COLLECTIONS MANAGEMENT POLICIES
DEPARTMENT OF EARTH & PLANETARY SCIENCES

Compiled For Use By
The Curatorial and Supporting Staff
Department of Earth & Planetary Sciences
American Museum of Natural History
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CONTENTS

SCOPE OF THE COLLECTIONS

Scope of mineral and gem collections

The mineral and gem collections of the American Museum of Natural History consist of about 108,000 minerals, approximately 3,000 of which are either faceted gems or gemstone carvings. The scope of the collections is global, with an emphasis on American representation. Approximately 2,500 minerals are exhibited in the 8,000-square foot Harry Frank Guggenheim Halls of Minerals and 1,000 gems in the J.P. Morgan Hall of Gems. In terms of importance, size, and specimen-quality, the Museum's mineral and gem collections place it among a select group of other institutional collections housed at the British Museum, the Smithsonian Institution, the Vienna Natural History Museum.

Scope of mineral deposit collections

The mineral deposit collections of the American Museum of Natural History consist of about 5000 specimens - the bulk of these samples are research-grade rock and mineral suites. The scope of the collections is global, with samples from most significant varieties of mineral deposits made available through the former Sampson ore deposit collection of Princeton University (acquired by the AMNH in the early 1990's). The Sampson rock collections are accompanied by several hundred polished ore sections. As a consequence of collecting efforts in the past decade, the collections involve a special emphasis on mineralization genetically associated with felsic magmatic rocks. This includes granite-derived tin, tungsten, molybdenum, and rare alkali metal ores; volcanogenic lithophile metal ores and associated volcanic rocks; and mineralized granitic pegmatites. There is minor overlap in collections focus with the petrology collections in that the mineral deposits collections include sample suites from volcanoes including Mt. Somma-Vesuvius, Italy; Mt. Mazama, Oregon; and various volcanoes of Indonesia.

Add information about scope of meteorite, and rock collections here.

COLLECTION GOALS

A statement of the Museum's policy governing the acquisition and disposition of biological specimens was approved by the Senate of the Scientific Staff, June 7, 1993(the last public statement was in *Curator* 1974, vol. 17, pp. 83-90).

The following is an adaptation of those guidelines as they relate to minerals, gems, meteorites, rocks, and ores.

1. To acquire as many specimens of minerals, gems, meteorites, rocks, and ores as possible, in order to increase research potential of the collection on a global scale and to anticipate the needs of future generations of earth and space scientists.

2. To acquire collections from geographic regions where adequate collection in the foreseeable future may be difficult or impossible—as in regions were profound geopolitical change have led to massive export of crystallized minerals or gem materials.

3. To accumulate significant holdings of earth and space specimens related to the research interest of present staff.

4. To serve as a depository for type and described specimens requested by outside investigators.

5. To accept existing collections of scientific or educational value from institutions no longer dedicated to their care, subject to our ability to provide or to acquire the necessary financial support for the transportation and initial curating of such collections.

INSTITUTIONS COLLECTION POLICY

This operation manual is to be consistent with (and is superseded by) the *AMNH Collection Policy* statement adopted by the Board of Trustees on June 5, 1996.

CURATORIAL PROCEDURES

Accessions (New)

Upon receipt of gifts, bequests, purchases and exchanges the Department of Earth & Planetary Sciences will obtain letters of intent by donors or their estates, purchase invoices, or will create exchange records. Restrictions on Permanent Loans will be indicated in the catalog (ref. *AMNH Policy 20*).

Accession Procedure (Steps):

1. Fill out Museum Accession Record form which includes an abstract of appropriate catalog information.

2. Have Chair sign and make 2 copies.

3. Send original and additional copy to Museum Registrar, who will assign a museum accession number.

4. Retain third copy until Registrar returns copy to us. File Registration copy.

Cataloging Procedure (Steps):

1. Assign new consecutive AMNH numbers from the Mineral & Gems, Meteorite, Petrologic, and Ore Deposits databases. Unique numbers are assigned to most specimens. Ovals of flat white paint are applied to the appropriate surfaces of Meteorites, Rocks, and Ores. India ink numbers are inscribed and sealed with clear lacquer [nail polish]. Computer-generated numbers on laser paper are cut and affixed to minerals with a water-soluble glue [Elmer's glue]. Faceted gems are stored in standard gem papers.

2. Enter data related to above specimens in respective databases.

   For example, the mineral and gem collection database is a proprietary version of SUPERBASE for WINDOWS. Created and custom-designed for us by Joe Nagel of KUSTOS, the "Mineralogical Collection Database System" is described as relational database that offers all of the features of a flat file database plus other capabilities including data validation and "one-to-many relationships." The latter capability eliminates the reentry of data required by flat-file database systems. In-house modifications of the Kustos-

supplied platform have enhanced its usefulness. Future tweaking may yield additional benefits for generating semi-annual collection reports and for collection-activity reports inserted in the departmental annual report.

As mandated by the Dean of Collections, our database is backed-up weekly, and the resultant copies stored off-campus.

Discuss databases for the meteorite, ore deposits, and petrology collections here.

COLLECTION STORAGE

Minerals & Gems

Type collection (4-4-15B)

The type and systematic mineral collections are stored in the "Collections Area" located in building 4, section 4. Within this temperature-controlled, high-security area, 50,000+ minerals are housed, the bulk of which are stored in 78 six-foot high steel cabinets.

The alphabetically-arranged collection of mineral types is restricted to holotypes and cotypes as defined in Embrey, Peter and Hey, Max H. (1970). "Type" specimens in mineralogy," *Mineralogical Record*, vol. 1,,pgs.102-104. Metatypes and topotypes are maintained in the systematic collection.

Systematic mineral collection (4-4-15B)

The systematic mineral collection is arranged in two hierarchal groupings—crystallo-chemical and geographic. On a macro level, the arrangement follows the Dana crystallo-chemical classification for non-silicates and Strunz for silicates. Within the adopted classification framework, specimens are arranged alphabetically by American states followed by a similar arrangement of foreign holdings. Oversized specimens (> 12-inches) are stored on steel shelving. A 6'x3'x 3' safe provides temporary storage for valuable specimens.

Visitors to the Mineral Collections Area, EPS staff and volunteers excluded, are required to sign a visitor's register. Visitors to this space are usually scientists from other institutions. Casual visits by non-EPS personnel are discouraged. Tours of the collections areas maintained by EPS are given on occasion at the discretion of the curators-in-charge.

Columbia University Systematic Mineral Collection

The 40,000-specimen Columbia University Systematic Mineral Collection is housed in 31 steel cabinets that line a common corridor directly outside the "Collections Area." Special diligence is exercised to insure that these cabinets are locked when not in use.

Vault storage (4-4-22?)

Valuable crystallized minerals from the Bement, Spang, and Thompson collections culled from the systematic collection are alphabetically arranged within 6 steel cabinets located in a vault on the mezzanine level directly above the "Collections Area." Faceted gems and gemstone carvings not currently on exhibit are also stored here.

Vault access is restricted to Gem & Mineral Curator George Harlow and Senior Scientific Assistant Joe Peters. Neither Harlow or Peters can visit the vault without being accompanied by at least one (but no more than two) individuals. Such persons include EPS volunteers assisting Mr. Peters on vault-related activities or colleagues from other institutions or from the mineralogical and gemological communities. Collegial access to the vault is granted on a case-by-case basis by Mineral & Gem Curator George Harlow.

Radioactive mineral storage (8-LL-11)

The Radioactive Mineral Collection is stored in a area known as "The Old Shooting Gallery", a 940 square-foot, L-shaped room located in the employee yard (see attached diagram). The door to the room is secured by a Yale lock. Keys are held by EPS, VP, the Museum's current Radiation Officer Ward Wheeler, and Security. A conventional OSHA approved "Caution Radiation Area" is clearly visible through the outer door's glass pane. An additional sign indicates that access to the room by pre-approved visitors can be obtained by calling EPS Gem & Mineral Curator George Harlow (x5378) or Senior Scientific Asst. Joseph Peters (x5386). The sign further states that a ventilation fan located to the left of the outer door must be switched on 30 minutes prior to entry. It should be noted that non-Museum employees granted access to this area are required to wear dosimeters if a visit exceeding one hour is contemplated. Harlow and Peters wear dosimeters when they enter the room as a matter of course.

This facility is shared with Vertebrate Paleontology, who occupy an 80 foot-long by 8 foot-wide corridor directly behind the outer door. VP stores dinosaur and mammal bones partially replaced by secondary uranium salts in their portion of the room.

The area controlled by EPS, a 300 square-foot, rectangular enclosure, is located at the end of the aforementioned corridor designated for use by VP. Our area is delineated by a plywood frame screened with chicken wire to facilitate ventilation. A door, secured by a heavy-duty

lock, allows ingress. Like the outer door, this door features an OSHA approved caution sign and a sign listing the phone extensions of Harlow and Peters. All visitors entering our space are asked to sign a visitor's register.

The radioactive collection is stored in six triple-door steel cabinets double-stacked against a wall. Additional specimen-filled draws covered by 4 mil plastic tarps have been placed atop the cabinet. Radioactive ores from the Sampson collection are stored in tarp-covered wooden drawers stacked in a far corner.
Storage of radioactive minerals outside of the steel cabinets is problematic. However, the contemplated relocation of the radioactive collection in the "Old Plumbing Shop (15-LL) will address that concern.

Safety issues related to storage and handling

For the purpose of this report, radioactive species are those which contain uranium or thorium, emit alpha, beta and gamma radiation and exhale alpha emitting radionuclides of radon and its daughter products(Lambert, 1944, Ionizing radiation with the mineral collection of the National Museum of Wales, SPHNC Forum, v. 10, no. 2, p.70). The storage, preservation, and handling of radioactive minerals require a stringent protocol which meets guidelines set by OSHA (29 CFR 1910.1096). It should be noted "…that USNRC guidelines for materials licensees, as set forth in Title 10 of the Code of Federal Regulations Part 20 [10 CFR 20], were aimed at artificially produced materials and may not be directly applicable to naturally occurring radioactive specimens in collections." (Wilson, 1996, Radioactive Specimens in Mineral Collections, The Society of Mineral Museum Professionals) Furthermore, "…incomplete compliance with applicable state and federal regulations…may be focused on potential rather than actual health risks."[ibid]

The NYC Board of Health schedules unannounced yearly visits to insure compliance with local regulations. The last BOH inspection took place on 12/22/99.

Pursuant to federal and local regulations, a radon track monitor is placed in the room for proscribed periods (usually six months) and returned to the manufacturer. Upon receipt, the manufacturer measures the radiation dose recorded and posts a report for EPS. It should be noted that identical radon track monitors are placed in the Mineral Collections Area where a limited collection of radioactive minerals are stored (4-4-15B), the Guggenheim Hall of Minerals (1-8), an EPS storage area which in future will contain the radioactive mineral collection (B-15), and

the former EPS Conference Room (2A-4-05), a designated control area presumed free of adventitious radioactivity.

EPS personnel are required to wear portable dosimeters when entering the radioactive storeroom. The revised version of Title 10 of the Code of Federal Regulations Part 20 [10 CFR 20], due to become effective on January 1, 1994, limits the exposure of non-radiation works to 'An eye dose equivalent of 15 rems (0.15 Sv) per year' [10 CFR 20.120 (a)(2)(i)]." Outside contractors or in-house HVAC, plumbing, electrical, or maintenance personnel are required to wear dosimeters if they request access for periods in excess of one hour.

Bagging all radioactive minerals stored in the radioactive storeroom (8-LL-11) and in the Mineral Collections Area (4-4-15B) insures that dust particles, preferred nucleation sites for radon and its radioactive daughter products, are encapsulated. Steel cabinets retard beta, and especially gamma radiation, which penetrates human tissue.

Radon gas exhaled by radioactive substances will attain dynamic equilibrium with its source if not dispersed (Lambert, 1994, ibid). In our present facility, room dilution is effected by a window fan located at the entrance. Extraction rates of 100 air changes per hour can be expected, exceeding require rates by a factor of 20[ibid]. A different protocol is anticipated when the radioactive collection is relocated in an EPS storage area in the basement of building 15 (15-LL). Radioactive minerals moved into this area will be bagged and stored in metal footlockers. Specimen-filled footlockers will be examined outside of the new facility thereby minimizing exposure to collective ionizing radiation. Venting the footlockers to air precludes accidental inhalation of radioactive dust particles propelled airborne by air extraction devices (fans or air handlers).

Field collections

The field collections of former AMNH Gem & Mineral Curators and their support staff are stored at the 131[st] Street facility.

Mineral deposits collections

The majority of the mineral deposit research collections are housed on the 4th floor, mezzanine level of building 4; the specimens are stored in six-foot high steel cabinets. Drill cores from Ducktown, Tennessee, and from the lithium pegmatites of central North Carolina are stored in wooden drill core trays in the basement of building 15. A small number of ores containing radioactive minerals are presently stored in the "shooting gallery", but they shall be relocated soon to the basement of building 15.

Additional specimens from the former Sampson collection, yet uncatalogued due to lack of space at the Museum, are presently stored at the 131st storage facility. In addition, a small number of ore samples acquired as display specimens for the Hall of Planet Earth are held at Valley, Marble, and Slate Corporation in New Milford, Connecticut.

Access to the collections in building 4 is limited to Curator Webster and Scientific Assistant Christine Tappen. Typically, AMNH graduate students, postdoctoral fellows, and one volunteer work with the specimens under the supervision of Webster and/or Tappen.

Meteorite collection (4-4-16C)

Add description of meteorite storage area.

Petrologic collections

Add description of rock storage areas.

HANDLING, PRESERVATION AND PREPARATION

Handling and storage constraints imposed by some earth and space science materials are discussed below.

HANDLING

Crystallized minerals

The core of most mineral collections of global scope housed in the great natural history institutions of the world were assembled by wealthy amateur collectors whose collections were later purchased or donated to natural history museums. Our institute's collection encompasses the assemblages of Charles and Norman Spang, Clarence S. Bement and William Boyce Thompson. All of these collections were assembled from esthetic considerations and as such, exhibit a marked bias towards crystallized minerals.

The inherent fragility of crystallized specimens requires that they be handled with care. Most crystal groups possess a base from which the majority of the crystals project and which constitutes a natural rest surface for exhibition or handling. Such specimens should be grasped at its base for either examination or exhibition purposes. Under no circumstances should crystal terminations be grasped as the crystal may separate from its matrix. Extremely fragile specimens are stored in cardboard trays lined with Volara, a cross-linked polyethylene foam.

PRESERVATION

Chemically-unstable minerals and meteorites, and ores

Certain minerals, meteorites, rocks, and ores stored in temperature-humidity controlled areas are meta-stable. Factors inhibiting the preservation of meta-stable minerals include thermal conductivity and expansion, deliquescence, efflorescence, oxidation, bacterial activity, and photosensitivity (Waller, 1980, The Preservation of Mineral Specimens, preprint, 8th Annual Meeting of the American Institute for Conservation of Historic and Artistic Works, pp. 116-128). The particular requirements for the preservation of radioactive minerals are outlined in the section dealing with their storage.

Thermal conductivity and expansion

Elevated temperatures cause thermal expansion in most minerals, and are particularly deleterious to minerals with low thermal conductivity and high thermal expansion coefficients, notably native sulfur and fluorite[ibid]. Temperatures below 0^0 C can shatter crystals containing liquid-filled inclusions. If follows that specimens must be protected from rapid temperature fluctuations.

Temperatures ranges between 0^0 and 30^0 C are generally tolerable for rock samples stored out-of-doors. In-door facilities should maintain a temperature of 21^0 C +/- 2^0 C.

Deliquescent and Efflorescent minerals

Temperatures above 23^0 C coupled with relative humidity levels exceeding 70% RH are harmful to both deliquescent and efflorescent minerals. Deliquescent minerals, with or without accompanying decomposition , are defined as "Any water soluble salt [capable of drawing]moisture from the air and with it form a solution when the relative humidity (RH) of the air is higher than the water activity of a saturated solution of that salt (Waller, 1980, ibid). Minerals undergoing deliquescence reprecipitate and form powdery crusts. Factors affecting the extent of deliquescence are "RH level, the duration of exposure, the rate of air flow, the total volume of air from which moisture can be drawn, and characteristics of the species involved." (Waller, 1980, ibid). Deliquescent mineral groups include halides, sulfates, and nitrates. Such specimens should be placed in 4 mil poly bags, and when deemed appropriate, a desiccant is added.

Efflorescent minerals, are inorganic compounds with water as an essential constituent. "If the partial pressure of water vapor in the air falls below that of the mineral, water will leave the mineral." (Waller, 1980, ibid) Sulfates, carbonates, and borates are often efflorescent. They are bagged, in some cases, with their local brines.

Oxidation (Metallic and Non-Metallic)

Inorganic substances are subject to varying degrees of oxidation. The incorporation of oxygen into a mineral or meteorite is controlled by the material's oxidation state and by the temperature and relative humidity levels encountered in storage. Elevated temperature and humidity levels accelerate oxidation. Native metals like copper and silver, arsenides like realgar, and sulfides like pyrite and marcasite (in concert with anaerobic bacterial

activity) will oxidize in temperature and humidity controlled environments without prudent precautions. Such specimens are placed in 4 mil poly bags to limit exposure to unforeseen changes in temperature or humidity.

Bacterial activity

The decomposition of the sulfides pyrite and marcasite are caused by anaerobic bacterial activity; the bacteria thrive in humid environments. Both iron sulfides are stored in 4 mil poly bags. The bags provide a moisture barrier and encapsulate decomposition products.

Photosensitivity

Photo sensitive minerals, substances that are either decomposed by light or that experience color changes when exposed to light are uncommon, but those which are so affected often posses high monetary value. The decomposition process is accelerated by oxidation, but if exposed to light, the silver halides chlorargyrite, bromyrite, iodyrite and miersite decompose in a vacuum. These minerals are placed in 4 mil poly bags and stored in lidded boxes.

The sulfosalts proustite and pyrargyrite are highly prized for their distinctive ruby red crystals—specimen valuations exceeding $25,000 are commonplace. If exposed to light and air, the scarlet-vermilion color of proustite and pyrargyrite is dulled by surface oxidation (tarnish) which if left unchecked, will blacken the crystals. The lilac coloration of kunzite fades rapidly in sunlight, a problematic color change when large, transparent crystals command six figure valuations. Properly bagged and boxed, light sensitive minerals will exhibit little if any deterioration.

The exhibition of heat and light sensitive minerals requires the installation of ultraviolet filters to protect such minerals and to arrest further deterioration and prevent future occurrence. The Guggenheim Hall of Minerals and the J.P. Morgan Hall of Gems were opened to the public in 1976, but no provision for UV filter protection was initiated at that time. Present-day efforts to ameliorate this situation are now underway.

PREPARATION

Cleaning minerals

The decision to clean mineral specimens is made on a case-by-case basis. Tarnish, oxidation products that film the surface of native metals, sulfides and sulfosalts, is usually not removed for a variety of reasons. The tarnish removal process is ineffective and pitted surfaces may result. Secondly, preserving the chemical history of minerals is a scientific imperative. If cleaning is deemed appropriate, a record of the cleaning method use and date of treatment is entered into the mineral and gem database.

Field-collected specimens

Specimens collected in the field may require cleaning prior to storage or exhibition. Three adherents are commonly encountered: "pocket clay," "rust" or lichen incrustation.

Clay removal

Pocket clay, the product of feldspar alteration, is endemic to crystallized pegmatite occurrences. Its removal can be effected mechanically or chemically. Mechanical removal, a method favored by mineral dealers, uses high-speed dental drills. Buffing pads are charged with crushed walnut shells in lieu of toothpaste.

Most mineral curators favor the chemical removal of clay adherents. The "Waller technique," popularized by R. Robert Waller, Chief Conservator for the Canadian Museum of Nature (**GEH cite reference!)**, is used.

Perhaps GEH can explain the Waller technique as he has used it on numerous occasions.

Rust removal

Superficial coatings of iron hydroxides on meteorites, iron-bearing minerals, or those deposited on samples collected insitu, are removed, particularly if said samples are earmarked for exhibition. The Waller technique, described above, is employed to clean them. **Joe B. should discuss Hank Silverstein's procedure for removing rust from nickel-iron rich meteorites.**

Lichen removal

Lichen incrusted rock samples are rarely collected in the field. Exceptions are rocks with well-preserved lineation, fault gouges, or other textures. Lichen coatings can be removed with dilute ammonia and mechanical brushing.

Surface Dust, Particulates, or Grime

Surface contamination, here defined as incidental dust, particulate matter (linen threads dislodged from clothing) or unnoticed fine-grained dirt particles clinging to mineral surfaces or crevasses, are given an ultrasonic bath with a mild detergent, followed by a second bath in distilled water. This cleaning treatment is particularly effective for cleansing fibrous minerals like zeolites. Water soluble borates, nitrates, and sulfates are cleaned in an ultrasonic bath filled with ethanol.

Cleaning faceted gems

The absorption of body oils are an inevitable consequence when handling gems. Surface grime of this type are treated by tooth-brushing the affected gem facets with soapy water followed by a rinse in distilled water. Tooth-brushing dilute ammonia solutions is an effective remedy from the removal of recalcitrant grime. Jewelry used in traveling exhibits are brought to AMNH Conservation for treatment.

Repairing damaged specimens

Damaged specimens are sometimes encountered. Clean breaks are repaired with a quick-drying epoxy, an adhesive rated acceptable by the Canadian Conservation institute.

LOAN POLICY AND PROCEDURES

The Department of EPS is responsible for both incoming and outgoing loans related to specimens within the scope of the several collections. Loans are made for research, exhibition and education.

1. **Out-going Loans:** Specimens and portions thereof will be loaned to qualified scholars and students within the ability and based on the judgment of the Department staff.

a) Loans are generally made to authorized staff of educational and research institutions or other museums for the purpose of scientific research; the policy for loans for research is described in the attached "Information for Users of Specimens..." Even though loaned material may be consumed by the activities of the borrower, the transaction is considered a loan.

b) Loans will also be made to institutions for exhibitions, educational programs, and for commercial photography. Such loans are negotiated by the appropriate curator on a per event basis.

c) A record of each loan, including an itemization, catalog numbers, specimen description, weights, terms, etc. is made by the Department. Two copies, signed by an authorized Department staff member, are sent to the borrower, one of which is to be returned to the Department upon receipt of the loan. Records of loans are maintained by the Department.

d) Loans of AMNH specimens are the responsibility of the borrower and his/her institution. Borrowers of loans with a fair-market-value (as determined by the Department) in excess of $1000 are required to insure such loans "wall to wall" under an All-Risk Fine Arts policy and issue Certificates of Insurance naming the AMNH as the additional insured.

e) It is up to the Department's discretion to demand special arrangements for transportation, security, care, and condition reports of such loaned specimens by a borrower's institution. Conditions will be stated in writing on the loan agreement.

f) The Department assesses no fees for non-commercial use of objects from the collection. Commercial users of the collection are charged according to Museum guidelines.

2. **In-coming Loans:** In-coming loans are materials usually requested by the Department for research or exhibition. Loans will not be accepted without Departmental approval. If a loan record is not provided by the lender, a loan record will be made and maintained in the Department. The Department will take all necessary actions and precautions to properly care for and handle in-coming loans. Condition reports will be completed for and an archival photograph taken of incoming objects valued in excess of $1000.

3. **Objects left in the care of the Department:** Except for incoming loans, objects cannot be left in the care and custody of the Department except under special circumstances for study or potential donation, at the determination of the appropriate curator. A written receipt from the appropriate curator or the chairman will be provided.

4. **Insurance coverage** is provided automatically on Museum-borrowed material by the Museum's blanket insurance policy. However, a specific insurance rider will be arranged through the Office of Financial Operations and a Certificate of Insurance will be provided to lenders of objects in excess of $5000 or at the lender's request.

5. **Overdue loans:** As mandated by the Museum’s Department of Registration, the status of loans are noted periodically and letters requesting return of AMNH samples are sent to recalcitrant borrowers.

EXCHANGES

Exchanges are carried out to improve the collections by replacing duplicate or no-longer-needed specimens. The departmental exchange policy is as follows:

1. Exchanges involve specimens of like kind under the management of a single curator. Exchanges involving unlike materials require the approval of the appropriate curators and the departmental Chairman.
2. Any trade with an aggregate value of $5000 (an amount determined by the Administration) or greater must be approved by the Director of the Museum.
3. Any specimen can be traded; however, specimens that are type materials, are on display, are one of a kind, or are covered by a gift restriction will not normally be considered and must be justified in the trade record.
4. All material in a trade is given a dollar value mutually agreeable to both parties; these values are

intended to provide an approximation of market value to assure equity in the trade.

5. Mineral and gem trades must be approved by two curators in the Department - invariably the mineral curator (Dr. Harlow) and usually the mineral deposits curator (Dr. Webster) - as well as the collection's manager/scientific assistant for the mineral collection (Mr. Peters).

6. A record of the exchange, itemizing all specimens coming in and going out, is signed by the appropriate curator and is kept as a permanent record. An accession record is also completed and forwarded to the Registrar's office with a copy of the exchange record.

PURCHASES

The global scope of the AMNH Mineral, Gem and Meteorite collections precludes the possibility of limiting future acquisitions to materials collected in the field or donated by philanthropic parties. Meteoriticists, in particular, are constrained by the ephemeral nature of meteor showers and the difficulties encountered in identifying and collecting meteorites in the field. In recent years hundreds of meteorites have been recovered on the ice and snow-covered expanse of Antarctica. All meteorites collected in Antarctica are consigned to the national museums of countries claiming sovereignty over the coastal regions of that continent. For example, all meteorites collected in that portion of Antarctica claimed by the United States are considered the property of the Smithsonian Institution. Museum-sponsored expeditions to Sub-Saharan regions in northern Africa or to the interior of the Indian sub-continent have been discussed within the Department of EPS to counteract the Antarctic advantage enjoyed by the Smithsonian. Until such expeditions are mounted, dispatched, and successfully concluded, meteoriticists have little choice but to participate in the commercial meteorite market. The large pallasite slice installed in the Rose Center falls into this category.

The acquisition of minerals and gems is also governed by the dictates of the marketplace, but the criteria used to determine the usefulness of particular minerals or gems differs from those used by meteoriticists. The potential or actual scientific value of meteorites offered for sale largely determines its suitability for acquisition (notwithstanding the example cited above). Mineral and Gem Curators not only purchase specimens suitable for scientific research, but also buy extraordinary “flowers of the mineral kingdom” for exhibition purposes (Desautels, Paul. *The Mineral Kingdom*, Ridge Press, New York, 252 pp.).

The purchase of minerals driven by esthetic considerations necessates that mineral and gem curators cultivate a connoisseurship (Wilson, Wendell E. Connoisseurship in Minerals. The Mineralogical Record, 21:7-12). Wilson defines a connoisseur as "a person who has expert knowledge and keen discrimination in some field…a person who is especially competent to pass critical judgments in manner of taste."

Among the criteria affecting the perceived value of minerals are rarity, condition, quality, provenance, size, desirability, and fashion (Gowland, R.G. Valuations: a professional's view. In Nudds, John R. and Pettitt, Charles W, editors, 1997). *The Value and Valuation of Natural Science Collections*. The Geological Society, Oxford, UK. An encyclopedic knowledge of the perceived qualities of notable specimens housed in other natural history museums, in important private collections, or maintained in the stock of a select subset of mineral dealers is required of all Gem and Mineral Curators. Such experience is gained by handling and inspecting important specimens at international Gem and Mineral shows held each year in New York, Tucson, Arizona, Denver, Colorado and Munich, Germany.

The purchase of minerals, gems, or meteorites collected on foreign soils are subject to any and all laws enacted by foreign governments to regulate the export of minerals, gems, and meteorites.

GIFTS

The Department of Earth & Planetary Sciences is always interested in improving its collections through the addition of new specimens as gifts. There are two major requirements. First, we must approve a gift before it will be accepted; the specimen(s) must be within the scope of our collections, must represent a useful addition, and must be within the Department's ability to house and maintain. Second, the donation must be made as an unrestricted gift. We cannot make promises about the indefinite future of a specimen once it belongs to the Museum. However, we do not accept specimens we do not intend to keep for the foreseeable future. Furthermore, we make an effort to exhibit display-quality specimens and have three cases in the Mineral and Gem Hall and one in the Meteorite Hall where new acquisitions are displayed. We normally include an acknowledgment of the donor in these cases.

Particularly significant additions will be added to the permanent display collection, although this can take a

long time to accomplish, as the permanent halls are revised infrequently.

If you decide to donate a specimen(s), approval must be obtained first from the curator of the relevant collection within the Department. Once you have received approval, a letter designating your transfer of ownership and stating the unrestricted nature of the gift should be sent to the curator and the specimen(s) sent or delivered to the Museum. The donor will be sent an acknowledgment from the curator after both the gift and the letter of decision to donate is received. The acknowledgment letter is the official document of receipt from the Museum.

In the case of a gift which is being given as a tax deductible contribution and the value is in excess of $500, an IRS Form 8283 must be filed with your Federal income tax return. If the value of a gift is in excess of $5000, you will need an appraisal from an accredited appraiser and you will need to advise us so that we can fill in the necessary information on the 8283 Form. We will send this for you and your appraiser to complete.

The Museum appreciates the generosity of donors of gifts-in-kind in their support of the collections. All donations valued in excess of $5000 are reported to the Management Board of Trustees; such donors are sent a letter on behalf of the Trustees acknowledging the gift and expressing appreciation for the donor's generosity and support. Such donors are also listed in the annual report. Other acknowledgments of a donor's generosity are provided; a description of these is available from the Development Office of the Museum.

If there is an opening of a new exhibition featuring the activities of the department or its collections, we attempt to provide friends and supporters of Earth & Planetary Sciences with invitations to an opening event.

DEACCESSIONS

Specimens are retained by the Department as long as they retain their physical integrity and continue to be relevant to the scope and purposes of the collections. The possible methods of deaccession are exchange, sale and discard. Upon deaccessioning, a deaccession record is transmitted to the AMNH Registrar and the catalog is modified accordingly (see cataloging procedures).

1. **Exchange:** Discussed under Accessions - 4., above.
2. **Sale:** Sale of specimens is a procedure to be avoided unless absolutely necessary. Sales are subject to the following restrictions:
   a) Any offer of sale of specimens must be approved by the department Chairman and Museum Director.

A sale with potential price in excess of $5000 must be approved by the Board of Trustees.

b) A responsible effort must be made to sell specimens to museums and other public institutions before considering private institutions or individuals.

c) The proceeds from sale are to be restricted to the use of purchasing like material, e.g., minerals sold to buy minerals, either directly or through a purchasing fund or endowment.

3. **Discard:** Specimens that have lost their value or relevance to collections because of alteration, replication, or other reason and have no value for trade or sale may be discarded with the approval of the curator in charge and chairman of the Department. The rationale for discard must be recorded in the catalog.

DEPARTMENTAL ARCHIVES

Photos and prints

A library of 35 mm slides generated by lectures conducted by EPS Gem and Mineral Curator George Harlow and Senior Scientific Assistant Joseph Peters is maintained and stored in 3-ring binders within the Mineral Collections Area. The slides, usually 35 mm color transparencies, are loaded in high-density polyethylene sheets. Dr. Harlow also maintains lecture sides, as do other EPS curators, in their respective offices.

An extensive photographic survey of select gems and mineral specimens from our collections was undertaken in 1990 by Harold and Erica Van Pelt, whose 4x5 color transparencies of mineral and gems have graced the covers of Gems & Gemology, the Mineralogical Record, the Lapidary Journal, and most notably, within the pages of *Gems & Crystals from the American Museum of Natural History* coauthored by former EPS Gem Consultant Anna S. Sofianides and Gem and Mineral Curator George Harlow. A second publication, *Minerals and Gems from the American Museum of Natural History,* coauthored by George Harlow and Senior Scientific Asst. Joseph Peters, utilizes the Van Pelt images. The latter publication also features numerous 4x5 and 35 mm color transparencies of AMNH minerals and gems photographed by the AMNH Photo Studio.

Books and Magazines

A collection of books about minerals and gems assembled by Leonard Feldman, a Past President of Brooklyn

Gem & Mineral Society [deceased] is maintained in room 4-4-13. Most of these books were intended for amateur enthusiasts and, as such, provide useful information when EPS staff members answer public inquires pertaining to rock and mineral collection.

Partial runs of the Mineralogical Record magazine, the Lapidary Journal, and the Journal of Gemmology, donated by former EPS volunteer Joe Rothstein, are used in a similar fashion. These items are shelved in room 4-4-16.

Archival materials

The mineral and gem collection accession log books for the period 1871-present are stored in the Mineral Collections Area (4-4-15B). Also stored here are catalog cards describing individual gem and mineral specimens. Cards like these date from circa 1900 to the present.

LABORATORY SAFETY FEATURES

EMERGENCY EQUIPMENT AND PROCEDURE

A. Safety equipment available for use in the laboratories (Sample Prep Lab and Experimental Petrology Lab) includes the fume hoods, flammable storage cabinet for organic liquids, flammable storage cabinet for acids, lab coats, lab goggles, lab face shields, gloves, and masks.

B. Emergency equipment available in the labs include fire extinguishers, fire blanket (located in the hallway between the two labs), faucet eye wash, and first aid kits. Familiarize yourself with their location and use.

Emergency procedure information is posted on the doors to the labs. Familiarize yourself with their location and contents. The documents include 1) procedures to follow in case of Hazardous Chemical spills, 2) Laboratory specific procedures in case fire, flood or injury.

STORAGE AND DISPOSAL OF CHEMICALS

A. Chemical Paperwork - Material Safety Data Sheets (MSDS) are kept for all hazardous chemicals. These forms are located in the large filing cabinet in room 4-4-14.

B. Chemical Storage - There are two storage areas for chemicals in the department.

1. The Sample Prep Lab contains a flammable storage cabinet for organic liquids, a seperate flammable storage cabinet for acids, and a cabinet for bases. All bottles are clearly labelled with their contents. Waste organic liquids (small quantities) are stored in clearly marked bottles inside the fume hood.

2. The Experimental Petrology Lab cabinets stores the stock (dry) chemicals. All bottles are clearly labelled with their contents.

C. Chemical Disposal - The Maintenance and Engineering Dept (X5363) is contacted and will pick up hazardous chemicals that need to be disposed. Maintenance/Engineering solicits this information annually.

USE OF ORGANIC LIQUIDS

All organic liquids are decanted into non-breakable bottles for use in the labs. Caution should be used at all times when handling these liquids. Be sure to have adequate ventilation (fume hood, etc.) and use safety equipment (gloves, etc.).