfachen Mineralien" with 400 coloured specimens from the collection. Three years later, in 1797, Lenz founded the "Societät für die gesammte Mineralogie zu Jena" - the first association belonging especially to geoscience. Thousands of minerals, rocks and fossils from all over the world arrived in Jena as presents from the members of the association. Duke Carl August kept on sending a few suites of minerals and rocks to the collection in Jena. The son of Carl August married Maria Paulowna, a daughter of the Russian Tsar Paul I. Later on two grandsons and two granddaughters were born. Both Marie and Augusta obtained a real good education and in the same way they got well schooled in mineralogy. For this reason in 1820 Carl August bought a collection of minerals, mostly polished. Predominantly the collection contained a lot of quartz and a large variety of chalcedonies. Furthermore there are some topaz, beryl, feldspars and oxides contained. This collection belonged to the family in Weimar till the beginning of the 20th century. Then under the professorship of Gottlob Link this famous collection went to the mineralogical museum in Jena. After 1945 this collection for teaching had been assigned to the traditional grown up collection of gems in Jena. In 2007 the author hit by fluke on the origin of parts of the today's gem collection and kept tracks in the archive.

Birgit Kreher-Hartmann has acted as a curator of the mineralogical museum of the Friedrich-Schiller-University in Jena, Germany for about 15 years. Research on the history and development of the collection are parts of her favorite job.

Contrast on Display Effects of Ruby in Illuminant D65 and Illuminant U30

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The quantitative effect of different illuminants on ruby's colour difference is investigated by colorimetry and spectrophotometer. It is revealed that when the colour temperature of the illuminants decreases, brightness value L will increase slowly; red/green value a^* and saturation C^* are independent of colour temperature difference; yellow/ blue value b^* and hue angle h_0 increases largely with the decreasing temperature difference. It can confirm that U30 illuminant is the best illuminant for all varieties of ruby display, compared to other common illuminants. Furthermore, it is obtained that purple ruby looks more beautiful at U30 illuminant rather than D65 illuminant; red ruby looks more beautiful at D65 illuminant rather than U30 illuminant; parts of amaranth ruby looks better at U30 illuminant, but the rest are not decided. Hence, it will be helpful to the display and selling of rubies.

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Quantitative Nomenclature for Colour of Ruby in Uniform Color Space

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In view of the human eye's visual colour characterization methods, it is necessary to carry out colour quantification of ruby in uniform colour space. In accordance with the colour parameter of specimen from spectrophotometer, rubies are divided into red, amaranth and purple by hue; into grey, shallow, moderate, deep, vivid by saturation; and into darker, dark, middle, bright and brighter by brightness. Record the colour of ruby in the objective way of "brightness /saturation /hue", which provides a precise colour formulation for ruby colour hierarchical model in CIE LAB uniform colour space.

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Barium- and Lead-Rich Orthoclase with Unusual Fe-Pb-Al-Ti and Mn-Fe-Ti Oxide Inclusions from the Andover Iron Mine, Sussex County, New Jersey

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Orthoclase from the Andover/Sulphur Hill iron mine, Sussex County, New Jersey, contains two unusual Ti-bearing oxides which may be new mineral species. It occurs as granular orthoclase-biotite rock associated with calc-silicates and magnetite within Proterozoic gneisses, on strike and about 12 miles SW of the famous Franklin-Ogdensburg deposits. The orthoclase has bright blue fluorescence and CL and is Ba- and Pb-rich, 3.41 wt % BaO, 3.17 wt % PbO, $(K_{0.71}Na_{0.09}Ba_{0.07}Sr_{0.02}Pb_{0.04})(Al_{1.11}Si_{2.90})O_8$; not quite rich enough in Ba to be hyalophane. XRD unit-cell refinement gives $a = 8.5431(13)$, $b = 13.0027(15)$, $c = 7.1986(9)$ Å, $\beta = 115.922(10)^\circ$, $\alpha = \gamma = 90^\circ$, $V = 719.19(11)$ Å³. A few grains lacking blue CL have lower BaO (1.8-0.0 wt. %) and no detectable Pb. Inclusions (10-100µm) of two kinds of opaque oxide minerals occur within the orthoclase. Most abundant is an Fe-Pb-Al oxide phase also containing significant Zn, Ti, and Mn. Probe analysis (wt.%): 15.26 PbO, 0.39 MgO, 0.05 CaO, 3.62 MnO, 16.59 Fe as FeO, 8.58 ZnO, 45.28 Al₂O₃, 8.36 TiO₂, 0.20 SiO₂, Σ98.33; atomic proportions, with O=19 and all Fe expressed as Fe³⁺, are $Pb_{0.61}Mg_{0.09}Ca_{0.01}Zn_{0.94}Mn_{0.45}Fe^{3+}_{2.06}Al_{7.91}Ti_{0.93}Si_{0.03}O_{19}$. It may be an analogue of magnetoplumbite, $Pb(Fe^{3+}, Mn^{3+})_{12}O_{19}$; hibonite, $(Ca,Ce)(Al,Ti,Mg)_{12}O_{19}$; or of senaite (crichtonite group), $Pb(Ti,Fe,Mn,U)_{21}O_{38}$. A less abundant Mn-Fe-Ti oxide phase contains (wt. %): 1.46 MgO, 6.75 FeO, 25.41 MnO, 0.30 ZnO, 0.13 PbO, 0.30 Al₂O₃, 58.67 TiO₂, 3.54 SiO₂, Σ96.56; atomic proportions, $(Mn_{0.86}Fe_{2+0.23}Mg_{0.09}Zn_{0.01}Al_{0.01})(Ti_{1.76}Si_{0.14})O_5$. This may correspond to the end-member composition $MnTi_2O_5$, a manganese analogue of armalcolite, $(Mg,Fe)Ti_2O_5$. XRD work on the two oxide phases is needed!

Dr. Peter J. Modreski is a geochemist with the U.S. Geological Survey, Denver, Colorado. His background is in petrology and mineral resources, and he is presently responsible for public communications and outreach for the USGS. Pete has a Ph.D. from Penn State in experimental petrology. He is a Research Associate with the Denver Museum of Nature and Science, Earth Sciences Department, and he was a coauthor of *Minerals of Colorado*, published in 1997.

Mineralogy of Alkaline Pegmatites of the Kovdor Massif, Kola Peninsula, Russia

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Kovdor massif is one of the world's largest intrusives of ultramafic and alkaline rocks with carbonatites. Its specific feature is a distinct concentric-zonal structure. More than 250 mineral species have been detected there. Kovdor is the type locality of 20 minerals of which 12 were discovered in dolomite carbonatites and 4 in alkaline pegmatites. The latter belong to a rare type of alkaline vein rock, quite different from typical peralkaline pegmatites of Khibiny and Lovozero massifs. Their most specific feature is high concentration of calcium. As a result, primary cancrinite is a common rock-forming mineral in early mineral assemblages. The role of calcium increases on latest stages of mineral formation. High-calcium zeolites thomsonite-Ca and scolecite are very typical for hydrothermal zones of such pegmatites. Very unusual accessory mineralization in the pegmatites, includes rare minerals of barium, titanium, zirconium, niobium and thorium. A special complex of accessory minerals is characteristic for each vein. Pegmatite veins of similar type are known in the Inagli massif of ultramafic and alkaline rocks. All peralkaline veins of the Kovdor massif are confined to melilite-bearing and other rocks of the so-called Kovdor phlogopite complex situated between the olivinite core and the ring melteigite-ijollite intrusion. Despite the small sizes of Kovdor alkaline pegmatites, they are characterized by a remarkable mineral diversity, mineral composition being individual for each vein and even for each zone of a vein and depends on the composition of a host rock. Accessory barium mineralization is rather diverse: in 7 minerals Ba is a species-forming component. Eudialyte-group minerals are usually enriched in Ca and Ba in comparison with related minerals from typical peralkaline pegmatites.

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The Role of Digital Photography in Mineral Collections Management at the American Museum of Natural History

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The gem and mineral collection at the American Museum of Natural History currently consists of over 100,000 specimens. It is a dynamic collection that has steadily grown since its inception in 1869. Accessions have been recorded in a variety of ways including cards, ledgers, and digital databases. At the present time, we use Superbase, an inter-relational database with a very wide range of fields, including the ability to incorporate digital photos. Five years ago we began an effort to capture images of every specimen, exhibit window by exhibit window and drawer by drawer. We do this in a small, makeshift photography set-up in the collection area, mostly utilizing volunteers. Each picture includes the catalogue number and a centimeter scale. All images are adjusted for brightness and contrast and cropped if necessary. Archival full-sized images are retained with naming based on catalog number. Images are reduced to a "small version" of no more than 760x480 pixels and compressed into JPEG format prior to being added to the database file system. Image files are stored and backed up weekly along with the database files. Systematic imaging of specimens has not only provided us with the obvious advantage of being able to identify specimens quickly and accurately, but also serves as an inventory of the specimens. To date we have captured about 22,000 images, roughly 20% of the collection. We plan to employ our thousands of images as part of a future web-accessible on-line subset of the catalog of the entire mineral and gem collection.

Jamie Newman is a Senior Scientific Assistant and Collections Manager of the mineral and gem collections at the American Museum of Natural History in New York City. With a strong background in Media Studies, as well as Geology and Mineralogy, she is currently working on digitally documenting this world class collection.

Varieties and Formula of Vishnevite

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The idealized crystal-chemical formula of the cancrinite-group mineral vishnevite has been usually written as $[\text{Na}_6(\text{SO}_4)][\text{Na}_2(\text{H}_2\text{O})_2][\text{Al}_6\text{Si}_6\text{O}_{24}]$ where the first part refers to the content of the large channel, the second to the columns of cancrinite cages, and the last to the framework composition (Bonaccorsi, Merlino 2005). Vishnevite has unit cell with $a = 12.7$, $c = 5.2 \text{ \AA}$. We have studied vishnevite samples from the cotype localities at Vishnevye Mountains and Ilmeny Mountains (Urals) deposited in Fersman Mineralogical Museum and Vernadsky State Geological Museum (both Moscow, Russia), as well as from Khibiny, Lovozero, Kovdor (Kola Peninsula) and Murun (Siberia) alkaline complexes (all: Russia) and examined published data on the mineral from worldwide localities.

According to our EMP analyses, the typical feature of vishnevite from a majority of the localities is high potassium content: 1.8-2.85 apfu K, whereas sodium content varies from 4.3 to 6.0 apfu. Only Lovozero samples are K-poor, with 0-0.04 apfu K and 7.1-7.7 apfu Na. Calcium content is typically low (0-0.3 apfu), except one specimen from Vishnevye Mountains with 0.7 apfu Ca. Al/Si atom ratio varies from 0.86 to 1.01. Sulfur content is 0.8-1.15 apfu. According to earlier published data, K-poor vishnevite ($K < 1$ apfu) was found at Loch Borolan (Scotland), Kuusamo (Finland), Urusay (Kyrgyzstan) and Lovozero whereas the mineral from other localities is K-rich and typically Ca-poor. It seems crystallochemically important that cancrinites closely associated with vishnevite (Urals) are Ca-enriched and K-poor. Thus, two chemical varieties of vishnevite are distinguished: widespread K-rich and relatively rare K-poor. Structural studies of K-rich vishnevite indicate that K is located in large channel and show existence of two structural varieties of the mineral: Na,K disordered (Hassan, Grundy 1984) and Na,K ordered (Pushcharovsky et al. 1989). More complex type of Na,K ordering was found in pitiglianoite, $[\text{Na}_4\text{K}_2(\text{SO}_4)][\text{Na}_2(\text{H}_2\text{O})_2][\text{Al}_6\text{Si}_6\text{O}_{24}]$, with $a = 22.1$, $c = 5.2 \text{ \AA}$ (Merlino et al. 1991), which seems a species dimorphous with K-rich vishnevite. All specimens of vishnevite from both cotype localities are K-rich (Vishnevye Mountains: 1.96-2.72, Ilmeny Mountains: 1.82-2.63 apfu K, according to our data) therefore its correct idealized crystal chemical formula is: $[(\text{Na},\text{K})_6(\text{SO}_4)][\text{Na}_2(\text{H}_2\text{O})_2][\text{Al}_6\text{Si}_6\text{O}_{24}]$.

Liudmila Olysysh is a PhD student, Mineralogy Department, Moscow State University. Her fields of interest are mineralogy, crystal chemistry of silicates, alkaline rocks, IR spectroscopy, gemmology, and mineral collecting.

The Italian Minerals in the Philadelphia Academy Collection

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The mineral collection of the Philadelphia Academy of Science has been dormant for decades. This institution has no laboratory, curator or other personnel active in mineralogy. Being short of cash, the trustees decided to liquidate the collection.

In 2007, part of the mineral collection was sold to a group of dealers including Collector's Edge of Golden, CO, Kristalle of Laguna Beach, CA, and Crystals Classics of Yeovil, Somerset, UK. The buyers subdivided the collection into national subcollections, with the declared aim to repatriate the specimens to institutions that could better relate to them, appreciate their historical background and use the material for their research objectives.

This opportunity was taken up by a consortium of the Milan Museum of Natural History and the Mineral Museum of the University of Padua. The consortium was coordinated by one of the authors (RP) who carried out the negotiations, the financial arrangements and finally the logistics that brought the specimens to Italy in May 2007.

The Italian subcollection included about 400 specimens. Some of them are of exhibition quality, but most of them are mainly of scientific and/or historical importance. The specimens are complete with the official Philadelphia Academy label, and generally also with the original label of the person, dealer or institution from which the specimen was obtained. The assemblage of specimens and old labels allows to trace interesting relationships of the Academy with the world of mineral collections in the 19th and 20th century.

The specimens from Tirol (both Southern Tirol, that is now part of Italy, and Northern Tyrol, now part of Austria) and from the Veneto region were assigned to the University of Padua, where they join the important regional collection there. The Padua collection includes, in particular, a good part of the collection of G. Gasser of Bolzano/Bozen: about 2500 specimens acquired in 1935 by Professor Angelo Bianchi. The suite of about 100 Philadelphia specimens integrate nicely that collection.

The Milan Museum took the bulk of the collection, about 300 specimens from various part of Italy, including most of the classic localities in Piedmont, Lombardy, Tuscany, Latium, Campania, Sicily. Exception made for some items of uncertain locality, obsolete species etc., they will be entered in the museum's general catalog.

In conclusion, it may be observed that, in the unfortunate case in which institutions can no longer curate or properly preserve collections (because their focus has shifted onto other subjects, or because of lack of funds etc.), the lesser evil is to pass them on to qualified institutions who can better understand and use the specimens and provide the necessary care and security.

Renato Pagano, after getting a Doctor of Electrical Engineering degree from the University of Genoa, Italy in 1963, did graduate work at the Rensselaer Polytechnic Institute, Troy, N.Y. and pursued a career in the electrical and electronics international business. A keen mineral, books and instruments collector, he actively supports the Milan Museum as collection management and acquisition consultant.

Mineralogy of the Los Archipelago (Guinea): New Mineralogical Data

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The Los Archipelago geological "ring" structure (Guinea, West Africa) is composed of peralkaline nepheline syenites, which extend over two long-, crescent-shaped islands (Tamara, Kassa), five islets and a central island (Roume). Geologically speaking, two petrologic suites are identified: the first series is miaskitic and composed of hastingite-augite nepheline syenites, whereas the second one is agpaitic and mainly composed of arfvedsonite-aegirine nepheline syenites. The mineralogy of this complex was first studied by Lacroix (1911) who recognized, for the first time, serandite and an important series of rare minerals, typical of those miarolitic cavities that includes villiaumite, catapleite and various minerals of the eudyalite group. More recently (Parodi & Della Ventura, 1987)(Oberti et al., 2001) , steacyite and britholite were added to the new mineral species that are typical of the Los Islands.

Thanks to the European SYNTHESYS project www.synthesys.info a re-examination of the samples deposited by Lacroix was initiated at the French national mineralogical and gemological collections of the Muséum National d'Histoire Naturelle in Paris. Thanks to this, we have identified also a new mineral species of the rinkite group, with the formula $(Ca, Na, REE)_7(Nb, Ti)[Si_2O_7]_2OF_3$. This mineral is the (Nb,Ti)-analogue of dovyrenite $(Ca_6Zr(Si_2O_7)_2(OH)_4$). Other mineral species, related to lavenite and eudyalite groups, remain still unidentified. Work is in progress to identify those species. We will report the mineralogy of these "new" old species, the one richest in U-REE-Zr-Nb, and others rich in rare elements minerals.

Dr. Parodi is Assistant Professor of Mineralogy, Muséum national d'Histoire naturelle, Paris, France.

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Nomenclature of Apatites: Problems Related to Split Site Occupancies

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The general formula of apatite can be written as $^{IX}M1_2^{VII}M2_3(^{IV}TO_4)_3X$ (the left superscript indicate the coordination number of the given sites). The archetype structure of apatite has space group P63/m. In apatite sensu stricto it is $M1 = M2 = Ca$ and $T = P$, hence the three minerals chlorapatite $[Ca_5(PO_4)_3Cl]$, fluorapatite $[Ca_5(PO_4)_3F]$, and hydroxylapatite $[Ca_5(PO_4)_3(OH)]$ are named on the basis of the dominant X- anion. Among phosphates with the apatite structure, other minerals exist such as pyromorphite $[Pb_5(PO_4)_3Cl]$, alforsite $[Ba_5(PO_4)_3Cl]$, and phosphohedyphane $[Ca_2Pb_3(PO_4)_3Cl]$. Besides, some apatite-group minerals exist with the same structure topology but lower space group symmetry (P63), in which the M1 sites are split into a pair of non-equivalent sites (M1 and M1'), occupied by Sr and Ca, respectively. Among them, there are fluorcaphite $[SrCaCa_3(PO_4)_3F]$ and strontium-apatite $[SrCaSr_3(PO_4)_3F]$.

Recently, a mineral with composition close to the Sr-P end member was sampled at the Kirovskii underground apatite mine, Mountain Kukisvumchorr, Khibiny alkaline complex, Kola Peninsula, Russia. Its chemical composition was derived through electron microprobe analyses and is: $(Sr_{4.47}Ca_{0.33}Ba_{0.12}Na_{0.02}La_{0.02}Ce_{0.01}Th_{0.01})_{\Sigma 4.98}P_{3.02}O_{12}[F_{0.56}(OH)_{0.35}O_{0.08}]_{\Sigma 1.00}$. Therefore its ideal chemical formula can be written as $Sr_5(PO_4)_3F$. Single-crystal X-ray diffraction study ($R = 0.030$) indicated that the mineral has space group P63/m, with a 9.845(7), $c = 7.383(4)$ Å, and that Sr is the dominant cation at both the M1 and M2 sites. No splitting of the M1 site into a pair of non-equivalent sites occurs. Evidently, such mineral (at present under evaluation by the IMA CNMNC) would have well deserved the name strontium-apatite (or strontioapatite), if that name was not already assigned to another mineral with formula $SrCaSr_3(PO_4)_3F$, i.e. with a lower Sr content with respect to this potential new mineral. To overcome this trouble, and to find a naming system which better reflects the relationships between given names and chemical composition, a subcommittee on apatite nomenclature has been established by the IMA CNMNC, with the aim of making some order in the nomenclature of apatites sensu lato, including not only phosphates, but also arsenates, vanadates, silicates, and silicates/sulphates with the apatite structure.

Marco Pasero is professor of mineralogy and crystal-chemistry at the University of Pisa. He is author of some 75 papers in peer-reviewed journals, most of them dealing with the crystal-chemical features of minerals (crystal structure refinements, polytypism, polysomatism, OD-structures), and with systematic mineralogy. He is the Italian member within the IMA Commission on New Minerals, Nomenclature, and Classification.

Igor V. Pekov, b. 1967, PhD (1997), DSc (2005), leading researcher (Dept. of Mineralogy, Geological Faculty, Moscow State University, Moscow, Russia). Fields of interest: general and genetic mineralogy; crystal chemistry of minerals; mineralogy of alkaline rocks and granitic pegmatites; mineralogy and geochemistry of rare elements; history of mineralogy; mineralogy of Russia and other countries of former Soviet Union. Author or co-author of 67 IMA-approved new mineral species. Special interest is systematic mineral collecting, collection management and databases.

Major- and Trace-Element Variations in Zoned Phlogopite from Carbonatites of Iron Hill (Gunnison County, Colorado): A Comparative Study

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Phlogopite is a ubiquitous accessory mineral in carbonatitic rocks and, owing to its large capacity for atomic substitutions and long crystallization span, can be used as a sensitive petrogenetic indicator. In the literature, zoning in phlogopite crystals from carbonatites has been suggested to reflect variations in crystallization conditions (e.g. T and fO_2) in the course of carbonatite evolution. In this work, we examined the major- and trace-element composition of phlogopite in carbonatite from the Iron Hill complex, where phlogopite occurs as sub- to euhedral grains up to 3 cm across set in a calcite-dolomite matrix. The composition of the mineral was determined by wavelength-dispersive X-ray spectrometry (major elements) and laser-ablation inductively-coupled-plasma mass-spectrometry (trace elements). Back-scattered electron images of the Iron Hill phlogopite exhibit a complex zoning pattern composed of low-AZ cores and high-AZ rims (AZ = average atomic number). The high-AZ rim is enriched in kinoshitalite component, $BaMg_3Al_2Si_2O_{10}(OH)_2$ (17-40 mol.%) and, to a much lesser extent, Fe (4-5.5 wt% FeO_T) and depleted in Ti relative to the core (<11 mol.% Kns, 3-4 wt% FeO_T , up to 0.5 wt.% TiO_2). The rim has higher levels of certain trace elements, including Mn (1410-2440 ppm), Sr (430-830 ppm), Zr (30-105 ppm), Sc (25-75 ppm), and lower concentrations of Rb (250-400 ppm) relative to the core (1140-1870 ppm Mn, 33-161 ppm Sr, ≤ 4 ppm Zr, ≤ 8 ppm Sc, 400-540 ppm Rb). There is a significant overlap in Nb and Ta values, although the rim typically contains somewhat higher levels of these elements. For comparison, we also analyzed zoned phlogopite from carbonatites of Kovdor (Russia), Prairie Lake and Oka (Canada). The core-rim evolutionary trends in the Iron Hill and Oka phlogopite are remarkably similar, whereas the Kovdor samples show a strong enrichment in Fe in the rim and an inverse pattern of trace-element (Rb, Sr, Ba, Sc, Mn, Zr, Nb) variation relative to that observed in the Iron Hill and Oka phlogopite. With the exception of decreasing Nb, the core-to-rim trend exhibited by the Prairie Lake phlogopite mimics that documented in the Kovdor samples. These differences indicate that the nature of zoning in carbonatitic phlogopite is dependent on competitive partitioning of minor and trace elements between phlogopite and its associated minerals (fluorapatite, pyrochlore, etc.).

Ekaterina Reguir has M.Sc. degrees in Geology/Mineralogy from St. Petersburg State University (Russia) and Lakehead University (Ontario, Canada), and is presently a Ph.D. student in the Department of Geological Sciences, University of Manitoba, Canada. Her research focuses on distribution of major and trace elements in rock-forming minerals from carbonatites and associated alkaline silicate rocks and in their potential applications as tracers of magma evolution. She also volunteers as Associate Curator of the Robert B. Ferguson Museum of Mineralogy.

Zhangpeishanite, BaFCl, A New Mineral in Fluorite from Bayan Obo, Inner Mongolia, China

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Zhangpeishanite, ideally BaFCl, occurs as fine inclusions in fluorite from Bayan Obo, Inner Mongolia, China. The location is in the fluorite-type ore and in the transition zone of dolomite and slate. Associated minerals are norsethite, barite and hematite in fluorite. Zhangpeishanite formed during the stage of hydrothermal activity. The grain size of zhangpeishanite as minute inclusions in fluorite is up to 100 µm, but is usually much less. It is tetragonal, P4/nmm, $a = 4.3951(8) \text{ \AA}$, $c = 7.223(2) \text{ \AA}$, $V = 139.52(7) \text{ \AA}^3$, $Z = 2$. The three strongest lines in the powder XRD pattern (IP - 114.6 mm diameter Gandolfi camera data employing Ni-filtered CuK α radiation) [$d(\text{\AA})$, l/h , hkl] are (3.75, 100, 101); (3.11, 94, 110) and (2.36, 82, 112). An electron microprobe analysis gave (wt.%); Ba 70.90, F 9.88, Cl 18.85, and lead to the empirical formula Ba_{0.99}F_{0.99}Cl_{1.02} on the basis of 3 total atoms per formula unit. Zhangpeishanite is a member of the matlockite group (3DC.25), and is the Ba-dominant analogue of matlockite and rorisite. The calculated density of zhangpeishanite is 4.54 g/cm³. Zhangpeishanite is colourless with white streak, and is transparent with vitreous luster. No fluorescence was observed under short or long wave UV light. The hardness is 2½ on Mohs' scale, measured on a crystal of the synthetic equivalent, which shows perfect cleavage on {001}. The optical data from synthetic equivalent are; uniaxial (-), ω 1.656(2), ϵ 1.652(2) (589 nm). The name is for Prof. Zhang, Peishan (born 1925), a mineralogist, in recognition of his contributions to the mineralogy of Bayan Obo. This mineral and the mineral name were approved by the IMA, CNMNC, #2006-045. Type material is deposited at the National Museum of Nature and Science, Tokyo under the registered number NSM-MF14696, and at the Institute of Geology and Geophysics, Chinese Academy of Sciences with registration number KDX013. Perfect partitions of Ba from Ca and of Cl from F in zhangpeishanite was indicated by the contact surface between zhangpeishanite and fluorite without solid solutions between Ca and Ba and between F and Cl. Zhangpeishanite is a natural equivalent of synthetic BaFCl crystals, which are applied as the photostimulative luminescent materials in imaging plates.

Dr. Ritsuro Miyawaki graduated 1982 from the Department of Chemistry, University of Tsukuba. He received his Dr. of Science (Chemistry) in 1987. From 1987-1995 he was a Researcher at the National Industrial Research Institute of Nagoya. From 1996 to the present he has been Curator, National Museum of Nature and Science, Tokyo.

Minerals Named in Honour of Persons and Geoscientists from Saxony

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Saxony has a long tradition in mining and geoscience. Famous persons like Georgius Agricola (1494-1555), Abraham Gottlob Werner (1749-1817), Johann Carl Freiesleben (1774-1846) and August Breithaupt (1791-1873) have significantly shaped the sciences of mineralogy, geology and mining.

Beside the naming of minerals after discovery localities, physical properties or chemical composition almost 45 % are named in honour of a person. Thus, 22 valid mineral species carry the names of mineralogists, geologists, chemists and miners who either came from Saxony or had worked in Saxony: Beyerite, Blöditte, Breithauptite, Brendelite, Fiedlerite, Freieslebenite, Fritzscheite, Herderite, Köttigite, Kolbeckite, Naumannite, Plattnerite, Richterite, Rinneite, Roscherite, Schlegelite, Schumacherite, Tischendorfite, Trägerite, Vaterite, Zeunerite and Zirkelite. In recent years, Pauflerite has been submitted for approval by the International Mineralogical Association (IMA).

Type material for Brendelite, Kolbeckite, Roscherite and Schlegelite is located in the Museum of Mineralogy and Geology (MMG) Dresden, for Herderite, Köttigite, Plattnerite, Trägerite and Zeunerite at the TU Mining Academy Freiberg.

Apart from these valid mineral species there are numerous discredited minerals named after persons with reference to Saxony whose identity with another mineral has been proven or which only represent varieties: Agricolite, Arnimite, Baldaufite, Beustite, Castellite, Cottaite, Fischerite, Frenzelite, Henkelite, Kalkowskyn (Kalkowskite), Kolbeckine, Kossmatite, Mohsine, Mohsite, Stelznerite, Wapplerite, Weisbachite, Weissian, Weissite (of Trolle-Wachtmeister), Wernerin, Wernerite and Winklerite. Thus, important geoscientists and persons are no longer represented with a recognized mineral: Georgius Agricola, Richard Baldauf (1848-1931), Friedrich Constantin von Beust (1806-1891), Bernhard von Cotta (1808-1879), August Frenzel (1842-1902), Ernst Kalkowsky (1851-1938), Franz Kossmat (1871-1938), Friedrich Mohs (1773-1893), Alfred Stelzner (1840-1895), Albin Weisbach (1833-1901), Christian Samuel Weiss (1780-1856), Abraham Gottlob Werner and Clemens Winkler (1838-1904).

Klaus Thalheim was born in Pirna, Saxony, Germany on 15 May 1956.

1976-1981 Study of geology at Bergakademie Freiberg, Saxony.

1981 Diploma thesis about mineral inclusions in cassiterites (Dipl.-Geol.).

1988 PhD thesis about soil-geological and soil-mineralogical investigations in the Osterzgebirge, Saxony at TU Dresden (Dr. rer. nat.).

1989-1991 Postdoctoral study of museology at Humboldt-University Berlin, thesis about the mineralogical collection at the Museum of Mineralogy and Geology Dresden.

1987-1994 Scientific assistant (mineralogist) at the Museum of Mineralogy and Geology Dresden.

1994-present Curator of mineralogy at the Museum of Mineralogy and Geology Dresden.

2002 Honorary Professor of applied mineralogy at TU Dresden.

Research interests: Regional mineralogy of Saxony, mineral raw materials and mineral deposits, history of mineral collecting and documentation of mineral collections, history of mineralogy and mineralogical museums.

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Remarkable Mineral Finds at the Afrikanda Alkaline-Ultrabasic Complex, Kola Peninsula, Russia

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Afrikanda is a small (7 km²) alkaline-ultrabasic intrusion located in southwestern part of Kola Peninsula, Russia. It is a Caledonian circular complex consisting of olivinites, pyroxenites (including their nepheline-bearing varieties), ijolites, various alkaline pegmatites, calcite-amphibole-pyroxene and calcite-perovskite-magnetite-pyroxene rocks. The Afrikanda complex discovered in 1917 became well-known due to the find of large bodies of unusual perovskite-rich rocks. It is less-known that Afrikanda is a source of museum-quality specimens of more than a dozen minerals, primarily titanium-bearing oxides.

About 110 mineral species are now known in the Afrikanda complex. It is the type locality of cafetite, kassite and zirconolite-2M. The most mineral diversity (including microminerals) has been reported for the late-magmatic and metasomatic rocks enriched by calcite and magnetite. Perovskite can be considered as "a mineral symbol" of Afrikanda. Its well-shaped cubo-octahedral black crystals to 6 cm and their clusters are housed in many museum collections. Perovskite is typically represented by knopite, a REE-bearing variety. Ti-rich magnetite forms octahedral and tetrahedral crystals to 10 cm. Acicular yellow cafetite is associated in cavities with lamellar yellowish kassite; both minerals are only known in old specimens. Zirconolite-2M occurs as brown pseudo-trigonal crystals to 0.5 cm and grains; some samples are very rich. Specimens of calzirtite from Afrikanda are probably the world's best: it forms perfect complicated dark-brown crystals and twins to 1 cm with diamantine lustre. Schorlomite (14-16 wt.% TiO₂) forms nice black lustreous dodecahedral, sometimes with subordinate trapezohedron faces, crystals to 3 cm; complete pseudomorphs of green diopside after such well-shaped schorlomite crystals are amazing. Cerite-(Ce) occurs in calcite pods as wine-red perfect transparent rhombohedral crystals to 0.5 mm, in clusters and brushes. Magnesiohastingsite forms spectacular groups of lustreous black perfectly shaped crystals to 3-4 cm in cavities after naturally dissolved calcite. Prehnite was found as large, rich bright yellow-green crusts consisting of split tabular crystals. Zeolites include, note harmotome (white well-shaped twinned crystals to 1 cm forming brushes in cavities), edingtonite (tetragonal modification; groups of colorless tetrahedral crystals and complicated twins to 2 mm) and rare species heulandite-Sr and thomsonite-Sr. REE-carbonates of the ancylite-(Ce) – calcioancylite-(Ce) series form spectacular coffee-colored crystals to 2 mm in perovskite cavities.

Anna G. Turchkova, PhD (1998), is a science researcher with the Dept. of Mineralogy, Geological Faculty, Moscow State University, Moscow, Russia. Her fields of interest include general and experimental mineralogy, crystal chemistry of minerals, natural zeolites and related minerals, mineral localities of Russia, and mineral collecting.

**Hydroxyl Groups in Non-Metamict Chevkinite- (Ce):
A Crystal Chemical Discussion**

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The minerals of chevkinite group are commonly considered to be anhydrous minerals. The infrared absorption spectrum of natural non-metamict chevkinite-(Ce) from the aegirine-alkali granite, Mianning, Sichuan Province, China, exhibits two broad peaks in the 3600-2800 cm⁻¹ region due to OH stretching. The corresponding H₂O content required for the charge balance in the formula is 1.27 %. The O-H...O bond lengths may extend 0.2658 to 0.2794 nm by the correlated OH stretching energies. An electrostatic charge balance for chevkinite-(Ce) based on the assigned site-population from chemical data was computed without the hydrogen contribution. The resulting empirical bond-valence sum on O6, O8, O2, O3, O5 and O4 ranges from 1.73 to 1.95 vu. The partial substitution of O by OH may occur in four atom sites: O6, O2, O4 and O5. The small differences in the bond-valence sums between the supposed donors and acceptors may mean a mixed donor/acceptor role of the involved oxygen atoms. The IR spectral features between 3394 and 3035 cm⁻¹ consist of various hydrous species at different structural sites and orientations. The OH groups in the chevkinite-(Ce) appear to be involved in local charge imbalance in the structure and to be present when the mineral crystallized hydrothermally.

Prof. Yang received a Ph.D in Mineralogy and Crystallography from China University of Geosciences. He was the former national representative in Commission on Classification of Minerals, International Mineralogical Association. Now he is the Vice-president, Commission on New Minerals and Mineral Names, Chinese Society of Mineralogy, Petrology and Geochemistry, and the Vice-president, Commission of Mineralogy, Chinese Society of Geology.

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