

Breakout Session Record

Amanuensis name: Sabiha Ahmad

Date: 7/13/05

Institution: Natural History Museum

Title of Breakout Session: "Minerals, mineral samples and collections"

Names of Breakout session leaders: Dr. Celina Fox (independent scholar), Ann Lum (Collections Development Manager, Library & Information Services, NHM) and Peter Tandy (Curator-Minerals, Department of Mineralogy, NHM)

Location: Geology Library

Attendees: Sabiha Ahmad, Carol Bowen, Clare Browne, Helen Clifford, Tara Nummedal, Pamela Smith, Sandra Wilson

General themes discussed at the Breakout session:

The session was prefaced by a short talk by Dr. Celina Fox on the paraphernalia of mineral samples and collecting. Below are my notes on the talk:

Paper relates the scholarly mineral collections to mining in Austria and Saxony

Description of Handsteiner:

- presentation models

- figured as mountains w/ mining equipment as decoration

- represent a microcosm of nature and artifice in one work

- "chess pieces" in games of international diplomacy

- embodied mining expertise to product

- manufacture

Sir Hans Sloane-

- Aimed to identify and classify the natural world

- had 10,000 minerals also fossils, draughts, remedies

Philip Rashleigh

- Collector

- 1799, 1802- "they may contribute to amusement"

Arthur Aiken-

- Collector

- Traveled to Wales to observe a mass of rock and process of extracting ore rather

- Than detached minutiae

Foreign visitors

Thomas Peter Smith- sec'y of APS, Philadelphia

Saw mineral specimens

Knowledge of collection related to knowledge of mining- symbolic and material wealth

Any other information about the session:

The breakout session featured a number of aporetic moments when the historians had difficulty articulating their questions about the objects to the curators. Questions that asked curators to account for the historical conditions of the dissemination/circulation of texts and objects or that asked curators to comment on the historical arrangement of knowledge about minerals were either unanswered or pushed aside as historical oddities. Instead, emphasis was placed on the actual identity of the minerals as understood within current theories. While the curator in charge of the texts could respond, the curator/mineralogist could not. Yet again another sign of the disciplinary divide between the liberal arts and the sciences?

Object Information

Object Title: Quartz Onyx Agate (entered in Sloane catalog v. 1 p. 41)

Object Date: 1753

Museum Accession number of object: 58643/58643a

Description of object (please attach any information received from breakout session leaders to this sheet):

polished pebbles

described in Sloane's catalog as "A flat round lump of agate wt. some yellow spots in it of the same [ie bought of Mr. Tinsey]" (p. 132)

Function of the object?

Where was the object used/viewed/consumed?

Original location—probably India

Who used it?

Original context of the object?

The significance of object?

Exemplary of most of Sloane's mineral collection, which was comprised of mostly agate.

What questions did the audience ask about this object?

Object Information

Object Title: Fluorite

Object Date:

Museum Accession number of object:

Description of object (please attach any information received from breakout session leaders to this sheet):

Function of the object?

Where was the object used/viewed/consumed?

Who used it?

Original context of the object?

The significance of object?

Described in Rasheigh's book—see Rashleigh entry

What questions did the audience ask about this object?

Object Information

Object Title: Type Specimen of Niobium

Object Date:

Museum Accession number of object:

Description of object (please attach any information received from breakout session leaders to this sheet):

Black mineral

Function of the object?

1st specimen described of the species—a “type” described in terms of all physical properties and chemical data e.g. crystallographic structure- once data obtained, no specimen needed to identify types

Where was the object used/viewed/consumed?

Who used it?

Original context of the object?

Discovered by Charles Hatchett

Collected by Sloane in seaboard states of America

The significance of object?

Exemplifies a problem in Sloane’s collection of differentiating between mineral and artifact

What questions did the audience ask about this object?

Object Information

Object Title: Quartz

Object Date:

Museum accession number of object: 60881

Description of object (please attach any information received from breakout session leaders to this sheet):

Cup of grayish white agate (#101 2; 3:8 in Sloane's collection catalog)

Function of object:

Where was the object used/viewed/consumed?

Who used it?

Original context of the object?

The significance of the object?

Raises questions about the difficulty of differentiating between specimen and artifact in Sloane's collection

What questions did the audience ask about this object?

Object Information

Object Title: Quartz "Mocha Stone"

Object Date:

Museum accession number of object: 60897

Description of object (please attach any information received from breakout session leaders to this sheet):

A cup w/ stem

Function of object:

Where was the object used/viewed/consumed?

Who used it?

Original context of the object?

The significance of the object?

Raises questions about the difficulty of differentiating between specimen and artifact in Sloane's collection

What questions did the audience ask about this object?

Object Information

Object Title: Hans Sloane's collection catalog v. 1 of a 5 volume set

Object Date:

Museum Accession number of object:

Description of object (please attach any information received from breakout session leaders to this sheet):

5 volumes- rebound by Geology library- catalog originally compiled by Sloane and accompanied his mineral collection

Function of the object?

to classify his mineralogical specimens

Where was the object used/viewed/consumed?

Who used it?

Original context of the object?

The significance of object?

What questions did the audience ask about this object?

How did Sloane classify the minerals? Answer: He had mostly agates but differentiated among spars and some other "outdated" method of classification

Is there a differentiation between found crystals and worked things?

Any Handsteins in his collection? Answer: Some record of a sparbox, which the group speculated may or may be not related to the more ceremonial Handstein (highly decorated trophies used to present ore specimens)

Context of usage of catalog?

Any evidence of catalog as a living document to which readers were constantly adding?
Accession of specimens?

Object Information

Object Title: John Hill's *A History of Fossils* or *A general natural history, or, new and accurate descriptions of the animals, vegetables, and minerals of the different parts of the world*

Object Date: pub. 1748 3 volumes

Museum Accession number of object:

Description of object (please attach any information received from breakout session leaders to this sheet):

Function of the object?

Where was the object used/viewed/consumed?

Who used it?

Original context of the object?

John Hill- an apothecary and actor- published and collected everything. His *History of Fossils* featured hand painted pictures

Appeals to a trade audience comprised of mechanics, physicians (because of reference to tinctures, material medica)

The significance of object?

What questions did the audience ask about this object?

Who was the audience/publisher of book? What was the marketability of the book?

What is the combination of skills of a polymath like Hill? Answer: his use of the phrase "virtues and uses" of natural history aligns him with mechanical/artisanal training

How expensive would this book be?

Object Information

Object Title: Sir William Hamilton's *Campi Phlegrui; Observations on the Volcanos of the Two Sicilies*, Naples

Object Date: 1776 & 9

Museum Accession number of object:

Description of object (please attach any information received from breakout session leaders to this sheet):

Illustrated large folio edition compiled while author was Ambassador to Kingdom of Naples from Court of St. James.

Function of the object?

Account of Vesuvius-- unusual

Where was the object used/viewed/consumed?

Who used it?

Original context of the object?

The significance of object?

What questions did the audience ask about this object?

Does this play on the Art/nature relation in Renaissance? Answer: yes book is proof that art/nature relation invoked well into 18th-19th centuries

Object Information

Object Title: *Histoire naturelle: ou, Exposition des morceaux, les mieux choisis pour servir a l'étude de la mineralogie et de la cristallographie*

Object Date: c. 1789

Museum Accession number of object:

Description of object (please attach any information received from breakout session leaders to this sheet):

Large folio edition—hand-colored images

Classified by type- no text

Index w/ provenance of objects in plates

Function of the object?

Prospectus of proposed project- for study of crystallography & mineralogy

Where was the object used/viewed/consumed?

Proposed as a subscription service

Who used it?

Geared towards gentlemen who are not fortunate enough to either own cabinets of curiosity or have access to such cabinets.

A subscription series of cabinet images to account for the lack of completeness of actual cabinets, which he describes as “objets de luxe”

Original context of the object?

Francois Louis Desfontaines Swebach was a miniature artist who engraved and hand painted the images in this book- was going to publish a “cabinet-like” book & took it to would-be patrons who turned the project down for being too expensive

Swebach was an apprentice to Fabien Gautier d'Agoty and learned 3-color printing from him.

The significance of object?

Claimed to supersede the importance of any one curiosity cabinet by providing the contents of each cabinet classified according to type of specimen

Only surviving copy of the prospectus

What questions did the audience ask about this object?

Is there any text in the book?

Are the specimens individual ones or variations on a type? Peter Tandy, a trained mineralogist, said the variations in different pictures were too slight to represent individual specimens.

Object Title: *Les dons merveilleux et diversement colories de la nature dans le Regne Mineral*

Object Date: 1782

Museum Accession number of object:

Description of object (please attach any information received from breakout session leaders to this sheet):

Object Information

Object Title: Rome de L'Isle's *Cristallographie, ou description des formes propres a tous les corps du regne mineral*

Object Date: 1783

Museum accession number of object:

Description of object (please attach any information received from breakout session leaders to this sheet):

Function of object: explanation of crystal formations in the 18th century

Where was the object used/viewed/consumed?

Who used it?

Original context of the object?

Balthazar Sarge- head of mines- his collections represented here

The significance of the object? Rome discovered key geometric features of crystals—one of many to found crystallography- 2nd edition 450 illustrations of crystal forms by Desfontaines

What questions did the audience ask about this object?

Discussion about instruments for measuring crystal faces—goniometer—in 1807/09?

When were early studies of crystallography? Any relation to study of perspective? Gem books? Answer: one participant responds that Johannes Kircher connected perspective to crystallography—also Nicholas Steno looked at samples of quartz

Object Information

Object Title: Philip Rashleigh's *Specimens of British minerals selected from the cabinet of Philip Rashleigh, of Menabilly, in the County of Cornwall . . . with general descriptions of each article*

Object Date: 1797

Museum accession number of object:

Description of object (please attach any information received from breakout session leaders to this sheet):

In vol. 2, Rashleigh admits that chemistry getting too difficult

Function of object:

Where was the object used/viewed/consumed?

Who used it?

Original context of the object?

Philip Rashleigh lived in Cornwall & had a big mineral collection- came from Tin and Copper mines on tour of gentlemen visits

The significance of the object?

1st accurate colored illustrations of minerals produced in Britain

What questions did the audience ask about this object?

Difference between printed book and painted plates? Answer: conventions of rock presentation- no scale- maybe because it is painted to scale

We compared an actual specimen of fluorite to one painted in the book (plate 23) part 1 1797 23 figure 3 pp. 38-39—the group marveled at the painter's ability to capture variation in hue and texture. While some commented that the painting's perspective was a bit off, we realized that the fluorite was painted directly from above (bird's eye view) so that any pieces jutting upward in the specimen appeared foreshortened in the painting.

Object Information

Object Title: Aberhard Equit

Object Date:

Museum accession number of object:

Description of object (please attach any information received from breakout session leaders to this sheet):

Realistic 3-D watercolors of crystals complete with shadows
paints in the accession label sometimes

Function of object:

meant to be collected as "art"

Where was the object used/viewed/consumed?

Who used it?

Original context of the object?

The significance of the object?

What questions did the audience ask about this object?

Display of these paintings spawned a discussion about the art/nature divide. Peter Tandy showed his own crystallographic drawings. The group asked if he learned about crystallography by drawing. He claimed no, that he learned only about art & drawing- any knowledge he had of crystallography was acquired through theory. His response prompted the group to comment that it is difficult to distinguish between art and science and how the two influence each other, especially in graphical representations of scientific knowledge.

Break out session: Additional Materials (from Celina Fox)
Wednesday, 13 July, 2-3.30 pm

Break out session 3)
Minerals, mineral samples and collections

Venue: Natural History Museum

Leaders: Celina Fox, Ann Lum and Peter Tandy

The session was loosely divided into three parts.

First Celina gave a short slide presentation 1) relating great mineral collections to princely ownership of mines as commemorated in *Handsteine*; 2) relating mining and mineralogical expertise to the progress of chemical industries e.g. porcelain and glass manufacture; 3) suggesting a range of motives for forming mineral collections based on the evidence of late eighteenth-century travel journals.

Then Ann took us through some of the highlights of late eighteenth-century/early nineteenth century mineral illustration in the NHM: Sir William Hamilton, *Campi Phlegraei*, 1776; J. B. Romé de l'Isle, *Cristallographie*, 1772/1783; F. L. Desfontaine Swebach's plates for the *Histoire Naturelle Règne Minéral* (1781-3) originally planned by the artist printer-publisher J. F. Gautier-d'Agoty and the 1789 prospectus drawings for his own mineral project; Philip Rashleigh, *Specimens of British Minerals*, 1797/1802 with drawings mainly by Henry Bone and Thomas Richard Underwood; James Sowerby, *British Mineralogy*, 1802-7; L'abbé Haüy, *Traité de Mineralogie*, 1801/1823; and sale and other catalogues e.g. Sloane, Portland.

At the same time and after, Peter introduced a selection of relevant mineral specimens from e.g. Sloane collection acquired 1753, Charles Hatchett collection acquired 1799, Charles Greville collection acquired 1810.

Peter also introduced a contemporary work, *The World's Mineral Masterpieces* (2002), produced by one of the finest mineral artists working today, Eberhard Equit, as a means of emphasizing the generalized and far from reliable nature of eighteenth-century mineral knowledge and illustration.

Introduction to Mineralogy Break-Out Session - Celina Fox

It goes almost without saying that the formation of scholarly mineral collections was closely connected with the location and practice of mining. The owners of the richest mines in central Europe, the Emperors of Austria and the Electors of Saxony, formed the greatest collections of minerals and were the first to establish academies of mining, the former at Schemnitz (Banská Stiavnica, Slovakia) in 1763, the latter at Freiberg in 1765. Franz Stephan of Lorraine, husband of Empress Maria Theresa, is seen here in his cabinet with his leading advisors, surrounded by his minerals, shells, coins and medals.

These princely collections included a number of *Handsteine*, presentation models comprising a mass of glittering metals and minerals arranged in the form of a mountain - or cavalry surmounted by a crucifix - but the slopes alive with activity in the form of mining plant and equipment worked by tiny miners, all modelled in silver. *Handsteine* represented the cosmos in miniature - microcosms encompassing naturalia and artificialia in a single work. They were status symbols, in part works of art, in part instruments for reflection and learning.

The princely ownership of mines and minerals, made manifest in symbolic forms, could be used as chess pieces in games of international diplomacy. When Elector August of Saxony visited Prague in 1581 he received from the Emperor Rudolph II a fabulous emerald encrusted stone, supposedly a natural wonder freshly mined in Columbia (in fact a chunk of iron ore into which the emeralds had been

cemented with pitch), which so came to symbolize Saxony's alliance with the Imperial House that in 1724 August the Strong commissioned from the sculptor Balthasar Permoser a model Moor to carry it.

A more practical manifestation of August's ambitions was the discovery around 1710 by Johann Friedrich Böttger, toiling away on alchemical experiments at the Elector's command, of the recipe for the first true European porcelain. In this endeavour, Böttger was greatly assisted by the manager of the royal mines, Gottfried Pabst von Ohain, who provided the utensils and chemicals, and by the chemist Ehrenfried Walther von Tschirnhaus, a specialist in glass manufacture who was familiar with the reaction of minerals under intense heat. Not surprisingly, mining motifs figure in early Meissen, notably a set of ten miners modelled by Johann Joachim Kändler and Peter Reinicke in the early 1740s, elaborate mining centrepieces and cups and saucers decorated with mining scenes. Such works embodied in polite form the application of mining and mineralogical expertise to the world of product manufacture.

We should therefore not be surprised to find that in the eighteenth century collections of minerals were formed for a wide variety of motives, ranging from disinterested scholarship to practical utility. In 1707, Dr Nehemiah Grew, late secretary of the Royal Society, recommended that repositories should be founded in each county where collections of mineral samples, together with a register book, should be preserved 'that any gentleman philosophically given, seeing the same and knowing by the said book from whence to procure any of them, may be

induced to enquire into their nature and the uses to which they may serve.'

As John Thackray has shown, **Sir Hans Sloane** (1660-1753) had at his death approximately 10,000 minerals and rocks listed in seven catalogues. They were subdivided into: precious stones, crystals, metals, talcs, bitumens and earths but there was considerable overlap between them. A few (less than a quarter) give the identification and description of the specimen with details of the locality of the find and donor. Sloane exchanged and purchased individual specimens and bought several large collections, included in one of which was probably a Handstein ('A mountain of metals and minerals of Saxony with the ways of working the same, bought by Mr Courten of Dr Walraven's widow'). He was a comprehensive rather than a discriminating collector but nevertheless, he used his minerals to make deductions about the earth and its history, particularly in relation to the great debate over the origin and significance of fossils. His collection was also influenced by his interest in drugs and remedies of all sorts, noting the medicinal powers of specimens in his catalogue. Above all, he wanted to identify and classify the natural world and to have examples of its huge variety within his own cabinet. He applied techniques of chemical and physical analysis - such as heat - to learn more about the properties of his specimens, to extract tinctures &c.

Philip Rashleigh (1729-1811) operated in the gentlemanly mode of a rich collector, publishing his *Specimens of British Minerals* in 1799/1802 in the hope they 'may contribute to the amusement of those who delight in such studies'. But even he realised he was rather behind the

times for he admitted not to be well enough acquainted with 'the science and nomenclature of modern chemistry, or to be sufficiently practised in chemical experiment, to give a complete analysis of the subjects exhibited in the following place'.

In the second half of the eighteenth century both the scientific knowledge and utilitarian application of minerals advanced hand in hand, with an increasing emphasis on the exact location and stratification of specimens as well as the industrial processes to which they gave rise. For example, **Arthur Aikin** took a tour through north Wales and Shropshire in the summer of 1796 as a supplement to his mineralogical studies because he wanted to investigate not minute detached fragments 'but of masses of rock in their native beds and strata.' Furthermore, he wanted 'to see the whole process, also, of mining; of extracting the ore, reducing, refining and manufacturing it.' So he visited copper and lead mines, slate quarries and Coalbrookdale.

Mineral, industrial and business interests often coalesced. In 1790 **Charles Hatchett** (1766-1847), the only son of a successful Long Acre coachmaker, took the opportunity of delivering a coach to Catherine II of Russia, to visit en route the most eminent German mineralogists, Werner in Freiberg and Klaproth in Berlin, as well as the mines of the Erzgebirge and the Urals. In 1794 he visited the mines in Devon and two years later undertook a tour of England and Scotland, taking in Cornish tin mines, the Worcester porcelain factory, Boulton's Soho factory and Birmingham brass furnaces, Yorkshire and Northumberland coal mines, Lanarkshire lead mines, Rotherham iron works, Sheffield steel works and

Coalbrookdale, making mineralogical observations along the way. He was elected F.R.S. in 1797 on the basis of his work on mineral composition. In 1799 he sold his collection of about 7,000 specimens to the British Museum for £700 (following the recommendation of a committee comprising Banks, Greville and Rashleigh) and in 1800 established a small chemical business near Chiswick.

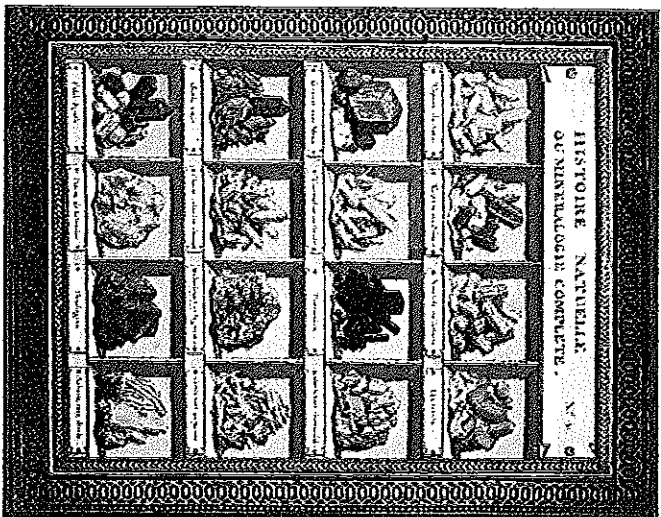
Finally we have the foreign visitors whose polite tourism encompassing mineral souvenirs often combined with their industrial interests and even espionage. In the first half of the eighteenth century there was a stream of visitors from the Swedish *Bergscollegium* or mining council, anxious to see whether British iron production threatened their own. American visitors were also keen recorders of industrial progress and I end with one **Thomas Peters Smith** (1777-1802), secretary of the American Philosophical Society in Philadelphia, who visited Europe in 1800-2, admiring mineral cabinets, collecting specimens and visiting mines, mills and factories throughout Denmark, Sweden, Germany, France, Spain, Switzerland and eventually Britain. Here he was particularly taken by the country's glasshouses and porcelain factories, copper works and coal mines. Before he died at the age of 25, he wrote a will at sea leaving the 62 mineral specimens he had accumulated to the American Philosophical Society 'with the proper catalogues to be found among my papers, to be arranged by them, so as to serve as a scientific collection, but more particularly in a geological & manufacturing point of view; They will find among my papers, descriptions of the various chemical manufactories, such as iron, copper, pottery, &c., as carried on in the various manufactories of Europe I have visited. References are made to such of

the specimens as relate to the manufactories, which they will find properly noticed. Should they find any information therein contained useful to the manufactories of my country, I beg them to publish them.'

paper treasures

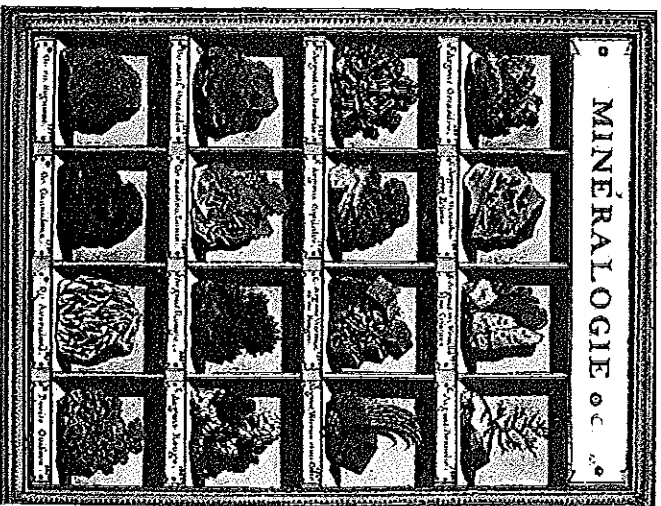
Swebach was also known as Desfontaines (the French form of Swebach), Swebach-Desfontaines, and Fontaines. He was a self-taught artist – sculptor, engraver, painter – and a self-taught mineralogist. He came from Toul in France, and in 1765, was employed to engrave plates for a history of Metz. He had also worked for the Duke of Orleans.

By 1780, he was in Paris, working as engraver to the Count of Artois. In 1782, he was employed by the widow of Jean Fabien Gautier d'Agoty (1747-1781) to complete the work of her late husband. Gautier d'Agoty, had embarked in 1776 on publishing an illustrated book on the mineral kingdom, entitled *Histoire Naturelle Règne Minéral*. Accompanied by explanatory text by Jean Baptiste Louis Romé de l'Isle (1736-1790), the eminent crystallographer. Few colour illustrations of minerals existed at the time.



Gautier d'Agoty's studio enjoyed considerable royal and noble patronage, and was a leading force in colour printing for two generations. Gautier d'Agoty's book, was to be published in eight or ten instalments or 'decades', of ten plates each. Gautier d'Agoty, a trained artist had published three 'decades' before his death. Swobach completed another four for Mme Gautier d'Agoty. The last, the seventh, is so rare that only two copies are known.

Swobach was not totally comfortable with colour printing. Therefore he did not use it when planning his own project of mineral illustrations, drawn from a variety of well known natural history cabinets. The drawings in the prospectus are similar to Gautier d'Agoty's, with some are direct replicas. Distinguishing original drawings from engravings in the illustrations is difficult as an elaborate border is painted around it.



paper treasures

Swebach's only other mineral drawings are in *Recueil Complet de Minéralogie*, six folio sized volumes which were his personal scrapbook of specimens, most of them hand painted, with a few engraved, hand coloured prints from the Gautier d'Agoty publication. Five of the six volumes survive in the The Natural History Museum.

It is uncertain whether Swebach perish in the French Revolution His son, Jacques François Joseph (1769-1823) was a better known painter and engraver, and artist to porcelain manufacturer Seves and for the Russian Imperial house.

Bibliography
Wilson, W. E. (1995) Fabien Gautier d'Agoty and his *Histoire Naturelle Règne Minéral* (1781). *The Mineralogical Record*, Vol. 26, No. 4, pp. 65-76.

Ann Lum 2003

For enquiries about the collections, contact Christopher Mills, Head of Collection Development, Library and Information Services, The Natural History Museum, Cromwell Road, London SW7 5BD
Telephone: 020 9742 5574 Email: library@nhm.ac.uk

Visit the Library's website at www.nhm.ac.uk

Editor Ann Lum

HISTOIRE NATURELLE

On exposition des Minéraux, les mieux choisis pour servir à l'étude de la minéralogie, et de la Cristallographie, cette science si intéressante qui est restée jusqu'à présent consacrée dans un petit nombre de personnes, avec l'intention pour se procurer un Cabinet, qui ne peut jamais être assez complet pour en faire une étude suivie, et dont la plus part non font le plus souvent qu'un objet de luxe.

Le Sr Desfontaines, amateur de cette science, ayant éprouvé la grande difficulté de se procurer tout les objets nécessaires pour y faire quelque progrès, a cherché le moyen d'y suppléer, par une représentation avec vrais pour pouvoir se passer des Originaux, et éviter les grandes dépenses que le goût de cette science entraîne ordinairement, il en a eu l'idée, et a fait faire, pour en parler au public, par le moyen de la gravure, et le mettre à portée de s'en occuper à peu de frais, ses gravures, seront parfaitement conforme à ses desirons. cet ouvrage sera distribué en dix Tablettes, qui contiendront des Minéraux, formant un Cabinet suffisamment complet, et en même temps un ornement agréable. Le prix de chaque sera de six

ils seront distribués tous les mois aux personnes qui auront souscrit, par une souscription seulement, afin d'être assuré du recouvrement des premiers frais, il sera joint à la fin en délivrant le dernier Tableau un imprimé, qui contiendra des notes instructives, qui indiqueront d'où sont tirés chaque individus, leurs formes, leurs variétés, les Matières, qui les accompagnent, le Cabinet on peut voir les Originaux, &c.

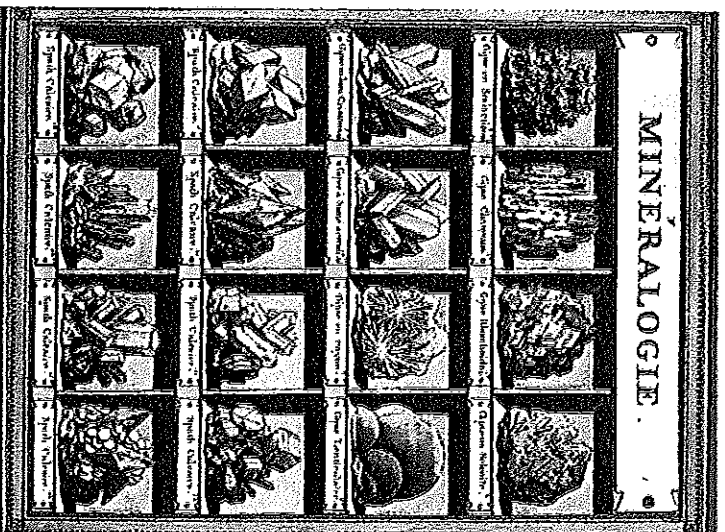
on trouve chez l'auteur aux St Louis au Marché 1777.
à Paris chez les Libraires, et chez les Vendeurs de Minéraux, et de Crystals.

voilà ce que j'ai vu 3 color printing

paper treasures

François Louis Desfontaines Swebach (fl 1769)

Prospectus for *Histoire Naturelle: ou, exposition des Minéraux, les mieux choisis pour servir à l'étude de la minéralogie et de la cristallographie...* 1789



The mineral artist Swebach envisaged his work as a collection of 10 colour plates, each consisting of 16 mineral specimens set into a boxwork cabinet. The prospectus was produced to solicit subscribers. Some of the plates are original drawings and other engravings, but all hand coloured. The project never came to fruition, for noted at the close of his introduction, "The revolution prevented the publication of this work." Only one copy of the prospectus survives today in The Natural History Museum, with 18 original art originals, manuscript prospectus for the 10 prints.

ROME de L'Isle (1736 – 1790)

*Cristallographie, ou description des formes propres a tous les corps du
regne mineral*
1783

The author discovered fundamental geometrical features of crystals and was one of the key scientists to found the study of crystallography. The work in its second edition contains more than 450 of the earliest illustrations of crystal forms, drawn by Desfontaines.

L' ABBE HAUY (1743-1822)

TRAITE DE MINERALOGIE, 2nd Edition, 1823.

Haüy was the French cleric, botanist, mineralogist and crystallographer who is regarded as the true founder of the science of crystallography. His main work was devoted to a system of mineral classification and recognition of the regular molecular constitution of crystals. The catalogue of Herbert Hoover's Collection of Mining and Metallurgy books states that Haüy was 'simple, modest, a lover of learning, whose attention was directed to the study of mineralogy almost by chance. In handling a group of calcite crystals at the house of a friend, Haüy accidentally dropped them. When he examined the broken prism he noticed a new form, bounded by faces as smooth and shining as the original. "A new light broke upon the subject".'

FRANCOIS LOUIS SWEBACH DESFONTAINES (fl.1769).

Histoire naturelle : ou, Exposition des morceaux, les mieux choisis pour servir a l'etude de la mineralogie et de la cristallographie ...
c.1789.

Swebach was a self-taught artist, sculptor, engraver, painter and mineralogist. In 1782 he was engaged in crystal drawing for Rome de Lisle and worked in the Gautier d'Agoty studio in Paris.

The prospectus was envisaged as a collection of ten colour plates, each depicting sixteen mineral specimens set into a boxwork cabinet. The project never came to fruition, as Swebach noted at the close of his introduction, "the revolution prevented the publication of this work."

Only one copy of the prospectus survives today and is held in the Library at the Natural History Museum. The drawings are similar to Gautier d'Agoty, and some are direct replicas. Some of the prospectus plates are original drawings and other engravings, which were all hand coloured rather than colour printed. However, it is not easy to determine one from the other as an elaborate border was painted around it.

Swebach's only other known works are six folio sized volumes of mineral specimens drawings entitled *Recuille Complet de Mineralogie* (1790). They appear to be Swebach's personal scrapbook of specimens, most of them hand painted, with a few engraved, handcoloured prints from the Gautier d'Agoty publication. Five of the six volumes survive in the Library at the Natural History Museum.

JOSEPH PIERRE BUCHOZ (1731-1807)

Les dons merveilleux et diversement colorés de la nature dans le Règne Minéral, ou collection de minéraux précieusement colorés
Paris 1782

Joseph Pierre Buchoz was born in Metz, Eastern France in 1731. He originally trained as a barrister but gave this up to become a doctor of medicine in 1763. However, he never practised and instead chose to dedicate himself to Botany. He travelled widely throughout France on foot, studying plants and agriculture as he went. Buchoz also taught Botany and was instrumental in setting up the botanic gardens at Nancy. He published numerous works on botanical, zoological and mineralogical subjects, which formed the "three Kingdoms of Nature". He died in Paris in 1807 at the age of 76.

JOHN HILL (1716?-1775)

A general natural history, or, new and accurate descriptions of the animals, vegetables and minerals, of the different parts of the world.

3 volumes

London, 1748-1752

Until the early 19th Century, the word fossil (from the Latin fossilis "that which is dug up") was used to denote both mineralization biological remains, and other inorganic substances.

In this work John Hill, a London apothecary set out his own classification scheme of geological materials, based upon their structure and composition as then known. He also described the sources and uses (including material) of the various substances.

SIR WILLIAM HAMILTON (1730-1803)

Campi Phlegryi : Observations on the Volcanos of the two Sicilies ...

Campi Phlegryi : Observation sur les volcans des deux Siciles ...

Naples, 1776 & 1779

Hamilton was born in Scotland in 1730 and became Member of Parliament for Midhurst in 1761. In 1764 he went as the British Envoy to the Court of Naples – a post he held for 36 years, during which he indulged in his two hobbies, the study of antiquities and vulcanology. In 1767 he presented a collection of volcanic earths and minerals to the British Museum. He was a pioneer of the understanding of volcanic activity, his observations being very detailed. He refused to be selective in recording facts to illustrate any particular theory, but recorded all facts as he saw them. His work greatly influenced those who came after him and refuted the Wernerian theory – men such as Hutton, Lyell, Scrope and Raspe.

Campi Phlegryi is a beautifully illustrated work which he compiled while Ambassador to the Kingdom of Naples from the Court of St. James. It remains one of the most accurate scientific and historical account of Mount Vesuvius.

Hamilton's wife Emma was the mistress of Lord Nelson.

PHILIP RASHLEIGH (1729-1811)

Specimens of British minerals selected from the cabinet of Philip Rashleigh, of Menabilly, in the County of Cornwall ... with general descriptions of each article – 1797

Although born in London, Rashleigh went to live in Cornwall and became M.P. for Fowey, the parliamentary seat that had been in his family for generations. He was educated at New College, Oxford and was elected a fellow of the Royal Society for his contributions to mineralogy. He was also interested in antiquities, particularly those relating to the prehistory of Cornish mining, later becoming a fellow of the Society of Antiquaries.

Inspired by the expansion of Cornish tin and copper mining during the industrial growth of his era, Rashleigh became one of the most important mineral collectors of the eighteenth century. He first acquired his specimens through his own efforts and later through exchange and purchase with European collectors and dealers. He amassed an unsurpassed variety of rare and unusual minerals from the granite and surrounding rocks of his adopted county and made advances in cataloguing the minerals and their provenance. In 1797 he published the first volume of *Specimens of British minerals* and the second volume in 1802. This work contained the first accurate coloured illustrations of minerals produced in Britain. *Specimens* is also of interest to historians of typography for its use of Bethel.

The works were illustrated by Henry Bone (1755-1834), Thomas Medland (died 1833) and Richard Thomas Underwood (1765-1836).

James Sowerby (1757-1822)

Exotic mineralogy : or, coloured figures of foreign Minerals, as a supplement to British Mineralogy.

London, 1811-1817-[1820].

James Sowerby was born on March 21st 1757 in London. He was the son of a lapidary. The Sowerby family were keen naturalists, collectors, artists and publishers. James studied art at the Royal Academy in London and began making studies of wildflowers and plants to include in his miniature portraits.

Sowerby was a careful, meticulous and observant artist who made a profound contribution to British natural history. This is evident in the quality of the workmanship of the drawings he produced and the copperplates that he personally engraved and etched. He did much to popularise the study of botany, conchology and mineralogy.

Sowerby's two volume *Exotic Mineralogy* (displayed here) was published as a supplement to his five volume *British Mineralogy* (1804-1817). Together they depict in colour over 1,500 specimens. Many of the drawings show mineral specimens held at the Museum. These publications are recognized as the first well-illustrated scientific reference books. Both publications were originally published in "parts" or periodical issues and were sold by subscription. It is thought that there are less than 100 surviving copies of *British Mineralogy* and far fewer of *Exotic Mineralogy*.