The History of Mineral Collecting



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THE HISTORY OF MINERAL COLLECTING

1530–1799

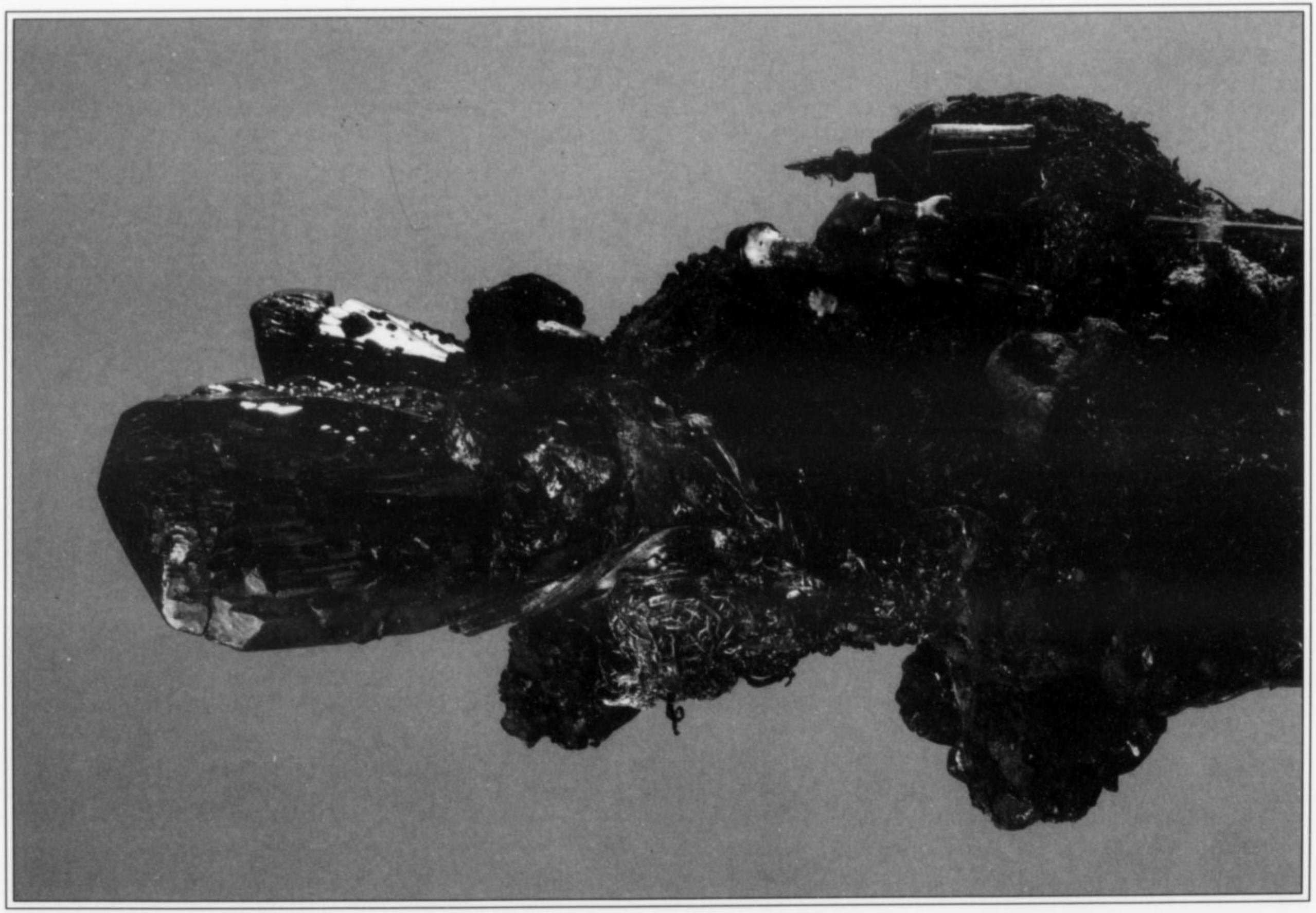
Commemorating
the 500th anniversary of the birth
of

Georgius Agricola

(Georg Bauer)
(1494–1555)

•

The Father of Mineralogy
and
The Father of Mineral Collecting



THE HISTORY OF MINERAL COLLECTING

1530–1799

With notes on twelve hundred early mineral collectors

BY

Wendell E. Wilson

The Mineralogical Record
Tucson 1994

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FRONT COVER:
A 16th-century Tyrolean miner shows his supervisor specimens of crystallized ore minerals; *Schwazer Bergbuch* (1554)

FRONTISPIECE:
Pyrargyrite crystals to about 5 cm, Saxon Erzgebirge, on an assembled "Handstein" from the collection of Ferdinand of Tyrol (1529–1595).

PREFACE

Seventeen years ago I began assembling materials for the publication of a proposed *Handbook of Mineral Collecting*. The opening chapter was planned to be a summary of the history and development of mineral collecting, both in America and in Europe. It seemed to be the logical foundation on which to build such a book, giving an historical context and perspective to the hobby. Mineral collectors today, at least those who have been involved for only a short span of years, tend to be unaware that any more than a few decades of significant collecting history have preceded them; this seemed a pity. The history of mineral collecting, I knew, was long, richly textured and much honored in times past. So I began to research the subject.

I had not known what I was getting into. Much of the existing literature, it turned out, was in German, French, Dutch, Spanish, Italian, Russian, Swedish, Danish, Slovakian and Latin. Furthermore, many of the earliest and most important works were so exceedingly rare that in most cases no copies were conveniently available for study. It soon became apparent that the subject was far larger and more intractable than I had imagined, and that it would be nearly impossible to fully encompass. A summary, if one could ever be written, would fill a volume rather than merely a chapter. Even the collecting histories of individual countries were so complex, so scattered and so obscure that there seemed little hope of ever bringing together enough to gain a useful perspective.

Thus discouraged, I gathered up the files, references and correspondence generated during that initial phase and quietly stored them away. All thoughts of the proposed book were set aside.

During the following years, professional historians in Europe and America continued to work at uncovering and analyzing selected portions of the history of mineral collecting. In 1977 Bruno Accordi published (in English) a scholarly historical study of the collection and catalog of the Veronese naturalist, Francesco Calzolari (1521–1606). He followed this in 1980 with a study of Michele Mercati (1541–1593), an Italian naturalist and collector in the Vatican, and in 1981 with a study of the Neapolitan naturalist Ferrante Imperato (1550–1625) (both articles published in Italian). William Campbell Smith (1978) summarized the early history of mineralogy and mineral collecting in Great Britain and Ireland. In that same year, John Greene and John Burke published their review of the state of mineralogy in the United States during the 18th century. And in 1980, Hans Prescher published an essential work on one of the first known mineral collectors, Johannes Kentmann.

An important event took place in 1983 as a result of preparations being made at the Ashmolean Museum, Oxford, to celebrate the tercentenary of its opening in 1683. The Ashmolean collection had been founded largely through the acquisition of the private collections built by the royal gardeners, John Tradescant the Elder and his son (also named John). In a foreword to the book which eventually resulted, David Piper wrote:

> The occasion focused attention on a hitherto somewhat neglected subject: the nature and development of such early collections, embryonic museums as they were, and their relationship to the early history of museums as they are now known. Accordingly, in July 1983, an international symposium was organized . . . [which] attracted a strong international response.

The papers presented at that symposium were gathered together by Ashmolean editors Oliver Impey and Ian MacGregor and published in 1985 as *The Origins of Museums*. Subsequently a new journal was founded in 1989, with the same editors, entitled *Journal of the History of Collections*.

An important publication on European mineral collecting history aimed at the non-academic audience appeared just a few years ago. In 1988 the famous *Mineralientage München*, Europe's premier mineral show, chose as its theme the history of mineral and fossil collecting: *Wer sammelt macht Geschichte* ("Those who collect make history"). Max Glas oversaw the editing and publishing of the

show catalog, including historical articles and short biographies prepared by a long list of prominent mineral curators and historians. The lead article by Gerhard Niedermayr, curator of minerals at the Natural History Museum in Vienna, carried the evocative title: "*Nichts ist auf der Welt Schöneres . . .*" ("Nothing in the world is more beautiful . . ."), a quote from the writings of an early Swiss monk and mineral collector, Father Placidus a Spescha (1752–1833). Niedermayr's article was perhaps the first relatively non-provincial attempt to touch the high spots of European mineral collecting history.

Seeing that a generation of historical scholars was now engaged in clarifying piece after piece of the tapestry of mineral collecting history (not only those authors mentioned above but many others as well), I took up the task once again of assembling a summary of what was known about early collectors in Europe and America. Returning to the earlier literature, the monumental work of Walther Fischer (1939), a densely detailed history of mineralogy and collecting in Saxony up to the early 1800's, stood out in particular, as did the article by Prescher (1955) on the earliest collectors, and the local histories of Wrany (1896) Zenzén (1921), and Garboe (1959). Schenkenberg's unique directory of mineral collections, compiled in the early 19th century, proved invaluable as well.

At about this time I was becoming involved with historical and antiquarian mineralogical literature as a result of working to build the Mineralogical Record Library. Curtis Schuh, perhaps the leading unpublished mineralogical bibliographer at present, supplied many obscure but highly useful references such as Gatterer (1798), Schenkenberg (1842) and Linné (1777). A visit to the British Museum libraries in London was useful because of the many extremely rare works that can be seen there. Book dealers Rick Blankenhorn and John Sinkankas, and book collectors Herb Obodda, Wayne Leicht and Richard Bideaux sold or loaned valuable antiquarian works. And, with the untiring assistance of my typist, Lynn Walsh, my wife Carolyn, the Interlibrary Loan System, and a list of librarians too numerous to mention, the database eventually grew to what is summarized in the book you now hold.

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This book is divided into two major sections: the narrative text, arranged by century and (for the 18th century) by country, and the reference section consisting of (1) an annotated census of all known collectors active before 1799, (2) a bibliography of their

published collection catalogs, and (3) a general bibliography. In the narrative portion I have inserted birth-death years following the mention of specific collectors in most instances. Although this causes an unavoidable disruption in the flow of text, I believe it is necessary in order for the reader to keep track of the relative chronologies at any given point, the relative ages of collectors at the times of their interactions, and the gradual procession of events through the centuries. Inserting reference citations or footnotes into this text, already so heavily loaded with parenthetical information, would have burdened the flow of thought to the breaking point; and yet, detailed referencing is indispensable to this sort of work. As a solution to this problem, I have appended almost all reference citations to the corresponding entries for individual collectors in the census listing, with the exception of very general references or subjects not related to specific collectors. The census listing is therefore the key to connecting the narrative with both bibliographies, and, through page numbers listed following the citations, serves also as an index to the narrative. Each listing in the census section may contain more or less information than will be found in the narrative; page numbers referring to a discussion of significant length are given in bold.

Readers should also be cognizant of the unavoidable geographic complications in a study spanning this many years. Countries and empires have come and gone, provinces have left one country to become part of another, and city and institution names have changed in concert with the politics and fashions of the times. For the sake of historical correctness I have tried to use the various names as they were at the times under discussion, though exceptions are common.

In presenting this material, I must apologize for the large amounts of data collected but *not* included, the many works that were not searched, the hundreds of references which could have been added to the general bibliography but were not, and the inevitable errors of omission and commission. It can only be hoped that the interested reader will find whatever additional information may be needed by consulting the cited references.

Wendell E. Wilson
September, 1993



Painting of an 18th-century mineral cabinet by Alexandre-Isidore Leroy de Barde (1777–1828).

INTRODUCTION

The great repositories of minerals today are the major public museums and institutions around the world, which, through the centuries, have gathered together and preserved over five million mineral specimens (Zwaan and Petersen, 1977). A comprehensive history of the curation of public mineral collections has never been written, but much is known about the early museums and their founders. In many cases, the curators and their associates were also scholars and authors who wrote voluminous tracts describing, as best they could, the contents of those museums.

Most public museums throughout history have been founded on the pre-existing collections of private individuals, and over the years have been enlarged significantly through the assimilation of many more such private collections. The collection of London's Royal Society, for example, was begun with the purchase (for £100) of the natural history collection of Robert Hubert. The famous British Museum got its start with the acquisition of the enormous collection of Sir Hans Sloane, and for many years after its founding the mineral collection of the Smithsonian Institution was essentially that bequeathed to it by James Smithson.

Private collections thus came first, and proved generally to be the necessary precursors of institutional collections. Their history, which is the subject of the present work, is therefore essential to the full description of the history and development of mineralogy as a science.

The study of early private collections, as Prescher *et al.* (1980) have pointed out, is unfortunately hampered by several factors. Many, if not most, early collections have not survived, and so are unavailable for historically oriented study; they have fallen prey to fire, war, theft, or the ignorance and apathy of heirs and institutions. Those early collections which were *not* destroyed have usually been dispersed through many later collections, their original pedigrees long since lost; and so the majority of them are effectively unavailable for study as well. Most of what remains



Ilvaite crystals with actinolite, Rio Marina, Elba, Italy;
from the collection of
LOUISE, COUNTESS OF AYLESFORD.

is on paper: rare antiquarian references, privately published collection catalogs, manuscript catalogs, museum records, early correspondence, specimen labels, published accounts of travelers and so on. From these a fragmentary picture of some early collections can be assembled, and at least the names of many early collectors can be identified. The picture, however, will always remain incomplete because many, probably most, early collectors have left no evidence of their activities.

Nevertheless, an historical overview is still instructive. It can reveal the general trends and attitudes prevalent among early collectors, and it allows modern collectors to place themselves and their collections in historical perspective. No matter how long the span of years that separates contemporary mineral collectors from their early, pioneering counterparts, they share the same passion for minerals and they belong to the same fellowship of enthusiasts.



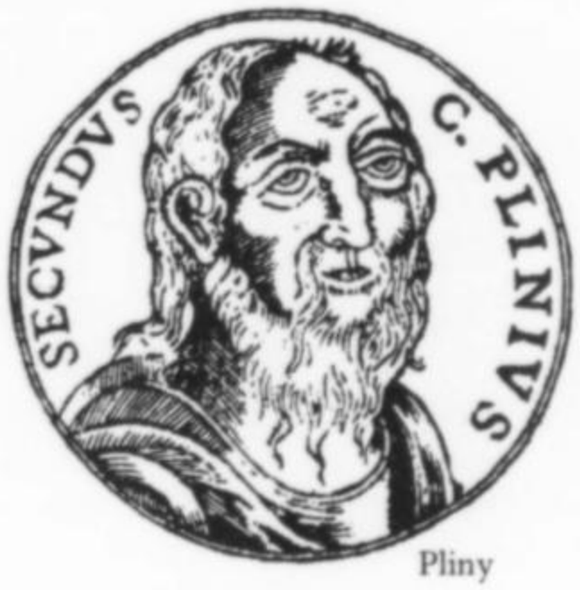
Fifteenth-century depiction of a French jewelry shop dispensing mounted and unmounted gemstones of various kinds.

ANTECEDENTS

The earliest uses of minerals, dating back at least to the neolithic age, were for tools (such as arrowheads, spearpoints, stone knives and scrapers), for adornment, and for medication. We will not deal here with minerals gathered for utilitarian purposes. However, the other two uses do have some bearing on the origins of mineral collecting.

The inclination to use minerals for personal adornment bespeaks a fundamental attraction rooted deep in the human psyche. There is a peculiar pleasure derived from gazing into hard, colored, transparent bodies such as gemstones, which may never be fully explained. Perhaps it stems from the similarity in appearance to the colorful, juicy interiors of ripe fruits that our pre-human ancestors evolved to forage for (Wilson, 1990). "Jewellery," says Joan Evans (in her *History of Jewellery, 1100–1870*) "answers to the deep human love of intrinsically beautiful materials, to the deep human wish for bodily beautification, and to the superstitious need for reinforcing human powers by things that seem to a savage more lasting and more mysterious than man." The collecting of minerals for jewelry purposes is therefore probably as old as man, and the recounting of its history, though paralleling mineral collecting for its own sake in recent centuries, is far beyond the scope of this work. Suffice it to say that the love of attractive minerals has always been manifest, and was a well-established prerequisite to the birth of formal mineral collecting when scientific knowledge began to give it more meaning.

Of equal interest has always been the pharmaceutical and, especially, the purported magical or miraculous properties attributed to minerals. Because of the complex mystical subculture that built up around minerals (going well beyond their merely attractive physical appearance), the ancient and medieval literature has much to say about them in this context.



Pliny

The Ancient Philosophers

From our distant remove in the 20th century, it is difficult to understand why mineral collecting was not *always* a common endeavor. However, it is essential to remember the pre-scientific mind-set. Aristotle (384–322 B.C.) deplored the idea of experimentation, believing instead that the secrets of nature could be more elegantly revealed simply by puzzling them out in a purely theoretical and speculative way. This unfortunate attitude hindered genuine scientific progress for nearly 2,000 years. Authors writing on earth materials for centuries after Aristotle's time were content to quote earlier authors, along with rumors, superstition and hearsay, with no means of verification. The idea of "study specimens" violated their basic philosophy.

When Albertus Magnus (1193–1280) wrote his compilation of the properties of "stones," entitled *De Mineralibus*, a hint of promise appeared. He claims to have "wandered far to visit places rich in mines that [I] might test the nature of metals" (Adams, 1938). Disappointingly, his treatise is still almost entirely mystical. And even so, Hoover (1912) called it "the only writing of any con-



Albertus Magnus, author of *De Mineralibus* (1260), pores over books on mineralogy.

sequence on the subject between Pliny [79 A.D.] and Agricola [1546]."

The second inhibiting factor, difficult to visualize now, was the ancient and medieval lack of any significant knowledge regarding the physical nature of minerals and any rational classification of earth materials. The nature of fossils as evidence of past life, although obvious to us now, was unsuspected then. A clear distinction between rocks and minerals was unformulated. Most of the 92 naturally occurring elements had yet to be discovered. Chemical analysis and crystal symmetry were unknown. Attempts at classification, when not cast into the 12 signs of the Zodiac, were generally alphabetical. And any suggestion that minerals, rocks, gems, etc. did *not* have supernatural powers as their principal defining attributes was considered blasphemy against God.

Consequently, mineral collecting as we know it, and certainly "systematic" collecting, was impossible in the sense that a person could not intelligently collect something that had yet to be conceived of, defined, systematized or understood. One might collect "things dug up"[1] in general, but to what end, if there was no guide to their meaning? Ancient and medieval accumulations of mineral specimen material did exist, although gathered for what purpose we cannot always be sure. The City Museum of Bordeaux, France, for example, has on exhibit a group of specimens found buried at the foot of an inscribed rock wall at Cap Blanc, France; the samples of chalcedony, galena, rock quartz and pebbles have been dated to about 17,000 years ago. Rumors also exist of a small 1st-century Roman collection of minerals (perhaps intended for use as paint pigments or make-up?) unearthed some years ago at Pompeii. And a Roman cache of about 50 Alpine quartz crystals, some as large as 64 cm, has been found recently at Magdalensburg, Carinthia, Austria; it is thought to date as early as the 6th century A.D. (Niedermayr, 1993). We cannot know for certain the precise cultural significance or meaning of these articles, and therefore cannot be positive that they constituted mineral collections for their own sake. It is definitely known, however, that much early specimen material was gathered for pharmaceutical use.

[1]The term "fossil" was derived from the Latin *fossus*, "to dig," and referred originally to anything dug up, especially minerals. This broad definition lingered as late as the 1830's.

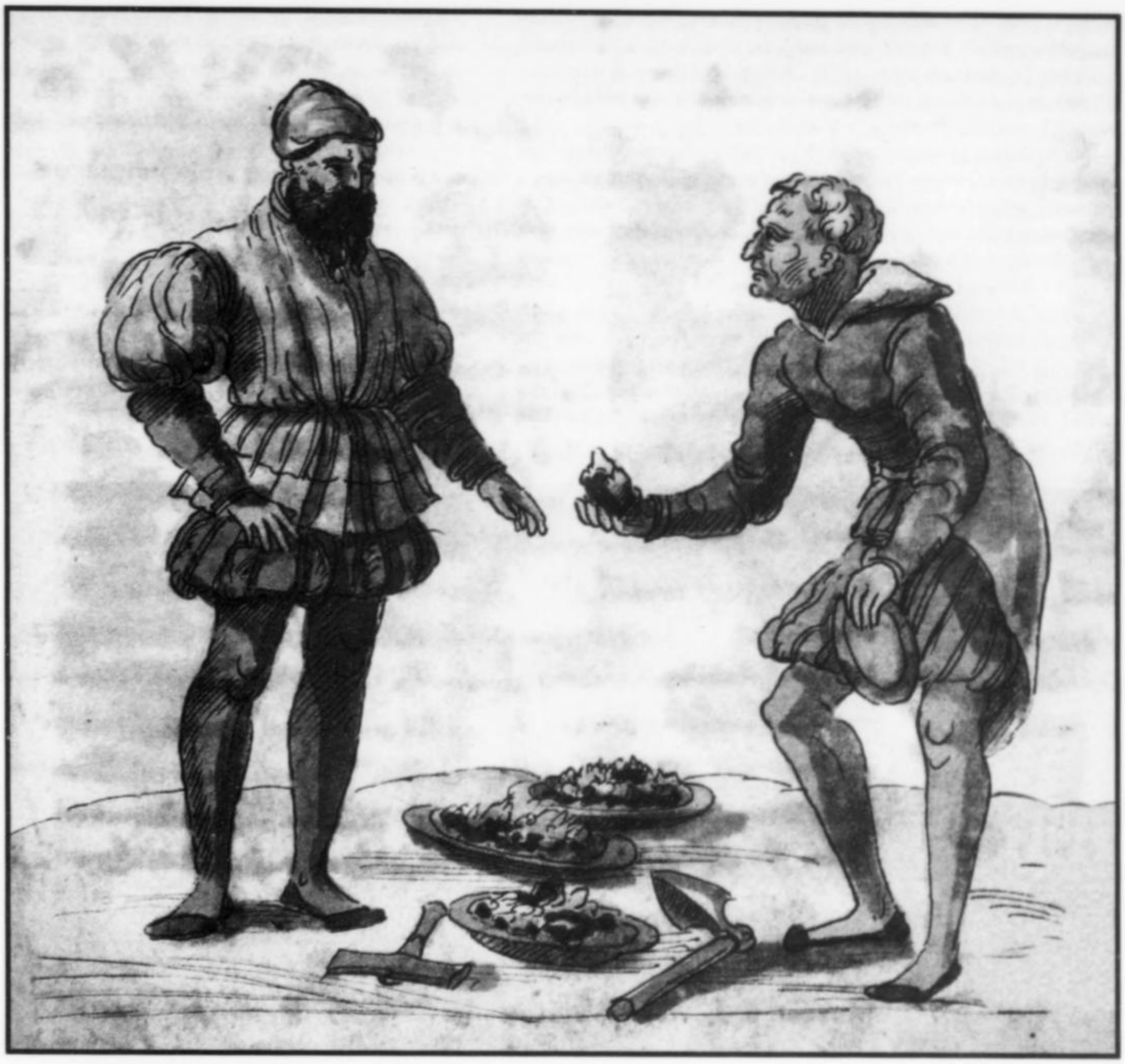
Pharmaceutical Mineral Collecting

The collecting of minerals as raw materials for pharmaceutical use is too practical in purpose to be equated with the recreational/intellectual goals of mineral collecting as practiced today. But it is an activity which probably predates recorded history, given meaning in the context of human biology and medicine. Cowen and Helfand (1990) have reviewed its history, as summarized below.

There are many recorded examples of pharmaceutical mineral collecting in antiquity. The earliest known medical text is a Mesopotamian pharmaceutical compendium, written on clay tablets around 2,100 B.C., but thought to have originated as much as a thousand years earlier. It lists 30 different substances of animal, vegetable and mineral origin. The library of the Assyrian King Assurbanipal at Ninevah (also on clay tablets, dating from the 7th century B.C.) contains information on 120 minerals of medicinal value. The Ebers papyrus, written in Egypt around 1500



A 15th-century pharmacy in Germany. The physician is selecting medications from the labeled canisters, some of which no doubt contain minerals.



A 16th-century miner showing a sample of crystallized ore to a mine captain or supervisor.

B.C., contains many recipes for prescriptions containing minerals, particularly alum, copper and halite. In fact, "collector of drugs" was considered a specific occupation in ancient Egypt, always under the supervision of a physician. The pharaoh maintained a royal repository where drugs, including minerals, were collected and preserved under a Conservator of Drugs.

In Greece the Hippocratic physicians (4th century B.C.) used at least a dozen minerals as drugs. Dioscorides, in the 1st century A.D., discussed 90 minerals (many on the basis of hearsay; his *De materia medica* was a standard reference into the 16th century). Itinerant Greek drug sellers were known as *pharmakopolae*, many of whom no doubt carried mineral specimens among their stock. Galen, born in Greece in the 3rd century A.D., was the leading physician of his time; in his medical treatises he described 473 drugs of animal, vegetable and mineral origin, which he stored in wooden boxes. Scribonius Largus, a Roman physician, described 36 mineral drugs in his *De compositione medicamentorum* (written around 43 A.D.).

Following the fall of the western Roman Empire, Arab scholars perpetuated pharmaceutical knowledge for several centuries; Ibn-al-Baytar, for example, described 145 mineral medicaments in a 13th century book called *Kitab al-Jami*. The most influential of the Arab physicians was Ibn-Sina ("Avicenna"), whose influence persisted into the 18th century.

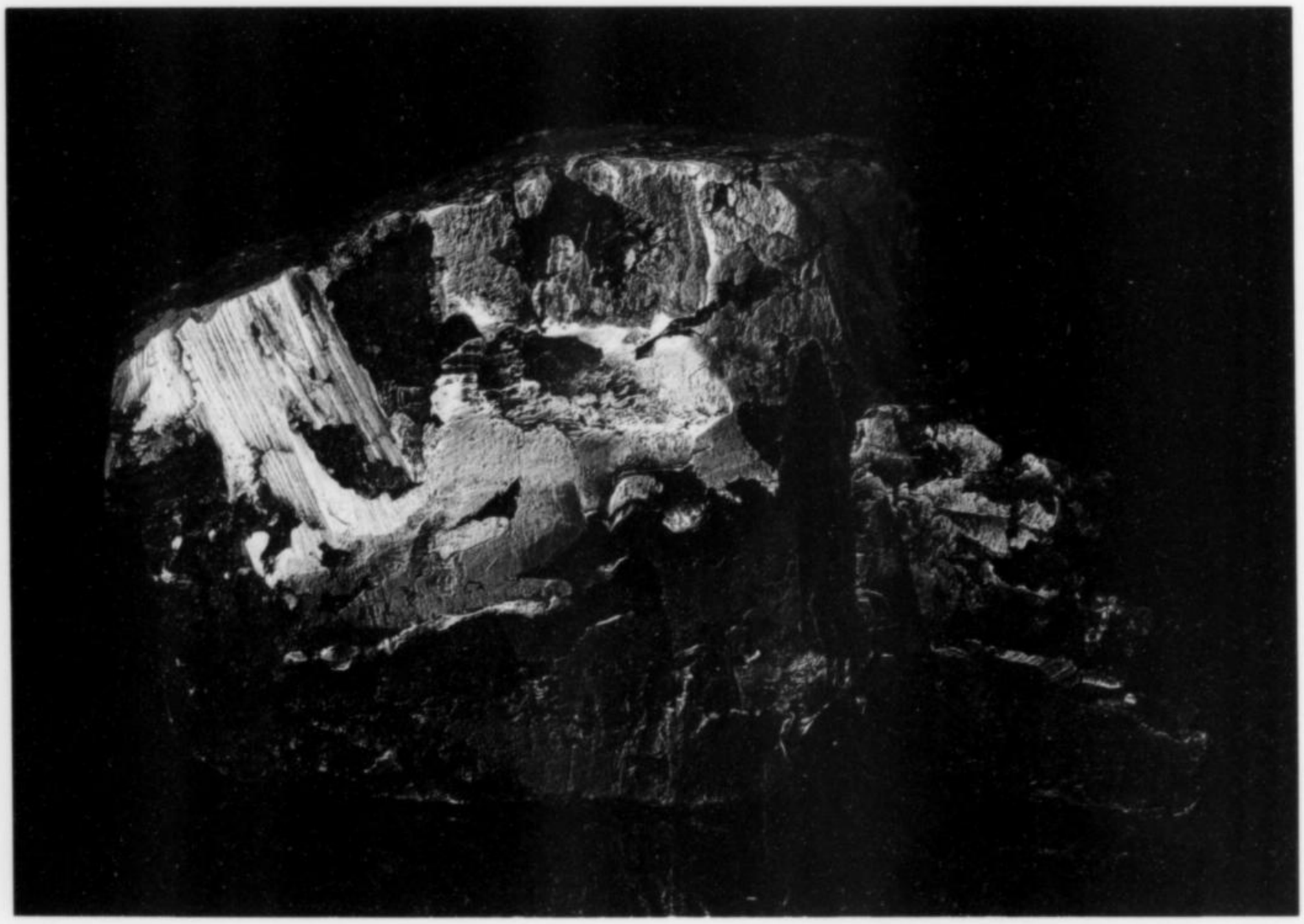
A brisk trade in expensive drugs from the Middle East sprang up in Europe. Along with this came the introduction of the pharmacy shop where rare and exotic animal, vegetable and mineral substances could be purchased. Court pharmacies flourished. Richard de Montpellier, for example, was Court apothecary to Edward I in the early 1300's, and is known to have stockpiled many drugs, including precious gems, gold, silver and other minerals. Monastic pharmacies were established as well, many of them quite ornate and lavish in their construction, and renowned for their special preparations. "Carthusian powder," produced by the Carthusian monks as an emetic and deobstruent, consisted essentially of crushed kermesite. And in the New World, Aztec Emperor Montezuma built an extensive collection of plants, animals and minerals of pharmaceutical value before his death in 1520. Consequently it is clear that the *habit* of gathering minerals was well-established over the centuries, before the birth of mineralogy as a science.

Miners as Mineral Collectors

Mining, of course, had been carried on since antiquity, and it might at first seem essential for "teaching collections" of ore minerals, at least, to have been maintained long before the 16th

century. However, that would imply a mining school, a type of institution which did not arise until the founding of the mining academy in Schemnitz in 1735. Before that time, knowledge needed by the mining professional was passed along in the time-honored way, via on-the-job training.

Nevertheless, considering all the beautiful minerals that ancient and medieval miners in many countries surely encountered during the centuries preceding the Renaissance, it is hard to believe that some specimens were not saved for beauty alone. Probably they were. But it might be observed in general that mineral collecting as an avocation or as an intellectual pursuit did not take hold until the rise of the middle class, which was a result of the Renaissance. Before that time, the common people were too poor, and the Church fulfilled many of the societal functions we associate with museums. As a result of this, and other inhibiting factors mentioned, there is no evidence of mineral collecting as we know it before the 16th century.



Native silver specimen from the "Silver Table," St. Georg mine, Schneeberg, Saxony, collected in 1477.

Duke Albrecht of Saxony having his dinner served underground on the massive silver slab called the "Silver Table," 1477.

The Earliest Mineral Specimens

Strangely enough, the earliest known surviving mineral specimens pre-date the actual founding of mineral *collections* by several decades. The specimens, two native silvers, are from Schneeberg, Saxony, and were originally saved more as mining artifacts than as items of scientific or scholarly interest.

The first major discovery of silver mineralization at Schneeberg took place in 1470, and during the following two years over 285,000 troy ounces of silver were extracted from numerous mines in the district. The most fabulous discovery to be made there, however, occurred in 1477 when miners encountered the convergence of twelve silver-bearing veins in the St. Georg mine. At this juncture a mass of solid silver 4 meters long and 1 x 2 meters across was uncovered, weighing approximately 20 metric tons (640,000 troy ounces) (Lieber and Leyerzapf, 1986).

When Duke Albrecht of Saxony (1443–1500) heard of this extraordinary discovery he went immediately to visit the mine and see the sight for himself. After descending into the mine, he had his dinner served to him using a large piece of the silver mass as his dinner table. Thus it became forever known in mining lore as the "Silver Table." Two small fragments chiseled off the main mass have survived from Albrecht's time. They were probably kept originally as part of his silver treasury—as early as 1469 there is known to have been a silver vault in Dresden (Menzhausen, 1978), and by 1530 it contained silverware and silver art objects totalling 128,000 gold gulden in value (see Table 2, p. 47). Not a single one of those art objects has survived the centuries, but the two crude chunks of silver are still preserved, in the Staatliches Museum für Mineralogie und Geologie in Dresden.

The silver specimens passed to Albrecht's son Georg the Bearded, who ruled from 1500 to 1539, and is considered the first of the princely art collectors. The ducal treasures were subsequently inherited by Georg's brother, Heinrich the Pious (1473–1541), followed by Heinrich's eldest son Moritz (1521–1553), and



then at last Moritz's younger brother, Augustus (1526–1586), who is today formally recognized as the founder of the electoral collection of art and rarities, including the mineral collection. From Augustus, ownership of the silver specimens passed through a succession of Saxon electors who nurtured the family mineral collection until eventually it was made a public institution.

Many other aristocrats who were not actually mineral collectors nevertheless owned specimens in the 16th century. These pieces were generally limited to the precious metals, and very few have survived. Miklós Oláh (1493–1568), Archbishop of Esztergom and a humanist writer, wrote in 1536 that he possessed a specimen of Transylvanian native gold heavier than 100 ducats (around three-fourths of a pound). Miklós Gerendi (died 1542), Bishop of Transylvania, possessed an even larger piece weighing 350 ducats. The register of the treasury of Louis II (1506–1526), King of Hungary and Bohemia, lists three large gold nuggets (Siklóssy, 1919). The 1577 testament of Pál Bornemisza (died 1579), Bishop of Nyitra, left a specimen of native gold to Hungarian Archduke Ernest (1553–1595). And numerous individuals sent their gold specimens to Emperor Rudolph (1552–1612) in Prague. These golds may ultimately have been added to, or stimulated the creation of, formal collections.

The Renaissance

The Renaissance profoundly changed public attitudes in Europe, and a desire arose to learn the truths about nature. The driving force for this resurgence of interest was the rise to prominence of the scholar as a third leading power in society (along with the clergy and the aristocracy). Scholars, according to the collector and physician Johann Major (1636–1683), achieved their fame by collecting alone, and not by birth, so they needed a proper environment to carry out their studies; thus was born the "modern" notion of a museum.

C. PLINII SECVNDI
HISTORIAE MVNDI LIBRI XXXVII
EX POSTREMA AD VETVSTOS CODICES COLLATIONE
CVM ANNOTATIONIBVS ET INDICE.



BASILEAE
IN OFFICINA FROBENIANA
M. D. XXXIX.

How should such a museum be furnished? Inspiration was provided by Pliny in his ancient *Historia naturalis*, written around 79 A.D. and preserved as carefully copied, recopied and translated manuscripts. Pliny described, in 37 volumes, the entire natural world as far as it was known in his time, including much on minerals. According to Pliny's philosophy, the goal of all human research into natural history was to fully realize the divine causality of all existence, and the humble triviality of man in comparison to the infinite power of nature. To Pliny, the "recording, analysis and investigation [of nature] represented the highest goal of all human activities" (Schulz, 1990). To be properly studied, specimens of the constituents of nature had to be assembled in one place, and Pliny's work was taken as a guide for the building of such collections.

Although initially conceived as primarily a theological exercise, the study of natural history soon evolved along progressively more scientific lines. Scholars began to question the purported supernatural properties of minerals, and to show more interest in their true physical characteristics.

The change was evident in the 16th century's first mineralogical

Speculum Lapidum Clarissimi Artium
Et Medicine Doctoris Camilli
Leonardi Pisaurensis.

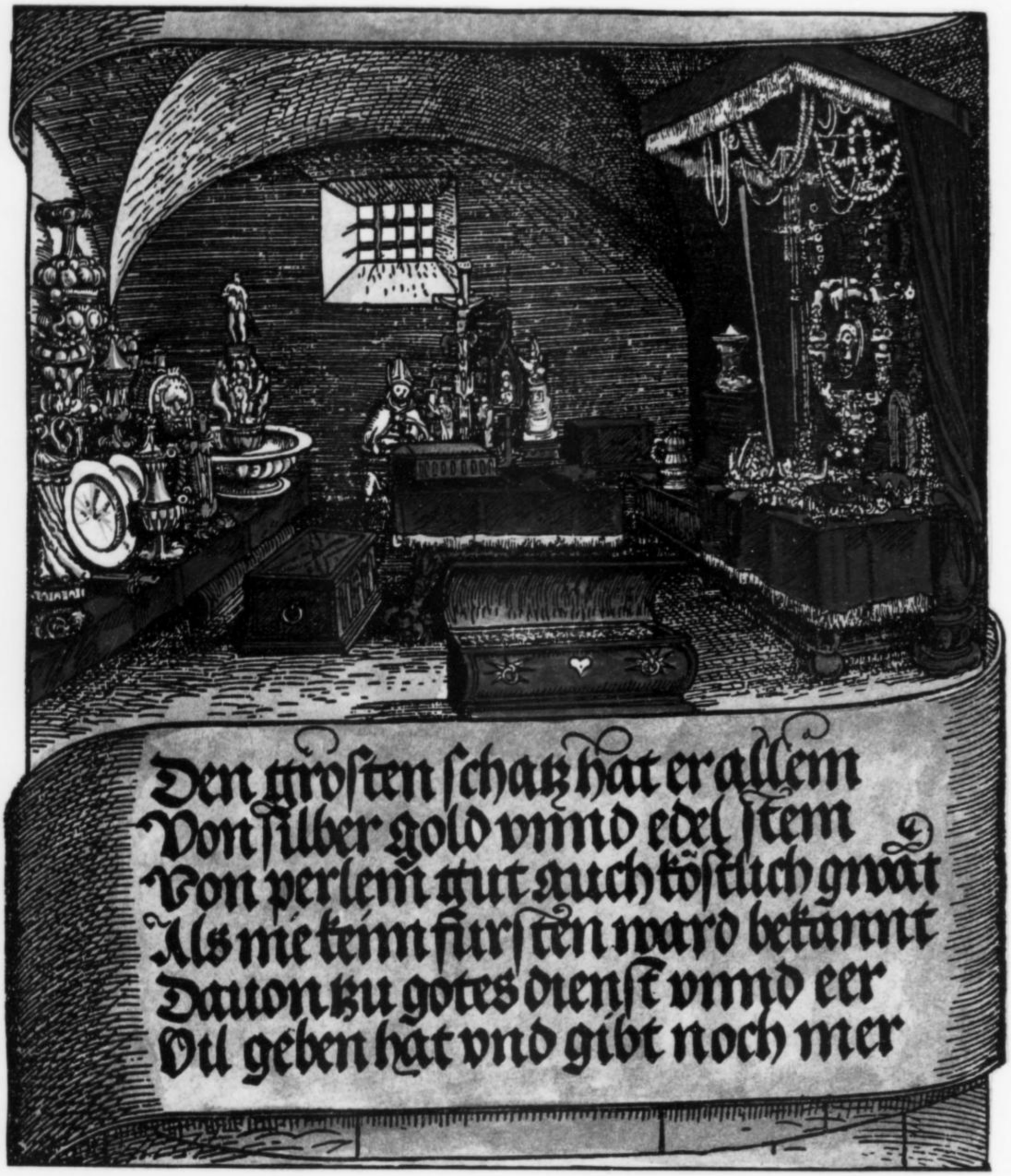
Valerii Superchii Pisaurensis Physici Epigramma.

Quicquid in humanos gemmarum parturit usus
Terra parens: uasti quicquid & unda maris.
Quãlibet exiguo claudis Leonarde libello
Mirandum/& seræ posteritatis opus.
Quod positis Cæsar interdum perlegat armis:
Seruariq; suas imperet inter opes
Et tibi pro meritis æquos decernat honores:
Consulat & famæ tempus in omne tuæ.



work, *Speculum Lapidum* ("The Mirror of Stones"), published in 1502 by Camillus Leonardus. Here, finally, an author begins to consider the physical properties of minerals (transparency, hardness, density, porosity, etc.) which can be used in the identification and characterization of species. With Leonardus there is therefore some reasonable basis to speculate that he may have had a study collection of minerals, although there are no written statements to confirm it.

Leonardus was court physician to Cesare Borgia (1475–1507) in the seaport city of Pesaro, in central Italy. Because of the necessity for physicians to be educated in the practical aspects of nature, including the pharmaceutical uses of minerals and plants, the combination of physician (or apothecary) and naturalist became common and persisted into the 19th century. It was just a matter of time before pharmaceutical minerals and metallic ores began to excite curiosity and interest for their own sake in the minds of renaissance scholars.



Treasury chamber of Maximilian I, Habsburg ruler of Austria, in 1515. *Schatzkammern* such as this often contained mineral, gem and precious metal ore specimens. The poem reads:

The greatest treasure has he alone,
of silver, gold and precious stone,
of lovely pearl and costly gown,
as even princes have not known.
From it you have rendered the Lord
service and honor, and give yet more.

THE 16th CENTURY

Mineral collecting began in the 16th century, in a form strikingly mature and similar in concept to modern collecting. That is, collectors such as Georgius Agricola, Johannes Mathesius, Johannes Kentmann and Bernard Palissy *began* as specialists in mineralogy and not as general natural history collectors. Most of their successors for at least the next two centuries tended to collect botanical and zoological samples as well, rather than specializing so intensely in mineral products alone.

Collections of the nobility (e.g. Rudolf II in Prague, Ferdinand of Tyrol, and the Medici) were decidedly opposite in almost every way. They grew by the accumulation of every conceivable type of object, natural and artificial, without any scientific purpose but more to illustrate or symbolize man's central place in the universe, and the sovereign's dominion over all.

Scholarly collections of a general nature included minerals with plants and animals, reflecting a more intellectual interest in nature. Conrad Gesner, the prominent Zurich naturalist, spent most of his life collecting and writing about plants and animals, turning to mineralogy only in his last years. Private Italian collections of *naturalia*, developing in parallel with the princely collections, also served a more didactic purpose. Their owners, lacking high aristocratic backgrounds, studied medicine and botany at universities and went on to professions as pharmacists (e.g. Francesco Calzolari and Ferrante Imperato), physicians, professors and directors of important botanical gardens (e.g. Michele Mercati and Ulissi Aldrovandi). They, like Agricola, began studying minerals as *materia medica* but developed a more consuming interest and a compulsion to collect all manner of mineral specimens regardless of their potential pharmacological value. For these scholars, building a personal collection of plants, animals and minerals meant acquiring an invaluable store of research specimens for first-hand laboratory study. Furthermore, the open access which students and the public had to private museums such as those of Aldrovandi and Calzolari sets them firmly apart intellectually from the princely collections which were guarded, private preserves. They differed even in their arrangement, the scientific museums being organized rationally like file cabinets, and the princely collections (with the exception of Augustus's) following arcane and symbolic arrangements of often mysterious significance (Olmi, 1985).

By the latter half of the 16th century, a whole range *naturalia* had found its way into private collections, especially in Italy. Encyclopedias of natural history began to appear as guidebooks for collection builders. Samuel Quiccheberg (1529–1569), personal physician to Duke Albrecht V of Bavaria, produced a particularly thorough treatise, considered also to be the earliest known museological tract (*Inscriptiones vel Tituli Theatri Amplissimi* . . . published in Munich in 1565). He carefully categorized the contents and organization of an ideal museum and library, covering all types of artwork, plants, animals and minerals . . . a "rich theater of objects of the whole universe." He employed, for the first time, the term *Wunderkammer* (repository of extraordinary objects), and concurred with Pliny in emphasizing the great importance of preparing collection *catalogs*.

According to Quiccheburg, the first collections were already described in the Old Testament (e.g. King Hezekiah's treasurehouse and armory, Book 2, Kings 20, 12–21). Solomon's temple and even the Garden of Eden he considered to be prototype universal collections, thereby establishing the scriptural precedents which made it desirable and proper for true Christians to also build their own natural history collections. Later writers (such as Neikelio, 1727) observed further that in building a universal collection, the curious and studious man, living in the macrocosm ordered by God, becomes similarly the creator of a parallel, ordered microcosm.

Thus developed the European notion of the universal collection, its goal being to encompass, through its examples, the full scope of the natural world, the three "kingdoms of nature" (plants, animals and minerals). Such a collection was referred to as a

INSCRIPTIONES
VEL TITVLI

THEATRI

AMPLISSIMI, COMPLECTENTIS
rerum vniuerſitatis ſingulas materias et
imagines eximias. ut idem recte quoq; dici poſſit:

Promptuarium artificioſarum miraculoſarumq; rerum, ac omnis
rari theſauri et pretioſæ ſupellectilis, ſtructuræ atq; picturæ.
quæ hic ſimul in theatro conquiri conſuluntur, ut eorum
frequenti inſpectione tractationéq;, ſingularis aliqua
rerum cognitio et prudentia admiranda,
citò, facilè ac tutò comparari
poſſit. autore Samuele à

QVICCHEBERG BELGA.

MONACHII
Ex Officina Adami Berg typographi.
Anno M.D.LXV.
Cum gratia et priuilegio Cæſareo.

"cabinet of curiosities" or a "closet of rarities" (in England), a *theatrum naturae* or *studiolo* (in Italy), and a *Wunderkammer* or *Naturalienkabinet* (in Germany). These latter were in the etymological tradition of the German *Kunstkammer* or "chamber of arts," and the *Schatzkammer* ("treasury"), but collecting paintings, jewelry and rare art objects remained more or less within the financial resources of only the very wealthy. Cabinets of curiosities also often contained what was called *artificialia*, consisting mostly of ethnological artifacts, scientific instruments and so on. Interest was engaged not only among scholars but generally among the middle class as well; even if not always prepared to study with scholarly zeal, the public was fascinated with natural history and eager for physical objects of nature to marvel at.

The great appeal of the *Wunderkammer* was that it could be built on virtually any budget, containing specimens of princely extravagance or things exclusively field-collected and traded. Anyone with an interest could participate, and cabinets could be made to emphasize whatever particular specialty local abundance or the collector's fancy might favor.

By the end of the 16th century, the majority of mineral collectors were no longer mineral specialists but natural history generalists. Many owned minerals merely as a footnote to their more lurid and entertaining plant and animal curiosities, monstrosities and freaks of nature. Often these collections were designed chiefly to thrill and delight casual visitors from the higher levels of society, as a means of elevating the owner to loftier social circles than he could otherwise achieve.

Thus the divisions were already drawn between the three principal types of collectors: (1) the scholars, scientists and serious amateurs, (2) the wealthy, aristocratic treasure builders, and (3) the non-scientific (one might even say anti-scientific) accumulators whose goals were entirely social. This is not to say that all scholars were immune from the temptation to lard their collections with grotesque rarities for social purposes. But the principal emphasis was usually clear in each case.

Following is a selection of short biographical sketches of the most important of the 16th-century mineral collectors, in chronological order by birth. For further information and references on *all* known early mineral collectors see the *Census of Mineral Collectors* chapter (p. 157). The story begins with the first known mineral collector, the only one to have been born in the 15th century: Georgius Agricola.



Agricola

Georgius Agricola (1494–1555)

Georg Bauer was born in Glauchau, Saxony. Nothing is known of his early life, but he entered the University of Leipzig at the age of 20, and earned his B.A. degree in 1518. He became Vice Principal of the Municipal School at Zwickau, where he taught Greek and Latin, and two years later was promoted to Principal. In 1522 he moved to Leipzig, taking a position at the university. For his publications he Latinized his name to Georgius Agricola ("bauer" means "farmer" in German; "agricola" means "farmer" in Latin).

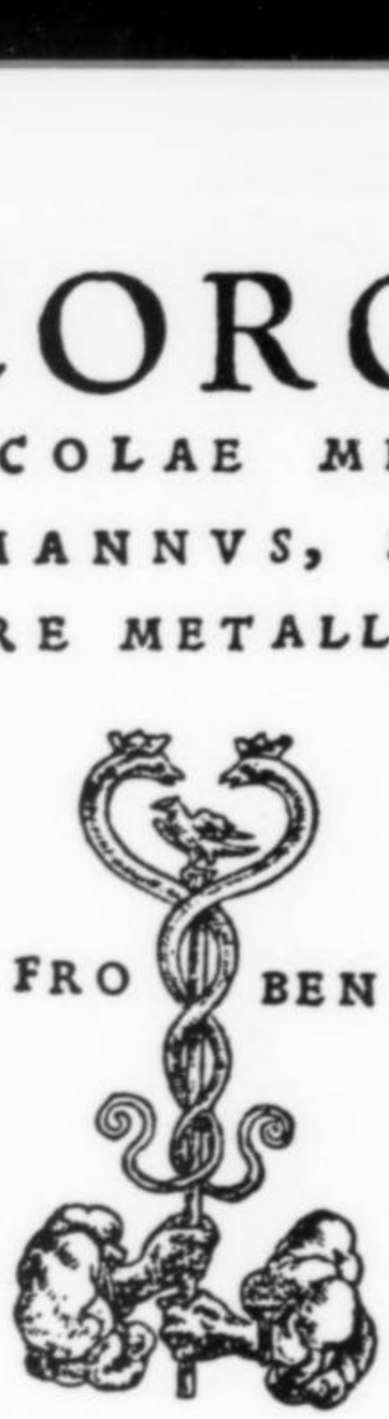
In 1526 he returned to Zwickau, and shortly thereafter accepted the post of city physician in the mining town of St. Joachimsthal, Bohemia. Six years later he accepted a similar position in the mining town of Chemnitz, and remained there until his death in 1555.

Agricola published a little book entitled *Bermannus* in 1530. It is a dialog on mining in which an expert miner conducts two novice friends through several mines and they discuss minerals and mining. The teaching is carried forward in the traditional way: illustrated *in* the mine by specimens in place. However, at the end it appears they have been collecting along the way, because one of them (Johannes Naevius, 1499–1574, a German physician and friend of Agricola) says to his servant:

> You there boy! Don't lose what I have handed you to take along; keep good watch! I want to examine these things more thoroughly at home, and in great composure. (Translation from Paul, 1970)

This is perhaps the first written reference to mineral collecting in the modern sense. Naevius also speaks of having an interesting specimen of chalcanthite at home (although perhaps for medicinal reasons).

In 1546 Agricola published two groundbreaking works: *De*



ortu et causis subterraneorum ("The origin and causes of inanimate subterranean materials") and *De natura fossilium* ("The nature of minerals"). In the latter he classifies minerals on the basis of their physical properties, using criteria such as color, density, transparency, luster, taste, odor, shape and texture. The stimulus which Agricola's works gave to men interested in natural history seems to have started the whole notion of personally collecting and studying minerals, giving a solid intellectual framework for others to work in, modify, and build on.

Agricola is thought to have begun collecting minerals of reputed medicinal value as early as 1524–1526 when he visited Venice. In a German-Latin mining dictionary (known as the *Meurerbrief*) which Agricola prepared in 1546, he actually mentions the names of many men who supplied him with mineral specimens from distant countries and cities. Among them was Wolfgang Meurer (1513–1583), to whom the dictionary is dedicated; he sent specimens from his hometown of Altenberg in Saxony. Georg Fabricius (1516–1571) sent Agricola specimens while traveling in Italy, and Paul Eber (1511–1569) sent ore specimens from Eisleben. In *De natura fossilium* Agricola says:

> I have attempted to discuss those minerals not found in Germany but in other parts of Europe and certain parts of Asia and Africa. In the discussion of these minerals, learned men, traders and miners have been of great assistance to me.

The bulk of Agricola's collection probably came from the rich silver mines at St. Joachimsthal, but in his dedication in *De natura fossilium* he also mentions Meissen, Sangerhausen, Freiberg, Geyer, Schneeberg, Annaberg, Marienberg, Albertham, Harz, Lauterberg, and the Jura Mountains in France. He eventually developed a strong scientific interest in the specimens, although we cannot say precisely when his collection passed from being a mere pharmaceutical stockpile to a true object of study in its own right. He added specimens at every opportunity during his travels, and corresponded widely with friends who supplied him with rare minerals. Agricola became a wealthy man and may well have obtained very expensive and valuable specimens. Unfortunately his collection has not survived, nor has any description of it. But judging from the scope of his original work, and the many first-person descriptions of mineral properties, it must have been extensive.



Mathesius

Johannes Mathesius (1504–1565)

Johannes Mathesius was a contemporary of Agricola's, an avid student of his works on mineralogy, and an interpreter of those works to the common miners of St. Joachimsthal.

Born in Rochlitz, Saxony, to a wealthy mining family, Mathesius served as a payroll messenger for his family's mines at the age of 14. After his father's death in 1521 he visited Nuremberg, Ingolstadt and Munich as a traveling scholar, working in Munich as a librarian until 1525. He taught classes in several schools, then entered the University of Wittenberg in 1529 to study theology and natural science. There he became a close friend and biographer of Martin Luther (1483–1546). In 1542 he took the position of preacher in St. Joachimsthal, and was promoted to minister or acting priest in 1546.

Agricola's *Bermannus* inspired Mathesius to descend into the mines himself, spending time there and assisting the miners in their work. He spread Agricola's ideas through sermons to the miners. Beginning with a reading from Agricola or other secular works on mining and mineralogy, translated from the scholar's Latin into the miner's German vernacular, he would then launch off on a moral or theological lesson in which he saw a relationship.

Mathesius collected his mining-related sermons together in a book which he published in 1562; it was entitled *Sarepta oder Bergpostill*, and bore the following subtitle: "Containing descriptions of a variety of mines and minerals, their properties and

nature, their use and purpose; with comforting and instructive explanations pertaining to the mentioning of minerals in the Holy Scriptures and how the Holy Ghost represents the articles of our Christian beliefs in minerals and mining."

Mathesius built a personal mineral collection that became quite well-known in his time and which served as a model or example for the collections of others. It contained specimens from many famous mines, and Mathesius took some pride in having specimens of minerals which Agricola neither possessed nor knew of. He wrote:

> I have obtained specimens from Eule in Bohemia, as well as from the Hungarian mountain towns and several mountain regions in Styria. I have obtained several gold specimens, and beautiful cubic pyrites and "agstein" mined at Leinbach in Austria. From Rauris and Gastein rare specimens have been sent to me of a kind which Dr. Agricola, as he freely admits in my house, has never seen before. From Schwaz in the Inntal I obtained talc and beautiful malachites. Also a very nice quartz specimen with native mercury and acanthite from Stahlberg in Pfalz.

Mathesius comments that he philosophized on minerals at great length with Agricola during his visit to St. Joachimsthal in 1550.

Some indication is given in the writings of Mathesius that mineral collecting on a limited scale was common among the miners. He cites, for example, an "old, laudable and permitted custom of presenting ore samples and attractive hand-specimens, given by God, to gentlemen and fellow miners." One can only wonder how far back in time this custom, already "old" in Mathesius's day, was practiced.



Martin Luther

Mathesius also relates a story about Martin Luther, who was himself the son of a Harz miner:

> When some miners with beautiful rocks and cut specimens and medals showed themselves as honest miners at the table, and rendered thanks for the children's sake, he (Luther) began to speak of the mine: "I gladly see how the rich God bid grow His treasures beneath the surface . . ."

The collecting of minerals for their appeal as specimens therefore appears to have originated with miners. Sadly, because common miners before the 16th century were generally illiterate, this must remain a hidden chapter in the history of mineral collecting.



Palissy

Bernard Palissy (ca. 1510–1590)

Bernard Palissy was a French Huguenot potter and self-taught naturalist who developed his interest in minerals independently in a different way. Whereas apothecaries and physicians like Agricola had begun by accumulating minerals of medicinal value, Palissy field-collected the highly varied mineralogical materials used in the production of his ceramics and glazes.

Although Palissy's birthdate and birthplace are uncertain, as well as the names of his parents and their trade or profession, it is known that his family settled in Saintes (95 km north of Bordeaux) when he was quite young. He learned to read and write French, acquired some proficiency in mathematics and geometry, and developed some skill in drawing and sculpture.

His first choice of a trade was to become a stained-glass artisan, and he served for a time as apprentice to an unknown master. Then, according to European custom, he went traveling to broaden his experience, visiting many areas of France and perhaps also Belgium and Germany.

By 1539 he had returned to Saintes and taken a wife, but the demand for stained glass had been dwindling as the architectural fashion shifted from Gothic to Renaissance. He worked for a time as a land surveyor, until the day he happened to see a particularly beautiful porcelain cup. Although Palissy knew little, if anything, about ceramics, he became obsessed with the idea of reproducing it. For the next 16 years he experimented tirelessly under the most adverse conditions, and at last succeeded in inventing a type of glazed stoneware that proved highly popular with the aristocracy.

For many years, poverty had rendered him unable to purchase all of his own raw materials, and his experiments had furthermore required a wide range of non-traditional mineral compounds. He had therefore been compelled to prospect the mountains, mines, quarries and outcrops of France himself in order to gather minerals and clays of all kinds. Over the course of many years his field work permitted him to learn a great deal about geology and mineral formation from first-hand observation, and also to build a substantial mineral collection.

In addition to being a fine craftsman, Palissy was a natural scientist. Iconoclastic in the extreme, he was the ultimate anti-

Aristotelian. He did not know Latin or Greek (the principal languages of medieval scholarship), and in fact had apparently never even read Aristotle or Agricola. He defied established authority in his writings, and derided some of the most revered philosophers of his time with an unrestrained fervor born of his Protestant background. If it was necessary, as Protestants believed, to critically examine the Scriptures and come to one's own conclusions about religious matters, possibly differing with the established church, why should the established authorities on natural science not be treated the same? Observation and deduction came first with him, and his original views on many natural phenomena have proven correct.

Following the commercial success of his ceramic ware, Palissy moved to Paris where he enjoyed the support and protection of the aristocracy. His mineral collection had developed into a personal earth science museum in which he regularly gave lectures to prominent intellectuals, physicians and scholars. Regarding the use of his specimens for demonstration, La Rocque (1957) wrote:

> Palissy's teaching methods were revolutionary for his time. Not only did he use specimens to illustrate his lectures, but he expected his readers to visit his museum, book in hand, to do laboratory work, as we would call it now, to verify his statements. In this he was so much ahead of his time that nearly three centuries were to elapse before his method was generally adopted.

None before him, La Rocque says, had so intimately connected arguments with specimens.

DISCOVRS AD-
MIRABLES, DE LA NA-
TVRE DES EAVX ET FON-
TEINES, TANT NATVRELLES QV'AR-
tificielles, des metaux, des ſels & ſalines, des
pierres, des terres, du feu & des emaux.

AVEC PLVSIEVRS AVTRES EXCEL-
lens ſecrets des choſes naturelles.

PLVS VN TRAITE' DE LA MARNE, FORT
vtile & neceſſaire, pour ceux qui ſe mellent de
l'agriculture.

LE TOVT DRESSE' PAR DIALOGVES, ES-
quels ſont introduits la theorique & la practique.

Par M. BERNARD PALISSY, *inuenteur des ruſtiques figulines du Roy, & de la Royne, ſa mere.*

A TRESHAVT, ET TRESPVISSANT
ſieur le ſire Anthoine de Ponts, Cheualier des ordres du Roy, Capitaine des cents gentils-hommes, & conſeiller treſfidele de ſa maieſté.

A PARIS,
Chez Martin le Ieune, à l'enſeigne du Serpent, deuant le college de Cambray.
1580.
AVEC PRIVILEGE DV ROY.

As an appendix to Palissy's geological treatise, called *Discours Admirables* (1580), he included the text of lengthy labels "placed under the marvelous things which the author of this book has prepared, and arranged in order in his cabinet . . ." Although not as detailed as Johannes Kentmann's catalog of 1565, it gives us an idea of the scope of this collection.

There is no actual count of the specimens, but Palissy refers to his collection as "a great number of stones." Included were stalactites, clays, gypsum crystals, talc, conglomerates, fossiliferous rocks (correctly interpreted), petrified wood, "ores of all kinds of metals . . . many samples of gold . . . silver, lead and copper," slate with imbedded pyrite crystals, quartz crystals, pyritized fossils, pumice, agates, chalcedony, and crystals of melanterite, metallic sulfates and nitre. Many fine crystal specimens of metallic minerals were included, "naturally cut into facets, as if they had been carved artificially."

Other geological cabinets existed in Paris at the time, and Palissy visited them with great interest (for example, the collections of Henri de Mesmes and Nicolas Rasse de Noeux). But they were generally unscientific hoards of curiosities, and did not compare with his own. Palissy's was the first collection in Paris to be used formally for instructive purposes, it was certainly the most specialized and sophisticated with respect to mineralogy, and his lectures on natural history (1575–1584) were the first to be given in that city.

According to Palissy, he had, by the year 1580, been led to "scratch the earth, during forty years, and to search its bowels, in order to know the things it produces within itself." Thus he must have begun his geological field work in 1540, at about the same time that he initiated his ceramics experiments; he may quite possibly have begun his mineral collection before the younger Johannes Kentmann, and perhaps even before Johannes Mathesius. In any case, it is certain that Palissy was a Founding Father of mineral collecting (with Agricola, Mathesius, Kentmann, Mercati and Gesner), and was surely the strongest field-collector of that distinguished group.

Conrad Gesner (1516–1565)

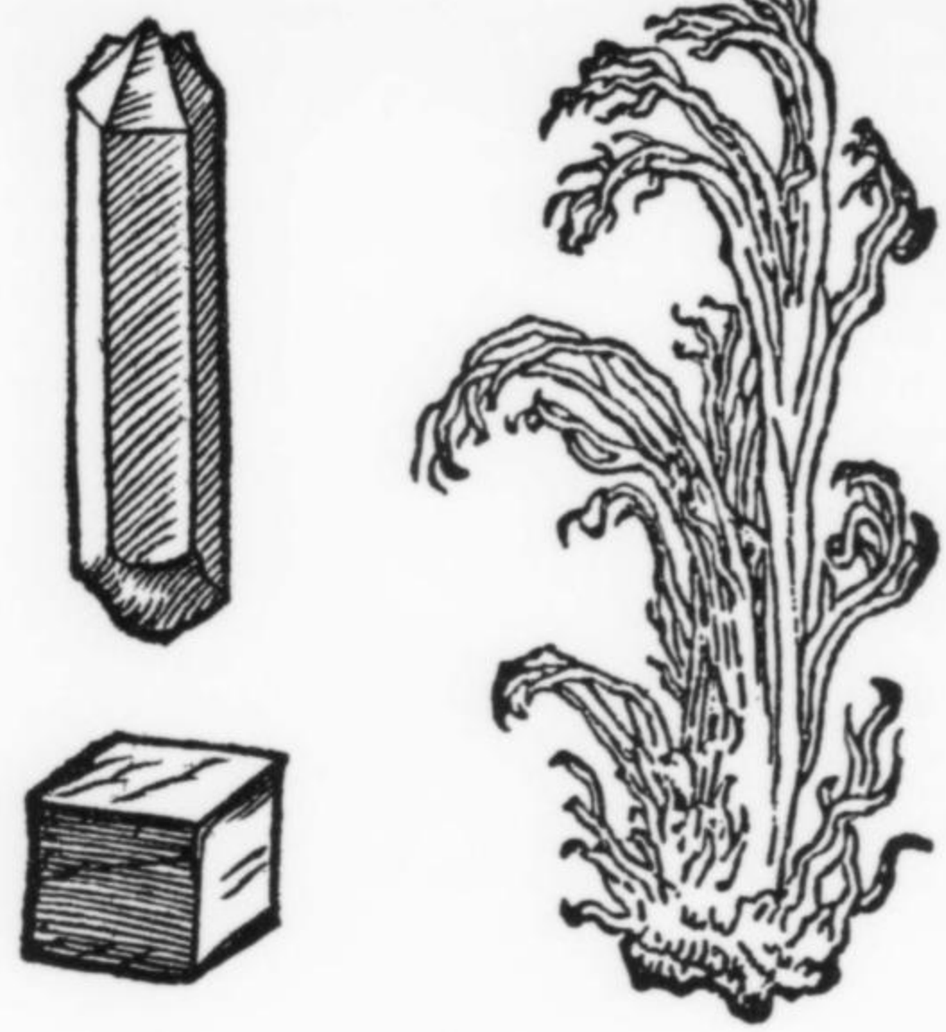
Conrad Gesner was born in Zurich, the son of a furrier with many children and little money. Although his father was killed in battle fighting for the Protestant cause when Gesner was only 15, he nevertheless received a good classical education, and at first planned to enter the ministry. But his interests in natural science diverted him onto another path.

In 1533 he was awarded a traveling scholarship, and spent two happy years in self-directed study in Bourges and Paris. Outbreaks of religious persecution caused him to flee Paris in 1535; he traveled first to Strasbourg, then to Basle where he earned his doctorate in 1541. He finally settled in Zurich, and was eventually appointed chief physician for the city.

Gesner, in the best scholarly tradition, was a man of many languages: he spoke Dutch, French, German, Greek, Hebrew, Italian, Latin, probably some English, and had a reading knowledge of Arabic. Botany, zoology and medicine were his principal interests, and his output on these subjects was enormous: at least 71 books published during his lifetime, and 18 more in manuscript form at the time of his death. His monumental *Opera botanica* contained 1,500 illustrations; his four-volume *Bibliotheca universalis* earned him fame as the "founder of bibliography;" and his 4,500-page *Historia animalium* influenced Cuvier and many later biologists. Adams, in his *Birth and Development of the Geological Sciences* (1938), wrote:



Gesner



Specimens from **CONRAD GESNER**'s collection:
a quartz crystal, halite cube, and
wire silver, the first minerals ever to be
illustrated in print (1565).

Gesner's aim was to embody the work of all previous writers and then to complete the treatment of the several subjects by information drawn from his own observations, or from those of the great host of naturalists in all countries with whom he maintained a continuous correspondence. Most of his works on natural history were elaborately illustrated, so that he was obliged to keep a draftsman and an engraver continuously at work in his house preparing illustrations.

Gesner, like Mathesius, had been influenced by Agricola's work, and he decided in the early 1560's to expand his natural history research and writings into the field of mineralogy, and to assemble a mineral collection for reference and illustration purposes. He was an avid field collector of botanical specimens, and had written a small work on the joys of Alpine mountain climbing, so it is likely that he personally collected at least some of the mineral specimens in his collection. However, many others were probably gifts from his many correspondents. He had his illustrators render several of his mineral specimens, but was not well pleased with the results.

In 1565 he published his first book on minerals, *De omni rerum fossilium* . . . ["Everything concerning the subject of the origins of things dug up: gems, stones, minerals and things of that sort, in several books, most of them now published for the first time through the efforts of C. Gesner"]. It was an anthology composed of eight books, each related in some way to minerals. Gesner's printer/publisher was reluctant to publish short works, a problem which may have inspired Gesner to conjoin the eight short treatises, only one of which he had written himself. The others were by Johannes Kentmann, Georg Fabricius, Severin Goebel, Valerius Cordi, François La Rue and Epiphanius.

Gesner considered *De omni rerum fossilium* to be the first illustrated book on minerals, and so it is, with the exception of two limestone nodules pictured in Christopher Encelius's *De re metallica* (1551).

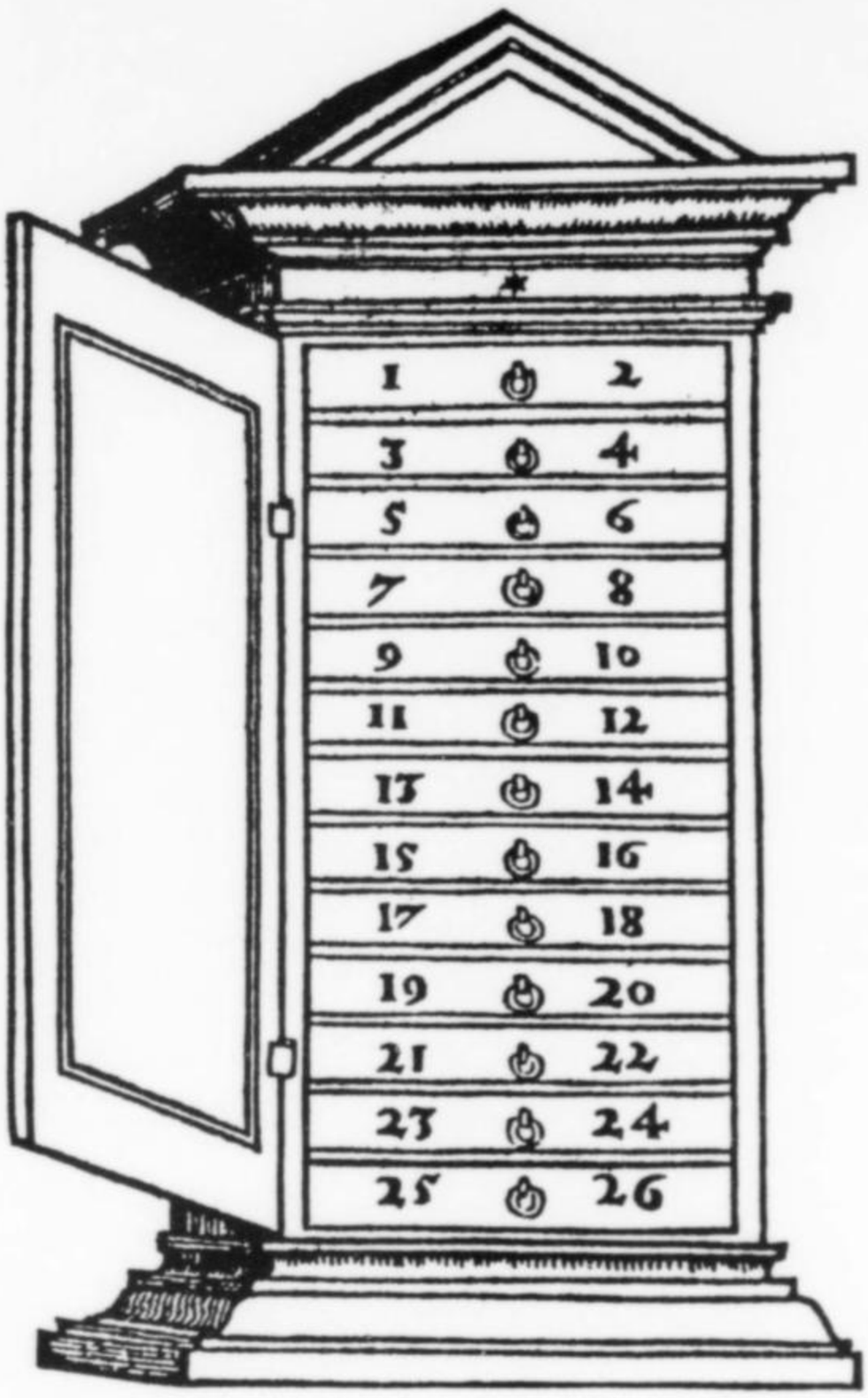
Gesner's own contribution to the above collection, *De rerum fossilium*, was essentially an outline for a proposed classification of minerals based on external form. It was written "offhand and rapidly, as a pleasure and recreation, and was intended to stimulate and encourage all students who were interested in minerals" (Adams, 1938). He wanted to develop some correspondence and feedback on the subject, providing an informal opportunity for others to discuss corrections and additions with him. It was his intention to later publish a more comprehensive and thorough volume on minerals, which would surely have been large and magnificently illustrated. Unfortunately, Gesner contracted the plague in that same year and died prematurely at the age of 49.

Gesner's mineral collection was acquired by Felix Platter (1536–1614), a fellow Swiss naturalist living in Basle, and was carefully preserved by his descendants. The English naturalist John Ray (1627–1705) wrote in 1673 that he had seen Gesner's specimens, and described them as "a good collection of minerals, stones, metals . . . the names being set to each one." Platter's collection was ultimately acquired by the Naturhistorisches Museum in Basle, but there is no way of determining today which of the few surviving specimens had originally been Gesner's.

Johannes Kentmann (1518–1574)

Johannes Kentmann was the first to put Agricola's mineral classification (more or less) to work in the organization of a major mineral collection. He was born on April 21, 1518, the son of Christoph Kentmann, a Dresden furrier who also served four terms as mayor of the city. Johannes Kentmann's grandfather had served for many years in the Saxon military; after leaving the service he was awarded Dresden citizenship, and went into what was in those days a rather new kind of profession: cutter and polisher of precious and semi-precious stones.

At the age of 14, Johannes Kentmann was sent off to a highly ranked boarding school in the mining city of Annaberg, where he stayed for two years. He later enrolled in the University of Leipzig, and in 1540 was accepted into the School of Medicine.



JOHANNES KENTMANN's mineral cabinet, each drawer containing a specific category of minerals, e.g. earths, gems, fluorite, silver, pyrites, lead minerals, etc.

He studied for a time at Wittenberg, then, in 1546, departed for Italy where he studied under various learned men at the universities in Padua, Rome and Bologna. In 1549 he was awarded the degree of Doctor of Medicine and Surgery at Bologna.

While in Padua he had developed an acquaintance with the prefect of the Paduan Botanical Gardens, who sent him in 1548 on a botanical collecting tour of Apulia and Sicily. The trip fueled his growing interest in natural history, and when at last it was time to return to Saxony he determined to stop in Zurich and visit the well-known naturalist Conrad Gesner. They developed a scholarly friendship which was to last until Gesner's untimely death. Gesner presented Kentmann with hundreds of copies of drawings and written descriptions of plants, animals and minerals.

In late 1549 Kentmann at last returned to his family home in Dresden. There he was reunited with his old Annaberg classmate, Georg Fabricius (1516–1571), who shared h's interest in natural history. Kentmann moved to Meissen for three years, then moved on to Torgau where he remained for the rest of his life. There he devoted himself to his medical practice and official responsibilities, while in his spare time he collected minerals and wrote on botany, zoology and mineralogy. Several of his works were published with the help of Conrad Gesner.

In 1565, the last year of Conrad Gesner's life, he published Kentmann's mineral collection catalog, entitled *Nomenclaturae Rerum fossilium, que in Misnia praecipue, & in alijs quoque regionibus inveniuntur* ("Nomenclature regarding things dug up, especially in Miessen, and also found in other regions"). In it Kentmann presents his own preference for a scheme of mineral classification (more or less a combination of the classifications proposed by



Kentmann

Agricola and Gesner), and also a detailed inventory of the 1,608 mineral specimens in his own collection, 1,136 of them from Saxony and 472 from specified foreign localities. This is an extraordinary compilation to represent the first documented mineral collection in history! Unfortunately no specimens were illustrated, but Kentmann does provide us with a picture of his orderly mineral cabinet, containing 13 drawers with specimens carefully sorted into 26 categories. The emphasis in Kentmann's collection is on the metals and ore minerals of Saxony, as one might expect, but the array of foreign specimens is surprising and his documentation of localities is exemplary.

Francesco Calzolari (1521/2–1600/6)

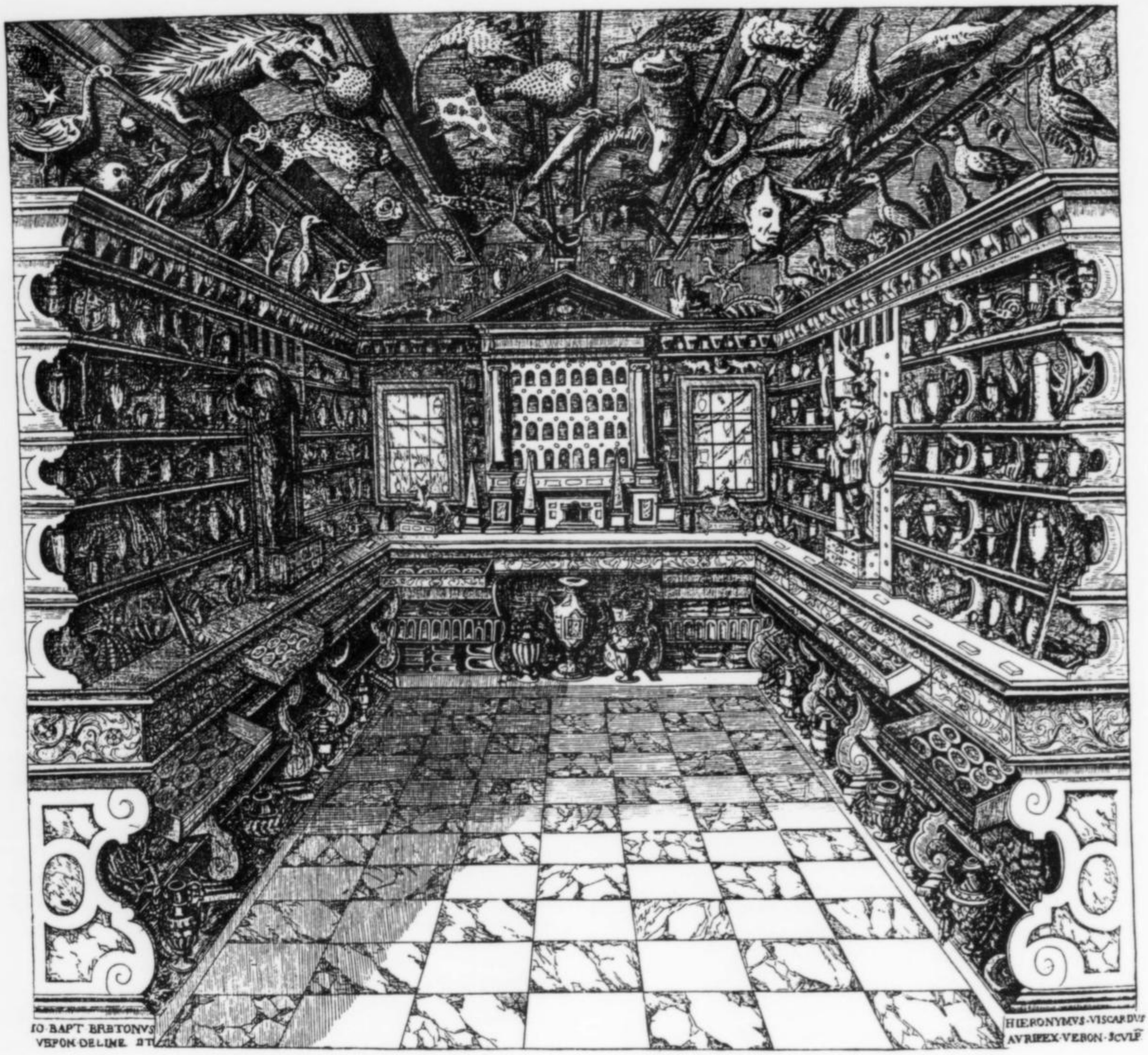
Francesco Calzolari was born in Verona in 1521 or 1522. After studying under the naturalist Luca Ghini, he went on to the University of Padua where he learned the preparation of pharmaceutical prescriptions using various plant, animal and mineral substances. He worked with the recipes of the great Greek physicians and also the best medicines of contemporary doctors. Excelling at this, he eventually left school and opened a pharmacy shop called "The Golden Bell" in the main square of Verona.

Calzolari loved to walk the mountains and valleys collecting his own plant and mineral materials, especially in the Monte Baldo area between Verona and Lake Garda. Driven by a fascination with natural history, he worked to acquire all sorts of herbs and minerals from Europe and Asia Minor through dealers and travelers. These he added to his personally collected specimens in a special room at the rear of his pharmacy, developing "a museum which in time grew ever richer with exotic and very rare exhibits."

As the extraordinary nature of Calzolari's little museum became more widely known, a steady stream of physicians, naturalists, friends and curiosity seekers began arriving for tours. Eventually the fame of "The Golden Bell" spread throughout Europe.

One visitor, Antonius Passienus, was a physician in Peschiera. In a letter to his friend Giacomo Scudellari (quoted by Olivi in his first catalog of the museum, 1584) he remarks that he had

> . . . always burned with a desire to visit the Calzolari

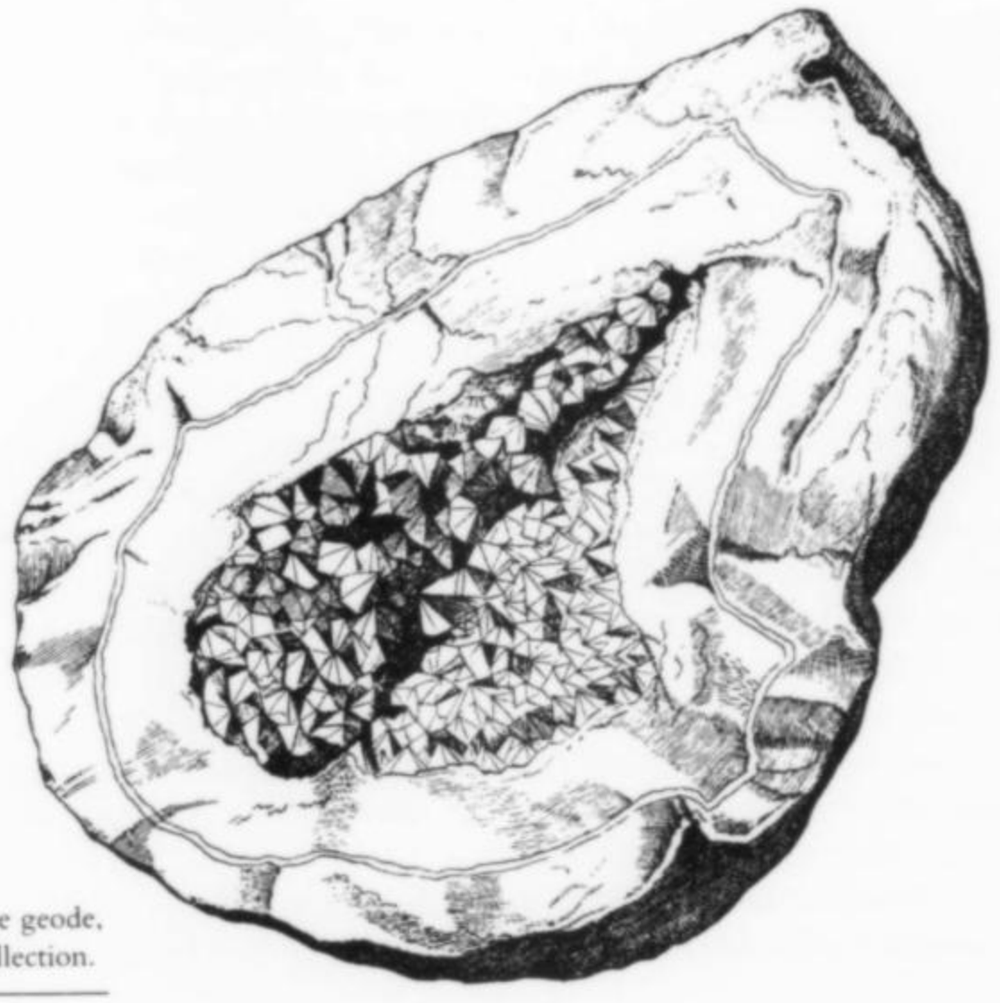


Collection room of **FRANCESCO CALZOLARI**; mineral specimens appear to have been kept in the drawers.

collection, made by the most famous vendor of aromatic herbs; so he went to Verona, and was amazed by the fraternal welcome and by . . . the Treasure, the well-ordered clean collection. There were exhibits which came from far away, or which had been given to him by princes and dukes; roots, juices, parts of rare plants, and much *metalla* (exhibits from the mineral kingdom).

Each specimen was accompanied by a minutely detailed label or *schaedula manuscripta*. The exhibit room was lined with nicely crafted open shelves above, and a series of drawers at waist-level. Stuffed animals hung from the ceiling.

Cultured, generous and friendly, Calzolari became one of the principal attractions of the city; a visit was considered essential for all lovers of nature who passed through Verona. Calzolari developed friendships with many of the most prominent natur-



A quartz crystal-lined agate geode, from **CALZOLARI**'s collection.



Calzolari



Aldrovandi

alists and collection builders of his time, including Ulisse Aldrovandi and Michele Mercati. Assisted by his sons, he developed a mail-order pharmacy business supplying medicinal preparations to Italian physicians in other cities and to other European countries as well.

Calzolari's sons predeceased him, and his health deteriorated with age. Ultimately, due to advancing blindness, he was forced to retire to the country and turn "The Golden Bell" over to his grandson Francesco Calzolari Jr., the son of Angelo Calzolari. The younger Francesco cared for the collection, enlarged it, and engaged two physicians (Benedetto Ceruti and Andrea Chiocco) to write a proper description of it. Francesco Sr. died in 1600 or 1606. The cataloging task was finally completed and published in 1622.

The museum was divided into several sections: (1) corals, (2) clays and earths, (3) crystal-lined geodes, amethyst, fluorite, diamond, opal, cat's-eye, emerald, topaz, malachite, jasper, beryl, sapphire, lapis lazuli, turquoise, ruby, garnet, chalcedony, sardonyx, carnelian, agate, magnetite, hematite, dolomite, gypsum and some fossils and other materials, (4) gold, silver, cinnabar, copper and iron minerals, antimony minerals, coal, talc, alum, cassiterite and others, (5) the herbarium, and (6) stuffed animals and dried or preserved animal parts, including the purported horn of a unicorn (actually a narwhal's tooth).

In the 1640's the Calzolari collection was sold off, part going to a Veronese pharmacist named Mario Sala, and part being incorporated into the already large collection of Lodovico Moscardo, a Veronese nobleman interested in science. Moscardo himself described his collection in 1656 (*Note ovvero memorie del Museo di Lodovico Moscardo, nobile veronese . . .*); it consisted of (1) antiquities, (2) stones, minerals and earths, and (3) corals, shells, animals and botanical specimens. The Moscardo collection eventually passed into the possession of the Miniscalchi family and what remains is today a part of the "Miniscalchi Foundation" in Verona.

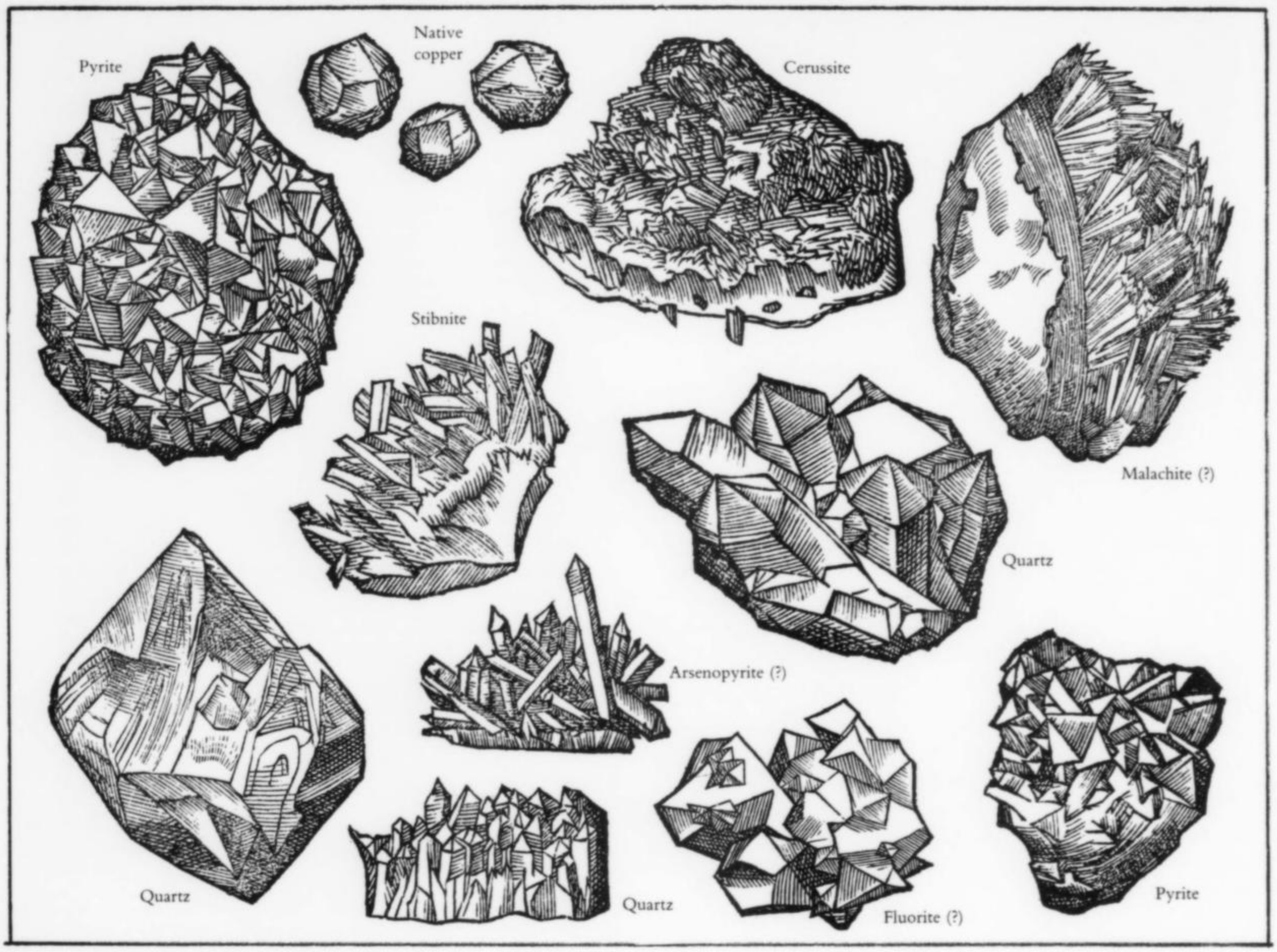
Ulisse Aldrovandi (1522–1605)

Ulisse Aldrovandi was born into a privileged background, the son of two noble families and second cousin to Pope Gregory XIII.

As a young man in Bologna he was restless by nature and found it difficult to stay focussed on his studies. He first studied mathematics under Annibale della Nave, a famous mathematician, but ran away from home on several occasions. During one of these escapades he traveled as far as Spain simply to see new things, new scenery and new people. Back in Bologna after many adventures, he switched to the study of Latin under Giovanni Gandolfo, a distinguished humanist. His mother, however, wanted him to join the legal profession, so he studied law for several years. When on the verge of receiving his law degree, he became interested instead in philosophy, and rededicated himself under the tutelage of the best philosophers in Bologna. Around 1545 he decided to pursue his philosophical studies in Padua, but while there became fascinated by medicine, and was a student in that field until Pietro Catena influenced him to take up once again the study of mathematics.

Upon returning to Bologna he was charged with heresy (probably because Averroës' prohibited doctrines were being taught then in Padua), but he cleared himself before the Inquisition in Rome. While there he became interested in archeology, until becoming friends with Guillaume Rondelet, personal physician to Cardinal Tournon, and a specialist in the study of fishes. Through Rondelet's influence, Aldrovandi at last settled on natural history and began collecting specimens of all sorts. In order to earn a living, Aldrovandi was obliged to complete his medical degree in 1553 in Bologna, and took a teaching position at the university.

His university position suited him perfectly, allowing him to devote further study to natural history when not occupied by his teaching duties. During school vacations he traveled widely to study nature firsthand and to gather ever more specimens for his



Some mineral specimens from
ULYSSI ALDRIVANDI's collection.

personal museum. In later years he was frequently accompanied on field trips by his favorite students, who helped him gather and carry botanical and mineral specimens.

Recognizing his intense, independent scientific investigations, the senate of Bologna appointed him to a professorship in what amounted to the study of natural history, a broader field than traditionally was taught by a single professor. His classes were so popular that his students successfully petitioned the University to declare the chair a full professorship in 1561.

Aldrovandi established the Bologna Botanical Gardens and was named its first director. However his prodigious studies in natural history, with the financial backing of Pope Gregory XIII, brought him the greatest fame. He wrote important volumes on birds, insects, fish, embryology, and minerals (some published posthumously). Although his thinking was uncritical with respect to the dubious and mystical writings of some earlier writers which he repeated, much of his work was based on first-person observation and experimentation which paved the way for later scientists. Castellani (1978) writes that, "Although Aldrovandi is not identified with any revolutionary discoveries, his work as a teacher and as the author of volumes that constitute an irreplaceable cultural patrimony earns him a place among the fathers of modern science."

His one mineralogical work, *Museum metallicum* ("Mineral Museum") (1648) is a massive, thousand-page, folio-size compendium of the study and description of his own enormous mineral collection. It contains a large number of woodcuts showing specimens of quartz, calcite, stibnite, pyrite and many other species, as well as fossils.

Upon his death, Aldrovandi bequeathed to the city of Bologna (the senate of which had so generously supported his long university career) his entire museum and library, along with all his unpublished manuscripts and accompanying beautifully prepared copperplate engravings.

Augustus of Saxony (1526–1586)

Augustus was born in Freiberg, the younger son of Heinrich the Pious, Duke of Saxony. He was brought up Lutheran and received a good education at the University of Leipzig. Augustus's elder brother Moritz inherited the dukedom on Henry's death, but he and Augustus remained friends. When Moritz died in 1553, Augustus became elector of Saxony at the age of 27.

As a ruler Augustus was a good economist, politically cautious and a wise governor. He improved roads, regulated coinage, benefitted agriculture and architecture, and established a comprehensive body of law regulating the church, the universities and the police. He was also covetous and superstitious.

The Habsburg family had begun a *Kunstkammer* in Vienna by



Augustus

1550, though nothing is now known of its contents. Augustus's own *Kunstkammer* in Dresden is believed to have been founded in 1560. By the time of his death 26 years later it had grown to over 10,000 items of all kinds. Augustus enlarged the electoral collection of coins and medals, and the century-old silver collection which already included specimens of native silver among the silverware and silver art objects. He founded an armory, established an *Anatomie-Kammer* exhibiting human and animal skeletons, medical specimens and fossils, and also a famous library. Together with the *Kunstkammer* they formed a coordinated system of collections.

The *Kunstkammer* consisted of seven rooms on the fourth floor of the western wing of the *Residenz*, directly over the electoral living rooms. There was a decline in general importance of the objects throughout the sequence of rooms. In the first and most interesting room Augustus kept his most precious specimens, such as a Colombian emerald matrix studded with manually implanted crystals of emerald (now in the Green Vaults in Dresden) and his favorite carved rock crystal ball. (Other items of precious and semi-precious stones were kept separately in the treasury and not in the *Kunstkammer*.) Only a few other items of *naturalia* were exhibited in the first room.

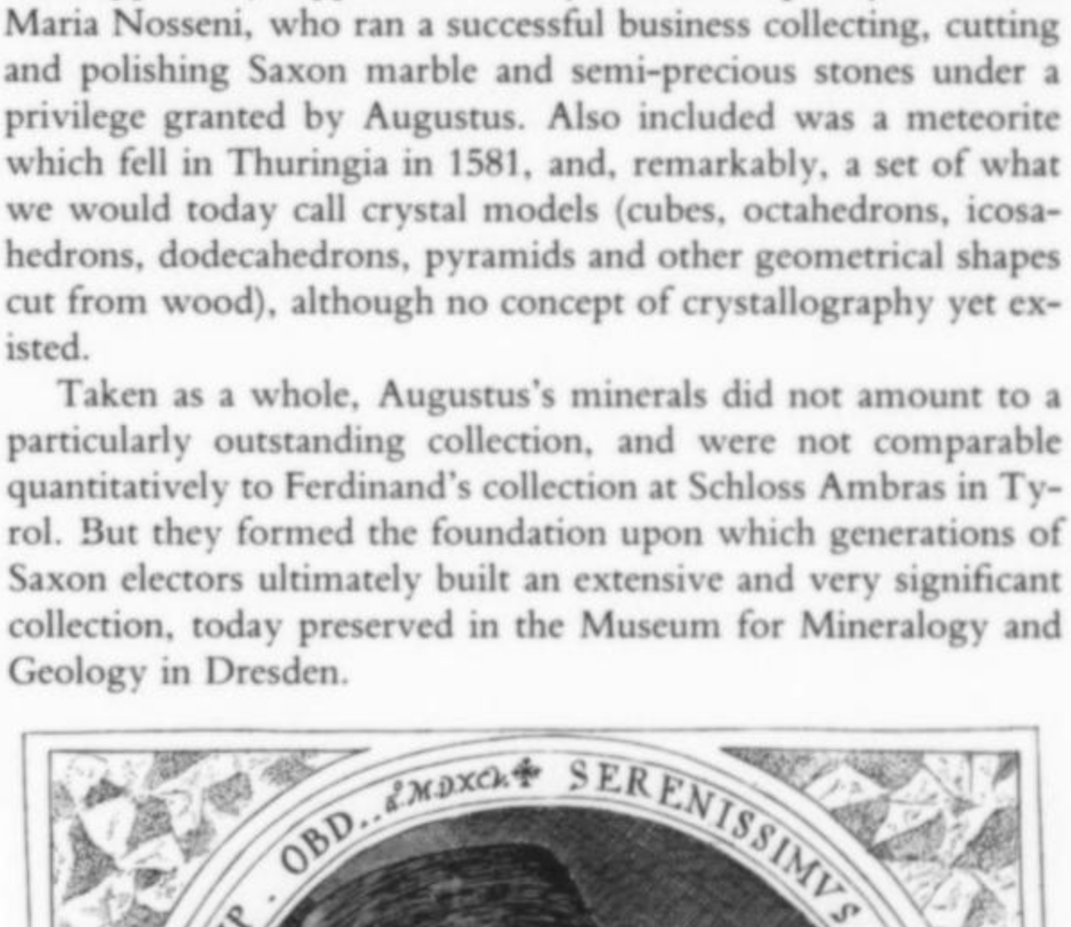
His most voluminous holdings, almost three-quarters of his entire collection, consisted of tools and instruments laid out according to the crafts and professions for which they were made. Cabinet-making, locksmithing, gardening, gunsmithing, gunnery, hunting, fishing, printing, mathematics and geometry, goldsmithing, sculpting, surgery and especially geodesy were among the many occupations represented.

Scientific instruments of all kinds were an important part of the electoral *Kunstkammer*: 442 quadrants, spheres, globes, compasses, astrolabes, clocks, hourglasses and measuring instruments of all kinds. Considering the enormous and unique assemblage of tools and instruments which Augustus brought together, his *Kunstkammer* was decidedly different from every other at that time and for many years to come. It can be thought of instead as the forerunner of the modern scientific technical museum.

The *Kunstkammer* also included a collection of Saxon minerals. The Electorate of Saxony was at that time twice the size of what in the 19th century became the Kingdom of Saxony. Saxony owned the most extensive industrial complex in Europe, fed by rich deposits of silver, copper, antimony, cobalt, tin, iron and bismuth. Saxony was also rich in semi-precious stones: agate, jasper, amethyst, garnet, opal, topaz and smoky quartz. These materials were a natural focus for the elector's collection.

Augustus's mineral specimens were kept, for the most part, in the fifth room of the *Kunstkammer*, which also housed the bulk of his library. The inventory of 1587 records specimens of marble, serpentine, jasper, amethyst, and a variety of unspecified species (listed only by their colors . . . "1 red stone . . . 1 green stone . . . 1 white stone . . ." etc.) from localities such as Zwickau, Chemnitz, Annaberg, Harzdorf and Schneeberg. Many of them were apparently supplied to him by an Italian lapidary, Giovanni Maria Nosseni, who ran a successful business collecting, cutting and polishing Saxon marble and semi-precious stones under a privilege granted by Augustus. Also included was a meteorite which fell in Thuringia in 1581, and, remarkably, a set of what we would today call crystal models (cubes, octahedrons, icosahedrons, dodecahedrons, pyramids and other geometrical shapes cut from wood), although no concept of crystallography yet existed.

Taken as a whole, Augustus's minerals did not amount to a particularly outstanding collection, and were not comparable quantitatively to Ferdinand's collection at Schloss Ambras in Tyrol. But they formed the foundation upon which generations of Saxon electors ultimately built an extensive and very significant collection, today preserved in the Museum for Mineralogy and Geology in Dresden.



Ferdinand

Ferdinand of Tyrol (1529–1595)

Ferdinand II was born the son of Holy Roman Emperor Ferdinand I (1503–1564) and Anne of Hungary (1503–1547). He was



Schloss Ambras, the Tyrolean castle of Ferdinand II.

given a princely education by Jesuit tutors and, in 1547, at the age of 18, was installed by his father as governor of Bohemia.

Ferdinand I abdicated in 1564, passing the imperial title to his eldest son, Maximillian II (1527–1576), Archduke of Austria and King of Hungary and Bohemia. At Ferdinand's death in 1564 his younger son, Ferdinand II, was appointed governor of Tyrol and the adjacent western territories. Spared the pressures of directing an empire, Archduke Ferdinand II set immediately about the task of rebuilding and refurbishing the family *Hochschloss*, a medieval castle dating back to the 11th century, situated in the Tyrolean mountains at Ambras.

By 1566 the initial work on the palace had been completed; in 1571 construction work began on a large banquet hall; and in 1573 the Archduke initiated a new building program in the Lower Castle or *Unterschloss*, a series of four large, interconnected buildings. These spacious facilities were being remodeled to house Ferdinand's collections, principally his extensive arms and armor collection which was to have three of the four rooms. The fourth room, however, was set aside for his *Kunstkammer*.

A visitor to the Archduke's museum began with the first hall of the armory (devoted to equipment for tournaments) and proceeded through eventually to the library and *Antiquarium* in an adjacent building called the *Kornschütt*. The *Kunstkammer* occupied a wing connecting the *Kornschütt* with the third hall of the armory. Before entering the *Kunstkammer*, the visitor passed through the *Türkenkammerl* or Turkish chamber containing ethnographic objects, especially trophies from the Turkish wars.

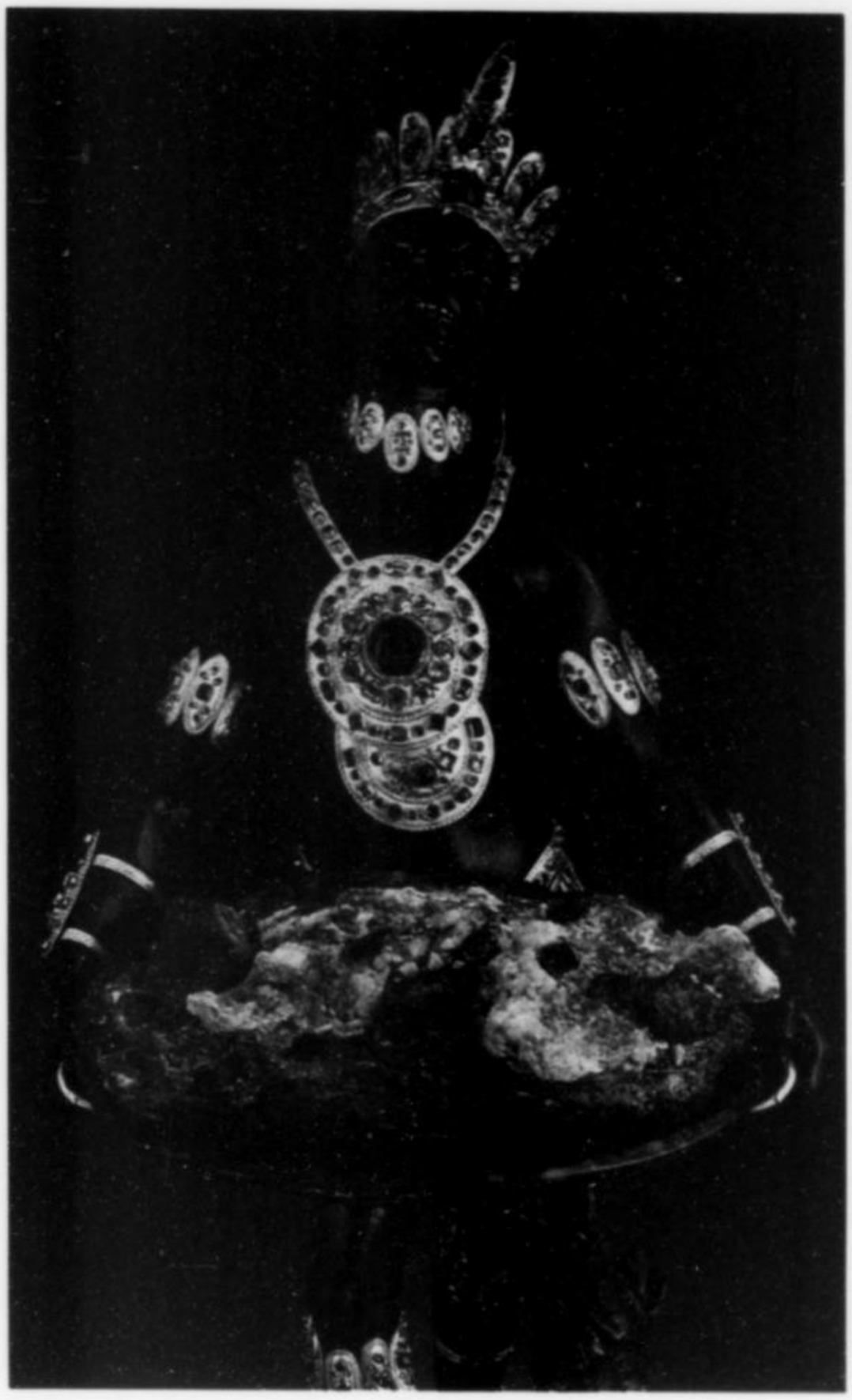
The items in the *Kunstkammer* itself were arranged within 18 cabinets positioned back-to-back in a row down the center of the room. Facing them were two additional cabinets called *Zwerchkästen*. Wall spaces between the windows facing each side were covered by paintings; and in the center of the room were several chests containing portraits, graphic works and items currently under study. Items in the cabinets were organized according to composition, objects made of the same material being grouped together. Thus the first cabinet contained gold objects, the second items of silver, and so on, according to Pliny's approach in stressing the connection between a work of art and the materials it is constructed from. This was also the plan followed by the Medici in their own museum or *studiolo* in Florence.

As an artistic complement, each cabinet was painted a different color so as to harmonize nicely with its contents; blue, for example, was used for the gold cabinet and green for the cabinet containing the silver items. And lighting was excellent, with a wall of windows facing each row of cabinets.

Although the *Kunstkammer* contained many objects of art, it was also well stocked with *naturalia*: minerals, plants, animals, bones, coral, sponges, reptiles, fish, and fossil dinosaur bones (thought to be the bones of "giants"), all mixed in with the other categories of man-made objects.

The Archduke was not of a scholarly bent, however, and there is no evidence that he ever attempted a scholarly assessment of his specimens, nor did he keep catalogs or lists of contents. To his credit, however, he paid no attention to purported mystical properties either. He simply pursued the universal interests of a princely collector.

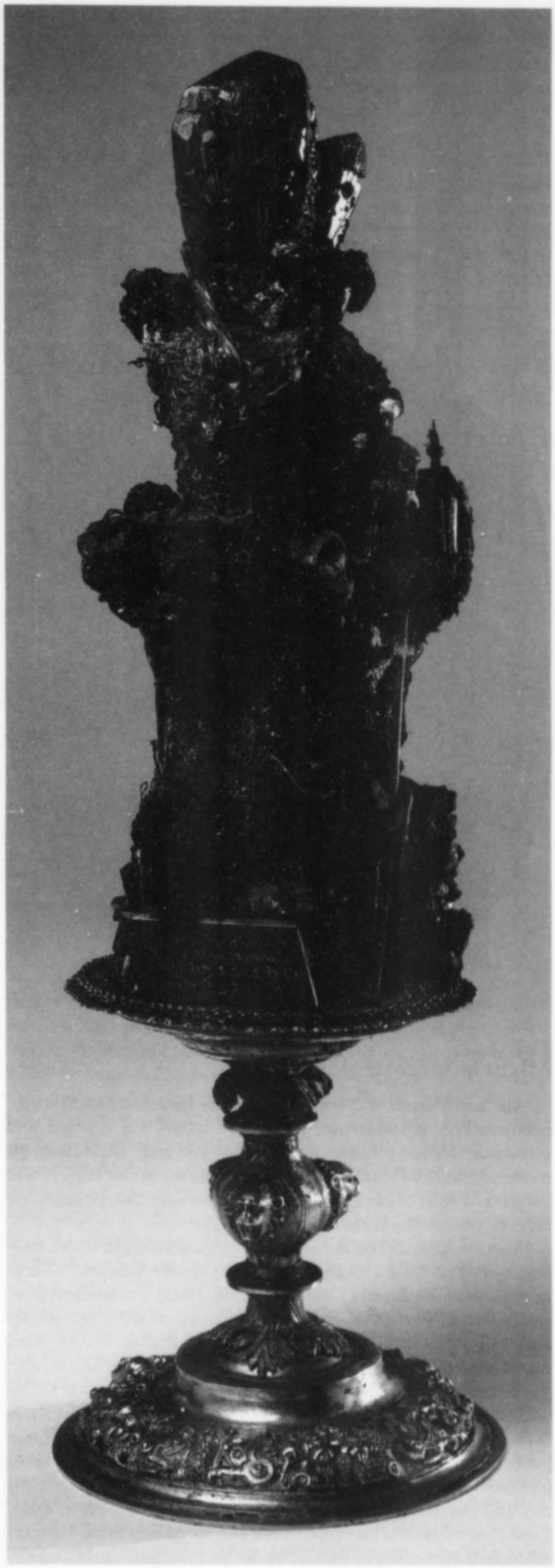
Although he had an appreciation for specimens in their raw form, Ferdinand was also attracted to their potential for being worked into art objects, especially those like coral which could retain some of their original form. He had artisans assemble min-



"Moor with Tray of Emeralds," collection of the Saxon Electors. The assembled Colombian emerald specimen dates before 1586; the sculpture of the Moor was created in 1724.

iature scenes (called "handstones") incorporating natural crystals, wire silver and tiny figures on silver pedestals. In addition he collected *artefacta* (man-made objects), *scientifica* (scientific instruments such as astrolabes, watches and compasses, as well as automatons), *mirabilia* (e.g. the largest known bowl of wood, playing cards for giants and dwarfs, illustrations showing people with gross deformities, and so on), *exotica* (ethnographic items such as pre-Columbian feather works), and one of the largest numismatic collections of his time. Some of these many items were inherited by Ferdinand from his father and brother. But many more were of his own judicious choosing.

Ferdinand had begun his collecting in Bohemia, and had also obtained specimens from the Tyrolean silver mines at Schwaz. He acquired large numbers of Milanese quartz crystals, gold spec-



An assembled and mounted specimen or "handstein," with pyrargyrite and native silver from the Saxon Erzgebirge; about 35 cm, from the collection of **FERDINAND OF TYROL**.

imens, over 1,200 specimens of different silver ores and minerals from various localities including South America, splendid stephanite and argentite specimens from St. Joachimsthal, cassiterite from Schlaggenwald, azurite and malachite from Schwaz, quartz from the Alps, and emeralds from "Peru" (now Colombia).

The collection stayed at Schloss Ambras for many decades following his death in 1595, but Emperor Rudolph II in Prague had promptly taken away many specimens, and other specimens were ultimately removed to Vienna and incorporated into the Imperial cabinet there during the following century. A large part of the mineral collection is believed to have been transferred with other *naturalia* to the University at Innsbruck in 1817.



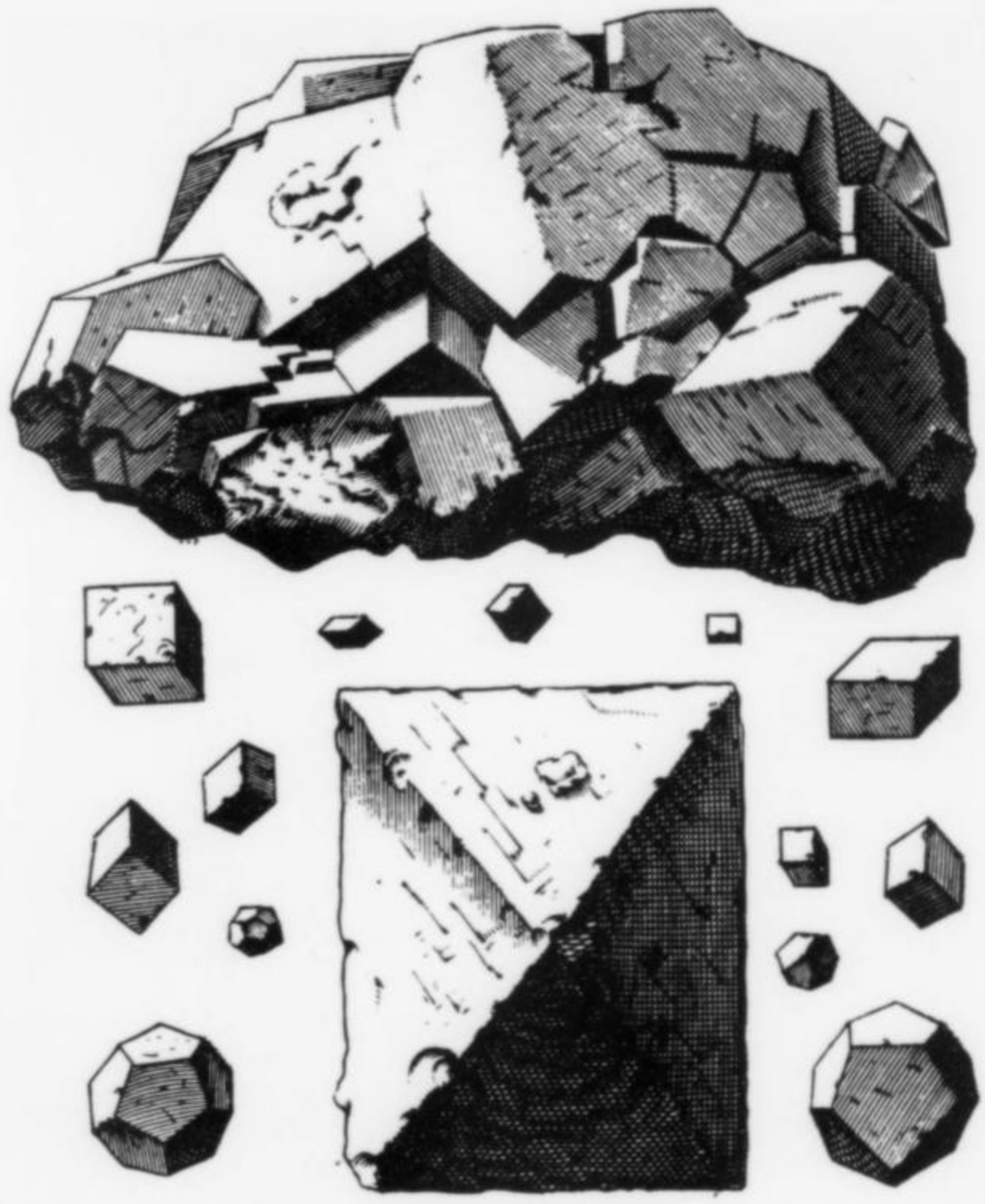
Mercati

Michele Mercati (1541–1593)

Michele Mercati was born to a wealthy family in San Miniato, between Pisa and Florence. His father Pietro was a prominent physician whose practice frequently took him to Rome; his mother, Lady Alfonsina Fiamminga, was of a noble family; and his grandfather Michele was a noted humanist and philosopher who moved in the highest scholarly circles.

Mercati studied first in San Miniato, then enrolled at the University of Pisa for his degree in Philosophy and Medicine. There he studied under Andrea Cesalpino (1519–1603), a celebrated physician, Professor of Materia Medica, and one of the greatest botanists of all time. The two became good friends for life, and Mercati became a proficient botanist. During these years he also studied minerals of medicinal value.

After earning his degree around 1561, he joined his father in Rome and worked as a physician. His dedication to medicine was put thoroughly to the test in 1566 when an epidemic swept Rome; he distinguished himself by making house calls throughout the city and never refusing to go where he was needed. As a result, Pope Pius V heard of his heroic work and called him to the Vatican, offering him the post of Prefect of the Vatican Botanical Gardens.



Specimens of pyrite from the collection of **MICHELE MERCATI**.

Although they had been in a state of decline, the Gardens—which provided medicines for the Papal Court—were revived under Mercati to become luxuriant and full of virtually all of the officinal herbs.

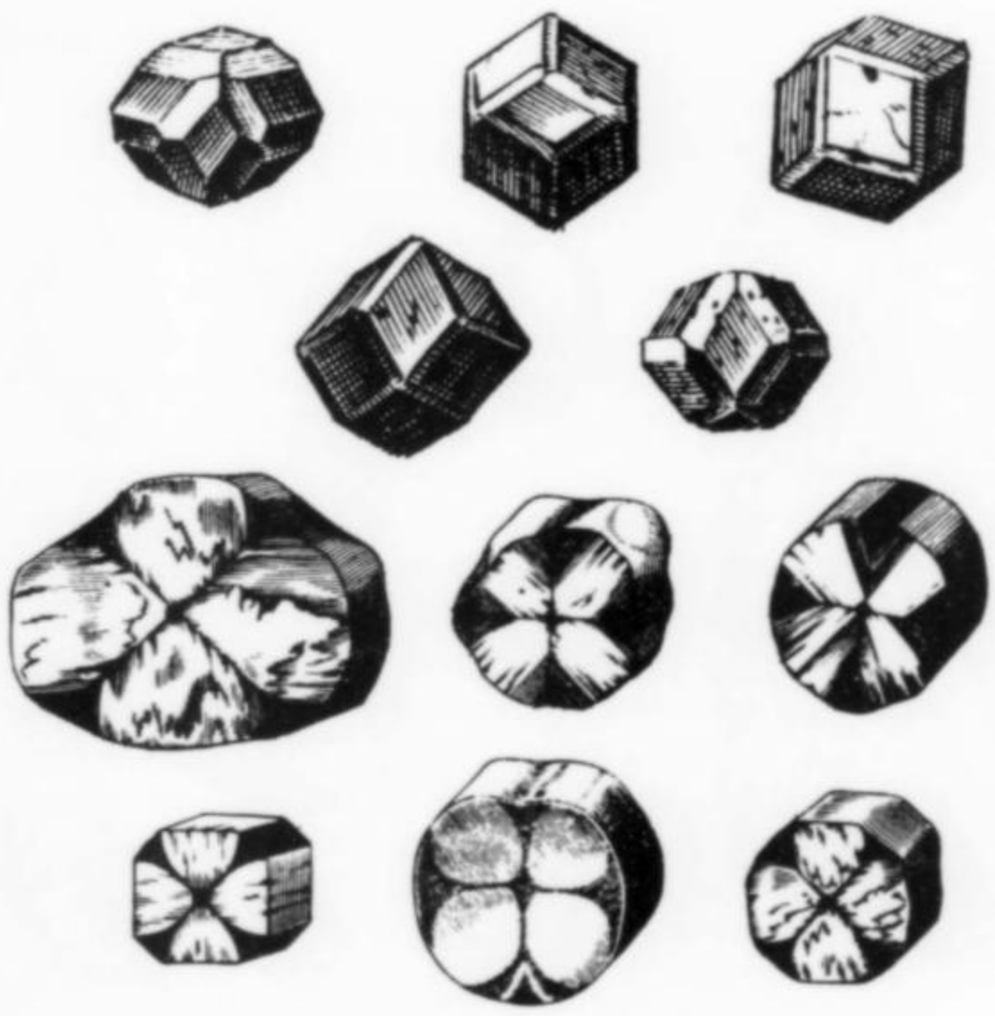
Mercati enjoyed the papal appointment, frequently riding out through the gates of Rome on the back of a mule, galloping awkwardly in search of medicinal plants and minerals throughout the countryside. Unfortunately he began developing kidney stones and gall stones which increasingly curtailed his work. Besides being thus partially disabled, he was also meek and unassertive by nature. His biographer, Monsignor Magelli, described him as indolent, overweight and unsuited to any physical activity. He was made the butt of jokes by countryfolk, and even the guards at the city gates made fun of him. Cardinal Bonelli was forced to set forth an ordinance requiring the public to assist Mercati rather than hinder him. However his scholarly colleagues all held him in high esteem.

In 1577 Mercati was officially received among the "familiars" of Pope Gregory XIII. The Pope, aware of Mercati's passion for collecting minerals and rocks, suggested during discussions on scientific topics that he found a museum of natural history focussing on earth products. Renazzi (1803) writes that the Pope "took advantage of Mercati's work to create a museum in the Vatican Palace in which all the products of nature would be assembled, especially items from the mineral world, for the convenience and benefit of students of Natural History," and of course also to bring credit to the Vatican itself. The Court of the Medici and several other great Italian families had collections of at least the medicinal minerals, and the Pope believed the Vatican Museums should not only do likewise but do better.

Mercati also practiced medicine in the papal court, along with his work on the botanical gardens, and Marini (1784) says that he became Chief Physician under Pius V, a post which he con-



A view of **MERCATI**'s collection room in the Vatican.



Specimens of garnet (top) and andalusite from the collection of **MICHELE MERCATI**.

tinued to hold under the following six Popes. He was never referred to as a priest while he lived, but most later writers refer to him as Monsignor. In any case, whether or not he took Holy Orders, he remained celibate and lived permanently in the Vatican.

He was in later years promoted to the title of *Protonotary*, in which capacity Cardinal Aldobrandini took him along on a delicate peace mission to visit King Sigismondo III of Poland. They departed the Vatican in June of 1588, passing through Innsbruck and Prague along the way. Mercati had the opportunity to visit mines, collect mineral specimens, and to meet and speak with one of the great mineral collectors of his day, Emperor Rudolph II in Prague. They discussed minerals, among other things, and Rudolph was so impressed with Mercati's learning that he pressured him to remain. But Mercati was anxious to return home, and arrived back in Rome in March of 1589 with hundreds of mineral specimens for his collection.

During his years of quiet, scholarly study Mercati expanded his scientific knowledge, making use of the Vatican's great library, and corresponding actively with collectors such as Aldrovandi in Bologna, Imperato in Naples, and Calzolari in Verona. He exchanged mineral specimens with them frequently. He was a medical consultant to Cosimo I de Medici (also a mineral collector), and was honored by his son Ferdinand I with a noble title, as the Grand Duke was accustomed to doing for Tuscans who had dis-



One of **MERCATI**'s specimen cabinets, designated for salts and nitrate minerals.

tinguished themselves in foreign service. The Senate in Rome conferred upon him another title shortly thereafter.

Mercati was recuperating in his home town in 1592 when his old traveling companion, Aldobrandini, was elected Pope (taking the name Clement VIII). Mercati was recalled to Rome to be the Chief Pontifical Physician, but he died there in 1593; an autopsy revealed 98 stones in the bladder, gall bladder and ureters. He was only 52 years old.

During the years of his service to the Popes, Mercati assembled an extensive collection of minerals, ores and fossils. Called the *Metallotheca* (a complement to the *Bibliotheca*, or library), it acquired official status under the long reign of Gregory XIII (1572–1585), and grew rapidly under Sixtus V (1585–1590). Its contents were systematically arranged in 19 large, expensive, custom-built cabinets "in some halls" of the Pio-Clementine Museum. The collection ranked among the largest and best mineral collections in all of Europe at that time.

Mercati spent years writing a scholarly description of the collection, but by the time of his death had completed work on only the first nine cabinets among the non-metallic minerals. These, unfortunately, are among the less interesting categories to modern collectors, and we can only guess what his fluorites, golds, silver and copper minerals must have been like. His manuscript, and 127 copperplate engravings of specimens, were claimed by his heirs and put into storage unpublished. His magnificent collection was entirely dissipated within a few years of his death, virtually all of his specimens having been stolen piecemeal by members of the papal court.

Had Mercati's *Metallotheca Vaticana* been published promptly after his death, he would surely have been accorded a place alongside Agricola and Gesner as one of the founders of mineralogy and paleontology. However, his manuscript lay hidden until 1717–1719 when it was rediscovered and published in a small number of copies by Lancisi and Assalti; by then it had lost its vitality and was generally ignored. He is even today unjustly overlooked in many reviews of the history of geology.

Mercati's old mentor at the University of Pisa, Andrea Cesalpino, succeeded him as physician to the Pope, and in 1596 published his own work on minerals (*De Metallicis libri tres*, dedicated to Clement VIII), describing many of Mercati's specimens.



Specimens of quartz from the collection of **MICHELE MERCATI**.

Specimens of pyrite and other metallic sulfides, with calcite and fluorite, Württemberg, from the collection of **JEAN BAUHIN**.

Jean Bauhin (1541–1613)

Like Johannes Kentmann, who became a follower of the older Agricola and caught his passion for collecting, Jean Bauhin found his mentor and inspiration in the older Conrad Gesner.

Bauhin's parents were French Protestants who had been exiled to Basle, Switzerland, during the revival of religious persecution under Francis I. Bauhin received his education in Basle under the similarly exiled Italian religious reformer Coelius Curione, and in Zurich under the famous naturalist Conrad Gesner. He completed his studies by a period of travel to foreign universities in 1560–1563, then established himself in medical practice in Lyons, France, where he married and fathered six children.

Bauhin was forced to return to Switzerland in 1568 by a wave of renewed religious persecution, but in 1571 he was appointed physician to Duke Frederick of Württemberg, ruler of Württemberg and Montbéliard, who proved to be a gracious and supportive patron. Bauhin established sizeable botanical gardens at Stuttgart and Montbéliard, and excavated archeological artifacts from ruins at Mandurium, which he displayed at Duke Frederick's chateau. He was also instrumental in founding a medical college at Montbéliard.

Despite his official occupation as a physician, Bauhin's main interest was botany, and he collaborated with Gesner for a number of years on a great botanical compendium. Gesner and Bauhin traveled together on collecting trips through the Alps collecting



Bauhin



Collection room of **FERRANTE IMPERATO** in Naples.

plant specimens and minerals. With his friends Leonard Rauwolf and Jacques Raynaudet he explored and collected across Languedoc and Provence, and spent nearly a year studying plants in northern Italy, and establishing contacts at the botanical gardens in Padua and Bologna. He began his own garden in 1564 at Lyons.

Sadly, Bauhin's collaborations with Gesner were cut short by Gesner's death from the plague in 1565, but by then Bauhin was well on his way as a competent naturalist himself. Like Gesner, he had developed a side interest in minerals and fossils, eventually building a personal collection as an adjunct to his principle botanical researches, and using many specimens as the basis for illustrations in his eclectic 1598 study, *Historia novi et admirabilis fontis*. This book, inspired to some extent by Gesner's *De omni rerum fossilium* (1565), is the only other illustrated mineralogical work to be published in the 16th century.

Historia novi deals primarily with the natural springs at Boll, in the duchy of Württemberg, which had long been famous as a health spa. The first three sections of the treatise deal with the springs themselves, and the medicinal properties of the water. However, the fourth "book" describes the local natural history, which was, as it turns out, rich in crystallized minerals; the book is subtitled, *Regarding the metallic minerals which miraculous nature has skillfully shaped in the bowels of the earth . . .* (in Latin), and goes on to include the plants, insects, birds and other animals of the area. The illustrative focus of this section is on the 211 woodcuts of mineral and fossil specimens in Bauhin's collection. Because of the primitive nomenclature used at the time it is difficult to be certain of some of the mineral species, but clearly pyrite, chalcopyrite, marcasite and fluorite are represented, and probably other sulfides as well, in fairly attractive and well-formed specimens. If Bauhin had such fine material from this single district, one might well wonder what the entirety of his mineral collection, gathered during his many trips through France, Switzerland and the Alps, looked like. But unfortunately no catalog has survived.

There is also no record of the final disposition of Bauhin's botanical and earth science collections. It is probable that they were bequeathed to his brother Gaspard (1560–1624), also a prominent botanist whose personal botanical garden included over 4,000 plants. Gaspard was professor of anatomy and botany at the University of Basel, where his collections are still said to be preserved, perhaps with a few surviving specimens from Jean Bauhin that have long since lost their original pedigree.

Ferrante Imperato (1550–1625)

The Neapolitan pharmacist Ferrante Imperato was another of the Italian apothecary collectors who, like Calzolari in Verona, accumulated a substantial private museum of natural history during his career. Unlike most of his contemporaries, who left only manuscripts, Imperato succeeded in having a book based on his collection published in 1599. Entitled *Historia Naturale,* it was the first volume of an intended series which never materialized, but it does give a detailed glimpse into his scientific opinions and his museum; it became essential reading for 17th-century writers on the subjects of minerals and museums. His beautiful engravings

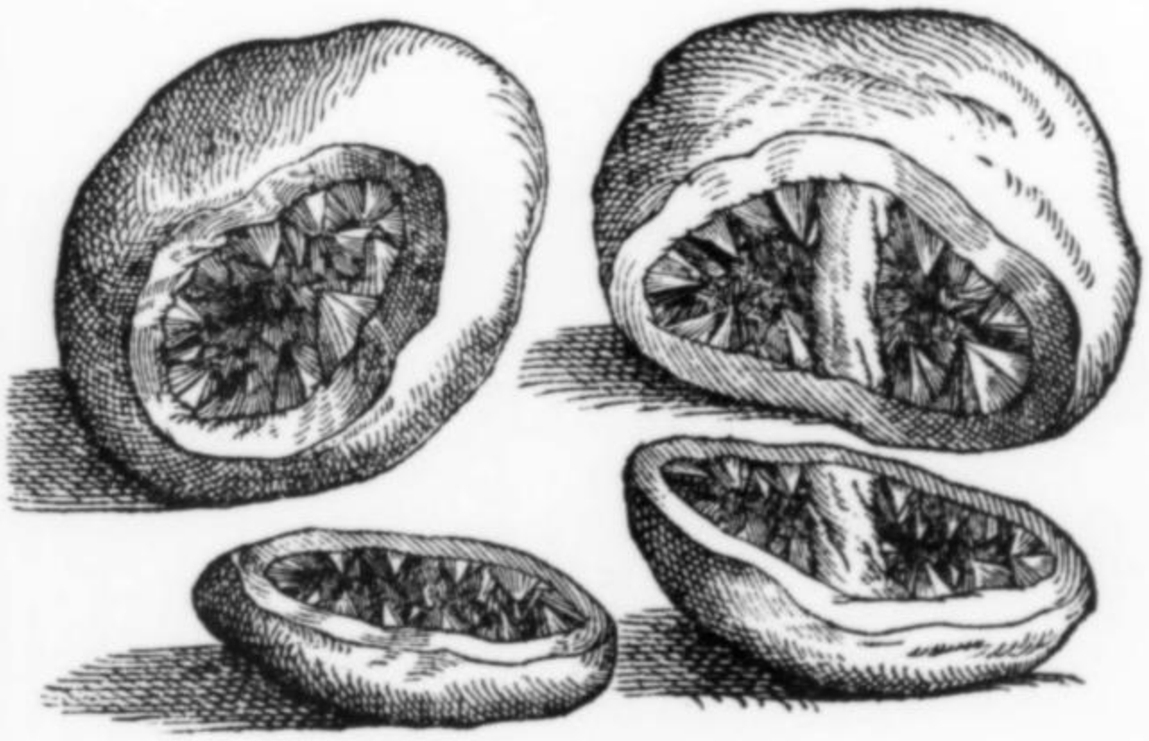


Imperato

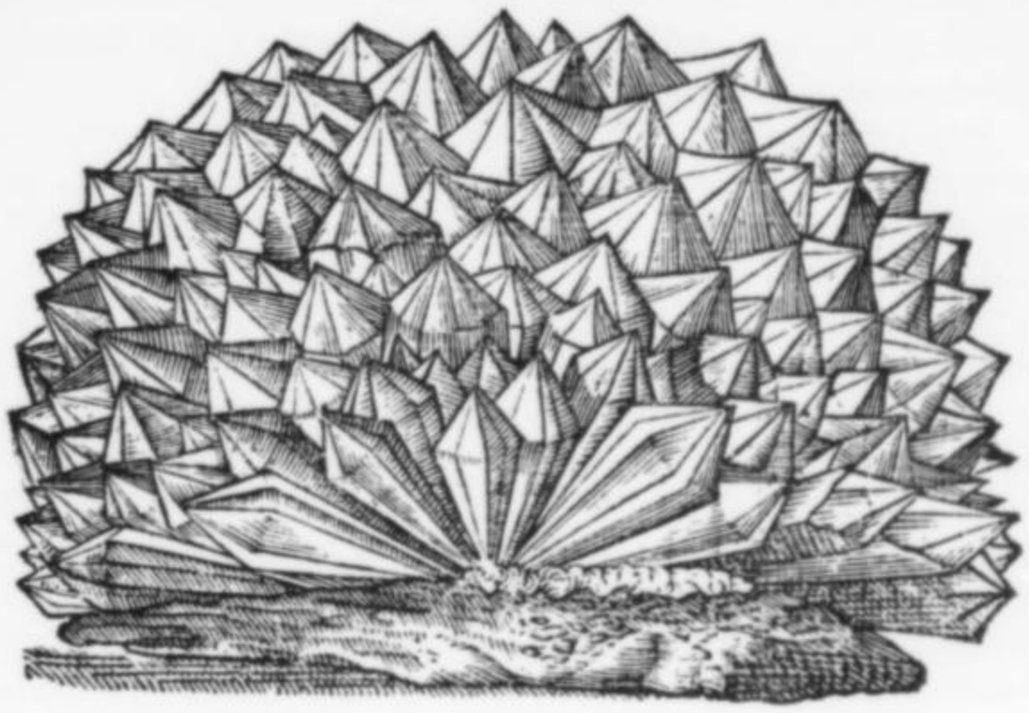
of three fine quartz crystal groups, for example, were copied (without credit) by Boetius de Boodt in his *Lapidum et Gemmarum Historia* (1609), and again by Athanasius Kircher in his *Mundus Subterraneus* (1665).

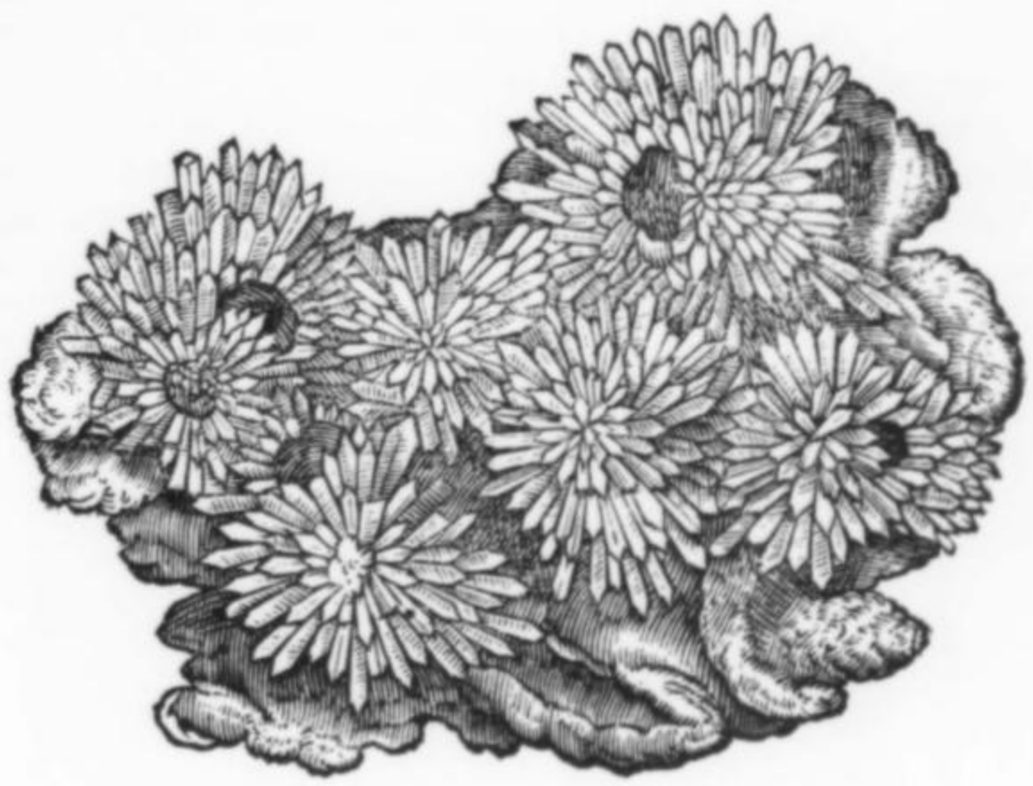
Little is known of Imperato's life. He ran a prosperous pharmacy in the center of Naples, and had two sons and a daughter. He traveled widely on field-collecting expeditions for plants and minerals, carefully examining the local geology wherever he went.

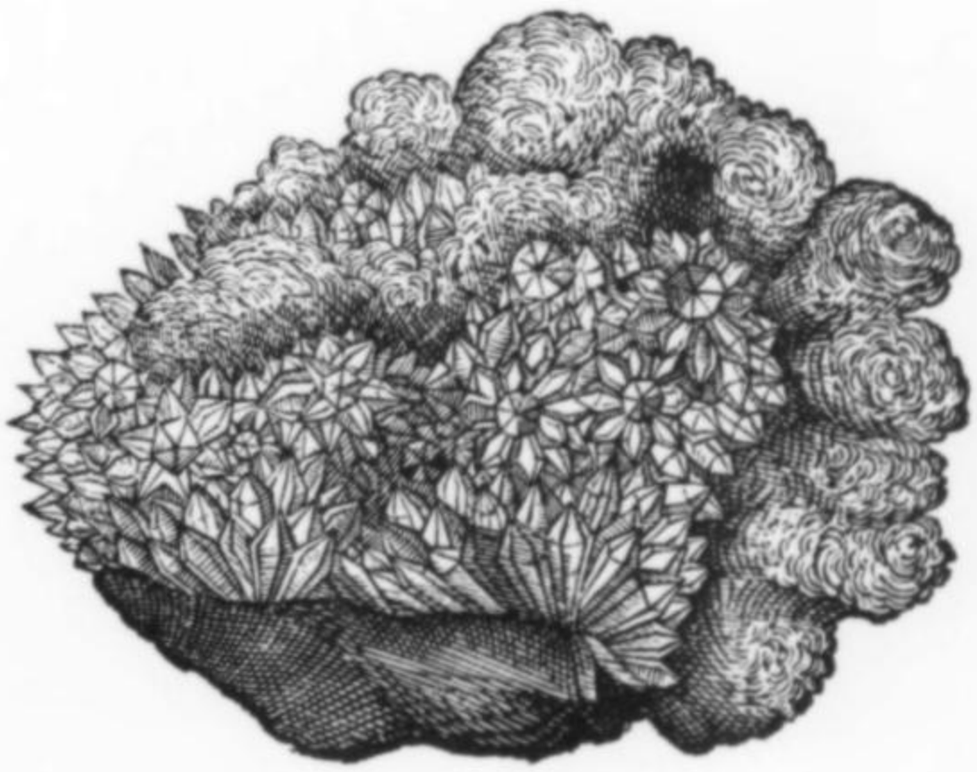
During the course of all this field work Imperato developed some significant contributions to geology and paleontology. He



Quartz geodes from the collection of
FERRANTE IMPERATO.







Quartz specimens from the collection of
FERRANTE IMPERATO.

boldly denied the purported magical properties of minerals and criticized the heavy quantity of superstitious misinformation handed down uncritically by generations of writers. He carried out laboratory experiments on the thermal properties of various minerals and the behavior of clays in water. He was confident that fossils were the remains of once-living sea creatures buried in sediments and later turned to stone through the action of "lapidifying juices." He described the transgression and recession of the seas in the deposition of sedimentary rocks, was the first person to develop the concept of a stratigraphic sequence, and understood clearly the role of running water in shaping the surface of the land. Unfortunately, his book was initially printed in only a few copies, which were presented as gifts to friends and correspondents. This limited distribution seems to have resulted in a lack

of recognition among modern historians; Frank Dawson Adams, for example, does not even mention Imperato in his *Birth and Development of the Geological Sciences* (1938).

As an essential part of his researches Imperato maintained correspondence with the most prominent European naturalists, and enriched his collections through countless exchanges and gifts. Aldrovandi, Mercati, Camerarius, Paladanus, Fabio Colonna, Charles de l'Escluse, Giacomo Cortuso and Bartolomeo Maranta were among his many sources of specimens and information.

In time Imperato's museum became famous throughout Europe, attracting many visitors. He had an herbarium (albums of pressed and dried plant specimens) consisting of 80 massive volumes, and large numbers of shells, various stuffed and preserved birds, sea creatures, reptiles and mammals. His geological materials included fossils, rocks, bezoar stones, clays, many specimens of quartz, salts, marble, gem species, volcanic products, sulfur, bitumens, and metallic ores of arsenic, mercury, gold, silver, lead, tin, bismuth and iron. All of these were arranged neatly in cabinets and on the walls and ceiling of his collection room, making for an elegant display.

Imperato enjoyed good health into his 60's, devoting many hours daily to the curation of his museum. He died in 1625, leaving his collections to his son, Francesco, a lawyer with a strong interest in natural history. Francesco cared for them in good faith, but their history thereafter remains unknown.



Rudolf II

Rudolf II (1552–1612)

Rudolf was born in Vienna, the son of Holy Roman Emperor Maximillian II and Maria, daughter of Emperor Charles V. At the age of 11 he was sent to Spain for his education, and took easily to the scholarly environment. He showed a high level of intelligence, although he lacked the tolerant spirit of his father.

By the time he returned to Vienna he had become a cultured young man. He was interested in astronomy and astrology, later extending his patronage to support the astronomers Tycho Brahe and Johannes Kepler. Rudolf was also very much interested in minerals, chemistry and alchemy, as well as art, and was something of a scholar himself.

In 1572, at the age of 20, he was crowned King of Hungary, and three years later King of Bohemia and of Germany, becoming emperor on his father's death in 1576. He was not a personable ruler, however, and became increasingly subject to attacks of depression and eccentricity bordering on insanity. He was haughty, suspicious and reclusive, and refused to marry.

Scholarship and culture were his refuge from the troublesome affairs of state, and he "became the greatest collector of his age, his agents ransacking Europe to fill his museums with rare works of art." He collected excellent paintings, sculpture, objects of Western craftsmanship, a large number of everyday objects from the Far East and Middle East as well as the Americas, and *naturalia* including hummingbirds, crabs, lobsters, shells, a mammoth tusk and fossils. He pursued minerals and gemstones with great enthusiasm, building an enormous collection.

Rudolf settled in Prague in the 1580's, at Hradschin Castle. Work began in 1587 on a Summer Palace which served as a temporary home for his growing collections. In 1597 the collections were being housed in three rooms of the southern wing, but were moved into new rooms in 1605 or 1606 when construction was finally completed. The *naturalia* were housed in the *Kunstkammer*, consisting of three vaulted chambers in front, each about 5.5 meters wide and 3 meters high and all together about 60 meters long, connected to the principal chamber 33 meters long. The *Kunstkammer* contained 37 cabinets. "Large natural gemstones" were kept in several chests.

Rudolf's *Kunstkammer* was not a mere cabinet of curiosities but rather a *systematic* collection of objects and specimens from the three Kingdoms of Nature and from the works of man, based on an encyclopedic principle. It was not designed and housed to be seen by a wider public, but only for those few initiates whom Rudolf had admitted to his inner circle. It also represented an important source of inspiration and raw materials for court artists.

Rudolf employed his court physician, Anselmus Boetius de Boodt (ca. 1550–1632) to curate his specimens. DeBoodt had studied medicine at Heidelberg and obtained his M.D. in Padua. From 1583 he lived in Bohemia as physician to the burgrave of Prague, and was a close friend and collecting partner of the imperial physician Thadeus Hayek, a well-known naturalist. DeBoodt was a polyglot, an artist, and an enthusiastic mineral collector. He made many mineralogical field trips into Germany, Silesia and Bohemia collecting specimens. With Rudolf's vast collection at his disposal, he went on to write one of the most influential mineralogical works of the seventeenth century, *Gemmarum et Lapidum Historia* (1609).

Because of his increasing psychological instability, Rudolf's relatives had him declared incapable of ruling in 1606, and placed his younger brother Matthias more or less in charge. Various difficult intrigues and political unrest followed; in 1612 Rudolf died, to be officially succeeded by Matthias as emperor.

Rudolf's mineral collection was not appreciated by his successors. It was eventually placed into storage, and in 1782 was packed in barrels and sold off to private parties by Joseph II.

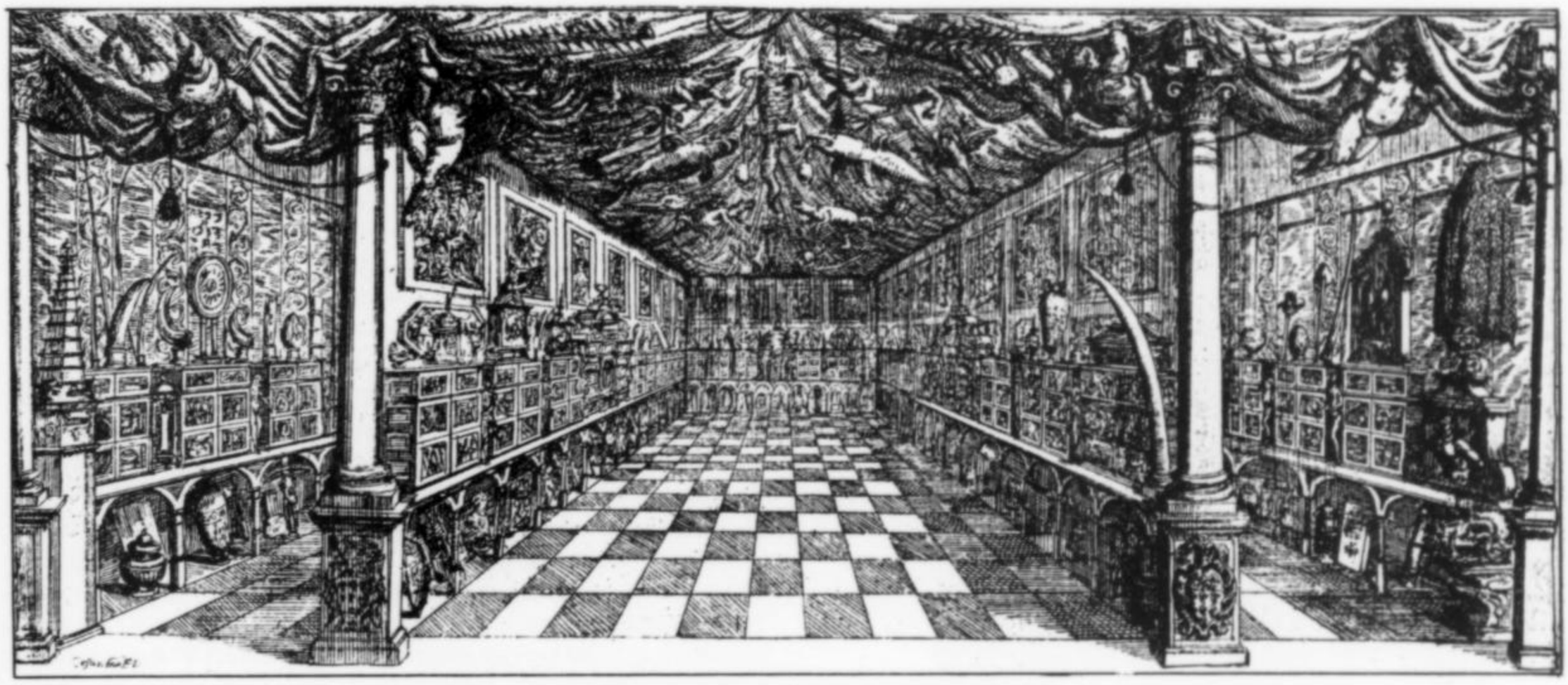
THE 17th CENTURY

During the greater part of the 17th century, the trend in collecting continued to depart (one might say regress) from the specialized mineralogical collections of Agricola, Kentmann and Mercati. Practically all collections were of general natural history, including plants and animals, and many also included artworks and other *artificialia*. Furthermore, a degree of intellectual vitality was lacking in many of them.

With regard to the Habsburg collections, Distelberger (1985) wrote:

> So completely do the great collectors Archduke Ferdinand II (1529–1595) and Emperor Rudolf II (1552–1612) overshadow the succeeding generation [of Habsburg collectors], that the seventeenth century came to be seen mainly as a time of consolidation rather than of acquisition, and it is certainly true that the Thirty Years War no longer permitted so intensive a dedication [to collecting] as that which Rudolf II had shown.

The number of minerals in the *Kunstkammer* of the Saxon electors continued to grow, and the collections of the Italian princes were maintained and enlarged. But the Habsburg collections were in decline, and important princely collections were to



Collection room of **MANFREDO SETTALA** in Milan.



Collection room of **FERDINANDO COSPI** in Bologna.

change in their basic concept and orientation. Francesco de Medici, for example, reorganized the private family *studiolo*, opening the Uffizi Gallery to the public in a politically oriented attempt to glorify and legitimize his dynasty.

Works of art gradually became more separated from *naturalia* of scientific value. Among the private collections of Italian physicians and naturalists there was a distinct movement toward purely natural history collections, but these collectors failed to gain the widespread fame that the museums of Aldrovandi and Calzolari had enjoyed. Olmi (1985) attributes this drift to the greatly increased availability of mineral, plant and animal specimens from distant lands. This abundance deprived many collections of their novelty and exclusivity, making them less interesting to the public. Many non-scholarly collectors, especially in Italy, whose goals had been primarily social, abandoned the pursuit of exotic *naturalia* and returned to art collecting as the best means of enhancing their social standing.

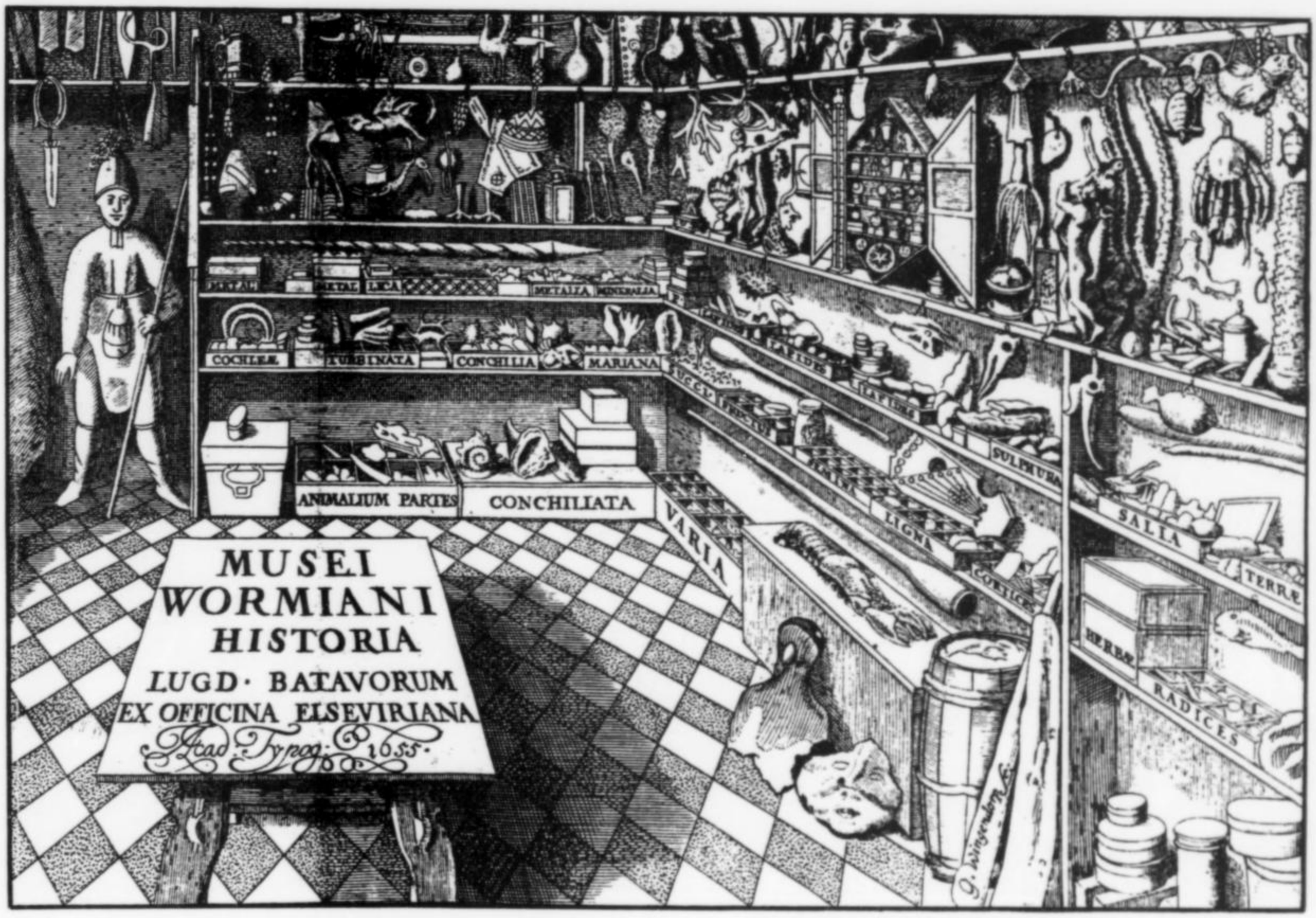
Encyclopedic collections combining all types of natural and artificial specimens thus declined somewhat. However, some excellent collections in northern Italy, for example, continued to be all-inclusive, notably those of Manfredo Settala, Lodovico Moscardo and Ferdinando Cospi. But unlike their scholarly predecessors, these collectors lacked college education and did not focus on scientific research. Even the scientific instruments in their collections were seen not as investigative tools but rather as precious, aesthetic relics. Their natural history specimens were "organized in such a way as to exclude systematically all normality"; they were focussed on the bizarre curiosities most likely to provoke astonishment and wonder.

As the seventeenth century progressed, a growing number of collectors and curious-minded scholars traveled about Europe on a regular round of visits to collections. They were aided by various printed itineraries and guidebooks. Although collections of the most broad and general scope remained common, many others were more specialized, several hundred of which were devoted solely to natural history. Some even maintained regular hours and charged a small admission fee. The exchange and purchase of specimens continued at a brisk rate, some collectors being more generous and benevolent to their colleagues, and others being more mercenary. One prominent traveler and writer, Zacharias Conrad von Uffenbach, commented as follows on the British collector James Petiver (1663–1718) (whose minerals and other curiosities were purchased later by Sir Hans Sloane): "He offers all foreigners who come to him a sample of his collection; but he takes care to ask a vast sum for it, so I declined with thanks."

Natural History Cabinets containing minerals developed in England individually on a smaller scale than in Italy. These collections were closely modeled on their counterparts in Italy and Germany, but did not begin appearing until the 17th century. The collections of naturalists such as the physician William Harvey (1578–1657), and John Tradescant (1587–1638) contained minerals, and the encyclopedic London museum of William Courten (1642–1702) contained over 10,000 cataloged mineral specimens.

Sir Hans Sloane (1660–1753) surely ranks as England's greatest collector of natural history; he acquired the Courten collection among many others, and eventually donated all of his specimens (along with a scientific library of 50,000 volumes) to the nation in order to found the British Museum.

A collection specializing exclusively in minerals, rocks and fossils was built by Dr. John Woodward (1665–1728), Professor of Physic (Medicine) at Gresham College in London. Thanks to a cash donation accompanying his bequest, the Woodward col-



Part of the collection room of **OLE WORM** in Copenhagen, showing labeled trays of minerals.

lection of 6,000 mineral specimens is preserved intact today, in its original wooden cabinets and with Woodward's original catalog, at Cambridge University. Woodward was the first British author to publish a work exclusively on the classification of minerals.

Sir Robert Sibbald (1643–1720), author of the first systematic natural history of Scotland, and inheritor of the earlier collection of Sir Andrew Balfour (1630–1694), built an excellent mineral collection which passed to the University of Edinburgh in 1697. But it was said to have been "almost entirely dissipated" within 50 years. William Harvey's collection was destroyed in the London fire of 1666. (The collections of Sloane, Woodward and Sibbald will be discussed more thoroughly in the next chapter.)

The earliest collector of note in Denmark was Ole Worm (1588–1654). He built a large cabinet of curiosities, including minerals, which was in its time among the most famous in Europe, and was a major attraction for visiting naturalists, especially while the Thirty Years War (1618–1648) was dragging on in central Europe. Worm is an early example of the university professor who utilized his own collection for teaching purposes, as did Ulisse Aldrovandi in Bologna and Bernard Palissy in Paris.

Worm had studied in Basle, where Gesner's legacy in natural history had continued to develop, and visited Ferrante Imperato in Naples. He began collecting around 1620, when he was appointed Professor of Natural Philosophy. His hefty museum catalog, *Museum Wormianum*, was issued the year after his death, but it became essential reading for later naturalists and collectors, and established his name as one of the founders of museums in Europe.

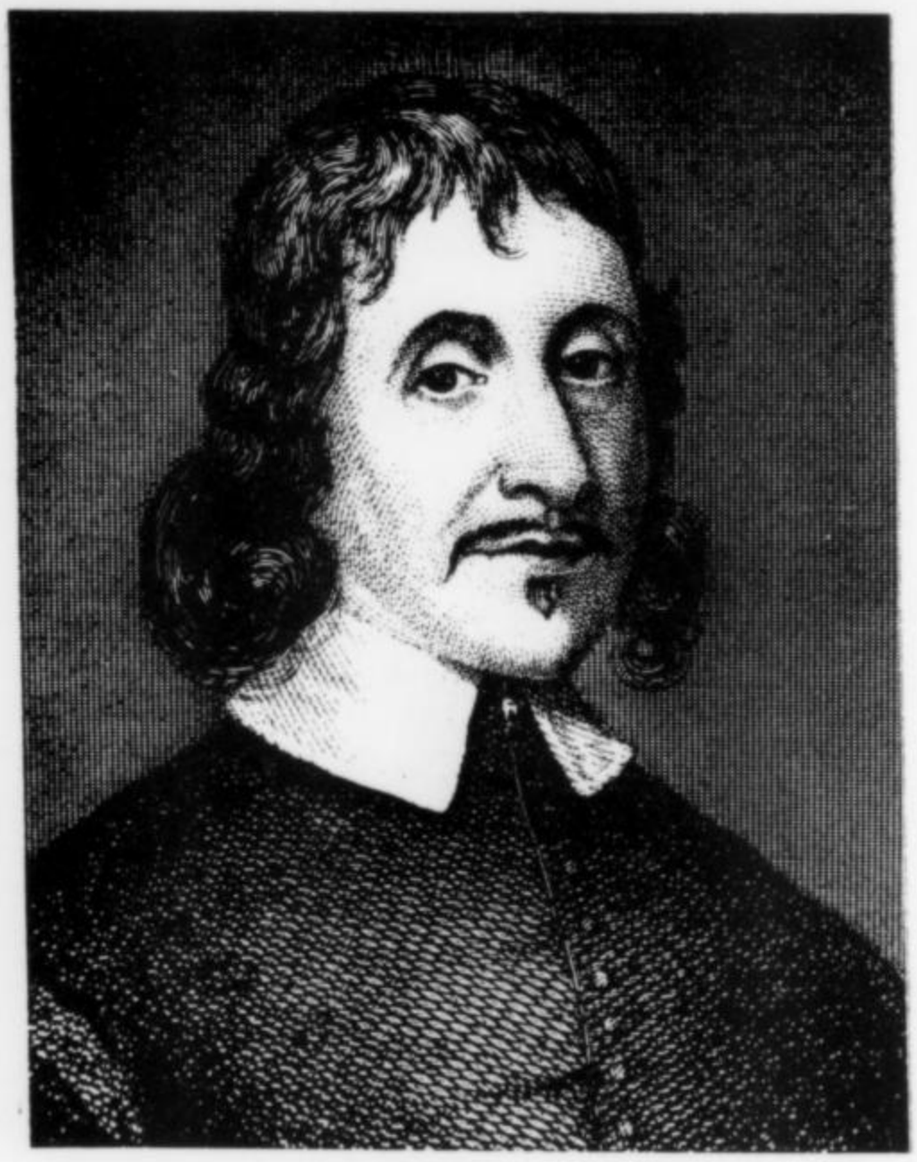
The first mineral collector of record in what was to become



Worm



The collection room of **BASIL BESLER** in Nuremberg.



Winthrop

the United States was John Winthrop the Younger (1606–1676), son of the first governor of the Massachusetts Bay Colony (John Winthrop, 1588–1649), and himself a colonial governor. He had been born in England and educated at Trinity College, Dublin, presumably acquiring there some interest in natural history. He possessed a good library, and was considered to be the "leading scientific mind in the colonies." As leader of a group that settled Ipswich, Massachusetts in 1633, he was later appointed governor of a vast plantation in Connecticut, and then of the entire colony (1657, 1659–1676). Winthrop owned mining properties in Massachusetts and Connecticut, his Saugus, Massachusetts operation being the first commercial iron mining and smelting operation in the Colonies in 1647. He appears to have been an active prospector, having made the first discovery of gold in New England (Great Hill at Cobalt, south of Portland, Connecticut). His mineral collection of New England specimens did not survive, but his catalog did; it was published, in part, in the *Journal Book of the Royal Society* by his grandson, John Winthrop (1638–1707) in 1734. The article was entitled "Selections from an ancient catalog of objects of natural history formed in New England more than 100 years ago."

By the end of the 17th century, encyclopedic collections were beginning to come under serious criticism. Count Luigi Ferdinand Marsili (1658–1730), an Italian naturalist with a more specialized collecting approach, severely condemned the mixing of *naturalia* and *artificialia*; such mixed collections, he asserted, served "more to delight young men and provoke the admiration of women and the ignorant" than to serve any legitimate scholarly purpose (Spallanzani, 1987). To Marsili, even the most common specimens of minerals, plants and animals had a necessary place and purpose in a truly scientific collection. This concept, shared by John Woodward, was a revolutionary idea in collecting, to acquire the mundane and superficially uninteresting along with the spectacular for the sake of systematic, scientific completeness. Such collections, particularly those specializing in minerals, were to become ever more common in the following century as the scientific revolution took hold.

THE 18th CENTURY

In the opening years of the 18th century two important reference works for collectors appeared which more or less summarized for the layman the collecting scene at that time. These books, by Michael Valentini (in 1704–1714) and Caspar Neickelio (in 1727), listed collections in various countries, discussed their contents, and reviewed collecting philosophy and recommendations.

Valentini began his book, *Museum Museorum*, by reprinting in its entirety the text of an earlier museological tract of 1674 by Johann Daniel Major (1636–1693). Major discussed the ways in which general collections (*naturalia* and *artificialia*) could be arranged, and addressed the basic question of why people collect. He listed the important collections known to him, and gave practical advice on specimen conservation, and on the study of museum materials. He recommended in particular that collectors prepare a catalog or "rarities book" to accompany their collection, describing not only their own specimens but also all other things that would be necessary to fill it out to optimal completeness. Major's work was the first widely circulated essay defining the various types of collections, and by 1700 the "rarities book" had become customary among collectors.

Valentini concentrated primarily on addressing collections of natural history in the remainder of his large two-volume tract. He lists many collections in different cities, often giving detailed lists and descriptions of their contents. His own collection is among those featured. He also provides a general text on mineralogy, botany and zoology for collectors to refer to, illustrated by engravings.

Caspar Neickelio, in his *Museographia* (1727), presents a geographically arranged compendium of all the known collections, giving little or no details on contents in most cases (with a few notable exceptions). He also lists all of the important libraries of the time, and discusses numerous practical and philosophical questions of interest to the collector. Neickelio was a strong believer in specialization, or at least in compartmentalization, and he de-



MUSEUM MUSEORUM,
Oder Vollständige
Schau-Bühne
Aller
Materialien und Specereyen/
Nebst deren
Natürlichen Beschreibung/Election, Nutzen und Gebrauch/
Aus andern
Material- Kunst- und Naturalien-Kammern/ Ost- und West-Indischen Reiß-Beschreibungen/
Curiosen Zeit- und Tag-Registern/ Natur- und Artzney-
Kündigern/ wie auch selbst-eigenen Erfahrung/
Zum Vorschub
Der Studirenden Jugend/ Materialisten/ Apothecker/
und deren Visitatoren/ wie auch anderer Künstler/ als Jubelirer/
Mahler/ Färber/ u. s. w. also verfasset/ und
Mit etlich hundert sauberen Kupfferstücken
Unter Augen geleget/
Von
D. MICHAEL BERNHARD VALENTINI,
Ihro Hoch-Fürstl. Durchl. der verwittibten Frau Landgräfin zu Hessen-Darmstadt/ Land- und Hof-Medico, der Artzney und Natürl. Wissenschafften Prof. Ord. zu Giessen/
auch verschiedener Curiosen Academien in Teutschland und
Italien Collegâ.
Zweyte EDITION.
Franckfurt am Mayn/
Verlegt von Johann David Zunners Sel. Erben/ und
Johann Adam Jungen.
Im Jahr Christi M DCC XIV.

MUSEOGRAPHIA
Oder
Anleitung
Zum rechten Begriff und nützlicher Anlegung
der
MVSEORVM,
Oder
Raritäten-Kammern,

Darinnen gehandelt wird

I. Von denen Museis, Schatz- Kunst- und Raritäten-Kammern insgemein, welche heutiges Tages gröſten theils annoch in vielen Europæischen Orten gefunden werden.

II. Dem nachmals ein Anhang beygefüget ist, von vielen, welche vor Alters in der Welt berühmt gewesen.

III. Im dritten Theile wird von Bibliothequen insgemein, als einem zu einem vollständigen und wohl eingerichteten Museo unentbehrlichen Wercke gehandelt.

IV. Der vierte und letzte Theil aber ist eine Anmerckung oder unvorgreiffliches Bedencken von Raritäten-Kammern oder Museis insgemein.

In beliebter Kürtze zusammen getragen, und curiösen Gemüthern dargestellet

von
C. F. NEICKELIO.

Auf Verlangen
mit einigen Zusätzen und dreyfachem Anhang vermehret
von
D. Johann Kanold,

der Kayserl. Leopold. Carol. Reichs-Academiæ Natur. Curiosi Mit-Glied.

Nebst einem Register.

Leipzig und Breßlau, bey Michael Hubert, 1727.

scribed numerous fields on which the collector might focus. In the preparation of a mineral collection, for example, he recommended that it include the following:

> All kinds of **Minerals** (the Mineral Kingdom), for example all kinds of *stones*; *gems* such as diamond, ruby, sapphire, emerald, etc.; *rarities* such as marble, bloodstone, osteocolla, etc.; *common* things such as sandstone and conglomerate, etc. One also has the stones found in some animals such as crabs, carp, toads, old roosters, and indeed even in some men (which according to the best authorities belong to the class *animalia*). To the Mineral Kingdom belong all sorts of *metals*: gold, silver, copper, tin, iron, lead, mercury or quicksilver, etc; materials that are *semi-metalla* or *mineralia* such as cinnabar, antimony, etc. *Recrementa Metallica*, or unripe metals, such as cobalt, marcasite, chalcitis, iron sulfates, porri, etc. *Salia*, all kinds of salts, such as saltpeter, common or cooking salt, vitriol, alum, etc. *Sulphurea*, sulfurated minerals, arsenic, sulfur, amber, naphtha, asphaltum, etc. *Terrestria*, such as earths, clays, marga, tripoli, chalk, etc. And, in short, all kinds of minerals and fossils that are found under the earth.

Having informed his readers of the whereabouts of hundreds of private collections and museums of all sorts which they might conceivably be able to visit, Neickelio then thoughtfully includes a list of 25 guidelines to follow for proper etiquette and maximum benefit when visiting someone's collection. These are as follows:

RULES FOR MUSEUM VISITORS

C. F. Neickelio,
1727

(1) Everyone should appear at the museum with cleanly scrubbed hands, so he won't soil something rare and clean which does not tolerate dirt from the touch of dirty hands.

(2) Furthermore, visitors from other countries should remember to wear neat, respectable clothing; because the old proverb, *vestis ornat virum* ["clothes make the man"] still applies, and everyone would prefer to keep company with a well-dressed person.

(3) But the most important thing of all to possess is an exemplary inner spirit (which brings with it mannerly outward conduct and virtuous behavior), so that the owner of the collection or his curator-in-charge will be encouraged to show off most clearly and thoroughly the natural and artificial rarities of the museum.

(4) Either at the beginning or at the end of the tour one can inquire about the origin of the museum, its initial collections, their nature and classification, and other particulars.

(5) One can also ask about other information, which kinds of specimens comprise the System of Rarities, so to speak; whether they are widely available or cannot be found elsewhere; and also about which other specimens are the most rare. Notes can then be made for when those pieces are encountered during the tour, and they can then be examined more particularly.

(6) When viewing an important piece, one should not be ashamed to ask his guide in a polite manner: (a) whether its nature is understood, what it is, whether manmade or a product of nature; (b) what its name is; and (c) if a piece of art, who made it, what is its function, and what should it be admired for? If it is a natural object, however, one should ask about its medicinal usefulness, and especially where it was found.

(7) Consequently, a compendious slate [big notebook] for writing in, where everything noteworthy or remarkable can be jotted down in abbreviated terms, will be necessary and useful.

(8) He who has some drawing ability will find it very useful, because he can capture in a quick sketch the rare and curious specimens, then prepare a more detailed depiction at home.

(9) If one has collected copperplate engravings of various kinds of rare specimens prior to the visit, they will be of great advantage, because they can then be compared against actual specimens in the museum to see how well they correspond.

(10) A good microscope will also find employment.

(11) When making notes on specimens, one should record the approximate color and size, because many items can be rare for their extraordinary size but still be small.

(12) Some people are of the opinion that one should not spend as much time examining artworks, antiquities and exotic rarities as he does on natural history specimens. But it is my belief that the more rare the piece (natural or artificial) the more time will be required to properly reflect upon it.

(13) Generally speaking, it is not good to spend too much time examining individual specimens. One should observe moderation in the examination of each object.

(14) Furthermore, one should limit the time spent admiring any particular object because the ignorant will sometimes make themselves appear ridiculous by spending too much time in the admiration of objects which are not especially rare or remarkable.

(15) On the other hand, some people are too incurious and blasé, behaving as if the objects are nothing new to them. such behavior is irritating to the guide, and he will become annoyed. Such visitors further display their ignorance by treating in a perfunctory manner a specimen which is plain in appearance but is actually quite rare. Therefore the middle road should be taken.

(16) Caution must also be taken in a museum because a person can, through carelessness, knock over or drop a specimen which will break, bringing disgrace upon himself.

(17) It is also not polite to reach for a specimen in order to examine it. The honorable person will ask the guide to hand it to him, which is much more courteous.

(18) The first of these rules mentions the importance of having clean hands in a museum. Here I would like to recommend that everyone be wary of having sticky hands and light fingers. Even though this remark may seem unsavory, it must be mentioned, because I have seen reputable-looking people behave deplorably in this respect. Therefore I want to set this out as the main rule, since many seem to believe it is no sin to steal rarities.

(19) One should make note of the number of cabinets and storage spaces, as well as the objects contained in them.

(20) One must form an image in one's mind of the general layout of the museum . . .

(21) . . . until such time as there is opportunity at home to record the full layout of the museum, including the partitioning of the cabinets and other important aspects.

(22) One should not miss the opportunity to visit a museum on repeat occasions, because we will discover more the second time than the first, and even more during the third, thereby perfecting our knowledge of the collection.

(23) A person should not be content with visiting only one museum, but should instead visit many, because one collection always contains specimens different from those in another.

(24) When visiting a collection in the company of others, one should converse freely, because one person will sometimes see things which the others had not noticed. Moreover, it is through such verbal repetition that the specimens will be better imprinted in one's memory.

(25) Finally, one should not visit a museum totally ignorant and unprepared; that would be about as useful as dragging a donkey in there. Consequently it would be wise to leaf through some appropriate books first, which are listed here in the bibliography. If this is done, anyone should be able to learn the name of the owner and other particulars about a museum, if it is famous, and why. If a catalog of the collection is available for purchase one should not stint on the cost; by repeated reading, one can familiarize himself thoroughly with the contents and the specimens in the collections.

He who observes the above rules will experience the benefits of visiting a museum. But, because many people are totally inexperienced and ignorant of all sciences, they will leave the museum as knowledgeable and clever as they entered it, and it will satisfy them to report merely that they have seen many colorful rarities. That is *not* the right way.



Neickelio's ideal museum

Regarding the composition and arrangement of an ideal private museum, Neickelio adheres to the old idea that it should be all-inclusive, a universe in miniature, but that the different categories of specimens should be well separated and segregated from each other for conceptual purposes. Ideally, in addition to the three basic natural history sub-collections (animals, plants, minerals), a comprehensive selection of artworks should also be included . . . man's creations to be exhibited beside those of God. A study of Vitruvius' classical treatise, *De architectura*, led Neickelio to further recommend the specific location of the collection rooms within a building, that the rooms be well-ventilated, that a museum room be roughly twice as long as it is broad, that it be oriented in a southeasterly direction, the walls painted in a light color, with a central entrance and a large work table. Bookshelves should be installed on one side of the room (a collector's library being very nearly as important as the specimens themselves), and sets of shelves for specimens on the facing wall, separated by windows. He specifies that the arrangement of the specimens should be orderly, not only grouping all the minerals together, for example, but also with the larger objects on the lower shelves and the smaller specimens higher up. To remind visitors of the silence necessary for study, a fearsome pair of stuffed or sculpted lions, bears or tigers should flank the entrance. A register of new acquisitions, a complete written inventory, and a method for conveniently accessing items are also required.

With such practical, helpful reference works as a guide, scientific and aesthetic mineral collecting as a common specialization eventually burst into full bloom in the latter half of the 18th century. As we have seen, the excellent beginning established for specialized mineral collecting in the 1500's was followed in the next century by a conceptual decline and dilution, as the emphasis shifted almost exclusively to broad-based, all-inclusive natural history and ethnographic collections. But this trend was reversed

during the course of the 18th century, as scientific understanding of minerals developed more fully. General, mixed collections of *naturalia* and *artificialia* became more sorted and compartmentalized according to the recommendations of Valentini and Neickelio. Specialists again emerged, in the mold of Agricola, Kentmann, Mercati and Palissy, and they leaned heavily for guidance on the writings of the earliest collectors. At the same time, collectors with a new aesthetic sensibility toward minerals began to develop a kind of sophistication unknown in the 16th century, resulting in the formation of some extraordinarily beautiful assemblages of minerals. Thus the modern concept of connoisseurship encompassing both beauty and science had at last begun to evolve.

Mineral collections of the 18th century were able to draw upon a much expanded system of sources and an active specimen market fed by many professional mineral dealers. Mineral enthusiasts with sufficient funds could now build enormous and expensive collections without having to field-collect so much of their material, a situation which served to promote the concept of connoisseurship, and the establishment of significant monetary values for the best specimens and the finest collections.

Although the majority of 18th-century mineral collections were probably relatively modest in size, perhaps 200 to 1,000 specimens, others were very large indeed. The largest private mineral collection was reputed to be that of John Stuart (1713–1792), the Earl of Bute, who is said to have had as many as 100,000 specimens. No catalog of the Bute specimens giving a count survives, and the figure is probably inflated. But a significant number of other collections containing 10,000 to 20,000 specimens is known to have existed, and several were attested to be in the 30,000 to 40,000 range. Of course, a large count is no guarantee of specimen quality, and some large collections (e.g. those of Franz von Beroldingen and Hans Sloane) are considered to have been of very mediocre quality. But others, such as those of George Gibbs, Charles Greville and Alexander Crichton, were assembled according to the highest standards. Unfortunately the great majority of mineral collections were of unknown extent; but a review of the largest collections of established size, shown in Table 1, demonstrates how substantial many of these collections became.

In most cases (unfortunately including many of the most important transactions) the selling prices of collections made or begun in the 18th century also remain unknown. However, some notable exceptions are listed in Table 2, which serve to give some idea of the value which had come to be accepted for large, excellent collections of minerals.

Selling prices can be informative in a broad sense but must be viewed with some caution, because significant underpayment and overpayment were common. Furthermore, it is difficult to establish precise equivalencies of 18th-century currencies with modern money. Nevertheless, because all European currencies were at that time based on gold, they can at least all be reduced to equivalent gold weights. And an approximate modern equivalent value of gold per ounce can be cautiously postulated on the basis of gross economic comparisons (see Table 2, footnote 2). Even given the uncertainties in the calculation, there is no doubt that collections which sold for upwards of half a million 1992 dollars must have been extraordinary, and were also surprisingly numerous, at least seven having changed hands for the equivalent of over a million dollars. This is a phenomenon which has probably happened in America only twice in the 20th century (the 1984 sale of the Perkins Sams collection to the Houston Museum of Natural Science and the recent sale of the William Pinch collection to the Canadian Museum of Science).

What follows is a summary divided more or less along nationalistic lines, based on the geopolitical divisions of the times.

Table 1. **Some of the largest mineral collections formed or begun by 1799 (for which specimen counts are readily available)**

Collector	*Birth/Death*	*Number of Specimens*
John Stuart	(1713–1792)	≈ 100,000
Joseph Lobkowitz	(1772–1816)	41,217[R F]
Dmitrii Golitsyn	(1734–1803)	≈ 30,000[R]
Johann Baillou	(1679–1758)	≈ 30,000[R S]
Joseph Blank	(1740–1827)	28,710[A]
Jacques de Bournon	(1751–1825)	22,881
George Gibbs	(1776–1833)	≈ 20,000
J. C. L. Heil	(1774–1853)	≈ 17,000[R]
Maximilian Archenholtz	(1706–1789)	≈ 16,000[F]
Pedro Dávila	(died 1775)	≈ 16,000
Charles Greville	(1749–1809)	≈ 14,800
Franz von Beroldingen	(1740–1798)	≈ 14,000
Étienne de Drèe	(1760–1848)	≈ 13,500
Joachim Moltke	(1746–1818)	> 13,000
Tönnes Neergaard	(1776–1824)	> 13,000
Nikolai Rumiantsev	(1754–1826)	12,794
René Haüy	(1743–1822)	≈ 12,000
Johann Lehmann	(1675–1739)	≈ 12,000
Mathias Piller	(1733–1788)	11,540
Benjamin De Witt	(1774–1819)	> 11,000
Hans Sloane	(1660–1753)	> 11,000
Abraham Werner	(1749–1817)	> 10,000
Friedrich Leysser	(1731–1815)	> 10,000
Anders Christophersson	(died 1804)	≈ 10,000
William Courten	(1642–1702)	≈ 10,000
Kaspar Schroll	(1756–1829)	≈ 10,000
Maria Anna	(1738–1789)	9,980
John Woodward	(1665–1728)	9,377[R F]
Karl Leonhard	(1779–1862)	≈ 9,000
James Smithson	(1765–1829)	≈ 9,000
Peter Monrad	(1758–1834)	≈ 8,500[G]
Nathaniel Leske	(1757–1786)	7,331
Swistunov	(died ca. 1812)	> 7,000
Charles Hatchett	(1765–1847)	≈ 7,000
Nils Bielke	(1724–1792)	≈ 7,000
Eric Swedenstjerna	(1765–1825)	≈ 6,090
Gregers Wad	(1755–1832)	6,089
Gregorii Razumovsky	(1759–1837)	> 6,000
Nicolai Demidov	(1774–1828)	6,004
Johann Lange	(1698–1765)	≈ 6,000
August Decker	(died ca. 1753)	≈ 6,000
Biagio Bartalini	(1750?–1822)	5,974
Samuel Robinson	(died 1827)	> 5,400
Heinrich Schumacher	(1757–1830)	> 5,000
Christian Pötzsch	(1732–1805)	> 5,000
Hugo Kollontaj	(1750–1812)	> 5,000
Karl von Moll	(1760–1838)	> 5,000
Sigmund Zois	(1747–1819)	≈ 5,000
Franz Enzenberg	(1747–1821)	≈ 5,000
Joseph Racknitz	(1744–1818)	≈ 4,700
Charles Alexander	(1712–1780)	4,480[R]
Christian Stieglitz	(1724–1772?)	4,263
Alexander Crichton	(1763–1856)	> 4,000
Johann Wallerius	(1709–1785)	> 4,000
Jean Gigot d'Orcy	(1733–1793)	≈ 4,000
Anton Swab	(1702–1768)	≈ 4,000

Indicates items in collections besides minerals: R = Rocks; F = Fossils; S = Shells; A = Artwork; G = Gemstones



Table 2.
Sale prices, purchase offers and evaluations of some early mineral collections.

Collector	*Year*	*Price*		*Equiv. Gold ounces*[1]	*Equiv. Modern $*[2]	
J. & F. Lobkowitz	(1870)	100,000[3]	fl	11,100	$6,660,000	
René Haüy	(1814)	600,000[4]	Ff	5,400	3,240,000	
Pedro Dávila	(1767)	800,000[5]	R	4,000	2,400,000	} 3 Mil.
Pedro Dávila	(1771)	200,000[5]	R	1,000	600,000	
Alexander Crichton	(1818)	80,000[6]	Rb	3,840	2,304,000	
Charles Greville	(1810)	13,727	£	3,212	1,927,200	
Maria Anna	(1781)	25,000	fl	2,775	1,665,000	
A. J. Forster	(1802)	50,000	Rb	2,400	1,440,000	
Nicolaus Jacquin	(1804?)	20,000	Gd	2,220	1,332,000	
Mathias Piller	(1800)	20,000	fl	2,220	1,332,000	
Étienne de Drèe	(1845)	215,000[7]	Ff	1,935	1,161,000	
Albertus Seba	(1717)	15,000	Gd	1,665	999,000	
Abraham Werner	(1817)	40,000	T	1,520	912,000	
Sigismund Hohenwarth	(1809)	12,000	Gd	1,332	799,200	
G. Von Engström	(ca. 1815)	30,000	T	1,140	684,000	
George Gibbs	(1825)	20,000	$	1,120	672,000	
Josef Dam	(<1807)	10,000	Gd	1,110	666,000	
Theodor Holm	(1787)	25,000[8]	T	950	570,000	
James Petiver	(1718)	4,000	£	936	561,600	
Morgenbesser Bros.	(1790's)	7,000	fl	777	466,200	
Anton Swab	(1751)	18,000	T	684	410,400	
Joachim Moltke	(1810)	15,000	T	570	342,000	
Johann Fichtel	(1799)	5,000	fl	555	333,000	
Mathias Mielichhofer	(1839)	4,000	Gd	444	266,400	
Van der Meulen	(1783)	3,667	fl	407	244,200	
Edward Clarke	(1823)	1,500	£	351	210,600	
Eleanor de Raab	(1793)	3,000	D	333	199,800	
Nathaniel Leske	(1792)	1,350	£	316	189,600	
Thomas Allen	(1833)	1,300	£	304	182,400	
Kaspar Schroll	(1819)	2,200	Gd	244	146,400	
Ignaz Born	(1773)	1,000	£	234	140,400	
John Fothergill	(1781)	1,000	£	234	140,400	
Arthur Pond	(1760's)	1,000	£	234	140,400	
Charles Hatchett	(1799)	700	£	164	98,400	
Peter Monrad	(1839)	4,170	T	158	94,800	
Peter Abildgaard	(1800)	4,000	T	152	91,200	
Johan Manthey	(1806)	4,000	T	152	91,200	
Josel von Krisch	(1795)	1,200	fl	133	79,800	
Bengt Quist	(1799?)	3,092	T	117	70,200	
Johann Voigt	(1791)	1,000	fl	111	66,600	

[1]Based largely on Kraus *et al.* (1985):

£	=	British pound	(= 0.234 oz. gold)
F£	=	French livre	(= 0.009 oz. gold)
Ff	=	French franc	(= 0.009 oz. gold)
$	=	American dollar	(= 0.056 oz. gold)
fl	=	Austrian florin	(= 0.111 oz. gold)
fl	=	Dutch florin	(= 0.111 oz. gold)
Gd	=	Swedish gulden	(= 0.111 oz. gold)
Gd	=	Dutch gulden	(= 0.111 oz. gold)
Gd	=	Austrian gulden	(= 0.111 oz. gold)
D	=	Austrian ducat	(= 0.111 oz. gold)
D	=	German ducat	(= 0.111 oz. gold)
T	=	German taler	(= 0.038 oz. gold)
T	=	Swedish riksdaler	(= 0.038 oz. gold)
T	=	Danish rigsdaler	(= 0.038 oz. gold)
R	=	Spanish real	(= 0.005 oz. gold)
Db	=	Spanish doubloon	(= 0.200 oz. gold)
Rb	=	Russian ruble	(= 0.048 oz. gold)

[2]A modern value for 18th-century currencies can be arrived at only approximately because of the fundamental changes that have taken place in Western society and the relative values of various commodities. Taking British society as a standard, a British pound during the late 18th century averaged roughly $140 in 1992 currency, that is to say, an ounce of gold equalled about $600 (Mitchell, 1983, 1992). This is in good agreement with the average lower-echelon working man's salary in those days, of around £80 to £100 (i.e. $11,200 to $14,000), which correlates well with the U.S. Census Bureau's 1992 upper limits for "poverty level" income: $11,189 for a family of three and $14,343 for a family of four. One of Britain's most important (unmarried) mineral collectors, the Rt. Hon. Charles Greville (1749–1809), struggled to maintain the appearance of a gentleman and build his art and mineral collections on an income of £500 per year, or about $70,000 in today's currency, which also correlates well with modern socioeconomic class levels. Despite his relatively limited finances, Greville was able through careful connoisseurship to build a mineral collection worth approximately two million dollars (in modern terms) at the time of his death.

[3]The collection, weighing a total of 80 tons, was said to have cost 100,000 florins to assemble, making it the most expensive 18th-century collection on record; it was sold for fl 35,000 (3,885 oz. gold) in 1870.

[4]Offered in 1814 but refused.

[5]Although the surviving bid books are said to indicate a sales total of about 200,000 francs (about $1,000,000), Sempere stated confidently in 1785 that the sale of the collection in 1767 realized 800,000 reales ($2,400,000); it is likely therefore that the bid book total does not include all materials actually sold. The second sale (1771) resulted in an annual pension of 40,000 reales which Dávila collected for the five years preceding his death, for a total of 200,000 reales. The combined income for both sales, including art and biological specimens, was 1,200,000 reales ($3,000,000).

[6]Evaluation of his 2,000-specimen Siberian collection only.

[7]Third sale.

[8]Evaluation for purposes of obtaining a government loan.

In some cases the predecessors in the previous century are reviewed, and in some cases the narrative is carried a bit beyond 1799 so as to give a proper conclusion to the stories of individual collectors whose activities overlapped both centuries. In terms of biographical detail, a general survey mentioning, at least briefly, most of the mineral collectors in that time and country is accompanied in the longer sub-sections by more detailed biographies of selected important collectors. This two-fold approach is utilized in this chapter because of the vastly larger number of collectors who lived in the 18th century compared to earlier times. The intent is to provide a general overview complemented by a closer, more personal look at the lives of these early mineral collectors.



France

During the 18th century, France became an international focus for the advancement of science. French became the international scientific language, finally supplanting Latin, and scholars from across Europe and America traveled to Paris for the purpose of refining their education and meeting the great teachers of chemistry, mineralogy and crystallography.

The passion for mineralogy in a purely scientific sense, relatively unconnected with its utility to the mining industry, flourished under the new philosophy of the Enlightenment. René Just Haüy (1743–1822) and Jean Romé de l'Isle (1736–1790) developed the fundamental principles of modern crystallography. Lavoisier and his colleagues laid out the new chemical concepts which enabled analysts such as Klaproth, Vauquelin, Berzelius and others to begin defining mineralogy as a branch of chemistry rather than mining science or pharmacy. The scientific revolution, begun in the late 17th century and nurtured by the iconoclasts of the Royal Society, was finally taking hold, and mineralogy lay at the center of much of the excitement.

Collections of minerals and of general natural history sprang up across the country. Esprit Claude Calvet (1728–1810), for example, built a large collection of minerals, plants and coins in Avignon, which remains today in the Musée Calvet. Jean Hermann (1738–1800), who, like Calvet, was a physician, built a beautiful collection of minerals and a substantial quantity of other natural history items which ultimately became the foundation for the Strasbourg Natural History Museum. Another Strasbourg physician, Johann Philip Grauel (1711–1761), also assembled a mineralogical collection. Philibert Lacoste (1762–1848), an abbot in Claremont, put together a collection of volcanic minerals later acquired by the Claremont Academy. Charles Fontaine (1754–1834), another clergyman, founded the Fribourg Museum of Natural History with his mineral collection. Baron Philippe Picot de la Peirouse (1744–1818), a mine inspector and professor at the University of Toulouse, donated his extensive collection of minerals from the Pyrenees to the mining college in Stockholm (now the Riksmuseet), where his original handwritten labels are still preserved. Dozens of others could be cited. Numerous as these provincial collectors were, however, the unquestioned hub of mineralogical activity in France was Paris, which during the course of the century became a virtual hotbed of mineral collecting.

The fashion in Paris was decidedly shifted in favor of the more aesthetic specimens. This was probably the result, at least in part, of the new emphasis on crystallography rather than ore value. Mining regions such as the Saxon Erzgebirge had traditionally produced collections strong in the economic metalliferous species, with relatively little emphasis on crystal form. Romé de l'Isle and Haüy changed all that. Their vision of minerals concentrated on the morphological expression of crystal structure rather than smeltable constituents, and therefore the better crystallized, more perfect specimens were desirable as clearer manifestations of these principles.

Parisian collectors came from a variety of middle and upper class backgrounds, but the most important were naturally the physicians, pharmacists, naturalists, chemists, geologists, mineralogists, and crystallographers (among the scientific professionals), the clergy, and the aristocracy. The pharmacists included such notables as Jacqués Valmont de Bomare (1731–1807), who published books on mineralogy in 1762 and 1774; Bertrand Pelletier (1761–1797); Pierre Bayen (1725–1798); and Balthazar Sage (1740–1824). The clergy included the abbots Haüy, Nolin (director of the Royal Botanical Gardens), Jean Joly de Fleury (1700–1755), and Jean Chappe d'Auteroche (1722–1769). Among the physicians we may count Jean Claude Délamétherie (1743–1817), Antoine Fourcroy (1755–1809), Joseph Lassone (1717–1788) and Charles Léoffroy de Saint-Yves (1717–1804). Prominent naturalists included Antoine Dezallier d'Argenville (1680–1765), Jean Gigot d'Orcy (1733–1793), Jacques Milbert (1766–1840) and Étienne Geoffroy de St.-Hilaire (1772–1844). Antoine Laurent Lavoisier (1743–1794), the founder of modern chemistry, kept a collection of minerals, as did other prominent chemists such as Louis Nicolas Vauquelin (1763–1829), the discoverer of chromium. The list of geologists would include Eugène Patrin (1742–1815), Alexander Besson (1725–1809), Nicholas Desmarest (1725–1815), and André Brochant de Villiers (1772–1840), among many others. Other occupations include those of Gallois (jeweler), Aubert (sculptor, gilder and varnisher to the King), François Boucher (1704–1770, a prominent French painter), and Louis Pajot d'Onsenbray (postmaster general).

Mineral collecting in Paris, as elsewhere in Europe, flourished among the aristocracy, from the Bourbon kings on down through the princes, dukes, marquises, counts and important government officials. A noble title became a dangerous liability at the time of the Revolution, and several of these highborn collectors met their end at the guillotine. Baron Philippe Joubert, for example, was Treasurer General for the province of Languedoc; his collection of minerals was considered among the best in Paris at the time of his arrest in 1792. Baron Philippe de Diétrich (1748–1793) had also assembled a significant collection before his execution. Lavoisier, who had served as one of the farmers-general (a kind of tax collector) under Louis XVI, was arrested and executed despite his claim to being a scientist of value to society. The arresting officer's reported response, "the Republic has no need of scientists," became widely repeated and condemned as an example of tragic excess, helping to bring an end to the Reign of Terror.

The mineral collections of Joubert, Dietrich and Lavoisier, as well as the collection of Jean Guettard (1715–1786), who had died shortly before the Revolution, were all seized by the Public Welfare Committee and turned over to the Paris School of Mines. The collection of Jean Gigot d'Orcy, another of the farmers-general executed in 1793, was allowed to remain with his family and was sold to an American, George Gibbs, a few years later. One famous collector, the Count de Bournon, fled to England when arrest seemed imminent, abandoning a substantial family mineral collection, and returned only after the monarchy was restored.

Eugène Patrin, a geologist, held the post of librarian at the Paris School of Mines. He had traveled extensively over the course of ten years, from 1781–1791, collecting aesthetic minerals in Germany, Hungary and Russia. His collection of about 2,000 specimens, including many from Siberia and the Urals, was do-

nated to the King's Cabinet in 1791. Ten years later he wrote five volumes on mineralogy for Buffon's great series on natural history, including 40 handcolored plates showing mineral specimens from the collections of his associates. Nine specimens belonging to Alexander Besson were included among the illustrations; Johann Ferber, a German mineralogist familiar with the Parisian collections, praised Besson's collection as one of the "greatest, most important and most instructive" in Paris. Another collection represented by illustrations was that of Claude Lelièvre (1752–1835), a chemist and member of the mining council.

One of the most active collectors in Paris was the Marquis de Drée (1760–1848), brother-in-law of the famous geologist Déodat Dolomieu. He had purchased some of Baron Joubert's collection before its confiscation, and eventually built up a substantial collection of minerals, coins and artwork which he had auctioned off in 1816. He then built a second collection, auctioned in 1826 to the mineral dealer J. Henry Heuland, followed by a *third* collection of no less than 15,000 specimens, sold to the Paris School of Mines in 1854.

Among the most important and historically significant of all these collections were those of Romé de l'Isle, Sage, Haüy, Bournon, and Gigot d'Orcy. To this distinguished list we may also add the King's collection, which ultimately absorbed four of these five.



Sage

Balthazar Sage (1740–1824)

Balthazar Georges Sage was among the most prominent Parisian mineral collectors of the late 1700's, and the founder of the Paris school of Mines. He promoted mineralogy and taught analytical chemistry, but his actual competence in these fields was minimal at best.

Sage was the son of a Parisian pharmacist of limited means. He attended the famous Collège des Quatre Nations, pursuing studies in science and eventually becoming an accredited pharmacist. He attended the public lectures on chemistry given by Guillaume Rouelle (1703–1770), and the lectures on experimental physics given by the Abbé Nollet.

In 1760, at the age of 20, he began giving public lectures in chemistry and assaying techniques at the family pharmacy. He also began building what was eventually to become one of the largest and most important mineralogical collections in the city. Sage befriended Romé de l'Isle, introduced him to mineralogy, and found him his first cataloging job in 1767. In 1769 Sage published his first of many works, on the "Chemical examination of different mineral substances."

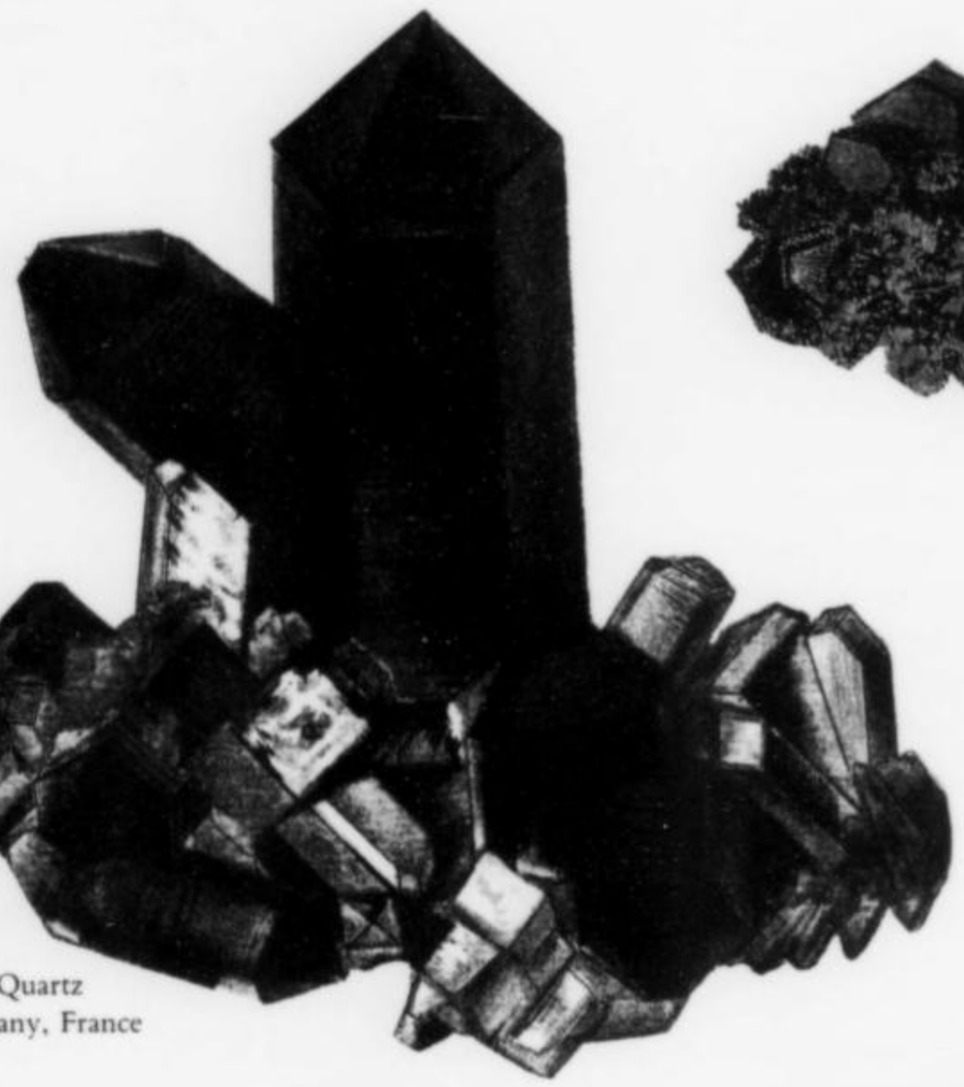
Sage was adept at acquiring powerful patrons including no less than the king himself, Louis XV, who pressured the Academy of Sciences into admitting Sage as a member in 1770. His incompetence as a chemist soon became apparent as a result of embarrassing published analytical errors, and his stubborn refusal to admit mistakes and to embrace important advances in the science. His blunders scandalized the Academy. Pierre Macquer, the dean of French chemists, wrote to Torbern Bergman that Sage "totally lacks a gift for chemistry and does not understand that science at all." One recent historian of chemistry wrote that Sage "became hopelessly entangled whenever he attempted to use wet methods of analysis." Other historians describe him as a "false scholar" (*faux savant*), and his scientific work as "totally without value."

Amazingly, despite his dubious qualifications as a chemist, he was well liked by his students and had many admirers among the non-scientists. He took an active part in the activities of the Academy, serving on important committees with his more august colleagues. And he actually made some legitimate chemical discoveries from time to time. Over the years he was promoted regularly within the Academy, much to the chagrin of his detractors.

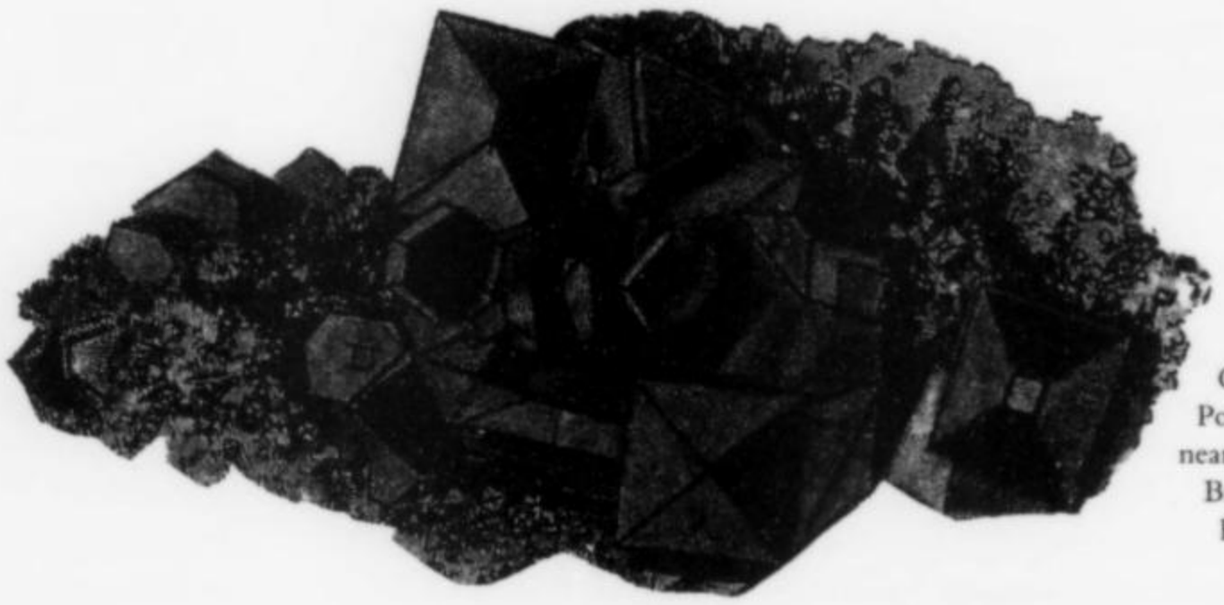
The creation of the Paris School of Mines was Sage's principal achievement. The initial steps were taken by Henri Bertin (1719–1792), *contrôleur-général des finances*, a protégé of Madame Pompadour and, as it happens, a mineral collector. As minister and secretary of state he established a governmental department responsible for various activities including mining. Bertin rejected Sage's initial proposal to establish a royal school of mines in Paris, but he did permit a new chair of mineralogy and analytical metallurgy at the Paris mint where Sage was the supervisor of assaying. Sage was granted the royal appointment in 1778, with a stipend of 2,000 livres per year, and the services of Jean Guillot-Duhamel (1730–1816) as his assistant.

A new building was taken over and remodelled for the mint. Sage moved his large mineral collection into the great hall, and began giving courses in mineralogy. Five years later a royal decree was finally issued for the founding of a school of mines in the mint, with Sage as director and professor of mineralogy and assaying. Sage ceded his mineral collection to the school in exchange for a lifetime annuity of 5,000 livres per year. He regularly employed his specimens in the course of his lectures, but he taught mineralogy as a simple display of minerals and rocks, inadequately distinguished from each other, and without reference to any of the recent advances in crystallography by Haüy and in chemistry by Lavoisier. Sage did contribute rare mineral specimens and gems to Lavoisier for experimentation, but then staunchly refused to accept the new chemical principles and nomenclature which Lavoisier developed.

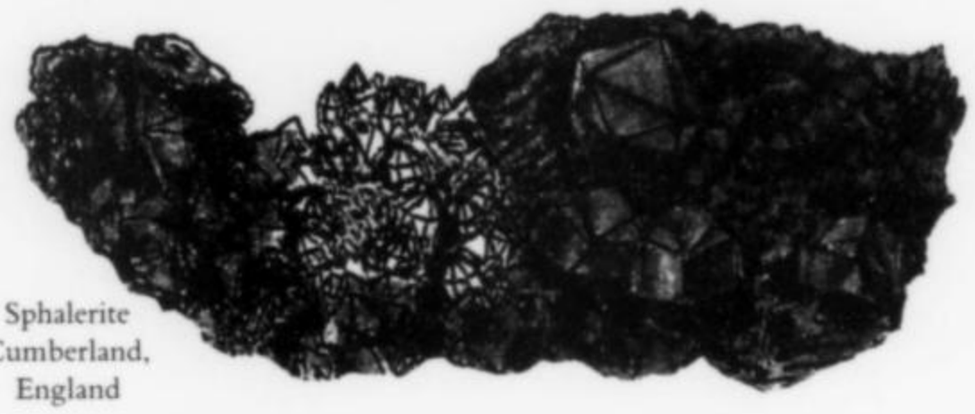
With the coming of the French Revolution, Sage's fortunes took a bitter turn. His former close ties with royalty were held against him, and he was arrested and imprisoned. He was released only after payment of a substantial fine, and was never to regain his former status. The school was moved and more competent men installed as teachers: Vauquelin taught assaying, Jean Hassenfratz taught mineralogy, and Haüy taught crystallography.



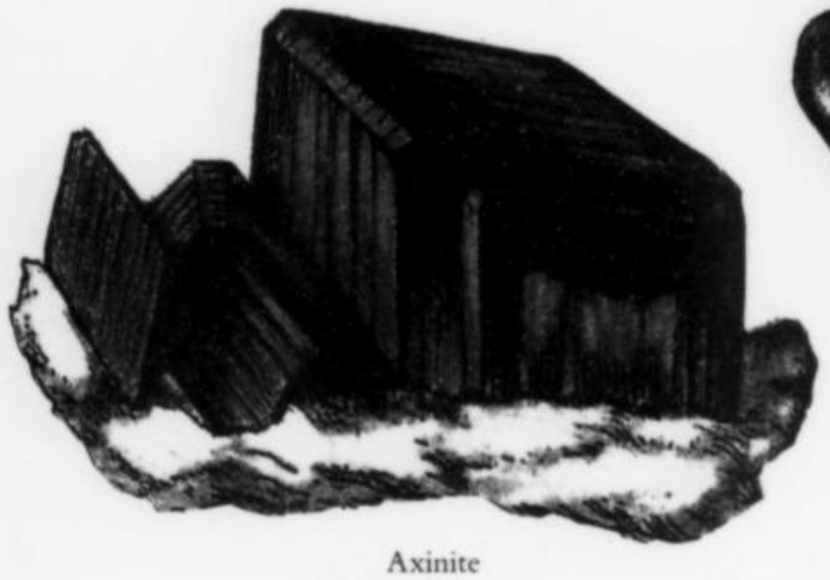
Quartz
Brittany, France



Galena
Pompéan,
near Rennes,
Brittany,
France



Sphalerite
Cumberland,
England



Axinite
Balme d'Auris in
Dauphiné, France



Sulfur
Cadix, France

Specimens from the collection of **BALTHAZAR SAGE** (sulfur, axinite), **HENRI BERTIN** (quartz), Abbé **NOLIN** (galena) and **FABIEN GAUTIER D'AGOTY** (sphalerite).

Guillot-Duhamel was retained to teach mining technology. But Sage was simply ignored.

In 1797 Sage was again put in charge of his mineral collection at the mint, but a few years later he became totally blind and was deprived of his pension. He died in poverty in his 85th year, "an unregenerate royalist, a scientific fossil, and a pathetic hangover of the *ancien régime*" (Guerlac, 1978).

Two years following his death, his mineral collection was divided between the Paris Museum of Natural History and the Paris School of Mines.

Jean Romé de l'Isle (1736–1790)

Jean Baptiste Louis Romé de l'Isle and Haüy were the two most influential mineral collectors and mineralogists in Paris in the late 1700's, and are together acknowledged as the founders of modern mathematical crystallography. The two had little in common, however, and never collaborated in their important work.

Romé de l'Isle was the son of a cavalry lieutenant. He studied humanities at the College of Saint Barbe in Paris, and following his graduation joined the military in 1756 to follow in his father's path. He served as a secretary in the Royal Corps of Artillery and Engineering in the French Indies, and was taken captive by the English in 1761; he was held as a prisoner of war in China for three years before being allowed to return home.

Back in Paris once again, Romé de l'Isle retired to civilian life, to pursue his interest in science. He attended the lectures on chemistry and assaying being given by Sage. Romé de l'Isle and Sage became friends, the younger Sage serving as his sponsor and supporter. At Sage's recommendation, Romé de l'Isle was hired by Pedro Franco Dávila (died 1775), a wealthy Peruvian naturalist then resident in Paris (see p. 137), to prepare a catalog of his mineral collection. The resulting work, nearly 600 pages, was published in 1767 and served as the auction catalog for the col-



Pyromorphite
La Croix mine,
Lorraine, France



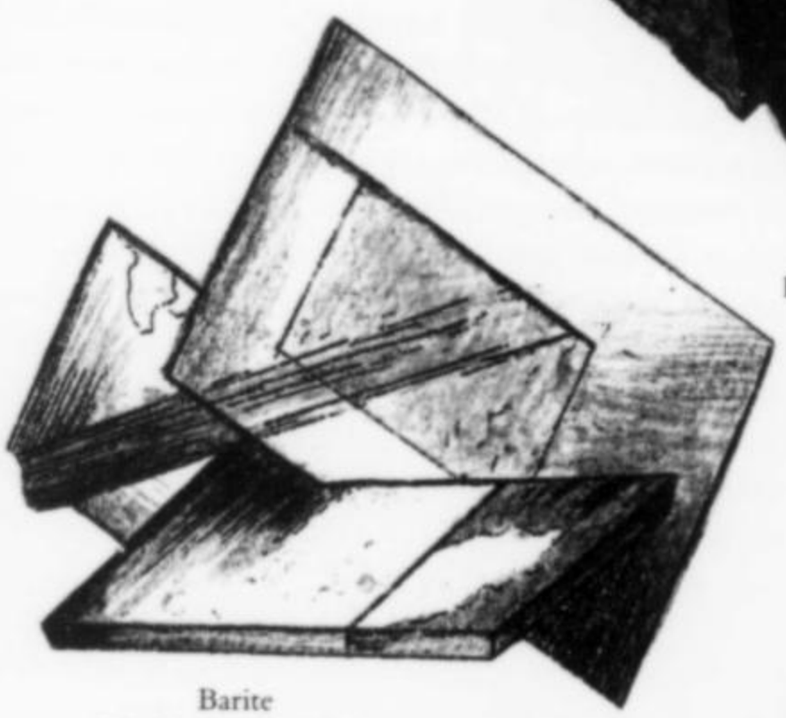
Quartz
Dauphiné Alps, France



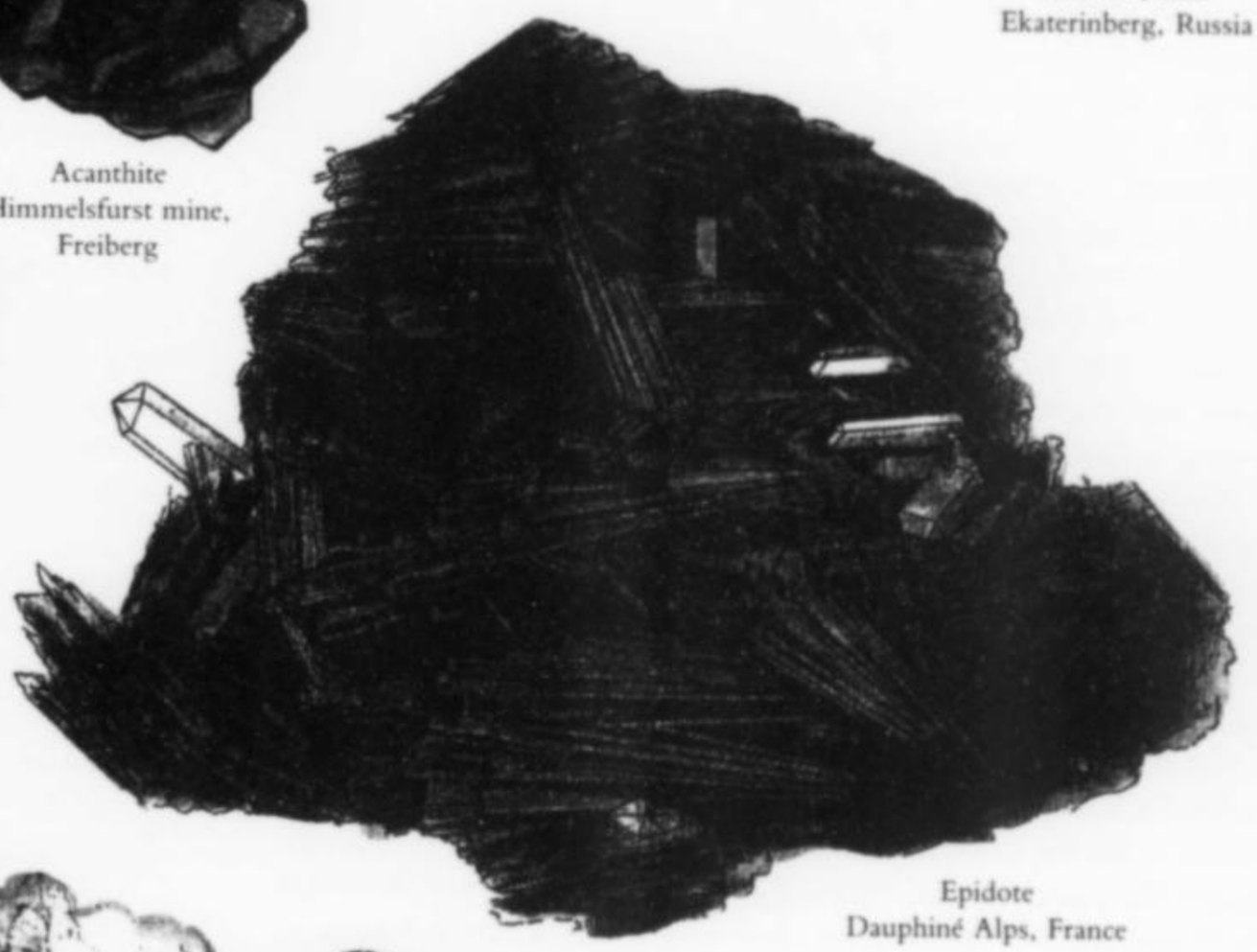
Crocoite
Beresov, near
Ekaterinberg, Russia



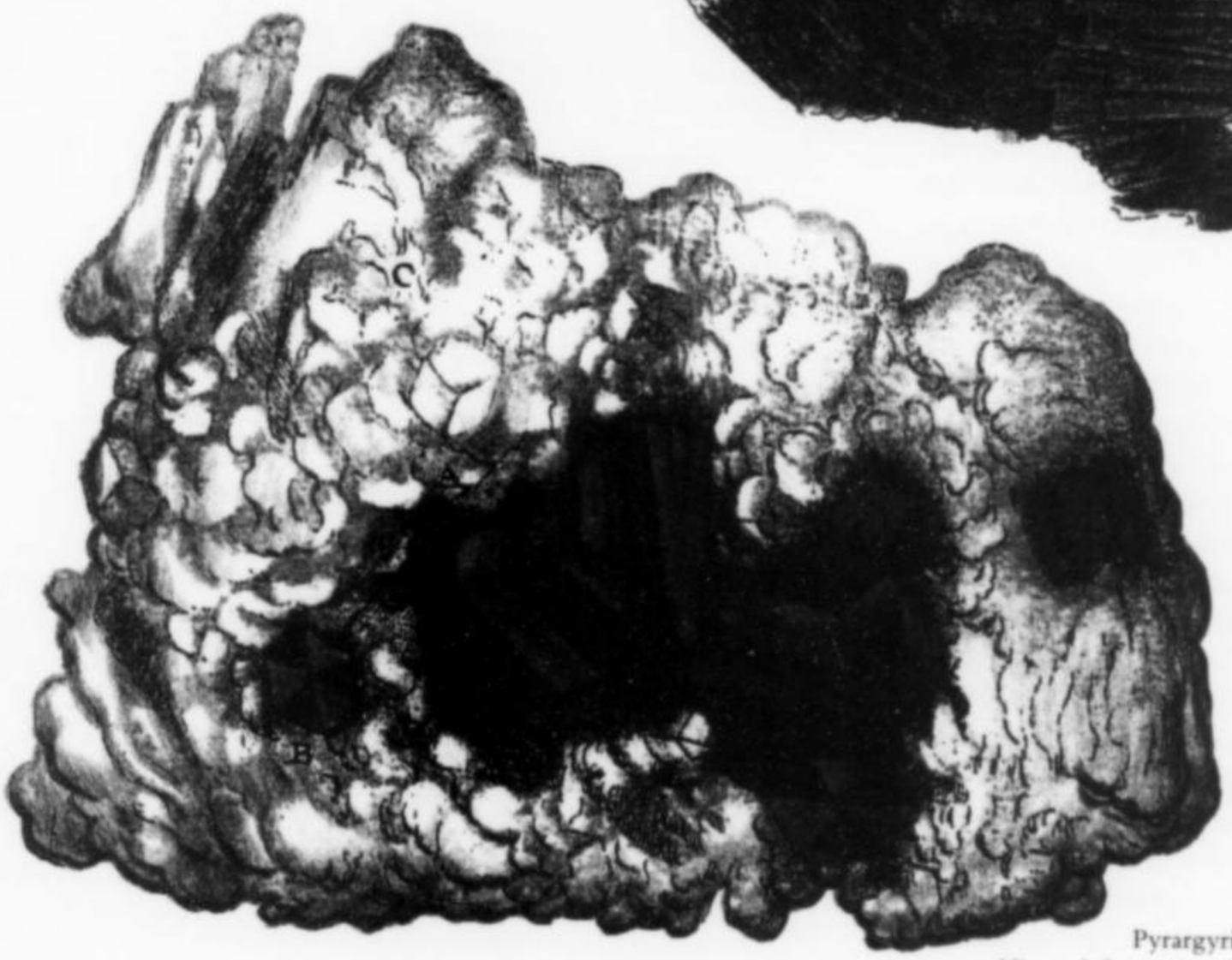
Acanthite
Himmelsfurst mine,
Freiberg



Barite
Felsobanya, Romania



Epidote
Dauphiné Alps, France



Pyrargyrite
Himmelsfurst mine, Freiberg



Pyrite
Rio Marina,
Elba, Italy

Specimens from the collection of **JEAN ROMÉ DE L'ISLE**.



Romé de l'Isle

lection. Two years later he was also hired to prepare a sale catalog for the London mineral dealer Adolarius Jacob Forster (1739–1806). Forster, assisted by his brother Ingham Henry Forster (died 1782), maintained a mineral store in Paris, and held special sales there in 1769, 1772, 1780 and 1783, hiring Romé de l'Isle to write each of the catalogs.

Romé de l'Isle found that he enjoyed mineralogy, crystallography and mineral collecting. In 1772 he published his first important technical work, a one-volume essay on crystallography in which he identified 110 crystal forms. This was a major expansion upon the work of Linnaeus, who had listed only 40. And, like Linnaeus, he believed that external crystal form should be the chief determinant in the classification of mineral species. Unfortunately, Romé de l'Isle did not yet recognize the significance of precise angular measurements.

The *Essai* made Romé de l'Isle a prominent name among the Parisian scientists of his day. During the next decade he busied himself with his crystallographic researches, and was frequently engaged to prepare collection catalogs for prominent dealers and collectors. In 1774 he wrote a catalog for the mineral collection of Claude Varennes de Béost (1722–1788), French Secretary of State for Burgundy, and Receiver General of Finances for Brittany. Varennes de Béost's collection had become famous as early as 1757, when he resided in Dijon, and was further enlarged by the acquisition of the collections of Savalete de Bucheley (one of the farmers-general under Louis XV) in 1764 and Jean Hellot (1685–1766), chemist and chief assayer for the French mint, in 1766. During his years of residence in Paris, Varennes de Béost's collection was considered among the most prominent in that city.

It was not uncommon for published collection sale catalogs, usually prepared for an auction, to withhold the name of the collection owner. This was, in fact, the case for the Varennes de Béost catalog, but Romé de l'Isle later revealed the name of the owner in a published bibliography. The mystery remains, however, for catalogs Romé de l'Isle prepared for an anonymous owner in 1777, and for another identified only as Mssr. "D★★★" in 1778. This latter catalog described a substantial collection of about 2,000 mineral specimens, most of them metalliferous and many of fine quality, along with about 1,500 fossils, corals, shells, etc.

In 1780 Romé de l'Isle prepared collection catalogs for three collectors: a Mssr. Delisle (perhaps a relative?), a Parisian jeweler named Louis de Gallois, and the Marquis de Grollier. These were followed in 1783 by catalogs for three more collectors: Count Charles d'Angivillier (died 1810); Joseph Lassone (1717–1788), First Physician to the king and a member of the Royal Academy; and Philippe de Leschevin (1771–1814), head clerk of the royal residence at Versailles and Controller de la Maison to the Countess of Artois.

Romé de l'Isle had begun to build his own mineral collection early on, and it had become quite substantial by 1773. In that year he published a catalog description of about 750 metalliferous specimens in his collection, although this was surely only a part of his holdings.

In 1781 an artist named Jean Fabien Gautier d'Agoty (1747–1781) approached Romé de l'Isle, on the recommendation of Sage, with a proposal regarding a publishing project. The plan was for Gautier d'Agoty to produce 100 color plates of outstanding mineral specimens, in installments of ten plates at a time, for which Romé de l'Isle would supply appropriately erudite descriptive text. Romé de l'Isle agreed, and although Gautier d'Agoty died that same year after producing only 30 plates, the artwork was taken over by another artist, François Louis Swebach Desfontaines. Romé de l'Isle wrote text for another 30 plates before his own death in 1790. The plates depicted specimens selected from some of the finest cabinets in Paris. No less than 68 of Romé de l'Isle's own specimens are shown, including superb Elba hematites, beautiful English calcites, Tyrolean and Siberian gypsum crystals, excellent fluorite groups from England and Germany, lovely barites from Hungary and Transylvania, French and German pyromorphites, Russian crocoite, beautiful groups of Alpine epidote and quartz, and many more. These illustrations demonstrate conclusively that Romé de l'Isle had a refined aesthetic taste in mineral specimens that was the equal of any in the two centuries since his death.

HISTOIRE
NATURELLE
OU
EXPOSITION GÉNÉRALE
DE TOUTES SES PARTIES
GRAVÉES ET IMPRIMÉES EN COULEURS NATURELLES;
AVEC DES NOTES HISTORIQUES.
Par M. FABIEN GAUTIER D'AGOTY, 5e fils.

I.re PARTIE, RÈGNE MINÉRAL.

A PARIS,
DE L'IMPRIMERIE DE MONSIEUR,
sous la direction de P. FR. DIDOT jeune, quai des Augustins.

M. DCC. LXXXI.

Other cabinets providing specimens for illustration in Gautier d'Agoty's book, and described by Romé de l'Isle, include those of Sage, Forster, Henri Bertin (1719–1792; French Minister and Secretary of State in Paris), Baron Philippe Joubert, the Abbé Nolin (Director of the Royal Botanical gardens in Paris), the Marquis de Cubieres (1747–1821), Jean Gigot d'Orcy, Baron Gaspard Caze de la Bove (1740–1824; a government administrator in Paris), Besnier de la Pontonnerie (Assayer General for the French Mint in Paris), Romé de l'Isle's own assistant, Arnould Carangeot (1742–1806); Jean Cramayel; a Mssr. de France de Croisset (probably the same "Mssr. Defrance" whose broken calcite inspired Haüy's crystallographic theories); and Gautier d'Agoty himself.

Romé de l'Isle was on good terms with many of the other Parisian mineral collectors of his day, and he made frequent visits about town to study specimens in many cabinets for a new edition of his *Cristallographie*. He refers to the collections of Pierre Jacqmin (died 1773; a goldsmith and jeweler to the king), Commandeur Sayve, Charles d'Angiviller (died 1810; French Royal Director of Trade whose beautiful collection was acquired by the Paris Natural History Museum in 1780), Louis Macquart (1745–1808; physician, mineralogist, and curator of the mineral collection of Fontainebleau), and two collectors named Tollot and Tidstrom, about whom nothing more is known.

In 1783 Romé de l'Isle published his most important work, a completely revised and greatly expanded *Cristallographie* in four thick volumes. The critical improvement developed as a result of the discovery of the constancy of interfacial angles by his assistant, Arnould Carangeot, while he was engaged with Swebach Desfontaines in manufacturing terra cotta crystal models for Romé de l'Isle. Carangeot then invented the contact goniometer in order to pursue such measurements on all of the minerals available, providing a massive amount of data that gave Romé de l'Isle's new work a solid mathematical base. Unfortunately, he still had only a vague appreciation for symmetry, and did not recognize, for example, that the cube and the octahedron reflect identical internal symmetry.

In the course of his work on the new *Cristallographie*, Romé de l'Isle visited and studied as many mineral collections as he possibly could, taking extensive notes. In his 1783 bibliography he even cites these collections, just as one would cite a book that had been referred to. In addition to those already mentioned, he acknowledges the collections of Alexandre Besson (1725–1809; naturalist and Inspector of Mines in Paris), Karl Pabst von Ohain (1718–1784; German mining captain), and the Prince of Lichtenstein, among others.

Romé de l'Isle was able to enjoy being at the forefront of crystallography for less than a single year. In 1784, Haüy's classic *Essai d'une Théorie sur la Structure des Crystaux* superseded Romé de l'Isle's *Cristallographie*, firmly establishing the mathematical principles underlying crystal symmetry. Romé de l'Isle was sharply critical of the speculative nature of Haüy's theories; Haüy, in turn, chose to ignore Romé de l'Isle's work as completely as possible.

Following his death in 1790, Romé de l'Isle's mineral collection was purchased by François Gillet de Laumont (1747–1834), French Inspector General of Mines and one of the greatest mineral collectors of his day. Gillet de Laumont's collection was purchased in 1835 by the French government, and is preserved today in the Museum of Natural History in Paris.

René Just Haüy (1743–1822)

René Just Haüy holds an exalted position in the history of mineralogy as the founder of mathematical crystallography. His initial discovery and much of his subsequent work were the direct result of his access to private mineral collections, and the many specimen donations he received from fellow scientists and collectors.

Haüy was born on the 28th of February, 1743, in Saint-Just, a small market town in the department of Oise, just north of Paris. He and his younger brother, Valentin (who developed instructional techniques for the blind), were the sons of a poor weaver. From the beginning Haüy took particular pleasure in religious ceremonies and spiritual music, so much so that he attracted the attention of the prior of the abbey of Prémontré near Laon. As Baron Cuvier later described it:

> Being struck with the vivacity of his intelligence, [the friar] procured him the instruction of some of his monks. The child's progress, promptly responding to the care of these masters, interested them more and more, and led them to suggest to his mother that by removing him to Paris she might shortly procure through their recommendation such resources as would enable him to complete his studies.

This she did, and the young Haüy obtained a position as chorister in a church in the Saint Antoine quarter. He ultimately became a respected performer on the violin and the harpsichord, a pastime which gave him solace throughout his later years.

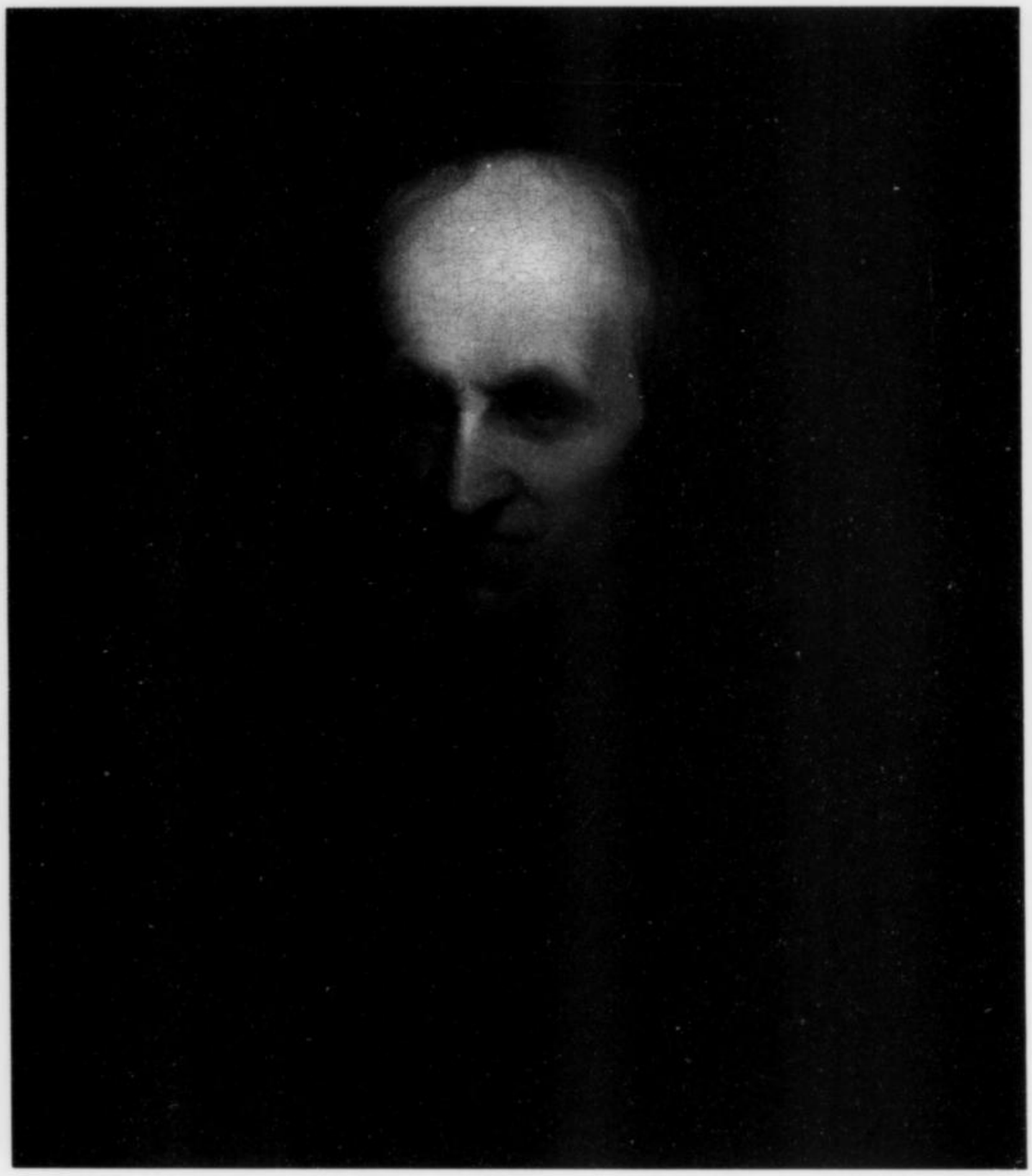
Finally, through the influence of the Saint-Just friars, he was granted a scholarship at the college of Navarre. There he flourished, being retained as an instructor immediately following his graduation in 1764. While at Navarre he had acquired a taste for physics, but pursued it more or less as a hobby.

After six years Haüy was ordained as a priest and transferred to the College of Cardinal Lemoine, where he became friends with an aged instructor named Lhomond. Botany was Lhomond's special passion; and so, to give pleasure to his friend and make their conversation more enjoyable, Haüy took up the study of botany, discovering in the process that he had a talent for natural science. He established his own herbarium, and developed a process whereby the color of flowers could be preserved in dried specimens. He began spending time at the "Jardine du Roi" near his college, associating there with the royal botanists.

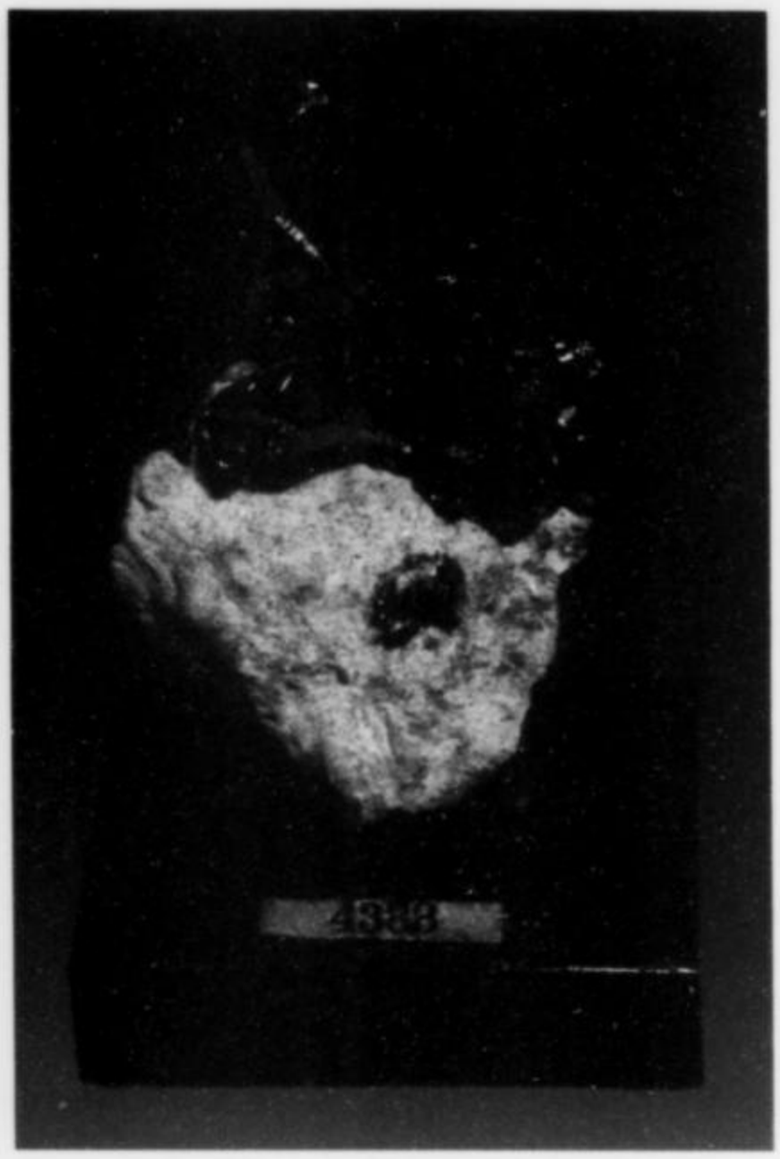
One day at the "Jardine du Roi" Haüy decided to attend one of the mineralogical lectures then being given by Louis Daubenton (1716–1800), a prominent naturalist and assistant to Georges Buffon. It was an experience that changed the direction of his life; mineralogy was more compatible with his taste for physics than was botany, and he felt an instant affinity for the subject. Having seen how the complicated forms of flowers and fruits followed an observable constancy, he could not help but wonder what laws might govern the simple geometric shapes of crystals. Romé de l'Isle's first treatise on crystallography (1772) seemed decidedly lacking in rigor as well as principle.

Haüy thus became fascinated with crystallized minerals, and began building a collection which, in the asceticism of his priestly calling, was his only personal possession. How these first specimens were acquired is not known; he is not considered to have been a field collector, and he had little money to spend with the Parisian mineral dealers. But he did correspond with mineralogists and chemists throughout Europe, and built friendships with many of the local collectors, visiting them regularly to admire their cabinets.

His greatest discovery was made during one of these visits in 1779 to a Parisian financier and amateur naturalist, Jacques Defrance; on this occasion, Haüy accidentally dropped and broke a group of prismatic calcite crystals. Examining the rhombohedral cleavage fragments, he suddenly realized that cleavage must be an expression of internal structure which, for a given species, remained the same regardless of varying external morphology. Haüy went home and immediately began breaking his own calcite crystals; his sudden insight was confirmed. The scalenohedrons,

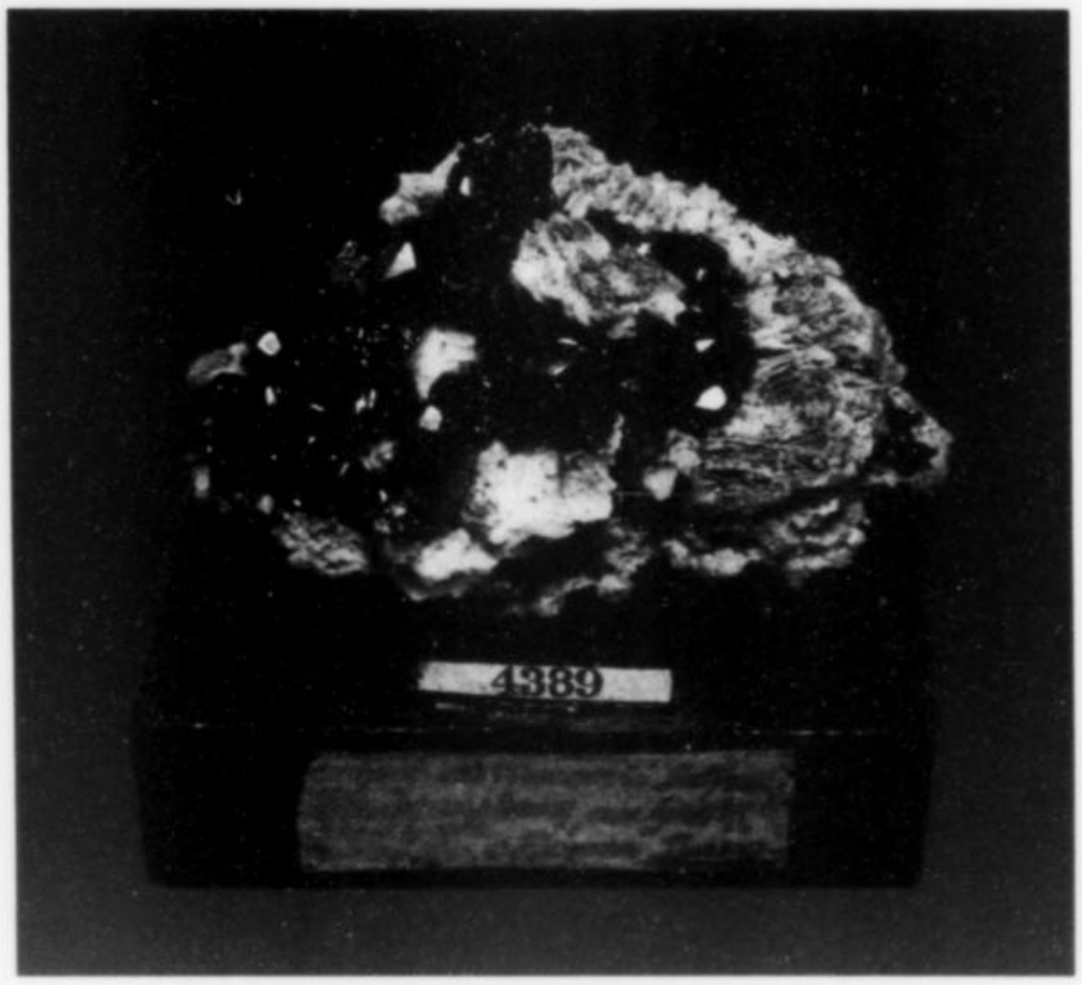


Haüy



Proustite specimen, Himmelsfurst mine, Freiberg (1797), from the collection of **RENÉ JUST HAÜY**.

Pyrargyrite, St. Andreasberg, Germany, from the collection of **RENÉ JUST HAÜY**.



rhombs, bipyramids, plates and prisms all broke into identical cleavage rhombs. "All is discovered!" he shouted. Within a short time he had determined how the stacking of basic units such as cubes and rhombs can generate a whole range of other crystal forms. Of all the countless mineral specimens that have been destroyed over the centuries, the calcites of Defrance and Haüy were surely worth the sacrifice.

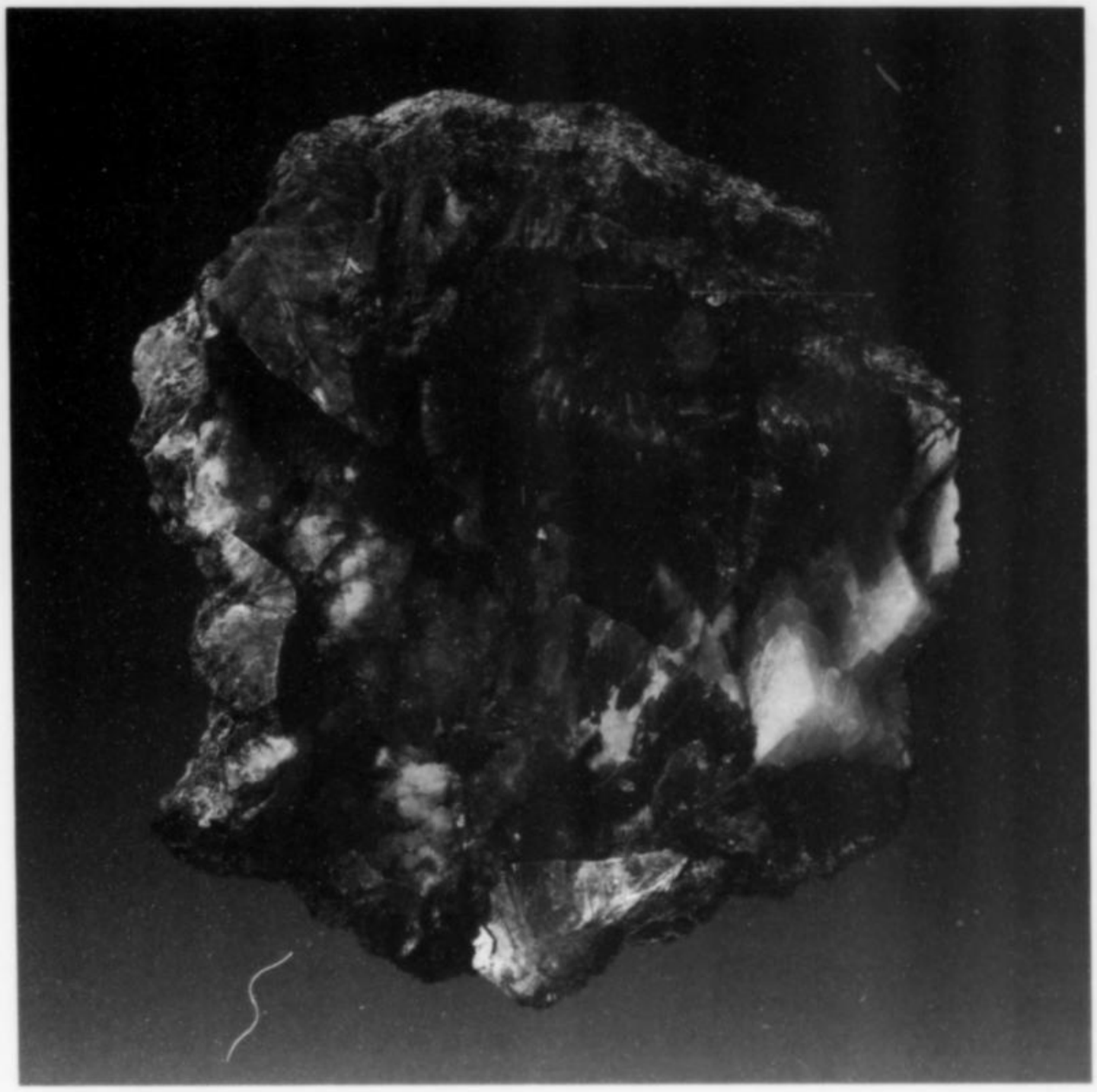
Haüy went to work first relearning the geometry he had forgotten since his student days, then proceeded to show mathematically the consistency and precision of his theory. Thus far he had worked in private, but when at last he showed his discovery to Daubenton, the aging naturalist grasped its significance immediately. Daubenton conferred with the astronomer and mathematician Pierre de Laplace (1749–1827), who agreed it was a major breakthrough in the understanding of crystals; Laplace urged Haüy to present his findings to the Academy of Science. Though reluctant at first to enter this new forum, Haüy agreed and was received with near unanimous approval, being elected a Member in 1783. He published the outline of his theory in 1784.

Romé de l'Isle, for one, did not approve of this latecomer's radical and speculative theories about crystal structures too small to observe directly. He derisively referred to Haüy as a *crystalloclast* ("breaker of crystals"). Romé de l'Isle's jealousy was intense, perhaps because Haüy's published explication of his theory had rendered Romé de l'Isle's own *magnum opus* on crystallography obsolete within a year of its publication. Haüy, however, was not of the temperament to counter-attack; he simply ignored Romé de l'Isle, and continued his researches, allowing his work to prevail on its own merits. Haüy's *Traité de Mineralogie* (1801), of which the first volume dealt more fully with his crystallographic theory, is still accepted as one of the great milestones in the history of the science.

Among the excesses of the French Revolution was a movement to combine revolutionary philosophy with theology, and then compel all clerics to take an oath in support of the official stance. This Haüy refused to do. Thus it was that in August of 1792 a group of men entered Haüy's humble residence, seized his papers,



Euclase crystal, Brazil, from the collection of
RENÉ JUST HAÜY.



Stilbite, from the collection of
RENÉ JUST HAÜY.

overturned his mineral collection, and conducted him to the St. Firmin Seminary where he was imprisoned with the other uncooperative scientists and intransigent clergymen. Tranquil at finding himself among friends in surroundings no more austere than he was accustomed to, Haüy made himself at home and requested only that his specimens and his cabinet of drawers be brought to him so that he could put them back in order.

Haüy's friends and colleagues, led by his pupil and fellow mineral collector Étienne Geoffroy de Saint Hilaire, bravely remonstrated with the officers of the Revolution, who at last gave in and issued an "order of deliverance" permitting Haüy's release. When his friends arrived at the prison that evening to claim him, Haüy was so comfortable and oblivious that he elected to remain until the morning. From that time on, he was never again threatened by the guillotine. He was on one occasion summoned for military duty, but was cashiered on the spot because of his awkward appearance. In 1802 Napoleon named him an Honorary Canon of Notre Dame.

The revolutionary authorities appointed Haüy as curator of the Cabinet of Mines. He tried boldly but unsuccessfully to obtain the release of Lavoisier in 1793, and in 1795 began teaching a course in physics and mineralogy at the school of mines.

Haüy broadened his contacts with other scientists, and corresponded regularly. His colleagues continued to donate specimens for him to study, and his collection grew steadily. In his *Traité de Mineralogie* (1801) he gratefully acknowledges the specimens received from Peter Abildgaard (1740–1801) and Johann Manthey (1769–1842) in Copenhagen, Dietrich Karsten (1768–1810) in Leipzig, Tönnes Neergaard (died 1824) in Paris, Jens Esmark (1763–1839) in Oslo, Baron Karl von Moll (1760–1838) in Salzburg, and two sources named Codon and Hoffman-Bang.

Following the death of Dolomieu in 1802, Haüy was appointed professor of mineralogy at the Natural History Museum, where he worked to significantly enlarge the Museum's mineral collection. He drew successfully on his professional contacts with the other great mineralogists and chemists of Europe for specimen donations. In 1809 he was also appointed to the chair of mineralogy at the Sorbonne.

When allied sovereigns gathered in Paris following the downfall of Napoleon in 1814, Haüy was visited in his modest quarters by Frederick Wilhelm III, King of Prussia; by the Russian Czar Alexander I (1777–1825), who had earlier collected minerals; and by Austrian Archduke Johann (1782–1859), an enthusiastic mineral collector. Johann is said to have offered Haüy 600,000 francs (about £24,000) for his mineral collection, but Haüy politely declined, saying he intended to bequeath it to France.

In 1822 Haüy published his *Traité de Cristallographie*, and died that same year, of complications resulting from a broken hip. Alexandre Brongniart (1778–1847) succeeded him at the Museum, François Beudant (1787–1852) at the Sorbonne, and Pierre Cordièr (1777–1861) at the Academy; all three were mineral collectors and former students of Haüy.

Despite his great achievements, Haüy remained unaffected throughout his life, always dressing in simple, unassuming fashion, always modest in his speech, and discharging every day his ecclesiastical functions. He was kind to strangers arriving in Paris, willing to mediate disputes, and always ready to give away free tickets to visit the museum collections.

Haüy's enormous personal mineral collection was sold to Richard Grenville, the Duke of Buckingham (1776–1839), by Haüy's niece and nephew in 1823. It consisted of a principal collection of 10,000 to 12,000 specimens supplemented by several accessory collections. The main collection was organized systematically and labeled with great care. Each specimen was affixed with wax to a black, rectangular wooden stand, in an orientation matching the respective crystal drawing in his *Traité de Mineralogie*. According to his nephew, Haüy had regularly spent his afternoons mounting and labeling specimens in this manner. Unlike Romé

de l'Isle, who collected primarily for aesthetics, Haüy's collection was selected solely to illustrate crystallographic types and features.

In 1848 the Duke's heirs sold the collection, or what remained of it, to the Natural History Museum in Paris for the minimal sum of £325. Armand Dufrenoy (1792–1857) was sent to England to supervise its return. Today over 6,000 specimens still retain their original labels in Haüy's handwriting.

In addition to his principal collection, Haüy assembled and sold small collections of minerals and large collections of wooden crystal models to private collectors and scientific institutions in America and throughout Europe. In this way he successfully promoted the spread of his crystallographic theories.

Jacques Louis de Bournon (1751–1825)

The Count de Bournon was among the most famous mineral collectors and mineralogists of the late 18th century, not only in France but also in England where he lived for nearly 20 years as an expatriate from the French Revolution.

He was born in Metz, France, on 21 January 1751, the eldest son of Jacques de Bournon and Marie Ann Martinet de Nibouville. His father was a nobleman and chevalier (knight) who had originally come from Verdun to become Lord of Gras and Retonfey; he was himself an amateur mineralogist, and had put together an "immense mineralogical collection" at the family château near Metz.

By all accounts, the young Bournon showed a keen interest in his father's minerals virtually from infancy, and his parents spared no effort in the encouragement of his precocious scholarly inclinations. Bournon studied natural history, probably from tutors, and became thoroughly educated in the Latin classics. Little is known of his early years as a young aristocrat, but in 1785, at the age of 34, he published his first scientific work, an essay on rocks found near St. Étienne-en-Forez.

Despite his scientific interests, Bournon was at heart a patriot, and he elected to pursue a career in the military. Enlisting first in the artillery regiment of Toul, he eventually rose to the rank of lieutenant of the Marshalls of France. He nevertheless continued his interest in mineralogy; he was an ardent follower of Haüy's theories of crystal structure, and was a friend to Romé de l'Isle and Sage.

The French Revolution was, to Bournon, a catastrophe. He would not disavow his allegiance to the former monarchy, and would probably soon have been threatened by the Reign of Terror had he not moved into voluntary exile. The decision was apparently an abrupt one, for he writes of departing "in incredible confusion," visiting his friends Sage and Romé de l'Isle one last time, and abandoning his estate, his fortune and his mineral collection. Bournon took his family first to the Rhineland, where he fought in the army of the princes of Condé (who, incidentally, were also mineral collectors). After the unsuccessful campaign of 1792, and the subsequent dissolution of the princes' army, Bournon finally crossed the Channel to England, with his family, in 1794.

In England, Bournon was introduced to Sir Joseph Banks, president of the Royal Society, by the Marquis de Chabert, one of his old friends in the French navy and a member of the Society. Because of Bournon's geological essay of 1785, which had been much admired in British scientific circles, he was warmly welcomed. He immediately entered the service of the leading mineral collectors, Charles Greville, Sir Abraham Hume and Sir John St. Aubyn, organizing, cataloging and helping to build their mineral collections. He lectured frequently on mineralogy, and enjoyed friendly relations with a wide circle of fellow enthusiasts. He seems to have been well-liked and admired, both on a personal and a professional level, by virtually everyone with whom he had contact, except the curator at the British Museum (see p. 78).

Over the years Bournon published at least 20 articles and books on mineralogy. His most important work is a handsomely illustrated three-volume treatise on calcite and aragonite morphology published in 1808. That same year he also produced a three-volume treatise on general mineralogy, and in 1813 published a descriptive catalog of his mineral collection (reissued in 1817 as a description of the French royal collection after its purchase by the king). Most of his shorter works appeared in *Philosophical Transactions of the Royal Society*, *Journal de Mines*, and *Transactions of the Geological Society*.

Although Bournon had arrived in England penniless, he prospered under the patronage of the British aristocrats, and in time built up an excellent and enormous new mineral collection of his own. Many of his specimens were borrowed by James Sowerby for illustration in his *British Mineralogy* and *Exotic Mineralogy* during the first years of the 19th century. By 1813 he had accumulated approximately 22,880 specimens. Probably because of Haüy's influence, and his own fascination with crystallography, more than 10,000 of his specimens were single crystals of the sort Haüy collected. All of his specimens were neatly organized in 225 drawers. Each drawer was divided into compartments, and in each compartment a specimen rested on a bed of cotton. Some drawers held as many as 130 specimens. Many of the smaller single crystals were mounted onto a support of green wax, permitting them to be more safely handled and examined; these were stored in little cotton-lined boxes in the drawers.

The published catalog of Bournon's collection is necessarily (and frustratingly) brief in its descriptions, considering the impracticality of describing over 22,000 specimens on an individual basis. Nevertheless, even the highly abbreviated entries speak of an amazingly broad and fascinating collection. Under *cinnabar*, for example, we learn that he possessed 131 specimens, *40* of which were single crystals! Some of these comprised "a very beautiful series of large crystals from Japan [China?]." He also owned samples of Brazilian platinum, palladium, rhodium, iridium and osmium obtained shortly after Wollaston had first discovered Pd and Rh from among the same material. He had Russian gold specimens obtained from Alexander Crichton in St. Petersburg; 121 specimens of native silver from Kongsberg, Peru and Mexico; and 148 specimens of proustite/pyrargyrite, including 66 single crystals (but we are not told any of the localities!). There were 197 cuprites (including 48 single crystals); 311 cassiterites (including 154 single crystals), many from Cornwall; *500* cerussites (including 345 single crystals), obtained, he says, from mineral dealers such as Mawe, Forster, Fichtel and Mohr, from localities in Derbyshire, the Hungarian Bannat and Siberia; no less than 246 wulfenites (of which 197 were single crystals); 117 specimens of crocoite, probably Russian (including 91 single crystals); and 54 specimens of bournonite, which Bournon discovered and had called *endellionite* until Robert Jameson formally named the new species after him. These are only the first specimens encountered under the "metals" section of his catalog. The full scope of Bournon's collection is formidable, and surely must have included what would amount to the finest collection of thumbnail-size mineral specimens in history.

Bournon's competence in mineralogy led to his election as a Fellow of the Royal Society in 1802, and he was a founder of the Geological Society as well, serving as its first Foreign Secretary from 1811 to 1814.

Napoleon, who cultivated relationships with French scholars of all kinds, repeatedly urged Bournon to return home, and offered him a prestigious position at the Institute. But Bournon, a committed royalist, declined out of loyalty to the Bourbon kings, and did not return until the monarchy was restored in 1814.

His loyalty was gratefully acknowledged by Louis XVIII, who bestowed upon him the Legion of Honor and made him a knight of the order of St. Louis. The king purchased Bournon's large mineral collection, no doubt at a generous price, and hired Bournon to continue curating it as Director General of the royal mineralogical cabinet, a post he held until his death.

Bournon died in Versailles on 24 August 1825. His collection is still preserved more or less intact in the French National Museum of Natural History and the College de France, having been divided between those two institutions in the year of his death.

Jean Gigot d'Orcy (1733–1793)

Jean Baptiste François Gigot d'Orcy was a wealthy patron of natural history, especially entomology and mineralogy, subjects which had interested him since his youth. His knowledge of minerals was probably instrumental in gaining a government appointment as Inspector of Mines. He later served as Receiver General of Finances for Châlons from 1773 until the Revolution.

Gigot d'Orcy was "a man of great opulence." His wealth permitted him to build lavish and expensive collections of insects and minerals, and to support the publication of a major six-volume work on butterflies (1779–1793). The text was written under his direction by P. M. Engramelle (1727–1780), an Augustinian monk, and the plates were prepared by a Strasbourg artist named Ernest. Gigot d'Orcy also undertook the publication of a general natural history of insects. Daubenton introduced him to the naturalist and physician Guillaume Olivier (1756–1815), who was charged with editing the work and traveling to examine specimens for the preparation of illustrations. The eight-volume work did not see completion, however, until 15 years after Gigot d'Orcy's death.

Gigot d'Orcy began collecting minerals seriously around 1753, at the age of 20, and over the succeeding 40 years built up quite a large collection, about 4,000 specimens. He traveled frequently to obtain specimens, many of them purchased at considerable expense, and he maintained an extensive correspondence with other mineral collectors and mineralogists of his day. He owned a number of mining properties, and thus had access to good specimens directly from the source. He also built a substantial scientific library.

Gigot d'Orcy was acquainted with the Paris community of mineralogists and collectors, and his collection was well known. Around 1782 he was approached, probably by Romé de l'Isle, regarding the project initiated by Fabien Gautier d'Agoty to publish 100 color plates of fine mineral specimens, in installments of ten at a time, with accompanying descriptive text supplied by Romé de l'Isle. Most of the specimens pictured in the first 30 plates had been from Romé de l'Isle's own collection, but he was making an effort now to draw on other local collections as well, and wished to illustrate some of Gigot d'Orcy's specimens.

Being the enthusiast and patron of natural history publishing that he was, Gigot d'Orcy could hardly refuse. Over the next few years, 15 specimens from his collection appeared as plates in the series:

Plate XXXIX. Quartz crystals of a carnelian-red color, from Geyer, Saxony

Plate XLIII. Blue fluorite with calcite from Derbyshire, England

Plate L. Cuprite crystals with native copper and malachite (no locality given)

Plate LI. Purple apatite with quartz from [Ehrenfriedersdorf?] Saxony

Plate LII. Stilbite from Iceland

Plate LIV. Topaz with quartz from Schneckenstein, Saxony

Plate LV. Harmotome from St. Andreasberg, Saxony

Plate LVII. Emerald crystals in matrix from Colombia

Plate LX. Iridescent hematite from the St. Philip mine, Bannat of Temeswar, Hungary

Plate LXII. Barite [?] from Freiberg, Saxony

Plate LXIII. Azurite from the Bannat of Temeswar, Hungary

Plate LXVI. Prehnite from the Cape of Good Hope

Plate LXVII. Heulandite from the Faeroe Islands

Plate LXVIII. Torbernite from Johanngeorgenstadt, Saxony

Plate LXX. Chalcopyrite from Siegen, Germany

These are generally quite large, aesthetic specimens which would grace any 20th-century collection; judging by their high overall quality, the Gigot d'Orcy collection, at its peak, must have ranked among the finest in Paris.

In 1793 Gigot d'Orcy was arrested, along with the king's other farmers-general, and was executed under the guillotine. His widow and other heirs proposed the sale of his natural history cabinet and library to the French government, for the Museum of Natural History. The Temporary Commission for the Arts approved the acquisition, and the purchase was completed in 1794. However, for some reason, the minerals were not included. Perhaps his thousands of rare insect specimens, of relevance to the important publications he sponsored, were of most interest to the government assessors.

The family retained possession of the complete mineral collection and a miscellany of shells and other objects for some years following the Revolution. These materials were said to comprise two-thirds of Gigot d'Orcy's total original holdings, so it is clear that his mineral specimens had outnumbered his insects. In 1804 the heirs at last decided to put the remaining part of the collection up for sale. They engaged the auction house of Mr. Rameau in Victory Square, and opened the collection to public view at no. 11 Place Vendôme every Monday and Thursday from 10 a.m. to 4 p.m.; a Mr. Carette was the custodian in charge, and he gave tours to interested parties.

The plan was to advertise the collection via an abbreviated published catalog, and hope that buyers would come forward. The family was staunch in their belief that the mineral collection should not be broken up but should be preserved intact for the benefit of science. However, if no one came forward with an acceptable offer, the collection was scheduled to be auctioned off in February of 1805.

It was at this time that the collection came to the notice of Col. George Gibbs, a wealthy young American military man who had been enjoying some years of "cultivated leisure" in Paris, and had studied mineralogy at the Paris School of Mines. He was interested in buying specimens; during that same time period Gibbs had purchased the large collection of Count Gregorii Razumovsky (1759–1837) in Lausanne, while studying mineralogy there under Heinrich Struve (1772–1851). In Paris he had been building his collection with the help of Gillet de Laumont, François Dubuisson (1763–1836), and the exiled Count de Bournon in London.

Negotiations with the family were successfully completed, and in November of 1804 Gibbs took possession of the entire Gigot d'Orcy collection and its meticulous catalog in return for an unknown (but no doubt substantial) sum.

In 1805 Gibbs returned to America with two of the finest European mineral collections ever assembled. The catalog had been compiled by Arnold Carangeot (1742–1806), a well-known



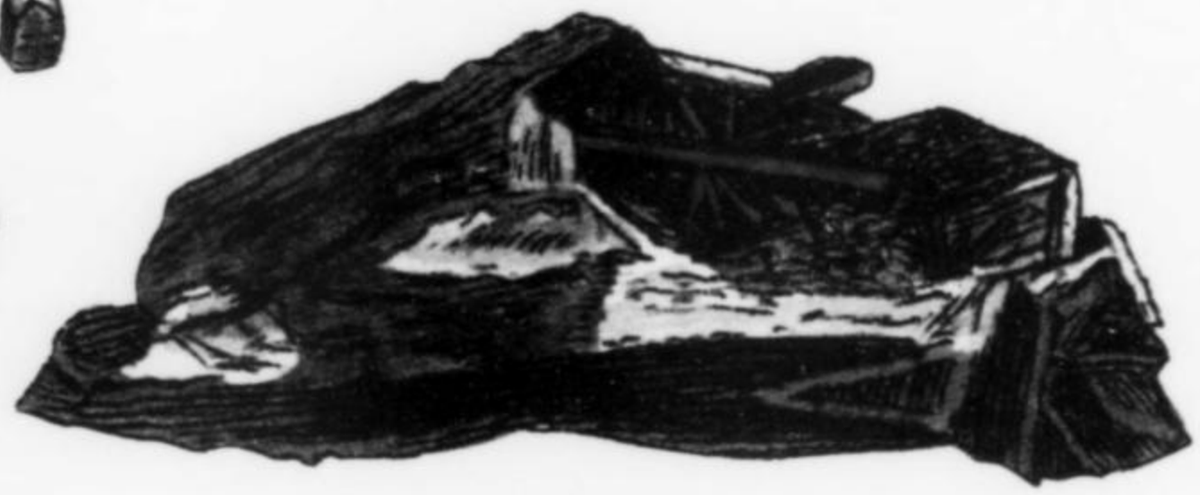
Nepheline
Vesuvius, Italy



Corundum
India and Burma

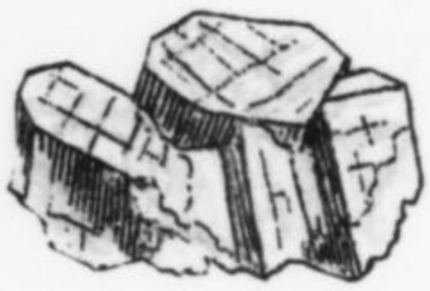




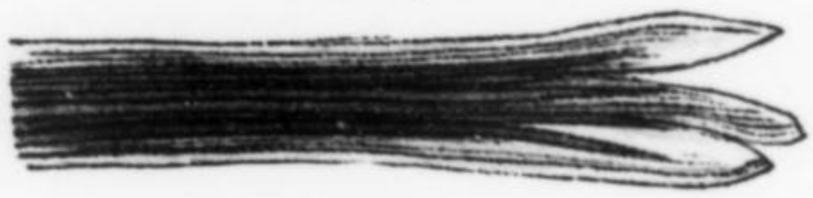


Kermesite
Saxony





Anhydrite
Saxony



Kermesite
Saxony

Chrysoberyl
Connecticut (?)







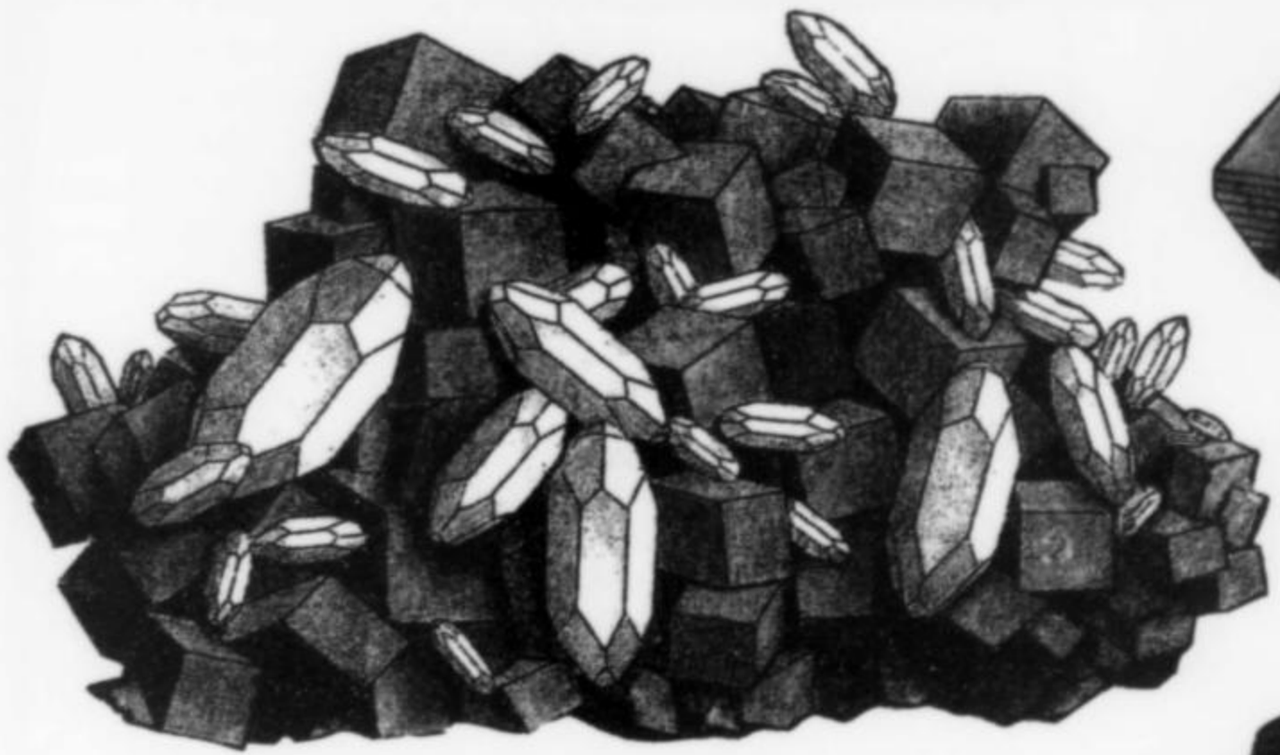


Meionite
Vesuvius, Italy

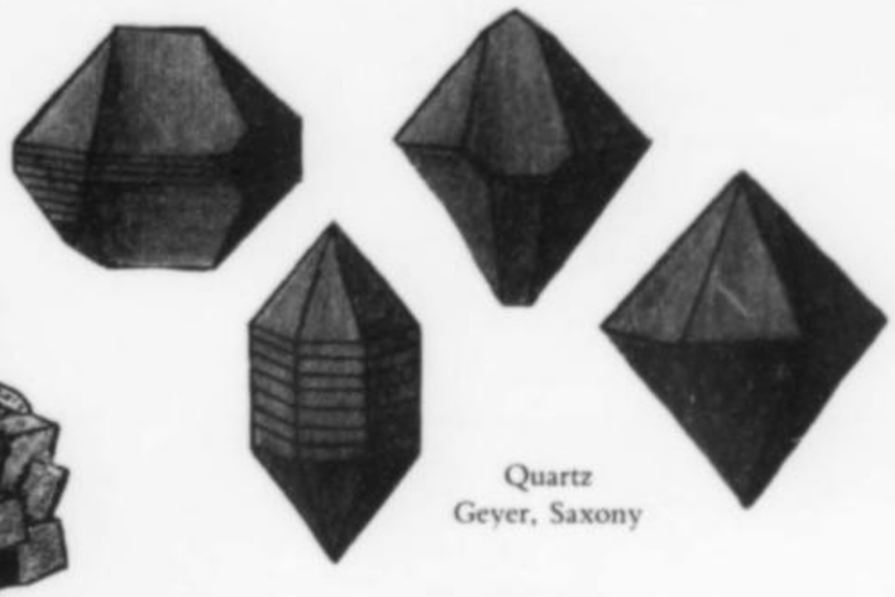


Ilvaite
Elba, Italy

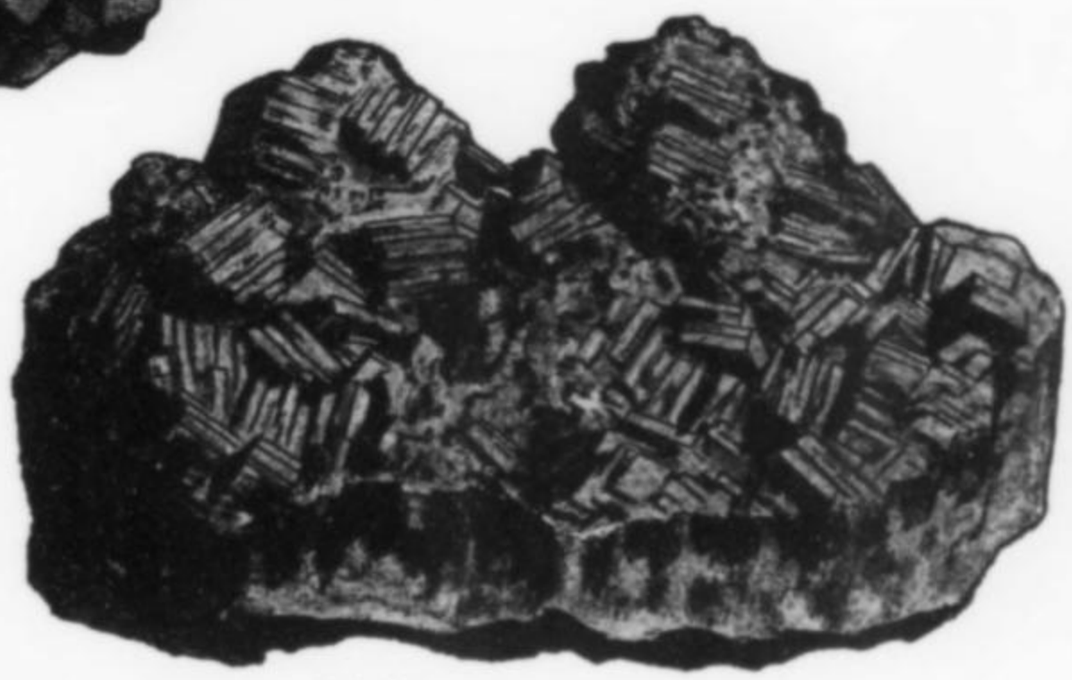
Specimens from the collection of **JACQUES de BOURNON**.



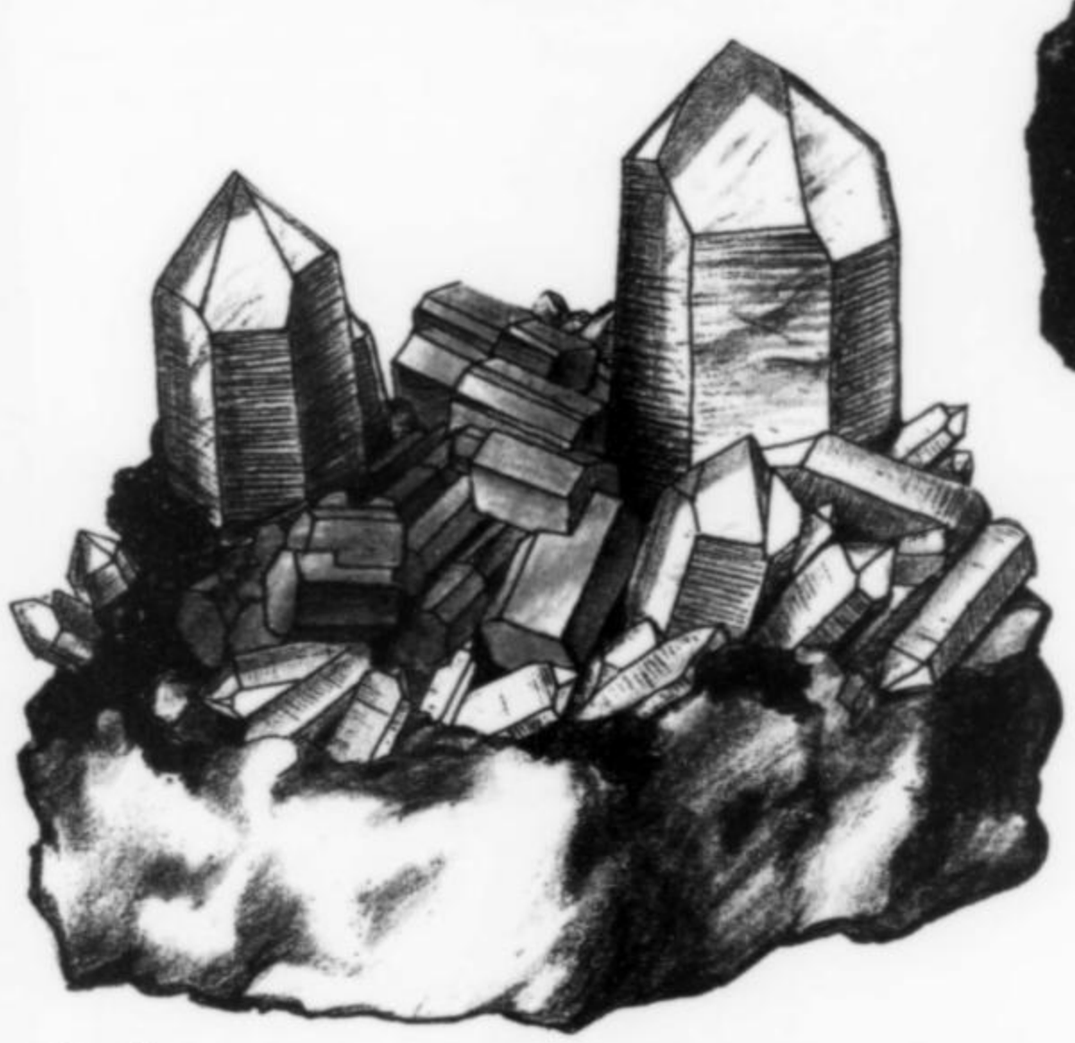
Fluorite with Calcite
Derbyshire, England



Quartz
Geyer, Saxony



Prehnite
Cape of Good Hope, South Africa



Emerald
Colombia



Apatite
Saxony



Topaz
Schneckenstein, Saxony

Specimens from the collection of **JEAN GIGOT d'ORCY**.

Ordre de mon Catalogue.

Métaux.

☉	Or.	page 1.
☽	Argent	15
♄	Etain	55
♄	Plomb	71
♀	Cuivre	147
♂	Fer et	231
♂	Pyritten	300
☿	Mercure	339
K	Cobalt	347
B	Bismuth	369
Zn	Zinc	371
♁	Antimoine	403
oo	Arsenic	419
G. S	Sélénite, Gypse et Pierre a plâtre	425
S	Spath calcaire et Spath perlé	433
S. S.	Spath Sélenitteux	457
S. P.	Spath phosphorique	481

Demi Métaux

Z. O.	Zéolite	501
Q	Cristal quartz	513
	agaten transparente	
	Opale	
	hydrophane, oeil du monde	
	Cacholong	
	Calcedoine	
	Cornaline	
	Sardaine	
	Caillou d'Egypte	
	Silex	
	Jaspe	
	Pierre arménienne	
	Chrisoprase	
	aventurine	
C. G	Gemmes 1er Ordre	557
	Savoir	
	Diamant	
	Rubis	
	Saphir	

1° Produits de Cristallisation

	Topaze d'orient	
	Rubis Spinelle et Balais	
	Chrysolite	
	Emeraude	
	Beril aigue Marine	
	ametthiste	
	Chrysolite du Brésil	
	hyacinthe	
	Gemmes 2de Ordre.	
G	Grenats	
S. h	Schorl asbeste et ami	
S. S	fels Spath	
	Pierre argilleuse	
M.	Mica	
	Talc	
	Stéatite	
	Roches mélangées	
	Savoir	
	Granite	
	Porphire	
	Serpentin	
	Roches feuilletées granitoide	
	granduleuse	
	Marbres primitifs	

2° Débris de Roches minéralisées ou amas de corps marins

3° Dépôts de matières non détériorés

	Brèches { dures / calcaires	
	Poudingues	
	Marbres coquilliers	
	Roches conglomerées	
	Schistes { argilleux / calcaires	
	Ardoises	
	Glaises	
	Craies	
	Marnes	
	Gravers et Sables	
B	Bitumen Houille, Charbon de terre, Tayes	681
♁	Souffres	619
L	Produits volcaniques	627

Contents pages from the manuscript catalog of **JEAN GIGOT d'ORCY**'s collection.

crystallographer and former assistant to Romé de l'Isle. Following Gigot d'Orcy's death it had been edited and cross-checked with the actual specimens by a prominent Parisian mineral dealer named Gaillard and an unknown mineralogist. The arrival of the Gigot d'Orcy and Razumovsky specimens in America excited great interest among New England mineralogists and their students who were periodically allowed access. A notice in the *Medical Repository* (1808) on "Gibbs's grand collection of minerals" had this to say:

> The collection of Mr. D'Orcy is particularly rich in the productions of the French mines: such as the phosphates, carbonates and molybdates of lead; the iron ores of Bangory, Framont, and the Isle of Elba; the silver of St. Maria and d'Allemont; the mercury of Deuxponts; a great variety of marbles, calcedonies and agates, quartz, calcareous, and other spars from France and different parts of Europe.

Gibbs ultimately sold his entire collection to Yale University in 1825. Gigot d'Orcy's original handwritten catalog is still preserved there. And, although most of the Gigot d'Orcy specimens have since lost their pedigree and disappeared into the general university collection, a few have recently been recognized by comparison with Gautier d'Agoty plates supplied by the Mineralogical Record Library.



Louis XIV

The Kings of France

Royal enthusiasm for mineralogy in France was an inspiration to collectors and mineralogists throughout the 18th century. It began with Louis XIV (1638–1715), who in 1671 issued an edict regulating the *Jardine du Roi* ("Kings Garden") and the royal pharmacy where medicinal plant and mineral specimens were kept. These officially became the *Cabinet du Roi* ("King's Cabinet") upon his death in 1715; under the regency of Philip of Orleans (1674–1723) it was organized by Bernard Jussieu (1699–1777) along the lines of the great 17th-century Italian collections.

Louis XV (1710–1774), who was only five years old when his father died, took an interest in the collection. He appointed the famous naturalist Georges Buffon (1707–1778) curator in 1739, and permitted Buffon to open the cabinet to the public in 1745.



A reconstruction of the pharmacy of Louis XIII, including minerals.

It thus became the first publicly accessible museum in Paris (after that of Bernard Palissy many years before), opened five years before the Louvre. Louis Daubenton, Buffon's deputy, took over primary responsibility for the mineralogical portion of the cabinet.

Louis XVI (1754–1793) retained Buffon and Daubenton after his accession to the throne in 1774, and continued to assist in building the collection. Having married the daughter of Austrian Emperor Francis I and Empress Maria Theresa, enthusiastic mineral collectors themselves, he received many mineral specimens from the Imperial Cabinet in Vienna. Important donations were also received from Catherine the Great of Russia (1729–1796), King Christian VII of Denmark (1749–1808), and various traveling naturalists. The private collections of Réné Réaumur (1683–1757) and Joseph Bonnier de la Mosson (1702–1744) were acquired in 1776–1779. Joseph Dombey (1742–1793) sent many specimens collected during his travels in Mexico and South America in 1779; many of these, including atacamite and euclase, became important research specimens. Déodat Dolomieu (1750–1801) sent zeolites from the Cyclopean Islands, and sulfur with celestine from Sicily. By the time of the Revolution, the King's Cabinet had grown to include about 2,600 mineral specimens.

The King's Cabinet was taken over by the new government of the Revolution, and was re-established in 1793 as the Museum of Natural History. Daubenton became the first professor of mineralogy at the new institution, to be succeeded in due course by Dolomieu and Haüy.

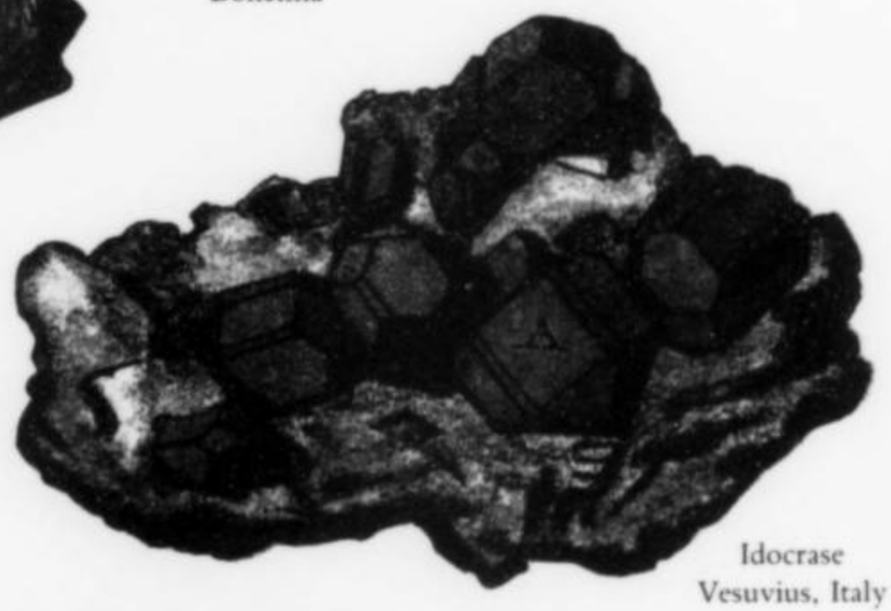
Many of the most important private mineral collections of 18th-century France were, in time, acquired by the Natural History Museum. Sage's collection was divided in 1825 between the Museum and the Paris School of Mines, which he had founded. Romé de l'Isle's important collection had been acquired following



Silver
Kongsberg, Norway



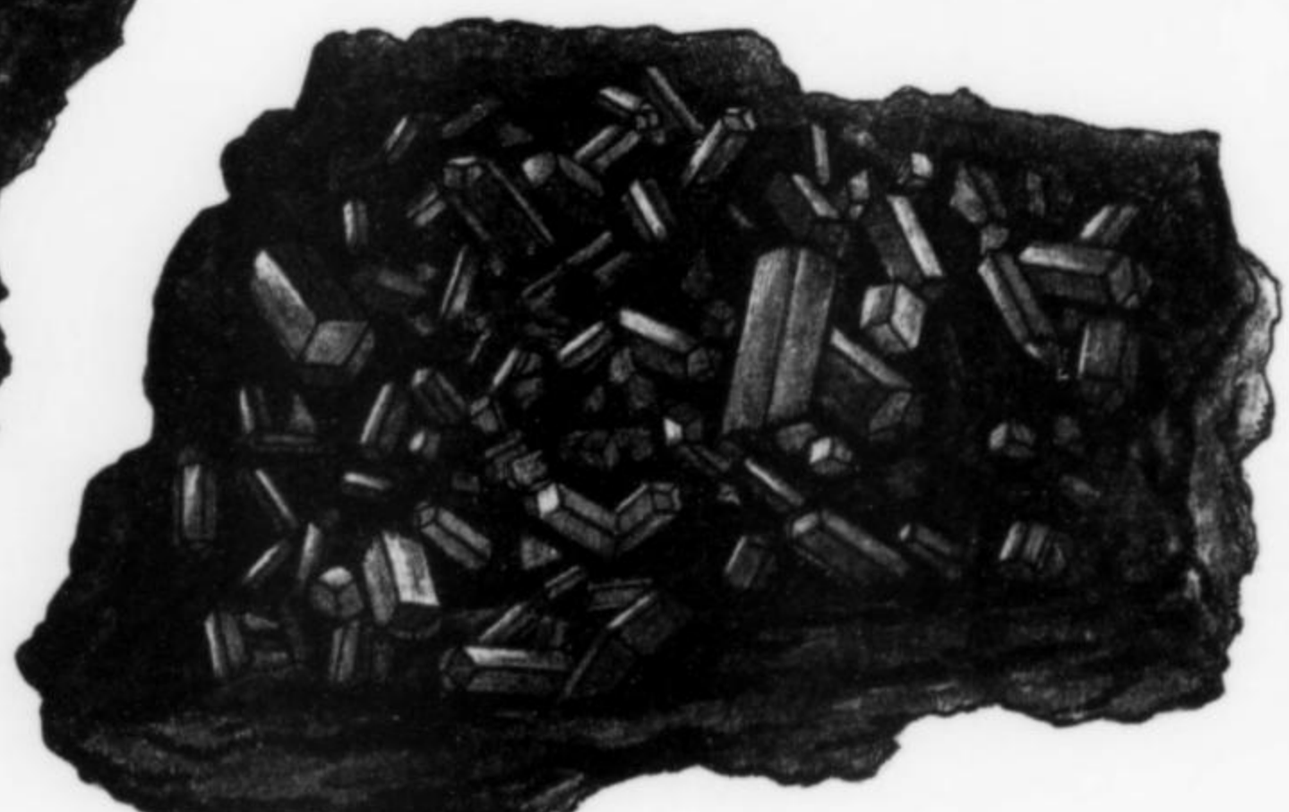
Pyrargyrite
St. Joachimsthal
Bohemia



Idocrase
Vesuvius, Italy

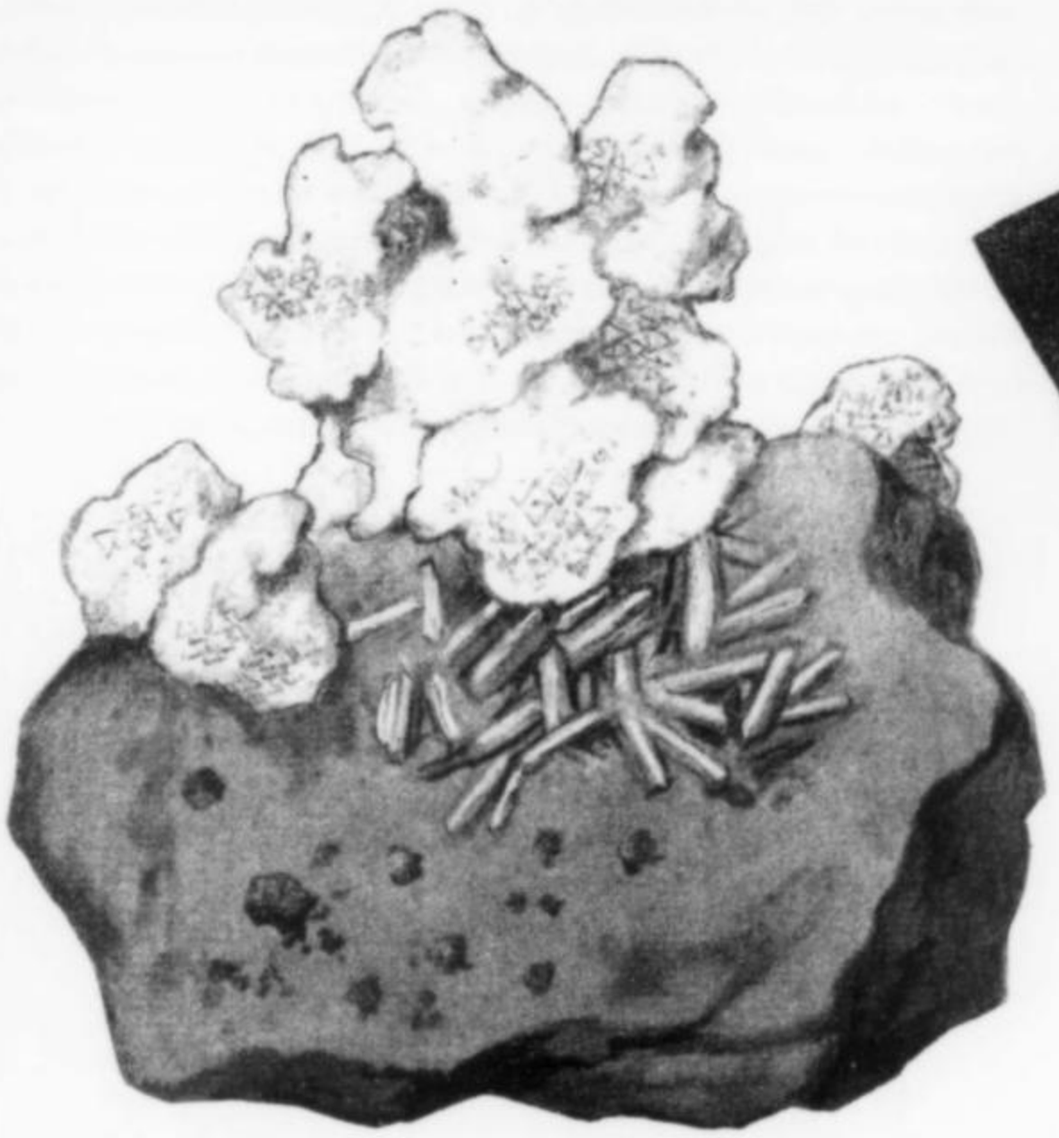


Cinnabar
Idria, Carniola

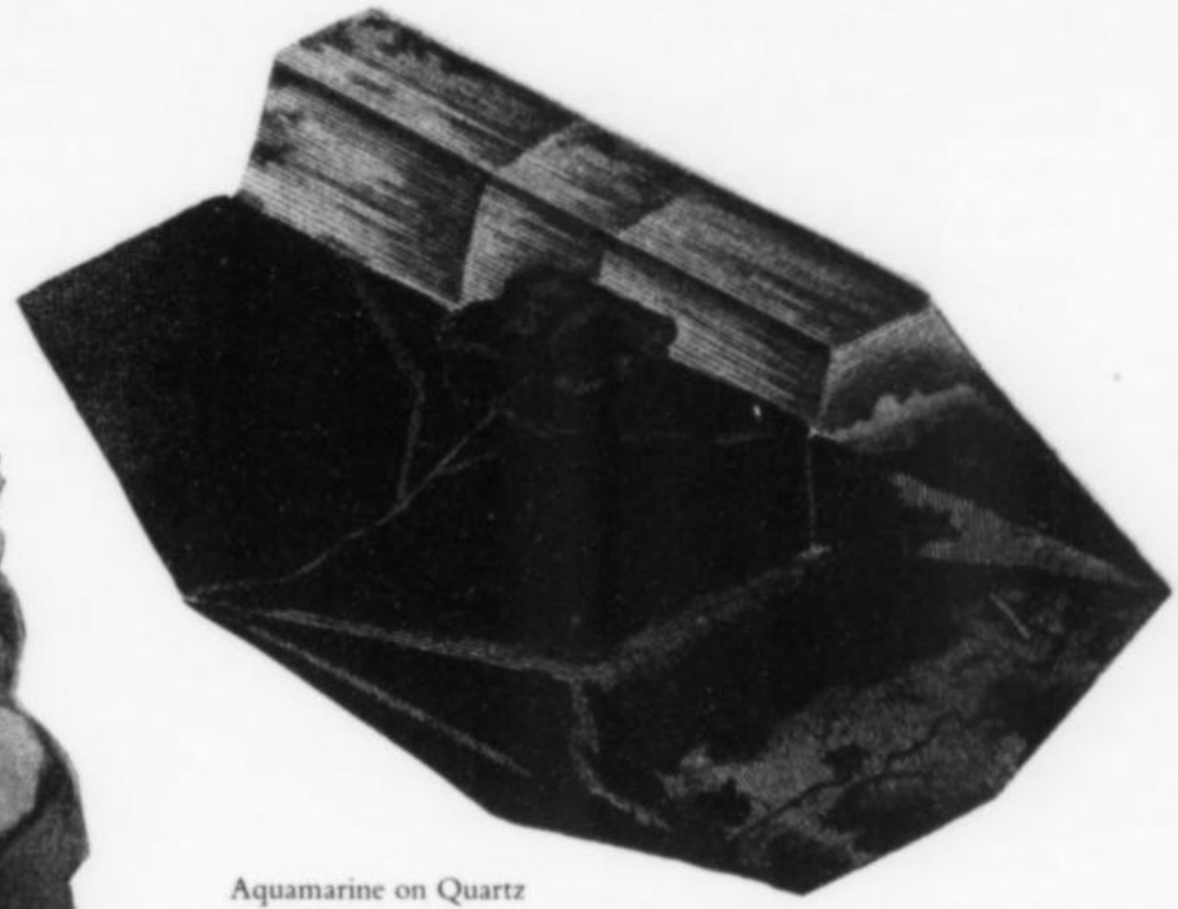


Cerussite
La Croix mine, Lorraine, France

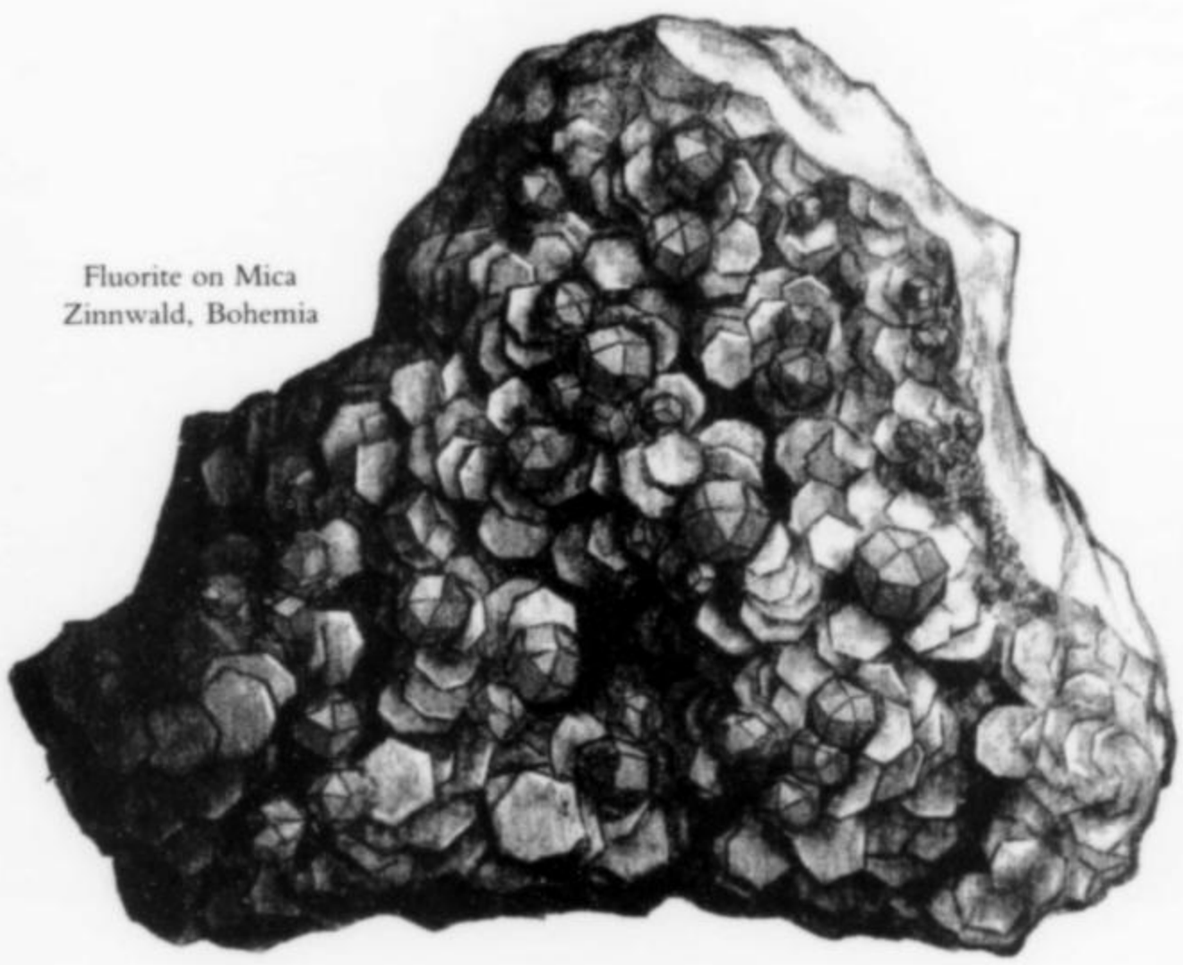
Specimens from the collections of **LOUIS XV** (silver), a gift from King **CHRISTIAN VII** of Denmark in 1770;
Abbé **NOLIN** (pyrargyrite, cerussite), **JEAN CRAMAYEL** (idocrase), and **GASPARD CAZE de la BOVE** (cinnabar).



Gold
probably Transylvania



Aquamarine on Quartz
Ural Mountains, Russia



Fluorite on Mica
Zinnwald, Bohemia



Copper
Siberia, Russia

Specimens from the collections of **GASPARD CAZE de la BOVE** and **EUGÈNE PATRIN** (copper, aquamarine).

his death in 1790 by Gillet de Laumont. Gillet de Laumont's 1,600 specimens (including Romé de l'Isle's) were purchased by the Museum in 1835. Haüy's mineral collection, sold by his niece to the Duke of Buckingham in 1823, was purchased from the Duke's heirs in 1848. At the same time, many of Europe's most prominent mineralogists and chemists, who had also begun their collections in the late 18th century, made frequent donations of mineral specimens. Minerals were received from naturalists such as Karl Ludwig Giesecke (1761–1833), Louis Leschenault de la Tour (1773–1826), Pierre Marcel de Serres (1780–1862), Louis Vauquelin, and many others.

Following the restoration of the Bourbons in 1814, Louis XVIII (1755–1824) welcomed his friend, the loyal expatriate Count de Bournon, back from voluntary exile in England. Louis had no doubt enjoyed the mineral cabinet of his brother, Louis XVI, prior to the Revolution. He had spent time with Bournon in England during the Napoleonic wars, and had studied mineralogy under Bournon's guidance. Back in Paris, Louis purchased Bournon's collection of nearly 23,000 specimens and installed Bournon as its new curator. Thus, for a few years, the King of France once more had a private mineral collection.

Bournon and Louis XVIII died in the same year, and the Natural History Museum was given most of his mineral collection.



Great Britain

The Beginnings of British Collecting

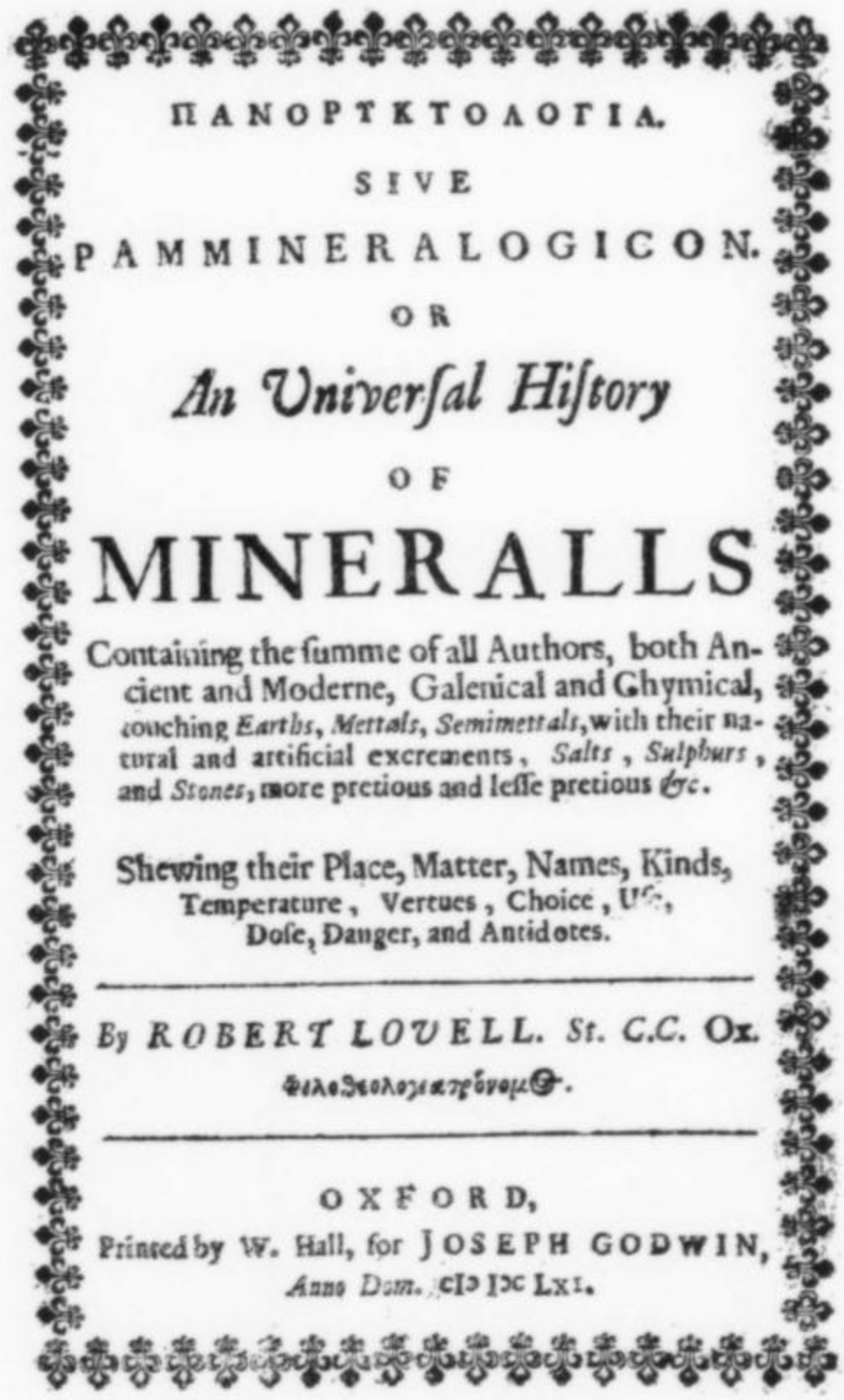
Great Britain is abundantly endowed with interesting mineral occurrences, and the ore deposits of the Cornish Peninsula, for example, are as rich in collectible minerals as the great mines of Saxony and Transylvania. It is therefore surprising that the inclination to collect minerals was so much delayed relative to the 16th-century beginnings in Europe. The marked disinterest shown by the Royal Families in building important cabinets of curiosities was probably a factor. And perhaps the scarcity of mineralogical references in English contributed to the situation. In any case, it was not until the latter part of the 17th century that British scholars began to supply the public with interesting works in the vernacular. Before that time, significant collections of minerals in Britain were almost unknown.

The physician William Harvey (1578–1657) is thought to have possessed some minerals in his geological collection, perhaps acquired in Italy during his studies under Galileo at Padua. Unfortunately his collection was destroyed by fire in 1666. The first two collections to gain any significant public exposure in England were those of John Tradescant Sr. (1587–1638) and Jr. (1608–1662), and Robert Hubert, which founded the collections of the Ashmolean Museum in 1677 and the Royal Society in 1678, respectively. Hubert claimed (in 1664) to have built his collection of minerals and curiosities "with great industry, cost, and thirty years' travel in foreign countries," so it was actually the product of continental influence rather than a home-grown collection.

Isaac Newton (1642–1727) had an early interest in minerals as well. He had read Browne's travels, describing many of the mining districts in central Europe, and decided to assemble a collection. In 1669, the year he was appointed a professor at Trinity College, Cambridge, Newton learned that a young friend of his, Francis Aston, would be making a tour of Europe. Newton wrote to Aston requesting that he bring back for him specimens of "antimony [and] of copper oare, [ores] of tin, of iron, of lead, of quicksilver, of lapis lazuli, and of zinck . . . with notes upon them shewing what oares they are & from whence they came."

These were not especially fine or comprehensive collections in any way. But they constituted a start, and scholars could at least get a look at some of the more common species at these institutions.

Several published works in English provided scholarly information on minerals at about this time, giving the public better access to the subject. Robert Lovell's *Panmineralogicon, or an Universal History of Mineralls* (1661), Christopher Merret's *Pinax rerum Naturalium Britannicorum (1666)*, John Webster's *Metallographia, or an History of Metals* (1671), Robert Plot's *Natural History of Oxford-shire* (1677), and *Natural History of Stafford-shire* (1686), and Nehemiah Grew's 1681 description of the minerals and other specimens in the collection of the Royal Society (*Musaeum Regalis Societatis*) all stimulated interest by bringing minerals within reach of the English-speaking scholar and amateur. In 1699 Edward Lhuyd published a catalog of the minerals and other specimens in the Ashmolean Museum, so that both of the first public collections in England were now officially documented.



ΠΑΝΟΡΥΚΤΟΛΟΓΙΑ.

SIVE

PAMMINERALOGICON.

OR

An Universal History

OF

MINERALLS

Containing the summe of all Authors, both Ancient and Moderne, Galenical and Chymical, touching *Earths*, *Mettals*, *Semimettals*, with their natural and artificial excrements, *Salts*, *Sulphurs*, and *Stones*, more pretious and lesse pretious &c.

Shewing their Place, Matter, Names, Kinds, Temperature, Vertues, Choice, Use, Dose, Danger, and Antidotes.

By ROBERT LOVELL. St. C.C. Ox.

Φιλοθεολογικῶς ὀνομῶ.

OXFORD,

Printed by W. Hall, for JOSEPH GODWIN,

Anno Dom. clɔ Iɔc Lxi.

Among the above-mentioned authors, at least Robert Plot (1640–1696) built a collection of rocks and minerals during the course of his research, and he left this collection to the Ashmolean Museum and the Royal Society (none of it survives). Robert Boyle (1627–1691), a prominent chemist and founding member of the Royal Society, also built a small collection of ores and minerals which he bequeathed to the society but, again, no specimens can be located today and little is known of its original composition. Robert Hooke (1635–1703), Professor of Geometry at Oxford and first curator of the Royal Society's collection, field-collected his own minerals on the Isle of Wight, beginning in 1665, and probably turned them over to the Society at some point as well.

By the end of the 17th century, London abounded in all sorts of private museums and collections of curiosities and rarities. These usually included some minerals and fossils, but generally not in any real scientific context. That was to change with John Woodward and William Borlase. And, although Sir Hans Sloane's enormous collection was more general in character, it was more intelligently organized and built than its predecessors (many of which it absorbed).

From that time forward, superb collections of minerals blossomed in Great Britain. Mineralogists, mineral dealers, scholars and antiquarians accounted for the majority of the collections, but medical men were nearly as important. Artists in particular were drawn to mineral collecting, along with a few clergymen, businessmen, barristers and government officials. The middle aristocracy had an interest here and there, but the high nobility in England from the 18th century right up to the present day, has almost universally shunned the collecting of minerals. Mineral collecting in Britain retained a consistent attraction for the middle class predominantly, an attraction that was to grow into a virtual mania for botanical and zoological collecting in the 19th century.

England

Hans Sloane (1660–1753)

Hans Sloane, one of the greatest generalist collectors of all time, was born in Killyleagh, County Down, Ireland. He was the seventh and youngest son of a Scotsman who had moved to Ireland as part of an English colonization program. Always of rather frail constitution, and restricted from boisterous activities, he developed an early interest in the study of natural history.



Sloane

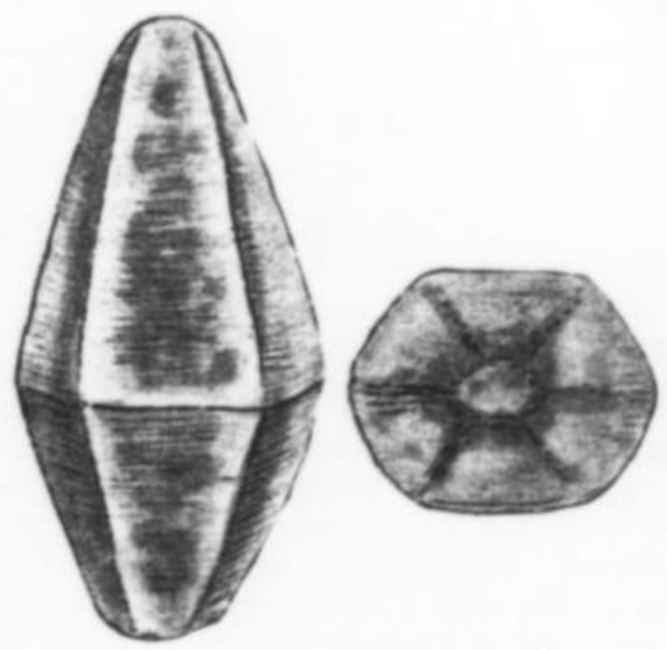
At the age of 19 Sloane traveled to London to pursue his studies in botany, chemistry and medicine. Boarding in the house of a chemist, he studied botany at the Apothecaries' Garden in Chelsea, and soon came to the notice of John Ray (1627?–1705; eventually to become known as "the father of English natural history") and the prominent physicist and chemist Robert Boyle (1627–1691); they all became fast friends.

After four years in London Sloane traveled to Paris and Montpelier to complete his medical schooling, receiving his M.D. at the University of Orange in 1683. It was at Montpelier that he first made the acquaintance of William Courten (1642–1702), who at that time had already assembled a massive and fascinating collection of curiosities and rarities, in part inherited from his father, William Courten (ca. 1600–1655) and grandfather Sir William Courten (1572–1636). William (III) had lived in England up until 1670, but had then spent 14 years abroad indulging his interests in science and collecting. In 1684 Courten returned to London and opened his extraordinary collection to public view; it was at that time said to be worth £50,000.

Sloane also returned to London in 1684, bringing along many rare plants and seeds acquired in France. He entered into medical practice and immediately became successful. He was elected a Fellow of the Royal Society in 1685, and a Fellow of the Royal College of Physicians in 1687. Still young and harboring a zest for more travel, Sloane joined an expedition to Jamaica as chief physician for the Duke of Albemarle, Governor of the West Indies. He spent 15 months there tending the sick and collecting local minerals, plants and animal specimens which would later form the basis for his two-volume *Natural History of Jamaica*.

Back in London, he settled in permanently to practice medicine and build his collections. John Evelyn visited him in 1691 and admired his Jamaican specimens. In 1695 Sloane married Elizabeth Langley, whose ample fortune augmented his own earnings as a successful physician.

In 1702 his friend William Courten died, leaving to Sloane his entire museum, said to include over 10,000 mineral specimens. John Evelyn listed some of Courten's holdings in a description published posthumously in 1786:



Corundum specimen from the collection of
SIR HANS SLOANE.

> . . . miniatures, drawings, shells, insects, medailes, natural things, animals [preserved in alcohol], minerals, precious stones, vessells, curiosities in amber, christal, achat, &c., all being very perfect and rare of their kind . . .

Sloane was also well acquainted with the London naturalist and collector James Petiver (1663–1718), another friend of John Ray. Petiver was a pharmacist with a good practice, although he is known to have advertised some quack nostrums. He corresponded with naturalists all over the world, and was an ardent collector of curiosities. His methods of acquisition included furnishing ships' captains with lists of things he would be willing to buy from them, should they come across curiosities during their far-flung travels. Petiver was known for his wide knowledge of natural history, and was a recognized authority on the plant life of the London area. But his collections, which included many minerals, were always in a state of confusion. On at least one occasion he served as Sloane's agent, traveling to Leiden in 1711 to buy for Sloane the collection of Dr. Hermann. When Petiver died Sloane bought his collection for £4,000.

It took Sloane seven years to complete the sorting, arranging and cataloging of Petiver's collection, along with his own and Courten's. In the second volume of his *Natural History of Jamaica* (1725) he gives a synopsis of his holdings: 49,117 catalogued items of all sorts. By 1748 that number had risen to more than 200,000.

Sloane's professional life was filled with honors; in 1727 he was elected President of the Royal Society, succeeding Isaac Newton in that position. He was an honorary member of the Royal Academy of Sciences in Berlin, and was elected to the Academies of Madrid and St. Petersburg in 1735. In 1752, just a year before his death, he was also elected an honorary member of the Royal Academy of Sciences in Göttingen. Sloane, by all accounts, was tall, good-looking, and blessed with a charming manner and a talent for medical diagnosis. He also appears to have been the inventor and first marketer of milk chocolate. But he wrote little on minerals, and gave but scarce attention to learning about them. He died painfully in 1753, after a long period as an invalid.

In his will Sloane set the selling price of his collections (for the benefit of his two daughters) at £20,000, although he had paid over £50,000 for them. The estate was to be offered first to the British Government, in hopes that it would be kept intact as a public museum. The Government turned the fund-raising project over to an unscrupulous adventurer, who succeeded in fraudulently raising £100,000 through the sale of bogus shares in Sloane's name. The money problem thus solved, an Act of Parliament was passed in 1753 authorizing the purchase, and in time Sloane's collections formed the foundation for the British Museum, opened in 1759.

Sloane's mineral specimens were numerous but apparently very mediocre. His executors in 1753 noted among his inventory the following categories and numbers of specimens:

Precious stones, agates, jaspers, etc.	2,256
Crystals, spars, etc.	1,864
Metals, ores, etc.	2,725
Earths, sands, salts, etc.	1,035
Bitumens, sulfurs, ambers, etc.	399
Talcs, micas, etc.	388
Asteriae, trochi, entrochi, etc.	241
	8,908

In addition he had 542 carved vessels of agate and jasper, and 1,275 fossils, flints and stones, bringing the earth science total to 10,725, about as many as might be expected from the Courten and Petiver collections combined. So it seems clear that Sloane did not pursue mineralogical acquisitions on his own to any great extent. He also owned about 32,000 numismatic items, 2,093 antiquities, 19,788 shells, fish, birds, animals and human anatomical preparations, 12,840 botanical specimens, over 2,000 miscellaneous items and instruments, 347 volumes of drawings and illuminated manuscripts, 3,516 other manuscripts, and about 46,000 printed books.

In 1803 the British Museum held an auction sale, disposing of 2,000 duplicates and unwanted mineral specimens; in 1816 another 1,700 specimens were sold. Many of these are known to have come from the Sloane collection. At the same time, many essentially worthless specimens (e.g. "a flint resembling a macaroon

From *The Gentleman's Magazine*, London, vol. XVIII, July, 1748.

Prince and Princeſs of Wales *viſit Sir* Hans Sloane.

An Account of the Prince and Princeſs of Wales *viſiting Sir* Hans Sloane.

DR *Mortimer*, ſecretary to the Royal ſociety, conducted their Royal Highneſſes into the room where Sir *Hans* was ſitting, being antient and infirm. The Prince took a chair and ſat down by the good old gentleman ſome time. when he expreſſed the great eſteem and value he had for him perſonally, and how much the learned world was obliged to him for his having collected ſuch a vaſt library of curious books, and ſuch immenſe treaſures of the valuable and inſtructive productions of nature and art. Sir *Hans's* houſe forms a ſquare of above 100 feet each ſide, incloſing a court; and three front-rooms had tables ſet along the middle, which were ſpread over with drawers fitted with all ſorts of precious ſtones in their natural beds, or ſtate as they are found in the earth, except the firſt, that contained ſtones formed in animals, which are ſo many diſeaſes of the creature that bears them; as the moſt beautiful pearls, which are but warts in the ſhell fiſh; the *bezoars*, concretions in the ſtomach; and ſtones generated in the kidneys and bladder, of which man woefully knows the effects; but the earth in her boſom generates the verdant *emerald*, the purple *ametbiſt*, the golden *topaz*, the azure *ſapbire*, the crimſon *garnet*, the ſcarlet *ruby*, the brilliant *diamond*, the glowing *opal*, and all the painted varieties that *Flora* herſelf might wiſh to be deck'd with; here the moſt magnificent veſſels of cornelian, onyx, ſardonyx and jaſper, delighted the eye, and raiſed the mind to praiſe the great creator of all things.

When their Royal Highneſſes had view'd one room and went into another, the ſcene was ſhifted, for, when they returned, the ſame tables were covered for a ſecond courſe with all ſorts of *jewels*, poliſh'd and ſet after the modern faſhion; or with *gems* carv'd or engraved; the ſtately and inſtructive remains of antiquity; for the third courſe the tables were ſpread with *gold* and *ſilver ores*, with the moſt precious and remarkable ornaments uſed in the *habits* of men, from *Siberia* to the Cape of *Good Hope*, from *Japan* to *Peru*; and with both ancient and modern *coins* and *medals* in gold and ſilver, the laſting monuments of hiſtorical facts; as thoſe of a *Pruſias*, king of *Bithynia*, who betray'd his allies; of an *Alexander*, who, mad with ambition, over-run and invaded his neighbours; of a *Cæſar*, who inſlaved his country to ſatisfy his own pride; of a *Titus*, the delight of mankind; of a Pope *Gregory* XIII. recording on a ſilver medal his blind zeal for *religion*, in perpetuating thereon the *maſſacre* of the *proteſtants* in *France*; as did *Charles* IX. the then reigning king in that country; here may be ſeen the coins of a *king* of *England*, crown'd at *Paris*; a medal repreſenting *France* and *Spain*, ſtriving which ſhould firſt pay their obeiſſance to *Britannia*; others ſhewing the effect of popular rage, when overmuch oppreſſed by their ſuperiors, as in the caſe of the *De Witts* in *Holland*; the happy deliverance of *Britain*, by the arrival of King *William*; the glorious exploits of a Duke of *Marlborough*, and the happy arrival of the preſent illuſtrious *royal family* amongſt us.

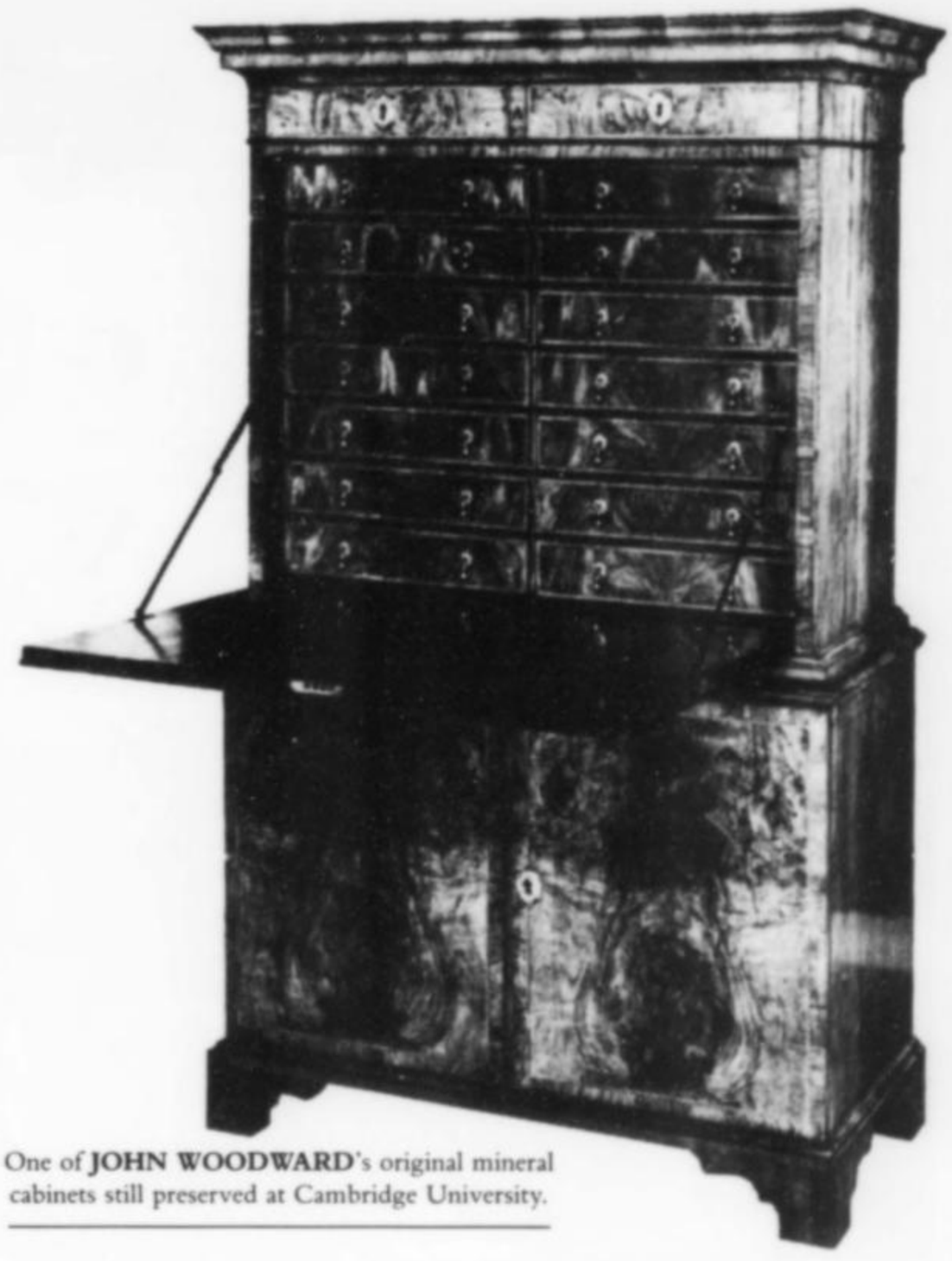
The gallery, 110 feet in length, preſented a moſt ſurpriſing proſpect; the moſt beautiful *corals*, *cryſtals*, and figured ſtones; the moſt brilliant *butterflies*, and other inſects, *ſhells* painted with as great variety as the precious ſtones, and feathers of *birds* vying with gems; here

Their *royal bighneſſes* were not wanting in expreſſing their ſatisfaction and pleaſure, at ſeeing a collection, which ſurpaſs'd all the notions or ideas they had formed from even the moſt favourable accounts The Prince expreſs'd the great pleaſure it gave him to ſee ſo magnificent a collection in *England*, eſteeming it an ornament to the nation; and expreſſed his ſentiments how much it muſt conduce to the benefit of learning, and how great an honour will redound to *Britain*, to have it eſtabliſhed for publick uſe to the lateſt poſterity.

biscuit") were simply discarded. By 1883, when the British Museum got around finally to cataloging their older specimens, the history of most pieces remaining had been lost, and only about 370 mineral specimens were thought with any certainty to have been Sloane's. An attempt to refine the history of the collections in 1933 succeeded in identifying only 161 original Sloane specimens.

Three of Sloane's catalog volumes deal with mineralogical materials, and are preserved in the British Museum Library. Among his sources, in addition to Courten and Petiver, he lists Robert Boyle, William Cavendish (The Duke of Devonshire; 1640–1707), Robert Hooke (1635–1703), Robert Plot (1640–1696), Ralph Thoresby (1658–1725), John Woodward (1665–1728), and the American John Winthrop (1681–1747). Of the 2,725 specimens of metallic minerals, only a columbite specimen obtained from Winthrop (from which the element columbium—now called niobium—was first isolated) is still identifiable today.

Being a physician by profession, Sloane had a particular interest in minerals of pharmaceutical value. In 1931 two drawers of "mineral oddments" were discovered among Sloane's botanical/medicinal materials in the Department of Botany. These hundred specimens or so can be added to the known remains of the Sloane mineral collection, although their quality as specimens is of the lowest order. It was not until the British Museum acquired the collections of Charles Greville (1749–1809), Charles Hatchett (1765–1847), and Clayton Cracherode (1730–1799), among others, that any degree of quality in the mineralogical collection was achieved. These late acquisitions no doubt inspired the discarding of even more Sloane specimens as worthless duplicates. But the Sloane collection did serve to establish Parliamentary support for the British Museum, and served as a basis for building and upgrading what is today considered one of the world's greatest public collections of minerals.



One of **JOHN WOODWARD**'s original mineral cabinets still preserved at Cambridge University.

John Woodward (1665–1728)

Among the most important early British mineral collectors was John Woodward (1665–1728). He had left school at the age of 16 to become a linendraper's apprentice in London. But he somehow made the acquaintance of Dr. Peter Barwick, physician to Charles II, in 1684. Barwick decided to sponsor the young Woodward through medical school, and took him into his own household. In 1692 he was elected Professor of Medicine at Gresham College in London, was made a Fellow of the Royal Society in 1693, and was awarded his M.D. by the University of Cambridge in 1695.

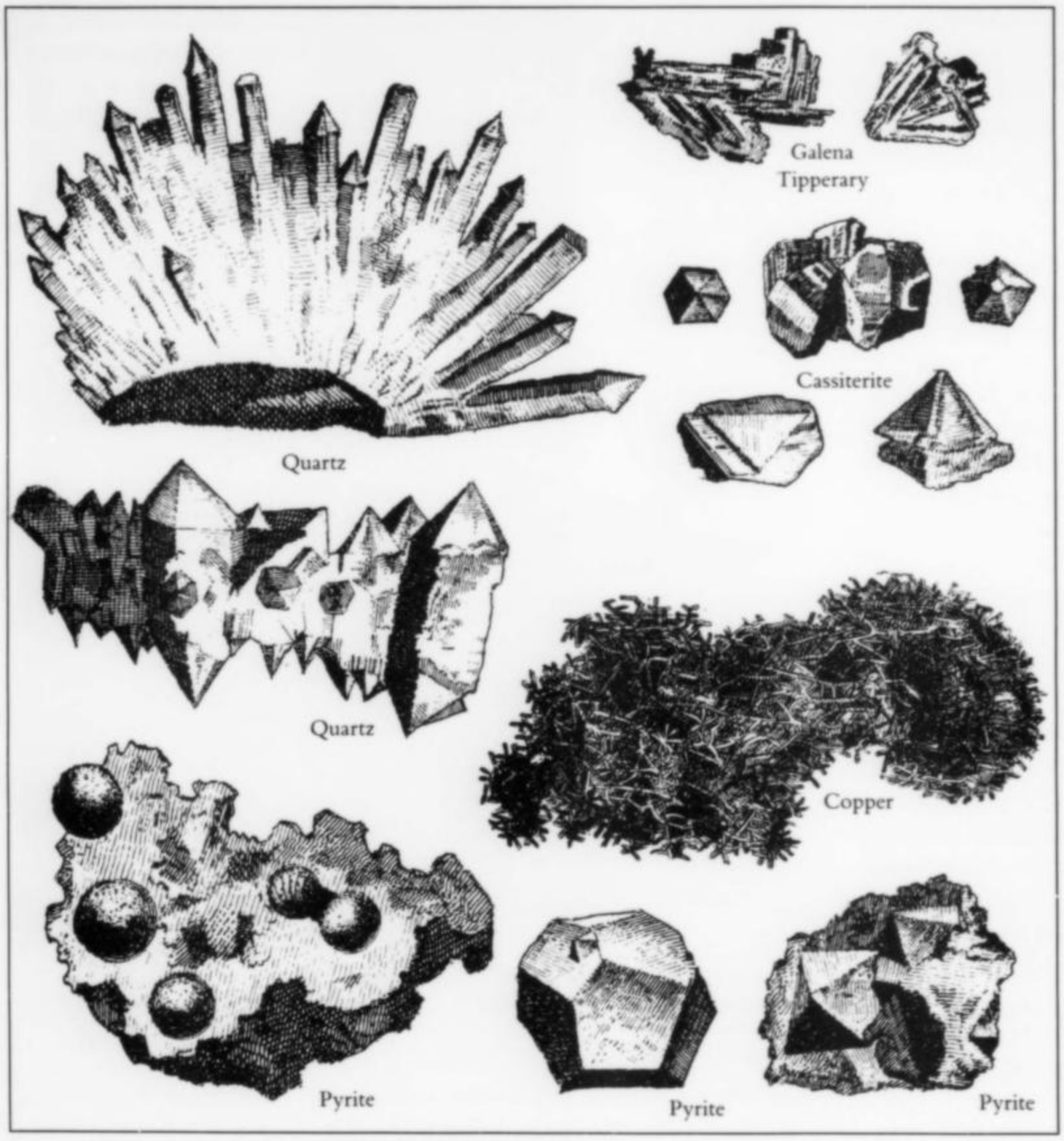
He writes of having found his first specimen in a gravel pit near some new construction going on in London in 1688: " 'Twas the first stone I ever took notice of or gathered." He then went to examine the stone quarries around the Sherborne estate of Barwick's son-in-law, Sir Ralph Dutton, in Gloucestershire. He subsequently began traveling throughout England collecting minerals and rocks, and gathering information for his first geological work: *An Essay toward a Natural History of the Earth* (1695). Field collecting remained a passion for him long after he became established in his position at the College.

In addition to his own extensive field collecting, Woodward purchased specimens that came on the market, and paid assistants to go out on collecting expeditions on his behalf. He maintained contact with a wide range of diplomats, merchants, ship captains and other travelers at home and abroad, badgering them for donations of specimens. A major acquisition was the collection sold to him in 1717 by the Sicilian naturalist, Agostino Scilla (1639–1700). He also obtained American specimens from John Winthrop and Cotton Mather, and 278 Swiss specimens from the Zürich naturalist Johann Jacob Scheuchzer. By 1724 Woodward's systematic collection had grown to include over 6,800 English specimens and over 2,500 foreign minerals and fossils.

The geographic representation of his collection covered virtually all of England and a remarkable range of foreign localities. The great mining areas of Germany, Hungary and Bohemia account for the majority of the specimens, but he also had numerous examples from Switzerland, France, Spain, Scandinavia, Russia, the Middle Eastern countries, China, India, Tibet, Japan, Burma, Borneo, and North and South America. His catalogs list 151 people as sources for specimens he was not able to collect on his own, including such colorful entries as Captain William Dampier, "bucaneer, pirate and circumnavigator," Sir Isaac Newton, and the famous British architect, Sir Christopher Wren.

As in the Tradescant and Hubert collections, Woodward's minerals were neither very rare nor attractive in comparison to the standards of later collectors such as Sowerby and Romé de l'Isle. But, unlike his contemporaries, Woodward built a thorough, purposeful, intelligently arranged mineralogical collection rather than a haphazard accumulation subordinated to botanical, zoological and ethnographic curiosities.

Woodward collected minerals in a more systematic and specialized way than any of his compatriots had up to that time. He made a point of not seeking out only the extraordinary or abnormal examples, but also the commonplace minerals that would make a truly representative and comprehensive collection. " 'Tis not well," he wrote, "that Gentlemen that have not duly inform'd themselves of Things the most obvious and common, should take upon them to write of those that are the most abstruse and difficult." He took great care to accurately record specimen localities and other details of occurrence, holding in deep disdain other collectors who failed to be as meticulous. For these reasons Woodward is considered to be "the first truly scientific collector of geological objects" in England.



Cornish (and Irish galena) specimens from the collection of **WILLIAM BORLASE**.

THE
NATURAL HISTORY
OF
CORNWALL.

THE
Air, Climate, Waters, Rivers, Lakes, Sea and Tides;
Of the Stones, Semimetals, Metals, TIN, and the Manner of Mining;
The CONSTITUTION of the STANNARIES;
IRON, COPPER, SILVER, LEAD, and GOLD, found in CORNWALL.
Vegetables, Rare Birds, Fishes, Shells, Reptiles, and Quadrupeds:
Of the INHABITANTS,
Their Manners, Customs, Plays or Interludes, Exercises, and Festivals;
the CORNISH LANGUAGE, Trade, Tenures, and Arts.

Illustrated with a new Sheet MAP of the COUNTY, and Twenty-Eight Folio Copper-Plates from ORIGINAL DRAWINGS taken on the Spot.

By WILLIAM BORLASE, A.M. F.R.S.
Rector of LUDGVAN, and Author of the ANTIQUITIES of CORNWALL.

---------- *Natale solum dulcedine cogens*
Ducit.

OXFORD,
Printed for the AUTHOR, by W. JACKSON:
Sold by W. SANDBY, at the Ship in *Fleet-Street* LONDON; and the Booksellers of OXFORD.
MDCCLVIII.

Because he relied so heavily on less educated people for his specimens, and because of the lack of knowledge and low level of collecting sophistication in England at that time, Woodward wrote and published a detailed guide for people to use when "collecting, preserving, and sending over natural things" (1696). In 1728 he published his own attempt at a systematic mineralogy: *Fossils of all Kinds Digested into a Method*. Finally, immediately following his death, in 1728 and 1729, his *Catalogue of the English Fossils in the Collection of John Woodward* was published, listing also his foreign minerals.

Woodward left his four beautifully made wooden cabinets, most of his minerals and his catalog (along with funds for their upkeep) to Cambridge University, where they have been preserved almost perfectly intact in the Sedgwick Museum. His collection of foreign and duplicate English minerals was auctioned in 1728.

William Borlase (1696–1772)

The Rev. William Borlase was the first Cornishman to assemble a significant mineral collection. He was born in Cornwall to an old Norman family, and attended medical school at Exeter College, Oxford, where he earned his B.A. and M.A. degrees. He was ordained a deacon in 1719 and a priest in 1720, following which he took the position of Rector in the parish of Ludgvan near Penzance. There he developed an interest in the natural history and antiquities of the surrounding area. He wrote in an autobiographical letter:

> At times I collected mineral and metallic fossils, with which the rich copper-works of the late Earl of Godolphin, in Ludgvan parish, fortunately enabled me with the greatest ease to gratify my friends at home and abroad. . . . I received such information on the productions of the Cornish mines, as encouraged me now first to think of studying the . . . structure and properties of the so much commended fossils . . .

Borlase was surely among the most generous of collectors, readily giving out specimens to all who asked, and apparently collecting more in the field as necessary over many years. He also undertook a study of the archeological monuments and ruins of Cornwall. His work was assisted and encouraged by two wealthy local patrons: Rev. Edward Collins and Sir John St. Aubyn (died 1772; father of the famous Cornish mineral collector of the same name).

In 1735 Borlase received a request for specimens from one of his medical mentors, John Andrew, who was at that time in Leiden studying medicine under the famous physician Hermann Boerhaave and chemistry under Johann Gronovius. Andrew wrote:

> I am become fond of chemistry, and the taste I have for it has frequently led me into Boerhaave's and the Professor of Chemistry's [Gronovius's] company, who have frequently showed me their collections of rarities, which I find very deficient in metals and minerals; and this defect, presuming upon your granting the favor I am now going to desire, I have promised to supply. It will be in your power in one morning's time to get a better collection of [metals

> and minerals] than this whole university can furnish out. Pray send me a little box, with as great a variety as you can get. Wrap every species by itself, and write upon the back the name it's called by among the tinners.

Borlase complied by sending three shipments of minerals to Leiden, including native copper and a variety of copper minerals, pyrite, cassiterite, lead minerals and some beautiful Cornish quartz crystals. Andrew divided the specimens between Boerhaave, Gronovius, and Linnaeus (who was there on an extended visit). Gronovius was "quite transported" with joy over the specimens, and Linnaeus confessed that he had never seen such a fine group of specimens.

His other medical friend, William Oliver, wrote Borlase in 1739 with a request on behalf of Alexander Pope (1688–1744), one of the foremost literary figures in England. Pope was constructing a fanciful tunnel or grotto on his estate, and wished to line the walls with beautiful mineral specimens set in mortar. Borlase must have been at least momentarily taken aback to read Oliver's request:

> I beg, therefore, that you will spare no cost in collecting a quantity, three or four tons[!], of the finest spar [calcite and fluorite], mundick [pyrite], copper and tin ores, which you shall judge proper for such a work, and let them be packed up in hogsheads [barrels], and sent to London by one of the tinships.

Borlase ultimately sent four shipments of large Cornish specimens to Pope for his project, and Pope emblazoned Borlase's name in gold letters inside the completed grotto. Pope's residence was demolished in 1807, but the grotto apparently still survives in a deteriorated state.

Another correspondent was Emanuel Mendes da Costa (1717–1791), a London mineralogist of Portuguese Jewish descent who first wrote to Borlase in 1748. Borlase welcomed the correspondence, assisted him with questions on mineralogy, and sent da Costa the first of many boxes of Cornish mineral specimens. Da Costa spent much of the summer of 1749 in Cornwall studying the local minerals and mines, while staying with Borlase at the Rectory.

Among the most celebrated naturalists to visit Borlase was Thomas Pennant (1726–1798). They first met in 1746 when Pennant was still an undergraduate. Borlase introduced Pennant to the study of minerals and gave him a small selection of specimens which awakened his interest. In later years they exchanged correspondence and more mineral specimens.

In 1758 Borlase brought his years of research to publication in *The Natural History of Cornwall*, half of which he devoted to mineralogy, geology and mining. The work includes many engravings of mineral specimens in his collection, prepared from his own drawings. In that same year he turned over the cream of his collection to the Ashmolean Museum at his beloved Alma Mater, Oxford, including every specimen described in his book. These were received with thanks and placed in a glass cabinet. In the following years he continued to send the best specimens he could find to further enrich this display. Unfortunately, not a single Borlase specimen entrusted to the Ashmolean has survived.

Despite the depletion of his collection by the donation of his best specimens to the Ashmolean, Borlase continued to supply minerals to other interested collectors. In 1761 he provided large pieces to decorate another grotto, this one being built by Earl Tilney. In 1765 he sent more specimens to da Costa, part of which were for the collection of the Royal Society. In 1768 he exchanged minerals with Gustaf von Engström (1738–1815), the Swedish chemist, who was then just beginning to build his own collection. In that same year Borlase filled a request for some Cornish minerals from no less a worthy than the young Queen Charlotte (1744–1818). He sent 19 specimens of pyrite, 19 of copper minerals, 20 cassiterites, four lead minerals, three iron ores, 12 quartz crystals, four examples of steatite and two of actinolite. This small collection survives today in the possession of the British Royal Family.

During the late 1760's Borlase also corresponded and exchanged specimens with his cousin, William Pryce (1735–1790), a mine surgeon at Redruth. Pryce was engaged in studies of his own which led ultimately to the publication of his famous work on Cornish mining and minerals, *Mineralogia Cornubiensis* (1778).

Even in his last days Borlase continued to distribute mineral specimens. In April of 1771, following a bout with illness, he is known to have sent a selection of minerals to Colin MacKenzie (1723–1775), a physician and mineral collector in London. Thereafter, however, he was more or less unable to oblige his many friends and correspondents with specimens. He died at the end of August, 1772. What remained of his mineral collection he bequeathed to his young grandson William, "the companion and pupil of his old age." The specimens ("worth ten guineas at least"), along with his manuscripts, bound correspondence, drawings and prints, many rare and valuable books, and his scientific instruments, were to be sold by the executors to provide a liberal education for the boy.



Bute

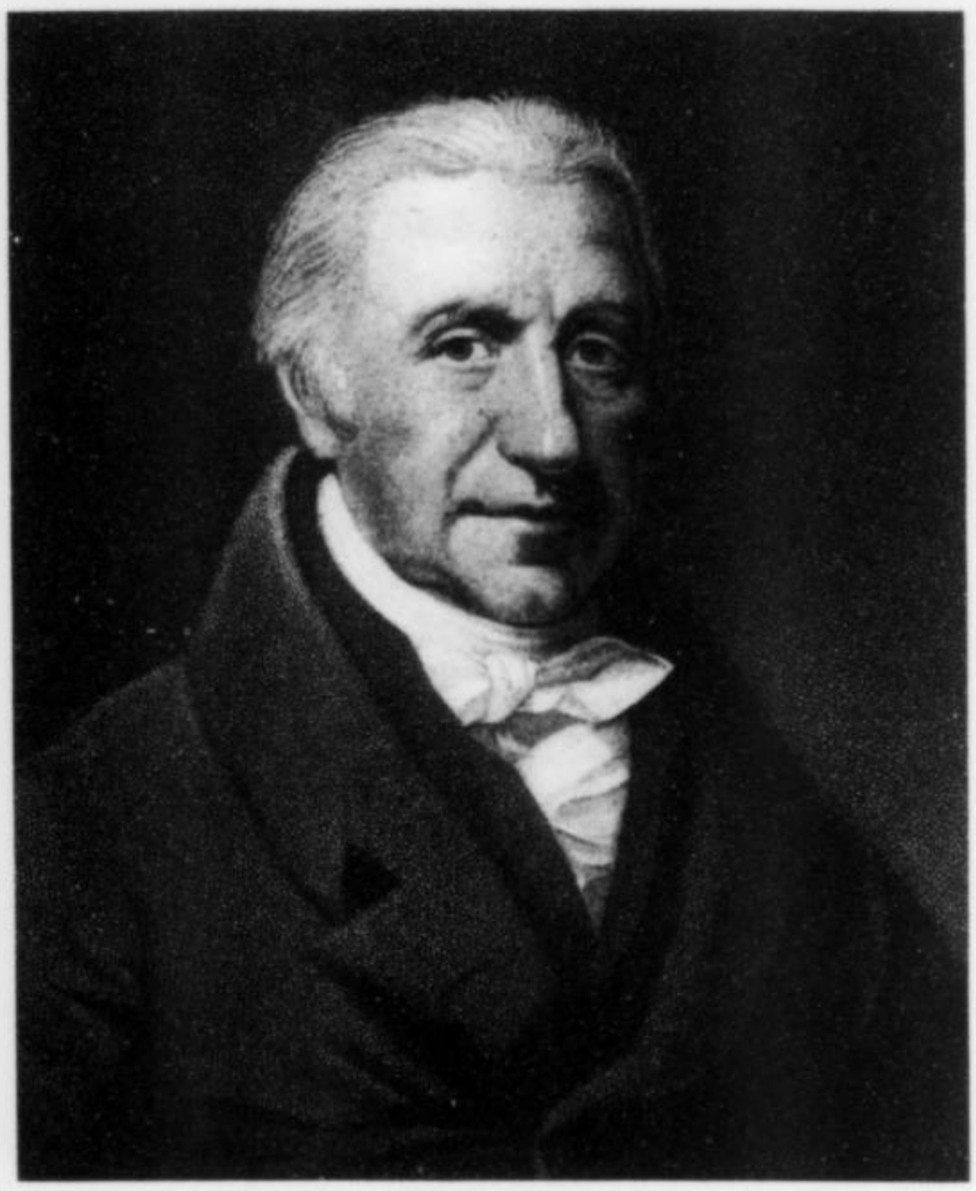
Earl of Bute (1713–1792)

John Stuart, third Earl of Bute and one of England's greatest mineral collectors, was a wealthy and prominent Scottish aristocrat and politician. He was elected to the House of Lords in

1737, but spent most of his time on the Isle of Bute studying natural history and agriculture.

In 1745 he moved to London and two years later made the accidental acquaintance of the young Prince and Princess of Wales, through whose friendship he became an intimate of the Royal Family. He eventually rose, through difficult and scandal-ridden political warfare, to serve as Prime Minister; but he was so unpopular that he could not go out in public undisguised without being attacked, and was the constant subject of vituperation in the press. He stepped down in 1763 but retained his position in Parliament until 1780, taking off more than a year at one point to travel incognito through Italy.

Bute has been described as "a proud but well-intentioned nobleman, with a handsome person and pompous manners . . . utterly unfit to direct the destinies of a great nation." He was well-liked in his private life, however, and his knowledge was extensive on many subjects. He had a taste for literature and the arts, and was passionately fond of botany and mineralogy. Bute was made a trustee of the British Museum in 1765, and served as President of the Society of Antiquaries of Scotland in 1780. He amassed a magnificent library, a collection of scientific instruments, a gallery of Dutch and Flemish paintings, a valuable botanical garden, and a large collection of natural history including as many as 100,000 mineral specimens! This number, if accurate, would rank Bute's as the world's largest private mineral collection before (and perhaps after) 1799.



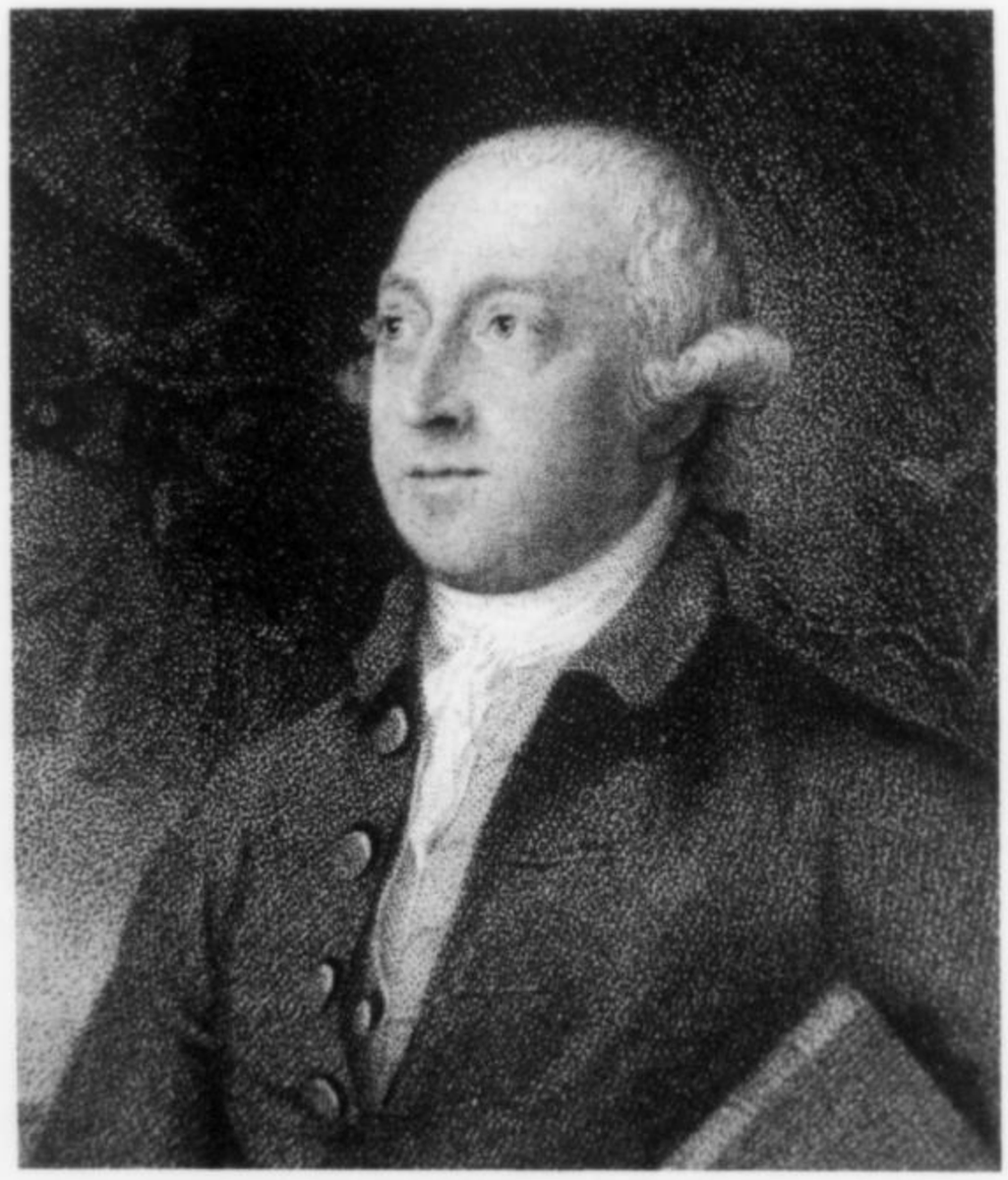
Babington

Following his retirement from public life in 1780, Bute removed to his marine villa in Hampshire where he spent his remaining years. It was probably at this time that he enlisted the Irish physician and mineralogist William Babington (1757–1833), then an apothecary at Guy's Hospital in London, to arrange his extensive mineral collection. John Hill (1714–1775), the controversial London physician and naturalist whom he patronized and obtained specimens from, called it "the greatest [mineral collection] in existence." George B. Greenough, writing in 1838, referred to it as "the finest [mineral collection], perhaps, which at that time existed in England."

Bute's mineral collection went on sale almost immediately following his death. The American physician David Hosack (1769–1835) visited London in 1793–1794 and purchased some specimens from it, possibly at auction.

Babington purchased much of Bute's collection and based his most-important works, *A Systematic Arrangement of Minerals* (1795) and *A New System of Mineralogy in the form of a Catalogue* (1799) on its contents.

Having completed his mineralogical publications, Babington sold his portion of the "Butean Collection" for £3,000 to the Cornish collector John St. Aubyn (1758–1839) around 1799.



Pennant

Thomas Pennant (1726–1798)

Thomas Pennant was a pioneer of British zoology and a prominent travel writer, as well as a significant early mineral collector. He was born at Downing near Holywell to an ancient and wealthy landowning family in Flintshire. While still an undergraduate at Queen's College, Oxford, he toured Cornwall in 1746 and stayed for a time with Sir John St. Aubyn. He made the acquaintance there of William Borlase, Rector of Ludgvan, who showed him his mineral collection, introduced him to the study of mines and mineralogy, and gave him a small collection of Cornish specimens. Pennant's interest in natural history was thus awakened, and following the completion of his studies he established a correspondence with Borlase. Reminding him in 1753 of their earlier meeting, Pennant credited Borlase with recruiting him to the study of natural history.

During the 1750's and 60's Pennant appears to have collected minerals extensively in his home neighborhood of Flintshire, becoming thoroughly familiar with the local mines and their products. He eventually published in 1778 a description of the Flintshire mining district in *A Tour of Wales*.

In 1753 Pennant wrote to a friend that he intended to prepare a detailed catalog, backed by the most up-to-date mineralogical literature. This he did, three years later, and the three manuscript volumes which resulted (two of them devoted to minerals) have fortunately survived. Each of the 1,250 entries includes a specimen

description, the locality, the name of the collector or donor, and other miscellaneous notes.

The catalog notes on Pennant's sources are particularly interesting. The Rev. William Borlase, for example, sent him 78 specimens, including Cornish malachite, quartz, steatite and botryoidal chalcopyrite. Erich Pontoppidan (1698–1764), Bishop of Bergen, Norway, and author of *The Natural History of Norway* (1755; first published in Danish in 1753) sent Pennant 15 specimens which are checked off against the corresponding text in Pennant's copy of the book. Emanuel Mendes da Costa contributed 43 specimens, and Pennant sent him specimens in return.

Pennant's catalog also lists jasper from the Harz Mountains, iron minerals from the Forest of Dean, a fine example of mendipite from the Mendip Hills, malachite from Ecton, a limonite pseudomorph after chalcopyrite, and many other interesting items.

In 1754 Pennant visited Ireland and collected many specimens. At the Muckross copper mine he found chalcopyrite, tetrahedrite-tennantite, and native copper. At the famous Silvermines district in County Tipperary he gathered a fair suite of cerussite specimens. At Llanymynech Hill in Shropshire he collected bornite with rhodochrosite.

His most numerous personally collected minerals were the ones from Flintshire on which he based his description of that district. He recorded numerous specimens of green pyromorphite with cerussite and galena from the Silver Rake mine, 45 specimens of smithsonite, including fine botryoidal yellow specimens from Talargoch, smithsonite pseudomorphs after calcite, and epimorphic green smithsonite on purple cubic fluorite. Altogether 26 Flintshire localities are represented.

Pennant spent his later years on biological researches and publications which established his fame as a naturalist and traveler. But his first love was minerals and he nurtured his collection throughout his life. Pennant states in one of his last published works (1796) that he had:

> . . . a good and numerous collection of fossils and minerals, partly collected by myself, partly by my son in his extensive travels; many of the specimens are elegant, and most of them instructive.

The son mentioned was David Pennant (1764–1841), a Fellow of the Royal Society. He inherited the family collection, and is acknowledged by James Sowerby as having loaned him specimens for illustration in his *British Mineralogy* (1804, 1809, 1811). He apparently continued to enlarge the collection, especially with Swiss and German specimens, until at least as late as 1820.

In that state it remained virtually intact and untouched for nearly a century, until it was purchased by the Earl of Denbigh and presented to the British Museum. Of the original 1,250 specimens approximately 800 survive today, 340 still bearing their original handwritten labels.

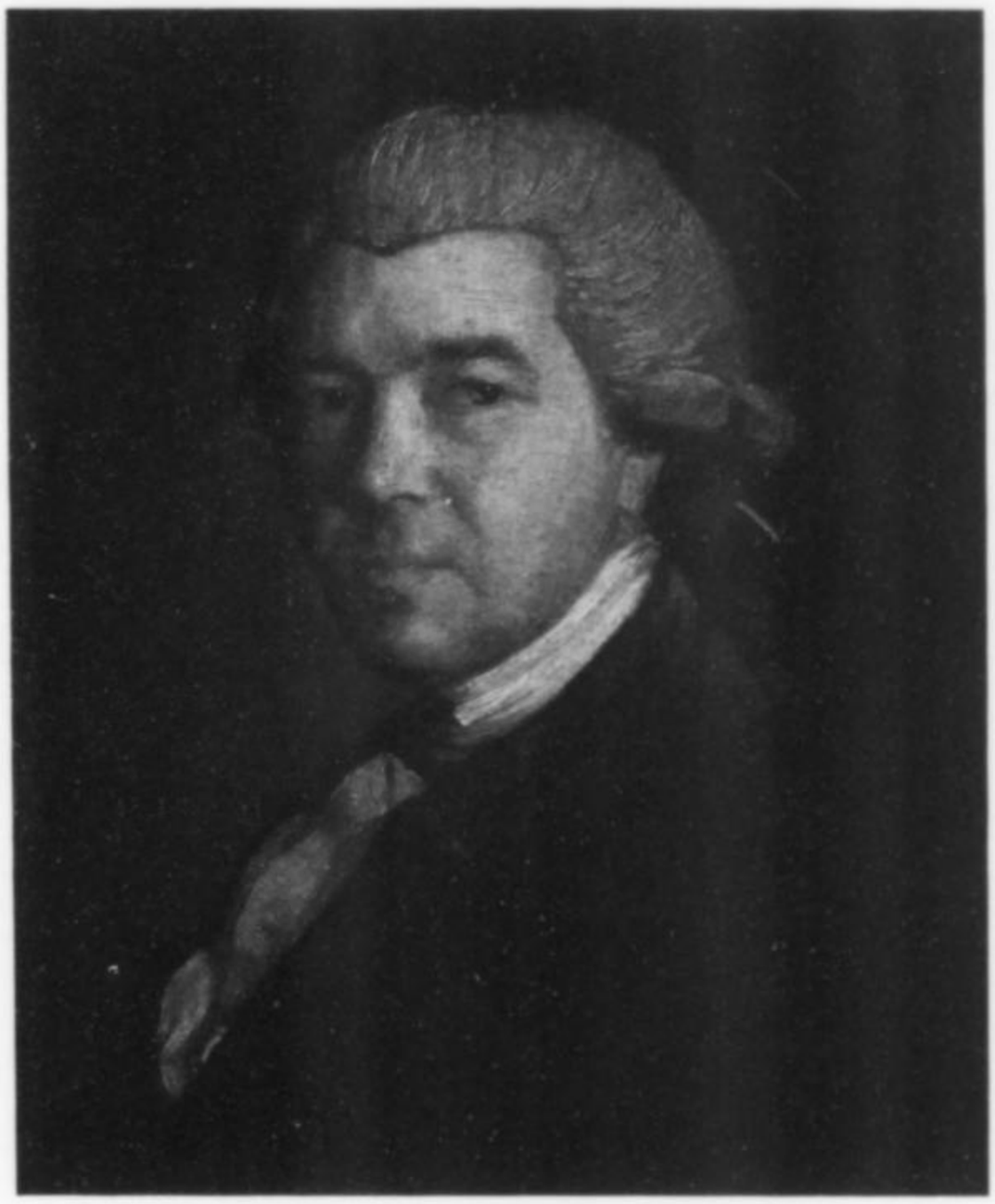
Philip Rashleigh (1729–1811)

Among the most important British mineral collectors of the 18th century was Philip Rashleigh; he assembled what was surely the finest private collection of Cornish minerals ever made.

Rashleigh was born in London and attended Oxford, though he left without taking a degree. He was the eldest son of Jonathan Rashleigh, Member of Parliament for the family borough of Fowey. Following his father's death in 1764, Philip was elected to take over his father's seat in Parliament, and held it until the dissolution of 1802, when in recognition of being the longest-serving MP in the House he became known as "the Father of the House of Commons." He apparently had begun collecting minerals around the year 1765, and pursued this interest energetically throughout the rest of his life. His knowledge of Cornish mineralogy won him election as a Fellow of the Royal Society and a Fellow of the Society of Antiquaries in 1788. He married his first cousin, Jane (1720–1795), but died childless.

Rashleigh's mineral collection was housed in a special room in the 16th-century ancestral mansion called Menabilly, near the southern coast of Cornwall a few kilometers east of St. Austell. It was put up in eight cabinets and 10 meters of wall cases with drawers underneath. Sir Arthur Russell (1952) wrote:

> So famous was it that scientific celebrities of all kinds, when visiting Cornwall, included in their itinerary an introduction to the owner and a visit to Menabilly. Appreciative visitors, especially those versed with some mineralogical knowledge, were always welcome . . .



Rashleigh

Although himself not a traveler, Rashleigh maintained an extensive correspondence with mineralogists and collectors throughout Europe, and frequently traded specimens by mail. He was a particular friend of the English scientist and mining geologist John Hawkins (1761–1841), who was also a prominent mineral collector. According to some surviving letters written to Hawkins in 1789–1791, Rashleigh had been disappointed in the quality of some Hungarian specimens traded to him by the Italian Professor of Mineralogy at Schemnitz, Giovanni Scopoli (1727–1788), but was much better pleased by specimens received from the Saxon Mine Inspector Baron Friedrich von Trebra (1740–1819). Rashleigh and Hawkins, on one occasion, together visited the mineral dealer Jacob Forster at Covent Garden; Rashleigh left much amazed at the vitality of the current mineral market. He was also a customer of Mrs. Francis Powell, a mineral dealer at Leicester House in London; from her he acquired specimens from the Cumberland and Durham lead mines.

Among his other sources were the Swedish mineralogist Gustaf von Engström (1738–1813); the German naturalist Peter Simon Pallas (1741–1811); the Flintshire naturalist Thomas Pennant (1726–1798); the Irish physician and mineralogist William Bab-

Olivenite
Carharrack,
Cornwall

Chalcocite
Cook's Kitchen,
Cornwall

Cuprite
Gwennap, Cornwall

Bournonite
Huel Boys, Endellion, Cornwall

Cassiterite
St. Agnes, Cornwall

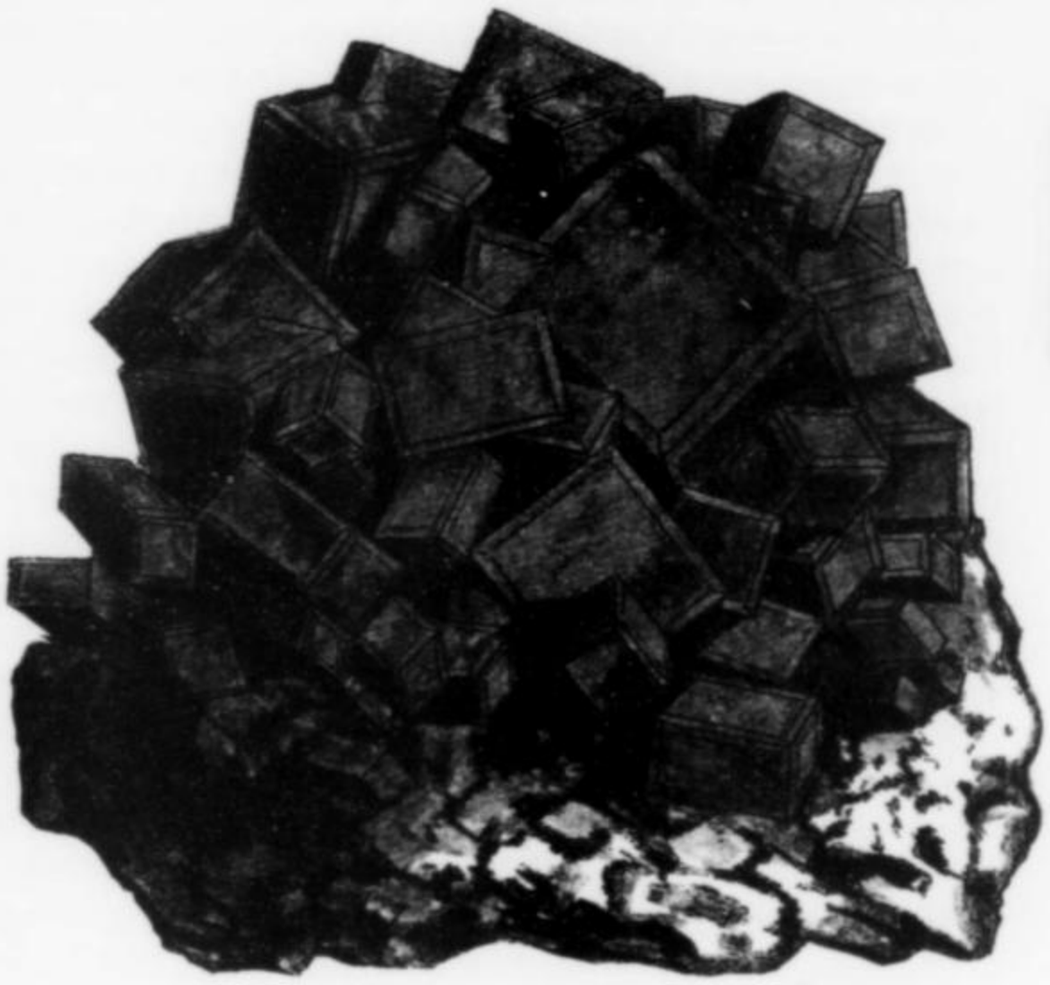
Cassiterite
St. Agnes, Cornwall

Galena
Derbyshire, England

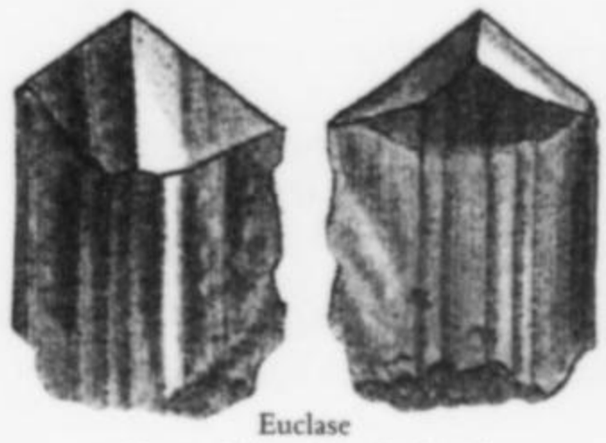
Galena
Derbyshire, England

Chalcophyllite
Tincroft, Cornwall

Specimens from the collection of
PHILIP RASHLEIGH.



Fluorite
Northumberland, England



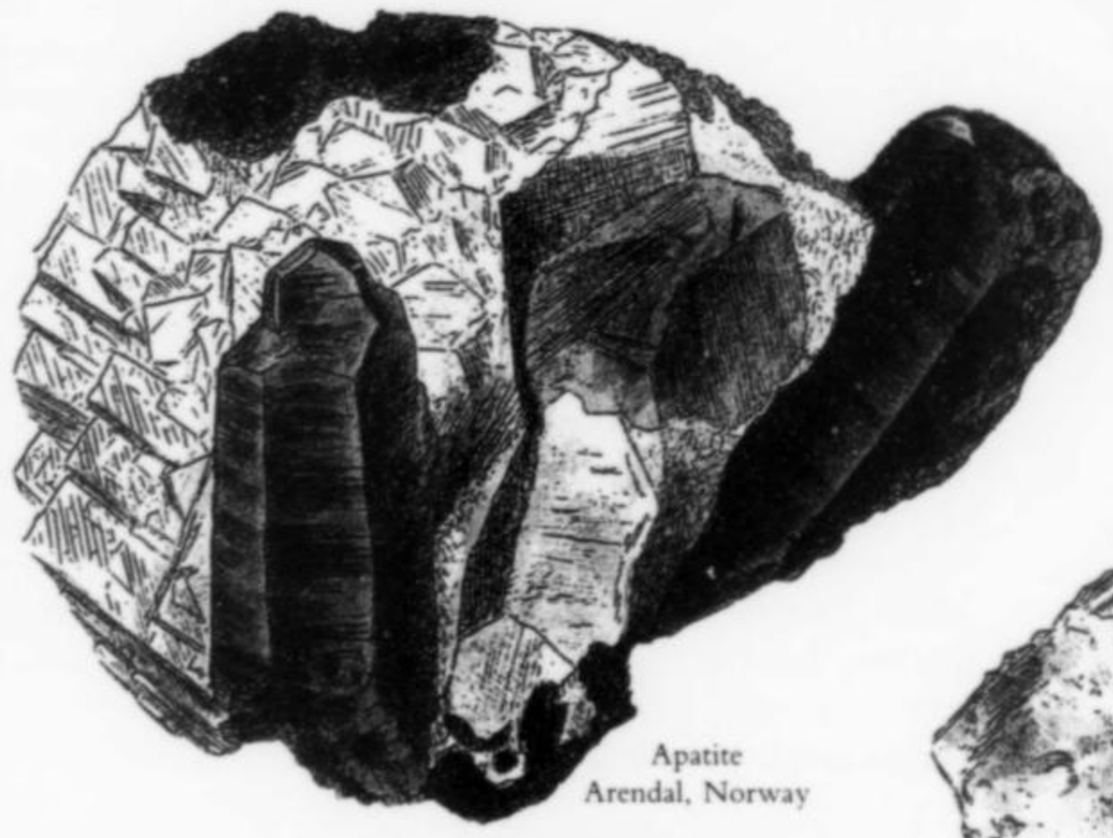
Euclase
Casson, Minas Gerais, Brazil



Corundum
India?



Chalcocite
Wheal Abraham, Cornwall

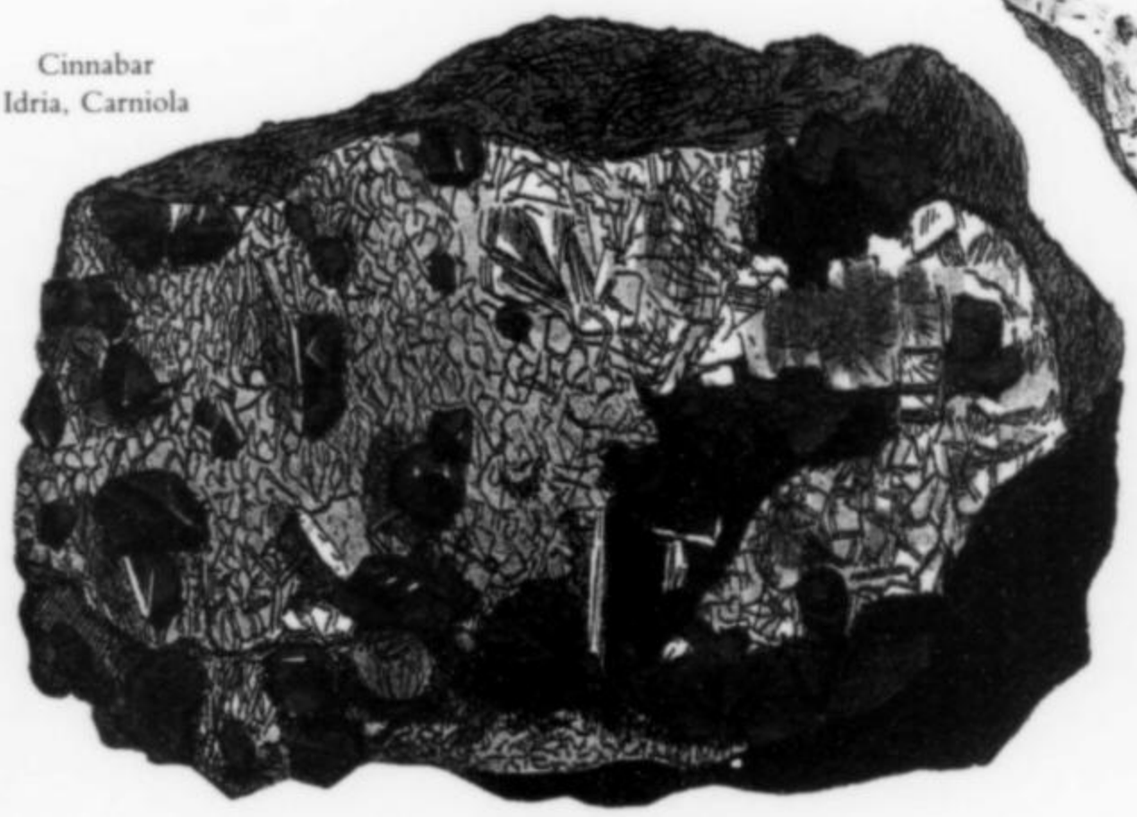


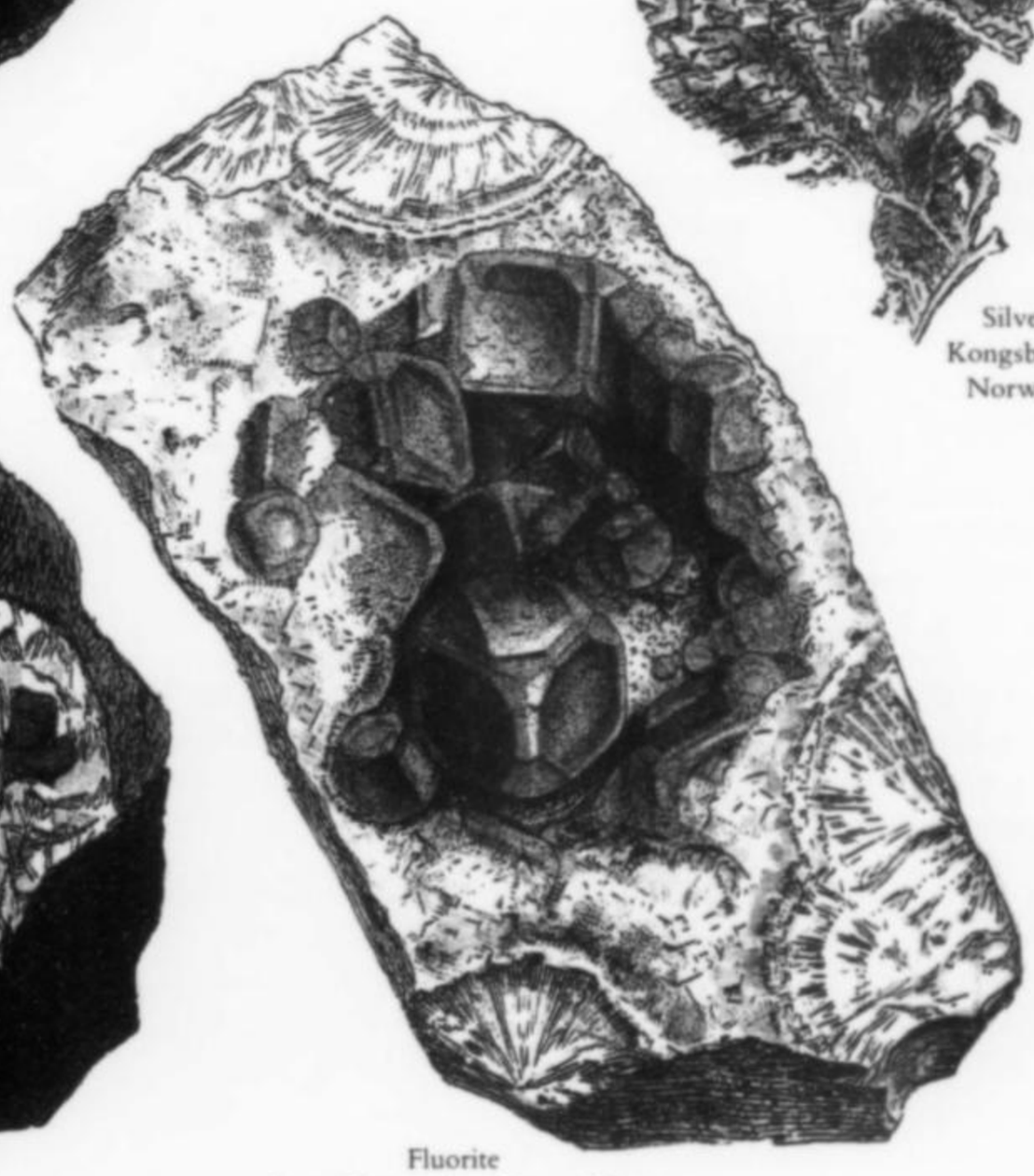
Apatite
Arendal, Norway



Silver
Kongsberg,
Norway

Cinnabar
Idria, Carniola





Fluorite
Bere-Alston mine, Devonshire

Specimens from the collections of **JACOB FORSTER** (fluorite), **EDMUND RUNDELL** (euclase), **SMITHSON TENNANT** (corundum), **JOSEPH BANKS** (apatite), **HENRY HEULAND** (silver), and **WILLIAM LOWNDES** (chalcocite and fluorite).

ington (1757–1833); another great British collector, Charles Hatchett (1765–1847); and a long list of mineral dealers including Joseph Joseph in Redruth; John Mawe (1764–1829) in London, John Henry Heuland (1778–1856) and Edward Hennah (1773–1835).

Rashleigh made a particular point of cultivating as many Cornish mine owners and operators as possible, and regularly visited the mines in search of specimens. He obtained minerals from Francis Basset, Lord Dunstanville (1757–1835), owner of many Cornish mines; Cornish smelter manager John Edwards (1731–1807); the Cornish mine captains John Moyle and James Phillips (1746–1823); and Mrs. Harriet Tremayne, co-owner of Wheal Gorland and Wheal Unity at Gwennap.

Other collectors listed in Rashleigh's records as having supplied him with specimens include the Rev. Montague Barton of Devonshire; Sir Samuel Bentham (1757–1831); the Rt. Hon. Reginald Pole Carew (1753–1835); the Cornish Rev. William Gregor (1761–1817), discoverer of titanium; John Rogers (1750–1832); the Irish collector Sir Walter Synnot (1741–1821); and James Tobin in Bristol.

The special treasures in Rashleigh's collection included a superb suite of beautifully crystallized bournonite specimens, obtained mostly from Edward Fox (1749–1817), a Quaker merchant and "mine adventurer," in 1789. These specimens, from Wheal Boys, St. Endellion, were understood to be an ore of antimony but the species was as yet unknown; Rashleigh's letter of 1789 to Hawkins is the earliest known description of the mineral.

Another of his most important pieces was a superb liroconite crystal on matrix from Wheal Gorland, Gwennap, Cornwall. At 3.5 cm this is the largest and finest known crystal of the species.

Although Rashleigh did what was necessary to obtain the best Cornish specimens, he was not a man of unlimited means. Like many a collector before and after him, he often complained about the increases in specimen prices:

> The expense of procuring specimens has increased to such extravagance that if my collection was not considerable at present, I should not have begun now.

He groused about visiting collectors invading his territory and driving up specimen prices among his sources:

> Strangers who come into this country now and then, seeing a specimen which appears beautiful, give a great price for it, and the dealers then think everything they can procure is inestimable.

And he ran afoul periodically of mine owners unsympathetic to the removal of their ore by collectors. Having asked a representative to obtain some fluorite on his behalf from the Beer Alston mine in 1790, Rashleigh writes that:

> . . . He properly applied to Mr. Gullet [proprietor of the mine] for this liberty, who writ me a most impertinent letter on the occasion, on which I shall have no further intercourse with him.

In 1797 Rashleigh published a volume of handcolored illustrations and text describing some of his best specimens. This was followed in 1802 by a second volume. The illustrations were prepared by Henry Bone (1755–1834), Thomas Medland (died 1833), and Richard Thomas Underwood (1765–1836), himself a geologist and Fellow of the Geological Society from whom Rashleigh had obtained specimens. These volumes are today greatly treasured by mineral book collectors.

Philip was also a good friend of the London natural history artist and publisher James Sowerby (1757–1822), who borrowed many of his specimens to illustrate in his *British Mineralogy* beginning in 1802. In fact, Sowerby even executed some illustrations apparently for Rashleigh's use which remained unpublished.

Philip Rashleigh was the most prominent but by no means the only member of his family to develop an interest in minerals. His brother Charles (1747–1825) was an avid collector who obtained a large number of specimens for him. Another brother, John (1742–1803), is also cited as a source. Philip's sister, Rachel, married Dr. John Gould (1740–1823) of St. Austell and Truro, who also supplied him with mineral specimens. Rachel, Harriot Rashleigh and Miss F. Rashleigh all helped prepare specimen illustrations. Harriot, Philip's niece, married the Rev. Edward Rodd (1768–1842), from whom Philip also obtained mineral specimens. Philip's nephew, William Rashleigh (1777–1855), developed an early interest, and Philip's catalog records specimens obtained from him as well.

William Rashleigh was a Fellow of the Geological Society and also a Member of Parliament. Perhaps because of his interest in minerals, Philip chose William as the heir to his mineral collection in 1811. William continued to add to it at least until 1838, but his taste was no match for his uncle's connoisseurship. The Rashleigh collection, or most of it, remained in place at Menabilly for nearly a century following Philip's death.

In 1902, through cash donations organized in part by John Davies Enys, a geologist, the Rashleigh collection was bought for £1,200 and presented to the Museum of the Royal Institution of Cornwall (today the County Museum) in Truro. It is still preserved there, along with Philip Rashleigh's historically invaluable manuscript catalog describing 3,902 specimens (many more were uncataloged). But there was more to this collection. As it turns out, William Rashleigh had given a portion of the collection to his son John, and when these specimens finally came to light in 1923 they were purchased by Sir Arthur Russell and later were given with the rest of his collection to the British Museum.

Because Rashleigh's collection was assembled at a time when many of the most famous Cornish mines were operating in the vuggy upper zones of the ore deposits, it can surely never be equalled. It is one of the few great 18th-century mineral collections to be preserved largely intact, along with its original documentation, a fortunate circumstance for the history of Cornish mineralogy.

Adolarius Jacob Forster (1739–1806)

Jacob Forster was one of the leading mineral dealers of the 18th century, selling high-quality aesthetic display specimens out of premises in London, Paris and St. Petersburg.

Forster appears to have been related to the naturalists Johann Georg Adam Forster (1754–1794) and Johann Rheinhold Forster (1729–1798); their family had left Yorkshire in 1649 and settled in Prussia. Forster himself began dealing in mineral specimens around 1766, at the age of 27, and continued in that profession for 40 years. His mineral shop in Covent Garden, London, had opened by 1789, and his wife operated the business from a shop in Soho during his long travels. His brother, Ingham Henry Forster (1725–1782), periodically operated his mineral store in Paris, where spectacular sales are known to have taken place in 1760, 1769, 1772, 1780 and 1783; the sales catalogs for most of these events were written for Forster by none other than Romé de l'Isle. Ingham Henry Forster was himself a mineral collector, and Jacob acknowledged having obtained some the best specimens in his personal collection through Henry.

Forster traveled extensively in search of minerals. He spent a number of years in St. Petersburg (where he is rumored to have served as a Professor of Mineralogy at the St. Petersburg Academy, but there are no records to support this claim). He is also credited with travels in "many lands" of Europe throughout his

career. He is known to have collected minerals as an agent for King Carlos IV of Spain. The king granted Forster the concession to operate his well-known sulfur mine in Cadiz for specimens. At the time of Forster's death in 1806 he still possessed five or six crates of Russian mineral specimens, valued at about £1,000, which he had not yet dispatched to Madrid.

Many of Forster's own specimens were illustrated in Paris by Gautier d'Agoty (1781) and later by Swebach Desfontaines in 1790 to 1792; unpublished paintings of Forster specimens by Desfontaines are preserved in the library of the British Museum, and clearly show his fine sense of aesthetic taste and his particular fondness for fluorite crystal groups.

Forster and his nephew, John Henry Heuland (1778–1856), were in some way involved with the procurement of crude Brazilian platinum from Corrego Bom Sucesso which Wollaston used in the discovery of palladium. It appears most likely that Wollaston obtained his first specimens directly from Mrs. Forster in 1800, roughly 6,000 troy ounces; but the Russian Count Moussin-Poushkin (1760–1805) also obtained specimens from Forster in St. Petersburg (the Russian platinum deposits had yet to be discovered).

In 1802, while Forster was living in semi-retirement in St. Petersburg, Count Moussin-Poushkin (himself a chemist and mineral collector) helped mediate a major sale. Moussin-Poushkin, then Vice President of the St. Petersburg Academy, obtained the authorization of Czar Alexander I (1777–1828), who was *also* a mineral collector, for the purchase from Forster by the Mining Institute of 1,139 high-quality specimens for the sum of 50,000 rubles. This single acquisition was said to raise the Institute's mineral collection to international status. Payment was to be partly in the form of native gold specimens from the Institute's collection, and partly in cash. According to Forster's will, however, the transaction was never completed, and the final disposition of the specimens is not known.

Despite his lengthy stay in St. Petersburg, Forster kept his large personal collection in his Gerrard Street residence in London. In his will this collection is left jointly to his brother Ingham Henry Forster and his nephew, John Henry Heuland, then on the way to becoming a prominent mineral dealer in his own right. The instructions were that the collection should be cataloged and then sold by Heuland, with the two heirs dividing the proceeds. Other small sub-collections and specimen stockpiles were given to his wife and other relatives.

Heuland added some specimens to Forster's collection from his own stocks, then sold it in its entirety to Charles Hampton Turner, whose collection was later acquired by Henry Ludlam (1822–1880). The description by Lévy of the new mineral forsterite was based on a specimen in the Turner collection which Heuland had supplied. The Ludlam collection was ultimately given to the British Museum and the London Museum of Practical Geology, where specimens are preserved today. The mineral specimen stock from Forster's store was sold at public auction beginning in 1808.

Forster's brother-in-law, Christian Heuland (father of John Henry Heuland), was also a mineral dealer; he ventured on collecting expeditions to Peru and Chile in 1795–1800.

George Humphrey (1739?–1826), yet another mineral collector and well-known natural history dealer in the family, was a brother of Forster's wife, Elizabeth Humphrey. He ran his own mineral and shell shop in London at least as early as the 1790's. He supplied mineral specimens to Clayton Mordaunt Cracherode (1730–1799), and prepared a catalog of his collection which is now in the British Museum. Humphrey auctioned off his first collection in London in 1779, entitling his catalog *Museum Humphredianum*. His "large and valuable" museum included minerals among the "many thousand curious subjects in natural history," 4,310 lots all together.



Greville

Charles Greville (1749–1809)

The Rt. Hon. Charles Francis Greville, well known in England as one of the founders of the Royal Horticultural Society, was also among the country's most important and influential mineral collectors. He was born to an aristocratic family, the second son of Francis, 8th Baron Brooke and 1st Earl of Warwick. Nothing is known of his formal education, but by his 20's he was already interested in science and, probably through his friendship with Joseph Banks, was elected a Fellow of the Royal Society in 1772.

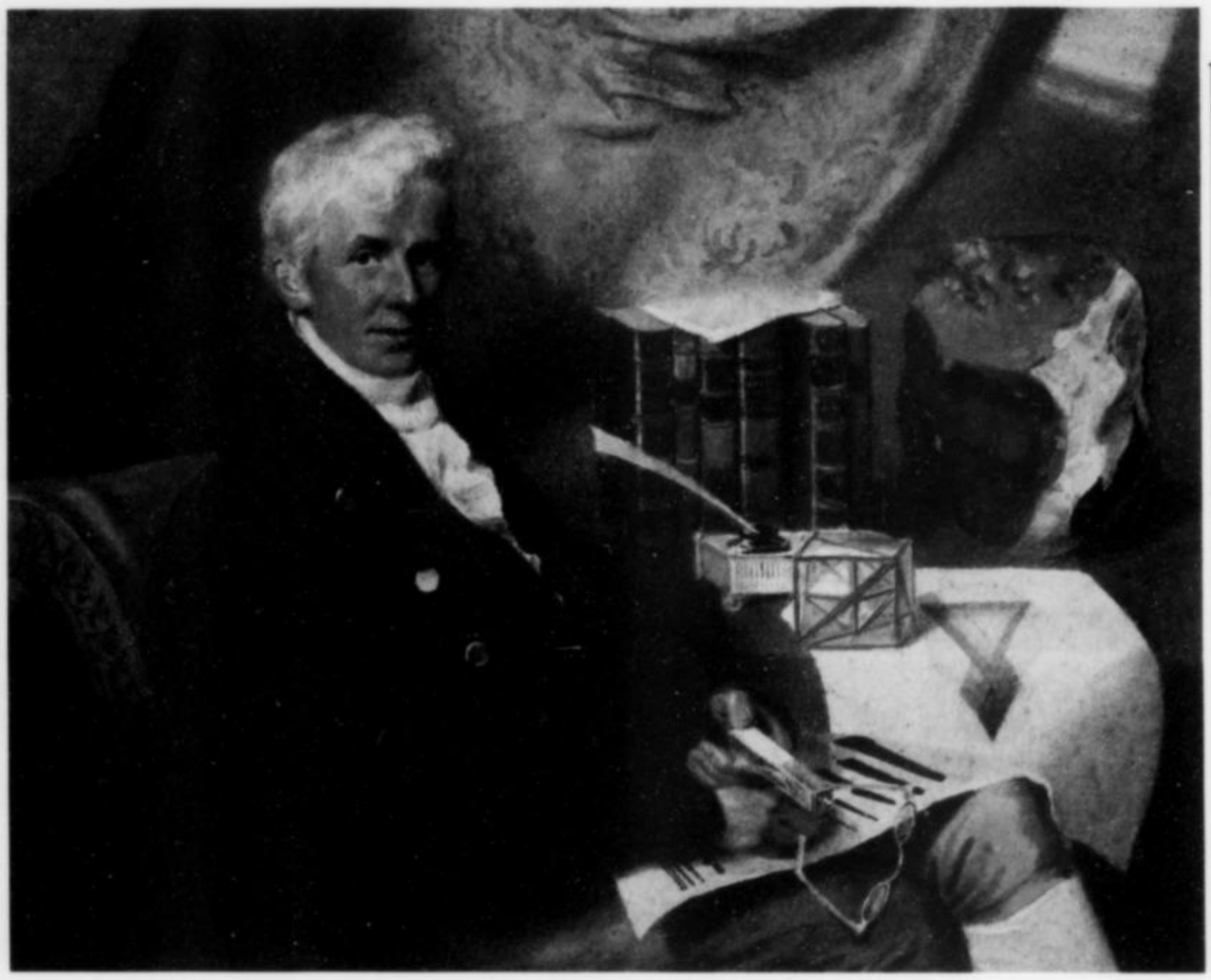
Greville's first interest was minerals; in 1773 he acquired the large mineral collection of Ignaz von Born, then of Prague, and Greville continued to enlarge upon it throughout his life. He was particularly fond of natural crystals of the gem species, and built up a fine suite of diamond, ruby, sapphire, emerald, topaz and rubellite crystals. He also acquired minerals from the Marchess Ippolito Durazzo (1754–1818) in Genoa, Italy.

Greville's only paper ever delivered before the Royal Society dealt with a stony meteorite that had fallen in France, and an iron meteorite from India. He eventually acquired pieces of many meteorites, seven of which were not represented in the British Museum collection.

Upon the death of his father, Greville became a Member of Parliament for Warwick in 1774, and succeeded to his brother's position on the Board of Trade.

Greville had a well-developed taste for fine art, perhaps inspired by his rich uncle, William Hamilton, Ambassador to Naples and a prominent collector of art and antiquities. Hamilton's collection was purchased by the British Museum in 1772, some examples later providing models for the famous potter (and, incidentally, mineral collector) Josiah Wedgwood. Greville went about building his own lavish collection of paintings, antiquities, sculpture, coins and engravings. With his friend (and occasional mineral collector) Joseph Banks he was elected to the Society of Dilettanti, which counted among its membership many of London's leading connoisseurs of art. Greville was not quite as wealthy as many people assumed, however, and his income was barely enough to support his hobbies. Thus his specimen purchases had to be carefully chosen.

In 1790 Greville moved to a larger house at Paddington Green where he had more room for his mineral collection, his works



Sowerby



Pharmacosiderite
Cornwall



Humite
Vesuvius, Italy



Chalcophyllite
Cornwall



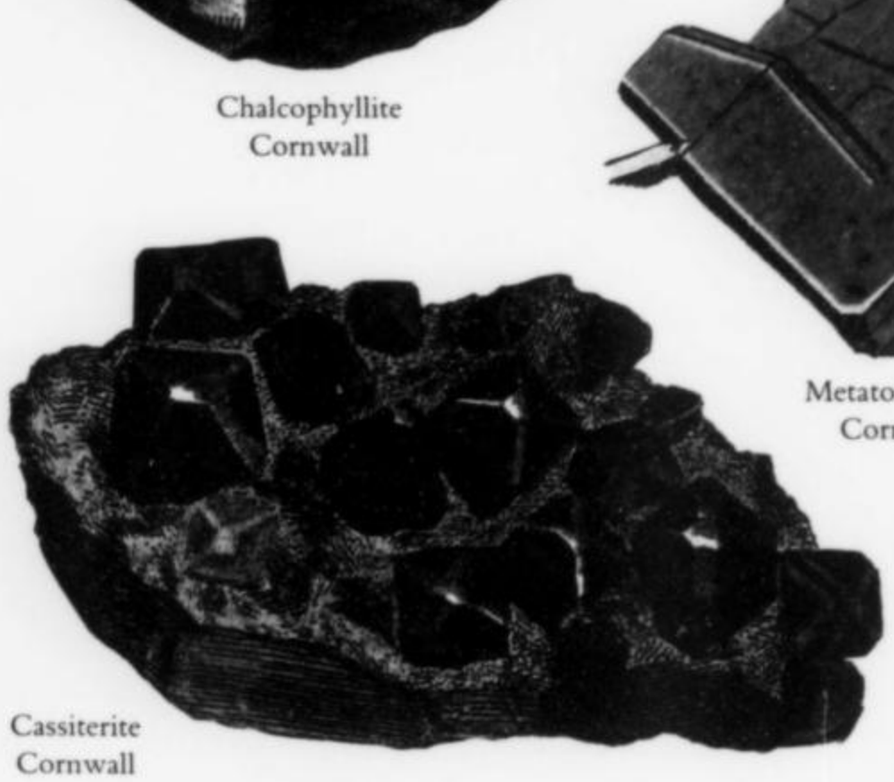
Pyromorphite
Johanngeorgenstadt



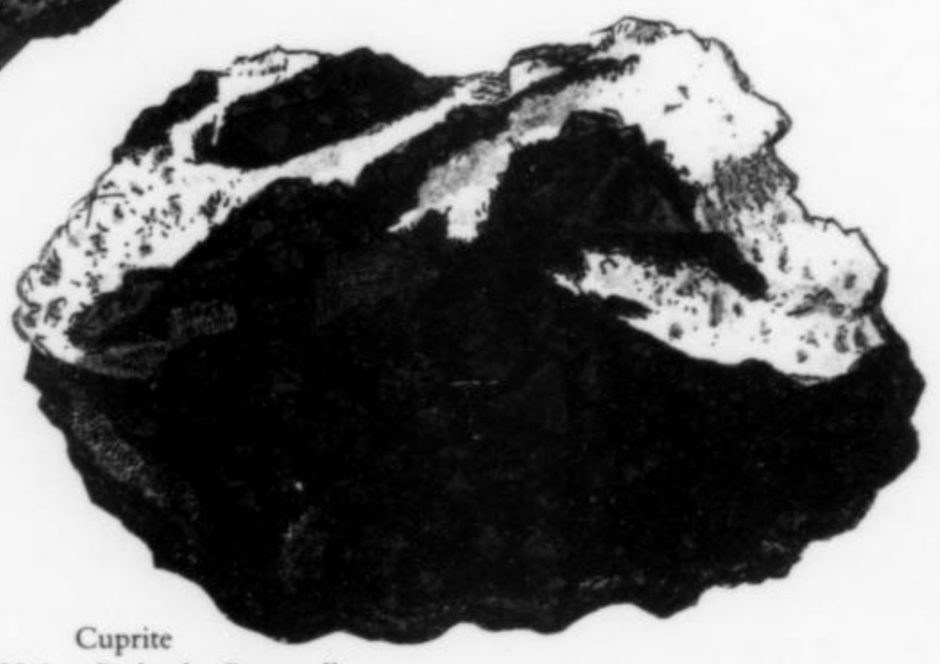
Calcite
Derbyshire, England



Metatorbernite
Cornwall

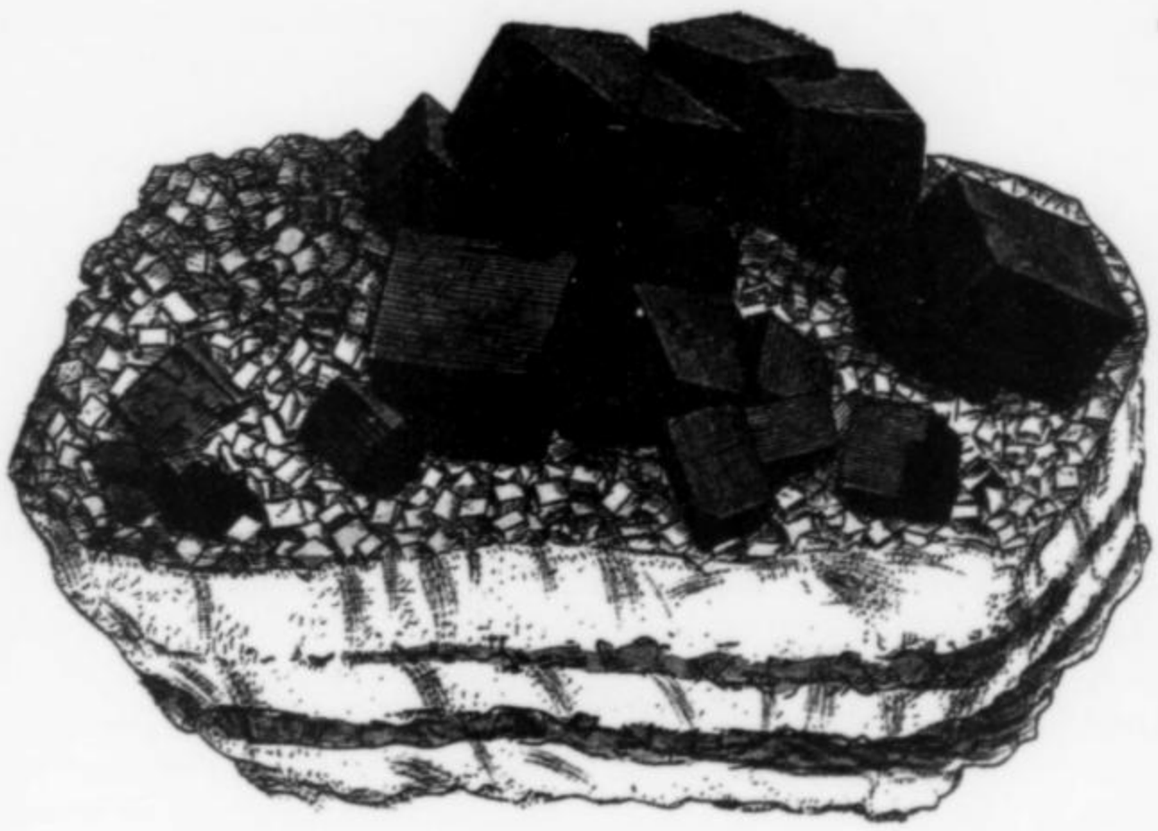


Cassiterite
Cornwall



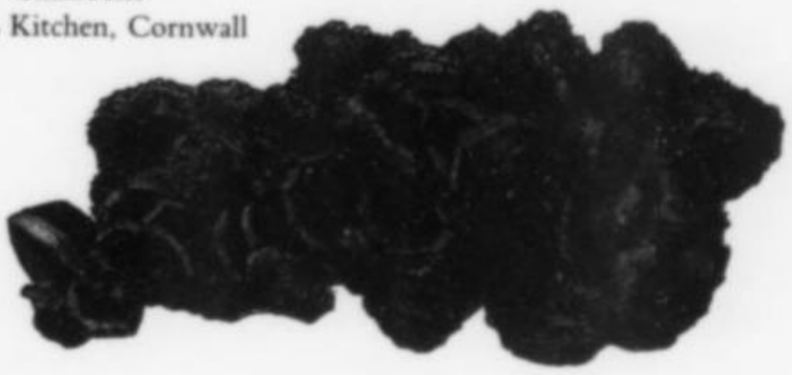
Cuprite
Wheal Unity, Redruth, Cornwall

Specimens from the collection of **JAMES SOWERBY**.



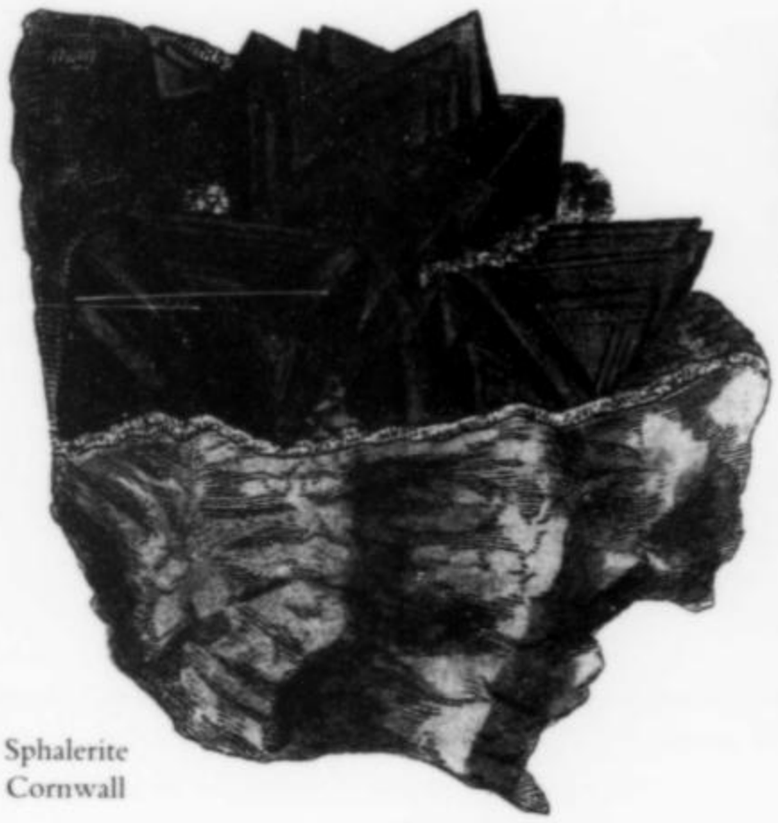
Galena
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Cook's Kitchen, Cornwall

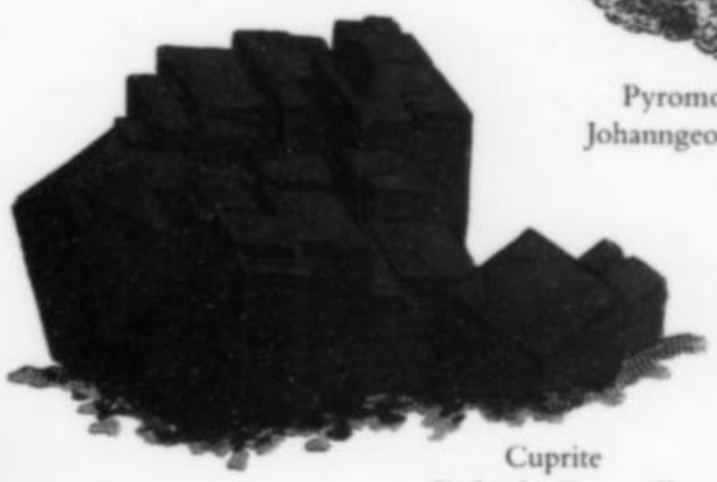




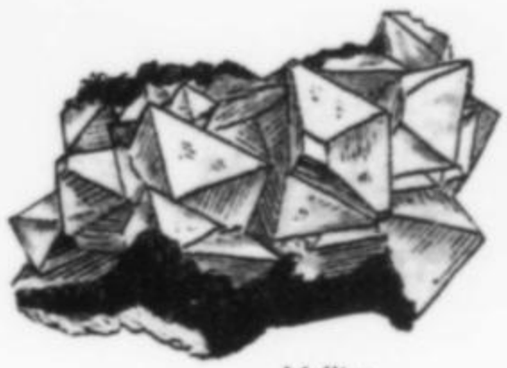
Pyromorphite
Johanngeorgenstadt



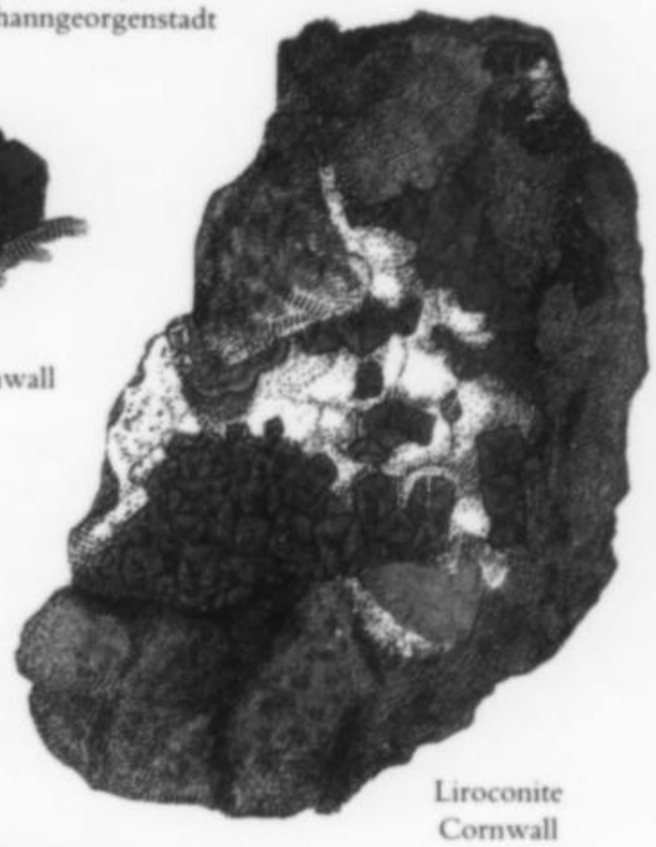
Sphalerite
Cornwall



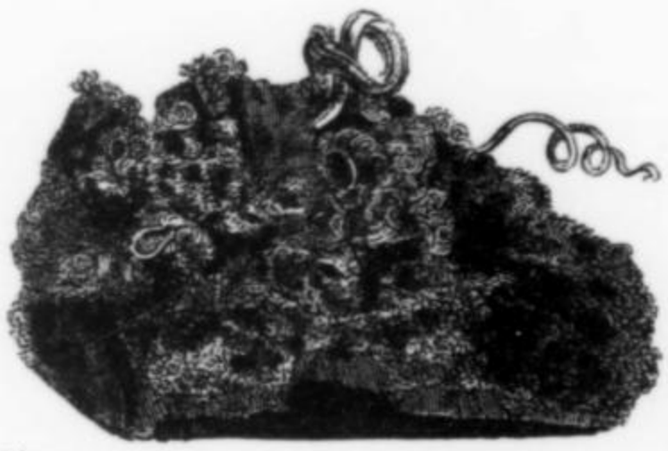
Cuprite
Redruth, Cornwall



Mellite
Switzerland (?)



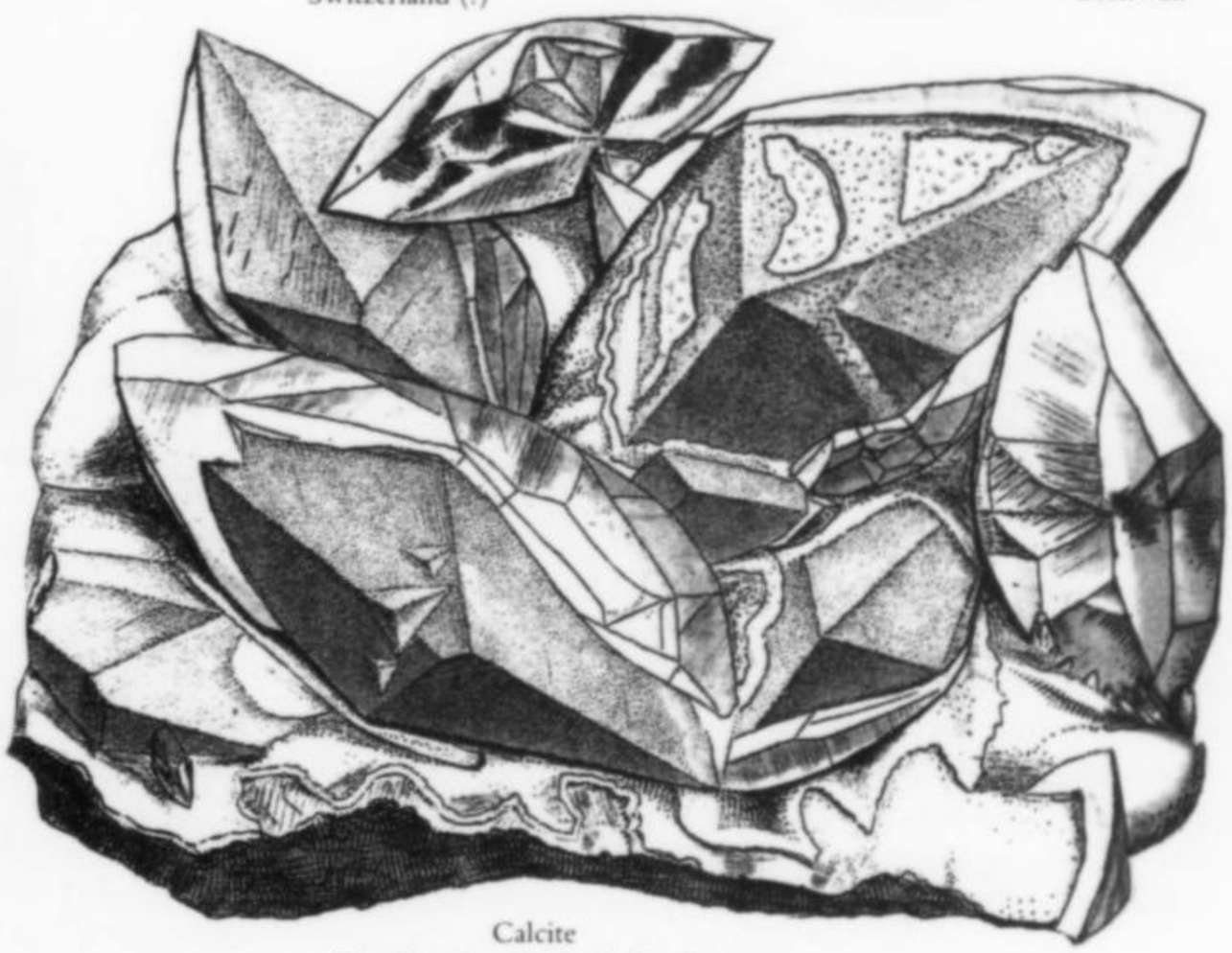
Liroconite
Cornwall



Silver
Herland mine, Gwinnear,
Cornwall



Diopside
Mussa Alp, Piemonte, Italy



Calcite
Dimple mine, Matlock, Scotland

Specimens from the collection of **JAMES SOWERBY**.

of art, and also a large garden. There he cultivated "the rarest and most curious plants, from various climates . . . with peculiar success." He later joined the Linnaean Society in 1802, after having become quite famous among local gardeners. In 1804 he met with others at Hatchard's Book Shop in Picadilly, and there they founded the Royal Horticultural Society.

In 1794 Greville received an appointment from the king as Vice-Chamberlain of the Household, which surely helped his strained financial position. In that same year the Count de Bournon arrived in England, a refugee from the French Revolution who had lost all his property and his substantial mineral collection. In London he was immediately befriended by Greville, Sir John St. Aubyn and Sir Abraham Hume. The three of them collaborated in Bournon's support, employing him to curate their mineral collections. Bournon assisted Greville in this capacity from 1794 to 1806, also giving advice on further acquisitions. The combination of Bournon's scientific knowledge and Greville's sense of aesthetics could not have worked better. Unfortunately, the meticulous Count never prepared a complete catalog of the collection, even though he did assure that all specimens in the cabinet were carefully labeled.

In the meantime, mineral science had been sadly neglected at the British Museum. Up until 1799, all the officers of the natural history department had been either botanists or zoologists. In that year a committee of mineral experts was formed in order to evaluate the Museum's holdings. The members were Charles Greville, Joseph Banks and Philip Rashleigh. Their assessment was predictably dismal: poor representation of British localities, and a poorer selection overall than visitors to the museum had a right to expect. They recommended as a start on improvement the purchase of Charles Hatchett's large collection, which the trustees approved.

Greville enjoyed good relations with other London collectors and appears to have been generally well liked. He was particularly friendly toward James Sowerby, and loaned many of his specimens for illustration in Sowerby's *British Mineralogy* and *Exotic Mineralogy*. Following Greville's death, Sowerby maintained contact with the collection, and continued to borrow specimens to illustrate. Sowerby's engravings provide some of the best surviving evidence of what the Greville collection was really like.

In 1803 Greville's uncle died and, as expected, Greville inherited a small fortune, some £7,000 and Hamilton's Welsh estate. Thus, at least for the final six years of his life, Greville could indulge more liberally in building his collections without financial worries.

In the last three years of his life, after the Count de Bournon had ceased working for him, Greville bought a large number of surely very aesthetic specimens from the mineral dealer John Henry Heuland (1778–1856) and had thereby to displace a significant number of what de Bournon had considered scientifically interesting specimens from the cabinet. The specimens removed were consigned to an outbuilding and forgotten. Lacking the help of the French scientist, Greville followed his own aesthetically based collecting instincts.

From an examination of Greville's life it becomes clear that he was, above all, a lover of beautiful things. He was a connoisseur but not a scholar in the area of fine art. He never engaged himself very deeply in the scientific study of mineralogy (despite being supportive of those who did), and his horticultural endeavors do not seem motivated by a liking for scientific botany but only for beautiful flowers. His collection of cut gems did not inspire the least bit of technical gemological research on his part. And even in his private life he never married because of the impossibility of finding a sufficiently beautiful woman of means who would marry a second son (although he does seem to have kept a very beautiful young mistress for a few years who later married his uncle). Thus his mineral collection likewise seems to have been selected with the careful eye of the connoisseur of all things artistic.

Greville died intestate in 1809, and it was necessary to convert his estate to cash for division among his heirs. William Babington, William Wollaston and Charles Hatchett, with four others, set about the daunting task of appraising Greville's minerals on behalf of the British Museum. His collection was, they said, "equal in most, and in many parts superior, to any similar collection which any of us have had the opportunity of viewing in this or other countries." Count de Bournon stated the collection was "far superior" to the existing Museum holdings. They concluded that the entire mineral collection was worth £13,727 (including £1,600 for the cabinets); Parliament approved the sum, and the minerals were transferred to the British Museum, roughly 14,800 specimens in all. Another 5,200 faceted precious stones were sold separately, but the uncut gem crystals remained with the minerals.

The Greville collection ultimately became recognized as probably the finest private collection of minerals ever assembled in England. Although the British Museum had previously been in possession of the Sloane collection, the Cracherode collection and the 7,000-specimen Hatchett collection, it was Greville's collection of minerals which they felt at last "raised the Museum collection to the first rank among the collections of the world."

In the official history of the British Museum collection (Fletcher, 1904), a few specimens of particular note are mentioned: a large rubellite from Burma, an Indian (probably Ceylonese) corundum, a crystallized atacamite from South America, a datolite from Norway, a superb euclase crystal from Minas Gerais, a unique aragonite crystal group from near Glasgow, a group of twinned and simple calcites from Derbyshire, two very rare and fine "cromfordite" (phosgenite) crystal specimens, and an extremely fine, large group of apatite crystals from Russia.

Count de Bournon, aware of the aesthetic component so intrinsic to the collection, proposed to the Museum a plan for organizing the collection he had tended for 12 years. But it was rejected by curator Charles Konig, who arrived at a different plan which, he said:

> . . . may be deemed preferable to the scheme lately proposed by M. de Bournon, of forming two collections of the same kind, the one for the man of science and the other for the stupid gaze of the visiting vulgar.

In time the specimens from all the early collections acquired by the British Museum became intermixed, and today very few can be specifically identified as having come from a particular collection, including those that had once belonged to Charles Greville.

James Sowerby (1757–1822)

James Sowerby holds a special position in British mineral collecting. Not only was he an active mineral collector in his own right, but he served as a focal point for other English collectors, and as a great stimulus to mineral collecting throughout England because of his published books. His five-volume *British Mineralogy* (1804–1817) and his two-volume *Exotic Mineralogy* (1811–1817) depicted in color over 1,500 specimens from the best mineral collections in England, most of them dating from the late 18th century. He was, for many collectors, almost their sole source of information about British minerals and localities.

James Sowerby was born in London, the son of a lapidary, and soon began to show artistic talent. He studied art at the Royal Academy in London, later exhibiting a number of his paintings there. In 1786 he married Anne Brettingham de Carle and moved into a London house given to them by her father.

In 1790 he began the first of his serialized illustrated works, *English Botany*, which over the next 24 years would run to 2,592 handcolored plates. His later *Mineral Conchology of Great Britain* (1812–1846) ran to 650 plates, and he also produced colored plates of minerals and fossils for most of the 11 editions of John Mawe's *Familiar Lessons on Mineralogy* (1819–1829).

Sowerby began collecting mineral specimens for illustration purposes in 1791. His handcolored engravings are generally realistic and accurate, depicting the specimens actual size. In a few cases he admitted to magnifying specimens to better show their features, restoring to undamaged appearance a few crystals that had been "bruised by ill usage," showing only the best portion of a specimen as if it had been trimmed, or even upon rare occasion "compositing" the best crystals from a very large specimen onto a matrix small enough to fit his printed page. A number of the original specimens survive, however, and comparison with Sowerby's illustrations generally shows a very high degree of accuracy in the renderings. Consequently, his books are some of the best surviving evidence of the kinds of specimens 18th-century mineral enthusiasts collected (actual surviving specimens having often been damaged almost beyond recognition during the intervening two centuries).

The text accompanying his specimen plates is casual, chatty and informative, giving brief mineralogical information and notes on the circumstances of the finds, the localities and the collectors owning the specimens. Production of the plates began in 1802 (although the first title page is dated 1804).

Sowerby's circle of mineralogical friends and acquaintances was extensive, and they were happy to loan him specimens from their collections so that he could illustrate them. Prominent collections represented in the plates include those of William Babington (1757–1833), William Wollaston (1766–1828), Henry Brooke (1771–1857), Smithson Tennant (1761–1815), the Count de Bournon (1751–1825), John Henry Heuland (1778–1856), Adolarius Jacob Forster (1739–1806) and Friedrich Stromeyer (1776–1835), all of whom later had minerals named in their honor. Other especially important sources included Charles Greville (1749–1809), Sir Joseph Banks (1749–1809), Philip Rashleigh (1729–1811), William Lowndes (1752–1828), David Pennant (1764–1841), Edmund Rundell, and John Mawe's wife (a collector of small, one-inch specimens). Greville's collection was sold posthumously to the British Museum, from whom Sowerby continued to borrow specimens.

Sowerby not only accepted mineral specimens on loan, but also as gifts for his personal collection. In addition, he was known to collect specimens in the field himself. In the text accompanying plate 17 of *British Mineralogy* he states:

> In June 1799, soon after the discovery of native silver in the Herland Copper mine, in the parish of Gwinear, about 7 miles from St. Michael's Mount, I had the pleasure of calling there in company with my friend D. Turner, Esq., and was lucky enough to procure some rich little pieces which served my purpose.

Sowerby even acquired entire mineral collections to incorporate into his own, notably that of his friend, William Day, who died around 1799.

Sowerby's books are meticulous in giving credit to collectors who loaned him particular specimens for illustration. The other specimens are all indicated or presumed to have been from his personal collection, and he often notes who sent them to him. Although he professed to concentrate only on British minerals, it is clear that he owned many foreign specimens as well, probably obtained as gifts or exchanges. He had, for example, purchased the Yorkshire meteorite from Edward Topham and frequently broke small pieces from it to trade for other mineral specimens; it originally weighed 56 pounds at the time it was observed to fall on December 13, 1795.

Sowerby's collection was especially rich in fine Cornish specimens, including arborescent copper, fine cassiterite crystals, green octahedral fluorites from St. Agnes, liroconite crystals on matrix from Huel Gorland, beautiful chalcophyllite groups, botryoidal malachite from Wheal Unity, gold nuggets, superb cubic and octahedral cuprite crystals on matrix, lustrous jet-black sphalerite crystals, blue-tarnished chalcopyrite crystals on quartz, torbernite and autunite crystals, phenakite crystals from St. Just, tetrahedrite crystals, excellent chalcocite crystal groups from Cook's Kitchen, stibnite crystals, argentite crystals from the Herland mine, and specimens of the material later to be named bournonite from Endellion.

From Derbyshire Sowerby had attractive fluorites and calcites, an excellent group of cubic galena crystals on matrix, cockscomb marcasite groups, and an interesting specimen of epitaxial drusy quartz on cuboctahedral galena. From Matlock he had green smithsonite and superb calcite crystal groups. His Wanlockhead specimens included groups of cerussite twins and green botryoidal hemimorphite. From Devonshire he possessed siderite crystal groups, pyrite crystals on quartz, and crystalline hematite. In addition, he had fine Durham and Cumberland calcites, Scottish garnets, analcime crystals from near Edinburgh, a green strontianite crystal group from Strontian, smoky quartz from Cairngorm, anglesite from Anglesey, blue barite crystals from Dufton, crystallized native silver from Stirlingshire, excellent brookite crystals on quartz from Prenteg, and a witherite crystal group on galena from Yorkshire. Although he had comparatively few foreign specimens, he does picture two little crystals of Russian dioptase, very rare at that time, which he complained were "more costly than real emeralds of the same dimension." From these examples it is obvious that Sowerby's mineral collection was first-rate, even though it has historically been overshadowed by the fame of his books.

Eventually Sowerby's many specimens of minerals, rocks, fossils and plants multiplied to the extent that, in 1796, he was forced to add a room onto his house for their storage. It was his plan to assemble a "complete" collection of the natural history of Britain. In a letter to a friend he once made reference to his personal museum as consisting of "some thousands of minerals, many not known elsewhere," plus fossils, several thousand plants and 500 preserved animals.

In his later years Sowerby opened his museum to the public on a limited basis. Admission was by invitation ticket "every Tuesday during the winter from eleven o'clock 'till four," and presumably at other times by appointment. His sons attempted to establish the museum as a public institution open to anyone. An 1827 notice states that "tickets for admission and study in Sowerby's Museum and Library may be had . . . at 10s each for three months, or £2 per annum." However, the museum did not long remain intact after his death.

Sowerby is known to have given many specimens away to other mineral collectors during his lifetime. But a large number remained by 1831 when the family published the following notice:

> [It being] necessary for the purpose of completing some family arrangements to dispose of the above splendid collection, the result of forty years' labour, Messrs. J. & E. Sowerby, the administrators, have determined to open it for Private Sale on Monday the 18th of this month.

The ultimate purchasers are unknown. In addition, mineral specimen auctions under the name of G. B. Sowerby (who had just turned 21 and was perhaps liquidating part of his inheritance)

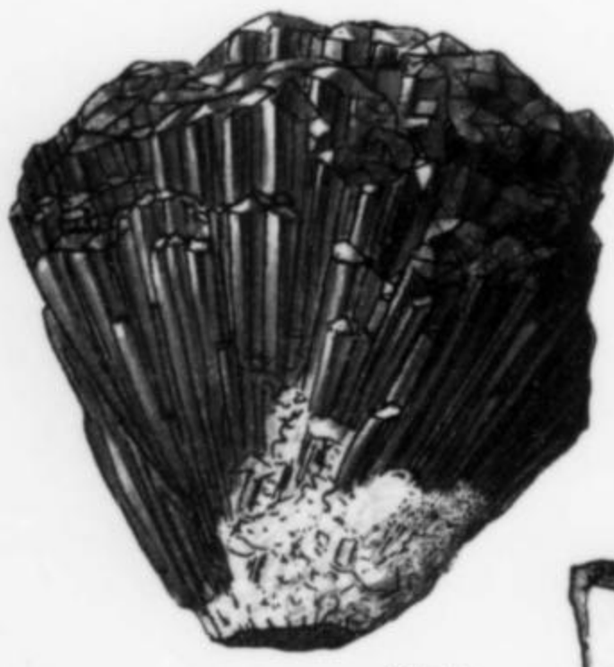


Cobaltite
Tunaberg, Sweden



Wulfenite
Bleiberg, Carinthia, Austria

Specimens from the collection of the **EARL OF BUTE** (later of **BABINGTON** and then **ST. AUBYN**).



Elbaite
Russia



Diopside
Russia

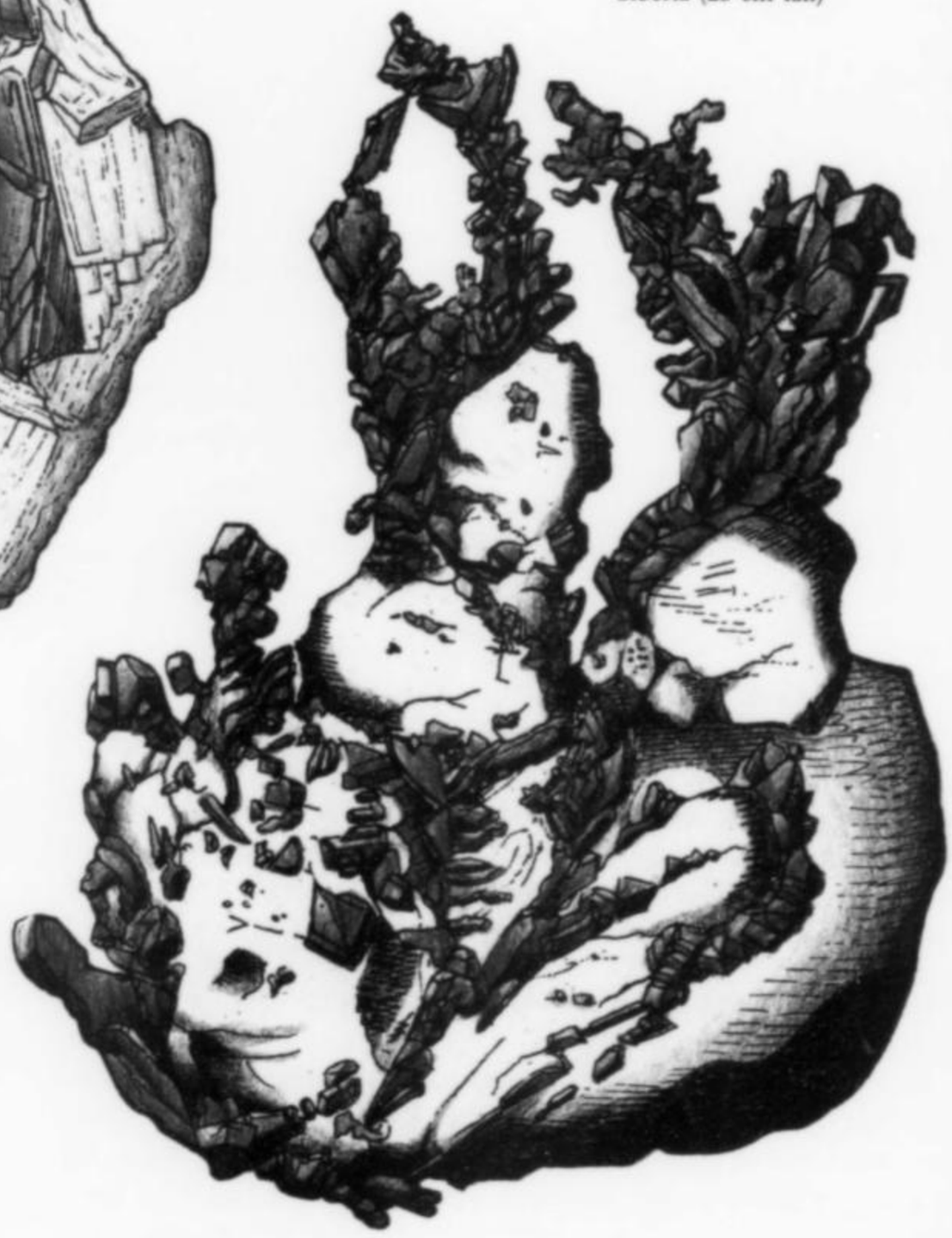


Elbaite
Russia



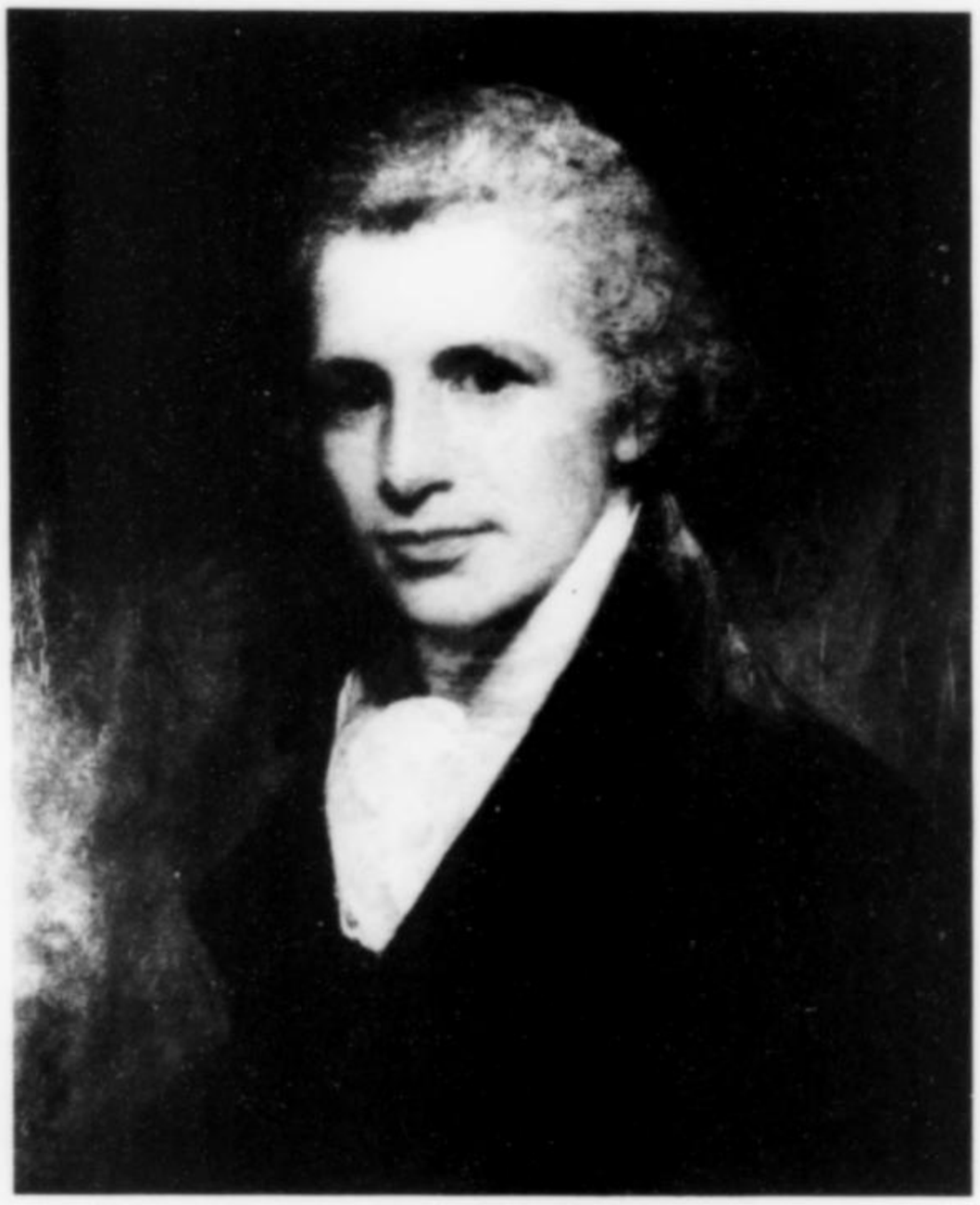
Topaz
Odontschelon, Russia

Copper
Siberia (25 cm tall)



Specimens from the collection of **ALEXANDER CRICHTON**.

took place in 1833 and 1835 (Chalmers-Hunt, 1976). A century later, in 1934, some Sowerby descendants offered what they called "the Sowerby Collection" to the British Museum, for which they were paid the minimal sum of £50. Included were five mineral specimens illustrated in *British Mineralogy*, valued by the Museum at about $2.25 each.



St. Aubyn

John St. Aubyn (1758–1839)

Sir John St. Aubyn, 5th baronet of that name, was for a time among the most important mineral collectors in England in the late 18th century. His grandfather (the 3rd baronet; 1700–1744) had been a friend and classmate of William Borlase at Exeter College, Oxford, a founder of the Society of Antiquaries, and a Member of Parliament for Cornwall at the age of 22. He was also a Justice of the Peace, who had taken part in the arrest and conviction of a murderer and gangster named Henry Rogers. Rogers was not given the death sentence, but lived on to terrorize the family with such threats that Lady St. Aubyn died of the stress, and the baronet placed his son (John St. Aubyn, later 4th baronet, 1726–1772) in the care of William Borlase and left the country. It may be that the enthusiasm Borlase held for mineral collecting impressed the young St. Aubyn sufficiently for him to begin a collection of his own. It is known, at least, that his wife, Elizabeth Wingfield, Lady St. Aubyn, maintained a collection and sent mineral specimens to William Hunter in 1764 or 1765.

His son, destined to become the 5th baronet, was born in 1758 and baptized in St. James Church, Westminster. He succeeded the baronetcy at the age of 14, and enrolled at Westminster School in 1773. He proved to be an intelligent and cultured man as an adult, but led an extravagant life and fathered at least 15 children, all illegitimate. He served as High Sheriff of Cornwall (at the age of 23), and went on to become a Fellow of the Royal Society, a Fellow of the Linnean Society, a Member of Parliament, Fellow of the Society of Antiquaries, Provincial Grandmaster of the Freemasons (for 54 years), and a Fellow of the Society of Arts. He built a fine library and an extensive collection of etchings and engravings.

The exact origins of his mineral collecting activities remain unknown, but he had a substantial collection at least as early as 1794, when he met and hired Count de Bournon as his part-time mineral curator. In 1799 St. Aubyn (perhaps on the advice of Bournon) made his two major purchases: the minerals formerly owned by Richard Greene (for £100), and the enormous collection of minerals assembled by the Earl of Bute (for £3,000). These acquisitions were catalogued, at least in part, by Bournon, but the portions of the catalog which would have described metallic minerals are lacking. Bute's collection had already been catalogued by William Babington, who owned it for a time before selling it to St. Aubyn.

In 1804 St. Aubyn worked to establish a public mineralogy collection and assay office in Cornwall, but it failed through lack of funding. When he died in 1839 his own estate was deeply in debt, and much of his property and estate income went for years to the clearing of these debts. The mineral dealer Isaiah Deck (1792–1853) was commissioned to help dispose of the huge mineral collection. In a copy of Babington's 1799 catalog of the Butean collection Deck wrote:

> In 1834 I had the [job of making an] arrangement of Sir John's whole collection, of which I formed two complete small collections; one for Lady St. Aubyn and another for Mrs. Parnell, his daughter. A very beautiful and extensive collection I formed for the museum at Devonport, and the duplicates were brought to the hammer [i.e. sold at auction], most of which I purchased.

The specimens acquired by the Civil and Military Library Museum at Devonport survive today in the Plymouth City Museum. Others of his specimens were obtained by the Saffron Walden Museum.

Alexander Crichton (1763–1856)

Alexander Crichton was born and educated in Edinburgh, where he apprenticed himself at an early age to the surgeon Alexander Wood. In the summer of 1784 he traveled to London for medical studies, then moved on to Leiden where in 1785 he was awarded his M.D. degree. After four more years of study in Paris, Stuttgart, Vienna and Halle he returned to London, where he practiced surgery until 1791. He then transferred to the College of Physicians. In 1794 he was elected physician to Westminster Hospital, where he also lectured on chemistry and *materia medica*.

Crichton had probably developed an interest in minerals while studying in Paris and Vienna, where excellent collections abounded. The American physician and collector David Hosack (1769–1835) visited Crichton in London in 1794 and admired his already fine mineral collection.

In 1804 Crichton was offered the appointment of Physician in Ordinary to Czar Alexander I, and decided to accept. He was well-received in St. Petersburg, and soon gained the favor of the Czar, who promoted him to head the entire civil medical establishment in Russia. Over the years he advised the dowager Czarina on the construction and regulation of charitable institutions, and was decorated for his work in mitigating a serious epidemic in the southeastern provinces.

During this time Crichton avidly collected minerals and developed into a first-rate connoisseur. Wagner (1818), who wrote the catalog of his collection, said of it:

> Nothing is found therein which cannot make a claim to

being extraordinary. All is chosen according to strict criteria, with the most refined taste and the finest delicacy . . . the most beautiful and well-developed flowers of the Mineral Kingdom.

Crichton's collection consisted in large part of Russian and Siberian specimens acquired during his years in St. Petersburg. But it was also rich in exquisite examples from Norway, Hungary, Germany, England, America and India, many perhaps acquired during his medical studies in Paris and Vienna. Most were cabinet size (12 to 15 cm), but there were also many excellent smaller specimens, especially single crystals.

For his services to the Czar, Crichton was no doubt well paid, and could afford to purchase even the most expensive specimens. St. Petersburg and Moscow had a number of mineral dealers and prominent collectors who no doubt provided important pieces. Some of the dealers' prices appalled even Wagner, however, who complained about seeing a white, water-clear topaz measuring 1 by 2 inches priced at 2,000 rubles by the dealer Dmitrii Luchmanov; and a beryl of pale green color and 1.5 inches long was priced at 2,500 rubles, both apparently inflated in price due to their perceived gem value.

Highlights of Crichton's collection included a superb suite of fluorite crystal groups in all colors, associated with quartz, calcite, siderite, barite and pyrite, from localities in England, Scotland, Saxony, Bohemia and Siberia. A particularly large and fine Cornish example had cubic crystals 3 inches on an edge, and had cost £5 sterling in London. Another example, with large, green octahedral crystals, was studded with white topaz crystals; it came from Klitschkinskoy near Nertschinsk, Siberia.

Crichton, of course, had specimens of crichtonite from St. Cristoph, Bourg d'Oisans, France, which Count de Bournon had named in his honor in 1813.

The topaz suite included Brazilian, English, Saxon and Bohemian examples, but the Siberian specimens from Mursinka and Oduntschelon were especially fine. The Siberian aquamarine crystals were also extraordinary, and the "siberite" (red tourmaline) crystals were fine as well. Crichton also owned 80 specimens of feldspar in crystals and groups from 3 to 15 inches across, from Norway and Siberia. His large amazonite crystal, about 16 cm, cost him 1,000 rubles.

Wagner states that Crichton's collection of 2,000 Siberian pegmatite minerals was assembled with much "work, money and luck" over an eight-year period (i.e. from 1810 to 1818), and was valued at 75,000 to 80,000 rubles. Many of the specimens, he said, were of the kind that had not been found for 30 to 50 years.

Over 70 native gold specimens, mostly from Berezov near Ekaterinberg in the Urals, were included, as well as crystalline and leaf gold in quartz, in barite, in malachite, in jasper and in limonite. One especially nice crystal Crichton received as a "costly gift" from Novositzoff, former president of the Imperial Academy of Science.

His 66 native silver specimens included "rich and wonderful" Kongsberg examples, and his native copper crystal groups from Siberia were equally as spectacular. Of the lead-containing minerals he had 130 to 140 specimens, including fine wulfenites and cerussites.

In 1819 the Czar granted Crichton leave to return to his home in England for health reasons, but he was recalled the following year to tend the Grand Duchess Alexandra for a short time. In 1820 and 1821 he was knighted by William III of Prussia and George IV of England, respectively, and apparently retired thereafter from active medical practice, although he did publish an occasional technical paper on medical and geological subjects.

In 1827 Crichton elected to auction off his extraordinary collection of over 4,000 high-quality display specimens. Isaac Walker is known to have obtained some of them, the Duke of Devonshire bought 176 specimens, the Leeds Philosophical and Literary Society acquired some 250 specimens, and the physician George Tuthill (1772–1835) also made purchases. (Tuthill's collection, incidentally, later became the basis for Francis Chantrey's collection when it was purchased by Chantrey following Tuthill's death. Many specimens from Chantrey's collection were acquired by Gerard Troost (1776–1850), a Dutch mineralogist who settled in America; his 14,000-specimen collection is preserved in the Louisville [Kentucky] Museum of History and Science.) The Linnean Society Library in London has Crichton's catalog. Crichton lived for another 29 years before he died at The Grove, near Sevenoaks in Kent, at the age of 93.



Smithson

James Smithson (1765–1829)

James Smithson would perhaps be better remembered today as a mineral collector had his great collection not perished and any detailed description of it been lost. He is instead known solely as the founder of the Smithsonian Institution, where in the last century one of the world's great public mineral collections has been assembled.

Smithson was born in Paris, the illegitimate son of Hugh Smithson Percy, first Duke of Northumberland, and Elizabeth Hungerford Keate Macie, widow of James Macie of Bath. Until the age of 36 he was known as James Louis Macie, but in 1801 he formally took the surname Smithson.

At the age of ten Smithson returned to England with his mother, where he attempted to become a citizen, but due to the accident of his birth he was accepted only with the restrictions that he never hold public office or receive any grant of land from the Crown. He entered Pembroke College, Oxford, in 1782, finding an attraction to the study of chemistry and mineralogy. He was awarded the M.A. degree in 1786, and was elected a Fellow of the Royal Society through the sponsorship of the Irish mineralogist Richard Kirwan, the prominent horticulturist and mineral collector Charles Greville, and the well-known chemist Henry Cavendish.

While at Oxford Smithson excelled in his studies, and was said to be the best chemist and mineralogist of his class. In 1784 he made a geological and mineral collecting tour of Oban, Staffa, and the western Scottish Isles in the company of (among others) the great French geologist Barthélemi Faujas de St. Fond (1741–1819), whose own mineral cabinet was among the finest in Paris. Smithson's vacations from school were generally spent in the field, collecting minerals and ores; the comfortable financial status of his mother surely allowed him the latitude of buying mineral specimens as well. Some of these specimens he used as the basis for chemical and analytical experiments.

Following graduation Smithson took up residence on Bentinck Street and occupied himself with chemical experiments, perhaps also assisting Cavendish in his laboratory. Smithson traveled through Switzerland, Italy and the Tyrol in 1792, no doubt collecting mineral specimens along the way, and then returned to Paris for a time.

In 1802 he published a competent paper identifying many "calamines" as zinc carbonate, rather than zinc oxide as Haüy had thought. It was on the basis of this paper that the mineral smithsonite was named in his honor.

Little is heard from him in the following years, save for a few publications on various mineral species and their chemistry . . . numbering 27 in all. He obtained satisfactory results in his analytical work despite utilizing "the most primitive and unsatisfactory appliances," which surely he could have afforded to improve if he had chosen. He is known to have been a friend of the chemist and mineralogist William Wollaston as well, and rivaled him in microanalytical technique.

Apparently Smithson lived for most of his later years abroad, mainly in Paris, dividing his time between chemical studies and the gaming tables. Although in ill health, he prepared over 200 manuscripts which remained unpublished at the time of his death.

Smithson had inherited a fortune from his mother, who had been well-provided for by her two husbands and who had fallen heir to the rich estate of the Hungerford family. In his will, Smithson left nearly all of it to his nephew, Henry James Hungerford, but with the provision that if his nephew died childless the estate would go . . .

> . . . to the United States of America, to found at Washington, under the name of the Smithsonian Institution, an establishment for the increase and diffusion of knowledge among men.

Smithson died in Genoa, Italy, in 1829, and his nephew died without heirs six years later. The United States Government was duly notified, and prosecuted its claim to the estate, which ultimately amounted to over $550,000. The money was shipped as 105 bags of 1,000 gold sovereigns each to the Philadelphia mint, and Smithson's physical property including his mineral collection was sent to Washington. It was not until 1846 that the American congress completed its plans for the founding of the institution. (Smithson's remains were shipped from Genoa to Washington in 1904 and were interred in the original Smithsonian building.)

A committee formed to examine Smithson's bequest wrote of his mineral collection as follows:

> Among the effects of the late Mr. Smithson is a cabinet which, so far as it has been examined, proves to consist of a choice and beautiful collection of minerals, comprising probably eight or ten thousand specimens. The specimens, though generally small, are extremely perfect, and constitute a very complete geological and mineralogical series, embracing the finest varieties of crystallizations, rendered more valuable by accompanying figures and descriptions by Mr. Smithson, and in his own writing. The cabinet also contains a valuable suite of meteoric stones, which appear to be suites of most of the important meteorites which have fallen in Europe during several centuries.

Although Smithson traveled widely and was acquainted with chemists and mineralogists in many countries, he seems at heart to have felt closest to the Paris community. In Paris he was raised, and to Paris he returned for many years, where his favorite circle of friends and scholars resided, and where an unprecedented number of excellent mineral collections could be seen. It is reasonable to speculate that Smithson's mineral collection was strongly influenced by the Parisian passion for highly aesthetic, colorful, well-crystallized specimens, especially single crystals and crystallographically demonstrative examples, despite Smithson's personal emphasis on chemical analysis. The above-quoted committee report supports this speculation.

In 1865 a fire broke out on the second floor of the Smithsonian building. Many collections were destroyed, including Smithson's cabinet of minerals, his catalog, unpublished manuscripts and personal effects. Thus the mineralogical research and collecting activities of the founder of America's greatest museum were thrown into darkness for all time.

John Mawe (1766–1829)

John Mawe achieved fame not only as one of the three most prominent English mineral dealers of the late 18th century (along with Jacob Forster and Forster's nephew Henry Heuland), but also as a pioneer in the geology of Derbyshire. Born to a baker and flour merchant in the town of Derby, he was unable, as the younger of two sons, to inherit his father's business. His mother died in 1776, when he was ten years old, and a year or two later he shipped out on a merchant vessel. The mariner's life was agreeable to him, and within a few years he had risen to become an officer of the ship.

Mawe's travels at sea took him all around the world, from Mozambique to Morocco, Jamaica and Bombay, for the next 15 or 16 years. Unfortunately, war broke out with France in 1793 and was to continue for some 22 years. The sea-faring life with the Merchant Navy became too hazardous for Mawe, and he elected to return to his home town to make his living in some other way. During his youth he had lived near Castleton for several years and developed a taste for mineral collecting, an interest which he soon turned into an occupation.

Mawe's father had died in 1783, leaving him a small inheritance. It was not enough to live on, however, so Mawe took a position as apprentice to Richard Brown II (1736–1816), a marble worker in Derby who specialized in manufacturing turned ornaments from Derbyshire fluorite and marble. He also specialized in the sale of small collections of the minerals found in Derbyshire. Mawe married Brown's eldest daughter, Sarah, in 1794 and moved to London to manage the company's new shop. It became known as "Brown, Son and Mawe, Petrifactions Warehouse." There he came fully into the mineral business, selling a wide range of minerals, "all the new-discovered substances and . . . elegant crystallisations, fossils and petrifactions in the greatest variety," along with "collections of mineral substances, the produce of Derbyshire," and at the same time offering mineral analyses for the collector, and sets of slabbed local rocks, minerals and ores.

In 1796 Mawe received an order for a systematic collection of Derbyshire rocks and minerals from Charles de Gimbernaut (1768–1834), purchasing agent for the natural history cabinet of King Carlos IV in Madrid. War between England and Spain broke out later that year, so it is unlikely that the order ever arrived in Madrid.

Jacob Forster's wife, Elizabeth, who operated the rival Forster

mineral shop in London during her husband's years in Russia, commented to Philip Rashleigh in 1799 that Mawe had "been very successful since entering the mineral line, and is a very busy man" (Rashleigh archives, Cornwall Record Office). He had become a prominent mineral collector in his own right, and his scientific opinions were being sought by the government regarding plans for a proposed mineralogical expedition to Ceylon and Australia. He had developed good connections in Vienna, St. Petersburg, Copenhagen, Lisbon and elsewhere throughout the world which brought in a steady flow of new specimen stock. These sources, combined with his own collecting trips, resulted in his having more than 20,000 specimens on sale by 1800.

In 1802 Mawe published the first of several interesting mineralogical works, and one that earned him recognition as a geologist: *The Mineralogy of Derbyshire, with a Description of the Most Interesting Mines in the North of England, in Scotland and in Wales.* As a result his fame preceded him on the Continent, and his 1802 visit to Paris found a friendly reception from the likes of Haüy, Patrin, Vauquelin, Faujas de St. Fond, Delametherie, Lelièvre and Pini. His wife managed the London shop in his absence.

Mawe had retained his taste for travel since his retirement from the Merchant Marine, and in 1804 decided to embark on a protracted journey to South America. Issuing a new catalog prior to his departure (*A New Catalogue of Mineral Substances . . . after Professor Werner . . . with the new names of Prof. Haüy . . .*), he once again left the Covent Garden shop in Sarah's hands, an establishment which now claimed to have the "largest variety of minerals and shells in Europe," supplied with specimens by his contacts in "Sweden, Norway, Switzerland, Madrid, Italy, Paris, East Indies, New Holland, etc." as well as Vienna, St. Petersburg, Copenhagen and Lisbon. He left England on August 1, 1804, for what is now Uruguay and, with the help of his new royal patronage from the Portuguese Court, worked his way across Brazil during the years 1807–1810, visiting many remote mining sites. Returning home in 1810, he wrote up his notes for publication as *Travels in the Interior of Brazil* (1812), and *A Treatise on Diamonds and Precious Stones* (1813).

Mawe continued his dealing successfully until his death in 1829, at which time his business and extensive specimen stocks were taken over by James Tennant (1808?–1881), a young mineral dealer and lecturer on mineralogy at nearby King's College. Sarah must have continued her involvement to some extent, for she was appointed 8 years later as "Mineralogist to Her Majesty" Queen Victoria. She died in 1846 at the age of 79.

Duke of Buckingham (1776–1839)

It will be remembered from the story of the illustrious crystallographer, René Just Haüy (1748–1822), that his mineral collection had been widely admired in Paris. Austrian Archduke Johann is said to have offered Haüy £24,000 for it in 1814, but Haüy politely refused to sell because it was his plan to bequeath the collection to France. He had, however, apparently neglected to prepare the necessary papers to accomplish this by the time of his death, and it passed to his niece and nephew, who promptly sold all 12,000 specimens to the Duke of Buckingham for an undisclosed sum.

The Duke's real name was Richard Temple Nugent Brydges Chandos Grenville; the "Brydges Chandos" portions of his name were added following his marriage to the heiress of those families. He was a Member of Parliament, and appears to have been made a Duke as a bribe to secure his family's allegiance to the Tory party. He was described variously as a "blubber head" and as having "a ludicrously exaggerated notion of his own capacity and consequence." His son and heir, Richard Plantagenet Temple Nugent Brydges Chandos Grenville, succeeded to the title upon his father's death; he spent profligately, and within a few years was bankrupt. His property, including the Haüy collection and many other items of natural history, was sold at auction by Christie's in 1848.

The Haüy collection, or what was left of it, was purchased by the Natural History Museum in Paris. The Duke's other mineral specimens were purchased by the London mineral dealer James Tennant. Tennant sold these (possibly after making a few substitutions) to John Ruskin (1819–1900), calling it the "Stowe Collection" and receiving from Ruskin a vastly inflated sum. Ruskin ultimately decided he had been swindled, and took the case to court, but due to interminable legal delays he finally settled privately. Some of these specimens are preserved today in the Ruskin Gallery in Sheffield. Of Haüy's original 12,000 specimens, only about half are known to have survived, carefully preserved on their original mounts in the Paris Natural History Museum.

The Williams Family

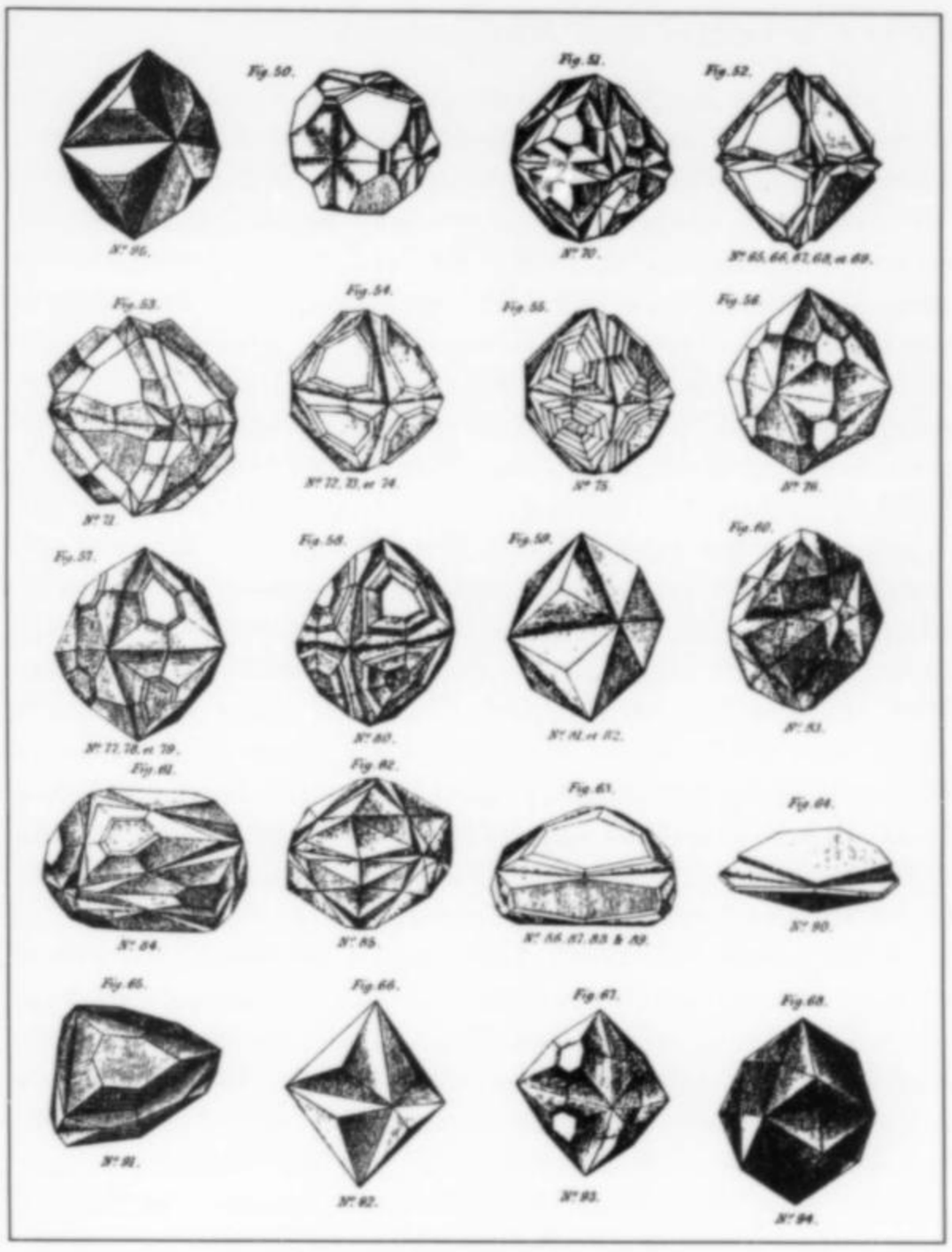
The principal mineral collector in the Williams family of Cornwall was John (IV) Williams (1777–1849), an accomplished chemist, mineralogist and businessman. He was the son of John (III) Williams (1753–1841), agent for the North Down and Gwennap mines in Cornwall, the grandson of Michael (I) Williams (died 1775), a Cornish "mine adventurer," and great-grandson of John (I) Williams (died 1761), who had emigrated from Wales to Cornwall in 1716 to seek his fortune in mining. John (I) was quite successful, leaving an estate of £10,000 to his son and beginning a tradition of involvement with Cornish minerals that lasted for generations.

John (III) was educated at the old grammar school of Truro and at once embarked on a career in mining, at first taking over the management of a mine called the Wheal Maiden, then later expanding his territory to superintend a large number of mines. He established himself in the village of Scorrier, parish of Gwennap, and in 1778 built a residence he called Scorrier House. He eventually came to be known as the greatest living authority of his time on Cornish mining, and was referred to as "the King of Gwennap." Visitors to Cornwall wishing to see the mines generally made their arrangements through him.

Between 1795 and 1800 John (III) Williams entertained many prominent visitors, including the French Princes later to be crowned as Louis XVIII and Charles X. He developed the manganese industry near Calstock in eastern Cornwall, became a partner in the Cornish bank at Truro, and helped build an important breakwater at Plymouth. During his later years he began accumulating an extensive Cornish mineral collection at Scorrier House, with the help of his son, John (IV). C. S. Gilbert, who visited them in 1796 when John (IV) was 19 years old, wrote that the Williams family had "the most valuable variety of Cornish minerals that was ever collected by any gentleman in Europe" (though we may question whether Gilbert had ever seen Rashleigh's collection).

John (IV) Williams soon came to be regarded as "probably the best chemist and most experienced mineralogist in the West of England." He was a member of the Society of Friends, was elected a Fellow of the Linnaean Society in 1806, and a Fellow of the Royal Society in 1828. He was a friend of James Sowerby, and loaned several specimens for illustration in *British Mineralogy*. In later years, however, he appears to have given up working on the collection. Following his death in 1849 the collection was purchased from his estate by his brother, Michael (II) Williams (1784–1858), in 1852, who observed that some of the drawers in his cabinets appeared to have been unopened for 50 years.

Six years later the collection passed to John Michael Williams



Diamonds from the collection of
ABRAHAM HUME.



Hume

(1813–1880), second son of Michael (II), who had by then developed an interest of his own in mineral collecting, and added significantly to the collection. John Charles Williams (1851–1939), John Michael's son, inherited the collection in 1880 but showed less interest. In 1891 he gave several thousand specimens to the Basset Memorial Museum of the newly formed Camborne School of Mines, and in 1893 he invited the curators of the British Museum to select the best 550 specimens from what remained.

A cache of specimens from the Williams collection that had been separated from the others remained for many years at the family's Estate Office in Burncoose. In 1948 Sir Arthur Russell purchased these 585 specimens from the heirs of John Charles, and these too were ultimately given to the British Museum, where at least 1,135 of Williams specimens are now preserved.

The Williams collection, although famous throughout most of the 18th century, is not well-known today primarily because it had no labels to speak of and no manuscript catalog or written records, and therefore, of course, no published catalog that would give the scholarly community access to information it contained. It is known to have included huge cerussite crystal specimens so large that two men were required to move them. A fine spangolite was among the specimens given to the British Museum. Williams specimens illustrated by Sowerby include a chlorargyrite from the Mexico mine, Cuthbert parish, Cornwall (plate 244, dated 1807), and an attractive group of what appear to be white blocky albite crystals, "Silex petuntse," from the Huel Rose mine, Gwennap (plate 257, dated 1808).

Other Mineralogists and Dealers

Among the 18th-century mineralogists in England, Emanuel Mendes da Costa (1717–1791) has already been mentioned as a correspondent of William Borlase. He served as Clerk for the Royal Society until his arrest and imprisonment for embezzlement, and was always short of finances. Following his release he attempted to renew many of his former contacts and built a new mineral collection later acquired by E. Donovan and Thomas Pennant.

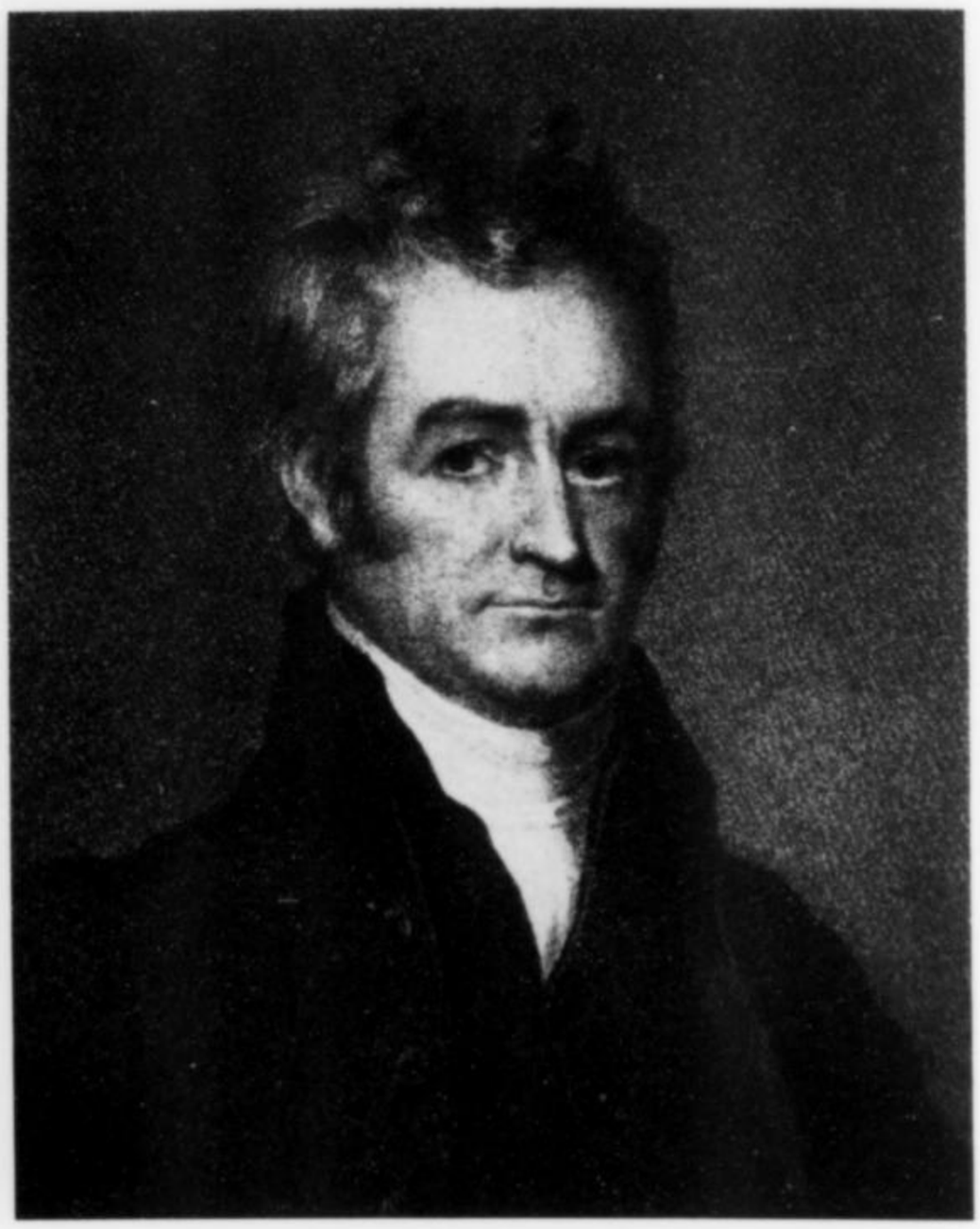
Sir Abraham Hume (1749–1838), along with Sir John St. Aubyn and Charles Greville, supported Count de Bournon during his exile in England by employing him to curate their mineral collections. Hume's collection, rich in diamonds, was acquired by the Sedgwick Museum, Cambridge, in 1841.

White Watson (1760–1835) was a British sculptor and mineral dealer in Derbyshire, and an early pioneer in the study of Derbyshire geology. Two manuscript catalogs which he prepared in 1799 and 1804 for mineral collections assembled by the Duchess of Devonshire are still preserved at Chatsworth; Watson appears to have supplied many of her specimens.

Thomas Pearson (ca. 1760–1830), a Matlock mineral dealer, is known to have sold specimens of phosgenite to Charles Greville in 1785. Joseph Tregoning (1762–1841) was a mineral dealer and also a printer and bookseller in the 1790's; he developed a stock of several thousand specimens, and prepared small study collections.

Other prominent mineralogists who maintained personal mineral collections included the chemist William Wollaston (1766–1828), discoverer of palladium and rhodium, and inventor of the reflecting goniometer; Johann Schmeisser (1767–1837), who under the sponsorship of the Linnaean Society gave the first course of lectures on mineralogy ever presented in London (in 1793), shortly thereafter publishing a *System of Mineralogy* (1795) much used in British and American colleges; Robert Bakewell (1768–1843), author of *Introduction to Mineralogy* (1819), whose mineral collection

was sold at auction in 1844; the widely traveled Cambridge Professor of Mineralogy Dr. Edward Daniel Clarke (1769–1822), whose collection was purchased by the University; Henry James Brooke (1771–1857), who produced a revised edition of Phillips' *Elementary Introduction to Mineralogy* in 1852 (his collection still survives intact at Cambridge); John Kidd (1775–1851) at Oxford, author of *Outlines of Mineralogy* in 1809 (his collection went to the Ashmolean Museum); and John George Children (1777–1852), whose Almaden cinnabars were illustrated by Sowerby.



Phillips

Finally, mention must be made of the brothers William Phillips (1775–1828) and Richard Phillips (1778–1851). Like Joseph Tregoning, they were printers and booksellers; their father James Phillips had printed Pryce's *Mineralogia Cornubiensis* in 1778. William became an apparently self-taught mineralogist of high standing, and published a number of much-used works including *Outlines of Mineralogy and Geology* (1815 and later editions), and *Elementary Introduction to the Knowledge of Mineralogy* (1816 and later editions). He was the most distinguished geologist among the founders of the Geological Society of London. His mineral collection of about 1,000 specimens was purchased by Dr. John Rutter in 1829 and later bequeathed to the Medical Institution in Liverpool. It was transferred to the Liverpool Museum in 1887, where it was later destroyed by German bombing in 1941. William's brother Richard became an accomplished chemist and mineralogist as well, and left the family printing business for the scholarly life. He lectured at several London institutions, served as Professor of Chemistry at the Sandhurst Military Academy, and as President of the Chemical Society. From 1839 until his death he held the position of curator at the Museum of Practical Geology. According to James Sowerby, he "possessed one of the finest and earliest collections of tins" and other minerals from Cornwall, some of which he loaned to Sowerby for illustration in his *British Mineralogy*. His collection is presumed to have gone to the Museum of Practical Geology.

Other Scholars and Antiquaries

Many other English scholars, naturalists and antiquaries of various types collected minerals, at least as an adjunct to their other pursuits. The 17th-century collectors William Cole (died 1701) in Bristol, Martin Lister (1638?–1712) in London, the famous architect Sir Christopher Wren (1632–1723), the Royal Astronomer John Flamsteed (1646–1719), the Rev. William Stonestreet, the famous astronomer Sir Edmund Halley (1656–1742), Ashmolean curator Edward Lhwyd (1660–1709), and the London antiquary John Kemp are all known to have possessed some minerals, many of them having supplied specimens to John Woodward.

Later examples include Ralph Thoresby (1658–1725) who operated a sizeable commercial museum of curiosities in Leeds, Charles Dubois (ca. 1660–1740), the celebrated botanist and treasurer of the East India Company, the naturalist and poet Henry Baker (1698–1774), the Caribbean naturalist John Ellis (1710?–1776), the Welsh scholar Richard Morris (died 1779), and the naturalist John Whitehurst (1713–1788), a friend of Benjamin Franklin, whose mineral collection, "confined to the productions of Derbyshire . . . was an assemblage of objects suitable to form the basis of a mineralogical description" of the county.

William Constable (1721–1791) built a substantial and varied museum of natural history including minerals, shells, corals, fossils and insects. It was all sold off, following his death, to Marmaduke Tunstall (1743–1790) and R. Chichester-Constable; much of it is preserved at Burton Constable Hall in North Humberside, but some of the minerals also went to the Hull Museum.

Peter Woulfe (1727?–1803), a chemist in London and Paris, is known to have built one of the most beautiful English collections of minerals, including over 500 specimens of mercury minerals, 500 other metallic minerals, and over 100 specimens of Derbyshire fluorite, among other things. With his brother John he sold over 1,000 mineral specimens to Dr. William Hunter, some of which are preserved today in the Hunterian Museum in Glasgow.

Among the best-known 18th-century collectors in London was Sir Ashton Lever (1729–1788). He originally built his extensive cabinet of curiosities, known as the "Leverian Museum," near Manchester around 1752. It contained 1,100 mineral and fossil specimens, especially English barites. In 1774 he moved his museum to London, and in 1783 offered it to the British Museum, but they declined. Having gone deeply in debt, he was forced by an act of Parliament in 1784 to dispose of it by lottery, whereby it fell to James Parkinson, who auctioned it off in 1806. Some idea of its size may be gained by the fact that the 7,879 lots (many consisting of multiple items) required 63 days to auction.

Another privately owned museum open to the London public was B. Rackstrow's Museum on Fleet Street. It contained a wide range of natural and artificial curiosities including "spars and crystallizations," all of which were auctioned off in 1799.

London was not the only site in England for interesting private museums. Peter Crosthwaite (1735–1808), William Todhunter (died 1830's) and Thomas Hutton (1746–1831) each operated commercial museums in the Lake District. Crosthwaite's museum opened in 1781; it contained a variety of natural history specimens including a glass display case of gems and minerals and a sales stock consisting of 16 large drawers "containing the scarcest minerals, and the finest crystallizations of spars, with every variety of the finest colors imaginable." Following his death it operated under his son and grandson, until 1870 when the "principal antiquities" (including minerals?) were sold to the British Museum. Todhunter, a hatter and bookseller by trade, opened his museum in Kendal in the 1780's. His exhibits included "crystals, spars, minerals, basalt from the Giant's Causeway, fossils [and] petrifactions," and he sold a great variety of minerals and fossils to

his visitors. The liquidation sale of his collection in 1835 was advertised as including "large, fine crystallizations . . . ores and singular combinations, etc., some foreign minerals, precious stones [and] sets of minerals." Hutton's museum, founded in 1785, included birds, fish, insects, shells, coins and, especially, minerals collected in the famous mines of northern England. After his death it was operated by his daughters, Hannah and Mary, who continued to sell "the most beautiful specimens of minerals, in every variety and colour."

The collections of John Stackhouse (1741–1819) and his son Edward Pendarves (1778–1853) at Oxford were among many later acquired by Sir Arthur Russell and turned over to the British Museum. Joseph Planta (1744–1817), a Swiss librarian at the British Museum, is also known to have donated specimens there. Henry Beeke (1751–1837), Regius Professor of Modern History at Oxford, built a mineral collection acquired by the University in 1851. And Henry Swinburne (1743–1803), the well-known British travel writer, kept a small collection exclusively of minerals, which was auctioned off in 1803.

John Hawkins (1761–1841) was a wealthy and prominent Cornish antiquarian and scientist. He traveled in Greece and the Middle East, and rebuilt a house in Sussex which he filled with valuable paintings, drawings, antiquities, curiosities, and a mineral collection especially rich in Cornish specimens. He was a Fellow of the Royal Society, and wrote a number of papers on the geology of Cornwall. Sir Arthur Russell purchased his Cornish specimens at auction in 1905 and gave them to the British Museum. Much of the rest of his large mineral collection was bought by the German mineral dealer F. Kranz and was dispersed.

Charles Hatchett (1765–1847) was an affluent London chemist, the son of a famous coach-builder in Long Acre. Most of his chemical and mineralogical researches took place between 1796 and 1806, including his most famous accomplishment: the discovery of the element columbium. He had noticed an interesting mineral specimen in the British Museum which had come from John Winthrop (1681–1747) of Massachusetts by way of Hans Sloane's collection; it proved upon analysis to contain a new metal. The specimen, now recognized as the mineral columbite, was illustrated by Sowerby in his *Exotic Mineralogy*, and is still preserved in the British Museum. Hatchett's own fine collection of approximately 7,000 mineral specimens was purchased from him by the British Museum in 1799, for £700.

Sir Humphrey Davy (1778–1829) was another famous British chemist from Cornwall who distinguished himself in many ways. Not the least of his accomplishments was the invention of the "safety lamp," a flame lamp protected by a screen so as not to ignite flammable gases in mines. He donated his mineral collection, formed during his youth, to the Royal Institution of Cornwall in 1804 or before.

The last of the scientists to be considered here is George Bellas Greenough (1778–1855), a wealthy geographer and geologist who studied at Eton, Cambridge, Göttingen, and under Werner at Freiberg. He was a great admirer of the Earl of Bute's collection. He served as first president of the Geological Society in 1811, and built a geological collection (minerals, fossils, rocks) of his own later acquired by University College in London.

Other Physicians and Apothecaries

As in other countries, training in medicine often led to diversions into natural history and mineral collecting in Great Britain. The examples set by the physicians John Woodward, Hans Sloane, William Babington and Alexander Crichton were followed by many others, especially those who took part of their training on the continent.

Among these might be mentioned Edward Brown (1644–1708), personal physician to Charles II, who collected minerals in Hungary in 1669–1670; John Beaumont (died 1731), a geologist and surgeon in Bristol; the London physician Richard Meade (1673–1754); William Stukely (1687–1765); and the Yorkshire physician John Fothergill (1712–1780), whose geological collections were purchased by William Hunter in 1781 for £1,000.

John Hill (1714–1775) was a particularly interesting figure. Early in life he apprenticed himself to an apothecary, then set up shop in Westminster. To earn extra money he studied botany, and hired himself out to tend the collections of the Duke of Richmond and Lord Petre. He traveled the countryside collecting plants and minerals. However, failing to make a satisfactory income through these endeavors, he went on the stage and acted in a number of productions, but these also failed. He tried his hand at writing the libretto for an opera based on Orpheus, but it was not accepted. In 1746 he published a translation of Theophrastus's *History of Stones*, initiated a periodical called the *British Magazine* under his own editorship, and wrote a daily scandal column for *The London Advertiser and Literary Gazette*. Hill produced a number of books during this time, including a thick mineralogical work entitled *The History of Fossils* (1748), in which he illustrated specimens from his own growing mineral collection. This collection, assembled for study purposes and without much financial expenditure, he described as being "rather [more] numerous than elegant." But it served his purpose, and he took every opportunity to improve it by exchanging minerals and plants with other collectors. Somehow, amidst all this activity, he also found time to earn his medical diploma from the University of St. Andrew, and could thereafter call himself "Dr." But his scandal-mongering in the press won him few friends, and he was unable to find the requisite number of sponsors for admission to the Royal Society; so he turned his acid pen on that organization as well. His contentious character even got him beat up in public. His patron, the famous mineral collector Lord Bute (whose collection was later obtained by William Babington and John St. Aubyn) encouraged him to publish a massive, 26-volume folio work on plants, with 1,600 copperplate engravings depicting 26,000 different plants. This project, completed in 1775, cost him heavily but resulted in his receiving the Order of Vasa from the King of Sweden; thereafter he called himself "Sir John Hill," much to the annoyance of his many detractors. Hill next turned to the production of quack medications, through the sale of which he greatly increased his finances. He died of gout, a disease for which he had claimed to have a specific medicinal cure. A later biographer described him as "a versatile man of unscrupulous character, with considerable abilities, great perseverance, and unlimited impudence."

Other physicians known to have maintained mineral collections in England include Charles Morton (1716–1799), Principal Librarian for the British Museum, Colin MacKenzie (1723–1775) in London, James Parsons (died ca. 1792), William Withering (1741–1799), who published an English translation of Torbern Bergman's *Sciagraphia Regni Mineralis* in 1783, William Wavell (died 1829), the discoverer of wavellite and a correspondent of the American mineralogist Archibald Bruce, and John Coakley Lettsom (1744–1815), who donated 700 mineral specimens to Harvard College in 1793.

Other Artists

James Sowerby, through his writings and his hundreds of published mineral specimen engravings, was among the most influential 18th-century mineral collectors. But other British artists developed a liking for minerals as well. Examples include the London goldsmith Jeremiah Marlow (died ca. 1724), a London silk-pattern artist named Joseph Dandridge (ca. 1660–1744)

(whose collection was admired by John Ray, James Petiver and Emanuel Mendes da Costa), the London painters Edward Steele (died ca. 1759) and Arthur Pond (died 1760's), the famous potter Josiah Wedgwood (1730–1795), the modeler James Tassie (1735–1799), the painter and watercolorist George Cumberland (1752–1848), and the watercolorist Thomas Richard Underwood (1765–1836), who executed many of the plates for Rashleigh's *Specimens of British Minerals* (1802). Underwood was a Fellow of the Geological Society, and is known to have contributed specimens to Rashleigh's collection.

Lastly there was Wilson Lowry (1762–1824), the artist who pioneered steel-plate engraving. He was a good friend of James Sowerby, and loaned numerous specimens for illustration in his *British Mineralogy*. He also executed engravings of cuprite specimens and cassiterite specimens for the publications of William Phillips. Lowry's own mineral collection was highly regarded by Count de Bournon. Lowry married Rebecca Delvalle (1761–1848), an Englishwoman of Spanish extraction and an accomplished mineralogist in her own right. She must surely have assisted her husband in building the collection. Their daughter, Delvalle Lowry, was also a mineralogist, who gave classes on mineralogy in London and wrote several popular mineralogical works including *Conversations on Mineralogy* (1822). William Phillips (1818) mentioned Delvalle Lowry's "fine collection of minerals, [crystal] models, and instruments used in the mineralogical and geological researches." The Lowry collection was dispersed at auction in 1830.

Other Clergymen

The Rev. William Borlase was the most famous of England's early clergymen to collect minerals but there were many others as well, beginning with John Bargrave (1610–1680), canon at Canterbury, whose small natural history collection survives more or less intact. Others include the Bishop of Carlisle, William Nicholson (1655–1727) (who supplied 76 mineral and fossil specimens to John Woodward), Thomas Shaw (1694–1751), the Rev. D. Brymer at Wadham College, whose specimens (now lost) went to the Ashmolean Museum around 1760, Richard Pococke (1704–1765), Lord Bishop of Meathe, the Rev. Joseph Townsend (1739–1816), who built an "extensive, exquisitely beautiful collection of minerals," the Rev. Thomas Penrose (1742–1779), the Rev. Thomas Matthews (died ca. 1785), the Rev. S. Parlby (died ca. 1803), the Rev. Archdeacon Pierson of Yorkshire, and the theologian George d'Oyly (1778–1846).

Perhaps the most important after Borlase was the Rev. Clayton Mordaunt Cracherode (1730–1799), a book and print collector in Westminster. He earned his M.A. in 1753 but retained his studentship at Christ Church, Oxford, until his death. He took orders in the English Church and held the curacy of Binsey near Oxford, but never became especially involved in church affairs. Cracherode inherited an ample fortune following the death of his father in 1773. He was shy, grave and studious, passing his time at home building his book and mineral collections. Among his many mineral specimens was a fine suite purchased from George Humphrey. He was a Fellow of the Royal Society and the Society of Antiquaries, and a Trustee of the British Museum. He died in 1799, unmarried, and left his collections to the British Museum. These included 4,500 books of great rarity and quality, 107 portfolios of Old Masters drawings and prints, a collection of coins and of gems, and 868 choice mineral specimens, "all worthy of an imperial cabinet."

Other Aristocracy

In the history of England, the Earl of Bute and perhaps the Duke of Buckingham can be considered the most important aristocratic mineral collectors. There were relatively few others, most of them women.

The Duchess dowager of Portland, Margaret Cavendish Harley Bentinck (died ca. 1786), built an extensive general natural history collection, including "spars, ores and crystals," which brought £11,546 at auction. Lady Douglas and the Marquis of Donegal built modest natural history collections auctioned in 1789 and 1801. William Wyndham, Baron Grenville (1759–1834), is known to have donated South American mineral specimens to the British Museum in 1809. Georgiana Cavendish, the Duchess of Devonshire (1757–1806), assembled a substantial collection of minerals in two large cabinets at the family mansion in Chatsworth; it is still preserved there today. And Louise, Countess of Aylesford (1761–1832), built an extensive collection of minerals which was dispersed at auction in 1833–1839 by Henry Heuland, the British Museum acquiring many specimens and her two-volume manuscript catalog.

Among the high nobility in England mineral collecting has remained almost entirely ignored. The only examples of any possible significance are King George IV (1762–1830) and Queen Charlotte (1744–1818). King George owned a superb collection of minerals from the Harz Mountains. How he acquired it, and whether he ever paid it any attention, are not known. But he gave it to the British Museum in 1828 rather than retain it with the Royal Family's many treasures, so we may assume he thought it would be more appreciated elsewhere. Queen Charlotte asked for and received a small collection from William Borlase in 1768 which is still in the possession of the Royal Family.

The attitude of royal indifference and possibly even disdain continued in England after the close of the 18th century. The mineral dealer John Henry Heuland, for example, is known to have approached the Prince Consort, who had greatly admired the mineral collection of Sir Francis Chantrey. Heuland might have closed a sale . . .

> . . . had not Queen Victoria come in at the critical moment, and, on hearing the price asked, £1,000, told the Prince he could not afford it, Heuland being abruptly dismissed.

Other Men of Business, Government and Law

Among the business, government and legal professions in England there were many mineral collectors, though none (except for the Cornish "mine adventurers" and the self-employed mineral dealers) of any high significance. Early examples include the London merchant John Sowter, whose collection of Cornish and Devonshire minerals was donated to (and later lost by) the Ashmolean Museum in 1694, the pirate and buccaneer William Dampier (1651–1715) who supplied specimens to John Woodward, the London woolen draper and naturalist Peter Collinson (1694–1768), and the wealthy St. Columb mine adventurer Robert Hoblyn (1710–1756), whose collection was destroyed by fire in 1803.

Gustavus Brander (1720–1787) was a wealthy London merchant, antiquary, Director of the Bank of England, and later a curator at the British Museum. He had a "grand collection of minerals, fossils and petrifactions," some of which he exchanged with Pedro Dávila in Paris ca. 1754. Another merchant and banker was Richard Bright (1754–1840) in Bristol, who specialized in Cornish specimens. His collection passed to his son and grandson but was left abandoned in the family residence when it was sold in 1870. Lord Ashburnham prevailed upon the British Museum to salvage the specimens in 1873.

Barristers, councilors and judges include William Frankcombe (1734–1767), Sir Thomas Fludyer (died 1769), the Hon. Topham Beauclerk (1739–1780), and Thomas Griffin (died after 1788).

There was also Robert Hughes, British Consul General for the Dutch and Agent for the English in Cairo, Col. Robson, the Lieutenant Governor of St. Helena, and the British political economist and Member of Parliament David Ricardo (1772–1823).

Scotland

Edinburgh in the 17th and 18th centuries was among the most respected centers of learning in Europe. Chemistry, geology and medicine flourished there in about equal proportions, producing many important mineral collectors.

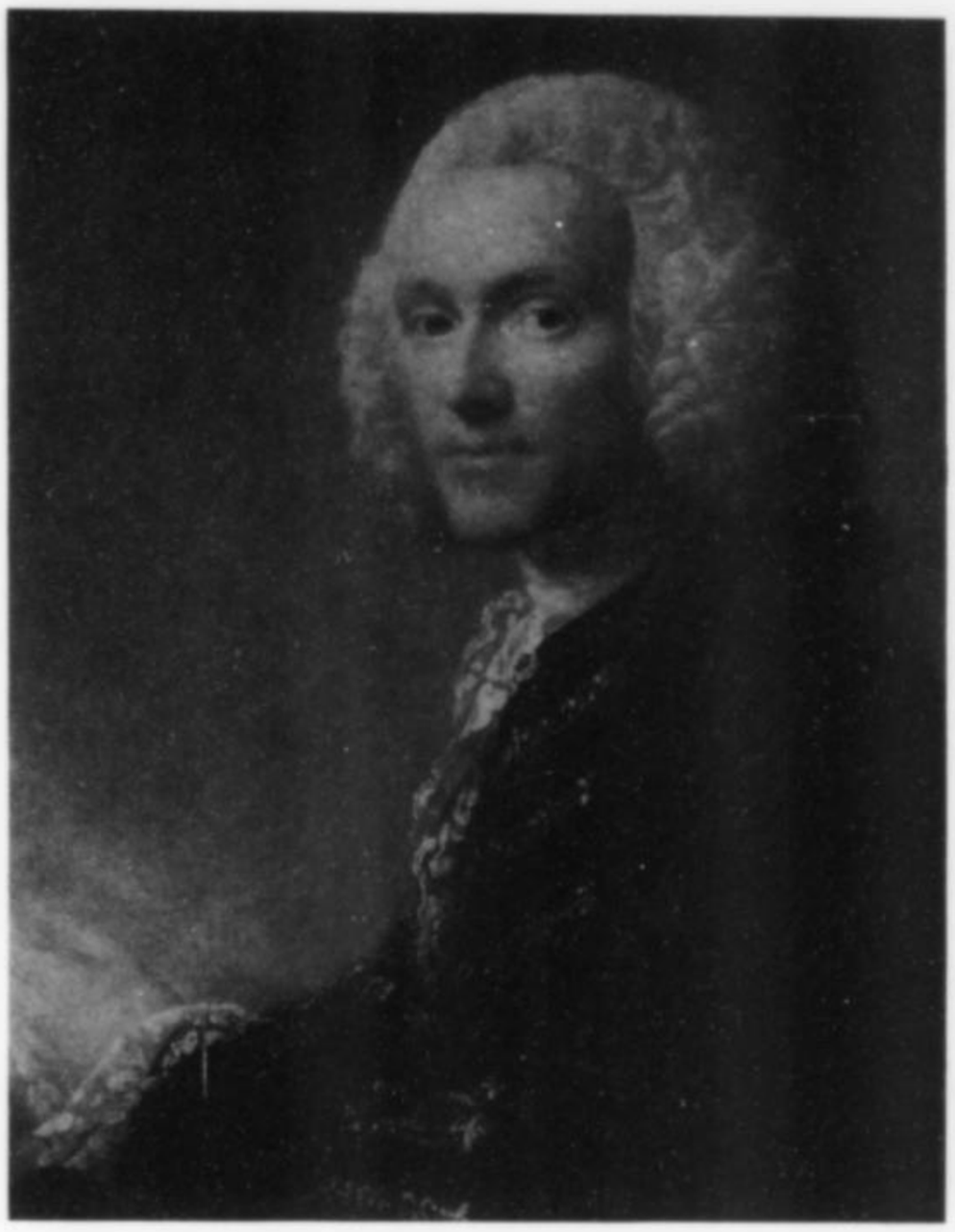
Among the earliest Scottish collectors was Sir Andrew Balfour (1630–1694), born at Balfour Castle in Fifeshire. He began to study natural history and medicine at the University of St. Andrew, then transferred to Oxford, following which he studied for some years in Paris and Padua. He received his M.D. degree at Caen, France, in 1661 and took up medical practice in London for a time, then traveled again on the continent for another 15 years, finally returning to St. Andrews and Edinburgh where he and Robert Sibbald (1643–1720) founded a major botanical garden at the University of Edinburgh. Although he concentrated mostly on botany, his collections also included minerals, though probably nothing extraordinary. These were all inherited by Sibbald.

Sibbald developed a famous private museum of his own, later combined with Balfour's. Born in Edinburgh, Sibbald showed an early aptitude for scholarship, and was eventually enrolled in the University. He studied theology for a time and entertained thoughts of entering the church, but, preferring a quiet life over the fractious nature of church affairs in those days, he finally fixed upon medicine. He took to travel, obtaining his M.D. at Leiden in 1661 after only a year and a half of study there. He proceeded through Paris and Angers, taking another degree there, returning to London and Edinburgh in 1662. There he entered the practice of medicine, and entertained himself with botanical work. In 1681 he founded the Royal College of Physicians in Edinburgh, and in 1682 was appointed chief physician to Charles II, and official geographer of Scotland.

Sibbald had for some years been gathering plants, minerals and other information for a description of the natural history of Scotland, which he published in 1684. The year after, he was appointed the first Professor of Medicine at the College of Physicians. In 1697 Sibbald donated his minerals, plants and other natural history specimens to the University of Edinburgh, along with a detailed catalog printed at University expense and entitled *Auctarium Musaei Balfouriani e Musaeo Sibbaldino* (having been the recipient of Balfour's collections just three years earlier). Within 50 years of his death, however, the collection was entirely dissipated.

Another famous Scottish physician and energetic collector was William Hunter (1718–1783). He was born in Lanarkshire and sent to Glasgow University at the age of 14, remaining there for five years. Although his father had intended he take up the ministry, Hunter transferred to the study of medicine. He studied in London under Dr. James Douglas, and in 1747 was admitted a member of the Surgeons' Corporation. His lectures in London became famous for their eloquence and abundance of practical illustrations. In 1756 he was admitted to the Royal College of Physicians in London, in time becoming the leading obstetrician in London, and the Royal Physician to Queen Charlotte (perhaps inspiring her small interest in minerals).

In 1763 Hunter began collecting minerals and other materials, thanks to his growing success and wealth, becoming a Fellow of the Society of Antiquaries in 1768. He had a notable anatomical and pathological collection by this time, and in 1765 began entertaining thoughts of assembling a great museum "for the improvement of anatomy, surgery and physik." He built in 1770 a house in Glasgow, on Great Windmill Street, furnishing it with a lecture theater, dissecting room and a large museum room. He purchased whole collections of medical specimens, as well as numismatics and natural history (minerals, shells and corals primarily). To this he added a remarkable library of rare and valuable books. He purchased the natural history collection of John Fothergill (1712–1780) in Yorkshire in 1781 for £1,000. He also purchased mineral collections from Johan Fabricius (1743–1808) in Denmark, and Jan Ingen Housz (1730–1799) in Vienna, and acquired many mineral specimens from the English mineral dealers Jacob Forster and Peter Woulfe between 1771 and 1781, and the Scottish mineral dealer John Jeans in Aberdeen in 1774–1777. Hunter later calculated that he had spent £20,000 building his museum. He died in 1783, at the age of 64, and by the terms of his will, his museum was later turned over to the University of Glasgow, where it is still preserved as the Hunterian Museum.



Hunter

Isaac Lawson (died 1747) was yet another Scottish physician who became interested in minerals. He developed a good skill in mineralogy and an extensive correspondence with other collectors and mineralogists, especially in Germany. His collection of minerals was said to be "large and elegant." He made contact with William Borlase while studying medicine in Leiden, and acquired Cornish minerals from him. Lawson's collection passed to his brother upon his death, and 20 years later was purchased by Mendes da Costa, but by that time some specimens had already been given away and lost.

Among the Scottish naturalists and mineralogists there was John Walker (1731–1803), Professor of Natural History at the University of Edinburgh. He had been interested in botany since childhood, and was fascinated by the neglected remains of the collections of Balfour and Sibbald at the University. His natural history classes included much on minerals after he became professor. His personal mineral collection was removed from its place in the University Museum following his death, and was acquired

by the Scottish mineralogist Robert Jameson (1774–1854).

Jameson had been educated at Edinburgh University and studied natural history there under John Walker. He at first worked as a surgeon in his native town of Leith, but soon gave that up for the study of mineralogy. In 1798, at the age of 24, he published his *Mineralogy of the Shetland Islands and of Arran*, which he incorporated two years later in his two-volume *Mineralogy of the Scottish Isles*. These were busy years, filled with field work and mineral collecting all over Scotland. Later he went to Freiberg for two years and studied mineralogy under Werner, followed by two more years of travel throughout Europe, returning to Edinburgh in 1804. There he was appointed Regius Professor of Natural History and Keeper of the University Museum, Walker's former positions. He published many mineralogical works, including a three-volume *System of Mineralogy* (in three editions, 1804–8, 1816 and 1820), *External Characters of Minerals* (1805 and 1816) and *Elements of Mineralogy* (1840). His personal collecting probably came more or less to a halt when he was appointed Keeper, because he thereafter spent a great deal of effort and money of his own building the University's collection up to 40,000 minerals and rocks and 10,000 fossils. He died unmarried in 1854, and his personal collection was bequeathed to the University in 1855.

Jameson had espoused Werner's theories for most of his life, but in his later years finally admitted that Hutton was probably correct. James Hutton (1726–1797), the Scottish geologist who is today credited with originating the modern theory of the formation of the earth's crust, was a mineral collector as well. His personal collection was also given to Edinburgh University, but, ironically, it languished unwanted, and nearly 50 years later was reported as having been still in its original, unopened packing crates. By the turn of the century it was gone, probably having been thrown away. Another famous Scottish geologist, John Playfair (1748–1819), also joined the staff of the University and did much to promote Hutton's theories. Playfair's mineral collection, however, was auctioned off following his death.

William Thomson (ca. 1760–1806) was also trained in Edinburgh, as a physician originally, but he found he enjoyed mineralogy much more. He was active as a mineralogist and geologist in Naples and Sicily (Italianizing his first name to Guglielmo), and is credited with field-collecting the first specimens of sarcolite at Mount Vesuvius. Most of his extensive mineral collection was shipped back to Edinburgh in 1808, following his death, and a small portion of it is still identifiable in the Royal Scottish Museum. Others of his specimens were acquired by Lady Hippisley in 1807, and a small part of the collection was rescued by Arthur Kingsbury and is now in the British Museum.

Other Scottish mineral collectors included Gilbert Laing Meason of Edinburgh (many of whose specimens were illustrated by Sowerby in his *British Mineralogy*), the Edinburgh banker Thomas Allan (1777–1833), who purchased Geisecke's first Greenland collection in 1808 (which went to Robert Hyde Greg in 1833, and with Greg's to the British Museum in 1860, by which time it was regarded as the finest private collection in the country), the geologist John MacCulloch (1773–1835) in London, the politician Robert Ferguson (1767–1840) (whose collection of minerals, "for richness and extent, is surpassed by few private collections of this sort in the Kingdom"), the Edinburgh physician William Nicol (1768–1851), inventor of the Nicol prism, the Edinburgh Professor of Chemistry Thomas Hope (1766–1844), the wealthy Banffshire judge Francis Lord Gardenstone (1721–1793), the field-collector David Mayne, the botanist John Murray (died 1820), the Rev. David Ure (died 1798), and the prominent Glasgow chemist Thomas Thomson (1773–1852). Thomson's collection was acquired following his death by the Museum of Victoria in Melbourne, Australia, where it was cataloged in 1866. The infamous John Calvert (whose word on any subject must be doubted) claimed to have obtained the best pieces from the Thomson collection before it was shipped to Australia.



Kirwan

Ireland

Ireland's most famous mineralogist was Richard Kirwan (1733–1812). Upon his father's death in 1741, he was sent at the age of eight to Poictiers to complete his education, and entered the Jesuit novitiate at St. Omer in 1754. He quit in 1755 and returned home when he came into the inheritance of his family's estates. He later studied natural history in London and Greek at Cregg in 1773. He resided in London until 1787, becoming acquainted with Priestley, Cavendish and the other chemists there. He was elected a Fellow of the Royal Society in 1780, and later sponsored James Smithson for membership. Kirwan's *Elements of Mineralogy* (1784) was the first systematic treatise on mineralogy in the English language; it appeared in a much expanded edition in 1794–1796, and in an unauthorized third edition in 1810. It also appeared in French, German and Russian translations.

Kirwan removed to Dublin for health reasons in 1787, where he was awarded a gold medal by the Royal Dublin Society for his part in helping to acquire the great Leskean Collection. This collection, assembled in Leipzig by Professor Nathan Gottfried Leske (1757–1786), consisted of 7,331 mineral, rock and fossil specimens which the Dublin Natural History Museum purchased in 1792 for £1,350. At the time of his death he bore the honorary title of Inspector-General of His Majesty's Mines in Ireland. He died as a consequence of "starving out a cold" in his 79th year. Kirwan's personal collection of minerals was described by the crystallographer William Hallows Miller as "the best collection on earth," but its final disposition is unknown.

Other Irish mineral collectors of the 18th century included the physician James M'Donnell (1754–1832), the cleric and naturalist William Hamilton (1755–1797), whose mineral collection went to Trinity College in Dublin, the Dublin Professor of Medicine Whitley Stokes (1763–1845), the "itinerant mineralogist" Donald Stewart (died 1811) (who was employed by the Dublin Society in 1786–1794 to travel about Ireland collecting minerals), the prominent Irish-born physician and mineralogist William Babington (1756–1833), who has already been discussed in the context of the Earl of Bute's collection, and Sir Walter Synnot (1741–1821), who donated or sold many Derbyshire specimens to Philip Rashleigh.



Germany

Since the days of Agricola, mineral collecting in Germany has been illuminated and nourished by the great ore deposits of Freiberg, the Harz Mountains and the Saxon Erzgebirge. Whole cultures based on mining and minerals evolved around these seemingly inexhaustible treasurehouses of precious metals. Although many physicians and pharmacists, like Agricola himself, gained their first exposure to minerals as *materia medica*, their collections bloomed with the products of Saxon mines as the most voluminous and exciting components. The essential role played by mining in the German economy, psychology and culture inspired collection building across the country, especially in the population centers of Leipzig, Berlin, Dresden, Hamburg, Stuttgart, Halle and Jena, as well as in the great mining town of Freiberg.

As in France, mineral collecting in 18th-century Germany crossed occupational barriers to include men and women from the clergy, the aristocracy, the military, government service, the medical professions, the mining community and academia. Professional mineral dealers also became more common, among them Johann Geissler in Leipzig (died ca. 1792) and Jean Honvlez (1730–1805), a Frenchman in Köln who commonly dealt under the impressive (and Germanic) sounding alias of Johann Wilhelm Carl Adolph, Baron von Hüpsch.

Mineral dealing had become thoroughly well-established by the end of the 18th century. Leonhard *et al.* (1817) in their comprehensive book about mineralogy for the collector, noted that buying minerals which cannot be personally collected is a good way in which to enlarge one's collection. However, they cautioned that the uneducated novice is vulnerable to abuse:

> For those who are not contented with self-collecting, there is no alternative but to purchase specimens. This can be excellent for the beginner, and there are many opportunities available outside of the commercial sector; [however,] one finds more swindlers than honest men in the mineral business. If a buyer has no knowledge of an item or its value, he [the dealer] will venture false facts. The buyer thereby is cheated, making payment based on deceptive statements about the [specimen's] locality.

Leonhard refers back to his *Taschenbuch* (1809) in which he listed all of the major European mineral dealers of that time (many of whom were probably in business before 1800). German dealers are listed in Leipzig, Dresden (2), Weimar, Karlsbad, Frankfurt, Oberstein, Berlin, Köln and Bamberg. Others are known to have operated in Karlsruhe, Göttingen, Alsenz and Donaueschingen.

As elsewhere throughout Europe, the aristocracy in Germany included many prominent collectors of art and natural history. The tradition of collecting minerals extended from the Emperors on down to Kings, Princes, Electors, Dukes, Counts, Margraves and Markgravines, Landgraves and Landgravines across the German Empire.

Maximilian I (1756–1825), King of Bavaria, acquired a substantial and valuable collection of silver ores upon the extinction of the von Rapoltstein family. The Princes of Bayreuth and Plauen both built mineral collections; Heinrich XLIII (1752–1814), Prince Reuss-Plauischen, had at least 774 specimens in the mineralogical portion of his natural history collection.

The German Electors such as Franz Ludwig (1663–1732) continued their long tradition of collecting, although Franz Ludwig himself sold his collection in later years to a Bamberg professor and canon named Linder for a high price. Karl Theodor (1724–1799), Count Palatine and later Elector of Bavaria, brought with him several mineral collections he had accumulated in Mannheim when he moved to Munich.

Karl August (1757–1828), Grand Duke of Saxe-Weimar and a good friend of Goethe, had a well known mineral collection. Nearly 400 of his specimens were illustrated in color by J. G. Lenz in his *Mustertafeln der bis jetzt bekannten einfachen Mineralien* (1794). The Duke of Zweibrucken specialized in mercury ores from the Pfalz area. And Charles (1713–1780), the Duke of Brunswick, established his ducal art and natural history collections (including minerals) as a public museum in 1754. The specimens were later acquired by the technical university of Brunswick but were destroyed by allied bombing in 1944.

Among the most famous of all aristocratic German collectors was the Margravine Caroline Louise von Baden (1721–1783), who corresponded widely with fellow nobility and commoners alike in her quest for mineral specimens. Her large collection of minerals was inherited by her son, Carl Ludwig von Baden (died 1818), who added to it. Johann Reinhard (1714–1772), the Margrave of Baden-Durlach, was also "a passionate collector of minerals," and a friend of Caroline Louise.

Counts Ross, Röder and Münster all possessed mineral collections, the latter willing his to the Bavarian state in 1844. Baron Joseph Friedrich von Racknitz (1744–1818) built a "complete and beautiful" mineral collection of 4,700 specimens later purchased by the Royal Museum in Dresden. The Barons von Friesen, von Schlotheim and von Seckendorf all built significant collections, and the "great collection" of Baron Friedrich von Lupin (1771–1845) in Volkratshofen was gathered through his own extensive field collecting in France, the Erzgebirge, the Rhöne Mountains, the Fichtelgebirge, Transylvania, Bohemia, Sweden, Hungary, the Carpathian Mountains and the Alps. The Hessian Landgraves (equivalent to Counts) also established important collections built over the generations, beginning perhaps as early as the 16th century.

Among military men, Hendrik Prehn (1733–1785) and Friedrich von Leysser (1731–1815) stand out in particular. Prehn served for many years in South Africa; upon returning to Germany he brought his mineral collection with him, including specimens of a new species from the Cape of Good Hope which Werner subsequently named *prehnite* in his honor. (Prehnite bears the distinction of being the first species named after a person.) Leysser was a Prussian military officer in Halle who spent 40 years amassing a mineral collection of over 10,000 specimens.

Among the German clergy, Johann Woltersdorff (1721–1772) is most famous because of his work on systematic mineralogy published in 1748. Conrad Rango (1639–1702), professor of theology in Greifswald, specialized in minerals from the Meissen area, Saxony. Maximilian von Rodt (1717–1800), Archbishop of Konstanz, bequeathed his mineral collection to the Margrave of

Baden. Johann Bytemeister (1698–1746), a professor of theology in Helmstedt; Johann Steinmüller (1773–1835) in Rheineck; Pastor Götzingen in Dresden; and August Francke (1633–1727) in Halle all built mineral collections, the latter donated to the Halle orphanage.

Many prominent German businessmen, lawyers and government officials built mineral collections. Among the most important were Johann Richter (1689–1751) in Leipzig, who published a huge catalog of his extensive collection in 1743 listing over 2,300 mineral specimens; Christian Pötzsch (1732–1805), a finance commissioner in Dresden who accumulated over 5,000 mostly Saxon



Von Moll

mineral specimens; Baron Karl von Moll (1760–1838), who served as Chancellor of the Exchequer in Salzburg and retired to Munich and Augsburg with his 5,000-specimen mineral collection; Christian Stieglitz (ca. 1724–1770's), a Supreme Court Justice in Leipzig who owned over 4,000 specimens; Karl Kampz (1769–1849), a Prussian statesman in Berlin who assembled a collection of over 3,000 choice mineral specimens; and Joseph Beroldingen, Würtemburg Minister to London who inherited the extensive mineral collection of his uncle, Franz von Beroldingen (1740–1798). Gottlieb Heyer (1767–1839), a German finance director and cabinet minister in Berlin, built a large collection of crystal specimens, many of great rarity. Baron Peter von Block (1764–ca. 1819), German Privy Councillor and inspector of the "Green Vaults" in Dresden, built a large natural history collection (including minerals) later acquired by the Royal Museum in Dresden. And Caspar Neikelio, author of the widely read *Museographia* (1727), was the son of a Hamburg merchant who built a wide-ranging collection. Gottlieb Mylius (1675–1726), secretary to the Elector of Saxony, built a personal museum which by 1716 contained 2,442 mineral specimens. There were many more such collectors among the privileged middle-class and high-ranking civil servants.

Perhaps the most famous of the German pharmaceutical collectors were the members of the Linck family in Leipzig. The family natural history collection, including a substantial array of mineral specimens, was begun by the pharmacist Heinrich Linck, who died in 1717. It was inherited by his son Johann Linck (1674–1735), who maintained and enlarged it until it passed into the ownership of his one-year-old son, Johann (1734–1807) upon his death. Under the younger Johann the collection flourished and grew to become known throughout Germany. It included 105 drawers of mineral and rock specimens complemented by a 1,200-volume natural history library. He published a detailed descriptive catalog (*Index Musei Linckiani*) in 1783, 1786 and 1787. Following his death the famous collection passed to another pharmacist, named Rohde, and in 1841 was purchased by Prince Otto Victor von Schönberg-Waldenberg; it is preserved today as part of the princely *Naturalien Kabinet* in Waldenburg, Saxony.

Prominent physician/collectors included Carl Titius (1744–1813), Inspector of the Royal Natural History collection in Dresden. Titius built a personal collection of over 5,200 specimens. Johann Heineken (1761–1851), a professor of anatomy and experimental medicine in Bremen, built an outstanding mineral collection. And Michael Valentini (1657–1729), physician to the Prince of Hessen and professor of medicine at Giessen University, built a natural history collection specializing in minerals and published a famous catalog description of it in 1704. There were many other such collectors in the medical community.

University professors, scientists and other academicians appear to have formed the largest segment of the German mineral collecting community in the 18th century. Of all the professions known to include mineral collectors, the academic community maintained the most vigorous internal communication, frequently going so far as to publish letters of correspondence between mineralogists in order to keep all their colleagues most efficiently informed. Professors passed on their passion for minerals to dozens of students at a time, many of whom went on to become professors with their own students. In fact, a professor's scientific ideas and theories were propagated as much by his students as by his publications. Students were taken on countless field trips to mines and occurrences throughout Germany and *taught* the skills of mineral collecting. German schools, in particular the Mining Academy at Freiberg, became magnets for aspiring geologists, mineralogists and mining men from around the world. So it is not surprising that mineral collecting, with the growing institutional collections and the private collections of professors as examples, became popular with a great many people in the academic world. It is probably safe to say that every trained mineralogist had his own mineral collection of one sort or another, and every student of mineralogy was encouraged to begin his own study collection. Evidence for most of these collections has disappeared, but many others gained prominence. Only the most important will be summarized here; the Census of Collectors includes many more.

The largest private collection ever assembled in Germany may well have been that of Joseph Bonavita Blank (1740–1827), professor of natural history at the University of Würzburg. In 1803, at the age of 63 and many years before his death, he donated to the University his extensive collection of minerals and art consisting of nearly 29,000 pieces (how many of these were minerals is not known). In 1854 the University of Tübingen acquired two enormous mineral collections: the 17,000 mineral and rock specimens owned by J. C. L. Heil (1774–1853) and the 16,000-specimen mineral collection of E. F. Glocker (1793–1858).

The most famous German collection, however, was that of Abraham Gottlob Werner (1749–1817). Principal instructor for the Freiberg Mining Academy, Werner accumulated over 10,000 specimens during nearly 60 years of collecting. His minerals have served as inspiration to countless students at the Academy over the course of two centuries. Johann Wolfgang von Goethe (1749–

1832), Germany's most important literary figure and an amateur enthusiast of mineralogy and geology, built a collection of over 10,000 mineral specimens as well (preserved today in the Goethe National Museum in Weimar). Another very large collection was that of Karl von Leonhard (1779–1862), professor of mineralogy in Heidelberg and an ardent promoter of mineralogy among the amateur community. His collection of 8,000 to 10,000 mineral specimens represented localities from the Harz, Switzerland, Poland, Vesuvius, Eifel, France, Iceland and elsewhere. He also founded one of the first magazines for mineralogists and mineral collectors (Leonard's *Taschenbuch*).

Nathanael Gottfried Leske (1757–1786), professor of natural history in Marburg and professor of economics in Leipzig, built a collection of over 7,000 minerals, rocks and fossils acquired by the Dublin Natural History Museum in 1792. His collection was cataloged by Dietrich Karsten (1768–1810), mineralogist and instructor at the Berlin Mining Academy (also a mineral collector); the published catalog runs to 858 pages.

Other large collections were built by Johann Lange (1698–1765; 6,000 specimens) and Johann Forster (1729–1798; 3,500 specimens), both of the University of Halle, Johann Widenmann (1764–1798; 2,879 specimens) at the University of Stuttgart, Johann Henckel (1679–1744; 2,000 specimens) at the Freiberg Mining Academy, and Urban Brückmann (1728–1812) at the University of Braunschweig (his published mineral catalog ran to 432 pages).



Von Flurl

Other prominent scholars who had important mineral collections included Mathias von Flurl (1756–1823; known as the "Bavarian Werner"), Heinrich Struve (1772–1851; mineralogist and diplomat), Johann Lenz (1748–1832; founder of the Mineralogical Society of Jena), Alexander von Humboldt (1769–1859; famous naturalist and traveler), and Friedrich Hoffmann (1660–1742) whose mineral cabinet was merged with that of Johannes Goldhagen (1742–1788) in 1777 and ultimately acquired by the University of Halle.

The mining community in Germany during the 18th century was nearly as active in building mineral collections as were the academics. Inspired in the late 1700's by the collections they saw in the great European mining schools, attendance at which was mandatory for career professionals by that time, mining men spread out to all the operating deposits in Germany carrying a new awareness of the value of specimens. Many of the most important mining officials built personal collections, and auction records of the time refer again and again to the posthumous sale of the minerals of mining captains. A significant number of these collections found their way to universities and mining academies, contributing further to the education of following generations.

Like Werner, many of the most prominent mining men who collected minerals were associated with the Mining Academy of Freiberg. Christlieb Gellert (1713–1795), Friedrich von Oppel (1720–1769) and Friedrich von Heynitz (1725–1802) all contributed specimens from their collections to help build the Academy's collection, and Karl Pabst von Ohain (1718–1784) curated it. Johann Ilsemann (1727–1822), Mining Commissioner at Clausthal, used his valuable collection for teaching purposes at the Clausthal Lyceum. The collection of German Mining Director Johann Cramer (1710–1777) was acquired by the University of Bonn. And the collections of Carl Tettau (died 1747), Adam Weidhase (died 1769) and Julius Schütz (1719–1793), all Saxon mining officials, were acquired by the Royal Museum in Dresden.

Other important collections include those of August Decker (died 1753?), Royal Prussian Mining commissioner in Wettin whose *Mineralienkabinet* comprised some 6,000 specimens of "metals, ores, druses, and minerals"; a German mine superintendent named Biehler whose collection included 3,536 specimens of Saxon ore minerals; August Beyer (1680?–1759?), Royal Saxon Mining Commissioner, whose collection of metalliferous ores was built up over a 60-year period; and Christian Richter (died 1784?), whose family included mine assessors and mining supervisors, all of whom helped build the family cabinet of ore minerals and surveying instruments.

Finally there was Friedrich von Trebra (1740–1819), Chief Inspector of Mines for Saxony and a noted author on economic



Von Trebra

geology. His book *Erfahrungen vom Innern der Gebirge* ("Experiences in the Interior of Mountains") (1785), described what he had learned about ore deposits while working and collecting in mines throughout Germany; it also appeared in a French edition (1789–1790), and was much admired. He wrote a comprehensive description of his own mineral cabinet in 1795.

Following are some detailed biographical notes on a selection of the more important German collectors of the period. Many others would merit being featured as well, but published biographies are frequently lacking and information is scarce. Those presented below must serve to represent to broader scope and experience of 18th-century German mineral collecting.

The Hessian Landgraves

The hereditary landgraves of Hesse-Kassel were an aristocratic family that developed a substantial *Kunstkammer*, including minerals. It was begun by Wilhelm the Wise (reigned 1567–1592), who transformed the family's medieval treasury into a collection of the type that became popular during the Renaissance. It grew to include art, natural history specimens and miscellaneous curiosities of all sorts. Some objects in the collection probably dated back to the Crusades in the 12th century.

Carl of Hesse (1656–1730), inherited the family collections. He expanded them further, going so far as to devote a large three-story house to the now gigantic *Kunstkammer*, the so-called *Kunsthaus*, inaugurated in 1709 and preserved today as the Staatliche Kunstsammlungen in Kassel. It included one room (the *Mineralienzimmer*) devoted exclusively to minerals, ores, fossils and so on, and another for gemstones, cameos, amber and jewelry.

Carl founded his own educational institution, the Collegium Carolinum, and affiliated the *Kunsthaus* with it, so that any interested person with a proper recommendation could have access to it for study. The museum buildings still exist today, along with many works of art and natural history. Here is one of the few remaining places where the genesis of a public museum, going back to private collections, can still be studied in its original surroundings.

The first public museum in the 18th century to be housed in a building constructed especially for it, however, was the Museum Fridericianum, built by Friedrich II (Landgrave of Hesse). Friedrich was the son of Wilhelm VIII, grandson of Carl. Using collections taken from Carl's *Kunsthaus*, he stocked the museum Fridericianum using the same basic arrangement of subjects (although excluding paintings). He opened it to unrestricted access by the public in 1779; hours were 9 to 10 in the morning and 2 to 3 in the afternoon.

Johann Richter (1689–1751)

Johann Christoph Richter was a gentleman of the wealthy middle class in Leipzig; he made his fortune in banking, and served for a time as a member of the legislature.

In his youth, he studied literature and philosophy, and developed a budding interest in law. But his father had other ideas, encouraging him instead to follow in the family footsteps and make a career in business. The elder Richter was a successful banker as well as a dealer in glass-making sand and coloring agents, especially cobalt for the manufacture of cobalt-blue glass. Seized with curiosity about the origins of the commodities he traded, the father took his son on travels to see the mines, living among the miners and going underground to see the ores in place. It was on these excursions that the young Richter began to build his mineral collection, at first simply as an aid to memory, but soon with a growing passion for the beautiful minerals themselves. In the preface to his published catalog he wrote:



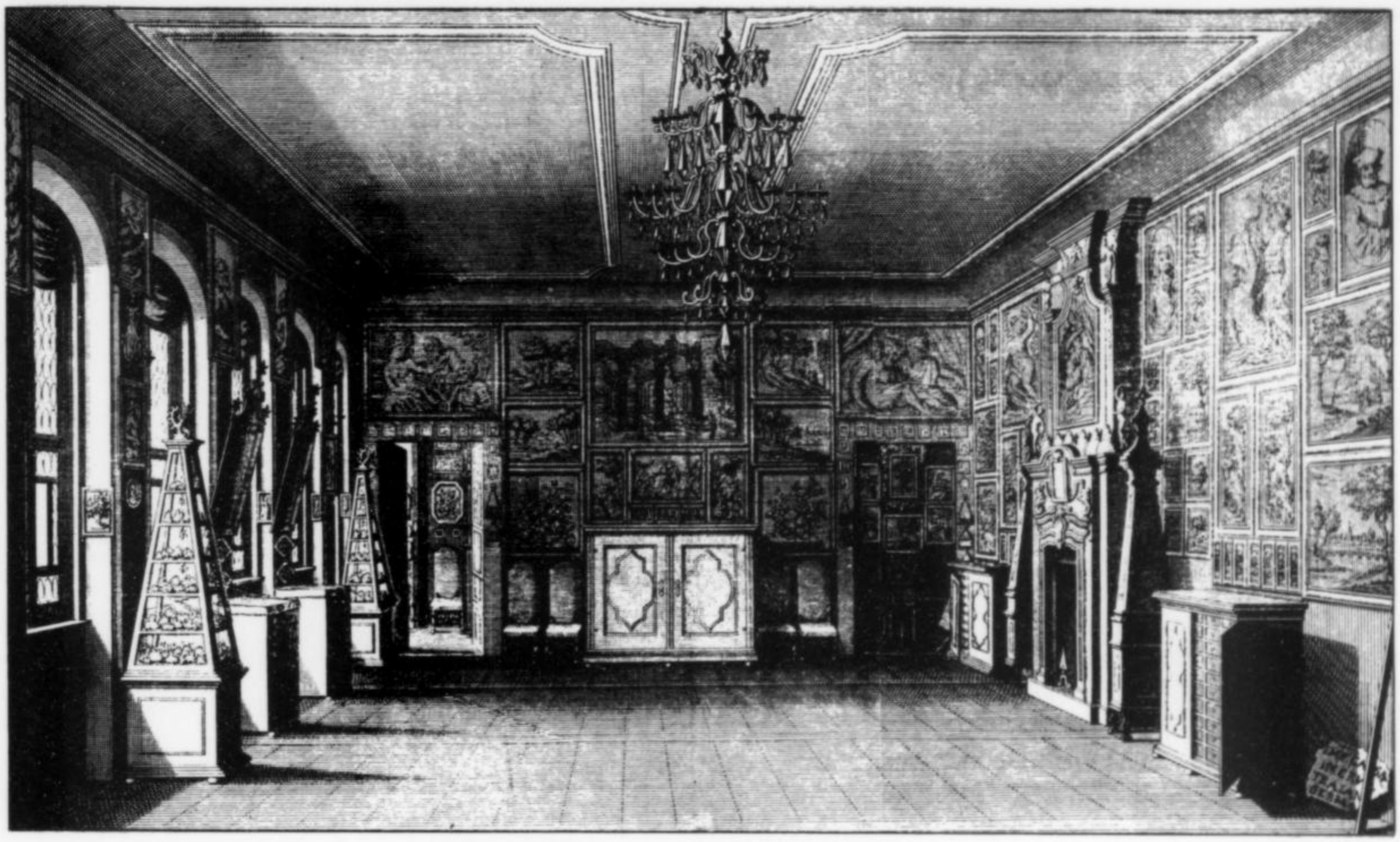
Richter

> The collection . . . grew from day to day, to such an extent that it became necessary to sort the specimens into categories and arrange them on shelves and in display cabinets. As the number of shelves kept growing, my love for these things grew also, so that after a while, whatever time I had left over from the management of my personal or business affairs, I dedicated to their study and care. I cannot disavow . . . the incredible satisfaction, the bliss, which swept over me at the contemplation of the divine perfection of these works of nature—an emotion that I can blame for nothing more grave than refreshing and invigorating the mind, and driving away other troublesome preoccupations.

Those lines could have been written, word for word, by many modern collectors as well.

Richter's friend and mentor in mineralogy was Johann Zacharias Platner, a Professor of Medicine in Leipzig. Platner visited Richter often in his mineral room, where they whiled away the hours in convivial mineralogical discussion and instruction, greatly strengthening Richter's interests in natural history. Platner offered advice on the preparation of Richter's museum, helped categorize the new specimens as they came in, drew the first rough outlines of the massive catalog that would eventually be published, and schooled Richter regarding the best books to read about mineralogy. Richter's library eventually grew to 3,000 volumes; of course, only a relatively small number could have been on mineralogy per se.

Like many of his privileged class before him, he felt a sort of *noblesse oblige* to science, as well as a simple desire to show off his treasures; thus it was that he decided to produce a lavish catalog describing and illustrating his specimens. He engaged Johann Ernst Hebenstreit to write a systematic catalog of his collection, and C. F. Boetius to illustrate the book with engravings. The resultant work, published in 1743, was entitled *Museum Richterianum*, "The Richter Museum."



Collection room of **JOHANN RICHTER**.

The book begins with Richter's dedication to Saxon Prince Friedrich Christian, then Richter's preface discussing the development of his collection and of the collection catalog. Following this is a detailed discussion (presumably by Hebenstreit) of the development of natural history collecting and systematic mineralogy or mineral classification, drawing on authorities and works then available (Pliny, Dioscorides, Aldrovandus, Henkel, Agricola, Gesner, Woodward, Linnaeus, Theophrastus, Caesalpinus, Mercati, etc.)

Minerals and ores are then methodically discussed in chemical order, with chapters on gold, silver, copper, tin, lead, iron, antimony, mercury, cobalt and bismuth ores, each broken down into the different species or varieties deemed significant. Other chapters cover sulfides, bitumens, salts, clays, "earths," quartz, flourite, the gem minerals, and a variety of other species. These are accompanied by engraved and hand-colored illustrations of 114 mineral specimens from Richter's collection. In each chapter, following a discussion of the systematics (with careful reference to their earlier authors), Richter's specimens are listed and described, giving habits, mineral association and localities for each.

Following the mineralogy chapters, which form the largest portion of the book, are discussions and specimen lists of the other objects Richter collected, including samples of various types of marble, fossils, and preserved biological specimens of animals, fish, insects, etc. Finally there is a dissertation on the gem cameos of antiquity by Johann Friedrich Christ (1700–1756), illustrated by three full-page plates showing many examples from Richter's collection.

Also included among the plates are a full-page portrait of Richter himself; a larger fold-out engraving showing the interior of the museum, with its odd pyramidal glass cases (perhaps inspired by very similar cases in the Brandenburg *Kunstkammer* in Berlin), cabinets of drawers, books, and an extensive collection of Old Masters paintings almost seamlessly covering the walls; and interesting half-page engravings beginning each major section, showing miners, cherubs, angels and so on engaged in mining and specimen collecting.

Richter's collection consisted of 2,309 mineral specimens and 291 gemstones; in addition there were 215 samples of marble and alabaster, 794 fossils and 2,022 biological items for a grand total of 5,631 specimens. Among the minerals, he seems to have had a particular interest in metallics. He owned 514 specimens of silver and silver-containing minerals, and 137 specimens of gold and gold-containing minerals. Those are impressive totals for a systematic collection even today, and they span a wide range of localities. His native golds, for example, came from Norway, Brazil, Guinea, India and China as well as the nearer localities in Transylvania, Bohemia, Silesia and Hungary. For silver minerals the famous Saxon Erzgebirge was a favorite collecting area.

In terms of specimen quality Richter's collection ranged from quite good to what we might term "study-grade" today. Judging by the plates, he had a great many crystal specimens but was indifferent to damage.

Following Richter's death in 1751, the museum was sold. Around 1780 the cabinet is known to have been in the possession of a Leipzig industrialist named Frege, and a few individual pieces became part of the Johann Heinrich Linck collection. The Richter collection as a unit is lost sight of by 1799, and ultimately appears to have been dispersed.

Karl Pabst von Ohain (1718–1784)

Karl Eugen Pabst von Ohain was a prominent Saxon mining captain in Freiberg, a member of the Leipzig and St. Petersburg Academies, the German correspondent for the Royal Sardinian Scientific Society in Turin, and a Director of the Freiberg Mining Academy. By 1760 he had become one of the most important and knowledgeable mineralogists in Saxony and, although he left no publications of his own, Werner described him as an enthusiastic

and clever teacher of great competence, an opinion said to have been shared by many foreign visitors who spent time with him in Freiberg, including Ignaz von Born, Martin Brünnich and Johann Ferber.

Werner had come to the Freiberg Academy as a student in 1769, just four years after its founding. Pabst von Ohain was at that time Director of the Academy and curator in charge of the mineral collection; he gave the young Werner free access to the collection, and probably also formal and informal instruction in mineralogy. Pabst von Ohain conceived the idea of a natural system of mineralogy based both on chemical composition and on physical properties ("external characters"). His approach surely influenced Werner, who acknowledges an unpublished handwritten manuscript Pabst von Ohain had prepared for a systematic mineralogy in 1760, which was available for students to study in the Academy library. It sketched out the plan of the system, its principles, a classification scheme, and techniques for determining the physical properties of minerals.

Pabst von Ohain further promoted the science of mineralogy through his own extensive and excellent mineral collection, built and organized for the most part during the years before 1770. Specimens were collected during his employment as a director of "an important and extensive mine" in the Freiberg district, during his travels and explorations of various mines "rich in the treasure of beautiful and rare minerals," and through his many contacts with other European mineralogists. He apparently had initially inherited a considerable collection in his youth, and it formed the foundation for a lifetime of mineral collecting. Werner called his cabinet "one of the largest and most splendid collections of his time."

Pabst von Ohain had organized his collection rather crudely into two general categories: his collection of Saxon minerals (which he had well documented) and his "systematic" collection. The systematic collection also had a geographic basis for its organization. For example, the native gold specimens were accompanied by an entire suite of minerals from Upper and Lower Hungary, and the good cassiterites were followed by a general Cornish suite. Aside from the Saxon suite, however, the minerals were undocumented and unlabeled. During Pabst von Ohain's final illness, and following his death in 1784, the collection fell into further disorganization, most specimens losing their locality information.

Pabst von Ohain's heir contacted Werner at the Freiberg Mining Academy, offering him a commission to put the collection in order and prepare a sales catalog. Despite his busy schedule, Werner agreed to the task, perhaps partially out of loyalty to his old mentor. Werner enlisted the help of two of his best students: Dietrich Karsten (1768–1810), who had singlehandedly prepared an 858-page catalog for the Leskean Collection in 1789, and a student named Hofman.

It took Werner two years to reorganize the Pabst Collection, sort out the many duplicates, attribute localities on the basis of his vast personal knowledge and experience, and correct errors in the original documentation. He divided it into five sub-collections based primarily on his 1778 article detailing his views of how such a collection should be arranged. Karsten had followed the same plan for the Leskean catalog. The categories and specimen totals [Leske's indicated in square brackets for comparison] are as follows: (1) a systematic collection of 3,326 [3,268] specimens, (2) a set of geographic suites totaling 2,781 [1,909] specimens, (3) a geological collection of 276 [1,100] specimens, (4) a set of 298 [580] specimens demonstrating physical characteristics, and (5) a collection of economic minerals which, along with supplementary specimens, totaled 819 [474] specimens. In all, the Pabst von Ohain collection encompassed 7,500 specimens [compared to 7,331 in the Leskean Collection], most of them in "mid-size to large format," that is, up to 3 by 6 inches. There were 200 museum-size specimens and a number of quite small examples justified by their extreme rarity or high quality.

Werner praised the collection highly as being very instructive, of excellent specimen quality, having very little damage, exquisite beauty and great rarity. He was particularly impressed by the native silver, acanthite, chlorargyrite, stephanite, polybasite and gold specimens, which in *bullion value alone* he estimated at 3,000 Reichsthaler (see Table 2, p. 47). The fluorite suite was also particularly fine.

The first volume of the catalog appeared in 1791, and the second a year later. It was Werner's opinion that the Pabst von Ohain collection should go to a University or one of the great academies, not only because of its size and quality but probably also because he had meticulously arranged it as a teaching collection according to his own theories on the mineral kingdom, theories which would be perpetuated through generations of students at a large teaching institution. "I confess with pleasure," he wrote, "that I would be most glad to see such a treasure of beautiful and instructive minerals remain in my homeland." That was not to be, however. Pabst von Ohain's minerals were sold to the government of Portugal, and shipped to the University of Rio de Janeiro for use in the teaching of mineralogy and geology.

Christian Ludwig Stieglitz (born 1720's)

Christian Ludwig Stieglitz was another prominent Leipzig burgher with an avocational interest in mineralogy. He and his father of the same name were both lawyers, the son eventually achieving the high rank of *Oberhofgerichtsrath* (i.e. an attorney serving the Leipzig Supreme Court). His son of the same name (1756–1836) became a prominent art historian and architectural archeologist. His grandson, also of the same name (1803–1854), returned to the legal profession which had been traditional among his forebears. The Stieglitz family had some early claims to nobility, and the grandson was eventually granted the privilege of reclaiming his patrimonial titles. All four men were scholars, and each had publications to his name, from 1713 through 1847.

Stieglitz's mineral collection included specimens from many of the most prominent European localities (St. Joachimsthal, Johanngeorgenstadt, Annaberg, Schneeberg, Schlaggenwald, Schemnitz, Freiberg, Zinnwald, Ilmenau, Nagyag, etc.), and also from more distant occurrences (e.g. Peru, Bolivia, Elba, Iceland, Brazil, India and Siberia). Particularly surprising is a large specimen of rock impregnated with native iron, undoubtedly one of the earliest known examples from Disco Island, Greenland. In the very brief preface to his catalog, Stieglitz indicates that he personally collected mineral specimens underground. Although the actual size of his entire collection is unknown, it must have been significant. The first English edition of Axel Fredrik Cronstedt's *Essay Towards a System of Mineralogy* (1770) makes particular note of Stieglitz's fine mineral collection.

In 1769 Stieglitz issued one of the rarest of all published mineral collection catalogs having colored specimen illustrations. It was entitled (in Latin): *Spicilegium quarundam rerum naturalium subterranearum Lipsiae collectarum* ("Selected specimens of some natural things from underground in a Leipzig collection"). It consists of a brief Latin preface followed by duplicate text in Latin and German describing 65 specimens, illustrated by handcolored engravings grouped on 21 plates.

The German mineralogist Johann Carl Freiesleben (1774–1846), reviewing the various mineral collection catalogs that had been published in Saxony up to the year 1828, commented on Stieglitz's catalog:

> The owner of the collection was the *Oberhofgerichtsrath* Dr. Christian Ludwig Stieglitz of Leipzig. He selected from his



Silver on Acanthite
Potosí, Bolivia



Diamond in matrix
Golconda



Bismuth
Schneeberg, Saxony



Pyromorphite
Zschoppau, Saxony



Acanthite
Johanngeorgenstadt

Cuprite
Mount Nicholas,
Siberia





Bismuthinite
Schneeberg, Saxony



Cassiterite
Schlaggenwald, Bohemia



Gold
Brazil

Specimens from the collections of **CHRISTIAN STIEGLITZ**
(silver, diamond, bismuth, cuprite, acanthite) and
JOHANN RICHTER (pyromorphite, bismuth, cassiterite, gold)

collection (which, following his death, went to the Royal Imperial Mineral Cabinet in Vienna) 65 of the most noteworthy pieces which he had illustrated in their natural size on 21 copperplate engravings, prepared by the miniaturist painter Morino. These illustrations, together with 24 pages of Latin and German explanation, constitute this rare and splendid work, of which only a few examples exist.

Leopold Fitzinger also made note of Stieglitz's catalog and collection in an 1856 review of private mineral collections that wound up in Vienna during the reigns of Francis and Maria Theresa (i.e. 1745–1780). According to him, however, the collection went to the Theresian Academy:

> The Theresian Academy collection consisted of shells and minerals, plus a collection of physical and astronomical instruments, machines, models and coins. This collection was founded by the Jesuits in 1747; their brothers in Steiermark, Carinthia, Carniola, Hungary, Transylvania and the Banat of Temeswar, where they maintained many colleges and ministries, turned over a substantial quantity of minerals which they had collected. The collection was also enlarged through the considerable support of benefactors, and through purchased acquisitions. The famous former mineral collection of Doctor Christian Ludwig Stieglitz, *Rathsherrn* and attorney in the Supreme Court of Leipzig (the most noteworthy pieces of which he described and illustrated in a 1769 work published in Leipzig, "*Spicilegium quorundam rerum [naturalium] subterranearum Lipsiae collectarum)*" came into the possession of the Theresianum in this way [i.e. by purchase]. Upon the dissolution of the Theresian Academy in 1782 the collection was in part given to the Imperial Natural History Cabinet [today the Natural History Museum], but the greater part was given to the University Museum.

Fitzinger's account sounds more authoritative, and is confirmed by Hailstone (1792); it is likely that Freiesleben confused the Royal Imperial Natural History Cabinet with that of the Theresian Academy. In any case, by the time the Stieglitz specimens were turned over to the Royal Imperial Cabinet and the "University Museum" over a decade later they had probably been disseminated through the larger collection of the Theresian Academy and had already lost their pedigree.

Several Stieglitz specimens have recently been identified in the Vienna Natural History Museum collection, including a native silver with acanthite from Annaberg, half of a galena-coated marcasite from the Albertine mine in the Bernburg area, and a fine kermesite with stibnite from the Neue Hoffnung Gottes mine near Freiberg. More Stieglitz specimens are probably in stock but, having been trimmed or broken down over the centuries, are now difficult to match with their original appearance as shown in the old paintings.

Freiesleben (1828) also reports a more extensive, anonymous catalog published in Leipzig three years later; it consisted of a 302-page octavo-size description of a mineral collection of 4,263 specimens. He attributes the ownership of this collection to a "Dr. Stieglitz of Duckwitz," and states that the "very numerous Saxony suite" covered pages 180–290. This may be the same person. It is possible that Steiglitz's 1769 publication was designed as an aid to selling the collection (although in the preface Stieglitz states that his aim is simply to give pleasure to people who cannot personally visit him and view the specimens for themselves); the collection not having found a buyer, the second more comprehensive publication might then have been issued. This is consistent with the fact that anonymous octavo catalogs of this sort were commonly issued as auction or sale catalogs in the 18th century. However, this speculation has thus far not been possible to verify or disprove because there appear to be no surviving copies of the 1772 catalog for comparison. If a copy can be found, it should be possible to match the descriptions in the two works and determine whether they actually apply to the same collection.



Von Baden

Caroline Louise von Baden (1721–1783)

Princess Caroline Louise was born to the house of Hessen-Darmstadt. Thanks to a teacher who recognized and nurtured her natural aptitudes, she received a multifaceted education in music, literature, the arts and the natural sciences.

She married Carl Friedrich, the Margrave (and later Grand Duke) of Baden-Durlach. With his support, she built a library and greatly enlarged the family collection of art and natural history in the Karlsruhe Palace. Her collections became so famous that they served as an aesthetic focal point for the country.

Caroline Louise developed a special liking for minerals and rocks during the course of her natural history activities. She decorated the palace with a wide variety of slabbed ornamental stones, and in the process made contacts with many dealers, collectors, scholars, museum curators and fellow aristocrats. She expanded the collection of polished slabs of minerals and rocks, and made a concentrated effort to learn mineralogy. Much to the astonishment of her subjects, she actually engaged in field-collecting, often to the point that her clothing became "full of sludge and slime." During these excursions, and afterward in the management of her growing collection, her devoted instructor was the Baden Margrave and Bergrat Elhard.

Caroline Louise, in addition to her field activities, was a voluminous correspondent, and many of the letters she received have been preserved. Her first important acquisition by mail appears to have been a number of agate, jasper and marble slabs sent to her by Lieutenant-General Belsky, Director of the St. Petersburg Academy of Science, in 1769. She received a shipment of minerals and ores from famous Hungarian mining districts (Transylvania, the Banat of Temeswar, the Slovakian Erzgebirge)

from Empress Maria Theresa, with whom she continued a frequent correspondence. During the years 1769–1777 Maria Theresa sent additional mineral specimen shipments, and Caroline Louise reciprocated by sending specimens of various sorts from Baden.

Other correspondents from whom Caroline Louise acquired specimens include:

(1) Friedrich Leysser (1731–1815), Prussian military officer and long-time mineral collector in Halle.

(2) Daniel Schreber (1709–1777), mineral collector and professor of economics in Leipzig.

(3) Johann Reinhard (1714–1772), Margrave of Baden-Durlach and "a passionate collector of minerals."

(4) Alexander (1777–1823), Czar of Russia, who presented her with fine Russian and Siberian minerals.

(5) Maximilian Archenholtz (1706–1789), a Stuttgart Bergrat and collector who amassed over 16,000 mineral specimens.

(6) Carl von Gemmingen (1739–1822), a German cabinet minister in the government.

(7) Gottlieb Deimling (1711–1773), who bequeathed to her his entire mineral collection.

(8) Jean Honvlez (1730–1805), French mineral dealer in Köln who operated under the alias of Johann Wilhelm Carl Adolph, Baron von Hüpsch.

(9) Joseph von Beroldingen (1738–1816), a clergyman from Hildesheim.

(10) Rudolph Erich Raspe (1736–1794), disreputable collector/dealer and author of the "Baron Munchhausen" stories.

(11) Karl Tux (1716–1798), Privy Councillor in Stuttgart and a part-time mineral dealer.

Caroline Louise was known throughout her life as a gracious, warm-hearted, highly intelligent woman able to deal cordially with anyone, from commoners to scholars to royalty. When the Director of the Royal Natural History Cabinet in Paris visited her in 1771, he exclaimed, "Behold, the foremost woman, who has astonished me!"

By the time of her death in 1783 Caroline Louise had built up one of the more important natural history cabinets in Europe, especially rich in minerals from Russian, Asian and European localities. It was inherited by her son Carl Ludwig, Margrave of Karlsruhe, who continued to maintain and expand it. In time it became known as the Grand Ducal *Naturalienkabinet* and was made a public institution, the Landessammlungen für Naturkunde in Karlsruhe. Unfortunately, the majority of the minerals were destroyed by Allied bombing in 1942, but those that survived are still on exhibit.

Johann Wolfgang von Goethe (1749–1832)

Goethe is known primarily for his dominating influence on the development of German literature. His tragedy, *Götz von Berlichingen*, founded the romantic school and established the Shakespearean form of drama on the German stage; he founded the German literary movement known as "Sturm und Drang"; his *Die Leiden des Jungen Werthers* inaugurated the sentimental school; and his *Faust* injected the modern spirit into German literature. Although his effect on the German language can hardly be overestimated, he was also a significant force within the sciences of zoology, botany, optics and geology. The collection of rocks and minerals which he assembled over the course of 50 years totalled over 18,000 specimens, making it one of the largest private earth science collections ever assembled in Germany.

Goethe was born to middle-class parents in the city of Frankfurt-am-Main. His father was a lawyer, and so the young Goethe also earned a degree in law, at Strasbourg in 1771. Because of his growing fame in literary circles he was summoned by Charles Augustus (heir apparent to the duchy of Saxe-Weimar) to live in Weimar in 1775, where his appointments included the post of supervisor of mining in 1777. He fulfilled his official duties well and in the process became an avid student of mining science, geology and mineralogy.

In 1784 Goethe superintended the reopening of the Ilmenau copper mines, and began to form some of his more adventurous theories on rock origins, many of which turned out to be wrong. He failed to comprehend the crucial concept of uplift and deformation; although he stood in agreement with most geologists in 1785, by the early 19th century they had advanced to a better understanding, but he still clung to his old ideas. He was, however, correct in his explanation of the origin of glacial erratics (boulders transported and left by receding glaciers).

Goethe greatly enjoyed geological field work, and had a number of famous friends and collecting partners who also distinguished themselves, including Friedrich von Trebra (1740–1819). Von Trebra had been assigned to work with him at Ilmenau, and they remained good friends for nearly 40 years thereafter. Goethe learned his mineralogy primarily from Johann Voigt (1752–1821), a student of Werner, overseer of the silver mine at Ilmenau, and an enthusiastic collector. The naturalist Joseph Müller (1733–1817) was another of Goethe's field collecting partners.

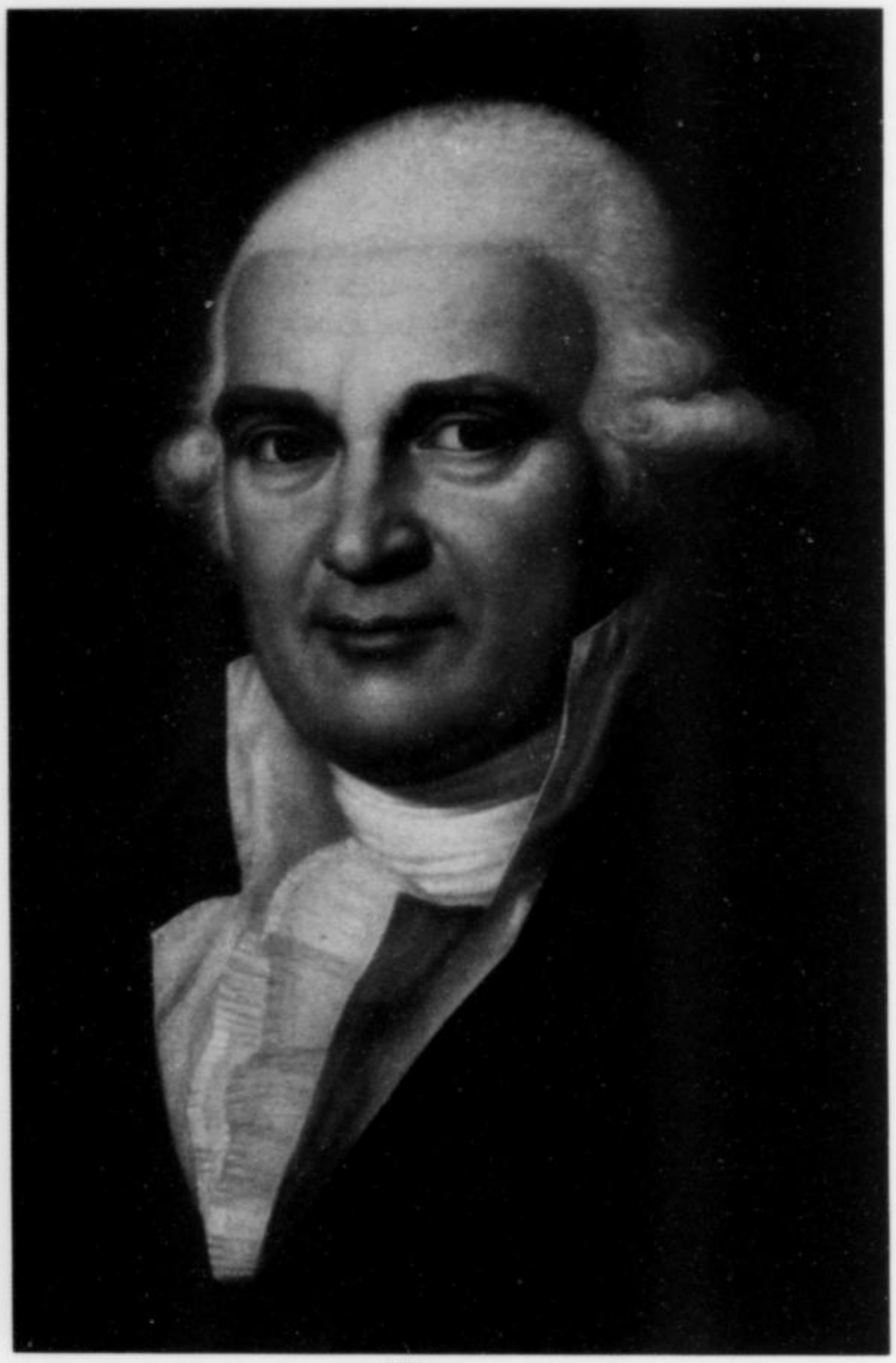
Over the years Goethe prepared four catalog descriptions of his growing earth science collection. His catalog of 1783 included his systematic mineral collection, his systematic rock collection, and locality suites from Saxony, the Harz Mountains, Bottendorf, Fürstenberg, Thuringia and Stockheim. His 1785 catalog covers mineral suites from Schneeberg, Karlsbad, Schlaggenwald, St. Joachimsthal, Fichtelgebirge, the Harz Mountains, Allemont, and Darmstädter, among others. His catalog of 1813 brought the total number of his locality suites to 100, and his 1849 catalog covered a mineralogical miscellany accumulated in the intervening years.

Goethe's collection has fortunately been preserved intact in the Goethe National Museum in Weimar. He viewed his minerals primarily as study specimens and examples of ore, as had long been common among his compatriots. Consequently the number of aesthetic or well-crystallized specimens is limited. Nevertheless, the Goethe collection is considered historically important as an example of a collection from what the Germans call the "Heroic Age" of mineralogy.

Abraham Gottlob Werner (1749–1817)

Werner is considered by many to be the father of modern mineralogy, and one of the most important mineral collectors of his age. He was born in Prussian Silesia near the Saxon border, to a wealthy family that had held important positions in the mining and smelting industries of the Saxon Erzgebirge since at least the early 1500's. Werner's father was the official Inspector of Iron Works at Wehrau and Lorenzdorf, and undertook himself the early education of his son, especially regarding mines, furnaces and minerals. By the age of nine the young Werner was already building his own mineral collection, drawing on his father's expertise and on his favorite handbooks (the *Lexicons* of Hübner and Minerophilo) for information.

When he reached the age of ten he was sent off to the Bunzlau Waisenschule, where he studied for five years. When his mother died in 1764 his father took him out of school and gave him the



Werner

position of *Hüttenschreiber* (a combination of bookkeeper, secretary, assayer and payroll clerk) at the ironworks, where he remained in his father's service for another five years.

In 1765 a mining academy was founded in Freiberg which was destined (with Werner's help) to become the most famous such institution in the world. A mineral collection to be used for teaching purposes was essential to the new institution; the first specimens were contributed by Friedrich von Heynitz (1725–1802) and Friedrich von Oppel (1720–1769), founders of the Academy, and by Christlieb Gellert (1713–1795). The new Academy collection was first displayed in Oppel's own house, where classes and demonstrations were given. Johann Charpentier (1728–1805) expanded the Academy collection while teaching there, bringing in representative Erzgebirge minerals from mines throughout the district. It was this heady environment of intense collecting and study that Werner entered in 1769.

The intention of Werner's father in sending him to the new Academy was to prepare him to take over eventually as administrator of the ironworks. The young Werner pursued his studies in mining and metallurgy with diligence, frequently visiting mines to study their operations and, of course, to collect minerals. Karl Pabst von Ohain (1718–1784) was at that time curator of the Academy's mineral collection, and gave Werner free access. Pabst von Ohain was among the most renowned mineralogists of his time.

Werner decided to set his sights on a career in the Saxon mining service instead of the Wehrau ironworks. In those days a degree in jurisprudence was essential if one wished to rise in the service, so Werner left the Academy to study law at the University of Leipzig. Law was not where his interest lay, however, and he became increasingly diverted toward his old love of mineralogy. In 1773 he published his first book on mineralogy (his now famous dissertation on the external characteristics of minerals) while still in law school, and a year later he left Leipzig without a degree.

His book, which introduced new methods in the description of minerals, was well-received. Pabst von Ohain recommended to the Board of the Mining Academy that they hire Werner as an instructor and as curator of the mineral collection. Werner accepted the position in 1775 and held it for the rest of his life.

Werner was a very popular lecturer, and much beloved by his students. He used specimens from his own or the Academy's collection in class, and expostulated not only on their immediate characteristics but upon the geology of their origin and their effect on the history of their country. Baron Cuvier said that Werner "roused the enthusiasm of his hearers and inspired them not only with a taste but with a passion for his science." Students flocked to the Academy from every civilized country to study under Werner, and for the rest of their lives proudly boasted of having been one of his pupils. He was never particularly fond of writing, however, and produced relatively few published works. It is his students primarily who spread his fame.

He was a diligent lifelong collector of minerals, and was meticulous in taking proper care to record, classify and arrange his specimens. In 1778 he published a short work (*Von den verschiedenerly Mineraliensammlungen*) giving his detailed recommendations for how a mineral collection should be structured. His own collection more or less followed these lines, and by 1814 numbered over 10,000 specimens organized into the following sub-collections:

(1) The systematic collection (8,043 specimens)

(2) The distinguishing features collection (309 specimens)

(3) The gem species collection (1,398 specimens)

(4) The display collection of large and aesthetic specimens (108 specimens)

(5) The topographic collection arranged by locality (in 24 boxes)

(6) The petrologic collection (1,045 specimens)

He also owned fossils (22 boxes), shells (22 boxes) and a zoological/botanical collection.

Werner expanded upon his ideas regarding the ideal collection in the catalog he wrote for Pabst von Ohain's collection in 1791–1792. Following his death in 1817 his final, refined system of mineral classification was published through the efforts of his students.

In addition to his love of minerals, Werner was a dedicated mineralogical bibliophile, amassing a large and excellent library of books and papers. In 1814 he sold this library, along with his enormous mineral collection, to the Mining Academy for the princely sum of 40,000 Talers. The price was primarily symbolic of the high esteem in which his collections were held, because when he died three years later he left most of the money to the Academy for use in the financing of scholarships.

Werner never married, and had no children. Mineralogy, mining, mineral collecting, the Academy and his students were his life. On each he left a lasting effect, and his collections, carefully preserved at the Academy today, have continued to inspire students and to illustrate the wonders of the science he loved.



EMPEROR FRANCIS I of Austria (in red), examining minerals in his collection room. **JOHANN VON BAILLOU** (in blue coat), the original builder of most of the collection, was hired to curate it.

Austria

In large part inspired by the enthusiasm of the Royal Imperial family (Emperor Francis I [Franz] and his wife Maria Theresa), the city of Vienna became one of the great hotbeds of European mineral collecting in the 18th century. Aristocrats, scholars, the clergy, military men, businessmen and medical men—all catered to by a remarkable number of full-time mineral dealers—comprised a very active, enthusiastic and competitive mineralogical community. Scholars from all over the Empire were called to Vienna and put to work tending the Royal Imperial collections, teaching in the Imperial academies, and serving in a plethora of official posts. Many of these scholars were, or became, mineral collectors in their own right.

Over the course of the 18th century, the love of mineral collecting spread downward through the Imperial family. Archduchess Maria Anna (1738–1789), daughter of Franz and Maria Theresa, accumulated nearly 10,000 mineral specimens in her personal collection. Their sons Joseph (1741–1790) and Leopold (1747–1792), who each in turn inherited the Imperial title along with the Medicis' collection of natural history, were less interested but Leopold did found the Imperial Museum in Florence where he put the Medici minerals on public display. Archdukes Rainer (1783–1839) and Johann (1782–1859), sons of Leopold, each built significant mineral collections of their own while still young, and purchased other collections as well. Johann's extensive collection

eventually helped to found the Steiermark Provincial Museum, known affectionately in his honor as the "Joanneum."

Other Austrian aristocrats known to have collected minerals include Princes Johann (1760–1836) and Louis (1780–1833) von Liechtenstein, the latter of whom employed the famous mineralogist Friedrich Mohs as his curator and purchased other collections (including that of Count Leopold von Kolowrath-Krakowski). Prince Ferdinand (1763–1834), Duke of Württemburg and Commandant of the city of Vienna, traveled on collecting trips to Russia where he acquired many beautiful Russian and Siberian mineral specimens; he later donated his collection to the Imperial Cabinet. Among the most important Austrian mineral collectors was Prince Prosper von Sinzendorf (1773–1822); Imperial curator Andreas Stütz ranked Sinzendorf's collection as equalling or surpassing most of the other collections in Vienna, and lamented the prince's removal of it to his castle in Ernstbrunn.

Count Rudolph Wrbna (1761–1823), President of the Royal Imperial *Bergkammer*, built a costly mineral collection of his own which was rich in Hungarian specimens. Count Ferdinand von Palfy (1774–1840) built another collection at great cost, traveling personally to buy mineral specimens in Hungary and other countries. Count Dietrichstein based his collection in Vienna on the minerals acquired from Abbot Anton Estner (1730–1801), curator of Count Wrbna's collection. Baron Thaddaeus von Lichtenfels (1764–1829), Baron Michael von Kienmayer (1755–1828) and the Marquis von Malaspina are also known to have built mineral collections.

In fact, a large percentage of the Austrian nobility probably at least dabbled in mineral collecting at one time or another. Baron Ignaz von Born (1777) wrote approvingly of the inspiration young aristocrats were given in school:

> The [mineral] collections of the [Viennese] academies for noblemen have afforded me great delight, not indeed for their rarities, but by their inspiring young noblemen with some relish for this science. Every nobleman in the Theresian college [founded by Maria Theresa] has a small cabinet of minerals, shells and insects in his apartment.

Collecting within the academic community was thus common as well. Among the most important scholarly collectors was Baron Nikolaus von Jacquin (1727–1817) a Dutch-born naturalist, Professor of Mineralogy at Schemnitz (1764–1769) and Professor of Botany and Chemistry at the Imperial Academy in Vienna (after 1769). Robert Townson visited him in 1793 and wrote: "In Professor Jacquin's collection of minerals are found the most splendid specimens." Included were beautiful Icelandic zeolites, tourmaline, Zillertal minerals, fine galenas and apatite, and Hungarian minerals. Jacquin's collection, begun around 1789, was ultimately purchased for the enormous sum of 20,000 gulden by Archduke Johann and eventually incorporated with his own collection in the "Joanneum" in Graz.

Among the most famous of all scientists who worked in Vienna was the Transylvanian-born mineralogist Baron Ignaz von Born (1742–1791), who in 1776 was appointed to head the Royal Imperial Natural History Collection. Besides building a large and interesting mineral collection of his own, he also helped build the collections of other aristocrats, and prepared published catalogs.

Other academic collectors included the Adjunct Director of the Imperial Natural History Museum, Karl Haidinger (1756–1797), and a former Augustinian monk named Andreas Stütz (1747–1806), who curated and cataloged the Imperial mineral collection in 1797–1806. His private collection, ultimately inherited by his brother Franz, was "small format" (in this case, specimens less than one inch square). There were also the Directors of the Royal Imperial Natural History Cabinet, Johann Baptiste Megerle von Mühlfeld (1740–1813), and Johann Carl Megerle von Mühlfeld (1765–1840). The latter described his personal mineral collection of 2,158 specimens in a beautifully illustrated 2-volume manuscript catalog; the catalog and collection were sold to Italian Archduke Massimiliano d'Este after the turn of the century and were donated to the University of Modena in 1819. Professors and instructors at the Royal Imperial Academies collected minerals as well, including Benedikt Hermann (1755–1815) at the Real-Akademie, and an instructor named Stromer at the Institute for the Deaf and Dumb.



Stütz

Mineral collectors in the Vienna medical community included the Dutch physician Jan Ingen Housz (1730–1799) (who sold his minerals to the English collector William Hunter), and the Viennese pharmacists Moser, Bonsaing, and Scharinger. In the late 1790's Scharinger purchased an excellent collection assembled by the Morgenbesser brothers—prominent Viennese mineral dealers—for 7,000 gold florins. He added to it significantly, acquiring many excellent Hungarian and Transylvanian specimens, along with a complete set of Romé de l'Isle's crystal models.

Collectors among the Viennese clergy included the Abbot Anton Estner (curator of Count Wrbna's mineral collection), Abbot Nikolaus Poda (1723–1798), Abbot Franz Neumann (1744–1816) (curator of the Imperial coin collection), Abbot Benedict Lamprecht (who specialized in Hungarian minerals), Archbishop Franz Salm (1749–1822), a patron of natural science who financed collecting expeditions, and Count Sigismund von Hohenwarth (1745–1825), an Archbishop and Oberdirektor of the Royal Imperial collections. Hohenwarth was a friend and field collecting partner of Franz von Wulfen (1728–1805), the Belgrade-born Jesuit and naturalist in Klagenfurt who is famous for his magnificent, full-color description of wulfenite. Hohenwarth inherited Wulfen's mineral collection, adding it to his own in 1808, and selling all in 1809 to Count Franz von Egger for 12,000 gulden. Egger later donated everything to the "Joanneum" in Graz.

Prominent mineral collecting members of the Vienna military establishment included the Field Marshall Lieutenant, Count von Spork; Austrian military commander, Archduke Karl Ludwig; Lieutenant-Colonel Franz von Tihawsky; Field Marshall, Count Andreas Hadik (1710–1790), whose "beautiful collection" was rich in gold specimens and amethyst; and Artillery Captain Josef von

Lettheney. Von Lettheney studied mineralogy, chemistry and physics, and built a large mineral collection "rich in varieties and containing many great rarities." Especially notable was his suite of Peruvian silver ores collected between 1788 and 1792 by Anton Helms. Lettheney specialized in "small format" minerals not exceeding two inches in size.

Among the businessmen of Vienna two collectors stand out, the bankers Jacob Friedrich van der Nüll and a Herr Bienenfeld. Van der Nüll built a large and very attractive collection by aggressively purchasing other collections and keeping the best specimens from them. He was said to be tireless in his pursuit of top-quality specimens, in the process building what was perhaps the best private mineral collection in all of Austria and Germany. Bienenfeld was also aggressive, being so bold as to compete with the Emperor himself for the purchase of the best specimens. But, whereas van der Nüll specialized in 2 to 4-inch specimens, Bienenfeld's taste ran to the very large as well as beautiful. To this end he spent much money, but his collection was considered "incomplete" because not every species could be found as enormous specimens. Still, the big pieces were admired as uniquely instructive, especially his large Siberian beryl, his large meionite crystal group from Vesuvius, a large proustite/pyrargyrite from the Harz Mountains, and a big native silver from "Spanish America."

Numerous government officials engaged their fancy for minerals. Joseph Wenzel von Dam, *Hofsekretair* to the Imperial coin collection, built a fine collection which he later sold to the Duchess of Calabrito, Petronilla von Ligniville, for 10,000 gulden. Ferdinand Mitis (whose mineral collection catalog was published in 1785) was President of the Imperial coin collection (the Royal Imperial Hofkammer numismatic and mining cabinet). Mathias Niedermayr (1750–1829), Director of the Royal Imperial Glass and Porcelain Works in Vienna, built a collection rich in Bohemian ores, silver minerals from Annaberg, and English minerals. The Royal Imperial Hofrats Franz Saurau, Joseph von Sonnenfels (1733–1817) and Johann von Müller are also known to have assembled nice collections.

More mineral dealers appear to have been operating in Vienna by the end of the 18th century than in any other city in Europe or America. Prominent members of the profession included the brothers Simon and Georg Preschern, the brothers Johann and Franz Morgenbesser, the Mohr brothers, Johann Weiss (who owned a rich collection of gem crystals including a 46-cm Siberian green beryl), Bernhard Dussolt (whose personal collection was curated by Friedrich Mohs), Norbert Muraweck (a specialist in Bohemian and Hungarian specimens), and a raft of others known only by their last names, including Barcigli, Kollman, Pauer and Zaberschnigg.

Of course there were many Austrian collectors who operated outside of the capital city. Among the most famous mineralogists was Baron Sigmund Zois (1747–1819), of Trieste and Ljubljana (then part of the Austrian province of Carniola). He kept his large mineral collection on the second floor of the family palace in Ljubljana. It survives today in the Slovenian Natural History Museum. Other major collectors include Kaspar Schroll (1756–1829), Chief of Salt Mining in Salzburg (who sold his 10,000 mineral specimens to the St. Peter Monastery in Salzburg), Mathias Mielichhofer (born 1772) (who also sold his minerals to the same monastery), Count Franz von Enzenberg (1747–1821), Austrian Appellations-President in Klagenfurt (who owned 3,500 "small format" specimens and 1,500 "large format" pieces), and Baron Karl von Moll (1760–1838), Chancellor of the Exchequer in Salzburg. Moll's fine collection, over 5,000 specimens, was acquired by the British Museum of Natural History and the Bavarian Academy of Science in Munich.

The mineral collection of Roger von Rutershausen (1727–1782) was acquired by the Kremsmunster Mineralogical Museum in 1792. Baron Louis Lederer (died 1842), Consul General for the Austrian states and an accomplished amateur mineralogist, retired to New York and sold most of his mineral collection to the University of Michigan.

Mineral dealers named Nepperschmidt, Thaleaker, Montageraud and Launois are all known from correspondence to have sold minerals to the Imperial Cabinet. A dealer named Steiger was an economics instructor for the Cadet Corp in Neustadt. He had a good personal collection, but in his dealings he was accused of falsifying locality information in order to obtain higher prices.

Following are biographical sketches of some of the more important mineral collectors operating in Austrian territory during the 18th century, at least those for which information is available.

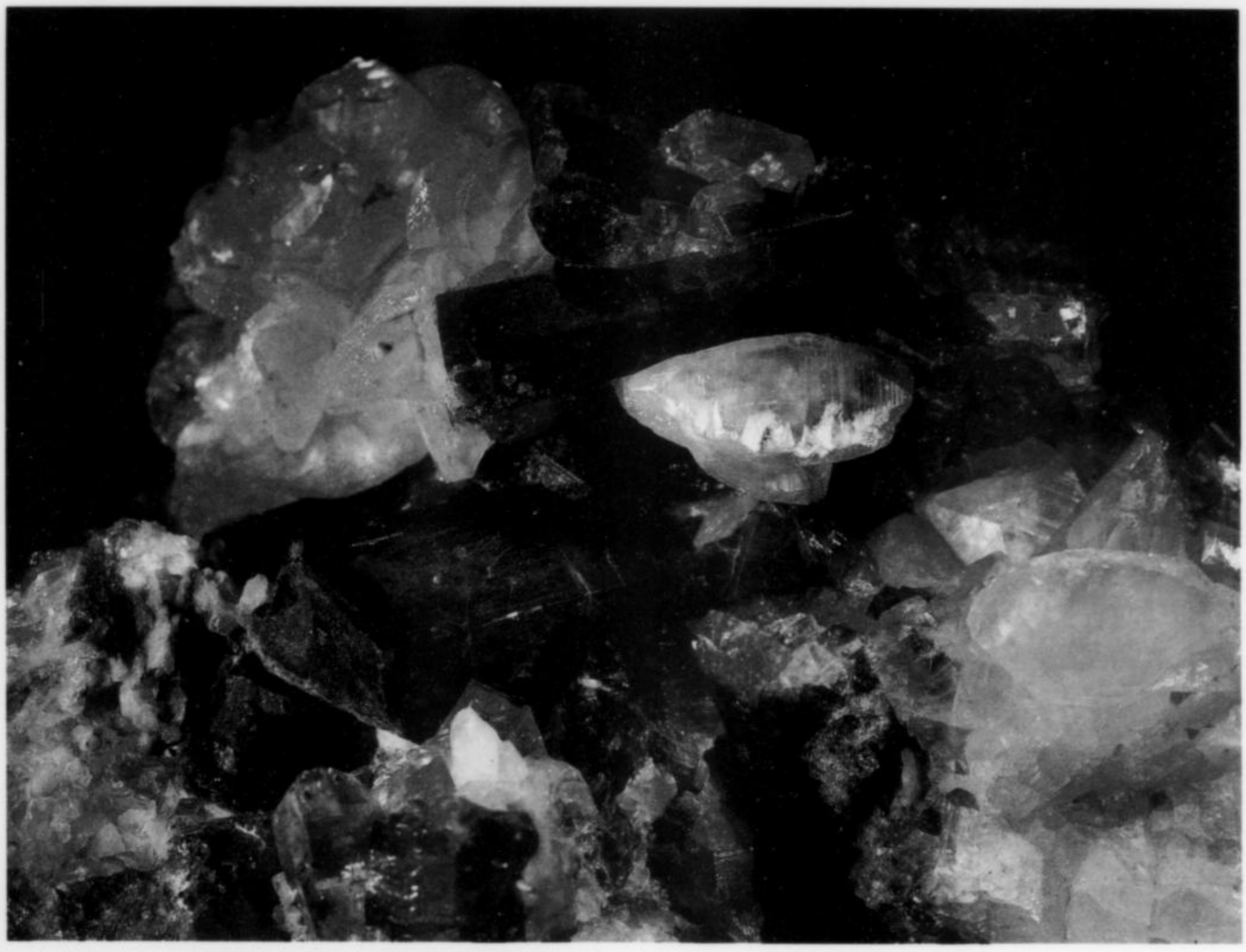


Franz Stefan (Francis I)

Franz Stefan von Lothringen (1708–1765)

The head of the Royal Family in Vienna was Franz Stefan, son of Leopold, Duke of Lorraine (Lothringen). He succeeded to the duchy in 1729, but ceded it to the King of Poland in 1737. The year before he had wed Maria Theresa of Austria and ruled Austria with her as co-regent from 1740 to 1745, when he was chosen as Holy Roman Emperor. He did not concern himself much with the wars that were going on, but preferred to indulge in his favorite pastime: collecting minerals and other *naturalia*.

In 1748 Franz (now Francis I) purchased the enormous natural history collection of a Florentine scientist, Ritter (Sir) Johann von Baillou (1679–1758). This collection, over 30,000 minerals, rocks and shells, was at that time one of the world's largest private collections of such objects. Franz had it brought to Vienna and installed it in the Hofburg palace as the Imperial private collection; von Baillou was retained as curator (see p. 124).



Emeralds in matrix, 13 cm, Colombia; from the **VON BAILLOU** collection.



Emeralds in matrix, Colombia (an assembled specimen), in a gold mount. Acquired by **FRANCIS I** from the collection of **FERDINAND OF TYROL**.

Franz was an amateur scientist at heart, with a partiality for medicine and chemistry, and a fondness for physical and mechanical scientific instruments and models. He even pioneered in the manufacture of some of his own instruments, including a large concave mirror with which he and the Jesuit Father Joseph Franz succeeded in demonstrating the combustibility of diamond in 1751.

In 1755 Franz commissioned the botanist Baron von Jacquin to undertake a collecting expedition to the Antilles, Venezuela and Colombia. The trip, which lasted four years, was the first officially sponsored overseas expedition on behalf of the Imperial Cabinet. Fifty large crates were shipped back to Vienna; included were zoological specimens, plant specimens, ethnographic items, and many valuable minerals.

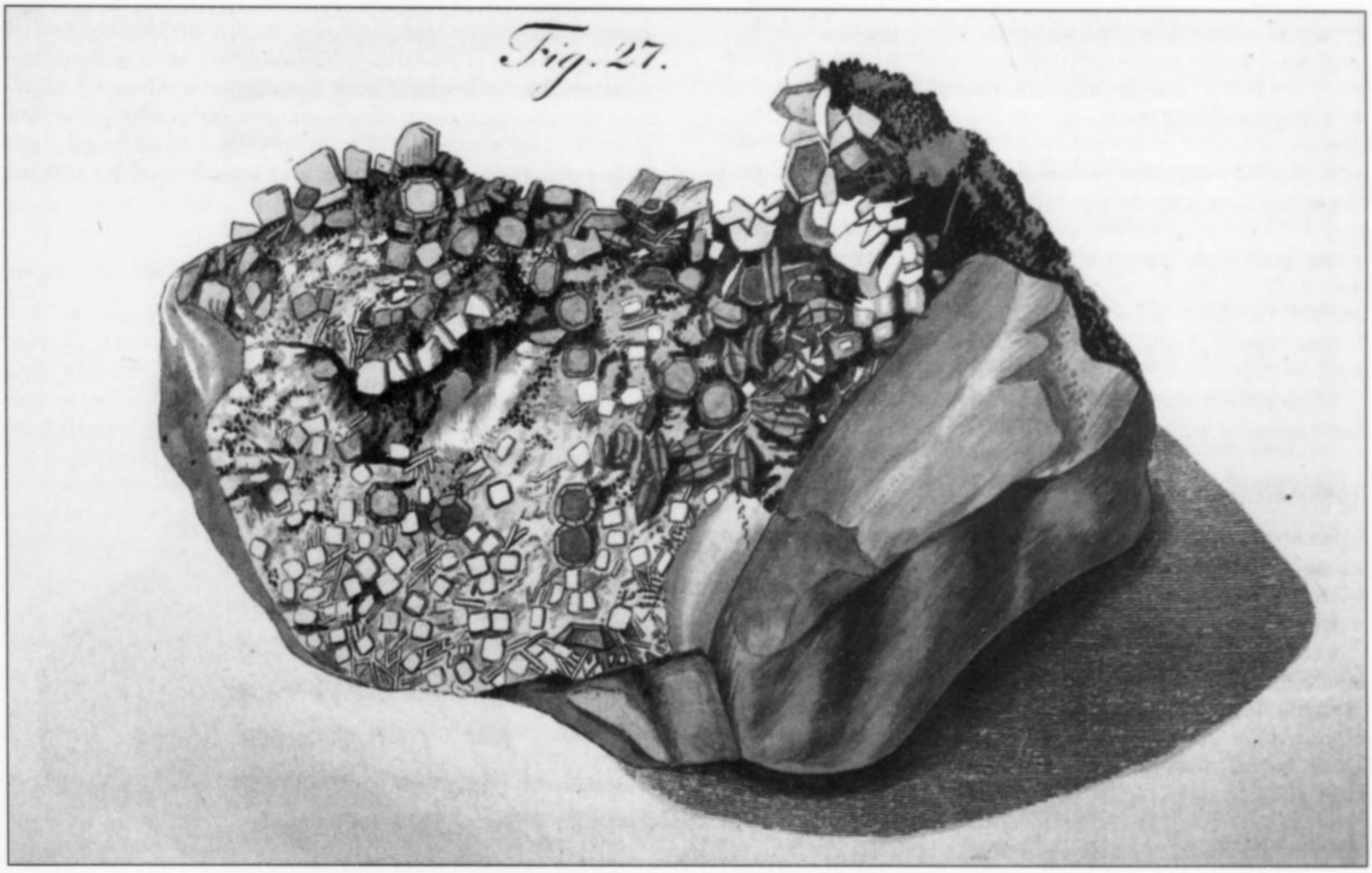
To Franz, however, all of his collecting was for the purpose of his personal enjoyment only, an attitude not shared by his wife. It was not until Franz's death in 1765 that she was able to share his magnificent collection with a wider audience.

Maria Theresa, Archduchess of Austria and Queen of Hungary and Bohemia, was the daughter of Charles VI (1711–1740), Holy Roman Emperor, King of Hungary and last of the male line of the Hapsburgs. Maria Theresa apparently took some interest in Franz's collecting activities. Unlike her late husband, however, she did not regard the collections as personal playthings but as national treasures of some potential use in educating and elevating the public. Therefore she formally presented his collections to the Austrian state and established for them a public museum (among the first in history) known as the Imperial *Naturalienkammer*.

It was also her motive that, in addition to providing pleasure to the public, the exhibits should help people gain a more widespread knowledge of the appearance of economically valuable minerals, facilitating new discoveries. She later called the famous mineralogist Ignaz von Born to Vienna to curate the natural history collection, and charged him with organizing it according to



Barite crystal group, 9 cm, from Schemnitz, Hungary;
collection of **FRANCIS I.**



Wulfenite from Bleiberg, Austria; collection of
FRANZ von WULFEN.

the latest scientific knowledge, and seeing that all Imperial mining properties contributed representative specimens.

The Imperial collection grew rapidly through donations and purchases from private collectors, including Bergrat Leithner in Idria, professor Anton Ruprecht (1748–1814) at the Schemnitz Mining Academy, Baron Franz Müller von Reichenstein (1740–1825; discoverer of tellurium) who was the director of all mines in Transylvania, Bergrat Karl von Ployer (1739–1812) in Carinthia, and the famous mineral collector Johann Fichtel (1732–1795) among many others.

Today Franz Stefan's minerals and all that was later added to his collection are still preserved in the Vienna Museum of Natural History.

Maria Anna (1738–1789)

Maria Anna, Archduchess of Austria, was the daughter of Franz Stefan and Maria Theresa. Because of her delicate health, she avoided the responsibilities of court life and was free to devote herself to study of the arts and sciences. Concentrating especially on numismatics and mineralogy, she became known as "the scholarly duchess" among her contemporaries. She spent most of her income on her collections, and they grew steadily.

By around 1776 she had enlisted the help of Ignaz von Born in building and organizing her burgeoning mineral collection. Born had come to Vienna at Empress Maria Theresa's request to curate the Imperial collection. So it was that Born engineered the growth of both of these important collections simultaneously. He became good friends with Maria Anna, and she became his patron.

When Maria Theresa died in 1780, her son Joseph expelled some of his siblings from the Viennese court. Maria Anna went to Klagenfurt, where she became Prioress of a convent. Her collections were confiscated and her minerals, nearly 10,000 specimens in all, were sold to the University of Buda for 25,000 florins.

Maria Anna's mineral collection is thought to have ranked as one of the best of its time (although most of her original catalogs have long since disappeared). It was rich in Cornish, Hungarian, Siberian, Transylvanian and Scandinavian minerals. Included were popular curiosities such as iron objects transformed into copper by cupriferous mine waters, bezoar stones, carved ornamental objects, and a collection of polished slabs. Her three gilded exhibit cases were faced with polished marble and intarsia decorations. There were also special sub-collections, such as the 500 volcanic specimens from Vesuvius. Localities in Persia, India, Ceylon, China, Brazil, Chile and Labrador were also represented, thanks in large measure to Born's energetic pursuit of acquisitions.

Maria Anna's collection is preserved today, at least in part, in the museum of Eötvös Lorand University in Budapest.

Ignaz Edler von Born (1742–1791)

Ignaz von Born was born in Karlsberg, Transylvania, the son of a noble German family. At the age of 13 he was sent to Vienna to study under the Jesuits, and join their order. The experience was not a happy one, however, and he left after about 16 months.

Born traveled to Prague where he took up the study of law. After completing his degree he took an extended trip through Germany, the Low Countries and France, acquiring a new interest in mineralogy along the way. Upon his return to Prague he took up the formal study of natural history and mining, proving so adept at these subjects that in 1770 he was invited to join the faculty of the mining and minting department. To inform himself regarding the duties of his new position he immediately went off to visit the principal mines in Hungary and Transylvania.

While visiting a mine at Felsobanya, Born's enthusiasm precipitated an accident that probably shortened his life. Ore was being loosened by the fire-setting method, in which piles of wood are ignited against the working face, the heat causing the ore to crack and soften. In his excitement Born entered the mine too soon, before the air had cleared sufficiently, and was overcome by arsenic vapor; his health never fully recovered, and he died some years later at the age of 49.

In 1772 Born prepared a catalog of his collection, listing 2,662 mineral specimens and 134 rocks. In 1775 he issued a second volume, bringing the totals to 3,592 minerals and 288 rocks, and adding his inventory of 714 fossils. In 1773 he had sold much or all of this collection to Charles Greville for £1,000, thus helping to found one of England's greatest private collections. (Greville's collection was acquired by the British Museum in 1810 for £13,727.)

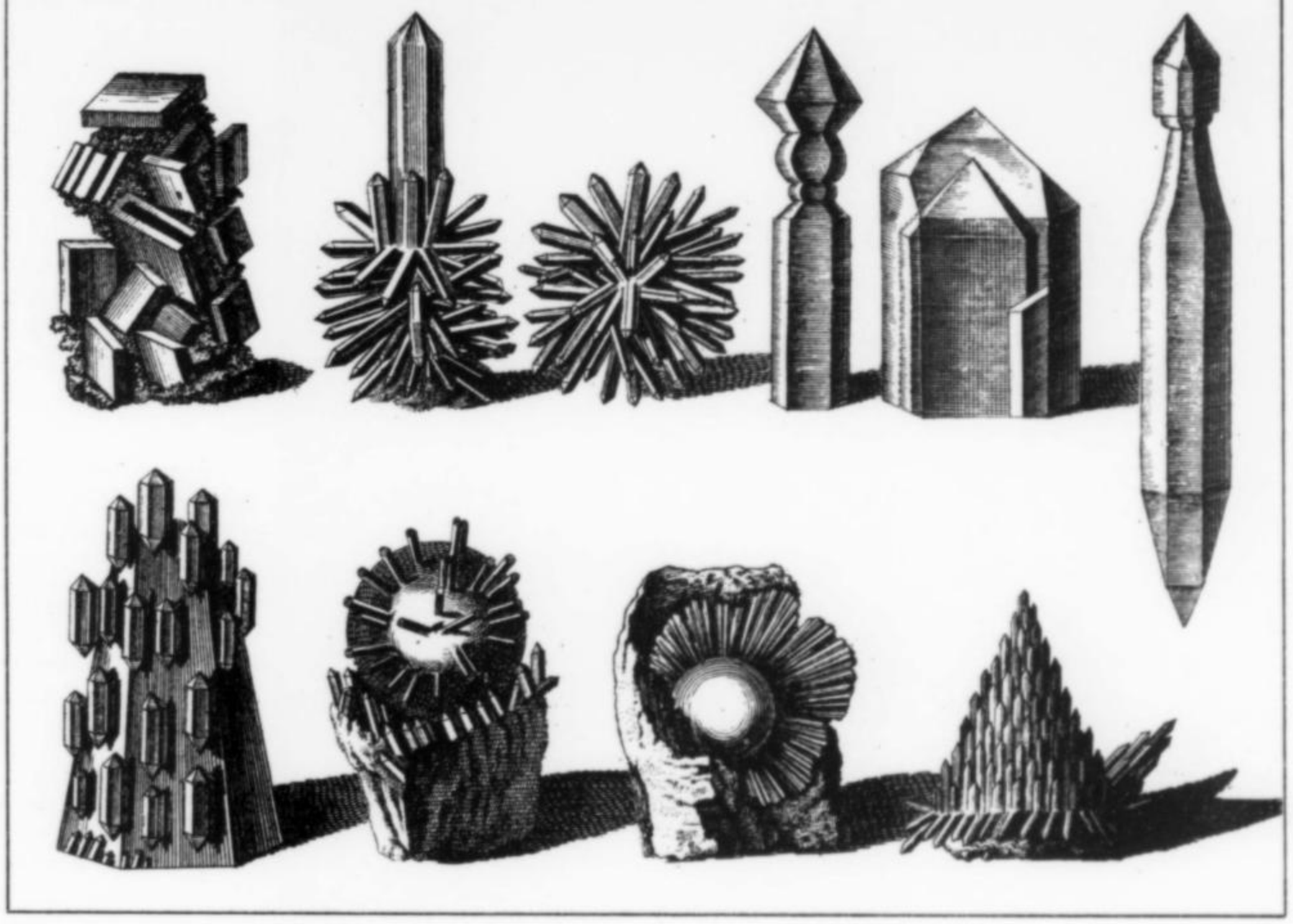
In 1776 Born was called to Vienna by Empress Maria Theresa and given the prestigious job of overseeing the curation, organization and growth of the Imperial mineral collection. Two years later he published an index of the collection: *Index rerum naturalium Musei Caesarei Vindobonensis*. But following the Empress's death in 1780 he abandoned the task of writing a more detailed description. The year before he had been promoted to the office of Court Counsellor on Mines and the Mint.

Born busied himself helping aristocrats build their mineral collections, most notably Archduchess Maria Anna (1738–1789), whose collection eventually numbered nearly 10,000 specimens, and Eleanor de Raab, wife of the Viennese aristocrat Friedrich von Uberta. Raab's beautiful collection of small, choice specimens "formed chiefly by donations from Mr. Born" was described by Born in a published catalog of 1790; although only a few copies were distributed, it was influential in the preparation and organization of other catalogs in later years. Raab's collection consisted of about 2,500 specimens (roughly 900 metalliferous minerals, 1,100 non-metallic specimens, 350 earths and rocks, and 150 petrifactions). In 1793 it was purchased by Count Moritz Friess in Vienna.

In addition to working on at least four major mineral collections (including his own) simultaneously, Born also found time to invent a new amalgamation process for extracting gold and silver from crushed ore; because it was a chemical process not



Born



Specimens of barite (top left) and quartz from the collection of **IGNAZ BORN**.

requiring smelting of the ore it saved huge quantities of fuel and made the process significantly more profitable. Born was awarded a share of the resulting profits from all Hungarian operations.

Besides his professional work Born belonged to a secret society of Freemasons in Vienna, pursuing its anticlerical activities with relish. His satirical work *Specimen Monachologiae*, made vicious fun of all of the monks of various orders and classified them like plants after a system modeled on Linnaeus's.

Jacob Friedrich van der Nüll

Jacob van der Nüll (or von der Null) was a prominent Austrian banker and businessman in Vienna. He assembled an exceptionally fine collection of nearly 4,000 mineral specimens with some assistance from the famous mineralogist Friedrich Mohs (1773–1839). Johann Megerle von Mühlfeld, Director of the Royal Imperial Naturalienkabinet, described van der Nüll's collection as "not only the best private collection in Vienna, but in all of Germany as well, and technically the most instructive." He raved about van der Nüll's perseverance as a collector:

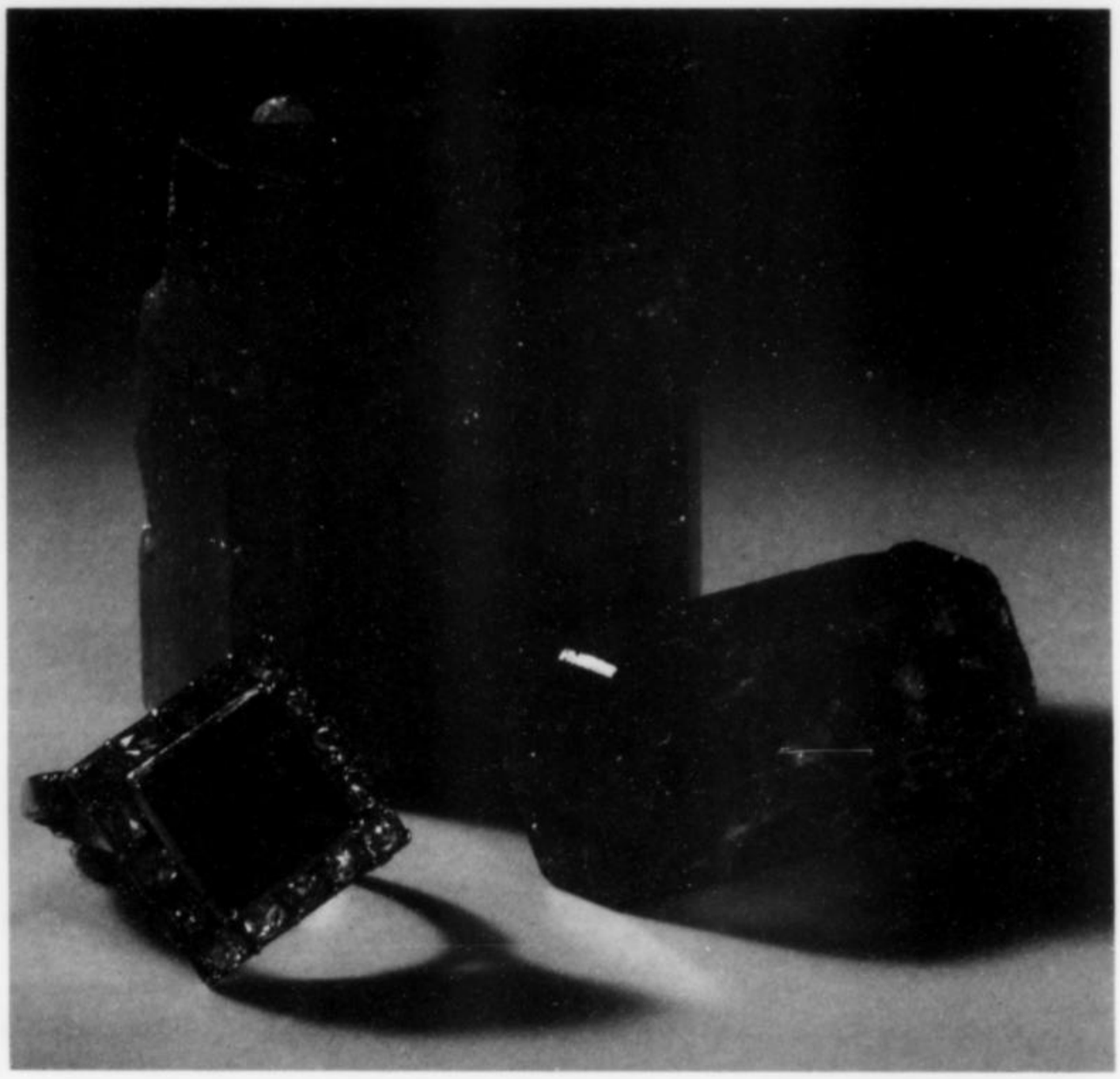
> Since the year 1797 the owner has purchased gradually not a few, but eleven important [mineral] collections, selecting from these the most beautiful and distinctive pieces; passing no mineral auction by; searching out through every mineral dealer the best specimens to purchase; exchanging specimens to obtain better or more elegant examples; sparing himself no effort in the discerning arrangement of his cabinets so as to emphasize the colors, lusters and habits; and finally has arranged for the systematization and description of these intelligently chosen (and, one wants to say, with rare luck gathered) minerals in a valuable treasure for the literary world by the highly esteemed and prominent mineralogist Herr Mohs. And still the owner continues to travel forth with untiring enthusiasm for the beautiful, excellent, distinctive and outstanding minerals, their various types and varieties. Even now, when better examples are found, those in the [published] catalog are displaced.

Van der Nüll specialized in what was called the "mid-size format," meaning specimens in the 2 to 4-inch size.

In the three-volume published catalog written by Mohs in 1804, he describes van der Nüll's collection as follows:

> The collection of Mr. von der Null is among those few which, by their composition, emphasize both usefulness and beauty. It contains all of the mineral species currently known to exist, the most important suites of which are so complete that the entire range of their distinguishing characteristics is represented. Many species, little or nothing on which has been recorded in previous published catalogs, are especially well attended to. The collection, through extravagant expenditure and expert knowledge, has developed under ideal conditions and contains many rarities. The large crystals of demantoid and corundum, the sharp and unusually large crystals of native gold . . . the suite of diamonds, spinels and related species, the suites of tellurium ores, and several others are especially excellent . . . [The collection] is fully curated and adheres to a mid-size format throughout. The arrangement [in cases] of the collection is tasteful and sumptuous.

Some idea of the depth of van der Nüll's collection can be gained by an examination of his suite of gold specimens, which may well have been the most complete of any in his day. Among the Transylvanian specimens were 37 from unspecified mines, 18 from Vöröspatak, 11 from Facebay, 8 from Boiza, and various others from Abrudbanya, Körösbanya, Offenbanya, Felsobanya,



Colombian emerald crystals, with emerald ring, from the collection of **JACOB VAN DER NÜLL**.

Mimetite crystal group, 7.5 cm, perhaps the finest known example from Johanngeorgenstadt, Saxony; from the collection of **JACOB VAN DER NÜLL**.

Nagybanya, Toplitz, Kapnik, Füzesch, Ohlapian, Stanischa, Trestyan and Beida. Hungarian specimens included examples from Nagyag, Kremnitz, Oravicza and Königsberg. Others are recorded from Chile, Kongsberg (Norway), Salzburg and Steirmark (Austria), Adelfors (Sweden), Choco (Bolivia), Peru, Berezov and Schlangenberg (Siberia), Eula (Bohemia), Mexico, Guinea, Ireland, and the East Indies . . . 158 gold specimens in all.

Van der Nüll died some time prior to 1827; in that year his entire collection was purchased by the Royal Imperial Mineral Cabinet in Vienna, where it is still preserved today.

Sigmund Zois (1747–1819)

Sigmund Zois was born in Trieste (then under Austrian rule) to a family of Swiss extraction. His father, Michaelangelo Zois (1694–1777), had moved to Ljubljana early in life and worked his way up in the iron business, eventually becoming full owner of an iron exporting firm in 1732. With an organized sales network extending over Italy and much of the Mediterranean, he soon became a rich man. In Ljubljana he acquired several contiguous houses which he had remodeled and combined into a palace. He owned a number of feudal estates in Carniola, as well as iron mines and smelting plants in Upper Carniola, Bohinjska Bistrica, Stara Fužina, Radovna, Mojstrana, Javornik and also Mislinia in Styria. In 1739 Michaelangelo was granted a nobleman's title in recognition of his great commercial successes, and thereafter was known as Baron von Edelstein ("Edelstein" being derived from the Tuscan root word of Zois, which meant "jewel"). Michaelangelo's second wife (Sigmund's mother) was the daughter of a Slovenian mine supervisor.

Sigmund's childhood was spent in Ljubljana, where he studied under tutors. At the age of 15 he was sent to an academy for the children of nobility at Reggio Emilia where he studied "humanist sciences." Three years later he returned to Ljubljana where he began to learn the iron mining, smelting and marketing business from his father while continuing his academic studies, especially in natural history, under the guidance of Jesuit tutors. During the course of his life, "he acquired immense knowledge by extensive reading and later on by traveling." In 1774 he took over the family business, which became known as "Sigmund Zois and Company"; three years later his father died, leaving Sigmund the sole heir to the enormous family fortune.

The iron business began to decline during the years 1775–1780

due to competition from Russia and Sweden. Zois, now the Baron von Edelstein, traveled extensively through Switzerland, Germany, the Netherlands and France to gather information on modern iron technology which might help his operations become more competitive. He also met with prominent natural scientists, chemists and mineralogists, and he had himself by then become an expert in mineralogy, chemistry, metallurgy, mining technology, zoology and botany. He was a correspondent of such luminaries as Abraham Werner in Freiberg, Martin Klaproth in Berlin, Friedrich Mohs in Graz and Peter Jordan (1751–1827), Professor of Natural Sciences at the University of Vienna. Mohs even paid a personal visit to Ljubljana to see Zois and his extensive personal mineral collection, which was among the greatest of its kind in Europe.

Zois had acquired his minerals through all of the available channels: personal field collecting, exchange, and purchase. He was a particularly good customer of the Viennese mineral dealers Simon and Georg Preschern (died 1806 and 1809). But he also acted as middleman for large exchanges of mineral specimens between collectors and dealers in Italy and Germany, no doubt receiving a commission in specimens. Zois himself regularly sold mercury minerals from Idria and Tržič to other collectors, and thus qualified as something of a dealer in his own right. He also dealt in beautiful greenish to pinkish quartz crystals from Črni, Herkimer-diamond-like quartz from Slivnica, and pisolite from Blegoš.

Zois kept his ever-growing collection on the second floor of the family palace in Ljubljana, and for a time employed his private secretary, Jersej Kopitar (1780–1844) as curator.

Zois's mineral collection was rich in native gold, silver, platinum, and other metallic elements. Most of his gold specimens came from the central Alps, but the best is from Rosia Montana (Verespatak) in Transylvania. Silvers from Kongsberg, from Transylvania and from Allemont in France; native platinum from Brazil; copper from Gwennap, Cornwall; native arsenic from St. Andreasberg, St. Joachimsthal and Nagyag; native bismuth from Schneeberg and Zlatna; and superb Sicilian sulfur specimens are among the prizes of his native element collection.

Among his many other fine specimens are cinnabars from Idria; sylvanite and nagyagite from Transylvania; realgar and orpiment from Kapnik; cuprite and tetrahedrite from Redruth; cassiterite from Zinnwald; uraninite from Johanngeorgenstadt; beautiful azurite and malachite from Moldavia and the Urals; fluorite from Durham and Siberia; crocoite from Berezovsk; extremely fine Siberian emeralds and aquamarines; Habachtal emeralds; topaz from Schneckenstein; and axinite from France, among countless others. Particularly noteworthy is the material sold to Zois by Simon Preschern which Zois recognized as a hitherto unknown species. He sent specimens to Werner and Klaproth for confirmation, and in 1805 they (along with D. L. G. Karsten) named the species in his honor. The type locality for zoisite is a place called Prickler's Halt on the western slope of the Saualpe Mountains in Carinthia; the abandoned quarry still exists there.

In 1821, two years after Zois's death, Bishop Augustin Gruber proposed at a meeting of the Carniolan States that Ljubljana needed a public natural history museum. Karl Zois (1778–1836), heir to his uncle's great mineralogical collection, offered to sell it to the city for such a purpose, and the States unanimously agreed. Prince Klemenz von Metternich (1773–1859), also a mineral collector, paid a visit to Ljubljana specifically to see the collection. The transaction was formally completed in 1823, and in 1826 the Provincial Museum in Ljubljana was founded and immediately took possession of the collection. One of Zois's old collecting friends, Count Franz Hohenwart (1771–1844), was appointed curator, and in 1831 the museum opened to the public; it is today known as the Slovenian Natural History Museum.



Hungary

Agricola had written much about the mines of Upper and Lower Hungary in his *De Re Metallica* (1556), tantalizing later mineralogists to venture into those lesser known parts of Europe. Like the Saxon Erzgebirge, the metalliferous mines of Hungary yielded large quantities of silver, and also gold, copper and iron. These mines, because of their richness and longevity, became a second major focal point of mining culture in Europe, spawning, as the Saxon mines had done, a thriving local enthusiasm for mineral collecting.

There was evidence for this enthusiasm even in the 17th century. Emperor Rudolf II (1552–1612), for example, ordered the magistrates of Schemnitz and Kremnitz and the Bishop of Eger to send him fine mineral specimens "from their collections," attesting to the accumulation of private Hungarian collections even at that early time. When Edward Browne (1644–1708), personal physician to the English King Charles II, visited Hungary in 1669–1670 he found many people collecting minerals there. (Perhaps the most notable of these was M. Dollinger, the director of mines in Kremnitz, but there were many others.) Hungarian mineral wealth became ever more famous throughout Europe.

In the 18th century, the German physician E. F. Brückmann traveled through upper Hungary in 1724, and later wrote of having seen many fine mineral collections. The French Jesuit, F. X. Feller, wrote of his visit to Hungary in the late 1760's that "the Hungarians have a special liking for natural history. Collections of minerals and other rare and valuable objects can be seen at many places" (Papp *et al.*, 1991). Ignaz von Born (1742–1791), who was born in Transylvania but spent much of his life in Prague and Vienna, traveled there as well in 1770. And Daniel Clarke followed his trail in 1802, both of them witness to active mineral collecting and dealing by commoners and aristocrats alike.

Unfortunately, many Hungarian collections were confiscated by the Habsburg rulers and removed to the capitals of Vienna or Prague. Such was the fate of Count Ferenc Nádasdy (1625–1671) and his extensive treasury, including minerals; he was caught in a plot to overthrow the Habsburgs, and was executed in Vienna.

But during the 18th century other important collections were built which fared much better. Count Ignac Batthyány (1741–1798), a Transylvanian bishop, built an enormous collection of minerals, fossils, shells, antiquities and books which he ultimately established as a museum called the "Batthyáneum." Along with the collections of the Barons Bruckenthal (Samuel, 1721–1803; Michael, 1746–1813) in Transylvania, the Counts Andrássy, Prince Josef Lobkowitz (1772–1816), and the Counts, Dukes and Princes of the Esterhazy family, it formed the basis for some of the most important public collections in later years. Other aris-



An 18th-century view of the Transylvanian gold district, where many fine specimens in Hungarian and European collections originated.

tocrats such as countess Julianna Széchény, (1753–1824) and the Counts Teleki (Samuel, 1739–1822; Domokos, 1773–1798) also helped to stock public collections through the donation or sale of their collections.

Prince Lobkowitz's collection (expanded significantly by his son, Prince Ferdinand Lobkowitz, 1797–1868) was "probably the greatest and most impressive private geological collection in Austria-Hungary. It included a large systematic mineral collection (11,675 specimens), a smaller traveling collection (2,962 specimens), a collection of minerals from his own estates (2,492 specimens), and other rocks, fossils and ornamental stones bringing the total to over 40,000 pieces. It was inherited by Ferdinand's daughter, Countess Bossi-Fedrigotti, who put it up for sale. Although the Imperial Mineral Cabinet in Vienna and the Serbian government were interested in acquiring the collection, it was ultimately purchased by the Hungarian National Museum in 1870 for 30,000 florins. The collection had cost the Prince more than 100,000 florins to build, ranking it as the most expensive mineral collection of the time. Much of it survives today, despite partial destruction by Soviet shelling in 1956.

Professors, such as Mathias Piller (1733–1788) and Baron Nikolaus Jacquin (1727–1817), also accumulated substantial personal mineral collections which later helped to build the collections of the Schemnitz Mining Academy and the Hungarian University in Budapest. Piller had been appointed head of the Department of Natural History at the University of Nagyszombat in 1774. This appointment was won, in large part, on the basis of his extensive private collection which was to come with him as a teaching aid. Three years later the University and Piller's collection were moved into the Royal Palace in Buda, where the minerals were set up on the second floor. When Piller died in 1788 a much protracted series of negotiations began between the University and Piller's heirs; the purchase was completed some years later, for 20,000 florins (see Table 2, p. 47). Many visitors considered Piller's collection (nearly 12,000 specimens, mostly personally collected), along with the 10,000 specimens the museum had obtained from the Austrian Archduchess Maria Anna (1738–1789), to be among the best in Europe. It is now part of the Eötvös Lorand University collection.

Ferenc Benkö (1745–1816), a Calvinist priest and professor at the Collegium Academicum in Nagyenyed, was particularly well versed in mineralogy. He had studied at the Universities of Jena and Göttingen, and was the first person in Hungary to teach Werner's theories. In 1786 he published a book on Hungarian mineralogy (*Magyar mineralógia, azaz a kövek s értzek*), the first manual of mineralogy in the Hungarian language. In this book he identified with an asterisk all minerals represented in his own 2,120-specimen collection. His collection passed to the college following his death, but most of it was destroyed during the revolt of 1848.

Istvan Spaits (1743–1804) was another educator (though not a professor) who built an important collection. Spaits was a Jesuit priest who taught in secondary schools at Trencsén, Buda, Ungvár, Nagyszombat, Komárom and Besztercebánya. He developed a liking for mineralogy, field collecting and prospecting, and began to accumulate specimens around 1770. He panned for gold in the placer deposits of the Danube River, and visited many mines and local occurrences. In 1796 he was appointed director of the Cistercian secondary school, by which time his collection had grown to include zoological and botanical specimens and various scientific instruments and books. His minerals consisted of 508 "earths," 28 "salts," 41 "inflammables," and 343 metalliferous specimens, 920 pieces altogether. It was all purchased by the Benedictine Abbey of Pannonhalma near Szt. Márton in 1802;



Benkö

about 350 original specimens are still identifiable, with neatly handwritten labels and an inventory catalog.

Another private collection purchased by the Pannonhalma Abbey was that of Lajos Mitterpacher (1734–1814). Mitterpacher was a prominent Croatian Jesuit scholar and professor of theology, medicine, philosophy and natural history. He taught at the Theresian Academy in Vienna until 1774, then took a position as professor of natural history at the Royal Hungarian University in Buda. He bequeathed his collection to his nephew, Gyula Mitterpacher, also a mineral collector, who brought the total number

MAGYAR.
MINEROLOGIA.
AZ AZ
A' KÖVEK' 'S ÉRTZEK'
TUDOMANYA.
Melly
A' TERMÉSZET Hármadik Országának gazdag, és szükséges, öt Szakaszbéli Javainak rövid, és Rendelvaló Le-irását foglalja magában, mellyel, a' Magyar Nyelven a' Szép Tudományokat fel-segíteni igyekező Elmével, a' Köz' hasznára kíván HAZAJÁNAK kedveskedni.
BENKÖ FERENTZ, Sz. R. P.



Az Auctor' Költségével

Kolo'sváratt, Nyomt. a' Réf. Koll. Bet. 1786.

FERENC BENKÖ's first *Hungarian Mineralogy* (1786).

BENKÓ FERENTZ,
Nagy Enyedi Histor. Natur. Geograf. Professor,
és a' Jénai Természet vizsgáló Tudós Társaságnak Correspondens Tagja által,
Esztendönként ki-adott,
PARNASSUSI
IDÓTÖLTES.
1796.
HETEDIK DARAB.
ENYEDI RITKASÁGOK.
EGY KIS TÓLDALÉKKAL.
A' Ritkaságokban, és az Haza javaiban gyönyörködöknek szémokra.



KOLO'SVÁRATT,
Nyomtatt. HOCHMEISTER MÁRTON betüivel és költségével 1800-ban.

Parnassus Pastimes (1800), the book in which FERENC BENKÖ describes his mineral collection.

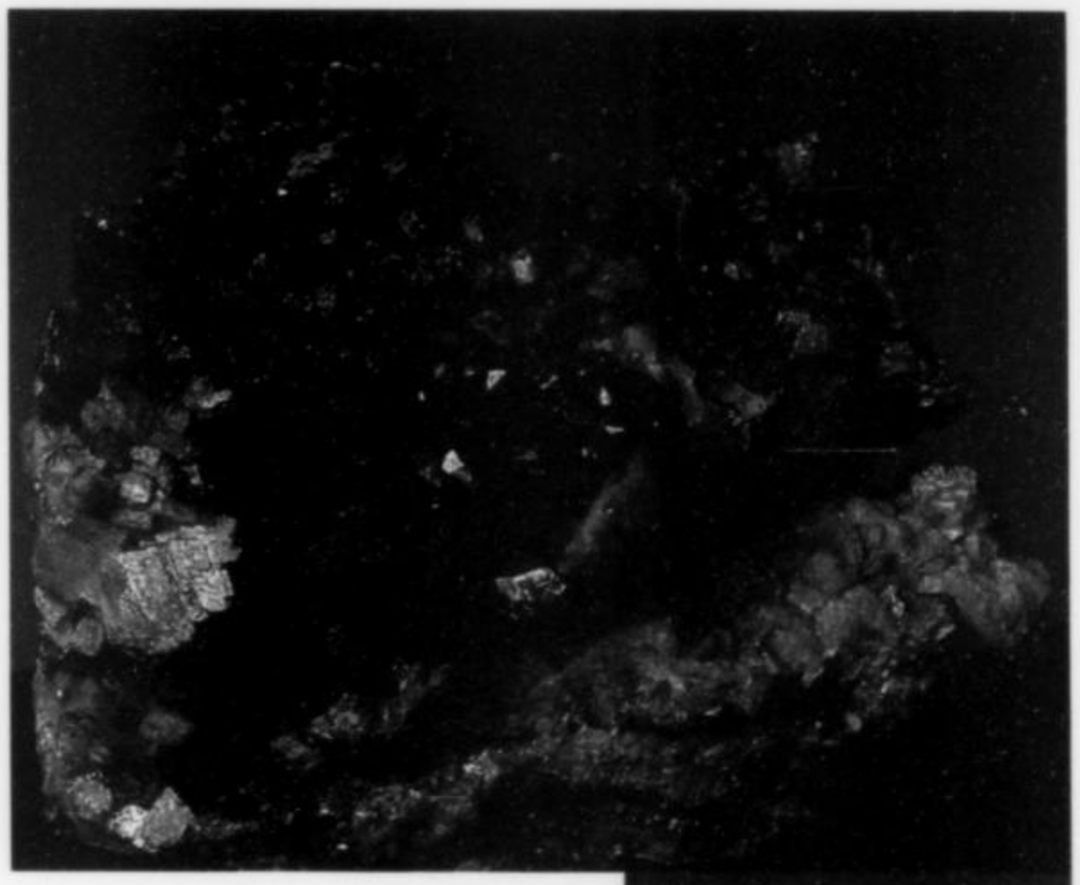
Fig. 9. Title page of Ferenc Benkö's book

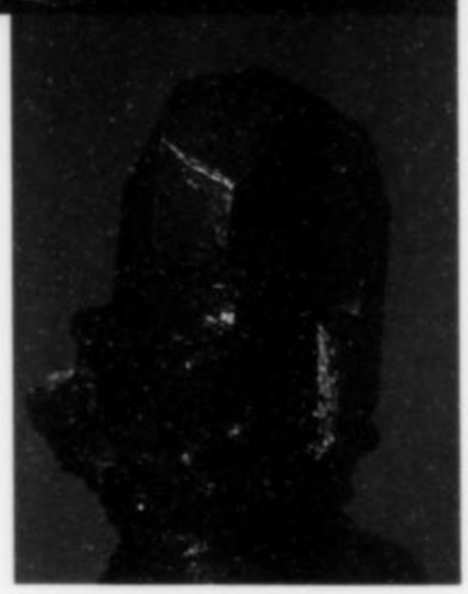
of specimens up to nearly a thousand. The abbey purchased the collection following his death in 1833; about 300 original specimens are still identifiable.

The Spaits and Mitterpacher collections at Pannonhalma are a historical treasure today. Among Hungarian institutions, only Eötvös Lorand University and the Museum of Natural History in Budapest possess such a well-documented and identified assemblage of 18th-century mineral specimens. Topographically the most important sources for these minerals were naturally the famous mining regions of Hungary (Nagyag, Kapnic, Felsöbanya, Verespatak, and many others). But specimens are also included from other countries as well, from Bohemia, Moravia, Siberia, Saxony, the Alps, and even Brazil and Peru.

In 1777 the Hungarian government issued a royal decree (called the *Ratio Educationis*) mandating that natural history, including mineralogy, be taught at all school levels. Thus, with this official stimulus in addition to the local wealth of mineral deposits, by the end of the 18th century many educated Hungarians had taken up the hobby of collecting minerals. Mining officers, physicians, chemists and young aristocrats were all exposed and encouraged in their mineralogical studies. Of the 595 members of Jena Mineralogical Society in 1801, 73 were Hungarian, and a Hungarian (Count Teleki) was elected the society's first president. Three of the society's 19 founding members (S. Bredeczky, S. Nagy and D. Mihalik) were also Hungarians. They enthusiastically traveled the Hungarian countryside collecting minerals, and taking notes, leading to a series of publications in 1802–1816 which at last documented in thorough scientific fashion the detailed topographical mineralogy of Hungary.

Bohemia





Proustite (above) and pyrargyrite (right) from St. Joachimsthal, and stephanite (below) from Pribram, Bohemia; from the collections of **JOACHIM VON STERNBERG** and **JOSEF LOBKOWITZ** (stephanite).

The rich history of Bohemian mineral collecting goes back to Agricola himself, who served as physician to the famous mining town of St. Joachimsthal (modern-day Jachymov) from 1527 to 1533. These are the very years in which he was beginning to build the first known mineral collection; and the St. Joachimsthal mines are the setting for his *Bermannus* (1530), in which the process of mineral collecting was first discussed. Another of the very first collectors, Johannes Mathesius (1504–1565), served as a clergyman in the same city beginning in 1542. And, among the early nobility, Emperor Rudolf II (1552–1612) in Prague assembled one of the earliest and most influential mineral collections of his time. So it can be said that Bohemia was among the first centers of mineral collecting.

In the 18th century, one of the most important mineral collectors in Bohemia was Count Joachim von Sternberg (1755–1808), whose extensive collections were later donated to found the National Museum in Prague.

Count Frantisek Kinsky (1739–1805) donated his excellent mineral collection to Prague University in 1775, where it became the basis of the "Museum Naturae Prague." This museum, which was opened to the public on Tuesdays and Thursdays, was curated by the University professors of mineralogy.

Other aristocratic Bohemian mineral collectors of the late 18th century included: Count Anton Waldstein in Duchov (Dux), Western Bohemia; Count Franz de Paula Hartig (1758–1797), Lord of Niemes and Wartenberg and a patron of science; Count Joseph Millessimo (died 1825) in Prague; Count Eusebius Pötting (died 1825?) in Prague; Count Leopold Kolowrat-Krakowski (1727–1809), whose mineral collection was sold to Prince von Liechtenstein; Count Franz Anton von Kolowrat-Krakowsky (1778–1861), whose mineral collection was acquired by the Narodní Museum; Count Johann Chotek (died 1824), whose collection numbered 4,000 mineral specimens; Count Nostitz-Rhinecku (also acquired by the Narodní Museum); and Count Josef von Auersperg (1767–1829), who had yet another "beautiful collection of minerals" acquired by the Narodní Museum. The Moravians Count Johann Nepomuk von Mitrovsky (1757–1799) and Count Lichtenstein both donated their mineral collections to the Scientific Society of Bohemia, which collection later became the basis for the county museums in Opava, in Olomouc and in Brno. Other collections were less fortunate, such as that of Count Frantisek Desfours-Walderode, destroyed by bombing in World War II.



aristocratic politicians was Prince Klemenz Wenzel Nepomuk Lothar von Metternich-Winneburg (1775–1859). Although his official duties took him to many European capitals, he maintained a castle at Kynzvart in western Bohemia where he accumulated quite a substantial mineral collection. He absorbed the collections of many other people, including that of Karl Huss (1761–1839), official executioner for the town of Eger. Metternich's minerals were finally acquired by the Narodní Museum in 1945.

Prominent members of the technical community who maintained mineral collections included Johann Thadeus Peithner of Lichtenfels, Bohemia (1727–1792), who served as Professor of Mining at the Schemnitz Mining Academy. His 2,000 mineral and fossil specimens were sold off piecemeal in Vienna, but his library of nearly 1,400 books is preserved today in the Mining



Metternich

Academy of Selmecbánya. Franz Ambros Reuss (1761–1830) and his son (a mining director) in Bilin built an excellent collection, and maintained a correspondence with such experts as Werner, Humboldt and Goethe; their collection was ultimately acquired by Hungarian Prince Josef Lobkowitz (1772–1816) in Bisin bei Töpliz, whose geological collections eventually totalled over 41,000 specimens. Johann Thaddeus Lindacker (1768–1816), Bohemian Director of Mines and later curator of Count Kaspar von Sternberg's great collection, was an active field collector who discovered a series of Bohemian mineral occurrences. And Bohemian Mining Director Alois Miessel (died 1815), who documented a great deal of the mineralogy of Bohemia, and of Pribram in particular, gathered a fine personal mineral collection ultimately purchased by the Narodní Museum.

Franz Koller (1767–1826), a Bohemian military man from Obristvi, near Prague, assembled a comprehensive collection of minerals during the years he was stationed in Naples. His collection, including 600 specimens from Vesuvius, was put on exhibit in the family museum following his death; it was later sold to the Galli Monastery in Prague, from which it was purchased in 1870 by the Agramer Museum.



Kolowrat-Krakowsky

Joachim von Sternberg (1755–1808)

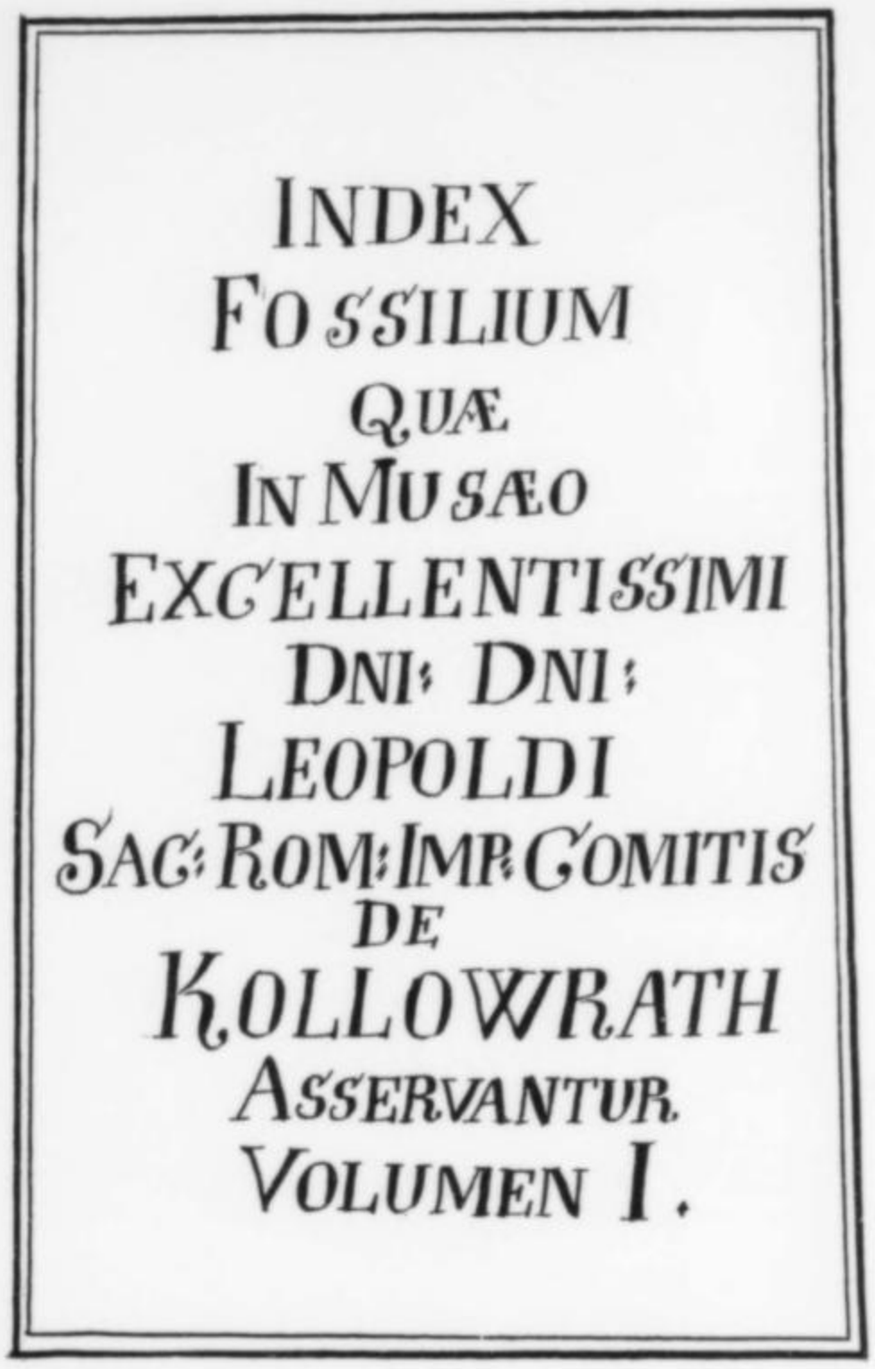
Count Joachim von Sternberg was the middle-born of three sons of the *Geheimenrat* and Finance Minister Count Johann von Sternberg. He enjoyed a thorough education from tutors in his father's house, especially concentrating on mineralogy and chemistry, but the only books available on those subjects were very old, and he became sidetracked for a while with alchemy. His younger brother, Kaspar, served as his secretary, taking notes on his experiments, and keeping the fire going under his smelting table.

At the age of 16 Joachim entered military service, but the leisure occasioned by peacetime conditions gave him time to further his studies in mathematics, mineralogy and chemistry. Following the campaign of 1778 he retired from the military after 14 years of the soldier's life. He traveled through his father's domains examining the various industrial, economic and mining activities. The more of mining and minerals that he saw, the more he became interested in them, and the more he traveled in order to enlarge his geological knowledge. In 1792 he traveled to Denmark, Sweden and western Russia, learning more about mining and the iron industry and enlarging his growing mineral collection.

In 1798 his father died, and Joachim inherited the family estates and title; his elder brother had died in 1789, leaving Joachim as eldest surviving son. During the next few years he continued his scholarly travels, studying mining and minerals in England, France, Hungary, and Carinthia. He died in 1808, at Brezina Palace.

Scientific work was the passion of his life, as shown by his various publications describing his travels, metallurgical investigations, botanical observations, and chemical mineralogical work. He was a member of several learned societies including the Naturalist Society in Berlin, the Botanical Society in Regensberg, and the Scientific Society of Bohemia.

Joachim had accumulated an extensive natural history cabinet, including an excellent collection of 2,800 mineral specimens. In 1808 it was inherited by his younger brother, Count Kaspar von Sternberg (1761–1838), who was an accomplished botanist and mineralogist. Kaspar hired Johann Lindacker to curate the minerals. An enthusiastic patron of the sciences, Kaspar founded the Royal Bohemian Museum in 1818, donating the family collections as a foundation. From the family castle in western Bohemia, eight horse-drawn wagons transported the Sternberg treasures into Prague, where the museum was established; it is today called the Narodní ("National") Museum. The example set by Sternberg


INDEX
FOSSILIUM
QUÆ
IN MUSÆO
EXCELLENTISSIMI
DNI: DNI:
LEOPOLDI
SAC: ROM: IMP: COMITIS
DE
KOLLOWRATH
ASSERVANTUR.
VOLUMEN I.

Manuscript catalog title page, Kolowrat-Krakowsky's collection.

served as an inspiration to other aristocratic collectors, many of whom also donated their collections in later years.

Karl Huss (1761–1839)

Karl Huss was born in Brux, Bohemia, the son of the resident executioner, and showed an early inclination toward scholarly endeavors. At the young age of nine he attended the local Piarist school, and was commended as a diligent student, but was eventually forced out because of prejudice against his father's profession. He was instructed at home by private tutors for a time, but his humiliating expulsion weighed on him and he ultimately gave up his struggle for a higher education and position in society.

Huss decided instead to follow in the path of his father, who was (in addition to his profession as executioner), skilled in folk medicine and the treatment of people and animals for common illnesses. After assisting his father in executions (at the age of 14), he traveled to Eger, where his uncle was the official executioner for the town, and became his assistant. In 1781 he succeeded his uncle in the position, and also became much in demand as a faith-healer, whose miraculous cures made him a wealthy man.

With his longstanding interest in science, and his newfound affluence, he began collecting coins, antiques and natural history specimens. Many items he acquired as payment for his medical services. He studied books on natural history, and became a part-time dealer in minerals and *naturalia*, supplying specimens to many collectors including Wolfgang von Goethe. The well-known Egar professor Anton Grassold was of help to him in these studies.

Huss was also something of an artist, and was "not ungifted" in drawing and painting. He often made copies of favorite paintings, family crests and so on for his own house.

Huss's mineral collection was eventually acquired by Prince Metternich and, with many others, became the property of the Narodní Museum in 1945.



The Low Countries

Mineral collecting in the Low Countries was hampered by a lack of important mineral deposits, and the absence of a local monarchy for many years who might have set an aristocratic example. Where collecting did flourish, it commonly centered more on shells and marine specimens of the kind that washed up on local shores or were brought into port by sailors and travelers. With the intense Dutch emphasis on commerce and business, it is not surprising that the collecting of coins was popular as well. Consequently, although the collecting of *naturalia*, art and ethnographic items was common, minerals were typically relegated to footnote status in most cases. The exceptions, such as Charles Alexander, Albert Seba and Martinus van Marum, are thus all the more interesting.



Charles Alexander

Charles Alexander (1712–1780), Governor General of the Low Countries, was the brother-in-law of Austrian Empress Maria Theresa. Like her husband, Franz Stefan, Charles also had a passion for mineral collecting, and built a substantial collection. His cataloged minerals and rocks eventually numbered 4,480 speci-

mens, including 650 specimens of copper minerals, 354 gold specimens, 135 silver-containing minerals, and 257 lead ores. Following his death, the collection was sold in 1781, a portion becoming the nucleus for the collection of what is today the Belgian Institute of Natural History in Brussels.

Willem Frederick (1772–1843), King of the Netherlands, began building his mineral collection as a youth, but it was looted by French troops during the Napoleonic Wars and taken to Paris as a war prize. The collection was returned in 1815, and is today preserved in the National Museum of Geology and Mineralogy in Leiden.

Other than Charles and Willem, and (to a lesser extent) the Princes of Orange and Nassau, mineral collecting in the Low Countries seems to have been restricted more or less to the medical and scholarly communities in the major cities.

Amsterdam had long been the commercial and financial center of the region, and one of the most important trading centers in all of northern Europe. The University of Amsterdam, founded in 1632, attracted many scholars. By the end of the 18th century, Amsterdam was home to many scientific and learned societies. Some of the earliest Dutch collectors resided in Amsterdam, perhaps obtaining most of their wide-ranging curiosities from ship captains and other travelers docked in the port. Wilhelm d'Orville, for example, published a sale catalog in 1622 listing "shells, rare sea creatures, beautiful agates, carnelians and other stones" in his collection. Johannes Grill (died 1679), an Amsterdam assayer,



Rumpf (after having gone blind)

collected metallic minerals. The famous Georg Rumpf (1637–1706), a merchant and scholar who had lived and collected for many years in the Dutch East Indies, brought his extensive *Rariteitkamer* back to Amsterdam upon his retirement; it included minerals, metals, stones, and especially shells, all described and illustrated in a lavish catalog published in 1705 and 1711. And Jan Swammerdam (1637–1680), a prominent scientist, and Nicolaes Witsen (1641–1717), a prosperous statesman and geographer, had well-known collections as well. So it is plain that natural history collecting in the 17th century was already well established in Amsterdam, although strict specialists in minerals were uncommon.

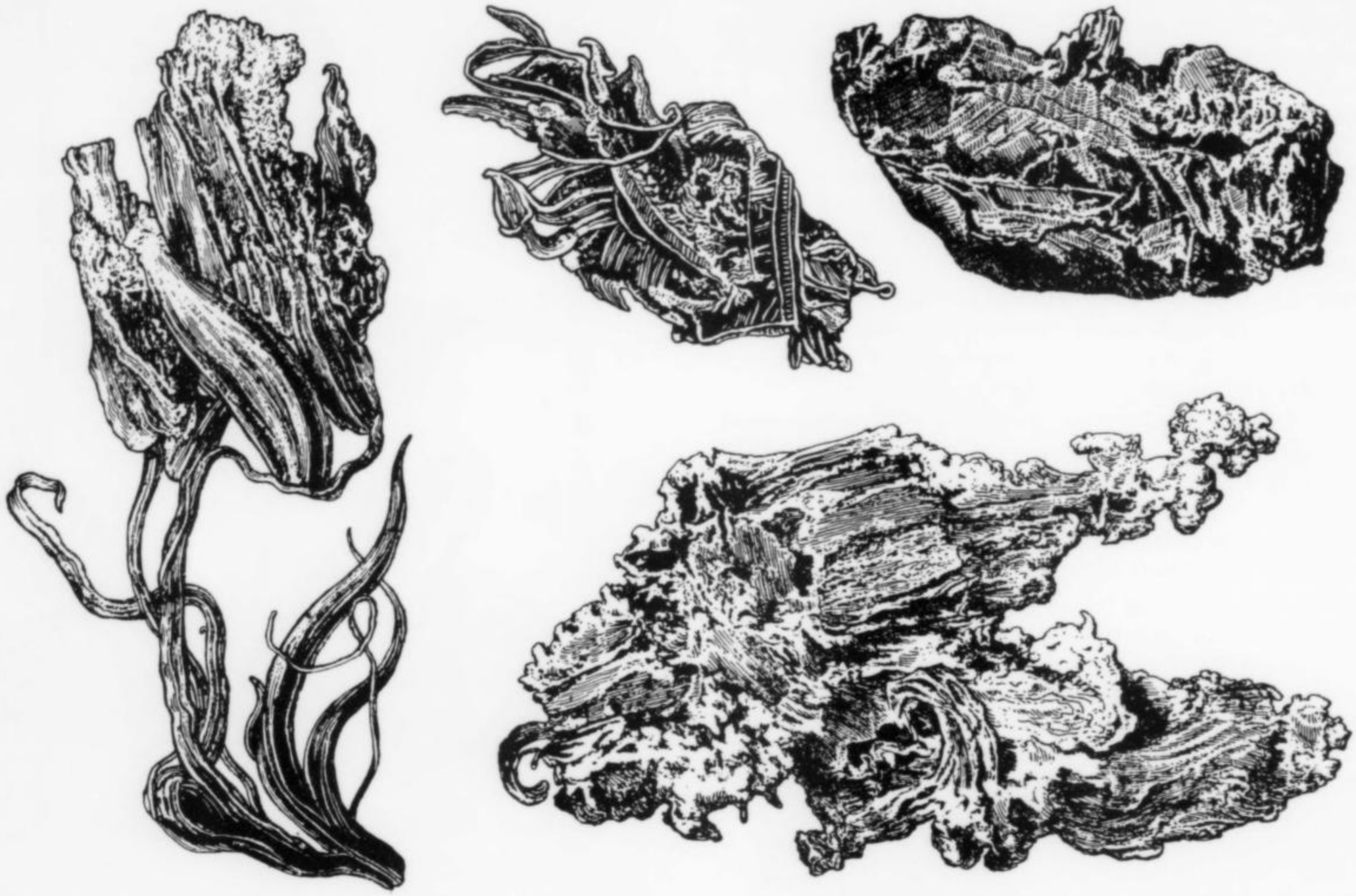


Quartz crystals from the collection of **GEORG RUMPF**.

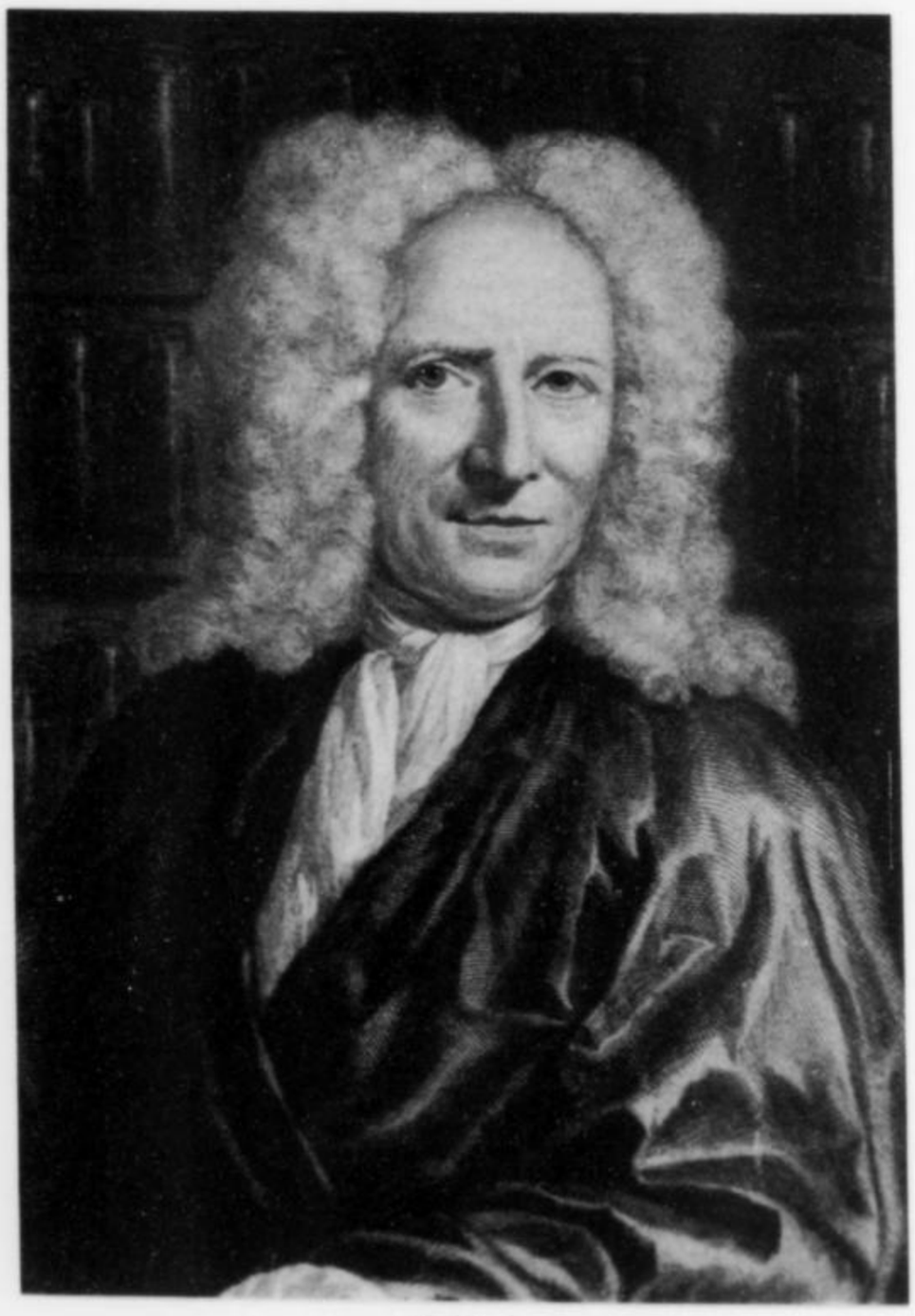
Among the most important Amsterdam mineral collectors of the 18th century was Albert Seba (1665–1736), a German-born pharmacist. He studied in Groningen, Amsterdam, Nuremberg and Staatsburg, finally settling in Amsterdam in 1696 and opening a shop called "The German Pharmacy" (*Die deutsche Apothek*). He traveled widely, bringing back a rich variety of natural history specimens including butterflies, reptiles, amphibians, shells, mammals, fossils and minerals. In time his cabinet of curiosities became famous throughout Europe; he was elected to membership in London's Royal Society, the Xenocratic College, the Imperial Academy in Vienna, and other scholarly organizations.

In 1717 Seba sold his extensive collection to Peter the Great for 15,000 gulden, which he used to begin building a second enormous and probably even better collection. By 1734 it had reached such size and stature that he elected to begin publishing a magnificent series of handcolored, large folio-size plates depicting his thousands of specimens, accompanied by descriptive text in Latin and French. His collaborators in preparing this work included many of the most respected naturalists of his day (although Linnaeus pronounced his seven-headed stuffed hydra to be a fake). Seba died two years later but, through the sale of this second great collection at auction in 1752, his heirs were able to continue publication through a total of four volumes and 449 plates, the final volume appearing in 1765. The plates were all colored by the Dutch artist Jan Fortuÿn.

Although several plates in volume one depict Seba's collection of dozens of bezoar stones (concretions or nodules thought to be of animal origin and to have curative powers), it is not until the end of volume four that his minerals are shown. Plates 100–103 depict over 100 mineral specimens, many of them quite fine and obviously the product of careful selection. They are mostly metalliferous species containing gold, silver, mercury, iron and copper. His native golds came from Sumatra, Japan, Hungary, Borneo, Siam, Cuba, Ceylon and "New Spain." The silvers and silver



Silver specimens from the collection of **ALBERT SEBA**.



Seba

ores, including some superb wire silvers, are recorded as having come from Norway (surely Kongsberg), Japan, Guinea, Germany, Siam, Hungary, the Cape of Good Hope, Arabia, and Virginia. The native coppers came from Mexico, Norway, Sweden, Japan, Siam, China and Ireland. He had cassiterite from England and Malacca; cinnabar from Japan and Hungary; minerals of lead and iron from Germany, Sweden, America, China, Japan, Hungary and Ceylon. Despite its relatively small size and clearly subsidiary status amid his much vaster array of plant and animal remains, his mineral collection was surprisingly sophisticated and broad-based in its range of localities.

Seba's illustrated catalog was of the finest quality that could be produced, beautifully engraved and colored on oversize sheets. Nevertheless, probably even Seba would be surprised to learn that a complete four-volume set sold at Christie's in 1990 for well over $200,000.

While in Amsterdam, Peter the Great also purchased the natural history collection of Friederich Ruysch (1638–1731), which was rich in anatomical specimens as well as minerals.

A contemporary of Seba, and a friend of the older Georg Rumph, was Simon Schynvoet (1652–1727). He was an enthusiastic collector of minerals and shells. But Schynvoet's collection was dispersed, following his death, by a disinterested son-in-law. Other Amsterdam enthusiasts included the physician Martinus Houttuyn (born 1720), who had an extensive collection and wrote a treatise in 1761 on the natural history of plants and animals; Anton Grill, whose catalogs (*Musei Grilliani*) were published in 1728 and 1776; Willem Baart, whose collection included shells, corals, fossils and zoological specimens as well as minerals; Henri Vernede (died ca. 1815), a collector of "*tres belle minéraux*"; and

J. D. V. Portz, whose cabinet of "petrifactions" also included minerals.

Leiden was already an internationally famous center of learning in the 17th century, the University of Leiden having been founded in 1575. The University became especially prominent as a center for medical studies, largely because of the influence of Hermann Boerhaave (1668–1738); medical students from all over Europe and America chose to complete the final years of their medical training in Leiden.



Boerhaave

Boerhaave himself was also a mineral collector; he corresponded widely with other collectors, arranging trades and exchanging information. The prominent British collector and author, William Borlase, assembled a collection of Cornish minerals for Boerhaave. It is perhaps his English connections and acquisitions that convinced his heirs to have Boerhaave's mineral collection auctioned in London in 1750.

Another scholarly mineral collector among the faculty at the University of Leiden was J.N.S. Allamand (died 1787), Professor of Natural History and first curator of the University's cabinet in 1751. He donated specimens from his personal mineral collection in order to fill gaps in the University collection. Count Willem Bentinck (1745–1774) had handed over his entire collection to the University in 1751 to help found the cabinet. The Dutch physician C. Zumbach de Coesfelt sold his extensive collection of minerals, gemstones, rocks and fossils to the University in 1754.

The Gronov family (latinized as Gronovius) included a number of prominent scholars, including Johann Friedrich (1611–1671), a professor at the University of Leiden; Jacob (1645–1716), also a classical scholar and professor; and Johann Friedrich (1690–1760), who was primarily a botanist but had an interest in minerals as well. His collection is known to have included some American minerals and, like Hermann Boerhaave, he received Cornish minerals from William Borlase. His minerals were probably inherited by his son Lorenz (1730?–1778), who kept a sizeable natural history collection of his own and published a catalog (*Museum Gronovianum*) in 1778.

In the Hague, just ten miles from Leiden, were other collectors owning minerals, among the earliest of which was Johan Maurits (1604–1669), who had been appointed Governor General of Brazil by the Dutch East India Company in 1636. He gathered an important collection of *naturalia* into a museum in Mauritsstad (now Recife), one of the earliest such "treasure houses" in the Southern Hemisphere. It was primarily biological in emphasis, but included specimens of gold and gold dust, ores of silver, lead, mercury, copper and iron, and precious stones. In 1644 the entire museum was transplanted to the "Mauritshuis" in The Hague.



Bentinck

Another notable early collector in The Hague was Benjamin Fagel. His catalog, published in 1709, described mostly shells and marine animals but also included minerals. Clement de la Faille (died ca. 1770), a friend of the French naturalist Dezallier d'Argenville, also owned a collection of shells and sea creatures supplemented by "many minerals." similar accumulations were possessed by Johann van Segvelt (catalog published in 1739), and A. E. van Braam (died ca. 1799), Director of the Dutch East India Company, whose collection was auctioned in London.

Certainly one of the Netherlands' most important and active collectors was Pieter Teyler van der Hulst (1702–1778), who built a magnificent museum in Haarlem which survives today, like a time capsule, in perfect condition. The museum building, the antique cabinets, and the mineral collection all appear today just as they did in the 1780's. Teyler, a wealthy silk and fabric merchant, left his entire estate to found a public institution to promote science and the arts; Teyler's Museum is today the oldest museum in the Netherlands. Burchard (1986) described it as follows:

> The mineral collection is housed in the magnificent hall, rich with wood paneling and decorated plasterwork, which forms the core of the museum . . . The original ambience seems to have changed little over the years. What impresses one most in Teyler's Museum is the harmonious manner in which exhibits of natural history and the arts can complement each other when displayed side by side.

The mineral collection, although begun by Teyler, was built up almost entirely by the Museum's first Director, Martinus van



Collection room of **LEVINUS VINCENT** in Amsterdam.



Teyler's Museum, Haarlem

Marum (1750–1837). He collected extensively at famous mineral localities throughout Europe, beginning in 1785, including Freiberg, St. Andreasberg and Mt. Vesuvius. His personal mineral collection was ultimately incorporated with that of Teyler's Museum, along with collections and specimens from many other collectors including the Amsterdam mineral dealer Johann Voight, the Swiss naturalist Nicolas de Saussure (1767–1845), Peter Simon Pallas (1741–1811), Wolfgang von Goethe (1749–1832), Professor Hahn in Leiden (who owned Transylvanian golds), and a Dutch collector in Amsterdam named van der Meulen. The van der Meulen collection was particularly extensive, with many fine specimens of gold, silver and cassiterite. It was purchased for Teyler's Museum by van Marum for 3,667 gold florins in 1783. Altogether about 10,000 mineral specimens are today held by the Museum. Among the other historical treasures acquired by the Museum were a complete set of 398 clay and wooden crystal models sold by Romé de l'Isle in 1802, and 597 wooden crystal models purchased from René Just Haüy.

Also in Haarlem was the museum of the Dutch merchant Levinus Vincent (died ca. 1730), begun originally by his brother-in-law, Anthony Breda, in 1674. Vincent's *Wunderkammer* was among the most famous in Europe, and was visited by King Carlos III of Spain and Czar Peter the Great. It covered the three Kingdoms of Nature, including a considerable number of very rare minerals. The collection, valued at more than 200,000 French livres, was auctioned off in 1779.

Collectors in other cities included Abraham Gevers (1712–1780) in Rotterdam, Henry Dacquet in Delft, and Colonel Bosc de la Calmette in Maestricht, whose large natural history collection was auctioned in London in 1778.



Switzerland

The approach the Swiss took to mineral collecting was as unique as their peculiar history. Having been more or less free of a monarch and most associated aristocrats since the 16th century, they had no royal models to emulate, nor royal collections to stimulate privileged intellectuals and collectors. Being landlocked, they had no seaports or seacoasts to provide support for shell collectors and fanciers of exotic imported curiosa from distant lands. Their multicultural and multilingual society was not conducive to the development of an influential, nationalistic mining subculture with its attendant preoccupation with ore mineralogy. And, in any case, the country was not blessed with an abundance of rich economic ore deposits; furthermore, those deposits that were mined were not rich in potential specimen material. All of these factors discouraged the development of collections.

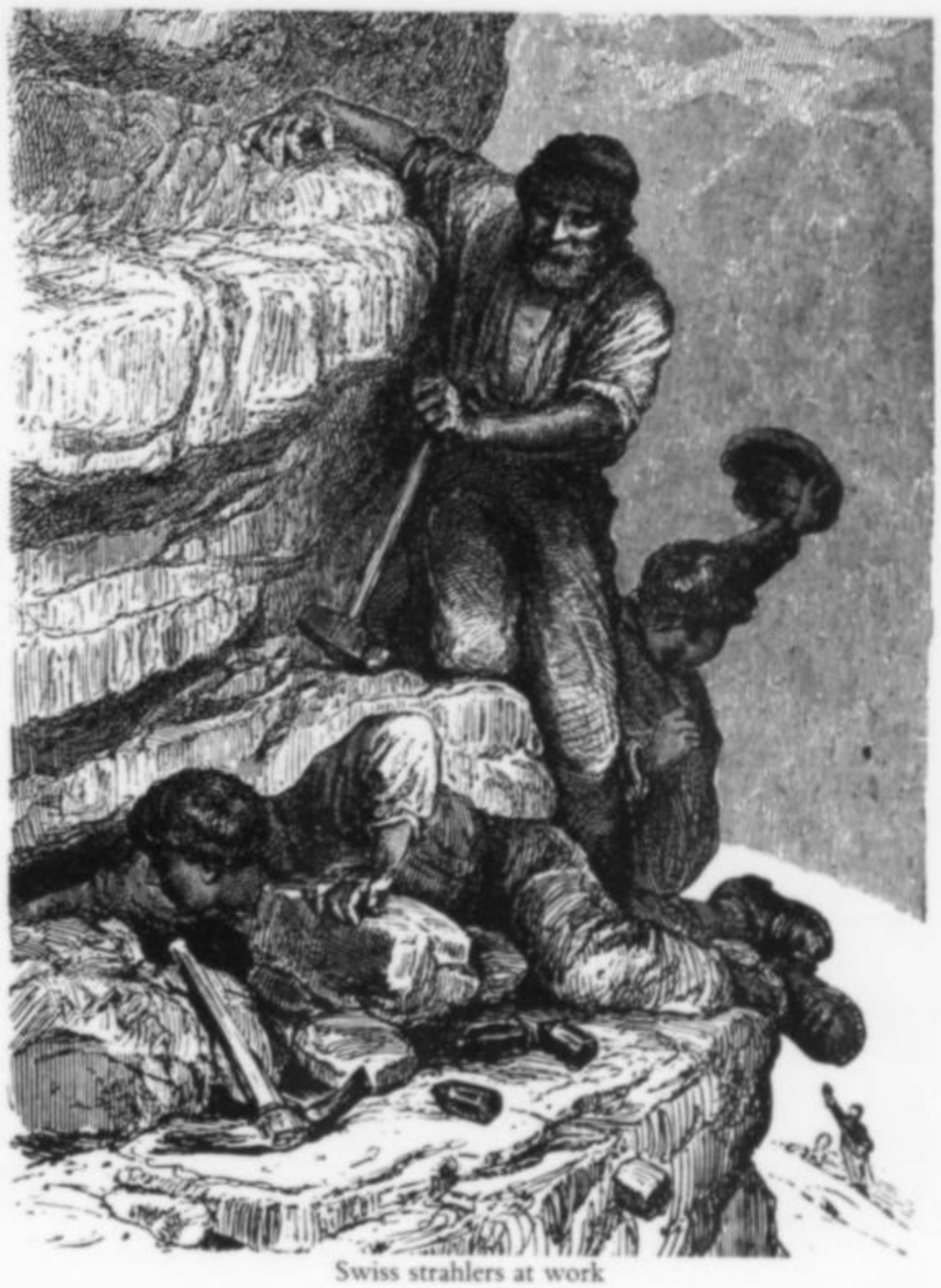
Switzerland, however, had the unique mineralogy of the Swiss Alps, consisting of countless thousands of small, superb crystal occurrences scattered widely throughout the mountainous cantons. A person could go exploring on foot and, with luck and diligence, find an Alpine cleft packed with treasures; the existence of underground mines was not required, and there were no special concentrations of occurrences into mining districts controlled by mine owners. The opportunities for any given collector were therefore as egalitarian and independent as the Swiss form of government itself. Consequently a true subculture of mineral collecting developed which was uniquely independent of the mining industry.

Many Swiss, who had an understandable fondness for mountaineering anyway, became part-time commercial mineral collectors. Their profession was known as *strahling*, and it provided the residents of many small mountain villages with extra income during the summer field season. When weather conditions made the mountain trails inhospitable, the *strahlers* returned to their regular jobs.

Because of the widespread and intensive collecting activity by so many people on public land, it is not surprising that the Swiss found it necessary to enact the earliest mineral collecting legislation in Europe. The provincial decree of 1759 in the canton of Uri declared:

> Any citizen is authorized to dig minerals from common land; and when a man begins to dig in a particular place and leaves his tools there [during his absences], for one year and a day may no other person work in that place.

In recognition of the income being earned by people collecting minerals, it is also not surprising that the Swiss government early on instituted a tax on mineral specimens found. In fact, two of the earliest known quartz crystals collected in the Zinggenstock area in 1721 are preserved today in the Natural History Museum in Bern because of having been seized due to non-payment of the tax.



Swiss strahlers at work

Most of the actual *strahlers* of the 18th century remain unknown, because many did not build sizeable personal collections. But a number who did own large collections have been recorded, and some of their collections survive. Most of the other people who built substantial mineral collections in Switzerland were clergymen or physicians and naturalists.

Already in the 16th century the mineral collections of the Basle naturalists Felix Platter (1536–1614) and Basilius Amerbach (1533–1591) were well-known; they were acquired by the city of Basle and later incorporated into the Natural History Museum of Basle, although little of their material now survives. The mineral collections of Pastor Hieronymous d'Annone (1697–1770) and his son Johann d'Annone (1728–1804) were acquired by the naturalist Peter Merian (1795–1883) and later formed the nucleus of the collection in the Natural History Museum of Basle. The mineral collection of H. Bernoulli (1745–1829) was also later acquired by the museum.

Gabriel von Erlach (1739–1802), a naturalist in Lausanne, was particularly interested in Alpine cleft minerals of the St. Gotthard region, and the lead and iron minerals of the Lauterbrunnental mines. His large mineral cabinet was purchased in 1798 by the Swiss Government, and is today preserved in the Natural History Museum of Bern. Also acquired was the mineral collection of Jacob Wyttenbach (1748–1830), a Bernese clergyman and naturalist who founded the Naturalist Society of Bern. He served as first president of the Natural History Museum in 1804. The mineral collection of Franz Tscharner (1768–1805), son of one of the last Bernese governors of Lausanne, was rediscovered just a few years ago in an estate sale and was purchased by the Museum.

The physician and senator Karl Lang (1670–1741) established his "Museum Lucernense Langianum" in Lucerne; it contained mostly minerals and fossils. In 1858 it was purchased by the Natural History Museum of Lucerne.

Horace Bénédict de Saussure (1740–1799), the prominent phy-



Cappeler

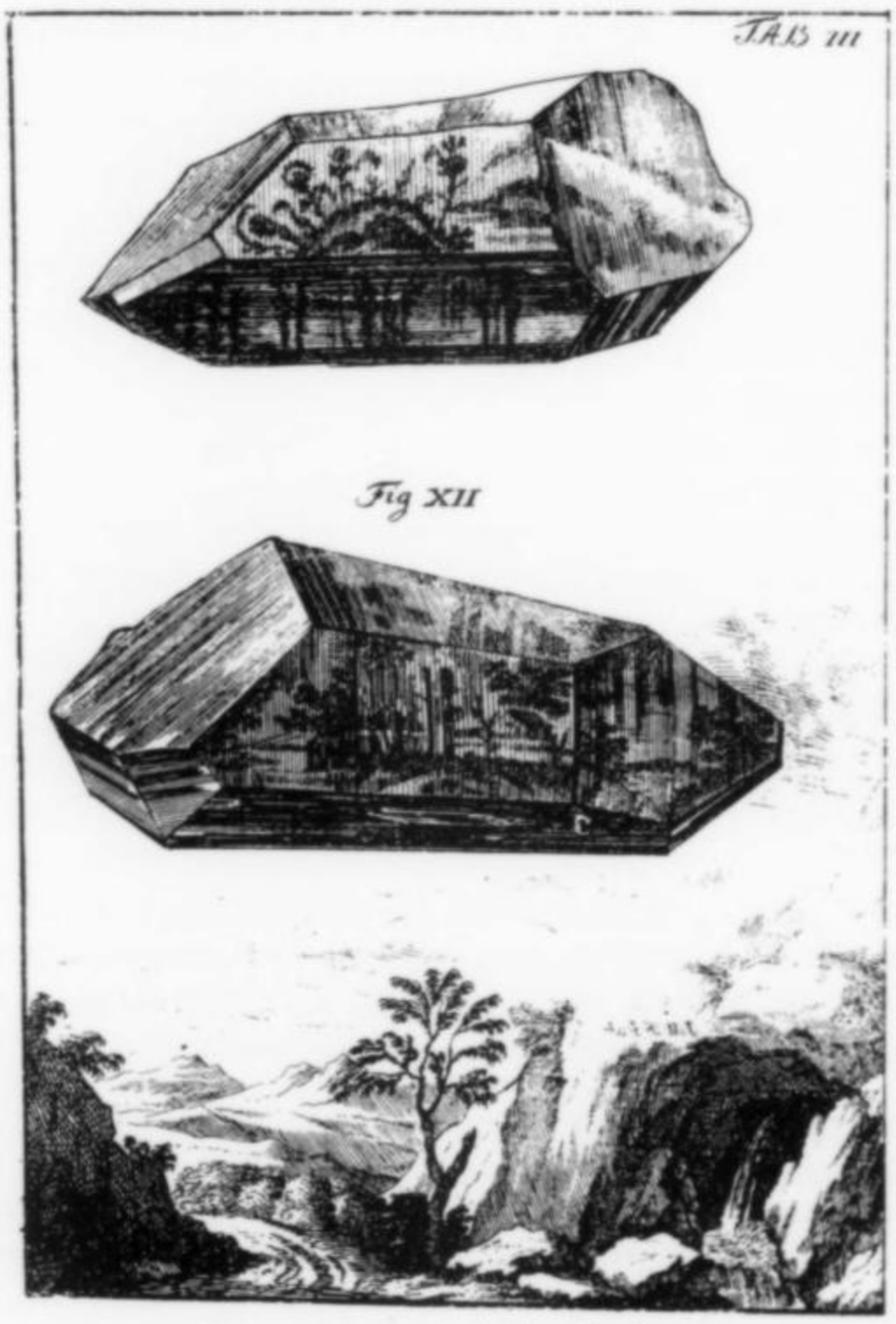


Scheuchzer

sician and mineralogy professor in Geneva, began his mineral collection while quite young. His 1,300 specimens are now in the Natural History Museum of Geneva.

Other surviving Swiss collections left the country. The collection of the Altdorf naturalist Johann Baier (1677–1735) included medical curiosities, shells and coins as well as minerals, gathered at much expense. It was transferred in 1805 to the University of Erfurt. The collections of D. B. Rätzer in Bern ("a multitude of crystallized specimens" mostly from the Gotthard Massif) and Hans Konrad Escher von der Linth (1767–1823), a statesman who owned about 600 Alpine specimens, were purchased by Martinus van Marum for Teyler's Museum in Haarlem in 1802. The Lucerne physician Moritz Cappeler (1685–1769) gave part of his collection of rare quartz crystals to Sir Hans Sloane, whose minerals later founded the collection of the British Museum of Natural History. And the famous Zurich physician and naturalist Johann Scheuchzer (1672–1733) built a collection of fossils and minerals which are today preserved, at least in part, in the Landessammlungen für Naturkunde in Karlsruhe.

Two more collections which survive today (to some extent) were built by the Beroldingen brothers, both of whom joined the clergy. Joseph von Beroldingen (1738–1816) spent many years building a large collection of minerals through purchase and exchange. He supplied minerals to Caroline Louise von Baden, among others. His collection was eventually purchased by Moritz Lechner in Vienna; after Lechner's death it was bought by the American mineral dealers Alvin and Ray Schortmann in 1955, who sold the better specimens to major U.S. museums such as the American Museum of Natural History, the Harvard Mineralogical Museum, and the Smithsonian Institution. The other brother, Franz Cölestin von Beroldingen (1740–1798), took an



Swiss quartz crystals in the collection of **JOHANN SCHEUCHZER**.

ecclesiastical post in Hanover. He traveled throughout Europe building a mineral collection of over 14,000 specimens; it was sold to the British Museum of Natural History by his nephew in 1816, but several thousand specimens were later discarded as worthless by the Museum staff.

The famous Swiss monk, Father Placidus a Spescha (1752–1833), was an active naturalist, mineral collector, trader and dealer in Trun/Disentis. His first mineral collection, which he had built to give to the Benedictine monastery of Disentis, was confiscated in 1799 by the French Army as a war prize, but he went on to assemble an even larger second collection (valued at 24,000 gulden in 1913). Spescha was among the leading Swiss mineral connoisseurs of his day and an active field collector. About the field-collecting experience he wrote:

> Nothing in the world is more beautiful, I repeat once again, than the view of a freshly opened pocket of excellent quartz, the various colors of nature playing therein. I have opened many which are not large but exquisite, and I cannot adequately describe the great joy which that view gives me, nor the sorrow which overtakes my heart when I must break apart such beauty in order to dig it out.

His second collection was acquired in 1913 by the Naturforschende Gesellschaft in Chur.

The physician, professor and naturalist Louis Jurine (1751–1819) in Geneva built a mineral collection which, as part of his natural history cabinet, was considered to be "among the richest in Europe." The Bernese clergyman Elie Bertrand (1712–1790) built a private museum known to have included minerals, some of which were carefully illustrated in color in Casimir Schmiedel's *Erz Stufen und Berg Arten* (1753–1771).



Cassiterite crystals, on quartz, from Eibenstok, Saxony; collection of **ELIE BERTRAND**.

Other important Swiss mineral collectors included the Bernese clergyman and naturalist Johann Gruner (born 1690's); his son, and one of the leading Swiss geologists of the 18th century, Gottlieb Gruner (1717–1778); the St. Gallen clergyman and professor, Peter Scheitlin (1779–1848); the naturalist Karl Ulysses von Salis-Marschlins (1760–1818) in Chur; the ornithologist and mineral collector Daniel Sprungli (1721–1801) in Stettlen; the mineralogist Johann Ammann (1724–1811) in Schauffenhausen; Johann Lavater (1711–1795) in Zurich; Peter Paul Scali in Geneva; and the Geneva chemist and naturalist Henri Gosse (1753–1816).



Italy

The long tradition of collecting in Italy continued into the 18th century, among a few aristocrats and, more importantly, within the academic community.

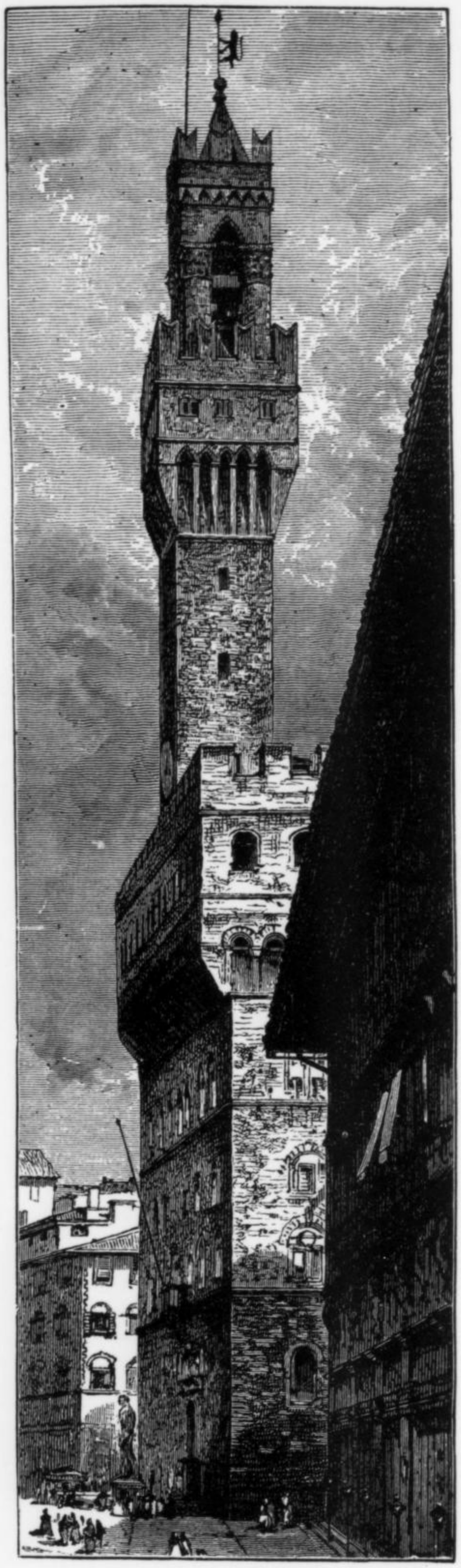
Cosimo de Medici (1642–1723), Grand Duke of Tuscany, had for many years promoted natural science and enlarged the family cabinet of curiosities with many "natural productions." When the last of the male Medici line died in 1737, their natural history collections (including minerals) were curated for a time by Giovanni de Baillou (1679–1758) in Florence; ultimately they were turned over to the public when the Imperial Museum of Florence was founded by Emperor Josef II (1741–1790). The minerals are preserved today in the collection of the Museum of Mineralogy of the University of Florence. Baillou's own collection, among the largest of his time (about 30,000 specimens) was purchased by Emperor Francis I in Vienna, and is now preserved in the Natural History Museum in Vienna.

Another important aristocratic collection was formed by Ferdinand I (1751–1825), Bourbon King of the Two Sicilies and King of Naples. His private mineral collection was donated to help establish the Royal Mineralogical Museum in Naples in 1801, and is kept today in the Institute of Mineralogy at the University of Naples.

Other highborn collectors included Prince Biscari of Florence (who published a catalog of his natural history collection in 1777), and the Duchess of Calabrito, Petronilla von Ligniville in Naples. She purchased the mineral collection of Josef van Dam in Vienna, and donated specimens from Vesuvius and Sicily to the Imperial Cabinet in Vienna.

Among the academic community, the famous collections of Antonio Vallisneri (1661–1730), Professor of Natural History at the University of Padua, formed the foundation for several museums in that city following his death. His minerals went to the University. Cosimo Collini (1727–1806) was a well-known naturalist who collected minerals during his travels and published numerous geological works. He served for some years as secretary to Voltaire, and later as Director of the cabinet of natural history at the University of Mannheim.

Two prominent collectors taught at the University of Pavia. The first, Giovanni Scopoli (1727–1788), had also served as Professor of Mineralogy at the Schemnitz Mining Academy, and as a physician to the mercury miners of Idria. In 1776 he published *Crystallographia Hungarica*, describing and illustrating many specimens of quartz, calcite, gypsum and other species which he had collected in the Hungarian mines. He donated his extensive collection to the University of Pavia. His colleague there, Lazzaro Spallanzani (1729–1799), had founded the University Mineralog-



Tower of the Palazzo Vecchio, Florence, where the Medici mineral and natural history collections were kept for many years.



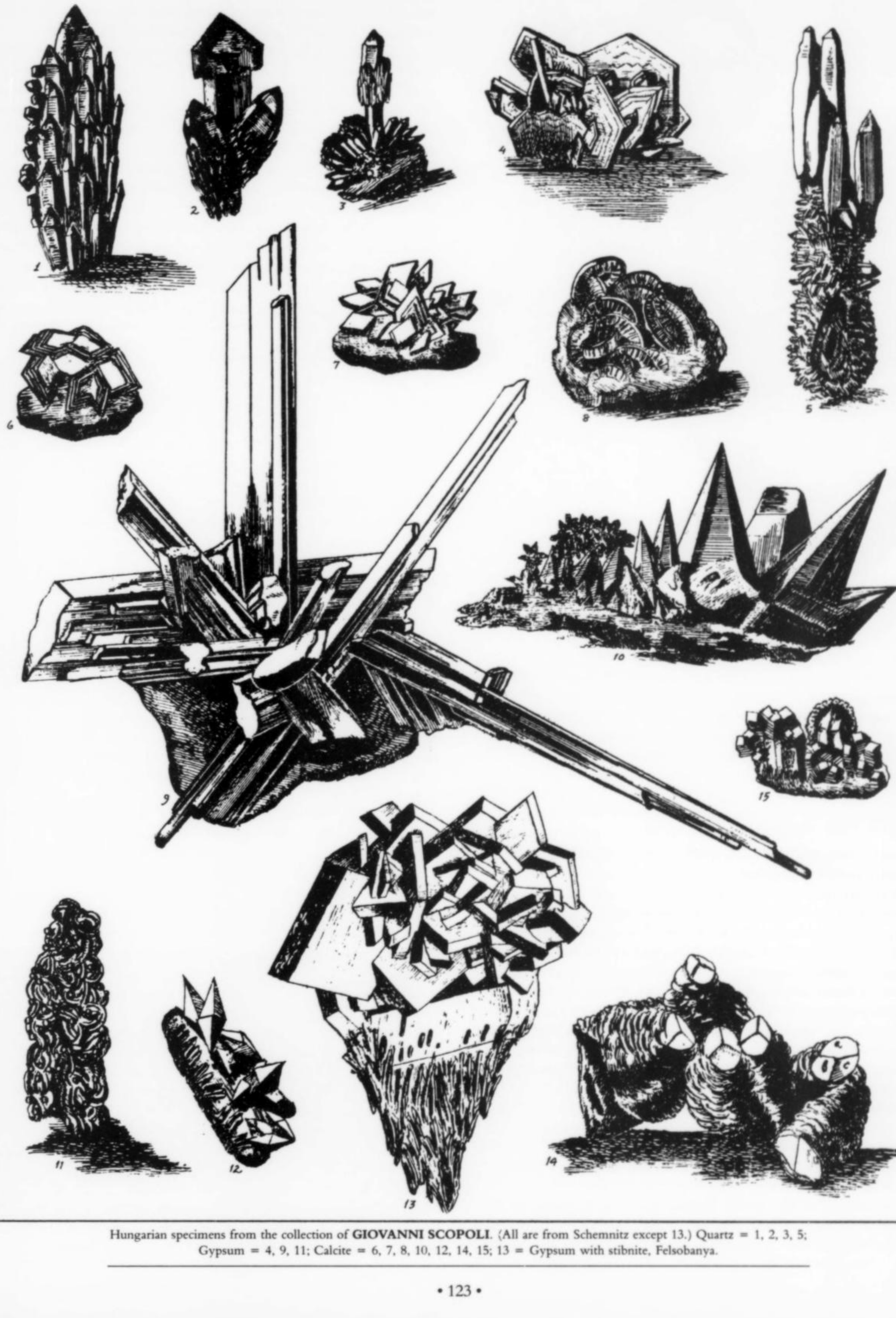
Breislak

ical Museum in 1772, and donated many of his own specimens, particularly from Austria and the Appenine Front. None are today identifiable, with the exception of a meteorite which fell in the Siena area in 1794.

Like Spallanzani, Scipione Breislak (1748–1826) took a special interest in volcanology in general and Vesuvius in particular. He had become interested in minerals during his early youth in Sicily, and subsequently studied natural history in Rome under Giovanni Fortis and Pietro Petrini. Moving to Naples, he taught natural history at the military academy, and in 1794 was witness to an eruption of Vesuvius which influenced his later geological theories and writings, and led to his recognition as one of the founders of volcanology in Italy. Finally he moved to Milan to take the post of Inspector at a niter factory, which left him time to inspect most of the important mineral occurrences in Lombardy. Over his long life Breislak built a mineralogical cabinet which "excited the admiration of all amateurs who have seen it, and of the Emperor himself." He bequeathed his minerals to his friend Vitaliano Borromeo in Milan, who had begun collecting just a few years earlier in 1822. In 1913 the Borromeo family collection was donated by Giberto Borromeo to the Natural History Museum of Milan, by which time it numbered about 8,000 specimens.

Teodoro Monticelli (1759–1846), Abbot and Professor of Ethics and Chemistry at the University of Naples, built a substantial mineral collection including 2,000 specimens from Mt. Vesuvius alone. He donated some of his minerals to the King's Cabinet in Paris, sold his Vesuvius specimens to the British Museum of Natural History in 1823, and donated the rest to the Mineralogical Museum of Naples.

Other prominent Italian collectors included Giuseppe Baldassarri (1704–1785) at the University of Siena; Biagio Bartalini (1750?–1822), also of the University of Siena (and whose 5,974 mineral specimens were purchased by the University after his death); Giovanni Zannichelli (1662–1729), whose *Museo Zannichelliano* in Venice specialized in minerals and fossils; Count Marco Antonio Corniani degli Algarotti (1768–1845), a Venetian mining expert; the Marquis Ippolito Durazzo (1754–1818) in Genoa, who supplied mineral specimens to Charles Greville; and Jan Filip Carosi (1744–1799), a naturalist and mineralogist who became Director of all mining in Poland and curator of the Royal Polish Natural History Cabinet. Carosi's personal mineral collection was



Hungarian specimens from the collection of **GIOVANNI SCOPOLI**. (All are from Schemnitz except 13.) Quartz = 1, 2, 3, 5; Gypsum = 4, 9, 11; Calcite = 6, 7, 8, 10, 12, 14, 15; 13 = Gypsum with stibnite, Felsobanya.



Quartz group, from the collection of **COSIMO COLLINI**.

described by Macquart in 1789 as containing "a great quantity of curious specimens."

Among the most interesting and significant of all these Italian collectors, however, was Giovanni de Baillou, whose mineral collection was one of the largest in Europe.

Johann von Baillou (1679–1758)

Johann von Baillou, as he was known in Austria later in his life, was probably born Giovanni de Baillou somewhere in northern Italy. He was trained in mathematics, medicine and chemistry, becoming exposed to minerals and other natural substances in the context of *materia medica*, and thereafter devoted himself especially to the study of the Mineral Kingdom. In 1716, at the age of 37, he began building what was to become one of Europe's largest personal collections of minerals, rocks, fossils and shells.

Baillou eventually came to the notice of François Farnese, the Duke of Parma, and was hired as the Duke's Commissioner General of the Artillery (no doubt because of his skill in mathematics). For the amusement of the Duke, Baillou taught experimental physics in Court utilizing interesting demonstrations.

Baillou was a skilled instrument maker, and designed his own scientific instruments. He built a microscope of his own design, as well as mechanical devices for the measurement of specific gravity, hardness, compressional strength, and other physical properties of minerals.

Following François' death, Baillou served in the court of his brother, Antonio (1679–1731), who succeeded him. Baillou designed a remarkable architectural wonder known as the Magic Grotto of Colorno and its associated garden for the Duke; complex fountains and artistic statuary highlighted the grotto, which was considered a work of genius the equal of any in Europe.

Following Antionio's death, Baillou went to work for Grand Duke Gian Gastone de Medici (1671–1737), probably in the capacity of curator of the Medici natural history collections. Gastone was the last of the male line; his sister, Anna Maria, inherited everything, but upon her death in 1743 the Medici line was finally extinct. The Grand Dukedom of Tuscany passed to Austrian Archduke Franz Stephan von Lothringen in Vienna. In her will, Anna Maria bequeathed to the new Grand Duke all the properties and possessions of the Medici, their palaces and villas, their vast store of art, sculpture, furniture, jewels, books and manuscripts, and their extensive natural history collection (including minerals). Her one stipulation was that nothing should ever be removed from Florence, so that the treasures of the Medici would remain a part of the culture they had overseen for centuries. Baillou, who had by this time been knighted, was retained as Director General of the new Grand Duke's "Galerie" in Florence.

During these years Baillou's own collection continued to grow at a rapid pace. By 1746 it numbered about 30,000 specimens. In that year he published a prospectus of his collection, written by Joannon de St. Laurent and issued in Lucca. Being only 156 pages long, it could include hardly any detail on the individual specimens, but instead presented a general description of the way he had grouped them into organized sub-collections. These included fossils, metals, stones, coral, shells, alabaster and marble, earths and salts, jaspers, agates, chalcedonies, pyrites, semi-metals, and "stones famous for their pretended [medicinal and miraculous] virtues." According to St. Laurent, Baillou's cabinet was a popular attraction in the city, "admired by princes, noblemen and the curious who passed through Florence."

In 1748, his distant employer, Franz von Lothringen, now Holy Roman Emperor Francis I as well as the Grand Duke of Tuscany, decided that although he could not bring the Medici collections to his court in Vienna, he would purchase the extraordinary collection of his Florentine curator, Chevalier de Baillou. This he did, removing Baillou's 30,000 specimens to Vienna and installing them in beautifully crafted cases in the Hofburg Palace (see p. 101). Baillou was brought along as curator, a position he held until his death in 1758, when the curatorial duties were taken over by his son.

Baillou was very much a scholar at heart, and he loved mineralogy. It had been his expressed intention to publish a much more ambitious work than his collection prospectus of 1746. In it he wanted to describe his collection fully, expounding on his own theories for a system of mineralogy and mineral chemistry. He teased the public with a title page in red and black at the back of his 1746 publication, and a "plan de la description générale du cabinet de M. le Chevalier de Baillou." The proposed work, entitled *Traité Universel des Pierres Précieuses, Métaux, Minéraux, et autres Fossiles*, was to appear in seven large folio-size volumes, printed on "grand papier impérial" and illustrated with 600 plates "of equal grandeur" showing the principal specimens in the cabinet. Had this grandiose work actually achieved publication it would have rivaled Albert Seba's huge four-volume illustrated catalog as one of the finest in the history of collecting. The Emperor, however, was interested in the collection only for his own amusement, and so the project was abandoned.

In 1765 the Emperor died, and his wife, Maria Theresa, donated his collections to the state, founding in the process what would eventually be known as the Vienna Museum of Natural History. Sadly, although many of Baillou's specimens are no doubt still preserved, almost all labels and identifying paperwork have been lost, and their pedigree with them.



Russia



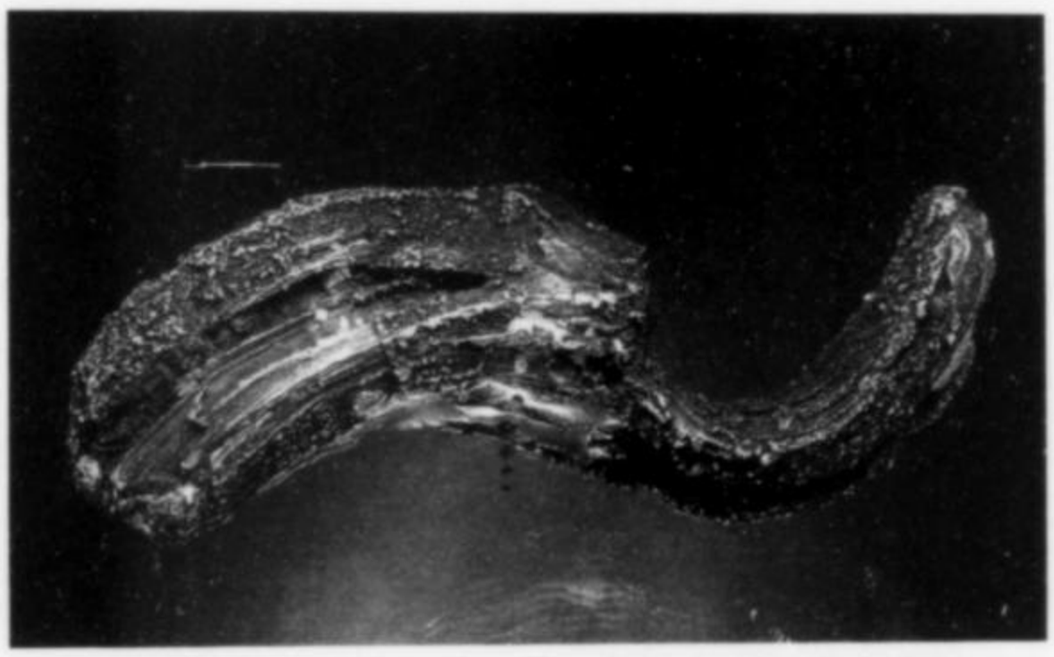
Peter the Great

The Russian nobility, like noblemen elsewhere in Europe, were not immune to the Baroque fashion for collection building. The earliest known Russian *Kunstkammern* belonged to Czar Ivan the Terrible (1530–1584), and later to Czar Alexis (1629–1676), father of Peter the Great, although these are not known to have contained any mineral specimens.

Peter the Great (1672–1725) was born to Natalia Kirillovna Naryshkina, a woman whose former guardian had raised her in an atmosphere open to the progressive cultural influences of Western Europe. As a child he became acquainted with residents of the nearby "German settlement" where foreigners were permitted, and became interested in the life of other nations.

In 1697–1698 Peter traveled through Western Europe with his so-called "Grand Embassy" of 250 diplomats and scholars, examining the international situation and gathering knowledge about the intellectual and cultural life of the West. He was enormously stimulated by this exposure to foreign ways, and as a result brought new vigor to the building of his own collection of rarities. He installed his first collection of *naturalia* in the imperial pharmacy, with his personal physician, Aryeskin, as its curator.

By 1714 Peter's natural history collection had become substantial, and, in the enlightened interest of fostering public education, he opened it to the public. During his second trip through Germany, Austria, the Netherlands and England in 1716–1717 he purchased entire collections to bring back to St. Petersburg. The most notable acquisitions were the enormous natural history collections of the Amsterdam apothecary Albertus Seba (1665–1736) and the Dutch anatomist Friderich Ruysch (1638–1731), both of which contained some minerals, and especially the collection of nearly 1,200 mineral specimens owned by J. Leopold Gottwald, a Danish physician in Danzig. A few years later, in 1724, Peter placed his scientific collections under the administration of the St. Petersburg Academy of Sciences. Most of Peter's specimens survive today as part of the 120,000-specimen gem and mineral collection preserved in the Fersman Mineralogical Museum, Moscow.



Silver specimens, 20.5 cm, from Kongsberg given by Charles XII, King of Sweden, to **PETER THE GREAT** in 1718.

The St. Petersburg Academy was to receive numerous other important mineral collections in the following years. These included especially the 2,000 specimens bequeathed by the famous Freiberg mineralogist Johann Henckel (1679–1744), the mineral collection of the German mineralogist and resident minister for Russia in Hamburg, Heinrich Struve (1772–1851), and the collection of the Hungarian mineralogist, Christian Andreas Zipser (1788–1866).

In 1773 the St. Petersburg Mining Institute was founded, and it soon acquired a number of important private mineral collections. Perhaps the most expensive was a collection assembled by a British mineral dealer living in St. Petersburg, Adolarius Jacob Forster (1739–1806); the purchase price was 50,000 rubles. A Finnish mineralogist, Erik Laxman (1737–1796), was Professor of Chemistry at the Institute; he donated much of his mineral collection, although some specimens he presented to Catherine the Great (1729–1796), who gave them to the St. Petersburg Academy of Science. Czar Alexander (1777–1825) himself presented a mineral collection to the Institute in 1801, and facilitated many later acquisitions. In 1825 he issued an imperial order temporarily suspending all mining activity throughout Russia while his representatives gathered mineral specimens for the Institute's collection. The mineral collections of numerous other early collectors about whom little is known but their last names, e.g. Casanova, Leybe, Renovanz and an early head of the Institute, Ober-Berghauptman Deraebin, further enriched the Institute's holdings.

Empress Catherine the Great deposed her husband Peter III in 1762, with the help of her paramour, Grigori Orlov, Grigori Pötemkin, and princess Catherine Dashkova. Both Catherine the Great and Catherine Dashkova were mineral collectors when not involved in palace intrigues. The former purchased a valuable mineral collection from the prominent German naturalist and



Alexander I



Catherine the Great



Title page to **ALEXANDER**'s manuscript collection catalog, dated 1803.

traveler, Peter Simon Pallas (1741–1811), and kept a cabinet of minerals at her winter palace. She appointed Catherine Dashkova as Director of the St. Petersburg Academy of Science in 1782, and the Russian Academy of Science in 1783, positions which she filled with distinction. Dashkova donated her personal mineral collection to the St. Petersburg Academy.

Grigori Orlov (1734–1783) was also a collector of natural history, including among his holdings a rich mineral cabinet. He was founding president in 1765 of what was called "The Free Economic Society," and assembled for them a mineral collection. His own minerals were donated to the St. Petersburg Academy of Science upon his death.

Catherine the Great's granddaughter, Alexandra (1783–1801), who married Austrian Archduke Joseph, was an enthusiastic mineral collector as well. She had a systematic mineral collection of 514 specimens (317 of which came from Russia), representing 250 localities. This collection had been assembled and organized for her by Pavel Olorovskiy. In addition, she maintained a 255-specimen collection of mainly Uralian specimens. Following her death, these collections were given to the Royal Hungarian University in Budapest (now Eötvös Lorand University) where they have been preserved, at least in part, along with her two-volume catalog.

Not only Catherine's friends, lovers and relatives collected minerals, but even her personal physician, Baron Georg von Asch (ca. 1720–1807). He built a substantial collection while in Russia, but ultimately donated it to his alma mater, the University of Göttingen, in 1788.

Among the most prominent of Russian collecting families were the Demidovs, descended from Nikita Demidov (ca. 1665–1720), favorite of Peter the Great. Nikita owned mines in Nizhni Tagil, and his son, Akinfi Demidov (died ca. 1740) also discovered and operated gold, silver and copper mines in the Urals. These holdings passed through succeeding generations of family ownership into the 20th century, and gave the Demidovs a longstanding vested interest in mineralogy. Akinfi's nephew, Pavel Grigorievich Demidov (1738–1821), was a prominent collector and patron of scientists. His cousin, Nikolai Nikitich Demidov (1774–1828)



Orlov



built a private collection of over 6,000 mineral specimens and over 2,000 rock samples. The collections of both Pavel and Nikolai were given to the University of Moscow.

Another notable Russian mineral collector was Count Alexis Golovkin in Moscow. He was a friend and patron of the French mineral illustrator Swebach Desfontaines. He purchased several thousand mineral specimens from the collection of the French statesman Charles Calonne in 1801, at what was said to be a great price. Calonne was a prominent collector in Paris, and had sold a substantial mineral collection to Balthazar Sage in 1789 which became the foundation for the Paris School of Mines collection. When Count Golovkin's collection was dispersed following his death, some specimens were acquired by Alexander von Crichton.

One of the largest Russian mineral collections ever assembled was that of *Kammerherren* von Swistunov (died ca. 1812). It numbered over 7,000 specimens from worldwide localities, and was said to be very well organized.

Another prominent Russian collector was Count Aleksandr Stroganov (1733–1811), who owned salt mines and iron mines in the Ural Mountains. He built an extensive scientific library at Stroganov Palace, with a large adjoining room for his mineral collection, arranged in glass display cases. He possessed especially fine specimens of native gold from the Urals, and an excellent Russian rubellite crystal group. It was preserved for some years following the death of the count, but today only the empty glass cases remain in the palace; the minerals are gone.

One of Russia's greatest private mineral collectors was Count Nikolai Rumiantsev (1754–1826). His private museum of books, manuscripts, coins and ethnographic items also included nearly 13,000 mineral specimens. He bequeathed his collections to the state, and they were thereafter opened to the public, becoming a popular attraction in St. Petersburg. The Rumiantsev Museum was later broken up, and the minerals allotted to the Moscow State Geological Museum.

Another Russian nobleman with a passion for minerals was Count Apollos Moussin-Poushkin (1760–1805). He was primarily a chemist but in that context gathered together a substantial collection of minerals. He is known to have sold 161 Russian mineral specimens to the English collector Charles Hatchett in 1799; that same year, Hatchett's collection was purchased by the British Museum, where a manuscript copy of the Moussin-Poushkin specimen list is still preserved.

Two notable Russian expatriates also assembled significant mineral collections while living in Western Europe. Count Gregorii Razumovsky (1759–1837) lived in Germany, France and Switzerland, pursuing his geological researches which appeared in print mostly during the 1780's (*Voyages mineralogiques . . .* 1784; *Essai d'un Système des transitions de la Nature dans le Règne Minéral*, 1785; *Observations minéralogiques sur les environs de Vienne*, 1822; and others). He owned a collection of about 6,000 mineral specimens, mostly from Russian localities but also from Germany and Switzerland, which was said to have been built at great expense over many years. The published sale notice read as follows:

> This is one of the most complete collections to be found of the products of the Mineral Kingdom, containing items obtained not only from Siberia, but from the other parts of Russia, both southern and northern, as well. It includes a very interesting series of all the stones, rocks, minerals and metallic ores from that Empire, numerous specimens of a remarkable size among them. The metallic ores include samples of the native gold from Olonetz on the shore of Lake Ladoga such as exist in very few collections; this mine, the workings of which are under water today, and which, moreover, have been very little studied, has not been exploited for some years. It is for this same reason that the beautiful specimens of crocoite found here are more precious today than ever. This collection fills fourteen large packing cases.

Razumovsky sold this collection to the American collector, Col. George Gibbs, around 1800; Gibbs brought it back to Rhode Island along with other collections he had purchased in Europe, ultimately selling it to Yale University in 1825. Razumovsky was at the peak of his career at the time he sold his collection to Gibbs. Armed with fresh cash and plenty of energy, he proceeded to build a second mineral collection which was eventually acquired, at least in part, by Austrian Prince Prosper von Sinzendorf (1733–1822).



Golitsyn

The other expatriate was Prince Dmitrii Golitsyn (1734–1803), a diplomat and naturalist who became *persona non grata* with the Czar because of his suggestion about freeing the serfs. He lived in Paris, Aachen, The Hague, Brunswick and Jena, publishing several books on mineralogy, principally a general treatise in several editions and a glossary of mineralogy in at least two editions. He collected throughout Germany, especially in Bavaria, and received, by gift, trade and purchase, specimens from many other countries including his Russian homeland. Visitors were amazed at the size and variety of his collection, and the rare specimens it contained. Golitsyn was admitted to the Mineralogical Society of Jena in 1799 and was elected its president. The society provided him with a ducal castle for the storage of his enormous collection, nearly two tons in total weight; it was later transferred to the University of Jena in 1905, but was destroyed by Allied bombing in 1945.

A few intrepid Europeans ventured out across Russia and Siberia on collecting trips during the 18th century. These included the German naturalist Peter Simon Pallas (1741–1811), discoverer and namesake of the class of meteorites now known as "pallasites." In 1767 he took a position with the St. Petersburg Academy of Science, and participated in the expeditions of 1768–1774, which he wrote up in 1771–1776. His extensive mineral collection, as mentioned, was acquired by Catherine the Great. Another traveling collector was Jean Baptiste Chappe d'Auteroche (1728–1769), a Parisian astronomer and naturalist who toured Siberia in 1761. Although his principal purpose in going was to observe the transits of Venus from a suitably distant location to allow parallax calculations, he also pursued minerals. He passed through the various mining districts of the Urals, especially the Ekaterinburg gold mines and the Solikamskaya and Souxon copper mines, bringing back 160 mineral specimens. His account of the trip (*A Journey into Siberia made by order of the King of France . . .*) was published in French (1768), English (1770) and German (1771).



Denmark and Norway

Mineral collecting in Copenhagen (Denmark's only major city) dates back to Ole Worm (1588–1654), a Danish physician, archeologist, and Professor of Natural Philosophy and Medicine at the University of Copenhagen. He began collecting natural history specimens (including minerals) in 1620, and devoted the first four chapters of his published catalog (*Museum Wormianum*, 1655) to the minerals in his collection. The catalog includes a fascinating engraving of his collection room, filled with stuffed animals, bones, tortoise shells and ethnographic items, and many trays of mineral specimens carefully organized into categories such as metals, stones, salts, and so on (see p. 41). His collection became famous throughout Europe, admired even by King Frederic III (1609–1670), who purchased it just prior to Worm's death, for inclusion in the Royal *Kunstkammer*. Frederic acquired other collections as well in the following years, by purchase or confiscation.



Frederick III

The Royal *Kunstkammer* continued to be fed with *naturalia* by King Christian V (1646–1699), who published a catalog of it in 1696, King Frederic IV (1671–1730), King Frederic V (1723–1766), who published another catalog in 1759, and by King Christian VII (1749–1808), who is known to have presented mineral specimens from it to the University of Göttingen and to the King's Cabinet in Paris. In 1808, following the death of Christian VII the mineral specimens were segregated, becoming part of the Royal Natural History Museum and later the Geology Museum



Frederick V

of the University of Copenhagen where some specimens still survive today.

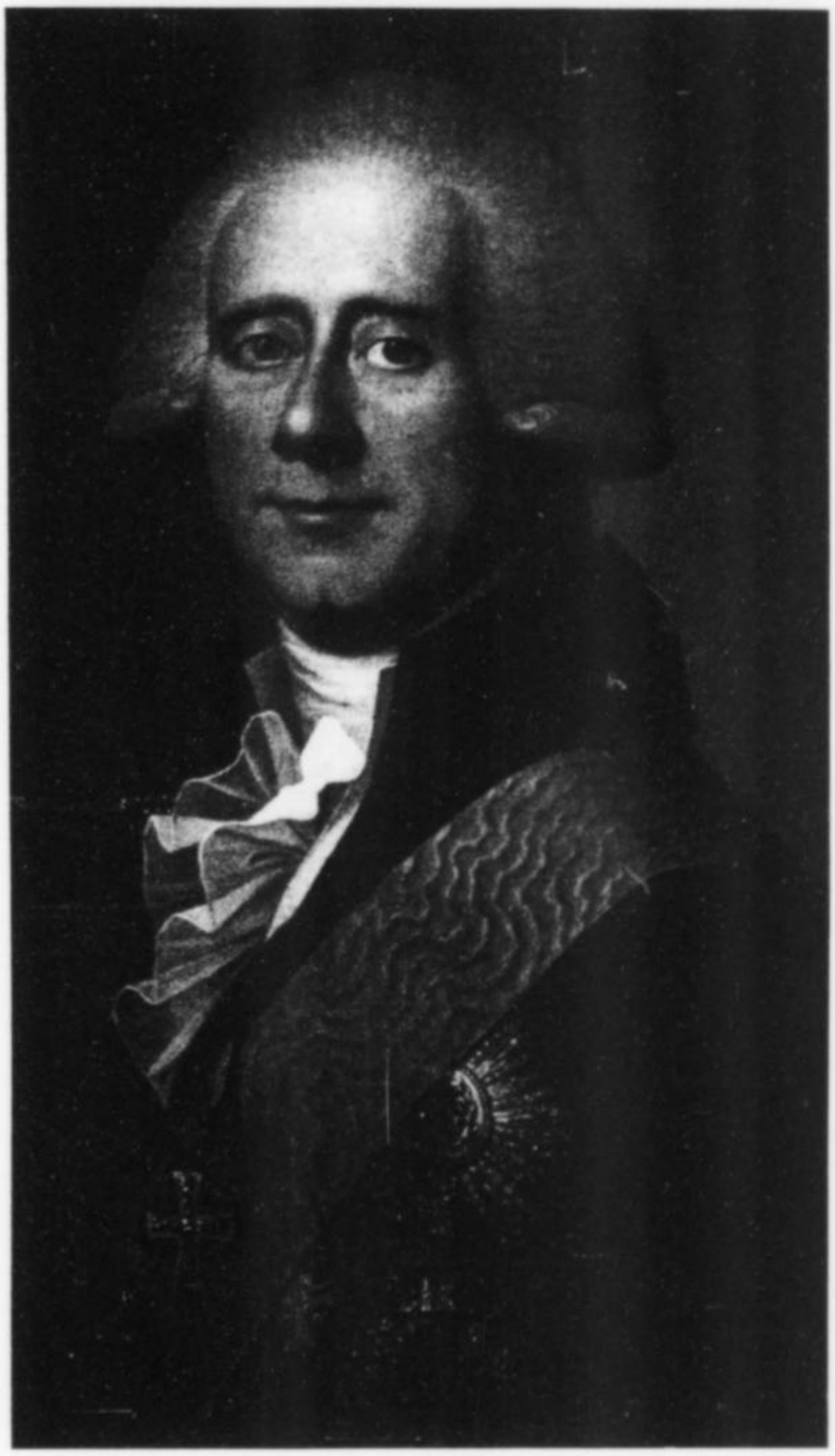
King Christian VIII (1786–1848) built a personal mineral collection beginning at the age of seven, but it was destroyed by fire in 1794. He began forming a new one around 1800, which eventually numbered about 2,300 minerals plus assorted rocks, stones and fossils. Following his death in 1848, it too was turned over to the University of Copenhagen.

Theodor Holm (or Holmskjold) (1731–1793) was a physician and botanist who served as Privy Councillor to Christian VII and as Cabinet Secretary to Queen Juliane Marie. He was also a mineral collector, and his Kongsberg silver specimens were said to be worth 10,000 rigsdaler alone (see Table 2, p. 47), while his mineral collection as a whole was valued at 25,000 rigsdaler. He went bankrupt in 1787, but was saved by an interest-free loan from the Crown given on the condition that his mineral collection would go to the king upon his death.

Another private mineral collection acquired by the Royal Family was that of Peter Monrad (1758–1834), a Norwegian civil servant, who had at one time studied medicine. Monrad built a major systematic collection, a crystallographic collection, a collection of large cabinet specimens for display, and a gemstone collection, all of which taken together numbered 8,000 to 9,000 specimens. These were purchased for 4,170 silver rigsdalers in 1839 by Christian VIII, for inclusion in his personal collection which, as mentioned, was turned over to the University nine years later.

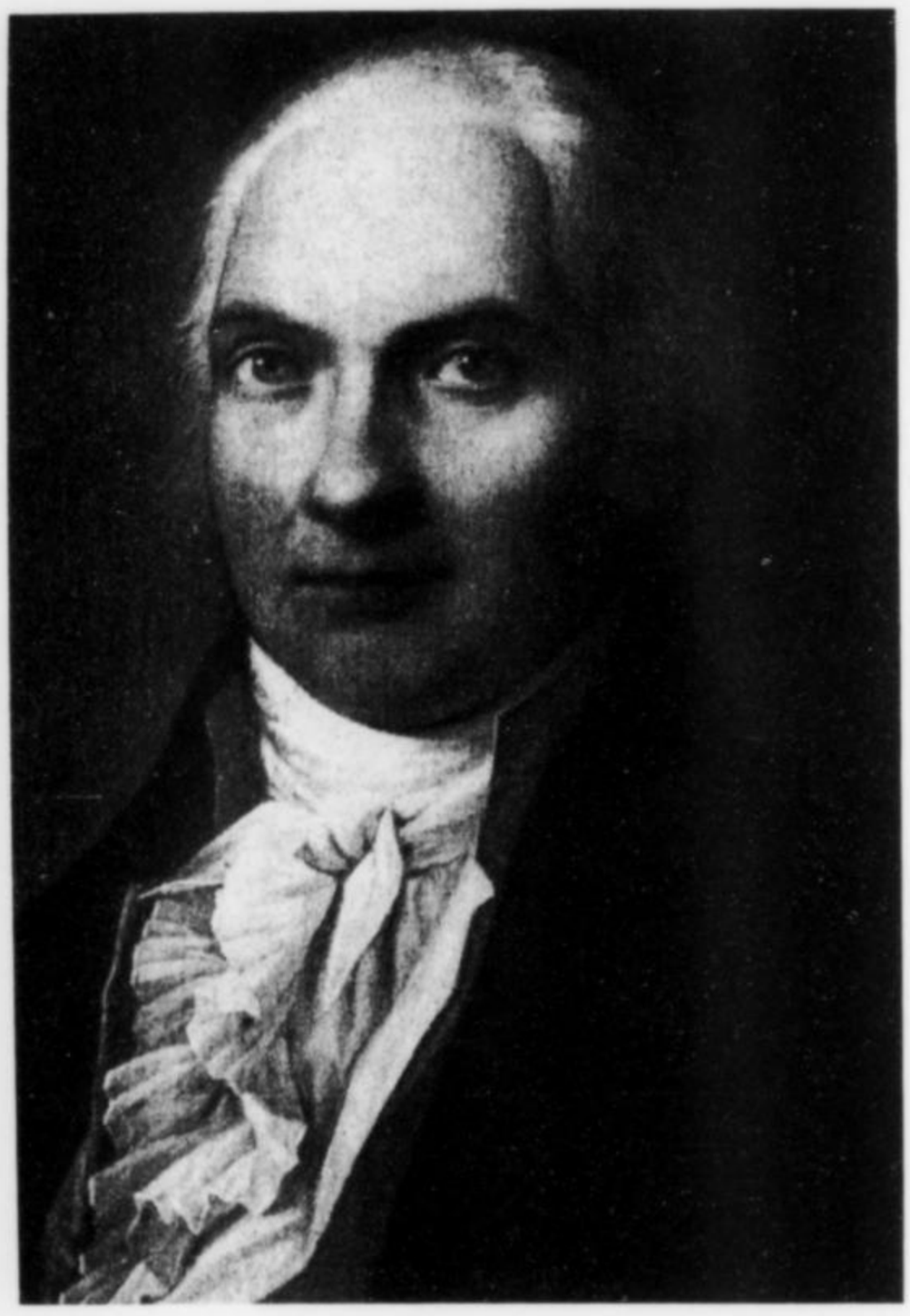
Collecting in the academic community flourished in the wake of Ole Worm's example. The collections of the physician and naturalist Henrik Fuiren (1614–1659) and his brother Thomas Fuiren (1616–1673) were no doubt directly inspired by Worm, who was their uncle. Both collections were donated to the University of Copenhagen. Their contemporary at the University, Thomas Bartholin (1616–1680), built a collection of anatomical and natural history specimens (including minerals) which he used for the instruction of his students as Worm had done. His specimens too were acquired by the University's natural history museum, but were destroyed by fire in 1728.

Other early collections that ultimately went to the University include those of Joachim Cappel (1707–1784), a German pharmacist in Copenhagen who owned fine Faeroes specimens; Terkel Kleve (or Klevenfeldt) (1710–1777), a Copenhagen historian whose costly collection included specimens of Sumatran gold; Andreas Birch (1716–1763), a Danish "Royal Mineral Inspector" whose collection of Kongsberg silvers and zeolites were exhibited in part at a meeting of the Royal Society in 1752; Peter Abildgaard (1740–1801), founder of the first Danish veterinary school, whose extensive mineral collection was purchased by the Royal Natural History Museum for 4,000 rigsdaler; Count S. V. Raben (1741–1819), whose collection of Austrian mineral specimens was bought for 600 rigsdaler; and the German pharmacist and "extraordinary professor" at the University, Johan Manthey (1769–1842), whose rich mineral collection, including many fine Norwegian display pieces, was purchased by the Royal Natural History Museum in 1806 for 4,000 rigsdaler.



Joachim Moltke

Among the most important 18th-century Danish mineral collectors were the Counts Adam Moltke (1710–1762) and Joachim Moltke (1746–1818). Adam served as minister and advisor to Frederic V, and built an extensive collection of natural history which was highly praised in its day. His son, Joachim, became the King's Prime Minister, and a prominent patron of the University. In 1810 he began joining the mineral collection built by his father with specimens from other collections he purchased, especially those of Gregers Wad (1755–1832) (whose collection



Wad



Pontoppidan

numbered over 6,000 specimens), Christian Münster (1779–1856) and Heinrich Schumacher (1757–1830), whose collection numbered over 5,000 specimens. Together these collections, plus a collection acquired from Erich Pontoppidan, were valued at 13,500 rigsdaler. Moltke donated them all to the University in 1812, where for over 160 years they continued to be known as "Count Moltke's Mineralogical Museum."

Mention must also be made of Tönnes Christian Neergaard, Baron de Bruun (1776–1824), a wealthy Danish landowner, traveler and writer. He studied mineralogy at the University of Copenhagen in the late 1790's, probably beginning his mineral collection at that time. In 1799 he was appointed as an auditor in the Danish Audit Office, and a year later became chamberlain to the king, a post he soon left in favor of a life of leisure and travel. During the following years he made trips through Germany, Scandinavia, Russia, Switzerland (1801–1802), Spain and Italy, but had a special fondness for France. He visited Paris in 1801 and 1805, utilized Parisian publishers for many of his works, and finally settled there permanently in 1809. Neergaard is thought to have purchased the mineral collection of Axel Cronstedt in 1803 (3,000 specimens), and the even larger collection of Anders Christophersson (10,000 specimens) in 1804. Neergaard's mineral collection became a famous point of interest in Paris. Christophersson's collection alone had been considered superior in quality to that of the Stockholm mining college; in combination with Cronstedt's collection and perhaps a large number of specimens acquired by Neergaard during the course of his many travels, it must have been excellent indeed. Unfortunately, he exhausted his fortune underwriting the expenses of his many publications. He wrote regularly on a wide variety of subjects, especially the state of the fine arts in the countries he visited, but also on various new mineral species (in the *Journal de Mines*, 1807, 1809, 1811). He was a good friend of Dolomieu, who accompanied him on his travels through Switzerland. Neergaard died, in a state bordering on poverty, at the age of 47. The final disposition of his extraordinary mineral collection remains unknown.

Other Danish mineral collectors included Johann Chemnitz (1730–1800), the German rector at the Garnison Church; Count Otto Thott (1703–1785), minister to King Frederic V; Johann Fabricius (1743–1808), an entomologist who sold his minerals to William Hunter; and David Bradt (died 1793), Secretary of Mining in Copenhagen.

Norway

Norwegian collectors (Norway was then ruled by the Danish kings) included the aforementioned Erich Pontoppidan (1698–1764), a well-known naturalist and bishop in Bergen, and author of *The Natural History of Norway*. He maintained a wide-ranging correspondence with other collectors and dealers, made more productive by the fame he gained through his book. Thomas Pennant, for example, received from him in trade 15 specimens from Norway, each keyed to the respective entries in his book. Pontoppidan's collection was purchased by Count Moltke and presented to the University of Copenhagen in 1812.

The Mining Academy in the world-famous silver-mining town of Kongsberg, Norway, was established in 1757 and acquired a number of important mineral collections. These were later dispersed to Copenhagen and Christiania when the Academy closed. Jørgen Hiort (1737–1804) donated his collection to the Academy in 1786. Born in Christiania (Norway's capital city, renamed Oslo in 1924), Hiort became a mining captain in the Kongsberg mines in 1775. During his years there he built an excellent mineral collection numbering 3,300 specimens from worldwide localities and 670 specimens from Norway. Hiort's collection and his two original leather-bound manuscript catalogs were transferred to the University of Christiania (Oslo) in 1814, and form the nucleus of the present-day collections in the Mineralogical-Geological Museum of the University.

Morten Thrane Brünnich (1737–1827) was a Danish-born zoologist and mineralogist, Professor at the University of Copenhagen from 1769 to 1783, and an *Oberberghauptmann* (high-ranking mine captain) and Director of the Kongsberg mines during the years 1784–1814. His mineral collection was acquired by the Kongsberg Mining Academy, but later sold to an organization (the *Rentekammeret*) in Copenhagen. A former instructor at the



Kongsberg silver from **PONTOPPIDAN**'s collection.

Catalogus

over en

Mineral-Samling

som med

Kongelig allernaadigst

Tilladelse

til

Det kongelige norske Berg-Seminarium

paa

Kongsberg

allerunderdanigst er offereret

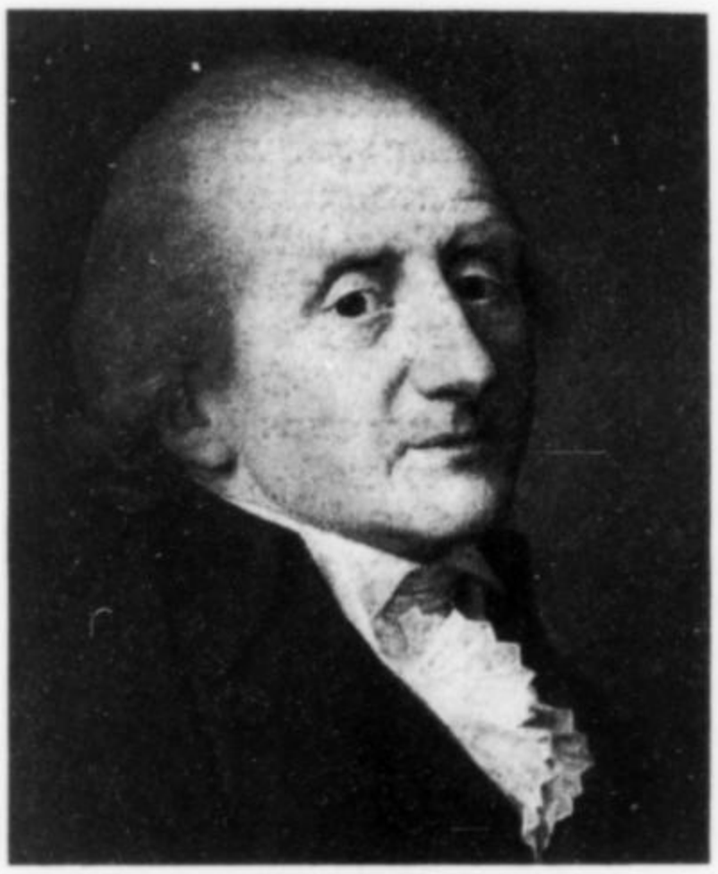
af

Berghauptmanden Etatsraad Hiort

den 27de May

1786.

JØRGEN HIORT's catalog



Brünnich



Esmark

Academy, Mr. Thorstensen, evaluated Brünnich's specimens and selected more than two-thirds for the University of Christiania. The original catalog (in Latin) lists 1,452 entries—some entries covering more than a dozen specimens—of which 1,050 apparently went to Christiania.

Jens Esmark (1763–1839) was a Danish-born *Oberbergamts-Assessor* at the Kongsberg mines in 1797, a lecturer at the mining academy there until 1802, and later a Professor of Mineralogy at the University of Christiania. His personal mineral collection of 1,658 specimens, along with his five-volume manuscript catalog, went first to the Mining Academy and from there to the University of Christiania, where they are still preserved today.

Iceland

Iceland was also administered by Denmark, and proved to contain a wealth of zeolitic minerals. Early collectors there included the Icelandic naturalists Biarni Palsson (1719–1779) and Eggert Olofsson, both of whom studied at the University of Copenhagen, and traveled together on a collecting expedition through Iceland in 1752–1757.



Sweden and Finland

Mineral science and mineral collecting flourished in Sweden, supported by a long succession of Kings and an active scholarly community, especially at the mining college in Stockholm and at the University in Uppsala. Mineral chemistry and chemical analysis in particular developed to a high degree in Sweden, such that by 1880, 22 of the 68 known elements had been discovered in Sweden, extracted from Swedish minerals by such pioneers as Brandt (cobalt, 1730), Cronstedt (nickel, 1751), Gahn (manganese, 1774), Berzelius (cerium, selenium and thorium), Arfvedson (lithium, 1818), and many others.

The Uppsala community was inspired by the leadership of their greatest naturalist, Linnaeus:



Linnaeus

Linneaus (1707–1778)

Among Sweden's most illustrious men of science was Carl von Linné, known in academic circles by his latinized name, Carolus Linnaeus. Born the son of a country parson who loved flowers, Linnaeus set himself the task of establishing general systems of classification for all plants, animals and minerals. After some years of travel and study he became a professor of medicine at the University of Uppsala in 1741. His most influential works were in botany (his *Species plantarum* of 1753 described over 8,000 plant species), and he was the first person to work with a clearly defined concept of species. He invented binomial nomenclature based on genus and species (which other mineralogists tried unsuccessfully to apply to the mineral kingdom). The definitive 10th edition of his famous *Systema naturae*, including his taxonomic proposals for the Mineral Kingdom, appeared in 1758–1759. In 1753 he published a catalog of the plant, animal and mineral collection of his benefactor Count Carl Gustav Tessin (1695–1770), entitling it *Museum Tessinianum* and including in it numerous engravings of mineral specimens. Linnaeus helped found the Swedish Academy of Science, became a professor of medicine at the University of Uppsala in 1741, and was officially elevated to the nobility in 1762.

Linnaeus's personal collections grew to such enormous size that he had to have a special museum built for them on his estate at Hammarby, Sweden. A few years after his death his entire museum containing tens of thousands of pressed plants and thousands of minerals, shells, insects and books was purchased by James Edward Smith and transported to London where it served as the basis for the founding of the Linnean Society.

Johan Wallerius (1709–1785)

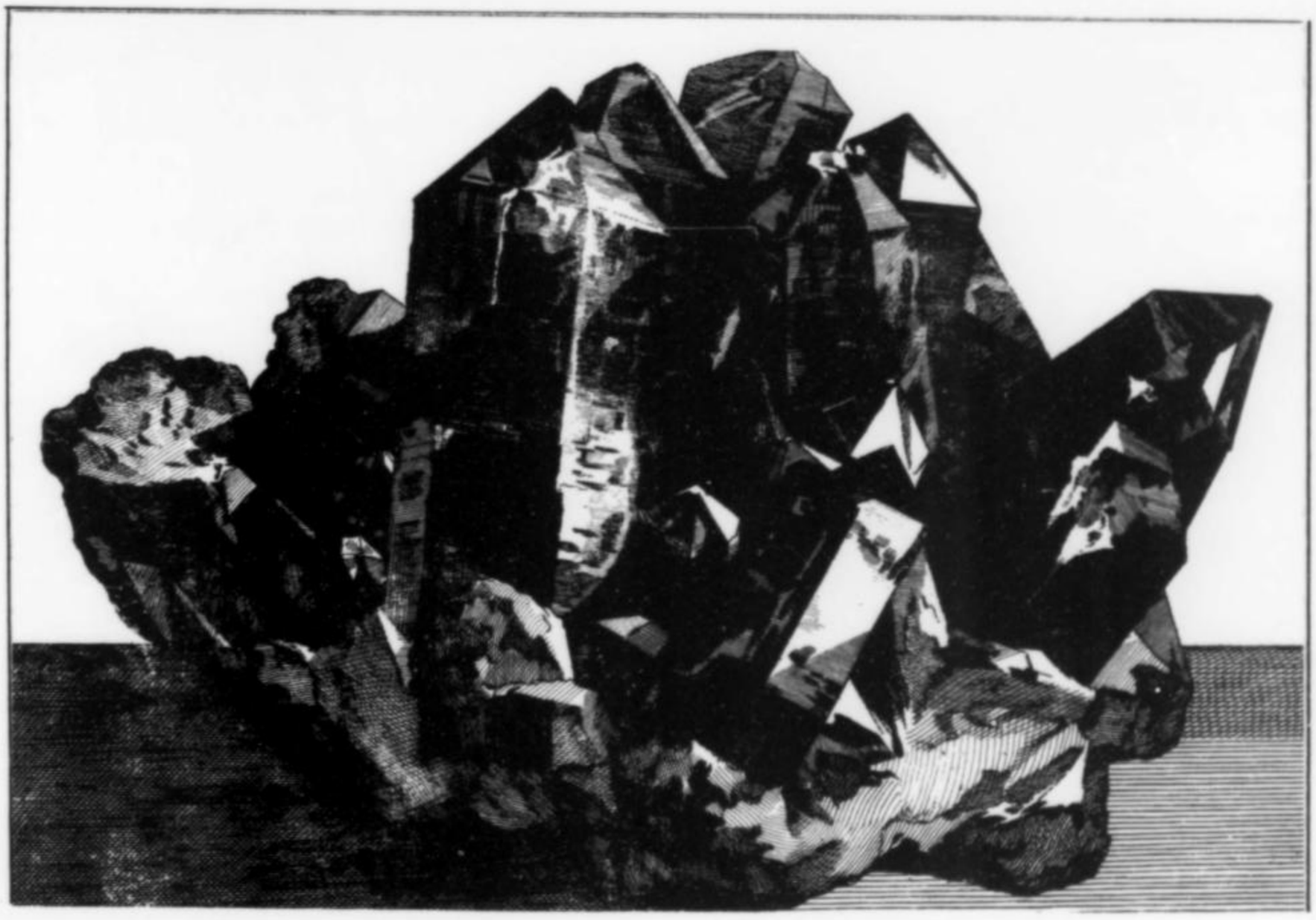
Wallerius, a colleague of Linnaeus at the University of Uppsala, had shown an interest in minerals by the age of 23. He studied the mining operations near Lund and began collecting minerals for his cabinet, which eventually grew to contain over 4,000 mineral specimens. His greatest work, *Mineralogia eller Mineralriket* (1747) appeared subsequently in French, German, Russian and Latin translations which secured his reputation and established his approach among the international mineralogical community. Never before had such a wealth of useful mineral data been presented in such clear and precise descriptions. His classification of minerals, based in part on Linnaeus's ideas, emphasized a combination of chemical and physical features. The final disposition of his mineral collection is unknown.

Axel Cronstedt (1722–1765)

Axel Friedrich Cronstedt was born in Stropeta, Sweden, and studied at the University of Uppsala, where he came under the influence of Wallerius, Sven Rinman and Georg Brandt. He soon developed into a first-rate mining expert and field mineralogist, visiting mines and smelting operations throughout the kingdom. He worked for a time as an assistant to Daniel Tilas (1712–1772) at the mining college in Stockholm, and was appointed director of the Bergslagen mining district in 1748.

Cronstedt pioneered the use of the blowpipe in mineral analysis, obtaining more accurate analyses than people had been achieving with other methods up to that time. In 1751 he discovered the element nickel (in niccolite). His research prompted him to publish his major work, a new system of mineral classification, in 1758; it subsequently appeared in German, French, English and Italian editions, becoming one of the most influential works in the history of mineralogy. Cronstedt was the first to emphasize the chemical uniqueness of minerals, to form a system of classification based almost entirely on chemistry, and to clearly distinguish between homogeneous minerals and mineralogically heterogeneous rocks.

Cronstedt's personal collection of about 3,000 mineral specimens, begun in 1746, was bequeathed to his son but was taken back by his widow when she remarried. She is said to have sold the collection and its manuscript catalog in 1803 to a wealthy Danish landowner living in Paris (probably Tönnes Neergaard), but its history thereafter is unknown.



Smoky quartz group from the collection of **CARL TESSIN**.

Torbern Bergman (1735–1784)

Torbern Olof Bergmann was born in Katrineberg, Sweden, the son of Barthold Bergman, sheriff on the royal estate at Katrineberg. He received a conventional education, and also some private tutoring in natural history from Sven Hof y Skara, a teacher at the Skara Gymnasium, later a geologist at the mining college in Stockholm, and a mineral collector.



Bergman

Bergman studied mathematics, philosophy, physics and astronomy at the University of Uppsala, graduating in 1756, and two years later earned his doctorate with a thesis on astronomy. He immediately joined the faculty of the University, teaching physics and mathematics, and succeeded to Wallerius's chair as Professor of Chemistry in 1767. He developed a growing interest in minerals, and his *Physical Description of the Earth* (1766) included a long account of mineralogy. In his classes he supplanted Wallerius's method of lecturing without demonstrations by providing two displays of minerals (probably from his own collection) arranged according to (1) composition and (2) locality. He taught his students not just chemical theory but also the new analytical techniques in mineral analysis pioneered by Anton Swab (1702–1768), Sven Rinman and Axel Cronstedt. He gave a full account of blowpipe technique in his *De tubo feruminatoria* (1779), and also greatly improved techniques for quantitative wet chemical analysis in his *De minerarum docimasia humida* (1780). He also made notable contributions to the early development of crystallography by demonstrating how the stacking of rhombohedral units could produce a scalenohedron. (Haüy later proposed the same thing but denied having known of Bergman's theories.) However, he made the mistake of attempting to classify minerals according to the Linnean system of classes, genera and species, defined strictly by composition, with varieties defined by appearance. This approach was the basis of his last major work, *Meditationes de systemate fossilium naturali* (1784).

During the many years of his mineralogical research Bergman developed a personal mineral collection of 3,900 specimens, which he drew on for classroom demonstrations and samples for analysis. He bequeathed the collection, along with his manuscripts and correspondence, to the University of Uppsala where they are still preserved.

Others at Uppsala

Olof Bromell (1639–1705) was a Swedish physician and botanist in Göteborg who developed a substantial collection of minerals inherited by his son, Magnus von Bromell (1679–1731), a physician and mineralogist at the mining college in Stockholm. After expanding the collection further, Magnus left it to his son who eventually donated it to the University of Uppsala.

Anton Swab (1702–1768), a pioneer in blowpipe analysis techniques, was a mine inspector, member of the Mining Council, Bergmästare at Skåne and Kronoberg, and a prominent mineralogist and metallurgist. His "extremely beautiful and valuable collection of 4,000 specimens of minerals" was purchased by Uppsala University in 1751 for 18,000 riksdaler.



Swedenstjerna



GUSTAVUS III

A third collection acquired by the University was that of Eric Swedenstjerna (1765–1825), Director of the Royal Natural History Cabinets in Stockholm, and also Director of Ironworking at numerous Swedish mining districts. His collection of 6,090 mineral specimens was purchased after his death by King Oscar I (1799–1859) and later presented to the University.

Royal Patrons of Uppsala

There was no shortage of enthusiasm among the royalty of Sweden for mineral collecting. King Gustavus Adolphus (1594–1632) had begun the tradition in 1632 when he purchased an ornate cabinet (*Kunstschrank*) from Philipp Hainhofer for 6,000 gulden. It was carefully stocked with interesting specimens from the plant, animal and mineral kingdoms. The king died that same year, and the cabinet was inherited by King Charles XI (1655–1697), who eventually donated it in 1694 to the University of Uppsala.

King Adolphus Frederick (1710–1771) possessed an interesting mineral collection, perhaps co-owned or merely inherited by his wife, Queen Louisa Ulrica (1720–1782). The king had gone so far as to have a published catalog prepared describing his specimens (*Museum Adolpho-Fridericianum*, 1746). Louisa Ulrica, a patron of literature and science and a friend of Linnaeus, passed the collection to the University of Uppsala in 1804.

King Charles XIII (1748–1818), and his elder brother King Gustavus III (1746–1792), sons of Adolphus Frederick, also had a mineral collection, perhaps obtained in part from their parents, which was donated to the University in 1804.

King Gustavus III (1746–1792) also collected minerals. His most elegant gift was a sumptuous cabinet, crafted in Paris in 1765 by Georg Haupt, which he filled with Swedish minerals and presented to Louis-Joseph, Prince de Condé (1736–1818) in France. It is still preserved at the Condé palace in Chantilly.



Lavish mineral cabinet given by **GUSTAVUS III** to the **PRINCE DE CONDE** in 1774.

The Mining College

The Stockholm *Bergscollegii*, or mining college, attracted mining students from throughout the Kingdom, and developed over the years a substantial collection of minerals (preserved today in the Royal Museum, the *Riksmuseet*). Among the oldest collections it incorporated was that of Peter Cronström (1651–1708), a mine assessor who began collecting minerals in the 1670's. He eventually left his collection to his grandson, Baron Alexander Funck (1716–1797), *Bergrådet* and field-collecting partner of Daniel Tilas (1712–1772). Baron Funck's collection eventually numbered 1,743 mineral specimens, obtained also from the Tilas, Törnehielm and Elias Brenner collections. It was purchased by Count Nils Bielke

(1724–1792) in 1784 for 1,336 riksdaler; Bielke donated it to the mining college in the early 1790's, and it is still preserved there today.

Daniel Tilas's first collection had been destroyed, along with his house, in the Stockholm fire of 1751. But he built a new collection numbering 2,326 Swedish mineral specimens and 1,497 from foreign localities, including numerous examples of native gold, silver and precious stones; it was acquired by the mining college, but his manuscript catalog was later cut up into squares and the back sides used for writing specimen labels.

Gustaf von Engström (1738–1815), *Bergsrådet*, chemist and numismatist, was hired as curator of the mining college's mineral collection in 1794. His personal collection, which he began in the 1760's, numbered several thousand specimens and included pieces from the Psilanderhjelm, Schröderstierna, Tilas, Sandel and Adlerheim collections. It was all purchased by Järnkontoret for 30,000 copper thalers and was presented to the mining college.

Among the oldest collections received by the College was that of Thomas Blixenstierna (1711–1753), a Swedish mine assessor. Another collection donated was the 450-specimen suite of Spanish and South American minerals gathered by Carl Ehrensvärd, a General Lieutenant in the Swedish Diplomatic corps in the late 1700's. The collection of Benet Andersson Quist (1726–1799), a mine assessor at the mining college, included 1,440 specimens of gem minerals, and was sold to the mining college for 3,092 riksdaler. Other mineral collections acquired by the college over the years include those of:

Pehr Adlerheim (1712–1789), Bergsrådet
Elias Brenner (early 1700's)
Johan Burman (mid 1700's)
Peter Cederbaum (1733–1795)
Lars Engström (late 1700's), diplomat
Erik Fleming (died 1679), geologist
Johan Gahn (1745–1818), chemist
Bengt Geijer (late 1700's)
Johan Geisler (1758–1826), jurist
Gustav IV Adolf (1778–1837), King of Sweden
Johan Gyllenhal, Bergmåstare
Samuel Hermelin (1744–1820), Baron, mining assessor
Peter Hjelm (1746–1813), curator at the mining college
Sven Hof i Skara, geologist at the mining college
Carl Leijel (1718–1786), Bergmåstare
Anders Lundström (1711–1793), Bergmåstare
C. J. Lundström, mining assessor
Olof Nauclér (1753–1832), jurist
Anders Polheimer (1746–1811), Berghauptman
Erik Printzsköld (late 1700's), Bergmåstare
Psilanderhjelm, Nils (1706–1768), Bergrath
Johan Reinius (1775?–1843)
Samuel Sandels (1724–1784), Bergsrådet
Samuel Schröderstierna (1720–1779), Bergsrådet
Anders Sparrman (1748–1820), naturalist
Anton von Swab (1763–1809), mine assessor
Göran Vallerius (1683–1744), mine assessor

Among the most prominent mineral collectors associated with the mining college was Count Nils Adam Bielke (1724–1792), president of the College from 1782 to 1789. His collection, however, went elsewhere. In 1785 he donated 150 specimens to the Swedish Academy of Science, but the bulk of his great collection he gave to the Ådelfors Goldworks in Småland. In 1801 his widow, with government approval, reclaimed the collection and gave it instead to the Stora Mining Company in Falun, where it is still preserved today. It consists of about 7,000 specimens arranged in eight cabinets (seven of which are original), including several drawers of fine native silvers, many native golds, and other gold-containing minerals.

However, the most famous Swedish mineral collector whose collection has been preserved in the mining college is surely Jöns Jakob Berzelius.



Berzelius

Jöns Jakob Berzelius (1779–1848)

Berzelius was born in Väversunda Sörgård, Sweden, the product of three generations of clergy on both sides of his family. His school grades in theology, however, were poor whereas he drew excellent marks in the natural sciences. In 1796 he began medical studies at the University of Uppsala, and was considered gifted but undisciplined. Inorganic chemistry and mineralogy were much more interesting to him, and it is in these areas where he eventually distinguished himself.

Berzelius's own mineral collection received a boost as the result of an English physician, Dr. MacMichael, who had come to study under Berzelius in his laboratory. MacMichael had undertaken the task of assembling a good, representative collection of Swedish minerals on behalf of the British Museum, and to that end had purchased a number of private cabinets from local estates. The duplicate specimens generated by this process he gave to Berzelius. Berzelius himself later presented specimens of berzelianite, yttrocerite and other recently discovered Swedish minerals from his collection to the British Museum in 1817, and sent a great many specimens over a 30-year period to Haüy in Paris. The rest of his collection is today in the Riksmuseet in Stockholm.

Berzelius is remembered primarily as one of the greatest mineral chemists who ever lived. He laid the foundations for the later discovery of new elements, and discovered cerium, selenium and thorium on his own, separating them from specimens in his mineral collection.

Other Collectors

Other prominent Swedish mineral collectors include Anders Christophersson (died 1804), a physician whose 10,000-specimen mineral collection was considered superior in quality to that of the mining college (it was probably purchased by a wealthy Danish collector in Paris named Tönnes Neergaard); Kilian Stobaeus (1690–1742), in Lund, whose mineral collection (studied by Wallerius) was acquired by the University of Lund; Anders Retzius

(1742–1821), a naturalist whose geognostic collection went to the University of Greifswald; Wilhelm von Hisinger (1766–1852), a geologist and mineralogist whose collection was given to the Geological Survey of Sweden in Stockholm; Johann Ferber (1743–1790), a Swedish mineralogist who distinguished himself as a director of mines in Germany, and whose mineral collection was acquired by the Royal Mining Academy in Berlin; Urban Hiärne (1641–1724), a famous Swedish physician, chemist and geologist whose cabinet contained "beautiful minerals of all sorts"; and Anders Hedenberg (1737–1798), a physician who assembled a "complete series" of Swedish minerals.

Finland

Finland, ruled by Sweden throughout the 18th century except for a brief period of Russian occupation, was home to a number of scholarly mineral collectors. Aside from Eric Laxman, whose collection was acquired by the St. Petersburg Academy, they were all associated in some way with the Turku Academy in the old town of Turku (Åbo in Swedish). The earliest of these was Herman Spöring (1701–1747), a professor of medicine, whose extensive mineral collection and library were purchased by the Academy after his death and became the foundation for the museum of natural history there. Johan Browallius (1707–1755), whose private collection was also purchased by the Academy, had planned to write a catalog of the Academy collection but was prevented by an early death at the age of 48. Carl Mennander (1712–1786), another professor, was an active proponent of field collecting; he donated all or part of his mineral collection to the Academy in 1775, before moving to Sweden to become an Archbishop. Pehr Kalm (1716–1779), a professor of "economy" (which at that time included the study of mineralogy), built a natural history collection including minerals from America, where he had



Gadolin

collected from 1747 to 1751. The chemist and mineralogist Johan Gadolin (1760–1852) kept his personal mineral collection at the Academy. And Henrik Kalmeter, a mining councillor, sold his valuable collection of minerals to the Turku Academy in 1753 for 5,000 copper thalers. All of these historic mineral collections at Turku, the mineralogical heritage of a century of Finnish field work, were destroyed in 1827 when the Academy was leveled by the Great Fire of Turku.

It was deemed opportune at that time to move the entire institution to the new capital city of Helsinki. In 1832 the newly founded University of Helsinki purchased the mineral collection of Fabian Steinheil (1762–1831) in order to begin building a new mineralogical museum.



Spain and Mexico

The monarchs of Spain were not drawn into the collecting of natural history with the same enthusiasm that characterized other European capitals. Even Ferdinand VI (1713–1759) "The Learned," a prominent patron of science, acquiesced only under the recommendation of his advisors and, having established a collection, neglected to support it. His successor, Carlos III, required even more convincing, but at last founded a great cabinet based on that of a wealthy Peruvian in Paris, Pedro Franco Dávila. Some of Dávila's friends in Madrid were also collectors, and assisted him in obtaining acquisitions.

Another prominent Spanish mineral collector was José de Viera y Clavijo (1738–1799), a naturalist and author of a natural history of the Canary Islands. Around 1780 he enlisted the mineral dealer Christian Heuland to prepare a manuscript catalog of his collection (no doubt because Heuland himself had supplied many of the specimens). The collection numbered over 2,000 pieces, mostly from Germany, Hungary, Spain, central Asia, Ceylon, India, Mexico, Peru, Chile, Brazil, North America and the Canary Islands. Heuland and his brother had spent several years in South America (his brother apparently died there during the expedition) collecting minerals which they sold to Spanish collectors.

In Santiago de Compostela there lived another Spanish mineral collector: Antonio Paramo Somoza. He donated his collection to the Real Sociedad Económica de Amigos del Pais de Santiago in 1784. It was transferred six years later to the University of Santiago de Compstela.

Despite the leadership offered by these early Spanish collectors, and the establishment of a national cabinet of natural history in Madrid in the 1770's, mineral collecting never attained the popularity in Spain that it enjoyed elsewhere in Europe. Looking back, Salvador Calderón, in his *Los Minerales de España* (1910), remarked:

> In our country it is lamentable the paucity of rich collections and the paltry funding and personnel devoted to them. Without entering into an investigation of the actual causes of the indifference which we [the Spanish] had toward natural history collecting, we can simply note in contrast the growing enthusiasm in the [other] advanced nations for rich collections.

Perhaps this indifference toward nature was in some measure a result of the long and stifling Spanish Inquisition (1480–1834), with its uncompromising emphasis on faith rather than scientific inquiry.

In any case, the most significant collection of minerals by far to be gathered by a vassal of Spain was that of Pedro Dávila.

Because he formed Spain's earliest important mineral collection, and because the story of his career has not been well-known up to now, a somewhat extended account is given here:

Pedro Franco Dávila (ca. 1710–1775)

Pedro Dávila was a gentleman of Castilian ancestry, originally a citizen of the town of Guayaquil on the southern seacoast of what is now Ecuador (then a part of Peru). Probably his family was centered in Lima where a number of prominent individuals named Dávila (or de Avila) are known to have lived. Possessed of a significant fortune and a love of scholarship sure to remain unsatisfied in Peru, he left his homeland in 1740 and relocated in Paris, one of the world's most cultured cities. There he began by studying Greek, Latin, and the European languages, and came in contact with the active Parisian scientific and collecting community.

Dávila soon began cultivating a strong interest in natural history collecting, especially mineralogical specimens. By 1745 he had already begun to accumulate large numbers of minerals, shells, fossils and zoological specimens, as well as artworks (engravings in particular) and books. By the 1750's his shell collection had grown into a fine assemblage, but he was less adept at the social graces than he was at acquisition. In 1756, for example, he visited the Countess de Praslin-Rochechouart at Agey to see her natural history collection, and promptly broke three supposedly unique specimens while examining them. The Countess nevertheless graciously gave him some rare shells, including an *Achatina* worth 100 gold louis, but he then proceeded to help himself to three more precious examples (perhaps as a result of a linguistic misunderstanding) despite objections from the Countess.

In his collecting, Dávila was assisted by a number of friends including Manuel de Junco y Pimentel of Valladolid, someone named Villalcázar in Madrid, José de la Viya in Madrid, the Abbé Clunier in Paris, and the Count of Peñaflorida, among others. Junco y Pimentel, on one occasion, traveled to London in 1754 and made contact on Dávila's behalf with the British collector Gustavus Brander (1720–1787). Brander, who owned a "great collection of minerals, fossils, petrifactions, etc.," was encouraged to exchange duplicate specimens.

Dávila or his agents also acquired specimens at auctions, including those which liquidated the collections of Albertus Seba (in 1752), the Abbé Joly de Fleury (in 1755), Claude Geoffroy (in 1753) and others. His catalog rarely mentions his sources, but several specimens from Seba's collection are proudly noted, including item 568:

> A rare and superb specimen of native silver in branches, from [Kongsberg] Norway, more than 9 ounces in weight. It came from the cabinet of Seba, and may be found illustrated in the fourth volume of the description of that cabinet: [quoting Seba] "One cannot see in this work anything of more beauty than this natural growth of silver. The solid metal appears here as outstretched leaves with raised ribs, and depicts not badly a tulip supported by a narrow shaft of leaves."

Dávila is known from surviving correspondence to have traveled widely in search of specimens. For example, a letter to him from Junco y Pimental in 1756 states:

> I am pleased that you have returned from your long voyage and that the collections you acquired in Switzerland, Louvain, etc. are so rich and rare.

Despite his longtime residence in Paris, Dávila considered himself a subject of the Spanish King, and as his collection grew ever larger he began to think about someday selling it to the Crown and establishing it as a public museum in Madrid. Unlike the situation in most other European capitals, there was no royal natural history collection in Madrid in the early 18th century, and no thought of forming one until the celebrated naval figure Don Antonio de Ulloa proposed the idea to Ferdinand VI in 1752. The monarch was amenable, and in 1753 issued an order to all of his viceroys, governors, magistrates, important mayors and provincial intendants of all the European and American dominions of Spain that they should remit to Madrid all of the curious productions of nature encountered in their districts. Ulloa and Guillermo Bowles were placed in charge of gathering together and curating this new repository, and unlimited funds for purchases were, for a time, allotted. This, of course, was interesting to Dávila, who (in 1755) asked his friend in Madrid, Junco y Pimentel, to find out about the mineralogical content of the new cabinet. His response:

> Although I have not been able to view the King's mineral collection myself, I'm told it is very good. However, as Antonio de Ulloa has abandoned this responsibility and has gone to Cadiz, this aspect of scholarship [mineralogy] is rather neglected.
>
> I have left a request with the curator, asking permission to send you some of the many mineral specimens that have come from America in considerable abundance—a category in which I believe the government of our monarch is very rich. And in order to facilitate this request, I provided a catalog of your collection so that the Count of Valparaiso (Minister of the Treasury, who has been placed in charge of the natural history collection) could see it.

So it was that Dávila and his collection were first brought to the attention of the Spanish Court. But interest in mineralogy had always been low, and with the departure of Ulloa and the Marquis of Ensenada (another supportive official) the royal collection languished.

Dávila spent the next few years carefully laying political groundwork through his correspondence with high Spanish officials and the lobbying activities of his friends. He and his cabinet became increasingly well known to the aristocracy of Madrid, and his expressed desire to someday move to Madrid with his extensive collections piqued their interest. "It will bring me great joy when you can bring your collection to Madrid," wrote his friend Viya in 1757. Junco y Pimentel was equally enthusiastic about the chance that he and other Spanish scholars might then be able to study Dávila's collection, and wondered "whether you still have some hopes of coming to Madrid to establish the love of natural history in our nation."

Following the death of Ferdinand in 1759, and the coronation of his stepbrother, Carlos III, Dávila felt the time was right to make a personal visit to Spain and promote the adoption of his collection by the new government. He arrived in Madrid in the summer of 1760, bringing with him an updated description of his collections. Although the trip was a failure in that no government action resulted, Dávila at least made more contacts and friends which would serve him later. The most important of these was Father Enrique Florez (1702–1773), a prominent Augustinian monk and author of a 27-volume history of the church in Spain. Florez was a man of great influence and power with the Royal Family, and he also maintained a natural history collection of his own. Dávila's friend, the Marquis of Montehermoso, wrote:

> I went to pay a visit to Father Florez, who, judging by what I heard while he was showing me his curiosities, is more skillful at collecting them than in understanding them, as his comments about the green quartz clearly indicated.

> He showed me the example he had, and I immediately recognized that it was a manufactured specimen. In any case, he has some very beautiful things, although they are in great disorder.

The Florez collection, despite its shortcomings, was of value in educating the princes, and thereby attracting the attention of the monarch. Florez wrote in a letter of 1766 to Dávila:

> My interest is focussed on any specimen that has a fine appearance, even if it is common, because I want others to become enamored, and this is achieved through the beautiful, even if it is not rare.

In 1767 Dávila formally offered his entire collection to King Carlos III, who instructed his minister, the Marquis of Grimaldi, to ask Father Florez for his opinion on the matter. Florez wrote a glowing recommendation. But political difficulties and the coming war with England distracted the king, who declined to make a commitment at that time. With what was surely a heavy heart, Dávila elected to put the collection up for auction in Paris, forsaking his dream of establishing it as an institution in Spain.

Balthazar Sage, the Parisian mineralogist, introduced Dávila to the young Romé de l'Isle, who helped Dávila put his collection catalog into publishable form. With some assistance on the shells from the Abbé Gua de Malves (1712–1786) they produced two volumes on the natural history specimens, one entire volume being devoted to minerals, which were generally acknowledged to be where the principal value of the collection was concentrated. With Romé de l'Isle's help, and probably with assistance from the Parisian painter Remy, a third volume dealing primarily with fossils, artwork and books was produced. Dávila wrote in the *avertissement* to the catalog:

> I feel obligated to inform the public here, and above all my friends and correspondents, about the reasons that require me to sell the collection to which I have not ceased to add until this very day. Some might think that I have become a little weary of a subject that has obviously given me the greatest pleasure for more than 20 years. Others, whose number includes illustrious naturalists who have contributed more than a little to the embellishment of this collection, might regret having surrendered some rare and curious specimens to me, which they might perhaps not have done except for their expectation of seeing them appear in the work that I proposed at that time to undertake concerning certain branches of natural history, and for which purpose I had already had sketches made of more than 200 specimens. However, it has not been possible to realize this work because of the very reasons that are forcing me to part with my collection at the present time. Among the various reasons I might cite, I hope that these two will suffice. One is the change in my state of health, which has been deteriorating seriously for some years, and which now requires calm. The other is that I am confronted with the need to return to Peru to deal with family matters that require my presence there. [But] I confess sincerely that it is not without extreme pain that I am surrendering the object of my keenest passion.

Dávila was not being totally forthcoming in this explanation. In reality, he had run himself 300,000 reales in debt (see Table 2, p. 47) because of his extravagant specimen purchases, and his creditors would wait no longer. Furthermore, there is no evidence that he ever returned to Peru following the sale.

The published catalog of 1767 gives us a detailed insight into his collection, his special tastes and preferences. Thanks to Romé de l'Isle, the mineral specimens are well described. Some examples that catch the eye include:

> **Lot 39:** A beautiful group of crystallized calcite in hexagonal prisms with flat terminations at both ends, on acanthite, from Marienberg in Saxony. Many of the prisms are over one and a half inches in diameter; they are opaque at the base and transparent above.

> **Lot 536:** A large and very beautiful specimen of solid native silver in which the edges are composed of little twisted leaves. It is interlaced with calcite and purple fluorite; from the Sta. Isabel [mine], Potosí. It came from the cabinet of the late Mr. Geoffroi [=Claude Joseph Geoffroy, 1685–1752].

> **Lot 30:** (no. 16) Cubical pyrite crystal with 72 faces, from Choco, Peru [=Colombia]. This rare and remarkable pyrite has each of its six faces formed of four triangular pyramids arranged like a Maltese cross; 12 triangular planes comprise each face of the cube, and therefore total 72. [This was clearly an "iron cross" twin.]

Particularly interesting is lot 194. "Siberian red lead" had first come to the notice of mineralogists just a year earlier, when Lehmann wrote about it to Buffon. Lehmann attempted to analyze it and reportedly came to the tentative conclusion that the lead was compounded with arsenic and sulfur. It was not until 1798 that Vauquelin isolated the new element chromium from the mineral and named it crocoite. The Berezov gold mine near Ekaterinburg was at that time the only known locality, and remained so for years thereafter. Peter Simon Pallas had pinpointed the locality in 1770, stating that it had been worked since 1752. But by the time of Vauquelin's analysis crocoite had become very scarce at the type locality and specimens sold for their weight in gold. Dávila had apparently obtained his when the first batch of specimens reached the Western European market. His description is as follows:

> **Lot 194:** A very rare and very curious specimen of crystallized red lead on a quartz matrix, with gold and iron oxide, from Catherinebourg in Siberia. The crystals are transparent, and consist of a quadrangular prism with rhomboidal faces. This lead mineral, recently discovered, is mineralized by a combination of sulfur and arsenic.

Another interesting specimen was Dávila's large, blocky cassiterite crystal from the East Indies (Malaya):

> **Lot 216:** A crystal of black tin, very rare because of its large size and regularity; it is a prism 6.5 inches in circumference [i.e. about 2.3 inches across] by 3 inches in height, which shows nine faces of unequal size, some of which have very fine, inconspicuous longitudinal striations. One of the ends is terminated by an obtuse triangular pyramid, some of its faces rhomboidal and likewise of unequal size, such that one face intersects four faces of the prism, another three and the other only two. It is from the East Indies, of the variety described by Mr. Linnaeus.

The 8,096 mineral specimens described in Dávila's catalog encompass the typical range of localities and species for that time, although his large Potosí suite and others from Spanish America were unusual. Specimen totals may be broken down as follows:

Metallic ores (As, Co, Bi, Zn, Sb, Hg, Pb, Sn, Cu, Ag, Au).	1,771
Pyrite, marcasite, iron oxides.	668

Calcite, barite, fluorite, gypsum, sulfur and salts 479
Quartz (including 1,217 agates) 1,990
Gem minerals (aquamarine, peridot, hyacinth, garnet, chrysolite, opal, emerald, topaz, sapphire, ruby, diamond, tourmaline) 471
Amianthus, micas, talc. 314
Earths, stones, rocks, pebbles, figured stones, bitumens 2,403

In addition, Dávila's catalog lists 5,253 shells, 600 animals (fish, insects, birds, etc.), 101 plants, 3,915 fossils, 154 bezoars and calculi, and 402 books, including many rare and valuable natural history works. Notable titles include:

Agricola's *De re metallica* (1657)
Barba's *Métallurgie* (1751)
Caesalpini's *De metallicis* (1596)
Ceruto & Chiocco's *Musaeum Calceolarium* (1622)
Dezalliar d'Argenville's *L'Oryktologie* (1755)
Grew's *Musaeum Regalis Societatis* (1681)
Hebenstreit's *Musaeum Richterianum* (1743)
Imperato's *Historia naturale* (1672)
Kircher's *Mundus subterraneous* (1678)
Linnaeus's *Musaeum Tessinianum* (1753)
Mercati's *Metallotheca Vaticana* (1719)
Schmiedel's *Fossilium metalla* (1753)
Seba's *Locupletissimi rerum naturalium* (1734–1765)
Sibbald's *Historiae naturalis Scotiae* (1683, 1684)
Valentini's *Musaeum museorum* (1714)
Wallerius's *Minéralogie* (1753)
Woodward's *Fossils of England* (1729)
Worm's *Museum Wormianum* (1655)

He also cataloged over 12,000 prints and engravings, 1,741 original artworks (drawings, paintings, bronze sculpture), 441 maps, 40 models and mathematical instruments, 224 ethnographic items, 521 lapidary items of cut crystal, gold, carved shell, ivory, porcelain and engraved stones, and a collection of 4,280 sulfur and clay impressions of engraved gemstones in collections throughout Europe. These various items of artwork thus totaled about 20,000 pieces. Therefore the total collection cataloged in the three volumes amounted to nearly 40,000 specimens. In a letter to the Spanish Court he also mentions having 4,000 dried and pressed botanical specimens and many other uncataloged items. If, as it appears, he later sold over 8,000 uncataloged mineral specimens along with thousands of art objects and biological specimens, to Carlos III, the grand total may well have exceeded 60,000 specimens. With the exception of books, a collection of this magnitude and scope rivals that of Sir Hans Sloane (whose specimens totaled 79,446 excluding his library of about 50,000 books), and Dávila's minerals were certainly of far higher quality.

A public announcement was made that Dávila would entertain offers for the entire collection as a unit until October 15, 1767. Interested parties were directed to call on Mr. Dávila at his residence on the rue de Richelieu near La Fontaine or at the quarters of Mr. Remy, a painter of the Saint-Luc Academy, on the rue Poupée, who often assisted with natural history sales. If (as proved to be the case) no applicants presented themselves, the public auction was scheduled to begin "the day after St. Martin's day, Thursday, November 12, 1767," and to continue without interruption until all items had been sold. A circular was promised every 15 days which would indicate the articles scheduled to come up on each of the following days.

Dávila's catalog received wide distribution, in Paris, London, Amsterdam, Rotterdam and Basle. When the great auction finally began, the cream of the Parisian scientific community was in attendance. Romé de l'Isle sat by and noted the selling prices and buyers' names in the "bid book" copy of the catalog. Mineral specimens were purchased by such luminaries as the mineralogists Balthazar Sage and Louis Daubenton, the prominent geologist Nicolas Desmarest, the famous physiocrats Baron Anne Robert Turgot and François Quesnay, the architects François Belanger and Jean-Marie Morel, and a long list of titled aristocrats from the upper crust of Parisian society. The 1,007 lots of shells brought 26,933 francs. Among the rare books, Seba's *Locupletissimi*, with its hundreds of magnificent, hand-colored specimen illustrations, brought only 203 francs (about $1,100 in today's money, compared to the estimated value of a quarter million dollars on today's book market). Among the artworks, an oil painting by El Greco sold for 18 francs (about $97 today).

Selling prices noted in the bid book reportedly totaled about 200,000 French francs, but this figure is probably only a partial sum for all that was sold. A contemporary, Juan Sempere y Guarinos (1785), stated that Dávila realized the equivalent of about 800,000 Spanish reales from the liquidation of his estate, and that this enormous sum was still less than half the actual worth of the collections.

Having paid off his creditors, Dávila now found himself with half a million reales left over. Still the passionate collector at heart, Dávila joyfully launched into an unbridled spending spree that must have warmed the hearts and bank accounts of every dealer in Paris (despite his health, which "required calm"). Within two or three years he had again amassed a sizeable collection, specializing in minerals, and selected with more knowledge and experience than his first collection had been. Once again he could entertain the idea of taking a collection to Madrid. His friends, especially the Marquis of Montehermoso in Cadiz, began advising him again on how to approach the king.

> It would be good if the catalog of the collection were to be preceded by a careful history of the collections currently in existence in other European courts [wrote Montehermoso in 1770], maintained at the expense of their princes as being among the most illustrious adornments of their capitals. This is an honorable motive, and you should make it clear that the first thing visiting monarchs will want to see upon their arrival is the natural history collection, adding that the lack of this feature in Madrid is depriving the King of greater glory.

Finally, in October of 1771, word reached Dávila via the Marquis of Grimaldi that King Carlos III had agreed to take over his collections. The terms were that Dávila would accompany the collection to Madrid and there serve as its director for life, receiving shipping and travel expenses, a generous stipend of 1,000 gold doubloons (over 80,000 reales) per year, and a house. Furthermore, Dávila was given a free hand to purchase additional specimens on behalf of the king to further enrich the collection, and was charged with "popularizing the taste for and concepts of this most important subject" among the citizens of Spain.

In January of 1772 the enormous job of packing the collection for shipment began. By May, 152 large shipping crates had arrived safely in Santander, Spain, with more on the way. In the meantime, Dávila was already busily engaged in spending the King's money on additional acquisitions. He purchased all manner of items wherever he could find them, including more minerals. The Abbé Clunier, for example, wrote from Stockholm in May of 1772:

> I am negotiating for a specimen of crystalline sulfur for you from Conil. (some examples of which, I've been told, have earlier been sent to Paris). Initially, its value was not appreciated, and the Dutch consul shipped cases of it to this

country. Now that it is highly valued, it is hardly to be found at all.

Dávila must certainly have been enjoying this task, and was becoming so involved in it that in late August Grimaldi was forced to write to Dávila, telling him to cease making purchases and leave forthwith for Madrid to assist with the unpacking.

Dávila was warmly welcomed in Madrid. Carlos III renewed Ferdinand's proclamation that Spanish officials in all parts of the realm should forward local specimens to Dávila for incorporation into the royal cabinet. The collection immediately became an object of national pride, as "one of the most important in Europe and, for the Mineral Kingdom, the most complete of all."

Dávila, whose health had indeed been frail, died just three years later, in 1775. Father Roselli in Rome wrote his eulogy, praising his rich museum for the many rare and admirable species of minerals, animals and plants that it contained. The royal cabinet in later years was renamed the National Museum of Natural Sciences, where Dávila's specimens are still preserved today.

Mexico

The first collector of minerals in Mexico appears to have been the Aztec emperor Montezuma (1480?–1520), although his specimens were probably gathered primarily for medicinal purposes. He was killed by the Conqistadors in 1520, but the Aztec collections were preserved intact for many years thereafter. This is attested to by Francisco Hernandez, Court Physician to King Phillip II, who was dispatched to Mexico in 1570 for the purpose of making a detailed inventory of all the plants, animals and minerals in New Spain. He found that the Aztecs had developed extensive botanical gardens, zoos containing animals from every corner of their realm, and a natural history collection containing various oddities and mineral specimens. Utilizing an Aztec artist for the illustrations, Hernandez labored for seven years to produce a 16-volume masterpiece (10 volumes of which were illustrations) on the natural history of Mexico. It probably contained paintings of many of Montezuma's own mineral specimens, along with a great many plants and animals. Hernandez prepared three duplicate sets, which he left in Mexico upon his return to Spain; all are now lost (Anderson, 1977). The set he gave to Phillip II in Madrid was destroyed in the Escorial fire of 1671. Only heavily abridged versions published between 1615 and 1651 survive today, giving some indication of why Hernandez became known as "the Pliny of Mexico."

In the realm of New Spain the few known 18th-century mineral collectors tended to be European-educated Spanish scientists and academics, but local mining men occasionally took up the practice as well. Mexico proved to be a treasurehouse of silver and other metals, spread throughout the mountainous regions from north to south. The silver mines were like those of the Saxon Erzgebirge, seemingly inexhaustible and lasting through generations of intense mining.

Martin Sesse (died 1809) was a Spanish naturalist sent to Mexico in 1785 to serve as Director of the Royal Botanical Gardens. He collected minerals as well as plants, eventually selling his collection to the mining college in Mexico City for incorporation into the first official public mineral collection in the country.

Among the mining men who collected minerals was Pedro Romero de Torreros (1710–1781), a wealthy Mexican silver miner in Pachuca. He began building his mineral collection around 1770. Ultimately it was inherited by his son, the second Count of Regla. It is thought that original specimens from his collection may still be in the possession of the Romero de Terreros family in Pachuca.

Zacatecas, another fabulously rich silver district, produced a vast fortune for many mine owners including Jose Maria Fagoaga



Montezuma

(died 1825), the Marquis of Apartado. Fagoaga dedicated himself to the study of mineralogy, and assembled a substantial mineral collection admired by Andrés del Rio.

The most famous mineral collectors in Mexico, however, were Fausto de Elhuyar and Andrés del Rio.

Fausto de Elhuyar (1755–1833)

Fausto de Elhuyar, the younger brother of Juan Jose de Elhuyar (1754–1796), was born in Logroño, Spain, and was educated in Paris (1772–1777) and at the Freiberg Mining Academy. He taught in Vergara, and founded the Royal School of Metallurgy. He and his brother, who had studied mineralogy under Werner and Bergman, conducted experiments leading to the discovery of tungsten.

In 1786, by which time Elhuyar was Professor of Mineralogy and a Royal Pensioner in Vienna, the Tribunal of Mines for Mexico established by the Spanish Crown in 1777 was undergoing reorganization. Elhuyar was enlisted to take over as Director-General. The establishment of a mining college in Mexico City, approved in 1774 but never acted upon, was one of the problems Elhuyar was expected to rectify.

Elhuyar was granted permission to postpone his departure for Mexico so that he could inspect the various mining and amalgamating operations in Austria, Bohemia, and Saxony; by the time of his belated arrival in Mexico in 1788 he had become



Elhuyar

thoroughly familiar with the most recent developments in European mining technology. In addition, he brought along with him a hand-picked staff of three trained German mineralogists, Frederick Sonneschmidt, Franz Fischer and Ludwig Lindner, as well as a mining engineer and seven master miners from Saxony. The mineralogists and miners were sent out from the base office established in Mexico City to act as technical consultants in the great mining districts of Zacatecas and Sombrerete (Sonneschmidt), Valladolid and Guanajuato (Fischer) and Taxco (Lindner). Elhuyar himself traveled widely, visiting Guanajuato, Sombrerete, Michoacán, Oaxaca and other important areas. He built up a significant personal collection of minerals during his years in Mexico, and was far more interested in field work than in administrative duties, so we may assume that he was actively involved in field collecting during these excursions.

Elhuyar's other project, the establishment of a mining college, finally became a reality in 1792. He had drawn up a detailed list of analytical equipment, mathematical instruments and books that would be needed. He considered it of "utmost importance" that a mineral collection be acquired in Europe for the College immediately. He specified that the specimens should be good study-grade examples at least 4 or 6 inches square, and labeled as to species and locality. The process of acquiring all of these materials dragged out over ten years, and the requested minerals never did arrive, so it became necessary to begin building a collection of Mexican minerals for the College. Acquisitions later included the collections purchased from the estate of Pablo Santelices for $1,514 in 1794, from Frederick Sonneschmidt for $500 in 1798, and from the architect Luis Martín for $200 in 1802. (Sonneschmidt sold the rest of his specimens to Martin Sesse.)

When Elhuyar needed to order more instruments for the students he generally did so through Alexander von Humboldt, who had visited the College for a time and had even assisted in the administration of examinations. Von Humboldt selected, purchased and shipped the required equipment from Europe without receiving any financial commission. But Elhuyar sent him many fine mineral specimens from Mexican localities which Humboldt later presented to European museums.

Elhuyar continued to direct the Mining Tribunal and the mining college for many years, up until the tumultuous times of the fight for Mexican independence. Being a supporter of the King, it was a fight he could not sanction. Elhuyar tendered his resignation from the College in 1821, after 33 years of service. He returned to Madrid, where he wrote a famous treatise on the influence of mining in New Spain, drew up the new mining law of 1825, was appointed Director General of all mining in Spain, and laid plans for a new school of mining to be built in Madrid. He died in 1833, as the result of a fall. In 1835 his extensive collection of minerals was acquired by the Director General of Mines in Spain and was turned over to the Museo Geominero in Madrid, where specimens are still preserved.



Del Rio

Andrés del Rio (1764–1849)

The other most prominent early mineralogist in Mexico was Andrés Manuel del Rio y Fernandez, born in Madrid and educated at the College of San Isidro and the University of Alcalá de Henares. Following his graduation he entered a public contest in experimental physics (though his Bachelor's degree was in theology and classical languages), and performed so well that he was granted a scholarship by the king to attend the newly founded Mining Academy in Almadén. There del Rio developed a great enthusiasm for mining and mineralogy, and achieved such high marks that he was selected to study further at government expense. He studied chemistry, natural history and medicine in Paris, and in 1789 studied mineralogy and geology under Werner at the Freiberg Mining Academy, developing a friendship in the meantime with his classmate Alexander von Humboldt. Del Rio then moved on to the Mining Academy at Schemnitz, where he studied metallurgy, chemistry and "subterranean geometry." He also visited mining areas in Bohemia and Austria. In 1791 he toured the metallurgical facilities of England, and in 1792, while studying the mining operations in Saxony, was notified that he had been offered an appointment to join the faculty of the new mining college in Mexico City as Professor of Mineralogy.

Del Rio, however, had not completed all of the mining studies in Europe that he wished to undertake, and asked for more time before taking the position. He traveled on to Paris where he studied chemistry with Lavoisier, but was almost a victim himself of the Reign of Terror, escaping France in 1793 disguised as a water bearer. He visited the Cornish tin mines, and made a final tour of Austria, Transylvania and Saxony before setting sail for Mexico. Finally, in November of 1794, he arrived in the port of Veracruz.

It seems likely that, considering his long training in mineralogy and his extensive travels, he brought with him to Mexico a collection of European minerals. The shipment of his equipment and possessions from Veracruz to Mexico City was so arduous that he did not arrive there until December 18, more than a month

after his ship reached port.

The opening of the school year at the mining college in 1795 was postponed until April 27, apparently in part to allow del Rio time to complete preparations for teaching his introductory course in mineralogy. He had arranged the Santelices mineral collection and drawn up a descriptive inventory of the specimens, probably covering minerals from his own collection as well. Amazingly, he also completed and had printed the first volume (172 pages) of a textbook of mineralogy in 1795 to supplement the mineral collection in teaching his class of ten students. The following year his courses were expanded to cover geology and elements of mining engineering. A course in chemistry and metallurgy was also begun by the German mineralogist Ludwig Lindner, who had accompanied Elhuyar to Mexico in 1788; another of the mineralogists, Franz Fischer, joined the faculty in 1797 to assist in teaching the chemistry and metallurgy courses. (The third member, Sonneschmidt, had elected to sell his mineral collection upon completion of his ten-year appointment and returned to Spain.)

In 1798, when the first class of trained mining men was about to graduate, the king proudly authorized their appointments as mine directors and mine engineers for operations in Peru, Argentina, Guatemala, and Chile.

Del Rio's most memorable single achievement was his discovery in 1801 of the element vanadium in brown vanadinite from the Cardonal mine in Hidalgo, Zimapán. He provisionally named it *erythronium* because of the red salts it produced, but later withdrew his claim in the mistaken belief that the new metal was only chromium. He had given specimens to von Humboldt to take back to Europe, and had followed up with a long letter detailing his chemical procedures. But, unknown to him, the letter was lost in a shipwreck and never reached the chemists of Europe who would have quickly confirmed his original discovery.

In 1820 Del Rio was appointed to a deputation sent to the Spanish Court in Madrid, where he spoke out bravely in favor of Mexican independence. While in Spain he was offered the directorship of the Almadén mines and of the Museum of Sciences in Madrid, but he preferred to return to the country he now considered home. He was subsequently appointed to succeed Elhuyar as director of the mining college.

Whereas most Spaniards were being expelled from Mexico in 1828, he was permitted to remain because of his earlier patriotic stance. Nevertheless, he chose to enter voluntary exile in American Philadelphia for four years, where he became familiar with the active circle of mineralogists and mineral collectors in that city. His new *Elements of Mineralogy* ("Elementos de Orictognosia") was published there, in Spanish, in 1832 before he returned again to Mexico City with specimens for his collection acquired from the American Philosophical Society and, no doubt, other American collectors. He also purchased in Philadelphia a "splendid collection of shells and fossils" for the mining college.

Del Rio continued to study and publish on mineralogy until the year of his death, 1849. He left his large and excellent collection of minerals from the Old and New Worlds to the mining college, but little of it survives today. Apparently the college collection was not well cared for following del Rio's death. In 1867 a writer in *Harper's New Monthly Magazine* lamented:

> Prior to the French Invasion [1862] there was in the City of Mexico a flourishing college, founded and maintained by the Government, and devoted exclusively to mining instruction. In the cabinet of that institution was a collection of mineral specimens, the rarest in the world, and of the intrinsic value of millions. Today nothing of it remains. A portion has fed the "imperial" mint, while the richest exemplars are said to be in Miramar [Argentina], and in certain glass cases in the Louvre.



Portugal and Brazil

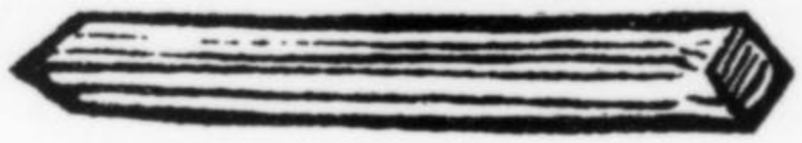
The early history of mineral collecting in Portugal and her South American colony of Brazil is not well-documented, and, as in Spain, is probably minimal. Jacob Forster is known to have traveled to Lisbon in the late 1700's to buy specimens; and at least one private mineral collector, a merchant named Payard who specialized in Mexican minerals, is known to have resided there. But in general the details surrounding the Portuguese community of collectors remain obscure, and can only be speculated upon.

Brazil, though not actually "discovered" until 1500, came under Portuguese hegemony as the result of divisions and treaties carried out in 1493 and 1494. However, unlike in the American territories of Spain, where prospecting commenced almost immediately, no appreciable amounts of gold or silver were discovered in Brazil until around the beginning of the 18th century. Colonial growth up to that time had been based on agriculture, hides and brazilwood (the source of a valued organic dye).

Among the first known mineral collectors to visit Brazil was the English buccaneer and pirate William Dampier (1651–1715), who made port in Bahia in 1699; it is not known whether he obtained any minerals there at that time, but he did later supply specimens to the English collector John Woodward (1665–1728). Occasional bands of militiamen would press into the Brazilian interior to capture slaves and prospect a little for gold and gems, but most of the Brazilian Portuguese population long remained centered on the seacoast. Even well into the 18th century, young Brazilian men desiring a higher education had to travel to Portugal, to the University of Coimbra, and there was no printing press or school of mines in Brazil until the 19th century.

Perhaps the earliest person known to have collected minerals in Brazil was João Coelho de Sousa, brother of the wealthy plantation owner Gabriel Soares de Sousa, who had come to Brazil in 1569. João collected numerous specimens of gold, silver minerals and crystals of precious stones on the family property in Bahia. Gabriel petitioned the Portuguese government around 1587 (after his brother's death) for permission to do further prospecting and exploitation; his request was granted in 1590, but he died of sickness before his first expedition had gone very far.

Finally, in 1693–1695, explorers found rich gold placers near present-day Ouro Preto in what is now Minas Gerais, and within ten years Brazil's entire economy had become reoriented to mining. Hundreds of thousands of Portuguese emigrated to Brazil to work in the goldfields and prospect for their own fortunes. Diamonds were discovered nearby in 1720, adding to the frenzy, and in 1721 gold was found in the present-day states of Matto Grosso and Goiás.



Green tourmaline crystal from Brazil in the collection of **CONRAD GESNER**; one of the first mineral specimens ever illustrated in print (1565).

Portugal wanted its mines in the New World to have the benefit of expert technical supervision. To this end, Brazilian-born students were sent to study in Portugal and to continue their studies in France, Germany and other centers of learning in Europe. Several outstanding mineralogists were produced through this channel in the late 18th century, including Manoel Ferreira da Câmara Bethencourt e Sá (1765–1835), José Bonifacio de Andrada e Silva (1765–1838) and his brother Martim Francisco Ribeiro de Andrada e Silva (1775–1844). Probably all of these men assembled personal mineral collections, but no record appears to have survived.



Brazilian specimens of palladium (top-left and top-center), platinum (right) and iridium (lower-left) from **WILLIAM WOLLASTON**'s collection.

Câmara and the elder Andrada had studied chemistry under Fourcroy and mineralogy under Haüy in Paris, and also studied under Werner at the Mining Academy in Freiberg. In Freiberg they became friends with Alexander von Humboldt (1769–1859) and Baron Wilhelm von Eschwege (1777–1855), both mineral collectors as well. From there the two young scholars traveled to the mines of Tyrol, Steiermark and Carinthia, then to Padua for a time and onward to Scandinavia in 1797. There Andrada discovered four new mineral species (cryolite, petalite, scapolite and spodumene).

In 1800 Andrada accepted a professorship in geology at Coimbra, Portugal, and was subsequently appointed the new Intendant of Mines for Portugal, while Câmara was appointed Intendant of Mines for Brazil in 1807.

Andrada's younger brother, Antônio Carlos, translated Ferber's *Manual of Mineralogy* into Portuguese; and his brother Martim was named Inspector of Mines for the Captaincy of São Paulo in 1802, where he traveled extensively on prospecting trips through the interior.

Baron Eschwege subsequently served as a high representative of the Portuguese Government in Brazil (1809–1821), where he assembled a collection of Brazilian minerals later acquired by the Technical University in Clausthal.



America

Mineral collecting and mineral science in America* were late to develop for a number of reasons. There were no long-established museums and institutions where collections could be studied and instruction obtained. There was no aristocratic leisure class possessed of old family collections and a penchant for financial patronage of the sciences. And finally, there was simply not much time for such unproductive indulgences as hobbies and pure science in a new land where making a living and building a business took all of a citizen's energies.

The early Americans were practical, and obsessed with business. They might have taken to the business of mining, and indeed some few did. But, despite a number of prominent iron, copper and lead deposits, the lands of the eastern seaboard did not prove to be endowed with mineral wealth on the scale of the Saxon Erzgebirge or Transylvania's "Golden Quadrilateral"; a mining culture and its accompanying preoccupation with minerals was not destined to develop in the American colonies. Consequently the mineralogical beginnings were modest and the progress slow.

When collections did begin to accumulate, they consisted predominantly of local ores and mineral specimens which were far from spectacular relative to the best that European localities had to offer. The emphasis for a long time was purely economic, and the idea of *aesthetic* specimens was unheard of until high-quality European collections were imported late in the century.

The late 1700's were a formative period in the history of American mineralogy. In Europe the cities of Stockholm, Berlin, Paris, London and Edinburgh had developed as centers for the new science. But in the fledgling United States activity was disseminated over a broad area. Greene (1969) wrote:

> The early history of American mineralogy is a story of the activities of individual collectors and investigators located in towns and cities from Georgia to Maine; of their relationships with roving European scientists; of their efforts to organize for the exchange of ideas, the pooling of books and specimens, and the publication of researches; and, finally, of growing cooperation in the common task of exhibiting the mineral products of America to the republic of science and letters.

The dominant center of mineral collecting, however, was Philadelphia, especially among members of the medical community who had been exposed to minerals and natural history as they related to *materia medica*.

Still fresh with revolutionary fervor and determined that their new republic should avoid the decadent indulgences of the Euro-

*Meaning that portion of the New World which became the United States of America.

pean monarchies, some of the early American mineralogists held the precious metals and gems in deep disdain. Samuel Latham Mitchill, a prominent New York collector and geologist who published "the first systematic geological survey of a substantial region of the United States by an American" (Greene and Burke, 1978), was pleased that he had found none as of 1798:

> Fortunately for our peace and happiness, no sources of gold and silver appear to have been detected. It is to be hoped our country contains none but those [minerals] of productive labour and active industry.

Benjamin Waterhouse at Harvard exhorted his students in the 1790's:

> I do not encourage you to pursue mineralogy in hope that you will find the Ruby, the Topaz, the Emerald, the Sapphire, the Onyx or the Diamond. These are useless articles; the mere playthings of Kings and Queens, and of course below the notice of us wise and frugal Republicans.

In the years following the turn of the century, the collecting of aesthetic specimens in what might be called the French style had finally achieved popularity with a segment of the American collector community. The Philadelphia mineralogist Thomas Cooper wrote disapprovingly of this trend in 1817:

> What with the beauty of many minerals, the delicacy of their colors, the varieties of their crystallization, and other external characters, cabinet collectors are led, or rather misled, to pass without notice the more common minerals, to neglect the great outlines of science as nature offers them to our view, to confine themselves to minerals so scarce, valuable and beautiful, as to make a cabinet rather an ornament and a plaything than an instrument of [scientific] illustration.

The debate about the merits of aesthetic versus scientific collecting is one which has endured up to the present day. The dichotomy appears to be a permanent feature of the psychology of mineral collecting.

Despite the growing sophistication among the community of mineralogists and collectors, the general public in America had little conception of natural history collecting. As late as 1811, Cooper's own field collecting activities along the Susquehanna River brought upon him the charge of lunacy from uncomprehending local residents.

As mentioned in the chapter on the 17th century, the earliest known mineral collector in the American colonies was John Winthrop the Younger (1606–1676), colonial governor of Connecticut. The narrative of American mineral collecting on an individual basis in the 18th century begins with his grandson of the same name:

John Winthrop (1681–1747)

John Winthrop, Jr., like his grandfather John Winthrop the Younger, built up a large collection of natural history specimens, including minerals and ores. Before 1717 he is known to have sent specimens of New England minerals to the British geologist John Woodward (1665–1728); some of these are recorded in Woodward's *A Catalogue of the Fossils of England* (1728).

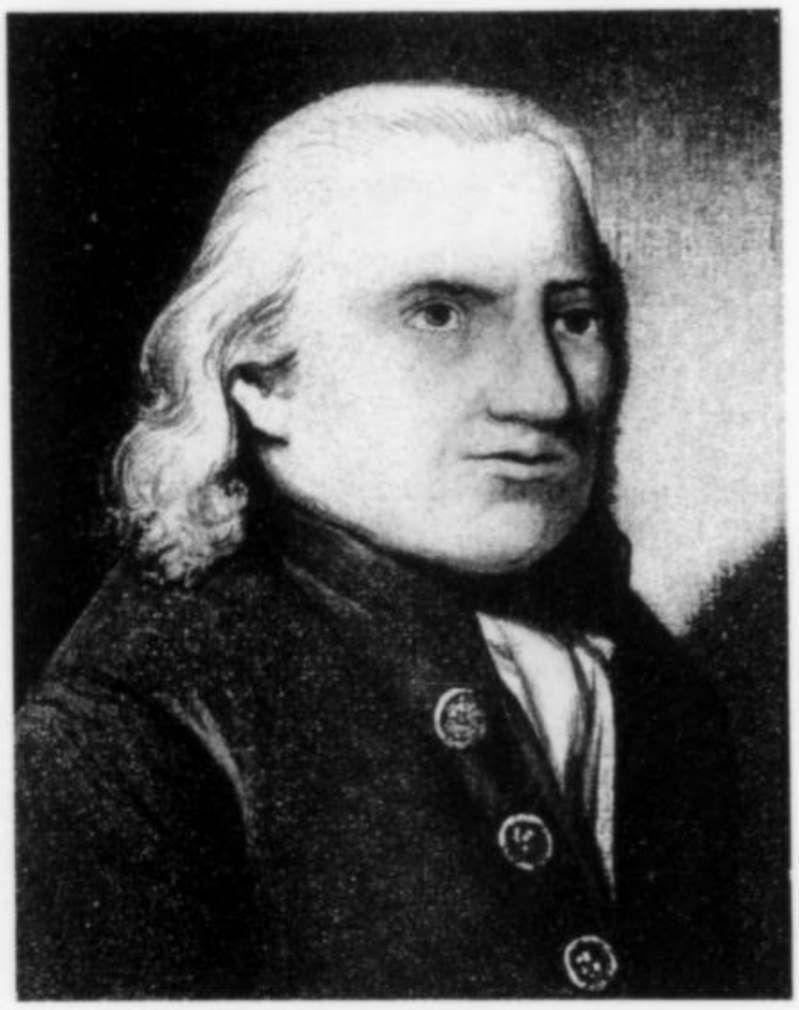
Upon his election to London's Royal Society in 1734, Winthrop donated to the Society a collection of over 600 mineral specimens, mostly from New England. The catalog that accompanied this collection survives, although the specimens themselves were later dispersed. Some were acquired by Sir Hans Sloane (1660–1753), and passed to the newly formed British Museum with the rest of his collections in 1753. A sample of columbite which served in 1802 as the type specimen for the element columbium still survives.

William Douglass (ca. 1691–1752)

William Douglass was a Scottish physician and author born in East Lothian. His family had good connections, allowing him to study medicine (and presumably natural history) in Leiden and Paris. It was probably in the heady scientific atmosphere of Paris, with its great lecturing mineralogists and crystallographers and its dozens of superb collections, that Douglass developed an interest in minerals.

Following the completion of his studies he crossed the Atlantic in 1716 to spend some time visiting with his relative, Gen. Douglass, in the West Indies, then settled in Boston in 1718. He is known to have possessed a mineral collection by 1720. Considering that the West Indies are not a mineralogically rich collecting area, and that his first years in Boston would have required much of his time for the establishment of his medical practice, it seems likely that he had brought his mineral collection with him from Europe. If so, it would represent the first mineral collection to be imported to the American colonies. Unfortunately, nothing is known of its contents or its disposition.

There is no indication that Douglass pursued his collecting activities once having settled in America. His principal researches were medical; he was a strenuous opponent of inoculation for smallpox, and published several papers on the disease. He was known to be an opinionated man, sometimes intemperate in his language, and prone to distorting history to suit his personal likes and dislikes. Adam Smith called him "the honest and downright Dr. Douglass."



Bartram

John Bartram (1699–1777)

John Bartram was born to a Quaker family near Darby, Pennsylvania, in 1699 (or in Chester County in 1701; authorities differ). He was the grandson of Richard Bartram, who accompanied William Penn to the colonies in 1682. Following the death of his father, who was killed by Indians in North Carolina, and his uncle, John inherited his uncle's estate at Darby near Philadelphia.

Bartram was a self-taught student of natural history, especially

botany. He learned the classical languages (for which he had a natural talent), and studied medicine and surgery with such dedication that he was able to successfully tend the sick in his neighborhood, despite his lack of credentials. He constructed the first botanical garden in the colonies in 1728, covering some five or six acres, building the stone house and even manufacturing the iron farming utensils himself. He made frequent collecting expeditions throughout the Atlantic Seaboard, from Canada to Florida, collecting mostly botanical specimens, but also minerals and rocks. He was much admired as a botanist by Linnaeus, who donated not only plant specimens but also some European minerals to his collection.

Besides Linnaeus, Bartram was a friend of Benjamin Franklin (who also had an interest in minerals), George Washington, Sir Hans Sloane, and the controversial British naturalist and mineral collector John Hill (1714–1775). They supplied him with books and analytical equipment in trade for American specimens gathered during his frequent excursions. Bartram was elected to membership in several European scientific societies, and was appointed American botanist to King George III . . . extraordinary recognition for a man without formal education. He was widely admired in Europe and America for his botanical expertise, his temperate, generous and hospitable nature, and his opposition to slavery.

His botanical garden and mineral collection were preserved for some time following his death, albeit perhaps not with as much organization or care as he would have given them. A visitor to his estate in 1783 described seeing "all manner of rocks and minerals which are now kept in a box without any system, intermixed with European specimens, especially Swedish, sent over by Linnaeus." The collection's disposition thereafter is not known, but his botanical garden is now a part of Philadelphia's park system.

Samuel Hazard (1714–1758)

Samuel Hazard was a Philadelphia businessman who is remembered chiefly for a scheme he developed to colonize Indian territory under the guise of Christianizing the inhabitants. He explored the territory that he and his group had targeted, bargained with Indians for land, and obtained a release from the colonial Connecticut government regarding its claims to the area. Due to his early death, the project was never completed.

Hazard lived originally in New York, where he had served as one of the original trustees of Princeton University (then the College of New Jersey). His son Ebenezer was educated at Princeton, graduating in 1762, and later becoming Postmaster-general of the United States.

Benjamin Franklin was an admirer of Hazard's "large collection of ores, minerals and other fossils of these parts of America," as he described it to a friend in 1764. Franklin went so far as to send a descriptive catalog of its contents to his scholarly contacts in England. At that time, six years after Hazard's death, the collection was said to reside in the "Library Company of Philadelphia," but its eventual disposition from there remains unknown.

Hugh Orr (1717–1798)

An early collector of strictly American specimens was Hugh Orr (1717–1798), a Scottish inventor and ironworker who came to New England in 1737. He established a shop in Bridgewater, Massachusetts, where he manufactured scythes, axes, shovels, muskets (the first to be made in the Colonies), and cannons. He was a staunch supporter of the Revolution, and afterward served some years as a member of the Massachusetts state senate.

Orr was admired as a man of high character, with a kind and sympathetic nature. Despite his common-school education, he had a keen interest in minerals, and in the discovery of new ore deposits. Thatcher (1804) wrote of him:

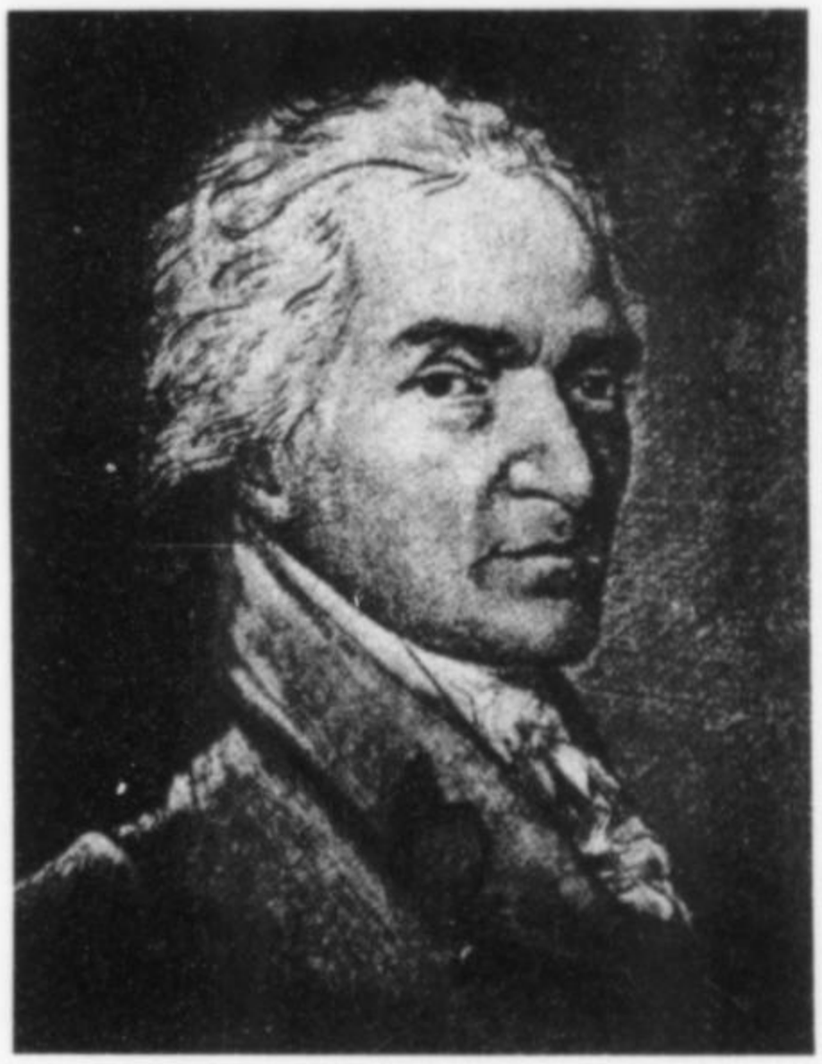
> His knowledge of minerals and ores was so extensive that from nearly every newly discovered mine in the country he was immediately furnished with specimens of its quality, and a few years previous to his death he was in possession of a valuable mineral collection.

As with most other early American mineral collections, its disposition is unknown. It was most likely dispersed or in large part discarded by his heirs.

Thomas Barton (1730–1780)

Thomas Barton was born to an English family long established in Monaghan, Ireland. He graduated from the University of Dublin, and in 1751 settled in Philadelphia, taking the position of tutor at the academy there (now the University of Pennsylvania). In 1754 he returned to England for a year to be ordained in the Established Church, and was for nearly 20 years thereafter a rector at St. James Church in Lancaster, Pennsylvania.

He was deeply interested in science, especially mineralogy, and he is said to have built a mineral collection which, upon his death, was inherited by his younger son, Benjamin Smith Barton (1766–1815). His elder son was also a mineral collector.



B. S. Barton

Benjamin Smith Barton's interests were primarily medical and botanical, but he did retain and add to the collections inherited from his father and brother. He had studied medicine and natural sciences at Edinburgh, London and Göttingen, no doubt acquiring an exposure to the mineralogists and collectors there. Shortly before his death he purchased Silvain Godon's mineral collection in 1812, outbidding the Philadelphia Academy of Natural Science. Barton's collection, along with Godon's, was purchased for the Academy by Joseph Watson a few years later, and is still preserved there, although the provenance of individual specimens may no longer be identifiable.

Thomas Jefferson (1743–1826)

Thomas Jefferson, principal author of the American Declaration of Independence, third president of the United States, and



Jefferson

an influential political philosopher, was a man of widely diversified interests. Born in Virginia, the son of a civil engineer, he entered William and Mary College in Williamsburg at the age of 16. There he acquired an interest in mathematics and natural sciences, and studied foreign and classical languages (becoming fluent in French, Greek, Latin, Spanish, Italian and Anglo-Saxon). In time he became interested in the study of law as a force for social and cultural development, and after five years of study was admitted to the bar in 1767. He had little taste for routine law practice, however, and abandoned it after a few years to devote his time to political action and philosophy.

Though impressive, his political career was far from absorbing all of his energy. He retained his early love of mathematics and natural science, was skilled and creative as an architect and inventor, enjoyed scientific farming and meteorological studies, and attained some fame as a paleontologist. At his personally designed plantation ("Monticello") he built a small museum, acquiring for it many of the products of the New World, including fossils and mineral specimens. He also assembled a substantial library including a number of mineralogical works (Haüy's *Traité de Minéralogie*, 1801; Cronstedt's *Essay Towards a System of Mineralogy*, 1788; Cramer's *Elements of the Art of Assaying Metals*, 1741; Hamilton's *Observations on Mount Vesuvius*, 1774; and others). Annoyed by the claim of the French naturalist Buffon that all American species were somehow inferior to those of the European continent, he sought plenty of examples to prove otherwise. He disdained laboratory work as stifling, and considered the study of chemistry as mostly wasted effort, but he enjoyed geological field work and prospecting, and carried with him a traveling blowpipe kit and a set of analytical chemicals. His interest in minerals was of an entirely practical nature, based on their utility to manufacturing.

His years in Paris as U.S. minister to France (1785–1789) had exposed him to the scientific intelligentsia. Like Benjamin Franklin, who held that post in Paris before him (1776–1785), he socialized with the important naturalists and mineralogists of his day. Franklin had even brought back a collection of Derbyshire minerals, which he later donated to Charles Willson Peale's museum in Philadelphia. Jefferson became a friend of Peale's as well, helping him in the acquisition of important large fossil skeletons. Peale's main purpose in the establishment of his large, public natural history museum in 1786 was to promote the scientific and *religious* enlightenment of his countrymen through the display of his many stuffed animals, insects, minerals, fossils and marine life. Jefferson, (classifiable as a "creationist" in modern terminology) fully approved, and later turned over to Peale a large proportion of the plant, animal and mineral specimens brought back by Lewis and Clark's expedition.

Although somewhat skeptical of geology as a useful science (Jefferson objected to its uncertainty and lack of practical utility), he encouraged Samuel Latham Mitchell (1764–1831), professor of geology at Columbia College and an enthusiastic mineral collector, to translate Cuvier's *Essay on the Theory of the Earth*. Jefferson also included mineralogy in the curriculum of the University of Virginia, despite the chronic shortage of properly identified study collections in the United States at that time.

Monticello has been thoroughly preserved and restored today as a unique national landmark. But regrettably, all of Jefferson's mineral specimens are gone.



Peale

Charles Willson Peale (1741–1827)

The prominent American artist Charles Willson Peale was born in Maryland, the son of a country schoolmaster. He attended school in Annapolis but, after his father died, he apprenticed himself to a saddler at the age of 13 and took up saddlemaking as a business for some years thereafter.

While visiting Norfolk, Virginia, he saw a portrait which made such a strong impression on him that he immediately undertook to learn the art of portraiture. He studied under a German painter for a time (giving him a saddle in payment), then studied painting in Boston under John Singleton Copley. He showed such talent that influential friends funded a sojourn to England, where he became a pupil of Benjamin West in 1770.

Returning at last to America, he paid off his various benefactors as promised by painting their portraits, then established himself in business as an artist in Philadelphia. He served fearlessly during the Revolution, taking time from combat and other military duties to paint portraits and landscapes which are today among the nation's historical treasures.

In the summer of 1783, the bones of a large, extinct animal found in Ohio were brought to Peale's studio, and he was commissioned to prepare some drawings of them. It was Peale's first attempt at scientific illustration, and he was fascinated by it. The artifacts remained in his studio for at least a year, and he noticed that they attracted visitors. Colonel Ramsay, a businessman and friend of Peale, commented to him that a better living could be made exhibiting curiosities to the public than exhibiting paintings.

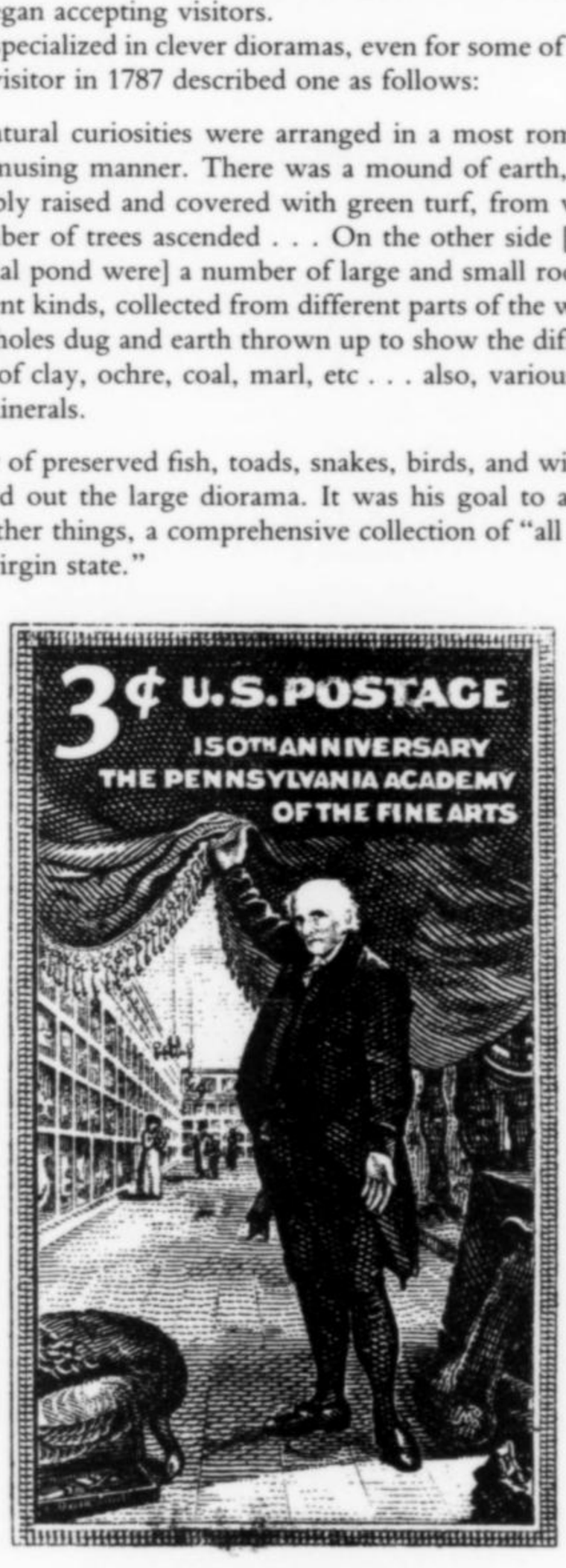
The idea struck him as interesting, and he immediately began making plans to develop his own museum of natural history. Like his predecessors during the Renaissance, he wanted "to bring into one view a world in miniature." He was described as being "boyish in the urge to collect and in the joy of it, and at the same time mature in his determination that the collection should be purposeful and coherent."

Peale went public with his plans in 1786 when he published an announcement of his projected museum in a Pennsylvania newspaper. A room in his house was turned over to the purpose, and he began accepting visitors.

Peale specialized in clever dioramas, even for some of his minerals. A visitor in 1787 described one as follows:

> His natural curiosities were arranged in a most romantic and amusing manner. There was a mound of earth, considerably raised and covered with green turf, from which a number of trees ascended . . . On the other side [of an artificial pond were] a number of large and small rocks of different kinds, collected from different parts of the world, [and] holes dug and earth thrown up to show the different kinds of clay, ochre, coal, marl, etc . . . also, various ores and minerals.

A variety of preserved fish, toads, snakes, birds, and wild mammals filled out the large diorama. It was his goal to assemble, among other things, a comprehensive collection of "all minerals in their virgin state."



Charles Wilson Peale welcoming visitors to his museum.

By 1810, the Museum (now in the spacious Old State House) was at its peak of public popularity and approval from the scientific community. The so-called "Long Room" was 100 feet in length, with portraits and stuffed birds all along one wall, and exhibit cases (of more traditional style than his dioramas) filled with mineral specimens facing them, in the spaces between windows.

Minerals had become the favorite study of his son, Rubens Peale (1784–1865). When the weather was good, Rubens and his friends would take off across the countryside with hammers and backpacks in search of minerals and plant specimens.

By 1819 approximately 8,000 mineral and fossil specimens were on exhibit, a very large number even by the standards of 20th-century museums. Among his specimens were the suite of Derbyshire minerals donated by Benjamin Franklin; lead ore, silver, mica and quartz brought back by the Lewis and Clark Expedition and donated by Thomas Jefferson; a collection of European minerals from the Abbé Haüy in Paris; Maine minerals contributed by William Maclure; many specimens given by various Philadelphia mineralogists; and thousands of others accumulated by donation from every part of the country.

Peale's museum was significant as the first important public museum in the United States where any citizen could go and see minerals. By the time of Peale's death, hardly a person in the country was unaware of his legendary museum.



Waterhouse

Benjamin Waterhouse (1754–1846)

Benjamin Waterhouse was born to a Quaker family in Newport, Rhode Island. He studied medicine in Edinburgh, London and Leiden, including natural history among his subjects. His mineralogical interests were aroused in London, primarily through his contact with the prominent physician and mineral collector John Coakley Lettsom (1744–1815).

Waterhouse returned to Rhode Island in 1782, after seven years of study and travel in Europe, and received an appointment as professor of medicine at the new Harvard medical school. He was recommended by John Adams, a strong advocate of the teaching of Natural History, and was also a frequent correspondent of Thomas Jefferson. Waterhouse first lectured on Natural History at the College of Rhode Island in 1786, but transferred his lectures to Harvard in 1788; these constituted the first formal instruction in mineralogy to be given in the Unites States. Although the subject was new, his students took to mineralogy enthusiastically. After the first lecture series had been completed he wrote to Lettsom that "my pupils had picked up a considerable collection of mineral productions from various parts of the country, and I soon perceived that the subject had become popular."

Harvard had begun accumulating various miscellaneous natural history specimens, probably including some minerals, at a very early date. A fire destroyed all of the original collections in 1764, but by 1784 the college had accumulated a "half peck of minerals" that were being used by Waterhouse in his lectures. Waterhouse was an active field collector, and had been simultaneously building a mineral collection of his own which by 1793 numbered some 500 specimens. In that year Lettsom donated to Harvard "a very valuable and extensive collection of minerals" (nearly 800 specimens), further enriching the stock of specimens available for instructional purposes. An 18-foot mahogany exhibit case 10 to 20 feet high was constructed to hold the collection (Frondel, 1988).

Waterhouse's son, John Fothergill Waterhouse, was by his father's pronouncement "a real mineralogist" and had also built his own mineral collection. Unfortunately the final disposition of both collections is unknown. Waterhouse lost interest in Natural History after his son's death in 1817, and devoted the remainder of his career to medicine and writing. He was a staunch supporter of inoculation against smallpox, and was the first to practice the procedure in America, using vaccine sent to him by Lettsom. Thomas Jefferson was among those he helped inoculate in 1801. The Harvard mineral collection remains the oldest continuously maintained collection in the United States.



Mitchill

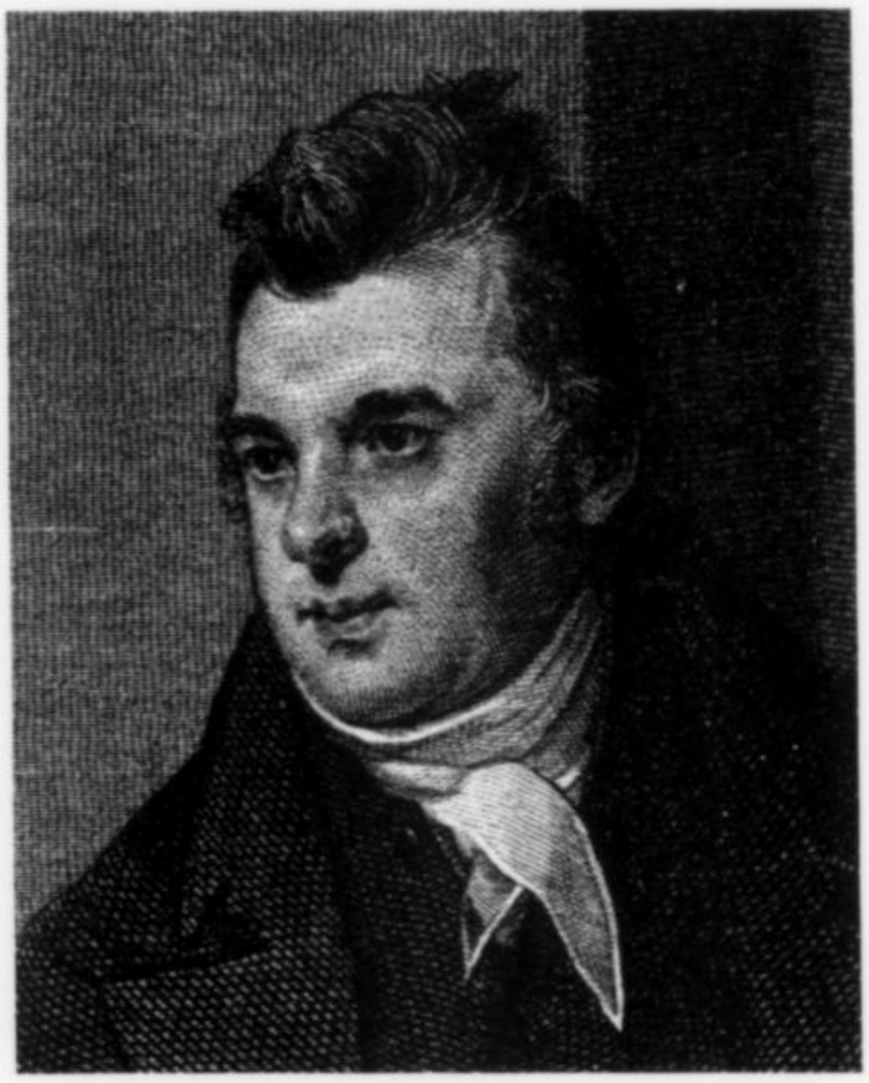
Samuel Latham Mitchill (1764–1831)

Samuel Latham Mitchill, among the greatest promoters of science in the new republic, was born and raised on a farm on Long Island. He studied medicine and natural history at Edinburgh, returning to New York in 1780 with what was probably the first substantial European collection of identified mineral specimens to be brought into the United States. During the course of succeeding years, Mitchill added greatly to it, ultimately donating it to the New York Lyceum of Natural History in 1826, an institution which he himself had founded nine years earlier.

Mitchill was a gregarious and enthusiastic man, fond of field collecting and egalitarian in his friendships. He served for years as editor of the *Medical Repository*, held the post of professor of chemistry, natural history and *materia medica* in New York, and served as a legislator and congressman. He helped organize the short-lived American Mineralogical Society in 1797. Through the *Medical Repository* he reported on new mineral discoveries throughout the country, including the 1803 discovery of gold in North Carolina (taking pains to acquire a specimen for his collection). Other American mineralogists and collectors also used the journal as a clearinghouse for information.

Mitchill's teaching at the college of New York focussed to some extent on mineralogy. "By bringing thus the elements of minerals before you," he told his students, "you learn the geologic alphabet and become able to combine them so as to understand compound rocks." He used specimens from his own collection for illustration. Tourmalines from Ceylon, garnet from Norway, brucite from New Jersey, a mass of native iron (probably a meteorite) found near the headwaters of the Red River in Louisiana Territory . . . these and many others held the interest of his students throughout his courses. Nevertheless, his personal collection, though large, was not considered to be especially well organized, and his detailed understanding of contemporary systems of mineral classification is doubted. Rather than analyze specimens himself, he preferred to pass them along for identification to his friends, such as Archibald Bruce. Nevertheless, his more general contributions were notable, and many mineralogists and geologists of the next generation owed their inspiration to him.

Despite his efforts to find a suitable repository for his collection in the New York Lyceum, it has not survived. The Lyceum was destroyed by fire in 1866.



Hosack

David Hosack (1769–1835)

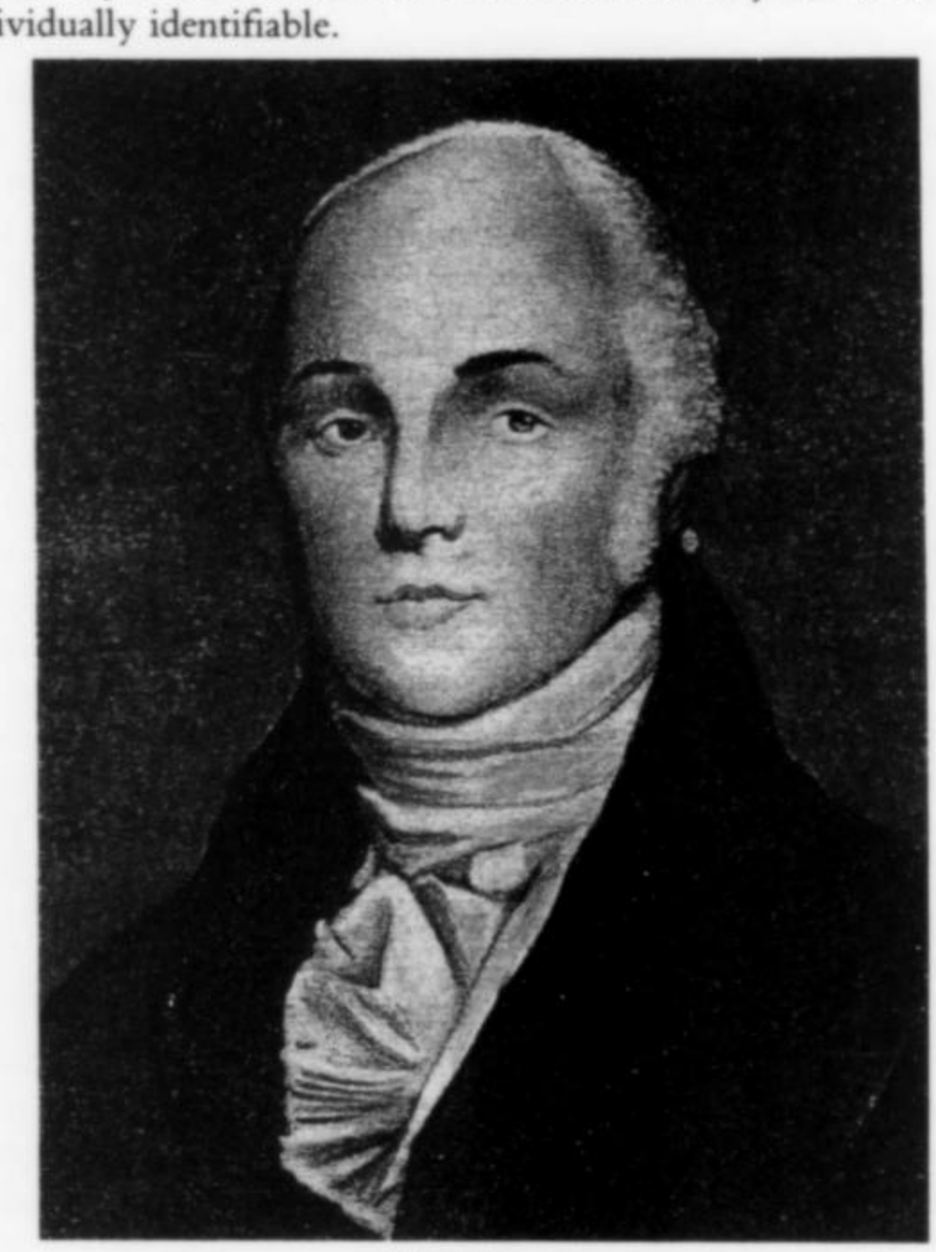
David Hosack was a prominent physician and botanist in New York. He studied at Columbia and Princeton (then called the College of New Jersey), and received his M.D. from the University of Pennsylvania in 1791. After a short medical practice in Alexandria, Virginia, he traveled to Edinburgh and London for further instruction.

He first became interested in minerals after seeing Lord Gardenstone's collection in Scotland in 1793. He visited all the London mineral collections, and began building a collection of his own by purchases from the famous Bute collection and others. When

he returned to America with these treasures, he was sure that his mineral collection was "the first to cross the Atlantic" in 1794. (Actually Samuel Latham Mitchell's collection, imported in 1780, predated Hosack's by 14 years, and William Douglass's collection, if indeed of European origin, long predated them both.)

Back in America Hosack became a prominent physician and member of society. He was a good friend of Alexander Hamilton, and was the attending surgeon at the Hamilton/Burr duel.

By 1821 Hosack's collection numbered about 1,000 specimens, several of which were considered "rare and splendid." In that year he donated it to the College of New Jersey, along with exhibit cases and a collection of mineralogical books. Although his specimens may still be in the Princeton collection they are no longer individually identifiable.



Woodhouse

James Woodhouse (1770–1809)

James Woodhouse was a Philadelphia physician who had trained at the School of Medicine (M.D. in 1792) along with his classmates Adam Seybert (M.D. 1793), John Redman Coxe (M.D. 1794), and Robert Hare. All vied in later years for the chemical chair at the School, and all became mineral collectors to one degree or another. Woodhouse won the first appointment in 1794.

Benjamin Silliman (1779–1864), one of his students, wrote that, "Our professor had not the gift of a lucid mind, nor of high reasoning powers, nor a fluent diction; still, we could understand him, and I soon began to interpret phenomena for myself and to anticipate the explanations." Nevertheless, Woodhouse's own efforts at mineral analysis were often flawed.

Woodhouse founded the Chemical Society of Philadelphia in 1792, with the purpose of providing mineral specimen analyses to the public free of charge. The Society met weekly in Woodhouse's laboratory, and received specimens from many areas of the country.

In the summer of 1809, Woodhouse died suddenly of a stroke at the age of 39. His mineral collection, including specimens acquired during a trip to London in 1802, were given to the American Philosophical Society. Coxe was given Woodhouse's chair at the School of Medicine, much to the disappointment of Hare and Seybert.

Adam Seybert (1773–1825)

Like many physicians before him, Adam Seybert (1773–1825) combined his medical studies with a growing interest in chemistry and mineralogy. Following the completion of his medical degree in Philadelphia in 1793, he pursued further studies in Edinburgh, London, Paris and Göttingen from 1793 to 1796. He then returned to America and tried medical practice for a couple of years, but was unsuccessful in establishing himself. He turned to pharmacy and the manufacture of chemicals, inventing a process for refining camphor which soon made him a wealthy man.

Seybert had brought back in 1796 a collection of minerals acquired during his stay in Göttingen. Because formal training in mineralogy, and well-identified study collections, were both rare in America, Seybert became Philadelphia's leading authority on the subject. And he continued to add newly collected American specimens to his cabinet, carefully recording the localities. "Experience has taught me," he wrote, "the utility of the present record of localities, for the places whence the specimens were brought are soon forgotten and thus the utility of them in great measure is lost."

His collection included specimens from Quebec, Mexico and South America. European specimens from Iceland, Bohemia, Saxony, England, Scotland, Germany, Italy and Spain were probably among those purchased in Göttingen. Somehow Seybert also managed to acquire 35 mineral specimens from Captain Lewis of the Lewis and Clark expedition.

In 1808 Seybert sent some minerals to another prominent collector, George Gibbs (1776–1833), who was about to leave on a trip to Europe. Seybert asked him to help establish a correspondence with the Parisian mineralogists Haüy and Delametherie. He also requested a set of Haüy's crystal models, a goniometer, and a range of other chemical equipment. Gibbs brought back the needed items later that same year.

Seybert had built a network of communication throughout the states for obtaining mineralogical specimens and information. In July of 1808 he put together the data he had gathered and published "A Catalogue of some American Minerals, which are found in different parts of the United States." The 40 specimens he described were all from his own cabinet.

Toward the end of his life Seybert gave up the pursuit of mineralogy. He devoted himself exclusively to the manufacture of cotton, and to serving as a congressman. In the summer of 1812 he sold his 2000-specimen mineral collection and the accompanying carefully prepared catalogs for $750 to the Philadelphia Academy of Natural Sciences, where they are preserved today.

Archibald Bruce (1777–1818)

Among David Hosack's students at Columbia College in 1794 was the young Archibald Bruce, who developed an interest in mineralogy after helping Hosack unpack his specimens. Bruce immediately began his own collection of minerals.

In 1798 he traveled to the University of Edinburgh to complete his medical studies. Mineralogy at that time was flourishing in Edinburgh, and Bruce gained more knowledge (and probably specimens) during his two years there.

In 1800, having completed his M.D., he treated himself to a mineralogical tour of Europe, visiting all the most prominent mineralogists and collectors in each city and trading them American specimens for European examples. He spent time with the two greatest collectors in London, Charles Greville (1749–1809) and the Count de Bournon (1751–1825), then visited the Abbé Haüy (1743–1822) in Paris. From there he passed through Switzerland and Italy, visiting Heinrich Struve (1772–1851) in Lausanne. Returning to London finally in 1805, he married a young



Bruce

woman whom he had met there. The couple returned to New York that same year, bringing his now extensive new mineral collection. His handsome cabinet, rich in European specimens, included "the chief part of the new metals and other late discoveries of the chemists."

In New York, Bruce began the task of building up his medical practice while continuing to enlarge his mineral collection. He became a focus for the gathering body of information on American minerals. In 1807 his expertise was formally recognized by his appointment as professor of mineralogy and materia medica at the College of Physicians and Surgeons. His circle of mineralogical friends broadened to include virtually all of the important American collectors and mineralogists of his day, including Samuel Latham Mitchell, Benjamin Silliman, George Gibbs, Robert Gilmor, Zaccheaus Collins, Adam Seybert and Parker Cleaveland as well as European contacts such as the Count de Bournon and the Abbé Haüy. In 1808 Bruce received a handsome selection of recently collected European minerals from Haüy.

Bruce had a number of single crystals in his collection, and he adopted Bournon's method of attaching a wax pedestal to each crystal which served also as a handle to facilitate examination. These were then stored in individual paper boxes or specimen trays. He prepared a small collection of such mounts for Zacchaeus Collins, including crystals of spinel, emerald, hyacinth, topaz, garnet, idocrase, cryolite, datolite, spodumene and other minerals.

Bruce had long dreamt of establishing an American journal of mineralogy along the lines of the French *Journal des Mines*, the publication of the Paris School of Mines. The time finally seemed right in 1810, with his extensive support network established; Bruce published the first issue of his *American Mineralogical Journal* in April of that year. It included field trip reports, locality descriptions, new species descriptions, chemical analyses, and reviews of recently published mineralogical literature. He kept it going until his health began to fail in 1814. Twenty-one Americans contributed 42 articles to the four issues that were published from 1810–1814.

Bruce died in 1818 of a stroke, at the age of 41. Not long afterward, his mineral collection was sold at public auction for $5,000. It was still in New York City as of 1859, but its whereabouts today are unknown.

George Gibbs (1776–1833)

George Gibbs was born in Newport, Rhode Island, the son of a wealthy merchant. Wishing that young George learn the mercantile business, his father sent him on a business trip to Canton, China, in 1796. On his return he passed through the academic centers of Europe, acquiring a strong interest in mineralogy. He studied in Paris, and especially in Lausanne under the well-known mineralogist Heinrich Struve.

Count Gregorii Razumovsky (1759–1837) was a Russian nobleman who had been living in Lausanne. He wrote a few minor papers on mineralogy and geology in Europe, and had formed a superb mineral collection. During the time of Gibbs' tutelage there, Struve no doubt introduced them to each other and Gibbs learned that Razumovsky would soon be returning to Russia, and wished first to sell his extensive collection. Razumovsky's minerals were predominantly from Russian localities, but he had also obtained many from Western Europe, over 6,000 specimens all together. Cost was no impediment to the wealthy Gibbs, and they closed the deal without delay.

Emboldened and excited by his magnificent new acquisition, Gibbs sought out other leads, and learned in 1804 that the enormous and excellent mineral collection of the late Jean Gigot d'Orcy (1733–1793), a victim of the Reign of Terror during the French Revolution, was to be auctioned off in Paris. Gibbs successfully acquired this second great collection as well, over 4,000 specimens.

Ownership of these extraordinary collections opened doors for Gibbs in Paris, where he soon became friends with the leading mineralogists and collectors. François Gillet de Laumont (1747–1834), J. F. d'Aubuisson, the expatriate Count de Bournon (1751–1825) and others developed warm and mutually helpful relationships with him which were to endure for many years after his return to America.

In the meantime Gibbs continued to acquire minerals, including "many rare and costly minerals" from the Count de Bournon, volcanic minerals from Italy and Germany, and many minerals "obtained by purchase or otherwise, here and there, from Saxony, Dauphine, etc." By 1805 these acquisitions had become so massive as to hinder Gibbs' freedom of movement, so he elected to oversee their safe transport back to Newport for secure storage before resuming his European travels.

The minerals were stored in crates in a warehouse near the Gibbs mansion in Newport. An inquisitive Benjamin Silliman, professor at Yale, prevailed upon Gibbs' sister to allow him to open a few of the crates in Gibbs' absence and get some idea of the quality of the specimens. He was duly impressed by what he saw, and upon Gibbs' return in 1807 the two became fast friends.

In 1811 Gibbs agreed to put some of his collection on exhibit at Yale, much to Silliman's joy. "It was a delightful recreation," Silliman later wrote, "to lift the covers and unroll the specimens which had been so long secluded from view, and when we turned out something superb we could hardly restrain our admiration." Despite the outbreak of the War of 1812, the exhibit of 10,000 specimens was opened to the public and soon became a popular tourist attraction, bringing national fame and new students to the college. Gibbs' collection was acknowledged by all as the best ever assembled in the country.

Gibbs eventually sold his entire 20,000-specimen collection to Yale in 1825, for $20,000. He continued to patronize the science, to assist students and researchers, and to support the activities of the local societies for many years. He died in 1833, admired by all as a man of culture, generosity and hospitality. His collections are still preserved at Yale, although most specimens are no longer individually identifiable as having been his.

THE END OF AN ERA

The period of our investigation in this history of early mineral collecting comes more or less to an end in 1799, by which time the foundations were in place, or nearly so, for the beginning of the modern era of mineralogy. Fossils had been distinguished from minerals, and Cronstedt had conceptually distinguished chemically homogeneous mineral species from rocks. Haüy and Romé de l'Isle had established the foundations of mathematical crystallography, and Berzelius and Werner the chemical basis for mineral classification. Chemical quantitative analysis had been pioneered by Klaproth, based on the fundamental principles established for the science of chemistry by Lavoisier and his colleagues.

Within the decade or two following 1799, further important advancements were made. Haüy refined his laws of crystal symmetry in 1801, and in 1809 Wollaston described the first reflecting goniometer that would prove essential to the precise investigation of crystal morphology which was to bloom in the 19th century. The polarization of light by doubly refracting minerals was discovered by Malus in 1808, opening the way to the development of optical crystallography. And Werner's last refinement of his mineral system, published posthumously in 1817, brought the total number of established mineral species to 317. Thus it was that the exact investigation of minerals had finally begun. As Franz von Kobell (1864) wrote:

> The mineralogist was no longer content with approximate descriptions of minerals, but strove rather to separate the essential facts from those that were accidental, to discover definite laws, and to learn the relations between the physical and chemical characteristics of a mineral.

In bringing to a close the story of the birth and development of mineral collecting through three centuries, it is worth taking a look at the situation which had developed by the end of that era. In addition to the advances in science and the flourishing role of the mineralogist himself as a scientific professional, there were two major aspects which directly benefitted mineral collectors and mineralogists: (1) the widespread availability of publicly accessible mineral collections, and (2) the emergence of various societies and periodicals devoted specifically to mineralogy. Neither of these factors existed before Agricola, and indeed mineralogy did not even qualify as a science before his time.

Public Mineral Museums

In our time one of the greatest benefits that society can offer to the mineral collector is access to large, intelligently assembled and well-identified public mineral collections. For the student and the novice, museum collections give a first awe-inspiring view of the broad scope and fascinating variety of the inorganic crystallizations which our earth has produced. This is a tremendous advantage over having to piece together the big picture from specimens personally acquired over time, or merely reading about them in more or less unillustrated books. It explains why, before the advent of public collections, naturalists and mineral collectors commonly devoted some years of their lives to traveling about Europe visiting as many *private* collectors as possible and studying their holdings. Only this, in combination with a study of the extant literature, could yield a useful education in mineralogy.

For most of the time period preceding 1799, it must be remembered, the notion of actually *analyzing* minerals in some way to identify their species was not much employed, even in universities. Minerals were identified, to a first approximation, by visual inspection alone. If they were suspected of containing precious metals they might then be submitted to an assayer; if thought to be precious gems they might be turned over to a professional lapidary. But, without an actual reference collection for study and comparison, it was almost impossible for a student or a scientist to learn how to identify minerals on his own.

Fortunately this problem was not lost on the educators or the nobility of many countries. In fact, monarchs came to realize in

the 18th century that a public well-informed about the appearance of valuable minerals and ores would be better able to make new discoveries of ore deposits, perhaps greatly enriching the country—and the Crown—thereby. It was also discovered by the nobility that establishing institutional collections for public betterment had the salutary effect of improving their own public image, and perhaps even making them beloved by their subjects (as happened with Empress Maria Theresa in Vienna). It was therefore in the ruler's personal best interest to provide public access to study collections of minerals.

Consequently, as the great universities took up the teaching of natural history, they also began developing study collections. At first the instructors used specimens from their personal collections to show in class but, as time went by, professorial collections were donated to the universities, outside naturalists contributed specimens, and the aristocracy donated their own collections, accumulated through generations of royal acquisitiveness. In time, most of the major institutions where science was taught had collections of minerals, plants and animals which were available for study by any student or visiting naturalist with a proper introduction.

Many monarchs took this concept a step further by establishing not just collections but schools and colleges devoted specifically to mining science and mineralogy. Thus were born the great mining academies in Schemnitz (1735), Potosí (1756), Kongsberg (1757), Prague (1763), Freiberg (1765), Berlin (1770), St. Petersburg (1773), Almadén (1777) and Mexico City (1792). In each case, public study collections were needed.

Mineralogists came to realize as well that their own scientific theories could be better promoted, preserved and spread among future students and the scientific community at large if they saw to the preservation of their working collections. Some even went so far as to prepare collections of specimens or (in the case of Romé de l'Isle and Haüy) crystal models for commercial distribution to institutions.

Private collectors also began to see that their own lifelong efforts at assembling an instructive collection of minerals would be lost if their collections were simply taken apart and scattered or (worse yet) discarded upon their death. The advent of permanent institutions with continuously curated collections offered the private collector a way of protecting and preserving the product of his labors long after his own death, and perhaps even immortalizing his name in some measure.

So it was in everyone's interest that institutional mineral collections should be established, nurtured and made accessible to the public. By the year 1799, the following institutions were among those which had minerals on exhibit or available for public study. This is surely just a partial list, but it gives some idea of the resources which had come to be available to anyone who wished to learn about minerals.

Table 3. **Public mineral museums and exhibits in 1799 (year of founding in parentheses)**

Almadén
Mining Academy (1777)
Amsterdam
Natural History Museum
Basle
Basle City Library
Berlin
Humboldt University (1770)
Royal Mining Academy (1770)
Bern
Bern City Library (<1733)
Bologna
University of Bologna
Brunswick
Natural History Museum (1754)
Brussels
Museum of Natural History
Buda
Piarist Secondary School
Cambridge (England)
Woodwardian Museum (1728)
Cambridge (Mass.)
Harvard College (1784)
Clausthal
Clausthal Lyceum
Copenhagen
University of Copenhagen (1770)
Dresden
Royal Museum (1728)
Dublin
Royal Dublin Society
Dublin
Trinity College
Natural History Museum (1792)
Edinburgh
University of Edinburgh
Freiberg
Mining Academy (1765)
Freiburg (in Breisgau)
University of Freiburg (1775)
Geneva
Natural History Museum
Glasgow
Hunterian Museum, University of Glasgow
Göttingen
University of Göttingen (<1798)
Gyulafehervar (Hungary)
The Batthyáneum
Haarlem
Teyler's Museum (1784)
Halle
Martin Luther University (1788)
Halle Orphanage
Hamburg
University of Hamburg
Jena
Mineralogical Society of Jena
Kassel
Collegium Carolinum
Museum Fridericianum (1779)
Kisujszallas (Hungary)
Calvinist Secondary School
Kongsberg
Mining Academy (1757)
Kremsmünster
Kremsmünster Monastery (1782)
Leiden
University of Leiden
London
British Museum (1753)
Linnean Society (1780's)
Lucerne
Lucerne Grammar School
Lund (Sweden)
University of Lund (ca. 1730)
Lyon
Academy of Science and Arts (1777)
Madrid
Museum of Natural Sciences (1752)
Marburg
Mineralogical Museum
Philipps University (1793)
Mexico City
School of Mines (1792)
Moscow
Academy of Science (1716)
Prospecting Institute (1755)
Nagyenyed (Hungary)
Museum of Natural History, Bethlen College
Transylvanian-Hungarian Linguistic Society

(Table 3 continued)

Newcastle
Hancock Museum

Oxford
Ashmolean Museum, Oxford University

Padua
Vallisneri Museum, University of Padua

Paris
Natural History Museum (1745)
School of Mines (1794)

Pavia
University of Pavia (1772)

Pest
Royal Hungarian University (1774)

Philadelphia
Peale's Museum

Pisa
University of Pisa

Prague
Prague Museum of Nature (1775)
Premonstratensian Monastery (1795)
Jesuit College in Klementinum (before 1747)
Schönfield Museum
Royal Bohemian Scientific Society (1770)
Technical University (1718)
School of Mines (1763)

Salzburg
Carolino Augusteum

Santiago de Compostela
University of Santiago de Compostela

Schemnitz
Mining Academy (1735)

Siena
Physiocratic Academy (1691)

St. Petersburg
Mining Institute (1773)

Stockholm
Mining College

The Hague
The Mauritshuis

Torino
University of Torino (1730)
Academy of Science (1759)

Tübingen
Tübingen University

Turku (Finland)
Turku Academy

Uppsala
University of Uppsala (1751)

Vienna
Royal Imperial Natural History Museum
University of Vienna

Weimar
Goethe National Museum (1780)

Würzburg
University of Würzburg

Zurich
Zurich Naturalists Society (1746)

Mineralogical Societies and Magazines

The 17th and 18th centuries saw the birth of numerous learned and scientific societies, including especially Britain's Royal Society (founded in 1662). Although mineralogy was commonly among the interests of these organizations, the scope of their activities generally spanned a broad spectrum of the sciences. It was not until the very end of the 18th century that societies devoted specifically to mineralogy arose. Although these each lasted only a few years, they were the precursors of more permanent institutions which have grown and survived to the present day. The early mineralogical societies, with memberships dominated more by mineral collectors and amateurs than by professional mineralogists, are evidence of the unprecedented popularity which mineral science had achieved, and the new level of public awareness on the subject.

In 1797 the first scientific society devoted exclusively to mineralogy was established through the efforts of Johann Georg Lenz (1748–1832) in Jena, Germany. Lenz, a student of Werner and the first professor of mineralogy at the University of Jena, joined with 18 other founding members and elected Count Domokos Teleki (an amateur) chairman. By 1801 the "Societät für die gesammte Mineralogie zu Jena" had grown to 595 members, attracting many of the most ardent and enthusiastic amateur and professional mineralogists and students in Europe. Well-known personalities, writers, aristocrats, physicians, clergymen, and politicians were included, but the majority were naturalists of one bent or another who shared a special interest in minerals. It is probably safe to speculate that nearly all of the members possessed mineral collections of their own, although the full membership lists and sufficient biographical data on all members have not survived. It is known, however, that 126 of the members were living in Jena at the time (many were probably students), and that 73 others were in Hungary, a number exceeded only by the German membership (Csíky, 1991b).

The British Mineralogical Society, founded in 1799, endured for only seven years but during that time was intensely active in the area of economic mineralogy. Its mission was to survey the nation's mineral resources. Weindling (1983) says:

> It had a national network of correspondents, although its activities were concentrated in London. Members were primarily apothecaries, chemists and pharmaceutical manufacturers, whose occupations involved mineral analysis.

These are some of the occupations typical of mineral collectors as well. Although some historians have considered the society to have served merely as a stepping stone to the formation of the Geological Society in 1807 (whose ranks also included great mineralogists and collectors, such as count Bournon), its focus on minerals rather than stratigraphy and paleontology was significant. Members included such well-known collectors as Wilson Lowry (1762–1824) and William Babington (1756–1833), and chemists such as Arthur Aikin (1773–1854) and Richard Phillips (1778–1851).

In 1799 a scientific society devoted specifically to "the investigation of the mineral and fossil bodies which compose the fabric of the globe" was founded in New York (noted in the *Medical Repository*, vol. 2, p. 114). The "American Mineralogical Society" was short-lived, and rather militaristic in the sense that it solicited especially information on American occurrences of (1) stones suitable for gun flints, (2) native sulfur, (3) saltpeter, and (4) lead ores, the raw mineral materials for firearms ammunition. Nevertheless, it was the first in America. Samuel Latham Mitchell (1764–1831) was elected the first president; Mitchell, along with Samuel M. Hopkins, George J. Warner, and other "early and zealous labourers, strove to arm every hand with a hammer, and every eye with a microscope" (Phillips, 1818).

The years around the turn of the century also marked the birth of journals and periodicals devoted specifically to minerals, often (but not always) as the products of early mineralogical societies. Before that time, mineralogist/collectors published their writings in less specialized vehicles, such as the *Philosophical Transactions*

of the Royal Society in London, the *Mémoires* of the Royal Academy of Science in Paris, and the *Annales de chimie et de physique* in Paris.* But by the close of the 18th century the need was being felt at last for magazines catering specifically to the growing *mineralculture*.

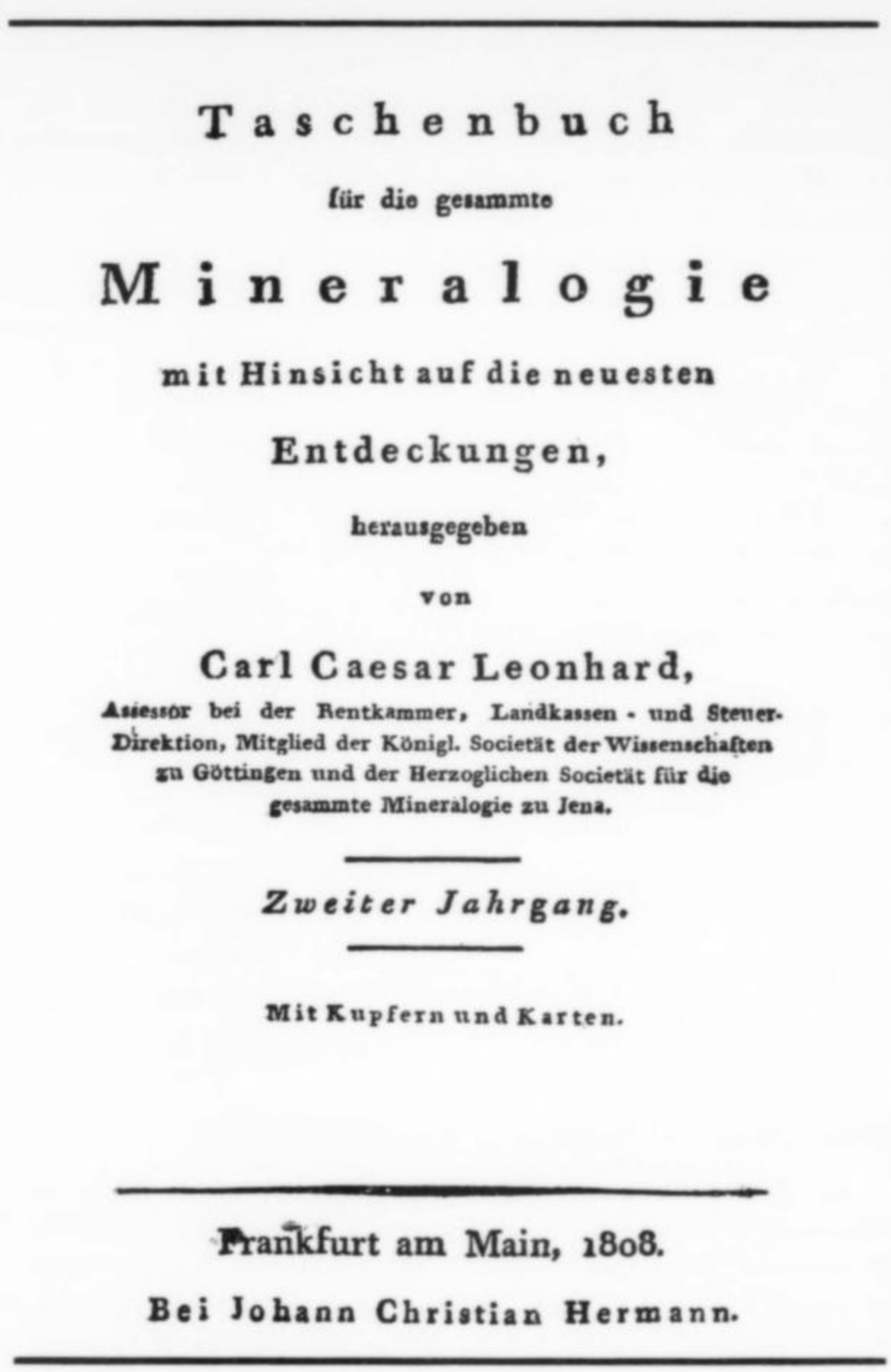
The earliest attempt at a mineralogical journal was the *Magazin für die Mineralogie und mineralogische Technologie*, published in Halle by Johann Hermann Pfingsten (1751–1798). Only two issues were published, in 1789 and 1790. The *Magazin für die gesammte Mineralogie, Geognosie und mineralogische Erdbeschreibung* was published in Leipzig in 1801 by Karl Ernst Adolf von Hoff (1771–1837), German director of the Ober-Consistorium in Gotha, and an enthusiastic mineral collector. It lasted for only four issues (one volume).

J. G. Lenz published the annals and journal of the Mineralogical Society of Jena (*Annalen der Societät für die gesammte Mineralogie zu Jena; Schriften der Herzoglichen Societät für die gesammte Mineralogie zu Jena*) beginning in 1802 and ending after six volumes in 1825.

Karl Ceasar von Leonhard (1779–1862) published his *Taschenbuch für die gesammte Mineralogie* (known popularly as "Leonhard's Taschenbuch") from 1807 to 1824, in 18 volumes. It included travel reports from corresponding mineral collectors, summaries of recent mineral analyses, reports on mineral localities, reviews and descriptions of important public and private mineral collections, death notices of mineral people, and even advertisements regarding mineral specimens and collections for sale. In short, it covered more or less the same range of subject matter seen in late-20th-century mineral collector magazines, albeit with very few illustrations of any kind.

Archibald Bruce's *American Mineralogical Journal* began in 1810 to serve the needs of American mineral collectors and mineralogists. Although it expired with its founder after a single volume, the concept was picked up in 1818 by Benjamin Silliman, who broadened it into the *The American Journal of Science, more especially of Mineralogy, Geology, and the Other Branches of Natural History*. "Silliman's Journal," as it was once known, survives today as a general-science professional journal nearing its 300th volume.

This is not to say that more general periodicals did not also continue to publish mineralogical news and research. *Nicholson's Journal*, the *Edinburgh Philosophical Journal*, the *Edinburgh Journal of Science*, the *Annales du Muséum d'Histoire Naturelle* in Paris, Gehlen's *Journal für die Chemie und Physik*, and the *Abhandlungen der Königlichen Akademie der Wissenschafen* in Berlin all carried mineralogy. But the more specialized mineralogical journals were now leading the way, supported by a broad spectrum of collectors and academics. Thanks in part to the enthusiasm and support of the amateur community of mineral collectors, the periodical literature of mineralogy had clearly become well-established at last.



Taschenbuch

für die gesammte

Mineralogie

mit Hinsicht auf die neuesten

Entdeckungen,

herausgegeben

von

Carl Caesar Leonhard,

Assessor bei der Rentkammer, Landkassen - und Steuer-Direktion, Mitglied der Königl. Societät der Wissenschaften zu Göttingen und der Herzoglichen Societät für die gesammte Mineralogie zu Jena.

Zweiter Jahrgang.

Mit Kupfern und Karten.

Frankfurt am Main, 1808.

Bei Johann Christian Hermann.

*Most late-18th-century journals open to the publication of mineralogical materials focussed primarily on mining science, medicine, chemistry and natural history; they included the following:

Johann Lempe's *Magazin für die Bergbaukunde* (Dresden, 1785–1799)

Alexander Köhler's *Bergmännisches Journal* (Freiberg, 1788–1793)

Neues Bergmännisches Journal (Freiberg, 1795–1804)

Annales de chimie et de Physique (Paris, founded by Lavoisier, Dietrich, Fourcroy and others in 1789)

Friedrich Gren's *Journal de Physik* (Halle, Dresden and Leipzig, 1790–1800)

Journal des Mines (Paris, founded by Haüy, Vauquelin, Brochant and others in 1794)

Johann Denso's *Monatliche Beiträge zur Naturkunde* (Berlin, 1752–1765)

Observations sur la Physique, sur l'Historie naturelle et sur les Arts (founded 1752 by Gautier d'Agoty, carried on later by Rozier, Mongez and Delametherie)

Johann Schröter's *Journal für die Liebhaber des Steinreichs und der Konchyliologie* (Weimar, 1774–1780)

Lorenz von Crell's chemical *Journal*, *Archiv* and *Annalen* (Lemgo, Leipzig, and Weimar, 1778–1779)

Ludwig Lichtenberg's *Magazin für den Neuesten aus der Physik und Naturgeschichte* (1781–1799)

Johann Voigt's *Magazin für den neuesten Zustand der Naturkunde* (Jena and Weimar, 1797–1806)

The Philosophical Magazine (founded 1789, London)

Philosophical Transactions of the Royal Society (London)

Mémoires de la Académie Royale des Sciences (Paris)

CONCLUSIONS

The passion for collecting minerals focused mineralogical studies in three major areas: the chemical analysis of minerals, the structure and physical properties of mineral crystals, and the rational classification of mineral substances. The progressive acquisition of knowledge in these areas jointly contributed to the founding of the science of mineralogy. (Greene and Burke, 1978)

The beginning of mineral collecting in the 16th century was therefore a necessary prerequisite to the development of the first systematic classification schemes for minerals. The critical importance of amateur mineralogists and the collections they assembled is a central theme of this study and can hardly be overemphasized. Peter Embry and Robert Symes (1987) of the British Museum have made the same observation:

> Mineralogy as a science, in common with other branches of natural history, owes an inestimable debt to the enthusiasm of amateur collectors; for it is nothing if not specimen-based, and our public museums would be poor things indeed had they not first been based on private collections. Much of their growth since then has been due to generous gifts or bequests, and to the purchase of whole or selected parts of private collections.

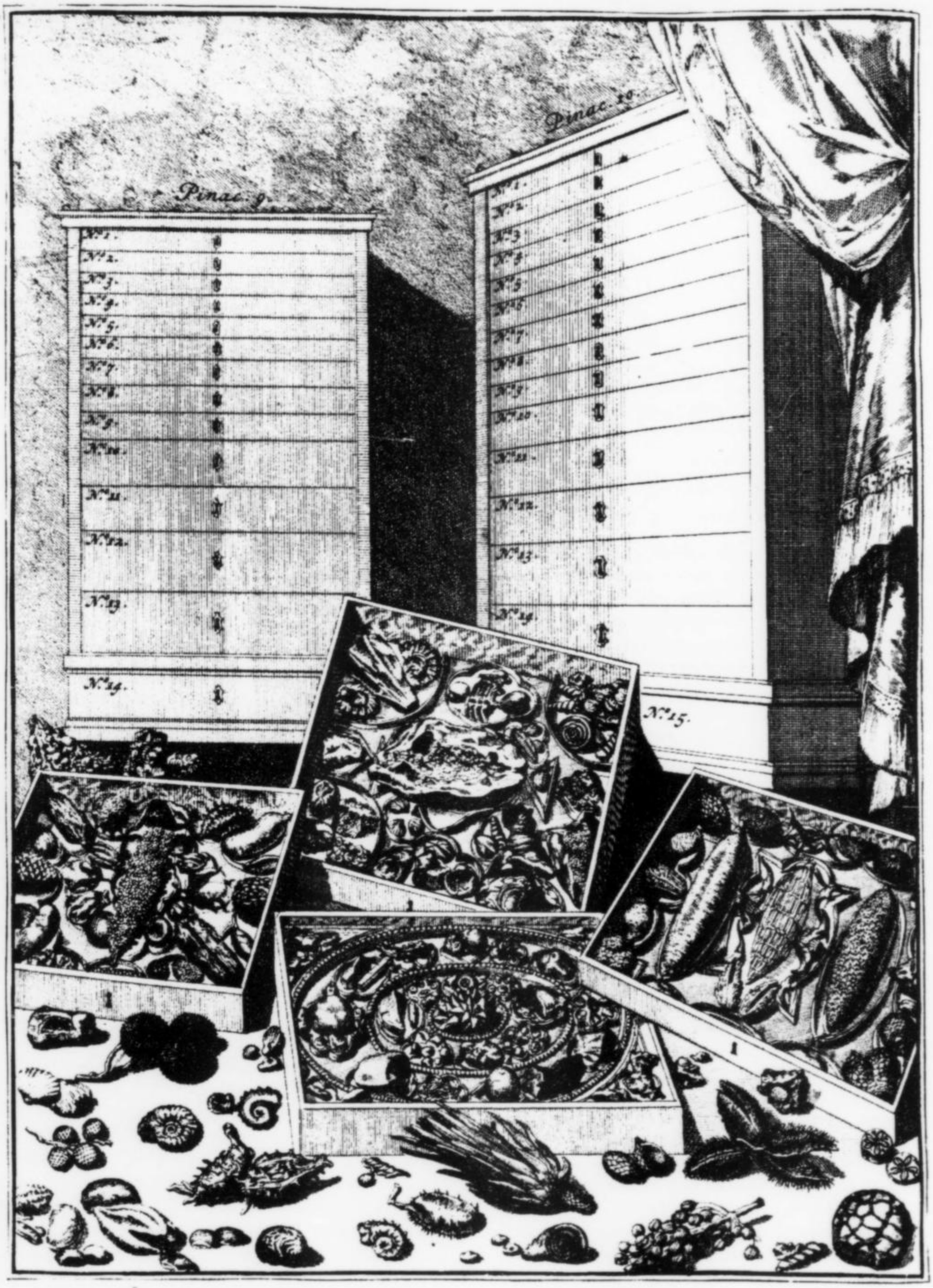
It is interesting to note that commerce in mineral specimens was already well-developed in the context of pharmaceuticals, and that specimen dealing contributed significantly to the very first collections on which the science of mineralogy was born. It is also worth emphasizing that the practice among German miners of collecting mineral specimens as keepsakes and heirlooms is older than science itself, and no doubt contributed greatly to those first historic collections which proved so important to the development of mineralogy and mining technology.

Perhaps the most striking observation that can be made from a study of the origins of mineral collecting is how little the basic process has changed. The first collectors field-collected, traded and purchased their specimens, took pride in them, showed them off to visiting like-minded enthusiasts, and stored them in cabinets and cases not significantly different from those used in all later centuries right up to the present day. The collections were studied by mineralogists and new species described beginning with Agricola himself. In his *De natura fossilium* he wrote:

> Some of these substances lack names, because previous writers have not mentioned them, and it will be necessary that I assign them new names. As a rule I will give them Greek names because they cannot be named so aptly in Latin.

Perhaps equally striking is the alarming vulnerability of mineral collections to the ravages of time. Illustrations of specimens from early collections, rendered on fragile paper, routinely outlive the specimens themselves. Countless thousands of fine mineral specimens which were lovingly collected, studied and preserved by early collectors are now lost, badly damaged or destroyed. The preservation and conservation of mineral specimens and their associated historical provenance is an uphill battle which every collector and curator must fight. And, as in the past, the publication of specimen illustrations will provide some insurance for future generations in case the original specimens are later lost or damaged.

The avocation and profession of mineralogy continue unabated in the 20th century. Despite over 400 years of accumulation and study, people are still finding new occurrences and new species of a beauty and fascination to rival anything in the past. And we are still learning new things about the nature of minerals. What is different, and what separates modern collectors from their early counterparts, is the vast mass of knowledge and literature built up over that time which is today available to any mineral collector. Thousands of books and journals have been published, and are easily accessible. Literally millions of specimens are preserved for study in museums, and millions more are in private collections or available for purchase from dealer stocks. Tens of thousands of specimens have been illustrated in the literature and thus may be studied by collectors worldwide. The study of the history of mineral collecting serves to remind modern collectors not only of their age-old traditions and their brotherhood with science, but of how fortunate people are in modern times to have so many benefits that were unavailable to the pioneers of mineral collecting.


Pinac. 9.
Pinac. 10.
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CENSUS OF MINERAL COLLECTORS
1530–1799

Following is an alphabetical listing of 1,200 early mineral collectors, including many not discussed in the previous chapters. This information was gathered from many sources, and is far from complete, but can nevertheless serve as a useful database and reference for mineralogical historians. I have endeavored, at least, to include all of the major names in the early history of mineral collecting. Mineral dealers are included as well, since virtually every dealer had to begin as a collector. However, people who primarily curated collections not their own are not included.

In many cases the collectors are known from having published collection catalogs. Often these were published within a year or two of the collectors' deaths, and probably served as official descriptions being utilized in the sale of the collections; some are clearly auction catalogs. The most comprehensive bibliographies of such catalogs are those by Gatterer (1798) and Freiesleben (1828). Unfortunately these catalogs are extremely rare, and some may no longer exist anywhere; in any case a number of them were unavailable for direct examination in this study, and we must take the word of Gatterer and Freiesleben that certain catalogs did indeed describe a significant number of mineral specimens (such lack of confirmation I have indicated by the words "considered to have included minerals"). In other works, however, the title makes it clear that minerals are included, or confirmation has been obtained through direct examination or from other references. A more recent work (Chalmers-Hunt, 1976) lists catalogs and contents of many early British auctions. The full titles of these numerous catalogs are given here in the Bibliography of Collection Catalogs which follows the Census.

Other than the above presumption that Gatterer and Freiesleben confirmed that minerals indeed formed a part of all the collection catalogs they list, very little has been assumed here. It is highly probable that most early mineralogists personally collected minerals to some extent, during some part of their lives; but unless a specific written reference to their mineral collection has been found, I have generally not included them on the list of early mineral collectors.

The scope of this survey involves American and European mineral collectors who were "active" in the year 1799 or before. Precise years of activity are rarely determinable, and so the cut-off is a bit ragged. In general, where the date of a collector's earliest activity is unknown, it is assumed (arbitrarily) that people born much past 1775 or so would not have had sufficient time to become active mineral collectors by 1799. In the case of posthumous collection catalogs, the cut-off date of around 1820 to 1825 seems reasonable to assure that most of these people had begun collecting by 1799.

[**NOTE:** Page numbers given are an index to the present publication, p. 1–155. For an interpretation of currency values see Table 2, p. 47. For an explanation of reference abbreviations see p. 229.]

ABILDGAARD, PETER CHRISTIAN (1740–1801), Danish veterinarian in Copenhagen, founder of the first Danish veterinary school in 1773. He was among the first to recognize the new mineral cryolite. His extensive mineral collection was purchased in 1800 by the Royal Danish Natural History Museum for 4,000 rigsdaler. *[Garboe, 1959; Noe-Nygaard, 1972]* [p. 47, 55]

ADANSON, MICHEL (1727–1806), French naturalist and traveler in Paris, member of the Royal Academy of Sciences. His collection covered all categories of natural history, and included many choice and rare specimens, especially from India. He sold it to the King of France around 1760, in exchange for a life annuity. *[Dezallier d'Argenville, 1767; Taton, 1986]*

ADLERHEIM, PEHR (1712–1789), Swedish Bergsrådet. He built a substantial mineral collection, some of which he sold or traded to S. G. Hermelin and G. von Engeström, but most of it was obtained by the mining college in Stockholm and is now in the Riksmuseet. *[Zenzén, 1921]*

ADOLPHUS FREDERICK (1710–1771; catalog *Museum Adolpho-Fridericianum* published in Uppsala, 1746), King of Sweden. His min-

eral collection, perhaps co-owned or merely inherited by his wife, Queen Louisa Ulrica (1720–1782), was acquired in 1804 by the University of Uppsala. *[Linné, 1777; Norin 1962; WBD; Per Nysten, personal communication]*

AGRICOLA, GEORGIUS (1494–1555), physician in St. Joachimsthal and Chemnitz, considered "the father of mineralogy," author of several important works including the famous *De Re Metallica* (1556). He is thought to have gathered a good collection of minerals from local mines and also from Europe, Asia and Africa. He might well be called "the father of mineral collecting" as well, considering that his may have been the first serious mineral collection in history. *[Prescher, 1955; Von Zittel, 1901]* [p. 19–21, 112]

ALBRECHT, JOHANN SEBASTIAN (1695–1774), German physician and naturalist in Coburg; professor of natural philosophy. His collection included minerals, figured stones, plants, insects etc. *[Neickelio, 1727; BUA]*

ALDROVANDI, ULISSE (1522–1605; catalog *Museum Metallicum*, 1648), of Bologna; Professor of Botany. His massive natural history collection, including minerals, was the most distinguished of the early Italian private museums. He bequeathed it to the city of Bologna in 1605. *[Burchard, 1986; Torrens, 1985]* [p. 19, 27–28]

ALEMANN, JOHANN AEGIDIUS von (ca. 1660–1719), Saxon physician and mining official. His mineral collection was acquired by the Royal Museum in Dresden *[Fischer, 1939]*

ALEXANDER PAVLOVICH (1777–1825; manuscript catalog dated 1803, St. Petersburg), Czar of Russia; he encouraged education and science. He gave many fine Russian-Siberian specimens to Caroline Louise von Baden. He also donated a substantial collection of Russian minerals, with a specially prepared catalog, to Friedrich Wilhelm III of Prussia in 1803; that collection is today preserved in the Humboldt University, Berlin. He donated the rest of his mineral collection to the St. Petersburg Mining Institute in 1801. *[Schenkenberg, 1842; WBD]* [p. 55, 125–126]

ALEXANDRA PAVLOVNA (1783–1801), Grand Duchess of Hungary, wife of Austrian Archduke Joseph, daughter of Czar Pavel Petrovich (1754–1801) and granddaughter of Catherine the Great. She had a systematic mineral collection of 514 specimens (317 of them from Russia) representing 250 localities, collected and organized by Pavel Olorovskiy. She also owned a 255-specimen study collection of minerals mainly from the Urals. Both collections were donated by her husband to the Royal Hungarian University (now Eötvös Lorand University) in Budapest in 1809. Many specimens, along with her two original catalogs, are still preserved. *[Papp, 1991]*

ALGAROTTI: see CORNIANI degli ALGAROTTI

ALLAMAND, J. N. S. (died 1787), Dutch professor of natural history at Leiden University, and first curator of the University's cabinet in 1751. He donated specimens from his personal mineral collection to fill gaps in the University collection. *[Brongersma, 1978]*

ALLAN, THOMAS (1777–1833), Edinburgh banker and mineral collector. He purchased Geisecke's first Greenland collection in 1808. Upon his death in 1833 the collection was sold to Robert Hyde Greg for £1,300. In 1860 the Allan-Greg mineral collection was acquired by Sir Arthur Russell and is now in the British Museum. *[Cleevely, 1983]* [p. 47]

AMERBACH, BASILIUS (1533–1591), Swiss jurist and art collector. His mineral collection was acquired in 1661 by the city of Basle and later the Naturhistorisches Museum, Basle. *[Burchard, 1986; Ackermann, 1985]*

AMES, JOSEPH (1689–1759; collection auctioned in London, 1760), secretary to the Society of Antiquaries, London, His small collection included minerals. *[Chalmers-Hunt, 1976]*

AMMANN, JOHANN CASPAR (1724–1811), Swiss mineralogist in Schauffenhausen. Thomas Pennant visited his collection in 1765, and described it as "rich in fossil shells and minerals." *[Pennant, 1948]*

ANDRASSY, _____, Count (fl. late 1700's), Hungarian aristocrat in Betlér castle. Count Andrassy had a family mineral collection kept at the castle; he kept only his iron minerals at his Vienna residence, but that sub-collection was nevertheless "very rich." *[Zipser, 1817b; Schenkenberg, 1842]*

ANDREOSSY, ANTOINE FRANÇOIS, Count (1761–1828), French military commander. He owned a "beautiful collection primarily of minerals" which was acquired after his death by the School of Mines in Paris. *[Schenkenberg, 1842; DBF]*

ANGERSTEIN, _____ (fl. late 1600's), British collector. His minerals were donated to the Ashmolean Museum and kept with Edward Lhuyd's specimens for a time. In 1760 they were removed and used to decorate the window sills of the museum. *[Gunther, 1925]*

ANKER, MATTHIAS JOSEPH (1771–1843), Austrian Professor of Mineralogy and curator at the Joanneum in Graz. He also maintained a personal collection of minerals and Miocene vertebrates. *[Zapfe, 1971]*

ANTON, KARL GOTTLOB von (1751–1818; catalog in ten volumes published in Oberlaufitz, 1780–1796), German historian and lawyer. Anton's mineral collection was cataloged by a private scientific society in Oberlaufitz, for distribution to its members. *[Freiesleben, 1828; Thomas, 1888]*

APARTADO: see FAGOAGA

ARCHENHOLTZ, MAXIMILIAN HEINRICH (1706–1789), of Stuttgart and Nassau. He built a 16,000-specimen collection of "minerals and petrifactions," and supplied mineral specimens to Caroline Louise von Baden. *[Mayer 1974b, 1976a]* [p. 46]

ASCH, GEORG, Baron von (ca. 1720–1807), German physician to Czar Peter III (1728–1762) and Czarina Katharina. He donated his large personal mineral collection to the University of Göttingen (his alma mater) in 1788. *[Burchard, 1986; Buchholz: "Die Göttinger Russland Sammlungen Georg von Asch," Giessen University Library]*

AUBERT, _____ (fl. 1780's), French sculptor, painter, gilder and varnisher to the king. He assembled in Paris a cabinet of natural history, including minerals, which Ferber (1789) ranked among the best in that city. A fine purple apatite of his was illustrated by Swebach Desfontaines (1790). *[Laissus, 1986]*

AUERSPERG, KARL JOHANN NEPOMUK ERNST JOSEPH, Count (1769–1829), of Bohemia. His "beautiful collection of minerals," kept at Schloss Hartenberg near Grossengrün, was eventually acquired by the National Museum in Prague. *[Wrany, 1896; Salomon, 1990]*

AUGUSTUS, Elector of Saxony (1526–1586). He founded in Dresden a royal *Kunstkammer* in 1560 which soon grew to include mineral specimens such as amethyst and emerald crystal groups and ore minerals from the Saxon mines. Much of the collection (the minerals) survives today in the Mineralogy and Geology Museum in Dresden. *[Quellmalz, 1967; Fischer, 1939]* [p. 28–29, 31]

AYLESFORD, LOUISE, Countess (1761–1832), English noblewoman. She built an extensive collection of minerals that was acquired upon her death, by the mineral dealer Henry Heuland. It was sold at auction in 1833–1839, the British Museum acquiring many specimens and the two-volume manuscript catalog. *[Cleevely, 1983; Chalmers-Hunt, 1976]* [p. 11, 88]

BAART, WILLEM (sale catalog published in Amsterdam, 1762). His collection included zoological specimens, shells, coral, petrifactions and minerals. *[Murray, 1904]*

BABINGTON, WILLIAM (1757–1833; Catalog 1795, 1799), Irish physician and mineralogist. He purchased the mineral collection of the Earl of Bute; his collection was later acquired by John St. Aubyn. *[Smith, 1978; DNB; DSB]* [p. 70, 71, 78, 79, 153]

BACH, _____ (fl. late 1700's), Abbot in St. Stefan's Church in Vienna. According to Baron Moll he possessed a small mineral collection. Schenkenberg also mentioned his collection. *[Moll, 1806; Schenkenberg, 1842]*

BADEN, CARL LUDWIG von (died 1818), Margrave, of Karlsruhe. He inherited the excellent mineral collection built by his mother, Caroline Louise von Baden, and added to it. In particular he received some fine Russian-Siberian mineral specimens from Czar Alexander I (1777–1823). Most of the collection was destroyed by bombing in 1942; the remainder is now in the Landessammlungen für Naturkunde in Karlsruhe. *[Burchard, 1986; Glas, 1988]*

BADEN, CAROLINE LOUISE, Margravine von (1721–1783), of Karlsruhe. She enlarged the natural history and mineral collections of the Margraves (marquis) of Baden. Many fine Austro-Hungarian speci-

mens, given by Empress Maria Theresa (1717–1780) were included. Most of the collection was destroyed by bombing in 1942; the remainder, along with subsequently acquired specimens, is now in the Landessammlungen für Naturkunde, Museum am Friedrichplatz, Karlsruhe. *[Burchard, 1986]* [p. 98–99]

BÄHR, _____, German Finance Officer in Köthen. He purchased the ore collection of Fr. W. von Leysser some time between 1806 and 1826. *[Freiesleben, 1828; Schenkenberg, 1842]*

BAIER, JOHANN JAKOB (1677–1735; catalog published in Nuremberg, 1730), Swiss naturalist in Altdorf, and fifth President of the Royal Society (London). He spent much time and money forming a private museum of medical curiosities, coins, shells and minerals. It was transferred in 1805 to the University of Erfert. *[Murray, 1904]*

BAILEY, G. (collection auctioned in London, 1799), of Piccadilly, London. His collection (452 lots) included minerals, shells, fossils, birds and insects. *[Chalmers-Hunt, 1976]*

BAILLOU, Ritter JOHANN von (1679–1758; catalog published in Lucca, 1746), Florentine naturalist. His extensive natural history collection, 30,000 minerals, rocks and shells, was among the world's largest. It was purchased in 1748 by the Emperor Franz Stefan I, who moved the collection to Vienna and retained von Baillou as its curator. Upon the Emperor's death in 1765, Empress Maria Theresa presented the collection to the state and opened it to the public. Today it is in the Naturhistorisches Museum in Vienna. *[Burchard, 1986; Niedermayr, 1989; Zapfe, 1971]* [p. 46, 101, 103, 104, 124]

BAKER, HENRY (1698–1774), British naturalist and poet, FSA, FRS, author of works on natural science. His collection of minerals, fossils and insects (255 lots) was auctioned in 1775. *[DNB; Chalmers-Hunt, 1976]*

BAKEWELL, ROBERT (1768–1843), English geological consultant, author of *Introduction to Mineralogy* (1819). His mineral and rock collections were sold at auction in 1844, current whereabouts unknown. *[Cleevely, 1983]* [p. 85]

BALDASSARRI, GUISEPPE (1704–1785), Italian professor of chemistry and natural history at the University of Siena, and president of the Physiocratic Academy from 1772 to 1784. He began building a systematic collection of minerals and rocks probably during the years 1750–1759. *[Ricci, 1972; Guasparri, 1991]*

BALFOUR, (Sir) ANDREW (1630–1694; catalog *Musei Balfouriani* published in Edinburgh, 1697), Scottish collector. His collection is considered to have included minerals. It was bequeathed to Robert Sibbald. *[MacGregor, 1985; Gatterer, 1798; DNB]* [p. 41, 89]

BALMAT, JACQUES (1762–1834), French mountain guide in Chamonix, specializing in geological excursions. He kept a stock of mineral specimens which he sold to visiting scholars, and spent his free time prospecting for gold. *[Schenkenberg, 1842; DBF]*

BANDEVILLE, MARIE-ANNE-CATHERINE BIGOT de GRAVERON (died 1787), "Madame la Présidente," French collector in Paris. Her "superb cabinet" was much admired by Dezallier d'Argenville (1767) and Thiéry (1783). Thomas Pennant visited her in 1765 and admired her cabinets with roll-back doors. Her collection included minerals, rocks, birds, shells and corals, many of them very rare. Following her death, it passed to the Abbé Gruel in 1792, then was later purchased by Prince Masséna and, later, in 1840 by Baron Benjamin Delessert. *[Taton, 1986 ; DBF]*

BANKS, (Rt. Hon. Sir) JOSEPH (1743–1820), English botanist and collector, President of the Royal Society. On a trip to Iceland in 1772 he acquired "a store of curiosities" including many mineral specimens, one of which he loaned for illustration purposes to James Sowerby (1804). He owned lead mines in Derbyshire, and exchanged mineral specimens with Philip Rashleigh. His personal library included 580 books on geology, mineralogy and paleontology. *[Sarjeant, 1980; Carter, 1988]* [p. 56, 73, 79]

BARBERI, _____ (catalog *Musaeum Barberianum* published in Rome, 1657). His collection is considered to have included minerals. *[Gatterer, 1798]*

BARCIGLI, _____ (fl. late 1700's), Austrian or Italian (?) mineral dealer from whom Austrian Emperor Francis I purchased specimens. *[Stütz, 1807]*

BARGRAVE, JOHN (1610–1680), British traveler and canon at Canterbury. His small natural history collection, which survives more or less intact, is said to have contained some minerals. *[Price, 1989; Sturdy and Henig, 1983]*

BARING, DANIEL EBERHARD (1690–1753; catalog of his museum published in Lemgo, 1744), German collector in Hildesheim and Lauenstein. His collection was a *Raritätenkammer* (cabinet of rarities) of Braunschweig-Lüneburg specimens. *[Gatterer, 1798; ADB]*

BARKER, (Sir) ROBERT (collection auctioned in London, 1792), British collector. His small collection consisted exclusively of minerals and shells. *[Chalmers-Hunt, 1976]*

BARTALINI, BIAGIO (1750?–1822), Italian professor of botany and natural history at the University of Siena. During the 1790's he collected 5,974 mineral specimens which were purchased by the University for 250 scudi in 1826. *[Ferri and Miraldi, 1992a]* [p. 46]

BARTHOLIN, THOMAS (1616–1680), Danish physician and naturalist in Copenhagen. He built a collection of anatomical and natural history specimens, including minerals, for use by his students in the mid-1650's. It was probably merged with the university's natural history museum in 1657, and destroyed by fire in 1728. *[Garboe, 1959]*

BARTLETT, E. (Hon.), American jurist and son of Josiah Bartlett (1729–1795), signer of the Declaration of Independence. He is known to have collected minerals, and sent specimens for identification to his brother Levi (also a mineral collector). *[Conklin, 1991]*

BARTLETT, LEVI (1763–1828), American physician in New Hampshire, son of Josiah Bartlett (a signer of the Declaration of Independence). His collection of small mounted crystals in a wooden chest of drawers, along with his Wollaston-type goniometer made by Cary in London, survives intact in the Herbert Obodda collection. Bartlett was an active field collector and had a substantial collection of local rocks and minerals. *[Conklin, 1991]*

BARTON, BENJAMIN SMITH (1766–1815), American physician and naturalist. He bought Silvain Godon's mineral collection at auction in 1812, outbidding the Philadelphia Academy of Natural Science. He also inherited the mineral collections of his father (in 1780) and elder brother. Upon his death, his collection was purchased for the Academy by Joseph Watson. *[Greene and Burke, 1978; Greene, 1969; Barton, 1816; CAB]* [p. 145]

BARTON, (Rev.) MONTAGUE (fl. 1795–1819), British vicar in Broadclyst, Devonshire. Philip Rashleigh reports acquiring specimens from him. *[Russell, 1952]* [p. 74]

BARTON, (Rev.) THOMAS (1730–1780), tutor at the College of Philadelphia, and rector of St. James Church in Lancaster, Pennsylvania, for nearly 20 years. He was deeply interested in science, especially mineralogy, and built a mineral collection which ultimately was inherited by his son, Benjamin Smith Barton (1766–1815). *[CAB; Barton, 1816]* [p. 145]

BARTRAM, JOHN (1699–1777), Philadelphia naturalist. He founded a botanical garden in 1730, and was a collector of rocks and minerals. *[Greene and Burke, 1978; Sarjeant, 1980; WBD; CAB]* [p. 144–145]

BASSET, FRANCIS, Lord de DUNSTANVILLE (1757–1835), British "Mineral Lord" of many mines including Dolcoath in the Camborne district, Cornwall. Philip Rashleigh acquired mineral specimens from him. *[Russell*, 1952]

BATTHYANY, IGNAC, Count (1741–1798), Transylvanian bishop in Gyulafehérvar and an enthusiastic collector. He founded the "Battyáneum" with his rich library, antiquities, minerals, rocks and fossils. *[Csíky, 1991a; Szakáll, 1991]*

BAUERSACHS, CH. FRIEDRICH (fl. 1790–1820), German mining assayer in Clausthal. His comprehensive collection of minerals was purchased in 1821 by the Technical University in Clausthal. *[Müller and Strauss, 1991]*

BAUHIN, JEAN (or JOHANN) (1541–1613), French botanist in Basle, Switzerland, and for many years physician to Duke Frederick of Würtemberg. He built extensive botanical gardens and herbaria, and collected minerals in the Alps with Gesner and others. Many of his specimens are pictured in his *Historia novi et admirabilis fontis* (1598), one of only two illustrated mineralogical works to appear in the 16th

century. *[DSB; BUA; NDB; ADB; Arber, 1953; Fuchs-Eckert, 1977]* [p. 35–36]

BAUT de RASMON, _____ (fl. 1780's), naturalist in Ghent. He spent many years building a collection which embraced all aspects of natural history. *[Burtin, 1784]*

BAYEN, PIERRE (1725–1798), French chemist and pharmacist, in Paris. Ferber (1789) lists him among the city's more notable mineral collectors, and says he had some (but not many) French specimens. *[DSB]*

BAYER, _____, Swiss professor and physician in Altdorf. His collection consisted of minerals and other *naturalia* plus coins and art objects. *[Neickelio, 1727]*

BAYER, MATTHÄUS (fl. 1720's), German proprietor of a mercantile business in Ulm. His extensive collections consisted mostly of artworks but also included botanical and zoological specimens, "extra rare minerals," figured stones, medals and coins. *[Neickelio, 1727]*

BAYLY, G. (died ca. 1799), British collector of minerals, fossils, shells, birds and insects in Piccadilly, London. His collection was auctioned posthumously in 1799. *[Chalmers-Hunt, 1976]*

BAYREUTH, _____, Prince von (catalog published in Erlangen, 1762–1764). His collection, a *Naturalienkabinet*, is considered to have included minerals. *[Gatterer, 1798]*

BEAUCLERK, (The Hon.) TOPHAM (1739–1780; collection auctioned in London, 1780), British judge and F.R.S. His collection included minerals. He also had a library of 30,000 volumes, much of it scientific, which was auctioned in 1781. *[Chalmers-Hunt, 1976; DNB]*

BEAUMONT, JOHN (died 1731), British geologist and surgeon in Bristol. He wrote letters to the Royal Society about crystallizations at the lead mines of the Mendip Hills. His collection of curiosities included minerals. *[Price, 1989; DNB]*

BECCELER, _____ (catalog *Rariora Becceleriana* published in Hamburg, 1684). His collection is considered to have included minerals. *[Gatterer, 1798]*

BEEKE, HENRY D. D. (1751–1837), Regius Professor of Modern History at Oxford. His mineral collection was acquired by Oxford University in 1851. *[Cleevely, 1983]*

BÉL, MATYAS (1684–1749), Hungarian schoolmaster at Besztercebánya and Pozsony, Lutheran minister, geographer, historian and naturalist. His natural history collection included minerals. *[Tasnadi Kubacska, 1940]*

BELLAMY, CLEMENT (died ca. 1810), British collector of minerals and fossils. His collection was auctioned posthumously in London in 1810. *[Chalmers-Hunt, 1976]*

BELLEVUE: see FLEURIAU de BELLEVUE

BENKÖ, FERENC (1745–1816), Hungarian Calvinist minister at Bethlen College in Nagyenyed, scientific writer, member of the Mineralogical Society of Jena. In his systematic mineralogy of Hungary (*Magyar Mineralogia*, 1786) he identified with an asterisk all minerals represented in his own 2,120-specimen collection. The collection passed to the College, but most of it was destroyed during the revolt of 1848. *[Vita, 1986; Csíky, 1991c]* [p. 110–111]

BENKÖ, JOZSEF (1740–1814), Hungarian Calvinist minister and professor of theology in Középajta and Köpec. He built a collection of minerals. *[Ernyey, 1932]*

BENTHAM, (Sir) SAMUEL (1757–1831), British naval architect and engineer; he traveled in Russia and Siberia collecting specimens. Philip Rashleigh obtained some minerals from him. *[Russell, 1952]* [p. 74]

BENTINCK: see PORTLAND, Duchess of

BENTINCK, _____ (Count) (died ca. 1815), British aristocrat and collector of minerals and shells. His collection was auctioned posthumously in 1815. *[Chalmers-Hunt, 1976]*

BENTINCK, WILLEM, Count (1745–1774), Dutch Lord of Rhoon and Pendrecht, and a Trustee of Leiden University. In 1751 he handed over to the University his collection of minerals and other objects of natural history, thereby establishing the school's cabinet. *[Brongersma, 1978]* [p. 117]

BÉOST: see VARENNES de BÉOST

BERGMAN, TORBERN OLAF (1735–1784), Swedish chemist and mineralogist. He donated his personal collection of 3,900 mineral specimens to the University of Uppsala. *[Burchard, 1986]* [p. 133]

BERNAT: see DEGELMANN

BERNHARDT, JOHANN JAKOB von (1774–1850), German Professor of Medicine in Erfurt and Director of the Botanical Gardens. His mineral collection was admired by Schenkenberg (1842) for its "excellent crystals." *[ADB]*

BERNON, LEONARD (catalog published in Paris, 1670). His collection of curiosities, mainly from the Indies, Egypt and Ethiopia, is considered to have included minerals. *[Gatterer, 1798]*

BERNOULLI, H. (1745–1829), Swiss collector. His mineral collection was acquired by the Naturhistorisches Museum in Basle. *[Burchard, 1986]*

BEROLDINGEN, FRANZ CÖLESTIN KARL JOSEPH, Baron von (1740–1798), Swiss ecclesiastic in Hanover. He traveled throughout Europe and amassed a mineral collection of 14,000 specimens. It was sold to the British Museum by his nephew in 1816. In 1880 the museum staff culled it down, discarding several thousand specimens. *[Cleevely, 1983]* [p. 46, 120–121]

BEROLDINGEN, JOSEPH ANTON SIGISMUND von (1738–1816), Swiss cleric, brother of Franz Cölestin von Beroldingen. He supplied Caroline Louise von Baden with mineral and fossil specimens. His collection was purchased by Moritz Lechner in Vienna; it passed to his son Adolf and was sold to the American mineral dealers Alvin and Ray Schortmann in 1955. The collection was dispersed over several years, especially to American museums such as Harvard and the U.S. National Museum. *[Mayer, 1974a; Burghardt, 1950; Smith, 1991]* [p. 120]

BEROLDINGEN, JOSEPH IGLASE, Count von (born ca. 1760's), Württemburg Minister in London, and the nephew of Franz Cölestin von Beroldingen (1740–1798). He inherited his uncle's extensive mineral collection, and held it for 18 years before selling it in 1816 to the British Museum. A two-volume manuscript catalog survives with it. *[Smith, 1969]*

BERTIN, HENRI LÉONARD JEAN BAPTISTE (1719–1792), French Minister and Secretary of State in Paris. A specimen from his mineral collection is illustrated in Gautier d'Agoty's *Histoire Naturelle* (1781). Romé de l'Isle (1783) and Thiéry (1783) also make note of his collection. *[Thomas, 1888]* [p. 49, 50, 53]

BERTRAND, ELIE (1712–1790; catalog published in Bern, 1763, 1775), Swiss geologist and clergyman. He had a private collection, which included minerals. Bertrand's specimens were apparently the ones used to illustrate Casimir Christoph Schmiedel's *Erz Stufen und Bergarten* (1753–1771). He donated French specimens to the Museum of Natural History in Paris. *[Gatterer, 1798; Leonard et al., 1817; Linné, 1777; Schenkenberg, 1842]* [p. 121]

BERZELIUS, JÖNS JAKOB (1779–1848), Swedish chemist. He presented specimens of berzelianite, yttrocerite and other recently discovered Swedish minerals from his collection to the British Museum in 1817. He sent a great many specimens over a 30-year period to Haüy in Paris and gave specimens to the University of Göttingen. *[Fletcher, 1904; Schubnel, 1987; Jorpes, 1966]* [p. 135]

BESLER, BASIL (1561–1629; catalog published in 1606 and 1622), noted herbalist of Nuremberg. He assembled a "marvelous cabinet of rare and precious things," including minerals, which he bequeathed to his nephew Michael Rupertus Besler, who continued to build it. *[Gatterer, 1798; Kuhner and Rizzo, 1980; BUA]*

BESLER, MICHAEL RUPERT (1607–1661; catalog *Gazophylacium rerum naturalium e regno . . . minerali* published 1642; *Rariora musei Besleriani* in 1716, 1733), physician in Nuremberg. He inherited the marvelous cabinet of rarities begun by his uncle, Basil Besler, and enlarged it. *[Kuhner and Rizzo, 1980]*

BESNIER DE LA PONTONNERIE, _____, Assayer Général of the French mint in Paris. Two specimens from his collection are illustrated in Gautier d'Agoty's *Histoire Naturelle* (1781). Dezallier d'Argenville (1780) and Thiéry (1783) also make note of his collection. [p. 53]

BESSON, ALEXANDRE CHARLES (1725–1809), French naturalist and Inspector of Mines in Paris. Patrin (1803) illustrates nine specimens from his mineral collection. Ferber (1789) praised his collection as one

of the greatest, most important and most instructive in Paris, and devoted six pages to a listing of his best pieces. *[Laissus, 1986; Thiéry, 1783]* [p. 53]

BETHLEN, GERGELY, Count (fl. 1790's), Transylvanian general superintendant and naturalist. He donated his collection of 2,000 mineral specimens to Bethlen college in 1796. *[Csíky, 1991c; Vita, 1986]*

BEUTH, FRANCIS (catalog published in Düsseldorf, 1776), German collector in Düsseldorf, who specialized in minerals ("fossilium"). *[Cobres, 1782]*

BEYER, AUGUST (1680?–1759?; catalog undated, ca. 1760), Royal Mining Commissioner and for 56 years a mine surveyor in Freiberg, Saxony. His collection of numerous metallic ore specimens was built up over a 60-year period, beginning before 1700. *[Freiesleben, 1828]*

BEYER, G. W. (fl. 1720's), German physician in Cahla. His natural history collection included minerals, druses, curious stones, shells, insects, birds and anatomical preparations. *[Neickelio, 1727]*

BIEHLER, JOHANN HEINRICH (1633–1698; catalog *Biehler's Erzstufen-Collection* published in Dresden, 1735), German mine superintendant ("Oberzehendner"). His collection consisted of 3,536 ore specimens from Saxony. *[Gatterer, 1798; Freiesleben, 1828]*

BIELKE, NILS ADAM, Count (1724–1792), President of the mining college in Stockholm from 1782 to 1789. He was an enthusiastic mineral collector. In 1785 he donated 150 specimens to the Swedish Academy of Science, but the bulk of his colleciton he gave to the Ådelfors Goldworks in Småland. In 1801 his widow, with government approval, had the collection transferred to the Stora Mining Company in Falun, where it is still preserved. It consists of about 7,000 specimens in eight cabinets (seven of which are original), including several drawers of fine native silvers, many native golds and gold-containing minerals. *[Zenzén, 1921; Kjellberg, 1895]* [p. 46, 135]

BIENENFELD, _____ von (fl. 1790's), Austrian banker in Vienna. He competed with the Emperor for the purchase of choice specimens, not only those which were most beautiful but also the largest in size. To this end he spent much money, but his collection was considered "incomplete" because not every species could be found in such large examples. But the big pieces were admired as uniquely instructive. Among his best specimens were a large Siberian beryl, a large meionite group from Vesuvius, a large proustite/pyrargyrite from the Harz, and silver from "Spanish America." *[Moll, 1806]* [p. 103]

BIGGE, CHARLES WILLIAM (1773–1849), English County Magistrate, Lt. Colonel, Vice President of the Natural History Society of Northumberland, in Newcastle. His mineral collection was donated to the Hancock Museum in 1830. *[Davis and Brewer, 1986]*

BIGOT de GRAVERON: see BANDEVILLE

BILLARDERIE: see D'ANGIVILLER

BINDHEIM, JOHANN JACOB (1740–1825), German chemist and mineralogist in Berlin, and, for a time, Professor in Moscow. His mineral collection is noted by Schenkenberg (1842).

BIRCH, ANDREAS (1716–1763), Danish "Royal Mineral Inspector" and mineral collector. He exhibited part of his collection at a meeting of the Royal Scientific Society in 1752. It was sold at auction following his death. Some of his specimens are now in the Geologisk Museum in Copenhagen, perhaps having come via the Royal Cabinet of Curiosities. Kongsberg silvers and Icelandic zeolites were included. *[Garboe, 1959; Noe-Nygaard, 1972]*

BISCARI, _____, Prince of (catalog of his *Gabinetto d'historia naturale* published in Florence, 1777), Italian nobleman. His natural history collection is considered to have included minerals. *[Gatterer, 1798]*

BLANCKLEY, _____ (died ca. 1766), British apothecary in London. His collection of minerals, fossils and shells was auctioned posthumously in 1766. *[Chalmers-Hunt, 1976]*

BLANK, JOSEPH BONAVITA (1740–1827; catalog published in Bamberg and Würzburg, 1810), German Professor of Natural History in Würzburg. In 1803 he left his extensive collection of minerals and art, 28,710 pieces, to the University of Würzburg. *[Burchard, 1986; Leonhard et al., 1817; ADB]* [p. 46, 92]

BLAVIER, JEAN (1764–1828), French engineer, mines administrator and amateur mineralogist. He donated a suite of mineral specimens to the Paris Museum of Natural History. *[Schenkenberg, 1842; DBF]*

BLIXENSTIERNA, THOMAS (1711–1753), Swedish mining assessor. His mineral collection formed the oldest part of the Stockholm mining college mineral cabinet, now in the Riksmuseet. *[Zenzén, 1921]*

BLOCK, PETER LUDWIG HEINRICH, Baron von (1764–1818?; auction catalog published in Dresden, 1818), German Privy Councillor and Inspector of the "Green Vaults" at Dresden. He built a natural history collection of birds, insects and minerals, later acquired by the Royal Museum in Dresden. *[Fischer, 1939; Freiesleben, 1828]*

BLÖDE, KARL AUGUST (1773–1820), German chemist and Finance Commissioner. He built a large mineral collection, some of which was acquired by the Royal Museum in Dresden, and some was purchased by Harvard University in 1820. *[Fischer, 1939; Frondel, 1970]*

BLUMENBACH, JOHANN FRIEDRICH (1752–1840), Professor at the University of Göttingen. His collection of minerals is referred to in Adam Seybert's catalog of 1808. He donated specimens to the University of Göttingen. *[Greene and Burke, 1978; Sarjeant, 1980; Burchard, 1986; Schenkenberg, 1842]*

BOCK, JOHANN GEORG CHRISTOPH (catalog published in Hamburg, 1774). He had a collection of minerals, shells and other objects of nature. *[Gatterer, 1798]*

BOERHAAVE, [probably HERMANN, 1668–1738; Dutch chemist, physician and scientist] (collection auctioned in London, 1750). His collection, as auctioned, contained 81 lots of mineral specimens and 118 shells. William Borlase reports having been asked to assemble a collection of Cornish minerals for him. *[Chalmers-Hunt, 1976; Borlase, 1758]* [p. 68, 117]

BOETIUS de BOODT, ANSELMUS (ca. 1550–1632), Belgian physician and mineralogist. He began his mineral collection while physician to the burgrave of Prague in the 1580's. In 1604 he was appointed physician to Emperor Rudolf II, and in addition served as curator to the emperor's own extensive mineral collection. Under Rudolf's influence he began writing his *magnum opus* on minerals (*Gemmarum et Lapidum Historia*) in 1604, and saw the first edition published in 1609. Upon his death de Boodt left his mineral collection, books, instruments and paintings to his next of kin. *[Hubicki, 1978]*

BOLZA, _____; Italian (?) collector. Romé de l'Isle (1783) refers to his mineral cabinet.

BOMARE: see VALMONT de BOMARE

BONANUS, PROCOPIUS POLYCARPUS (died 1663 or 1664), Italian (?) Doctor of Philosophy, Law, Medicine and Theology; Chief Physician for the mines of Hungary (from 1657). He built a personal mineral collection presumably rich in Hungarian specimens. *[Ernyey, 1912]*

BOND, BENJAMIN (collection auctioned in London, 1788), British collector in Clapham, Surrey. His collection included minerals, shells and exotic birds. *[Chalmers-Hunt, 1976]*

BONNIER de la MOSSON, JOSEPH (1702–1744; catalogs published in Paris, 1737, 1744), French bailiff and Captain of the Hunt to Varenne des Thuilleries; Treasurer General for the State of Languedoc. He built a very large collection of natural history, including minerals. It was eventually acquired by the Natural History Museum in Paris. *[Pinault, 1991; Turner, 1985; Bourdier, 1959; Laissus, 1986; Schubnel, 1987]* [p. 61]

BONPLAND, AIMÉ JACQUES GOUJAUD (1773–1858), French traveler and naturalist in Paris. He donated suites of mineral specimens from Paraguay, Central America and France to the Natural History Museum in Paris. *[Schenkenberg, 1842; BUA; DBF]*

BONSAING, _____ (fl. 1790's), Austrian chemist and pharmacist in Vienna. His mineral collection is mentioned by Fitzinger (1856).

BOODT: see BOETIUS de BOODT

BORLASE, (Rev.) WILLIAM (1696–1772), physician and Rector of Ludgvan, Cornwall. He assembled a considerable collection of minerals and fossils which was given to Oxford University in 1758, but little of it has survived. A few minerals given to Thomas Pennant are still identifiable in the British Museum. A volume of original drawings of his minerals (dated 1759) survives in the Bodleian Library (MS Ashmole 1824). *[Smith, 1978; Cleevely, 1983; Pool, 1986; DNB]* [p. 68–69, 70–71, 81]

BORN, IGNAZ EDLER von (1742–1791; catalog published in Prague,

1772, 1775), Hungarian mineralogist and paleontologist, prominent freemason, head of the Royal Imperial Natural History Collection in Vienna (from 1776). He built a fine collection of 3,592 minerals, 288 rocks and 714 fossils which was purchased by Charles Greville for £1,000 and, with Greville's own collection, was acquired by the British Museum of Natural History in 1810. He also assembled the mineral collection of the Archduchess Maria Anna, and the mineral collection of Eleanor de Raab was "formed chiefly by the donations from Mr. Born." *[Cleevely, 1983; Zapfe, 1971; Townson, 1797; Estner, 1795; Molnár and Weiss, 1986]* [p. 47, 75, 102, 106–107]

BOSC de la CALMETTE, ———, Colonel (collection auctioned in London, 1778), Dutch military man from Maestricht. His large natural history collection (1843 lots) included minerals, fossils, shells, corals, reptiles and fish. *[Chalmers-Hunt, 1976]*

BOUCHER, FRANÇOIS (1704–1770; catalog published in Paris, 1771), prominent French painter to the King in Paris. He had a "glass armoire richly filled with corals, minerals, rocks, etc., each of which is beautiful." *[Dezallier d'Argenville, 1767; Gatterer, 1798; BUA]*

BOUDON de ST. AMANS, JEAN FLORIMOND (1748–1831), French naturalist, archeologist and Professor of Natural History in Agen. Schenkenberg (1842) recommended his mineral collection as worth seeing.

BOULTER, DANIEL (catalog published in London ca. 1793), British merchant in Yarmouth, dealing in silverware, jewelry, cutlery, toys, books, coins, medals, antiquities and natural curiosities including minerals. He built an extensive museum of curiosities, beginning around 1774, which was open to the public for an admission fee of one shilling; many minerals were on exhibit.

BOULTON, MATTHEW (1728–1809), English manufacturer and engineer; partner of James Watt. The mineral species later named witherite was noticed in his collection by William Withering and described in 1784. He was a member, along with Josiah Wedgwood, John Whitehurst, Benjamin Franklin and others, of the Lunar Society. His collection still survives in his house near Birmingham (now a museum of sorts), although it is in need of some restoration. *[DNB; M. P. Cooper, personal communication]*

BOURBON: see CONDÉ; see FERDINAND

BOURBON, ——— (Duke de) (died ca. 1815), French aristocrat, possibly a refugee from the Revolution, in London. His collection of minerals (119 lots), fossils, shells, coral and birds was auctioned posthumously in London in 1815; the auction catalog ran to 67 pages. *[Chalmers-Hunt, 1976]*

BOURGUET, LOUIS (1678–1742), Swiss naturalist in Zurich; author of *Traité de Petrifactions* (1742) and a treatise on halite crystals. He supplied 121 mineral specimens to John Woodward. *[Price, 1989]*

BOURNON, JACQUES de (born ca.1730), chevalier, French aristocrat, Lord of Gras and of Retonfey, near Metz; father of Jacques Louis, Count de Bournon (1751–1825). He built a large mineral collection at the family chateau which inspired the mineralogical interests of his more prominent son. *[Burke, 1970; Morembert, 1954; BUA; NBG]* [p. 56]

BOURNON, JACQUES LOUIS, Count de (1751–1825; catalog published in London, 1813, 1817), French crystallographer and mineralogist. He lost his first mineral collection when he fled to England during the French Revolution, but he built a second collection there which he later sold to French King Louis XVIII (becoming its Director). This second collection consisted of 22,881 specimens, nearly half of which were single crystals. In 1825 the collection was divided between the College de France and the French National Museum of Natural History (Jardine des Plantes). *[Schubnel, 1987; Burke, 1970; Morembert, 1954; BUA; NBG; Conklin, 1991]* [p. 46, 56–58, 63, 78, 79, 81, 150, 153]

BOVE: see CAZE de la BOVE

BOWDOIN, JAMES III (1752–1811), American merchant and diplomat in Massachusetts. He purchased a collection of minerals from René Just Haüy in 1806, while posted in Paris, and a collection from William Maclure in that same year. His collection, 623 specimens, was bequeathed to Bowdoin College. *[Burbank, 1988]*

BOYLE, ROBERT (1627–1691), British physicist and chemist, founding member of the Royal Society. Upon his death he bequeathed his collection of ores and mineral specimens to the Royal Society; this repository deteriorated greatly before its transfer to the British Museum in 1781, and none of the specimens can now be located. *[Pilkington, 1959; Wilson, 1991b]* [p. 64, 67]

BOZENHARD, ——— (died ca. 1780; sale catalog published in Augsburg, 1780), German collector. His collection, acquired in part from D. Schmid in 1768, included minerals, plants, animals, artworks and books. It was sold off piecemeal in 1780. *[Cobres, 1782]*

BRAAM, A. E. van (collection auctioned in London, 1799), Chief Director of the Dutch East India Company. His collection of minerals numbered 60 lots. *[Chalmers-Hunt, 1976]*

BRACKENHOFFER, ÉLIE (1618–1682; catalog published in Strasbourg, 1677), French bibliophile in Strasbourg. His museum included many minerals. *[Gatterer, 1798; Romé de l'Isle, 1783; DBF]*

BRADT, DAVID EBERHARD (died 1793), Secretary of Mining in Copenhagen. He owned a select collection of minerals. *[Garboe, 1959]*

BRANDER, GUSTAVUS (1720–1787), London merchant and antiquary, director of the Bank of England for many years, a Fellow of the Royal Society, and a curator at the British Museum. He had a "grand collection of minerals, fossils and petrifactions," some of which he exchanged with Pedro Dávila in Paris ca. 1754. *[Amorós, 1963; DNB]* [p. 88]

BREE, MARTIN (died after 1808), British collector of minerals and shells, which were auctioned in London in 1808. *[Chalmers-Hunt, 1976]*

BREISLAK, SCIPIONE (1748–1826), Italian geologist and mineralogist. He devoted himself at an early age to the natural sciences, and over his long life built a mineralogical cabinet which "excited the admiration of all amateurs who have seen it, and of the Emperor himself." He bequeathed this collection to "the illustrious house of Borromeus" [Vitaliano Borromeo in Milan, whose descendant, Giberto Borromeo, donated it to the Natural History Museum of Milan in 1913]. *[Silliman, 1827]* [p. 122]

BRENNER, ELIAS (fl. early 1700's), Swedish mineral collector who began his collection in the early 1700's. It was acquired by the mining college in Stockholm, now the Riksmuseet. *[Zenzén, 1921]*

BREYNE, JOHANN PHILIPP (1680–1764; catalog published in Danzig, 1765), German naturalist. He owned a *Naturalienkabiniet* considered to have included minerals. Some of his specimens were found in the Dorpat Museum in 1940. *[Gatterer, 1798; Cleevely, 1983]*

BRIDGER, ——— (fl. <1725), American mineral collector. He supplied mineral specimens from New England to John Woodward. *[Woodward, 1729; Frondel, 1971]*

BRIGHT, RICHARD (1754–1840), English merchant, banker and mineral collector in Bristol. He specialized in Cornish specimens. The collection passed to his son, then his grandson, but was left behind when the family residence was sold in 1870. Lord Ashburnham asked the British Museum to salvage the specimens in 1873. *[Cleevely, 1983]* [p. 88]

BROCHANT de VILLIERS, ANDRÉ JEAN FRANÇOIS MARIE (1772–1840), French geologist and mineralogist; Professor at the Paris School of Mines, and Inspector General of the mines of France. He donated many mineral specimens to the School of Mines. He had a beautiful cabinet of minerals, including specimens from Bex, Tarantaise, Hungary, Scotland, England and the Pyrenees. *[Schenkenberg, 1842; Mitchell, 1978; DSB]*

BROMELL, MAGNUS von (1679–1731), Swedish physician and mineralogist. He inherited Olof Bromell's mineral collection and added to it while a member of the Royal Mining College. His son inherited the collection and ultimately it was acquired by the University of Uppsala. *[DSB; Zenzén, 1921]*

BROMELL, OLOF (1639–1705; catalog published in Göteborg, 1698), Swedish physician and botanist. His collection of minerals was bequeathed to his son, Magnus von Bromell. *[Gatterer, 1798; BUA; DSB]*

BRONGNIART, ALEXANDRE (1778–1847), Professor of Mineralogy at the National Museum of Natural History (Jardine des Plantes), Paris. He assembled his own working mineral collection but donated it to the Museum after publishing his *Traité de Minéralogie* (1807). *[Schubnel, 1987]* [p. 55]

BROOKE, HENRY JAMES (1771–1857), British mineralogist and crys-

tallographer. His mineral collection was given to Cambridge University in 1857 by his son. It still survives there, in good condition, and contains many exquisite well-crystallized miniatures. *[Cleevely, 1983; M. P. Cooper, personal communication]* [p. 79]

BROWALLIUS, JOHAN (1707–1755), of Turku, Finland. His private mineral collection was purchased by the Turku Academy, where it was later destroyed in the Great Fire of Turku in 1827. He had planned to write a catalog of the Academy's 3,000-specimen mineral collection, but was prevented by an early death at the age of 48. *[Klinge et al., 1987]*

BROWN, RICHARD (1736–1816), British sculptor, marble worker and mineral dealer in Derby. He inspired his son-in-law, John Mawe, to become a dealer in minerals and shells as well. Collectors such as Faujas de St. Fond, Philip Rashleigh, Josiah Wedgwood and Erasmus Darwin are known to have obtained mineral specimens from Brown in the 1780's and 1790's. His son, Richard Brown III, joined him in the family business. *[Torrens, 1993]* [p. 83]

BROWNE, EDWARD (1644–1708), personal physician to the English King Charles II. On a trip through Hungary in 1669–1670 he gathered together an excellent collection of minerals which he brought back with him to England. *[Browne, 1673]* [p. 87]

BRUCE, ARCHIBALD (1777–1818), American mineralogist and physician. He took up mineralogy while at Columbia College under David Hosack, ca. 1794. He collected American minerals while still a student, and using these as trading material he later built a valuable European mineral collection while touring Europe in 1800–1805. Not long after his death his collection was sold at auction for $5,000. *[Greene and Burke, 1978; Silliman, 1819; Hosack, 1822]* [p. 149–150]

BRUCKENTHAL, MICHAEL, Baron (1746–1813), Hungarian administrator in Hermanstadt, Transylvania. He inherited his father Samuel's magnificent private museum of minerals and art in 1803, and bequeathed it to his own son who opened it to the public in 1817. The museum remained family property until the extinction of the male line in 1872, following which it passed to the local Lutheran secondary school which today maintains it as a public museum. *[Benkö, 1800; Esmark, 1798; Clarke, 1808; Sestini, 1815; Csíky, 1991a; ADB]*

BRUCKENTHAL, SAMUEL, Baron (1721–1803), Hungarian statesman, Governor of Transylvania. He built a personal museum rich in mineral specimens and artworks at his palace in Nagyszeben. His minerals consisted principally of Transylvanian gold specimens, but also included native silver, an extraordinary Transylvanian cinnabar, and many others. Upon his death it passed to his son, Michael. *[Benkö, 1800; Esmark, 1798; Clarke, 1808; Sestini, 1815; Csíky, 1991a; ADB]*

BRÜCKMANN, FRANZ ERNST (1697–1753; catalog published in Wölfenbuttel, 1742), German physician in Wolfenbüttel and Braunschweig. He formed a 1,000-specimen personal museum of natural history, including mineralogy. *[Murray, 1904; Neickelio, 1727]*

BRÜCKMANN, URBAN FRIEDRICH BENEDICT (1728–1812; catalog published in 1814), Professor of Anatomy and Surgery in Braunschweig. The catalog of his extensive mineral collection ran to 432 pages. *[ADB; Fischer, 1939]*

BRÜNNICH, MORTEN THRANE (1737–1827), Danish theologian, Professor of Natural History and Economy at the University of Copenhagen, and Director for many years of the silver mines at Kongsberg, Norway. His mineral collection went first to the Kongsberg Mining Academy; from there about a third of his specimens were purchased by the University of Copenhagen (for 1,500 rigsdaler) and two-thirds went to the University of Christiania (now Oslo). His original catalogs list 1,452 entries, some consisting of up to a dozen specimens. *[Burchard, 1986; Cleevely, 1983; Garboe, 1959; Kjerulf, 1881; G. Raade, personal communication]* [p. 130–131]

BRUUN de NEERGAARD: see NEERGAARD

BRYDGES: see GRENVILLE, RICHARD

BRYMER, (Rev.) D. (fl. middle 1700's), British cleric at Wadham College. He donated a small collection of Yorkshire minerals and other specimens to Oxford around 1760; all are now lost. *[Gunther, 1925]*

BUCH, CHRISTIAN LEOPOLD von (1774–1853), German geologist, among the greatest of his time, in Berlin. His mineral collection was acquired some years before his death by the University in Berlin. *[Schenkenberg, 1842; ADB]*

BUCHELAY: see SAVALETE de BUCHELAY

BÜCHNER, [probably ANDREA ELIAS 1701–1769] (catalog published in Halle, 1771). His *Naturalienkabinet* is considered to have included minerals. *[Gatterer, 1798; ABD]*

BUCKHOLZ, GEORG (1688–1737), German Lutheran minister, naturalist and schoolmaster in Nagypalugya and Késmárk. He collected both minerals and fossils; the fossils were donated to the Electoral collection in Dresden. *[Tasnádi Kubacska, 1940; Szinnyey, 1891–1914; Neickelio, 1727; BUA]*

BUDDLE, JOHN (1773–1843), English mining engineer, colliery manager and pioneer in mine safety who worked with Humphrey Davy on the safety lamp. He collected mineral specimens for W. Hutton (1797–1860) and also built a collection for himself. His minerals, rocks and fossils were donated to the Hancock Museum some time before his death. *[Davis and Brewer, 1986; DNB]*

BULKLEY, EDWARD (fl. 1690–1724), British collector. He supplied 96 mineral and fossil specimens to John Woodward in 1690–1724. *[Price, 1989]*

BURMAN, JOHAN WILHELM; early Swedish Bergsrådet and mineral collector. His collection was large but of relatively low quality. It was obtained by the Stockholm mining college (now the Riksmuseet). *[Zenzén, 1921]*

BURTON, PHILIP (collection auctioned in London, 1792), British collector. His small collection included minerals, shells and fossils. *[Chalmers-Hunt, 1976]*

BUSS, _____ (catalog of the *Bussischen Sammlung* published in Berlin, 1767). He had a collection of shells and minerals. *[Gatterer, 1798]*

BUSTAMENTE, ANASTASIO (1780–1853), Mexican general and naturalist. He sent specimens to the Natural History Museum in Paris in 1825, including samples of a new mineral later described and named bustamite. *[Schubnel, 1987]*

BUTE, JOHN STUART, third Earl of (1713–1792; catalog published in London, 1795), Scottish aristocrat and politician in Bedfordshire; unpopular Prime Minister in London. He was the patron of John Hill, who assisted in acquiring mineral specimens for him. The collection was later "arranged" for him by William Babington, and ultimately purchased by Babington at auction, following the Earl's death, in 1793. It is reputed to have numbered as many as 100,000 mineral specimens. Hill called it "the greatest in existence," and G. B. Greenough referred to it in 1838 as "the finest, perhaps, which at that time existed in England." It was ultimately broken up, acquired in part by William Babington and later John St. Aubyn. *[Embrey and Symes, 1887; Smith, 1978; Rousseau, 1982; Cleevely, 1983; DNB]* [p. 46, 69–70, 80, 81]

BYRD, WILLIAM (1652–1704), English settler in Virginia. He corresponded with John Woodward and sent him specimens. *[Price, 1989; DAB]*

BYTEMEISTER, JOHANN HENRICH (1698–1746; catalog published in Helmstedt, 1731, and a second edition as an auction catalog in 1735), Professor of Theology in Helmstedt. His natural history collection is considered to have included minerals. *[Gatterer, 1798; BUA.]*

CALABRITO: see LIGNIVILLE

CALDECOT, _____ (collection auctioned in London, 1762), British surgeon and antiquary in Peterborough. His small collection included minerals. *[Chalmers-Hunt, 1976]*

CALMETTE: see BOSC de la CALMETTE

CALONNE, CHARLES ALEXANDRE de (1734–1802; sale catalog published in London, 1797), French statesman and Controller General of Finances in Paris. His extensive museum, sold at auction in 1801, contained 3,037 lots of shells, corals, minerals, birds, etc. The bulk of the minerals were purchased by Count Golovkin in Moscow. However, many mineral specimens were sold by Calonne before 1789 to B. G. Sage; these became the foundation for the mineral collection at the Paris School of Mines. *[Ferber, 1789; Murray, 1904; Chalmers-Hunt, 1976; Wagner, 1818]* [p. 127]

CALVET, ESPRIT CLAUDE FRANÇOIS (1728–1810), French physician at Avignon. He assembled large collections of coins, minerals and plants, all of which he bequeathed to the town of Avignon, where they remain today in the Musée Calvet. *[Murray, 1904]*

CALZOLARI, FRANCESCO Sr. (1521–1606), Italian pharmacist in

Verona. He built an extensive collection of minerals, fossils, animals and plants which was famous throughout Europe. It was briefly illustrated in a catalog of 1584, and later in a voluminous work of 1622, the completion of which was overseen by his grandson, Francesco Calzolari Jr. *[Gatterer, 1798; Accordi, 1977]* [p. 19, 25–27]

CAMPE, HEINRICH WILHELM (catalog published in Leipzig, 1827), German merchant. His collection, which had incorporated those of the German *Kammerrath* Trier, the engraver Capieur, and the Professors Gilbert and Rosenmüller, was rich in Saxon specimens. *[Freiesleben, 1828]*

CANAL, JOSEF MALABAILA, Count (1745–1826), Bohemian aristocrat and military man, in Prague. His extensive natural history collection was well-known for its minerals. *[Wrany, 1896]*

CANCRIN, GEORG, Count (1774–1845), German-Russian financier and statesman. He donated mineral specimens from his collection to Austrian Archduke Johann (1782–1859), for the "Joanneum" (now the Styrian Provincial Museum) in Graz. *[Burchard, 1986]*

CAPIEUR, _____ (died before 1827), German copperplate engraver. His collection of minerals was acquired, following his death, by H. W. Campe. *[Freiesleben, 1828]*

CAPPEL, JOACHIM DIETRICH (1707–1784), German pharmacist, moved to Copenhagen in 1747. His natural history collection included "wonderful chalcedonies" from the Faroe Islands. It was sold at auction following his death; some of the minerals were purchased by the University of Copenhagen. *[Garboe, 1959; Noe-Nygaard, 1972]*

CAPPELER, MORITZ ANTON (1685–1769), Swiss physician and naturalist in Lucerne. He gave part of his collection of rare quartz crystal specimens to Sir Hans Sloane, whose collection later established the foundation of the British Museum. *[Weber, 1923]* [p. 120]

CARANGEOT, ARNOULD (1742–1806), French crystallographer who, while a student of Romé de l'Isle, invented the contact goniometer and discovered the law of the constancy of interfacial angles. A specimen of his is pictured by Gautier d'Agoty (1781). His collection of minerals was crystallographically based, but he also owned some shells. *[Burke, 1966; Burtin, 1784]* [p. 53, 57]

CARDANO, GEROLLAMO (1501–1576), famous Italian collector in Milan whose museum is said to have been "rich in minerals." *[Aimi et al., 1985; DBI]*

CAREW, (Rt. Hon.) REGINALD POLE (1753–1835), British judge, Member of Parliament and Fellow of the Royal Society. He supplied mineral specimens to Philip Rashleigh. *[Russell, 1952]*

CARL, Landgrave von HESSE-KASSEL (1656–1730) in Kassel. He expanded the hereditary *Kunsthaus*, providing one entire room for the mineral collection (*Mineralienzimmer*). *[Dreier, 1985]* [p. 94]

CARL LUDWIG: see BADEN

CARLOS III, King of Spain (1716–1788). His natural history cabinet contained many minerals from the Spanish colonies in South America. In 1771 he purchased the collection of Pedro Dávila. It is now a part of the National Museum of Natural Sciences, Madrid. *[Burchard, 1986]* [p. 136, 139–140]

CARLOS IV, King of Spain (1748–1819), son of Carlos III. He worked to enlarge the mineral collection begun by his father, employing the English mineral dealer A. J. Forster (1739–1806) to serve as his buying agent. He also granted Forster an exclusive concession to operate the sulfur mine at Cadiz for specimens. *[Russell, 1950; WBD]* [p. 75]

CAROLINE LOUISE: see BADEN

CAROSI, JAN FILIP (1744–1799), Italian naturalist and mineralogist who spent his career in Poland; Director of all Polish mines and curator of the Royal Natural History cabinet. His personal mineral collection, seen by Macquart (1789), contained "a great quantity of curious specimens." *[Sarjeant, 1980]*

CATHERINE II, "The Great" [EKATERINA ALEKSEEVNA, originally SOPHIA AUGUSTA FREDERICA von ANHALT-ZERBST] (1729–1796), German-born Empress of Russia. She purchased the valuable natural history collection of Peter Simon Pallas, and kept a cabinet of minerals at her Winter Palace. She donated some specimens to the King of France. In 1916 the mineral collection was transferred from the palace to the Gornogo Museum by order of Empress Alexandra I. *[Schubnel, 1987]* [p. 61, 125–126]

CAVENDISH, GEORGIANA, Duchess of Devonshire (1757–1806; manuscript catalog dated 1804), English aristocrat and socialite in Chatsworth. She collected minerals to the extent of filling two large cabinets, in part through the purchase of specimens from the mineral dealer White Watson. Her specialties included Cornish, Derbyshire and Scottish minerals. The collection is still preserved in Chatsworth. *[Watson, 1811]* [p. 67, 85, 88]

CAZE de la BOVE, GASPARD LOUIS, Baron (1740–1824) French administrator (Intendant du Brittany et Dauphiné) in Paris. He built a natural history collection which included minerals. Specimens were illustrated by Gautier d'Agoty (1781) and Swebach Desfontaines (1790). *[Laissus, 1986; DBF]* [p. 53, 62, 63]

CEDERBAUM, PETER CHRISTOPHER (1733–1795), Swedish mineral collector. His collection was acquired by the Riksmuseet, Stockholm. *[Zenzén, 1930]*

CHAIS, _____ (catalog published in Amsterdam, 1766), Dutch collector of shells and minerals. *[Cobres, 1782]*

CHANDOS: see GRENVILLE, RICHARD

CHAPPE D'AUTEROCHE, JEAN (1722–1769), French Abbé and astronomer. He collected minerals in Russia in 1761, bringing back 160 specimens from the Urals, the Ekaterinburg gold mines, and the Solikamskaya and Souxon copper mines. His specimens were acquired by the King's Cabinet in Paris. *[Chappe d'Auteroche, 1770; Schubnel, 1987]* [p. 128]

CHARLES ALEXANDER (1712–1780; catalog published in Brussels, 1781), Prince of Lorraine, Governor General of the Low Countries, brother-in-law of Empress Maria Theresa. Thomas Pennant admired his "very fine collection of minerals, fossils and petrifactions" at his residence in Brussels. His extensive collection of 4,480 mineral and rock specimens included 650 specimens of copper minerals, 354 gold specimens, 135 silver-containing minerals and 257 lead ores. It was sold in 1781, a portion becoming the nucleus for the collection in what is today the Belgian Institute of Natural History in Brussels. *[M. Deliens, personal communication; WBD; Pennant, 1948]* [p. 46, 114–115]

CHARLES, Duke of Brunswick (1713–1780), German aristocrat. The ducal art and natural history collection was first opened to the public in 1754, and a few years later a separate natural history museum including minerals was established. The specimens were eventually acquired by the Technical University of Brunswick, but were destroyed by Allied bombing in 1944. *[Burchard, 1986]*

CHARLES: See also CARLOS and KARL

CHARLES XIII (1748–1818), King of Sweden, second son of Adolphus Frederick and younger brother of Gustavis III. His mineral collection, perhaps obtained in part from his parents and brother, was acquired by the University of Uppsala in 1804. *[Norin, 1962; BUA]*

CHARLETON: see COURTEN

CHARLOTTE SOPHIA (1744–1818), Queen of England, wife of George III. She requested (through Ann Harris, Master of the Household) a collection of Cornish minerals from William Borlase; he sent her 83 specimens of pyrite, quartz, actinolite, steatite, and a variety of copper, tin, lead and iron minerals. This collection is still in the possession of the Royal Family. *[Pool, 1986]* [p. 69, 88]

CHARPENTIER, JOHANN FRIEDRICH WILHELM TOUSSAINT von (1728–1805), German mineralogist and author (e.g. *Zur mineralogischen Geographie der kursächsischen Länder*). His personal mineral collection was acquired by Baron G. A. von Erlach and later became part of collection of the Natural History Museum in Bern. *[ADB; H. A. Stalder, personal communication]* [p. 100]

CHEMNITZ, JOHANN HIERONYMUS (1730–1800), German rector at the Garnison Church in Copenhagen. He built a collection of shells, minerals and other natural history objects including specimens from Iceland. Its disposition is unknown. *[Garboe, 1959]*

CHICHESTER, _____, Marquis of Donegall (collection auctioned in London, 1800), British aristocrat in Leicestershire. His collection consisted of 440 mineral lots and 110 lots of shells, corals and fossils. *[Chalmers-Hunt, 1976]*

CHILDREN, JOHN GEORGE (1777–1852), English chemist and mineralogist in London. He traveled to Spain, collecting specimens at Almaden, which he later gave to the Royal Institution (two of which

were illustrated in Sowerby's *Exotic Mineralogy* in 1811). He was later employed by the British Museum from 1816 to 1840. *[DNB; Gunther, 1978]* [p. 86]

CHRISTIAN ALBRECHT (1641–1694; catalog published in Schleswig, 1666), Duke of Schleswig at Gottorp; founded the University of Kiel in 1665. His cabinet of curiosities, gathered in part from political and scientific embassies in Russia and Persia, is considered to have included minerals. *[ADB]*

CHRISTIAN I (died 1591), Elector of Saxony and son of August (1526–1586), founder of the electoral kunstkammer in Dresden. He inherited his father's collection, including minerals, in 1586. *[Fischer, 1939]*

CHRISTIAN II (died 1611), Elector of Saxony and son of Christian I. He inherited the electoral kunstkammer founded by his grandfather. *[Fischer, 1939]*

CHRISTIAN V (1646–1699; catalog published in Copenhagen, 1696), King of Denmark and Norway. His collection of *naturalia* is said to have included minerals. *[Gatterer, 1798]*

CHRISTIAN VII (1749–1808) King of Denmark. He donated mineral specimens to the University of Göttingen, and also to the King's Cabinet in Paris. *[Burchard, 1986; Schubnel, 1987]* [p. 61, 62]

CHRISTIAN VIII (1786–1848), King of Denmark. He began collecting minerals at the age of seven; his first collection was destroyed by fire in 1794. His second collection, begun around 1800, numbered 2,300 mineral specimens plus additional rocks and fossils; following his death it was given to the University of Copenhagen. *[Garboe, 1959]* [p. 129]

CHRISTOPHERSSON, ANDERS (died 1804), Swedish physician. His 10,000-specimen mineral collection was the largest private collection in Sweden and, although somewhat less numerous than the mining college collection, was considered superior in quality and mineralogical value. It has been speculated that his collection was purchased by the Danish collector Tönnes Neergaard in Paris. *[Zenzén, 1921]* [p. 46, 135]

CLARKE, (Rev. Dr.) EDWARD DANIEL (1769–1822), Cambridge Professor of Mineralogy. He traveled widely, collecting minerals wherever possible. His mineral collection was purchased by Cambridge University in 1823 for £1,500. *[Cleevely, 1983]* [p. 47, 86]

CLASS, _____ (auction catalog published in Freiberg, 1808). His short but accurate and well-ordered catalog contained numerous Saxon specimens. *[Freiesleben, 1828]*

CLAVIJO: see VIERA y CLAVIJO

CLOSTER, FRIEDRICH LORENZ von JEMGUMER (1703–1751; catalog, published in Halle, 1746). His natural history collection included minerals, plants and animals. *[Gatterer, 1798; Meyer, 1976]*

CLOTTE: see MOUTON-FONTENILLE de la CLOTTE

COELHO de SOUSA, JOÃO (died ca. 1588), Brazilian plantation owner who collected gold, silver and crystals of precious stones on the family estate. *[Prieto, 1973]* [p. 142]

COESFELT: see ZUMBACH de COESFELT

COHEN, _____ (died after 1804?), British collector of minerals and shells, which were auctioned in London in 1804. *[Chalmers-Hunt, 1976]*

COLE, WILLIAM (died 1701), English naturalist in Bristol. His collection of natural history is said to have included minerals. *[Price, 1989; DNB]*

COLLING, OLOF (1677–1754), Swedish mine assessor, bergsråd and mineral collector. *[Zenzén, 1930]*

COLLINI, COSIMO ALESSANDRO (1727–1806), Italian naturalist, and secretary to Voltaire for several years in Berlin; later appointed Director of the cabinet of natural history at the University of Mannheim. He collected minerals during his travels and published numerous geological works. *[Collini, 1776; Adams, 1938; Zittel, 1901]* [p. 121, 124]

COLLINSON, PETER (1694–1768), London woolen draper. He built a natural history collection of minerals, fossils, shells and insects. The collection was retained by his family until 1834, when it was sold at auction. *[Cleevely, 1983; DNB]*

CONDÉ, LOUIS FRANÇOIS JOSEPH de BOURBON, Prince de (1736–1818), French nobleman. He had an extensive natural history cabinet, and received a magnificent gilded wood mineral cabinet, containing a collection of Swedish minerals, from Swedish King Gustavus III (1746–1792) in 1774. In 1787 he acquired the mineral collection of Valmont de Bomare. It has been preserved entirely intact in the Château de Chantilly, the ancestral family castle. *[De Broglie, 1965; Fischer, 1939; Laissus, 1986]* [p. 134]

CONDÉ, LOUIS HENRI, Duke de BOURBON, Prince de (1692–1740), French nobleman, father of Louis François Joseph de Bourbon, and owner (founder?) of a substantial natural history cabinet which presumably included minerals. It passed to his son, and is still preserved intact in the Château de Chantilly. *[Laissus, 1986; WBD]*

CONDÉ, LOUIS HENRI de BOURBON, last Prince de (1756–1830), French nobleman. He inherited a substantial mineral collection from his father (Louis François Joseph) in 1818. It is still preserved intact in the Château de Chantilly. *[WBD]*

CONSTABLE, WILLIAM (1721–1791), British naturalist and collector. His natural history collection of minerals, shells, corals, fossils and insects was acquired mostly from Marmaduke Tunstall. Constable's museum was sold at auction to R. Chichester-Constable in 1792, and much of it is preserved at Burton Constable Hall in North Humberside, England. Some of the minerals, rocks and fossils are also in the Hull Museum. *[Cleevely, 1983; Chalmers-Hunt, 1976; Hartley et al., 1987]*

CONTANT, PAUL (ca. 1570–1632), French Master Apothecary of Poitiers. His collection included plants, shells, fish, earths, stones and minerals. *[Murray, 1904]*

COOPER, THOMAS (1759–1839), English polymath and geologist; emigrated to the U.S. in 1795, became a judge and a Professor of Mineralogy and Chemistry in Philadelphia. He built a substantial mineral collection of 3,000 to 4,000 specimens, partially through field collecting and partially through the acquisition of the collections of Rev. Melsheimer and Sylvain Godon. *[Greene and Burke, 1978; Sarjeant, 1980]*

COPPENS, _____ (fl. 1780's), chemist in Ghent. His collection, though not especially numerous in specimens, was devoted principally to minerals. *[Burtin, 1784]*

CORDIÈR, PIERRE LOUIS A. (1777–1861), French mining engineer and geologist in Paris. His mineral collection, including suites from Auvergne, the Pyrenees, the Alps and from Norway, is mentioned by Schenkenberg (1842). He donated suites of mineral specimens to both the Paris School of Mines and the Museum of Natural History. *[Schenkenberg, 1842; Mitchell, 1979]* [p. 55]

CORNIANI degli ALGAROTTI, MARCO ANTONIO, Count (1768–1845), Italian mining expert in Venice. Schenkenberg (1842) called his mineral collection "excellent."

CORTUM, GOTTFRIED MICHAEL (fl. 1720's), German physician in Erfurt. He built a mineral collection rich in Hungarian specimens acquired during his travels. *[Neickelio, 1727]*

COSPI, FERDINANDO (1606–1686; catalog published in Bologna, 1667, 1680), Italian senator and purchasing agent for the Medici in Bologna. He was a collector of art objects and natural history specimens, including minerals. In 1660 he gave his collection to the senate of Bologna. It was at first housed in an annex to Aldrovandi's museum; the bulk was later transferred to the Instituto delle Scienze in 1743, which in 1871 passed to the Museo Civico di Bologna. [p. 40]

COSSIGNY de PALMA, JOSEF FRANÇOIS CHARPENTIER de (1730–1809), French naturalist, royal engineer and traveler. He donated a 139-pound quartz crystal from Madagascar to the Imperial Cabinet in Vienna, where it may still be seen. *[Niedermayr, 1988]*

COURTEN (alias CHARLETON), WILLIAM (1642–1702), London naturalist. He opened a museum in London in 1684 which a contemporary described as "one of the most perfect assemblies of rarities." His collection, inherited in part from his father and grandfather, included over 10,000 cataloged mineral specimens. It was bequeathed to Hans Sloane in 1702, whose collection later formed the basis for the British Museum. *[Smith, 1978; Cleevely, 1983]* [p. 40, 46, 65, 66]

COXE, JOHN REDMAN (1773–1864), American chemist and physician in Philadelphia. He frequently purchased mineral specimens in England, at considerable expense, and boasted to Parker Cleaveland that few mineral collections in America could rival his for size and beauty. *[Greene and Burke, 1978; Greene, 1969; CAB]*

CRACHERODE, (Rev.) CLAYTON MORDAUNT (1730–1799), Brit-

ish minister, curate, bibliophile and naturalist. His mineral collection (including a fine collection purchased from George Humphrey, 868 choice specimens acquired at a cost of nearly £1400) was bequeathed to the British Museum in 1799. *[Smith, 1978; Cleevely, 1983; Fletcher, 1904; DNB]* [p. 67, 75, 88]

CRAMAYEL, [prob. JEAN FRANÇOIS], French mineral collector, probably in Paris. Three specimens from his collection are illustrated in Gautier d'Agoty's *Histoire Naturelle* (1781), and his cabinet is referred to by Romé de l'Isle (1783). [p. 53, 62]

CRAMER, JOHANN ANDREAS (1710–1777), German Mining Director, author and mineralogist. His collection was acquired by the University of Bonn. *[Burchard, 1986]*

CRICHTON, (Sir) ALEXANDER (1763–1856; catalog published in Moscow, 1818), Scottish physician at Westminster Hospital, and also physician to Emperor Alexander I of Russia. Wagner (1818) called his the best of all private mineral collections in St. Petersburg at that time. It consisted of over 4,000 specimens of the highest quality, especially from Russia and Siberia but also from Norway, Hungary, Germany, England, America and India; many were 5 to 6 inches in size. David Hosack admired his mineral collection on a visit to London in 1794. It was sold at auction in 1827. Isaac Walker obtained some of the specimens, and the Linnean Society Library, London, has his catalog. *[Cleevely, 1983; Freiesleben, 1822; Hosack, 1822; DNB]* [p. 46, 47, 56, 80, 81–82]

CROISSET: see FRANCE de CROISSET

CRONSTEDT, AXEL FREDRIK (1722–1765), Swedish mineralogist renowned for his *Essay Towards a System of Mineralogy* (1758). His mineral collection of about 3,000 specimens, begun in 1746, was left to his son, but was taken by his widow when she remarried. In 1803 a Danish landowner and mineral collector living in Paris (probably Tönnes Neergaard) bought the collection, but its history thereafter is unknown. *[Barstow, 1953]* [p. 130, 132]

CRONSTRÖM, PETER (1651–1708), Swedish mining assessor in the Stockholm mining college. He began collecting minerals in the 1670's, eventually bequeathing his collection to his grandson, Alexander Funck. Funck's collection was acquired by the mining college in the early 1790's. *[Zenzén, 1921]*

CROSTHWAITE, PETER (1735–1808), English founder of the Lake District's first commercial museum in 1781. It included natural history specimens, notably "a glazed case of gems and minerals," and eventually a sales stock consisting of "16 large drawers, containing the scarcest minerals, and the finest crystallizations of spars, with every variety of the finest colours imaginable." *[Brears, 1992]* [p. 86]

CUBIERES, SIMON LOUIS PIERRE, Marquis de (1747–1821), French aristocrat in Versailles, traveler, official Conservateur of the statuary in the gardens at Versailles, author on botany. He had a mineral collection and maintained his own laboratory for physics and chemistry. Two specimens from his collection were illustrated in Gautier d'Agoty's *Histoire Naturelle* (1781). *[Fischer, 1939; Laissus, 1986; Thiéry, 1783]* [p. 53]

CUMBERLAND, GEORGE (1752–1848), British painter and watercolorist. His mineral and fossil collection was given to the Yorkshire Museum in 1824. *[Cleevely, 1983]*

CUSANUS, MAPHEUS; Italian apothecary, naturalist and collector in Verona. His museum contained minerals and stones, including "an agate having chrystal within [a geode]." *[Murray, 1904]*

D*** (sale catalog by Romé de l'Isle published in Paris, 1778), French collector whose catalog was published anonymously. His large collection included about 2,000 mineral specimens (most of them metal-containing, and many fine examples), plus about 1,500 fossils, corals, shells, etc. All were dispersed at auction in December of 1778. [p. 52]

DA COSTA, EMANUEL MENDES (1717–1791), London-born Portuguese-Jewish dealer in minerals and shells, writer and lecturer on mineralogy. He served as a Clerk for the Royal Society until he was arrested and imprisoned for embezzlement. His collection was acquired by E. Donovan and Thomas Pennant. *[Cleevely, 1983; Smith, 1913]* [p. 69, 71, 85]

DACQUET, HENRI (catalog published in Delft, 1708). His Natural history collection is considered to have included minerals. *[Gatterer, 1798]*

D'AGOTY: see GAUTIER D'AGOTY

DAM, JOSEF WENZEL von (fl. late 1700's), Austrian Imperial Hofsekretair to the minting and mining collections. He sold his mineral collection to Petronilla von Ligniville before 1807, for 10,000 Gulden. *[Stütz, 1807]* [p. 47, 103]

DAMPIER, WILLIAM (1651–1715), English buccaneer, pirate and circumnavigator of the world. He supplied mineral and fossil specimens to John Woodward. *[Price, 1989; DNB]* [p. 67, 142]

DANDRIDGE, JOSEPH (ca. 1660–1744), British collector and silk-pattern-drawer in London. His collection was admired by John Ray and James Petiver. According to Mendes da Costa (1812), he "had a fine collection of natural history, as fossils [minerals], birds, shells, etc." and insects especially.

D'ANGIVILLER, CHARLES CLAUDE de FLAHAUT de la BILLARDERIE, Count (died 1810; manuscript catalog, unpublished, prepared by Count de Buffon in 1783), French Royal Director of Trade. He assembled a natural history cabinet including a beautiful collection of minerals. It was acquired by the Natural History Museum in Paris in 1780. *[BUA; Romé Delisle, 1783; Fischer, 1939; Laissus, 1986; Thiéry, 1783]* [p. 52, 53]

D'ANNONE, (Pastor) HIERONYMUS (1697–1770), Swiss clergyman and naturalist. His *Steinkabinet* was acquired by the Swiss naturalist Peter Merian (1795–1883), and later formed the nucleus for the mineralogy collection of the Naturhistorisches Museum, Basle. *[Burchard, 1986; Sherborn, 1940]*

D'ANNONE, JOHANN JACOB (1728–1804), Swiss naturalist and mineral collector. His mineral collection was acquired by the Swiss naturalist Peter Merian (1795–1883), and later formed the nucleus of the mineralogy collection of the Naturhistorisches Museum in Basle. *[Sherborn, 1940]*

DANZ, GEORGE FRIEDRICH (1733–1813), German Mining Commissioner and mineral dealer in Göttingen. His son took over the business. *[Archives of the Landessammlungen für Naturkunde, Karlsruhe]*

D'ARGELAS, RAYMOND (1763–1842), French naturalist and curator of natural history at the Natural History Museum in Bordeaux. He collected mainly insects and plants, but also built a geology and mineralogy collection. *[Schenkenberg, 1842; DBF]*

D'ARGENVILLE: see DEZALLIER D'ARGENVILLE

DARWIN, ERASMUS (1731–1802), British physician at St. John's College, Cambridge; founder of the Philosophical Society at Derby (1784) and a botanical garden near Litchfield (1778). He bought mineral specimens from the Derby dealer Richard Brown in the 1780's and 1790's. *[Torrens, 1993]*

DASHKOVA, EKATERINA ROMANOVNA (1743–1810), Russian woman of letters; friend of Empress Catherine II; Director of the St. Petersburg Academy of Arts and Sciences (1782) and the Russian Academy of Science (1783–1796). She donated her personal mineral collection to the Academy. *[Neverov, 1990; WBD]* [p. 125, 127]

DAUM, CARL FRIEDRICH (sale catalog published in Berlin, 1812). German collector. He specialized in shells, minerals and scientific instruments. *[Murray, 1904]*

D'AUTEROCHE: see CHAPPE d'AUTEROCHE

DÁVILA, PEDRO FRANCO (ca. 1710–1775; catalog, by Romé de L'Isle, published in Paris, 1767), wealthy Peruvian naturalist in Paris and later Inspector of the Royal *Naturalienkabinets*, Madrid. His fine mineral and shell collections were auctioned off in Paris in 1767 for the equivalent of 800,000 reales. This same Dávila later assembled a new collection of 8,200 specimens, which he exchanged for an annuity to Carlos III of Spain in 1771. It is now in the Museum of Natural Sciences in Madrid. *[Gatterer, 1798; Leonhard et al., 1817; BUA; Llorente et al., 1990; Amorós, 1963; Laissus, 1986; Winckworth, 1946; Sempere y Guarinos, 1785; Mendiburu, 1880]* [p. 46, 47, 50, 88, 136–140]

DAVIS, T. C. (died ca. 1810), British collector of minerals, which were auctioned posthumously in 1810. *[Chalmers-Hunt, 1976]*

DAVY, (Sir) HUMPHREY (1778–1829), English chemist. He presented his mineral collection to the Royal Institution of Cornwall prior to 1804. *[Smith, 1978; Woodward, 1907]* [p. 87]

DAWSON, J. (1740–1813), English collector in Bradford, founder of the Low Moor Iron Company, and a friend of Joseph Priestley. His 2,000

mineral and rock specimens from worldwide localities, and a manuscript catalog dated 1810, are preserved in the Bradford Museum. *[Hartley et al., 1987]*

DAY, WILLIAM (died ca. 1799), A British mineral collector and friend of Philip Rashleigh. His collection was acquired by James Sowerby, who illustrated many of his specimens. *[Sowerby, 1804–1817; Embrey and Symes, 1987]* [p. 79]

DAZAINCOURT, _____, French collector in Paris. He gave several mineral specimens from his collection to Thomas Pennant in 1765. *[Pennant, 1948]*

DE BOODT: see BOETIUS de BOODT

DECKER, AUGUST HENRICH (catalog published in Halle, 1753), Royal Prussian Mining Commissioner in Wettin. He built a mineral collection (*Mineralienkabinet*) consisting of 6,000 specimens of "metals, ores, druses and minerals," plus fossils and other petrifactions. *[Gatterer, 1798; Freiesleben, 1828; Schwab, 1983]* [p. 46]

DEFRANCE, JACQUES LOUIS MARIN (1758–1850), wealthy French naturalist in Caen. He showed a taste for natural science at a young age, and assembled mineral and fossil collections later acquired by the Museum of Natural History in Caen. He is probably the same "Citizen Defrance" whose calcite specimen, accidentally broken by Haüy, led to the discovery of the relationship between cleavage, structure and morphology. He may also be the Mssr. "de France de Croisset" whose feldspar specimen is illustrated on plate XXXVI of Gautier d'Agoty's book (1781). *[Kunz, 1918; DBF; Haüy, 1801]* [p. 53]

DEGELMANN, JANOS BERNAT, Baron (fl. late 1700's), Hungarian aristocrat in Nagyszeben. His natural history collection, including Transylvanian minerals, was visited by Sestini in 1778. *[Sestini, 1815]*

DEIMLING, GOTTLIEB BECHTOLD (1711–1773), German collector. His mineral collection was bequeathed to Caroline Louise von Baden and is now in the Landessammlungen für Naturkunde, Karlsruhe. *[Cleevely, 1983; Aufschluss* **22**, 191]

DÉLAMÉTHERIE, JEAN CLAUDE (1743–1817), French physician in Paris. His collection consisted primarily of French minerals, including especially fine specimens from Burgundy. His collection was purchased upon his death by the British mineral dealer Henry Heuland. *[Ferber, 1789; Sowerby, 1811–1817; Laissus, 1986]*

DELESSERT, JULES PAUL BENJAMIN, Baron (1773–1847), French banker and philanthropist. In 1840 he acquired the collection of shells and minerals formed by Madame Bandeville and sold to the Abbé Gruel in 1792. It is now said to be in the Geneva Museum. *[Dance, 1966; NBU]*

D'ELHUYAR: see ELHUYAR

DE L'ISLE: see ROMÉ de l'ISLE

DELISLE, _____ (posthumous sale catalog by Romé de l'Isle published in Paris, 1780). His collection consisted primarily of minerals and "crystallizations." *[Romé de l'Isle, 1783]* [p. 52]

DELIUS, CHRISTOPH TRAUGOTT (1728–1779), German mineralogist, metallurgist, geologist and a professor of mining at the Mining Academy in Schemnitz. He later served as a councillor at the Imperial Court in Vienna. His estate included a mineral collection, arranged according to a system of his own invention, but its disposition is unknown. *[ABD]*

DEL RIO y FERNANDEZ, ANDRÉS MANUEL (1764–1849), Spanish mineralogist in Mexico City, and author of the first Mexican textbook of mineralogy. When he retired from his position as professor of mineralogy at the National Mining College in 1847 he donated his personal mineral collection to the school; specimens are still preserved today in the Escuela de Ingenieria de la Universidad Nacional in Mexico City. *[Jorge Díaz de León, personal communication; Howe, 1949; Weeks, 1945]* [p. 141–142]

DELVALLE [later **LOWRY**], REBECCA (1761–1848), Englishwoman of Spanish extraction, and an accomplished mineralogist. She married the English engraver Wilson Lowry, and together they built a substantial mineral collection which was much admired by Bournon (1813). The collection was sold at auction in 1830. Her daughter, Delvalle Lowry, was also a mineralogist; she gave classes on mineralogy in London and wrote several popular works on mineralogy. Phillips (1818) mentions Delvalle Lowry's "fine collection of minerals, [crystal] models, and instruments used in the mineralogical and geological researches." *[Embrey and Symes, 1987; DNB]* [p. 88]

DEMIANI, CARL FRIEDRICH (1768–1823), German painter, Inspector of the Gemäldegalerie in Dresden. He built a large mineral collection which was ultimately acquired by the Royal Museum in Dresden. *[Fischer, 1939]*

DEMIDOV, NIKOLAI NIKITICH (1774–1828), Russian aristocrat. He donated his collection of 6,004 mineral specimens and 2,015 rocks to Moscow University in 1812. *[Schenkenberg, 1842]* [p. 46, 126–127]

DEMIDOV, PAVEL GRIGORIEVICH (1738–1821; catalogs published in Moscow, 1806, 1817), Russian traveler, patron of scientists, and founder of the botanical garden in Moscow. His uncle (Akinfi Nikitich Demidov, died ca. 1740) established the family's extensive gold, silver and copper mines. Pavel donated the Demidov Museum of natural history and art to the Imperial University in Moscow. *[WBD; Freiesleben, 1822]* [p. 126]

DERAEBIN [or DERIABIN], _____ (fl. late 1700's to 1818), Russian *Ober-Berghauptman* and an early Director (before 1818) of the St. Petersburg Mining Institute. Philip Rashleigh obtained some specimens from him. Wagner (1818) says his personal mineral collection was rich in Siberian minerals, and also contained specimens from foreign countries. It was donated to the Institute sometime between 1819 and 1840. *[Schenkenberg, 1842; Russell, 1952]*

DERCSÉNYI (originally **WEISS**), JANOS (1755–1837), Hungarian physician, court judge, viticulturist and owner of an alum works in Munkács. His mineral collection was visited by Towson in 1793 and Beudant in 1814. *[Townson, 1797; Beudant, 1822]*

DESFONTAINES, RENÉ LOUICHE (1750–1833), French naturalist. In 1792 he brought back specimens of axinite from the Atlas Mountains in North Africa that resembled those from France. He also donated a mineral suite from Central America to the Paris Natural History Museum. *[Schenkenberg, 1842; Journal de Physique, 1792]*

DESMAREST, NICHOLAS (1725–1815), French petrologist and volcanologist, member of the Royal Academy of Sciences in Paris. He purchased mineral specimens at the auction of Dávila's collection in 1767. His collection is referred to by Dezallier d'Argenville (1780) and Thiéry (1783). During travels through Auvergne and Limousin in 1770 he collected interesting varieties of feldspar, some of which he later donated to the King's Cabinet. *[Kunz, 1918; Greene and Burke, 1978; Sarjeant, 1980]*

DEUTSCH, _____ (catalog undated, ca. 1770), German Commissioner of Finance. His collection consisted of "Mineralien und Naturalien." *[Freiesleben, 1828]*

De VILLIERS: see BROCHANT de VILLIERS

DEVISME, WILLIAM (collection auctioned in London, 1782), British collector of minerals, shells and Chinese butterflies. *[Chalmers-Hunt, 1976]*

DEVONSHIRE, Duchess of: see **CAVENDISH**, G.

DE WITT, BENJAMIN (1774–1819; catalog published in Albany, 1820), American physician and geologist, and Professor of Mineralogy in the College of Physicians and Surgeons, New York. In 1804 he donated a suite of New York mineral specimens to the American Academy of Arts and Sciences. His mineral collection consisted of more than 11,000 specimens collected in Europe and America. *[Greene and Burke, 1978]* [p. 46]

DEZALLIER D'ARGENVILLE, ANTOINE JOSEPH (1680–1765; catalog published in Paris, 1766), French naturalist. His *Enumerationis fossilium . . .* (1721) is among the earliest works on French paleontology. His *L'Histoire Naturelle . . . l'Oryctologie* (1755) includes engravings showing specimens from his mineral collection. *[Sarjeant, 1980]*

D'HOLBACH, PAUL HENRI DIETRICH, Baron (1723–1789), French materialistic philosopher in Paris, and a contributor of many articles to Diderot's *Encyclopédie*. He owned a collection of ore minerals and petrifactions. *[Dezallier d'Argenville, 1767; WBD]*

DIÉTRICH, PHILIPPE FRÉDÉRIC, Baron (1748–1793), French mineralogist and Mayor of Strasbourg; guillotined following the French Revolution. His collection of minerals was confiscated by the Public Welfare Committee and turned over to the National School of Mines in Paris. *[BUA; Hofmann, 1981]*

DIETRICHSTEIN, _____, Count (fl. late 1700's), Austrian aristocrat in Vienna. He acquired the mineral collection of Abbé Estner. *[Moll, 1806]*

DILLNER, GEORG SEBASTIAN (catalog published in Regensburg, 1777). His natural history collection is considered to have included minerals. *[Gatterer, 1798]*

DÖLLINGER, IGNAZ (1770–1841), Obermedicinalrath and Professor of Anatomy at the University of Munich. His mineral collection is mentioned by Schenkenberg (1842). *[ADB]*

DOLLINGER, M.; Hungarian director of mines in Kremnitz. His mineral collection was seen and admired by Edward Browne during a trip through the mining regions of Hungary in 1669–1670, as reported in his book of 1673.

DOLOMIEU, DIEUDONNÉ (called DÉODAT) GUY SYLVAIN TANCREDE GRATET de (1750–1801), French Professor of Natural History at the National Museum of Natural History in Paris; he was succeeded at his death by René-Just Haüy. A catalog of his collection, consisting mostly of volcanic minerals, was published in Frankfurt in 1797. *[Gatterer, 1798; Schubnel, 1987; Leonhard et al., 1817; BUA; Sarjeant, 1980]* [p. 61]

DOMBEY, JOSEPH (1742–1793), French botanist, physician and traveler. He sent mineral specimens to the King's Cabinet in Paris from Mexico and South America in 1779; many, including atacamite and euclase, became important research specimens. *[Schubnel, 1987]* [p. 61]

D'ONIS, _____ (Chevalier) (died before 1825), said by auction catalog to have been the "late Ambassador from Spain"; his collection consisted of 438 lots of minerals when it was auctioned in 1824. This record may actually refer instead to CHARLES D'EON de BEAUMONT, Chev. (1728–1810), French diplomat, spy, swordsman and Plenipotentiary Ambassador to London. *[DNB; Chalmers-Hunt, 1976]*

DONOVAN, EDWARD (1768–1837), English naturalist and author; founder in 1807 of the London Museum and Institute of Natural History. His museum of minerals, fossils, corals, birds, reptiles, fish, etc. was liquidated at auction in 1818 (878 lots). *[DNB; Chalmers-Hunt, 1976]*

D'ONSENBRAY: see PAJOT d'ONSENBRAY

D'ORCY: see GIGOT d'ORCY

D'ORVILLE, WILHELM (catalog published in Amsterdam, 1622). His collection consisted of "shells, rare sea creatures, beautiful agates, carnelian and other stones." *[Gatterer, 1798]* [p. 115]

DOUGLAS, _____ Lady (collection auctioned in London, 1789), British aristocrat. Her natural history collection included minerals. *[Chalmers-Hunt, 1976]*

DOUGLASS, WILLIAM (died 1721?), Boston physician. He assembled a collection of minerals and plants. *[Frondel, 1970; CAB]* [p. 144]

D'OYLY, GEORGE (1778–1846), English theologian and biographer. He donated his collection of minerals from Ceylon to the British Museum in 1827. *[Fletcher, 1904]*

DRAKE, _____ (died ca. 1807), British collector of minerals, fossils, birds, shells and butterflies all of which were auctioned posthumously in London in 1807. *[Chalmers-Hunt, 1976]*

DRECHSEL, FRIEDRICH (born ca. 1775), German pharmacist and naturalist at the Mining College in Clausthal. His mineral collection is mentioned by Schenkenberg (1842). *[ADB]*

DRÈE, ÉTIENNE GILBERT, Marquis de (1760–1848; first catalog published in Paris, 1811), French nobleman, brother-in-law of Dolomieu. He purchased some of the mineral collection of Baron Joubert. His first mineral collection, or at least a part of it, was sold at auction in Paris, where the auction catalog was published by Lacoste, in 1816. An auction (of a second collection?) was held in 1826, and the entire collection was purchased by J. Henry Heuland. Drèe subsequently sold yet another collection, 12,000 to 15,000 specimens, which was purchased by the Paris School of Mines in 1845. This latter group of specimens included (according to Schenkenberg, 1842) all or part of the former collections of Jacob Forster, Henry Heuland, Sittnikoff, Abich, Lardy, Schreiber, Baron Favier and Major Petersen. The selling price was 215,000 francs. *[Cleevely, 1983; Russell, 1949; Laissus, 1986; Burchard, 1986; Schenkenberg, 1842]* [p. 46, 47]

DREVENYAK, FERENC XAVÉR (1751–1818), Hungarian jurist, and statesman in Selmecbanya; Royal Mine Councillor (1791) and Director of the Upper Hungarian Mines (1816). He was a member of the Mineralogical Society of Jena, and built a mineral collection which was admired by Esmark. Some of his specimens were purchased by the Hungarian National Museum in 1872–1877. *[Esmark, 1798; Krenner, 1902; Zipser, 1817]*

DUANE, MATTHEW (1707–1785), British conveyancer, collector and antiquary. Between 1764 and 1777 he donated various mineral specimens to the British Museum. *[Murray, 1904]*

DUBOIS, CHARLES (ca. 1660–1740, "very aged"), celebrated British botanist and Treasurer of the East India Company, at Mitcham in Surry. His collections of shells and minerals were inherited by his nephew, Peter Waldo, in Surry, who retained them at least until 1760. *[Mendes da Costa, 1812; DNB]*

DUBOIS-JOURDAIN, _____ (died ca. 1756), former equerry to the king and Lieutenant General to the government of Toulois. His collection, referred to by Dezallier d'Argenville (1755), is considered to have included minerals. It was inherited and maintained for some years by his widow. *[Gatterer, 1798]*

DUBOIS-JOURDAIN, Mme. _____ (catalog published in Paris, 1766), widow of the Lieutenant General of Toulois, France. Her collection of curiosities, inherited from her husband, is considered to have contained minerals. *[Gatterer, 1798; Laissus, 1986]*

DUBUISSON, FRANÇOIS RENE ANDRÉ (1763–1836), French naturalist and pharmacist in Nantes, Director of the Nantes Museum of Natural History. He donated mineral specimens from the Loire area to the Paris Museum of Natural History. He assembled a "beautiful cabinet of natural history" in the 1790's, collected many minerals from the Nantes area, and built a "magnificent collection of minerals." His mineral collection was acquired by the city of Nantes for the Museum, and described by Dubuisson himself in a museum catalog of 1830. *[Schenkenberg, 1842; NBU]* [p. 57]

DUFAY, CHARLES FRANÇOIS de CISTERNAY (1698–1739), French chemist and scholar. He left a rich collection of semiprecious stones and minerals to the King's Cabinet in Paris in 1739. *[Schubnel, 1987; CBD]*

DUNSTANVILLE: see BASSET

DURAZZO, IPPOLITO, Marchese (1754–1818), Italian mineralogist and botanist in Genoa. He supplied mineral specimens to Charles Greville (1749–1809), whose collection was acquired by the British Museum in 1810. *[Smith, 1978; Cleevely, 1983]*

DUSSOLT (or TUSSOLT), BERNHARD (died <1817), Austrian mineral dealer in Vienna. His best specimens were cataloged by Friedrich Mohs. The collection was acquired by Frau von Barton, a prominent Austrian landscape painter. *[Moll, 1806; Zipser, 1817; Archives of the Landessammlungen für Naturkunde, Karlsruhe]*

ECKHOF, HERMANN (catalog, *Museum Eckhofianum*, published in Lubitz, 1732). His collection of curiosities and memorabilia, auctioned in 1732, is considered to have contained minerals. *[Gatterer, 1798]*

EDER, JOZSEF KAROLY (1760–1810), Hungarian priest, teacher and naturalist in Nagyszeben; member of the Mineralogical Society of Jena. His natural history collection included minerals. *[Esmark, 1798; Benedek, 1942]*

EDWARDS, JOHN (1731–1807), British collector and Cornish smelter manager. He supplied mineral specimens to Philip Rashleigh (1729–1811). *[Embry and Symes, 1987; Russell, 1952]* [p. 74]

EGGER, FRANZ, Count von (died ca. 1817), Austrian aristocrat. He purchased the extensive mineral collection of Count Hohenwarth (which included that of Wulfen) in 1809 for 12,000 Gulden. He donated it all to help found the Joanneum in Graz in 1816. *[Meixner, 1951]*

EHRENSVÄRD, CARL AUGUST; Freiherre and General Lieutenant in the Swedish diplomatic corps, represented Sweden in London and Paris. He built a 450-specimen collection of minerals from Spain and South America, which he donated to the Stockholm mining college in the late 1700's. *[Zenzén, 1921]*

ELHUYAR y ZUBICE, FAUSTO de (1755–1833), Spanish chemist, metallurgist and mineralogist, President of the Mining Tribunal and Director General of Mines in Mexico. For more than 30 years he directed the College of Mines in Mexico City. In 1783 he and his

brother Juan José discovered tungsten. His mineral collection was acquired two years after his death by the Director General of Mines (of Spain) and given to the Museo Geominero in Madrid. *[Weeks, 1945; Llorente et al., 1990; Howe, 1949; Prieto, 1973]* [p. 140–141]

ELLER, JOHANN THEODOR (1689–1760); catalog, *Gazophylacium s. Catalogus rerum mineralium & metallicarum*, was published in Bernburg, 1723), German doctor of medicine, Academy of Natural Sciences in Berlin. This was apparently a collection devoted exclusively to minerals. *[Gatterer, 1798; Leonhard et al., 1817]*

ELLIS, JOHN (1710?–1776; collection auctioned in London, 1791), English naturalist; agent for West Florida, Dominica and the West Indies (1764–1770); author of *History of the Zoophytes* (1786); F.R.S., F.A.S. His natural history collection included minerals, fossils, shells, reptiles and seaweed. *[Cleevely, 1983; Chalmers-Hunt, 1976]*

ELSÄSSER, JOSEPH ANTON (1773–1834), German Regierungsrat and Hofkammerkanslist in Donaueschingen. He was also a dealer in mineral specimens. *[Archives of the Landessammlungen für Naturkunde, Karlsruhe]*

EMMERLING, LUDWIG AUGUST (1765–1841), German physician, mineralogist and mining man; instructor in Giesen; student of Werner and author of several books on mineralogy including *Lehrbuch der Mineralogie* (1793–1800). His mineral collection is mentioned by Schenkenberg (1842). *[ADB]*

ENGSTRÖM, GUSTAF von (1738–1815), Swedish Bergsrådet, chemist, numismatist, and curator of the Stockholm mining college mineral cabinet until 1794. His personal mineral collection, which he began building in the 1760's, numbered several thousand specimens and included examples from the Psilanderhjelm, Schröderstierna, Tilas, Sandel and Adlerheim collections. He contributed Swedish mineral specimens to Philip Rashleigh's collection. It was purchased by Järnkontoret, for the mining college, for 30,000 copper thalers. *[Zenzén, 1921; Russell, 1952]* [p. 47, 69, 71, 135]

ENGSTRÖM, LARS; Swedish diplomatic envoy to London from 1793 to 1795. He built a collection of British minerals which he donated to the Stockholm Bergcollegii (now the Riksmuseet). *[Zenzén, 1921]*

ENZENBERG, FRANZ JOSEF, Count von (1747–1821), Austrian Appellations-Präsidenten in Klagenfurt. His "exquisite" mineral collection consisted of approximately 5,000 specimens, 3,500 of which were "small format" (2 inches square or under), and 1,500 "large format." The collection was offered for sale in Leonard's *Taschenbuch für die gesammte Mineralogie* in 1811 and 1812. Although no catalog had been prepared, the collection was said to be well-labeled. *[ADB]* [p. 46]

ERCKER, LAZARUS (1530–1594), Inspector-General of Mines in Hungary, Transylvania and Tyrol; author of a famous work on mining technology in 1574 (*Treatise on Ores and Assaying*). He is said to have been an enthusiastic collector of minerals. *[Prescher, 1955; Ferguson, 1906]*

ERHARD, BALTHAZAR (died ca. 1757), German physician and botanist in Memmingen. His natural history collection included 2,000 minerals and petrifactions, mostly self-collected and rather mediocre. *[Neickelio, 1727; NBU]*

ERLACH, GABRIEL ALBRECHT von, Baron von Spiez und Landvogt (1739–1802), Swiss aristocrat and naturalist in Lausanne. He was particularly interested in the Alpine cleft minerals of the Gotthard region and the lead and iron minerals of the Lauterbrunnental mines. His large mineral cabinet was purchased in 1798 by the Swiss Republic, and in 1803 it was installed in the Galerie der Bergerbibliothek Bern. Today it forms part of the collection of the Natural History Museum in Bern. *[H. A. Stalder, personal communication]* [p. 119]

ESCHER von der LINTH, HANS KONRAD (1767–1823), Swiss statesman in Zurich. His collection of Alpine minerals, about 600 specimens, was acquired in 1802 by Martinus van Marum and later incorporated into Teyler's Museum in Haarlem. *[ADB: Forbes, 1969]*

ESCHWEGE, WILHELM LUDWIG, Baron von (1777–1855), German geologist. He served as a high representative of the Portuguese government in Brazil from 1809 to 1821, during which time he put together a collection of Brazilian minerals. His specimens were later acquired by the Technical University in Clausthal. *[Müller and Strauss, 1991]* [p. 143]

ESMARK, JENS (1763–1839), Norwegian Professor of Mineralogy at the University of Christiania. His extensive mineral collection, 1,658 specimens, was acquired by the Kongsberg Mining Academy, and was subsequently transferred to the University of Oslo. *[Burchard, 1986; Sarjeant, 1980; Kjerulf, 1881]* [p. 55, 131]

ESTERHAZY von GALANTHA, MIKLOS II, Prince (1765–1833), Hungarian nobleman, ambassador and general. Hunter (1803) reported that the prince kept a small collection of minerals and other curiosities at the family castle in Fertöd, and Zipser (1817) saw a spectacular collection at the Esterhazy castle in Vienna. Shortly before, Esterhazy had acquired the excellent collection of Count Ferdinand von Palfy. The Esterhazy collection was ultimately purchased in 1880 by Andor Semsey for 10,000 gold florins on behalf of the Hungarian National Museum. Many of his specimens are still identifiable. *[Krenner, 1902]*

ESTNER, ANTON (1730–1801), German-born abbot and mineralogist in Vienna. He organized the collection of Count Rudolph von Wrbna, and also built a choice collection of mineralogical curiosities of his own, incluing an "extraordinarily beautiful crystallized gold." *[Von Buch, 1797–1798 (quoted in Moll, 1805); Zapfe, 1971]*

ETIENNE, ANDRAS (died 1797), Hungarian physician, chemist and naturalist; chief physician for the Zalatna mining district and later a professor of chemistry and matallurgy at the Academy of Kolozsvár. According to Esmark (1798) he owned the best mineral collection in Kolozsvár (today Cluj-Napoca). *[Szabadvary and Szökefalvi-Nagy, 1972]*

EVERS, HEINRICH (died ca. 1768; auction catalog published in Hamburg, 1768), German merchant and trader in Hamburg. He had a "handsome" natural history collection including minerals. *[Gatterer, 1798; Cobres, 1782]*

EWER, SAMUEL (died after 1809), British collector in Hackney. His minerals (111 lots) were auctioned in London in 1809. *[Chalmers-Hunt, 1976]*

EXCHAQUET, CHARLES FRANÇOIS (1746–1792), French mineral collector and director general of the Haut Faucigny foundry in Servoz, Savoie, France. His collection of ore minerals from the mines in the southern Aiguilles Rouges massif and the Mont Blanc massif is preserved in the Natural History Museum in Bern. *[Stalder, 1982]*

FABRICIUS, JOHAN CHRISTIAN (1743–1808), Danish entomologist, studied under Linnaeus. He sold his mineral collection to William Hunter in 1771–1781. *[Cleevely, 1983, WBD]*

FAGEL, BENJAMIN (catalog published in The Hague, 1709). His collection apparently consisted mostly of shells and sea animals but he is considered also to have had minerals. *[Gatterer, 1798]* [p. 117]

FAGOAGA, JOSÉ MARIA, Marquis de Apartado (died 1825), of Zacatecas, Mexico. He built a vast fortune from his silver mines in Sombrerete and Zacatecas. He dedicated himself to the study of mineralogy, and assembled a substantial mineral collection admired by Manuel Andrés del Rio (1832). *[Howe, 1949]* [p. 140]

FAGON, GUI CRESCENT (1638–1718), French physician and botanist. He was among the first to donate mineral specimens to the King's Cabinet in Paris. *[Schubnel, 1987]*

FAILLE, [possibly CLEMENT de la; died ca. 1770; naturalist and friend of Dezallier d'Argenville] (catalog published in The Hague, 1731). His collection of shells and marine animals was supplemented by "many minerals." *[Gatterer, 1798; BUA]*

FALCONAR, MAGNUS (collection auctioned in London, 1778), British surgeon, professor of anatomy, and naturalist. His large collection (1029 lots) included minerals, shells and animals. *[Chalmers-Hunt, 1976]*

FAUJAS DE SAINT-FOND, BARTHÉLEMI (1741–1819), French geologist and traveler known for his theory on the formation of volcanoes; professor of geology at the Natural History Museum in Paris. His mineral cabinet was considered among the more important in Paris. *[Ferber, 1789; WBD]* [p. 83]

FELDMANN, BERNARD (1704–1777; catalog published in Ruppin, 1781), Prussian naturalist and physician of Neu Ruppin. His *Naturalienkabinet* included minerals. *[Gatterer, 1798; BUA]*

FERBER, JOHANN JAKOB (1743–1790), Swedish mineralogist and Director of Mines in Germany. His mineral collection was acquired by the Royal Mining Academy (now the Technical University) in

Berlin in 1790 for 2000 Thaler and a 400 Thaler/year pension for Ferber's widow and daughter. *[Burchard, 1986; Leonard et al., 1817; Strunz, 1970; Sarjeant, 1980]*

FERCHAULT de RÉAUMUR, RÉNÉ ANTOINE (1683–1757), French physician and naturalist. His private collection of minerals was acquired by the King's Cabinet in Paris during the late 1700's, and is today in the Paris Natural History Museum. It consisted of a "complete" collection of "all the different metals and earths which exist in Europe and particularly in France." *[Schubnel, 1987; NBU; Gersaint, 1736]* [p. 61]

FERDINAND I (1751–1825), Bourbon King of the Two Sicilies (a.k.a. Ferdinand IV, King of Naples). His private mineral collection was established as the Royal Mineralogical Museum in Naples in 1801. It is today the Institute of Mineralogy of the University of Naples. *[Zwaan and Petersen, 1977]*

FERDINAND II, Archduke of Tirol (1529–1595). The archduke's *Naturalienkammer*, installed at Schloss Ambrass near Innsbruck in 1573, was among the most important of the late Renaissance period, and rivaled those of Saxon Elector Augustus I in Dresden and Emperor Rudolf II in Prague. It contained many fine mineral specimens, including 1,200 native silvers, most of which are lost. Some highly important specimens (e.g. a Colombian emerald and a St. Joachimsthal stephanite) are preserved in the Vienna Natural History Museum. *[Sacken, 1855; Wrany, 1896; Niedermayr, 1988]* [p. 2, 19, 29–32, 104]

FERGUSON, ROBERT (1767–1840), Scottish politician, aristocrat and amateur naturalist; a student of John Playfair. His collection of minerals, "for richness and extent, is surpassed by few private collections of this sort in the kingdom." *[Murray, 1845]*

FERNANDEZ: see DEL RIO

FERNANDO VI (1713–1759), King of Spain, known as *El Sabio* ("the Learned"). In 1752 he initiated the formation of a natural history collection, and decreed that mineral specimens should be sent from all operating mines in Spain and in Spanish America. *[Lopez, 1975]*

FICHTEL, JOHANN EHRENREICH (1732–1795), Bratislava-born doctor of law, Transylvania's representative to the Imperial Austro-Hungarian Court in Vienna, and mineralogist; he was author of a systematic description of the mineralogy of Transylvania, among other works. According to Sestini (1815), Fichtel had "a rich [mineral] collection from the whole territory of Transylvania, including several extraordinary specimens." Towson (1797) wrote that "His native and mineralized gold ores of Hungary and Transylvania are especially fine." The Fichtel mineral collection and its six-volume catalog were purchased from his son Leopold by the School of Chemistry and Metallurgy in Kolosvár (= Cluj-Napoca) in 1799 for 5,000 gold florins. After the closing of the school, the mineral collection was transferred to a local secondary school. *[Sestini, 1815; Towson, 1797; Csíky, 1990; Von Buch quoted in Moll, 1805]* [p. 47, 56]

FIELD, _____ (died ca. 1808), British collector of minerals, shells and insects, which were auctioned in 1808. *[Chalmers-Hunt, 1976]*

FISCHER, DANIEL (1695–1745), Hungarian physician in the Upper Hungarian town of Késmárk. His natural history collection contained many mineral specimens. *[Neickelio, 1727; NBU]*

FLAHAUT: see D'ANGIVILLIER

FLAMSTEED, JOHN (1646–1719), first Royal Astronomer to the King of England, and a friend of Sir Isaac Newton. He supplied mineral specimens to John Woodward. *[Price, 1989; DNB]*

FLEMING, ERIK HENRIKSSON (died 1679), Swedish geologist and President of the Stockholm mining college. His collection of ore minerals was purchased in 1748 by Baron Löven and presented to the Bergcollegii (now the Riksmuseet). *[Zenzén, 1921]*

FLEMING, GEORGE (collection auctioned in London, 1767), British painter in Wakefield. His small collection included minerals and fossils. *[Chalmers-Hunt, 1976]*

FLEURIAU de BELLEVUE, LOUIS BENJAMIN de (1761–1852), French scientist and Counsellor General, founder of the Society of Natural Science at the Museum in La Rochelle. His private collection included Italian minerals and rocks. *[Schenkenberg, 1842; DBF]*

FLEURY: see JOLY de FLEURY

FLOHR, PHILIPP JACOB (born 1749), German mine worker in Alsenz, and a dealer in mine minerals and products (*Bergwerksstufenhändler*). *[Archives of the Landessammlungen für Naturkunde, Karlsruhe]*

FLOREZ, ENRIQUE (1702–1773), Spanish Augustinian monk, author of *España Sagrada* (a history of the church in Spain), and close friend of the Royal Family in Madrid. He had a natural history collection including minerals, especially aesthetic specimens, but he was not scientifically learned and his collection was disorganized. He assisted Dávila in selling his collection to King Carlos III. *[Amorós, 1963; WBD]* [p. 137–138]

FLUDYER, (Sir) THOMAS (died 1769; collection auctioned in London, 1769), wealthy British counsellor and collector in Kent. His large collection (899 lots) included minerals, fossils and shells. *[Chalmers-Hunt, 1976; DNB]*

FLURL, MATHIAS von (1756–1823), German mineralogist known as the "Bavarian Werner." He assembled an extensive collection of Bavarian rocks and minerals, some of which survives today in the Bavarian Geological Survey and in the Technical University in Munich. *[Niedermayr, 1988]*

FONTAINE, CHARLES ALOYSE, Canon (1754–1834), French clergyman and mineral collector. He founded the Fribourg Museum of Natural History. *[Sarjeant, 1980]*

FORSTER, ADOLARIUS JACOB (1739–1806), mineral dealer and collector operating out of London, Paris and St. Petersburg. Many of his specimens were illustrated by Gautier d'Agoty (1781) and Swebach Desfontaines (1790). Romé de l'Isle wrote the catalogs for his public sales in Paris (1769, 1772, 1780, 1783). In 1802 he sold one large collection of minerals (1139 specimens) to the St. Petersburg Mining Institute for 50,000 rubles, and sold many other specimens to Philip Rashleigh. His own collection of minerals was bequeathed to his brother Henry Forster and nephew J. Henry Heuland. They sold some of it at auction in 1808, and some in 1820 to Charles Hampden Turner, who later sold it to Henry Ludlam (1822–1880). Ludlam gave some of his collection to the British Museum and some to the London Museum of Practical Geology. *[Whitehead, 1973; Embrey and Symes, 1987; Cleevely, 1983; Ferber, 1789; Schenkenberg, 1842; Russell, 1952; Frondel, 1972]* [p. 47, 52, 53, 56, 71, 73, 74–75, 125]

FORSTER, ELIZABETH HUMPHREY (died after 1806), wife of British mineral dealer Adolarius Jacob Forster; she operated the business successfully during her husband's long travels. *[Embrey & Symes, 1987; Fronde, 1972]* [p. 83–84]

FORSTER, INGHAM HENRY (1725–1782), British-German mineral dealer. He managed a store for some years in Paris, on behalf of his brother, A. J. Forster; sales were held there in 1760, 1769, 1772, 1780 and 1783. Jacob Forster acknowledged that he had obtained many of his finest specimens from Ingham. In 1783–4 his effects were auctioned off, the mineral specimens alone requiring ten days; they were cataloged by Mendes da Costa. *[Mendes da Costa, 1812; Frondel, 1972; sale catalogs prepared by Romé de l'Isle]* [p. 74]

FORSTER, JOHANN REINHOLD (1729–1798), German professor of natural history and mineralogy at the University of Halle. His collection of about 3,500 mineral and rock specimens was acquired by the University. *[Kaemmel and Gaedeke, 1987]*

FOTHERGILL, JOHN (1712–1780), British physician and collector in Yorkshire. William Hunter purchased his geological collections in 1781 for £1,000. According to Lettsom, his ores and minerals, "dug out of different parts of the earth, were more distinguished for their variety than their number." *[Durant and Rolfe, 1984; Fox 1919]* [p. 47]

FOURCROY, ANTOINE FRANÇOISE, Count (1755–1809), French physician, chemist and naturalist in Paris. He had a mineral collection, though not a substantial one. *[Ferber, 1789]*

FOX, EDWARD (1749–1817), Cornish Quaker merchant and mine adventurer of Wadebridge, England. He supplied specimens of Cornish minerals, especially Wheal Boys bournonite, to Philip Rashleigh (1729–1811). *[Embrey and Symes, 1987; Russell, 1952]* [p. 74]

FRANCE de CROISSET, _____, French financier and "Payeur des rentes de l'Hôtel-de-Ville." A specimen from his collection is illustrated in Gautier d'Agoty's *Histoire Naturelle* (1781). His collection is also referred to by Dezallier d'Argenville (1780) and Thiéry (1783). *[Laissus, 1986]* (See also under Defrance.) [p. 53]

FRANCILLON, J. (died ca. 1817), British collector of minerals, fossils,

shells, coral and animals, all of them auctioned posthumously in London in 1817. *[Chalmers-Hunt, 1976]*

FRANCKE, AUGUST HERMANN (1633–1727), German clergyman. He built the Halle Orphanage and associated *Naturalienkabinet* which included minerals. *[Schupback, 1985]*

FRANKCOMBE, WILLIAM (1734–1767), English barrister and "fossilist." His collection of minerals, fossils and shells was sold to Samuel Paterson in 1767. *[Cleevely, 1983; Mendes da Costa, 1812]*

FRANKLIN, BENJAMIN (1706–1790), American statesman and scientist. He traveled widely, became acquainted with the European intelligentsia (including the Russian mineralogist and diplomat, Dmitrii Golitsyn), and apparently collected minerals among his many other endeavors; he donated a suite of minerals from Derbyshire, England to Charles Willson Peale's museum. *[Greene and Burke, 1978]* [p. 145, 146, 147]

FRANZ LUDWIG (1663–1732), German Elector and Archbishop of Trier and Mainz. His mineral collection, mentioned by Schenkenberg (1842), was purchased by the Bamberg Professor and Canon Linder, for a high price. *[ADB]*

FRANZ STEFAN, Holy Roman Emperor Francis I (1708–1765), in Vienna. He was a connoisseur of beautiful minerals. His extensive mineral collection, which he had assembled for his personal enjoyment, was donated to the state by his wife, Empress Maria Theresa, following his death. It now forms the core of the mineral collection of the Natural History Museum of Vienna. He also became owner of the Medici mineral collection in Florence, which was made a public institution in Florence by his son Leopold II in 1775. *[Burchard, 1986; Niedermayr, 1989]* [p. 101, 103–106]

FREDERIC III (1597–1659), Danish Duke of Holstein-Gottorp. He built a "cabinet of curiosities," presumably including minerals, which was kept at Gottorp Castle. *[Garboe, 1959]*

FREDERIC III, King of Denmark (1609–1670), who founded the Royal Danish *Kunstkammer* in 1650. The extensive collection of Olaus Worm was acquired in 1654, bringing many mineral specimens. Other collections were bought or confiscated by the Crown. In 1804 the minerals were separated out, eventually being transferred to the Geologisk Museum, Copenhagen. *[Gundestrup, 1985]* [p. 128]

FREDERIC IV (1671–1730), King of Denmark and Norway. His collection of *naturalia* is said to have included minerals. *[Gatterer, 1798]*

FREDERIC V (1723–1766; catalog published in 1759), King of Denmark and Norway. His collection of *naturalia* is said to have included minerals. *[Gatterer, 1798]* [p. 128–129]

FREDERICK AUGUSTUS I (AUGUSTUS II The Strong) (1670–1733), Elector of Saxony (1694–1733). He inherited the Electoral collection from his father, Johann Georg IV. The catalog of 1671 and 1683 was issued as a third edition in 1703. *[Gatterer, 1798]*

FREDERICK AUGUSTUS II (AUGUSTUS III) (1696–1763; catalogs published in Dresden, 1749, 1755), Elector of Saxony. He inherited the Royal collection from a long line of successors. *[Gatterer, 1798]*

FREIESLEBEN, JOHANN KARL (1774–1846), German mining commissioner, mountaineer and author in Freiberg. His mineral collection is mentioned by Schenkenberg (1842).

FRIEDRICH II, Landgrave von HESSEN (1720–1785). He built a new museum building to house the family collections, including the *Mineralienzimmer* ("mineral room") in 1779 and opened it to the public. *[Dreier, 1985]*

FRIEDRICH WILHELM Elector of BRANDENBURG (1620–1688), called "the Great Elector." He built the Brandenburg *Kunstkammer*, including minerals. *[Theuerkauff, 1985; WBD]*

FRIEDVALSZKY, JANOS (1740–1784), Hungarian Jesuit priest and professor at the Academy of Kolozsvár (now Cluj, Romania). He wrote the first systematic description of the minerals of Transylvania in 1767. His collection consisted primarily of Transylvanian minerals. *[Koch, 1885]*

FRIESEN, JOHANN GEORG FRIEDRICH, Baron von (1757–1824), German aristocrat. His mineral collection was purchased by the Royal Museum in Dresden for 1500 Taler in 1813. *[Fischer, 1939]*

FRIESS, MORITZ CHRISTIAN, Count (1777–1826), Austrian nobleman in Vienna. He purchased the collection of Eleanor de Raab after 1793 and preserved it intact. He also had a very desirable collection of Swiss minerals, and a collection purchased from Haüy in Paris, 193 specimens for 7,873 livres. *[Moll, 1806]*

FREUDENTHAL: see WRBNA von FREUDENTHAL

FUCKER, FRIEDRICH JAKOB (1748–1805), Hungarian physician in Tállya. According to Esmark (1798), his mineral collection was unremarkable.

FUIREN, HENRIK (1614–1659; catalog published in Copenhagen, 1663), Danish physician and naturalist. He built a museum of rarities considered to have included minerals, and donated it to the University of Copenhagen. *[Gatterer, 1798; BUA]*

FUIREN, THOMAS (1616–1673), Danish naturalist brother of Henrik Fuiren, and nephew of Ole Worm. He cataloged his brother's collection, and collected extensively himself. His specimens were donated to the University of Copenhagen upon his death. *[Annemarie Brantsen, personal communication]*

FUNCHAL, _____, Count de, Ambassador Plenipotentiary from Brazil to the Royal Court in London, later Prime Minister of Brazil, and friend of Count de Bournon. He brought with him to London a fine collection of Brazilian minerals, some of which he gave to Bournon. *[Bournon collection catalog]*

FUNCK, ALEXANDER, Baron (1716–1797), Swedish Bergsrådet, and collecting partner of Daniel Tilas. Some of his 1,743-specimen mineral collection he inherited from his grandfather, Peter Cronström, who began it in the 1670's. Other specimens he obtained from the Tilas, Törnehielm and Elias Brenner collections. Funck's collection was purchased for Count Bielke by Järnkontoret in 1784, for 1,336 riksdaler; Bielke donated it to the Stockholm mining college in the early 1790's, where it was preserved intact. It is now in the Riksmuseet. *[Zenzén, 1921]*

FÜRSTENBERG, KARL EGON von, German Prince and naturalist in Prague, and first president of the Private Scientific Society (later the Royal Bohemian Scientific Society). He donated his mineral collection to the society; it was transferred to the Royal Bohemian Museum in 1828. *[Wrany, 1896]*

FÜRSTENBERG-HEILIGENBERG, ANTON EGON, Prince von (1656–1716), German Prince. He lived in Wermsdorf and built a mineral collection that was acquired by the Royal Museum in Dresden *[Fischer, 1939]*

GADOLIN, JOHAN (1760–1852), Finnish chemist and mineralogist. His valuable mineral collection was destroyed by fire in 1827, when the Turku Academy burned down. *[Partington, 1974]* [p. 136]

GAHN, JOHAN GOTTLIEB (1745–1818), Swedish chemist and mineralogist; discoverer of manganese. His mineral collection was acquired in part by the Stockholm mining college (now the Riksmuseet), and in part by the mining school in Filipstad. *[Zenzén, 1921; Sahlin, 1919]*

GAILLARD, _____, French mineral dealer in Paris, in partnership with his sister. Ferber (1789) mentions that he had just recently sold most of his best specimens to an unnamed Polish gentleman.

GALAMBOS, MIHALY (died 1789), Hungarian professor of natural history at Bethlen Calvinist College in Nagyenyed. His mineral collection was purchased by the College in 1790 for 180 gold florins. *[Vita, 1986; Csíky, 1991c]*

GALANTHA: see ESTERHAZY von GALANTHA

GALLOIS, LOUIS GEORGE GABRIEL de (?) (catalog prepared by Romé Delisle, published in Paris, 1780), Parisian Jeweler; author of numerous articles on mineral occurrences in the *Journal de Mines*, 1801–1818. His cabinet consisted of minerals, crystallizations, etc. He acquired the natural history cabinet of a Mr. Bellanger, director of a tobacco company in Paris. *[Romé Delisle, 1783; Thiéry, 1783; Laissus, 1986]* [p. 52]

GARDENSTONE [or GARDEN], FRANCIS, Lord (1721–1793), wealthy Scottish judge in Banffshire and Aberdeenshire. David Hosack examined his "small but beautiful [mineral] collection" in 1793, shortly before his death. *[Hosack, 1822; DNB]*

GAUTIER D'AGOTY, FABIEN (1739–1781), French printing expert who pioneered the use of printed (as opposed to hand-painted) colors in book illustrations. Three specimens from his mineral collection are pictured in his *Histoire Naturelle* (1781). [p. 50–53, 57, 75]

GEDENSHTROM: see HEDENSTROM

GEIJER, BENGT REINHOLD; Swedish mineral collector. Specimens with his own handwritten labels from 1795 are preserved in the Riksmuseet, Stockholm. Hausmann visited his collection in 1806–1807. *[Zenzén, 1921]*

GEISLER, JOHAN TOBIAS (the younger) (1758–1826), Swedish jurist and mineral collector. Specimens bearing his original handwritten labels from before 1780 have been preserved in the Riksmuseet, Stockholm. *[Zenzén, 1921]*

GEISSLER, JOHANN GOTTLOB (catalog, 774 pages, *Geisslerischen Mineralien-Sammlung*, published in Leipzig, 1792), mineral dealer of Leipzig. His collection of "beautiful and numerous" mineral specimens was sold in 1792. *[Gatterer, 1798; Freiesleben, 1828]*

GELLERT, CHRISTLIEB EHREGOTT (1713–1795; auction catalog published in Freiberg, 1795), German chemist and mineralogist, member of the Freiberg Mining Council, and author of a book on chemical mineralogy. His collection was rich in Saxon mineral specimens. He donated specimens to help establish the mineral collection of the Freiberg Mining Academy shortly after it was founded in 1765. *[Weber, 1992; Freiesleben, 1828]* [p. 100]

GEMMINGEN, CARL FRIEDRICH REINHARD von (1739–1822), German cabinet minister. He supplied mineral specimens to Caroline Louise von Baden. *[Mayer, 1975]*

GENERSICH, CHRISTIAN (1759–1825), Hungarian Lutheran minister, naturalist, writer, and member of the Mineralogical Society of Jena. He owned a mineral collection, some of which he donated to the Hungarian National Museum. *[Benedek, 1942; Miller, 1818]*

GEOFFROY, CLAUDE JOSEPH (1685–1752; sale catalog published in Paris, 1753), French chemist. His collection consisted of "minerals, shells, and other curiosities of nature." *[Murray, 1904; Gersaint, 1736]*

GEOFFROY de ST.-HILAIRE, ÉTIENNE (1772–1844), French naturalist in Paris. He built a personal cabinet of natural history, including minerals, and donated a suite of Brazilian mineral specimens to the Paris Museum of Natural History. He also donated a fabulous specimen of dendritic Mexican silver to the King's Cabinet in Paris in the 1790's. *[Schenkenberg, 1842; DBF; Schubnel, 1987]* [p. 55]

GEORGE IV, King of England (1762–1830). His collection of superb mineral specimens from the Harz Mountains was acquired by the British Museum in 1828. *[Burchard, 1986]* [p. 88]

GERAMB, TEOPHIL von (ca. 1750–ca. 1820), Royal Hungarian Mine Councillor and mineral collector in Selmecbánya. *[Jónás, 1820]*

GERHARD, _____ (fl. late 1700's), Hungarian copper-mill owner in Igló (=Spisská Nová Ves). He was a member of the Mineralogical Society of Jena and owned a mineral collection. *[Esmark, 1798; Benedek, 1942]*

GERHARD, CARL ABRAHAM (1723–1821), German mineralogist and author. His mineral collection was acquired in 1781 by the Royal Mining Academy (now the Technical University), Berlin, where it formed the nucleus of the Royal Mineralogical Collection. *[Burchard, 1986; Strunz, 1970]*

GERSDORF, ADOLPH TRAUGOTT von (1744–1807), German naturalist and social reformer. Founded the Oberlausitzische Scientific Society in 1779, in Görlitz. He built a mineral collection, which was acquired by the Society upon his death. By 1950 it had come into the possession of the Staatliche Kunstsammlungen Görlitz where it is preserved today. *[Sarjeant, 1980; Fischer, 1939; Zwaan and Petersen, 1977]*

GESNER, CONRAD (1516–1565), Swiss naturalist, founder of modern zoology. Author of the first popular mineralogy handbook for amateur naturalists interested in minerals (1565), only the second attempt in history to form a rational classification scheme or system for minerals. His mineral collection was acquired after his death by Felix Platter and was later assimilated by the Natural History Museum in Basle, but no trace of it remains today. *[Adams, 1938; Fischer, 1964; Prescher, 1955; Wellisch, 1975]* [p. 19, 23, 143]

GEVERS, ABRAHAM (1712–1780; catalog, *Museum Geversianum* published in Rotterdam, 1787). His natural history collection included minerals. *[Gatterer, 1798; Cleevely, 1983]*

GIBBS, (Col.) GEORGE (1776–1833), American collector in Newport, Rhode Island. His 20,000-specimen collection consisted primarily of specimens purchased in Europe, especially the collections of Count Razumovsky and Gigot d'Orcy, but also including a smaller collection of fine mineral specimens assembled for him by Count de Bournon. He returned to the U.S. with this treasure around 1805. It was eventually purchased for $20,000 by Yale University in 1825, where it was used by Benjamin Silliman, James D. Dana and others. *[Narendra, 1979; Goode, 1901; annonymous, 1808; Greene and Burke, 1978; DAB; CAB]* [p. 46, 47, 57, 61, 128, 149, 150, 154]

GIESECKE, KARL LUDWIG (1761–1833), German mineralogist and field collector. He collected minerals in Greenland, later distributing them to the Geological Museum in Copenhagen (1814), Thomas Allen (1808), and the Dublin Natural History Museum (1815), among others *[Cleevely, 1983; Burchard, 1986; Petersen and Secher, 1993]*

GIESSEL, (Pater) ALEXANDER (died 1770), Austrian Monk, founder in 1724 of the mineral and shell collection of the Minorite monastery. It was sold off prior to 1805, many specimens ending up in the imperial cabinet in Vienna. *[Fitzinger, 1856]*

GIGANTI, ANTONIO (1535–1598), Italian scholar in Bologna and friend of Ulisse Aldrovandi, whose museum was housed in the same group of buildings. Giganti began building a large encyclopedic museum before 1563; it was heavy on ethnographic and cultural works but also contained *naturalia*, including minerals. His museum had been dispersed by 1603. *[Laurencich-Minelli, 1985]*

GIGOT d'ORCY, JEAN BAPTISTE FRANÇOIS (1733–1793), wealthy French patron of natural history. He served as an Inspector of Mines, later as Receiver General of Finances of the généralité de Châlons. He assembled a large and valuable cabinet and library, including 4,000 fine mineral specimens gathered over 40 years; many of his specimens were illustrated by Gautier d'Agoty (1781). He was guillotined during the French Revolution; his heirs sold his minerals to the American collector George Gibbs in 1804. Gibbs's collection ultimately went to Yale University, where some specimens are still identifiable, and where Gigot d'Orcy's original manuscript catalog is still preserved. *[Narendra, 1988; DBF]* [p. 46, 53, 57, 59–61, 150]

GILBERT, LUDWIG WILHELM (1769–1824), German Professor in Leipzig. His collection of minerals was acquired by H. W. Campe. *[Freiesleben, 1828; ADB]*

GILLET de LAUMONT, FRANÇOIS PIERRE NICOLAS (1747–1834), French Inspector General of the Mines, and one of the greatest mineral collectors of his day. His collection of 1,600 specimens from all over Europe included the first axinites ever found in France. It was purchased by the French government for the National Museum of Natural History in 1835. *[Schubnel, 1987; Laissus, 1986]* [p. 53, 57, 61, 63]

GILMOR, ROBERT (1774–1848), wealthy American merchant in Baltimore. He traveled in Europe at least as early as 1800, and was acquainted with the most eminent mineralogists. His "handsome cabinet of minerals" was "remarkable for its richness in fine and rare minerals." *[Silliman, 1849; Greene and Burke, 1978]*

GODON ST. MEMIN, SILVAIN (ca. 1769–1840), Parisian mineralogist, later of Philadelphia; one of the earliest American mineral collectors. His collection was acquired in 1812 by Dr. Benjamin Smith Barton, and subsequently by Joseph Watson, who in turn gave it to found the mineral collection of the Philadelphia Academy of Natural Sciences. Godon built a second mineral collection after 1812 that was dispersed at his death, some specimens going to the American Philosophical Society. *[Canfield, 1923; Greene and Burke, 1978; Cleevely, 1983; Greene, 1969; Sellers, 1969]*

GOETHE, JOHANN WOLFGANG von (1749–1832), German poet and scientist; Supervisor of Mining in the Dutchy of Weimar (1775). His mineral collection is in the Goethe National Museum in Weimar. A catalog *[Prescher, 1978]* has been recently published. [p. 92–93, 99]

GOGEL, _____, German wine merchant in Frankfurt. Thomas Pennant saw his collection in 1765, a "cabinet of fossils and ores, of which he was very liberal." *[Pennant, 1948]*

GOLDHAGEN, JOHANNES FRIEDRICH GOTTLIEB (1742–1788), German physician and professor of medicine and natural history at the University of Halle. His natural science collections, among the most important in Europe, included a *Mineralienkabinet* with minerals,

ores, rocks and a few fossils. He purchased the large mineral collection of Friedrich Hoffmann in 1777. In 1787 his collections were purchased for 2,500 thaler by the University. *[Kaemmel and Gaedeke, 1987; Gaedeke, Kaemmel and Seydewitz, 1984]*

GOLDING, HENRY (died ca. 1813), British collector in Wallingford, Berkshire. His minerals, fossils, shells, corals, insects and birds were auctioned posthumously in London in 1813. *[Chalmers-Hunt, 1976]*

GOLITSYN, DMITRII ALEKSEEVICH (1734–1803), Russian diplomat and naturalist; lived in Paris, Aachen, The Hague, Brunswick and Jena. He bequeathed his mineral collection (30,000 specimens) and library to the Jena Mineralogical Society, which nearly a century later was disbanded. The ducal castle that had housed his collection was demolished in 1908, and the collection has since been dispersed into the general collection of the University of Jena. *[Wilson, 1991a]* [p. 46, 128]

GOLOVKIN, ALEXIS, Count (fl. 1790's–early 1800's), Russian statesman in Moscow. He was a friend and supporter of Swebach Desfontaines, who made crystal model sets for Romé de l'Isle. He purchased all or most of the several thousand mineral specimens of Charles Calonne in 1801; some Calonne specimens of Golovkin's later passed to Alexander von Crichton. *[Swebach Desfontaines, 1792; Wagner, 1818]* [p. 127]

GOSSE, HENRI ALBERTET (1753–1816), Swiss chemist and naturalist in Geneva. Schenkenberg (1842) recommended seeing his mineral collection.

GOTTLIEB, JOHANN (1755–1820), German dealer in natural history specimens, minerals and polished agates in Oberstein. *[Archives of the Landessammlungen für Naturkunde, Karlsruhe]*

GOTTWALD, JOD. LEOPOLD (catalog published in Danzig, 1714), Danish physician in Danzig. His collection, 1,195 specimens, was purchased by Peter the Great of Russia in 1716. *[Bancroft, 1988; Linné, 1777]*

GÖTZINGER, (Pastor) M. (auction catalog published in Dresden, 1827), German clergyman. His mineral collection included many interesting Saxon specimens.

GOULD, JOHN (1740–1823), British physician in St. Austell and Truro, Cornwall. He married Philip Rashleigh's sister, Rachel, and provided mineral specimens for Philip's collection. *[Russell, 1952]* [p. 74]

GRAMBS, J. (catalog published in Frankfurt, 1741). His natural history collection included minerals. *[Gatterer, 1798]*

GRAUEL, JOHANN PHILIP (1711–1761; catalog, *Museum Gravelianum s. Collectionis regni mineralis*, published in Strasbourg, 1772), Doctor of Medicine and Professor of Physics in Strasbourg. His was apparently an exclusively mineralogical collection. *[Gatterer, 1798; Leonhard et al., 1817]*

GRAVE, R. (died ca. 1807), British collector of minerals and shells auctioned posthumously in 1807. *[Chalmers-Hunt, 1976]*

GRAVENHORST, JOHANN LUDWIG CHRISTIAN (1777–1857), German Professor of Natural History and Director of the Zoological Museum in Breslau. His mineral collection is mentioned by Schenkenberg (1842). *[ADB]*

GRAVERON: see BANDEVILLE

GREENE, RICHARD (1716–1793; catalogs published in 1773, 1782, 1786), British surgeon, apothecary and antiquary in Litchfield. He began collecting curiosities around 1742, eventually opening his collection to the public. It included minerals, spars, ores, crystals, fluorites and incrustations along with all sorts of other natural history specimens and ethnographic items. The minerals were sold to John St. Aubyn in 1799 for £100. *[Torrens, 1974; Cleevely, 1983]* [p. 81]

GREENOUGH, GEORGE BELLAS (1778–1855), wealthy British naturalist, geographer, geologist and student of Werner; he was founder (1811) and first president of the Geological Society, London. He built a geological collection (minerals, rocks and fossils), and donated many British specimens to the Paris Museum of Natural History. His collection was later acquired by University College in London. *[Woodward, 1907; Schenkenberg, 1842]*

GREGOR, (Rev.) WILLIAM (1761–1817), British vicar in Creed, Cornwall, and the discoverer of titanium. He was an enthusiastic and meticulous chemical analyst, favoring in particular the minerals of Cornwall. Philip Rashleigh reported obtaining mineral specimens from him. *[Russell, 1952; Weeks, 1945]* [p. 74]

GRENVILLE, RICHARD TEMPLE NUGENT BRYDGES CHANDOS, Duke of Buckingham and Chandos (1776–1839), English Member of Parliament, President of the Board of Trade, and a collector of rare prints and *naturalia*. He purchased the large mineral collection of René Just Haüy in 1823. In 1848 it was sold by his heirs to the Natural History Museum in Paris, where it is still preserved. *[Schubnel, 1987; Schenkenberg, 1842; Chalmers-Hunt, 1976; BCP]* [p. 55, 84]

GRENVILLE, WILLIAM WYNDHAM, Baron (1759–1834), English nobleman. He donated 189 specimens of Peruvian ore minerals to the British Museum in 1809. *[Cleevely, 1983; Fletcher, 1904]*

GREVILLE, CHARLES FRANCIS (1749–1809), English statesman, botanist and mineralogist. He collected minerals for more than 36 years, building a collection of 14,800 mineral specimens and 5,200 faceted stones; acquired minerals from Ignaz von Born and the Marchess Ippolito Durazzo. His collection was curated by Count de Bournon, and later sold in 1810 to the British Museum for £13,727. *[Simmonds, 1942; Smith, 1978; Cleevely, 1983; Sarjeant, 1980; Dellow, 1973; Fletcher, 1904]* [p. 46, 47, 56, 67, 75, 78, 79, 82, 106]

GRIFFIN, THOMAS (died after 1788), British Counsellor at Hadnock, near Monmouth. Mendes da Costa (1812) described him as "a very intelligent and scientific collector" of minerals, shells, etc.

GRILL, [probably Adolph Ulrik, 1752–1794], (catalog, *Museum naturalium Grillianum*, written in 1783 and published in Stockholm, 1788). His natural history cabinet is considered to have included minerals. *[Gatterer, 1798]*

GRILL, ANTON (1664–1727; first catalog published in Amsterdam, 1728; second catalog, *Musei Grilliani*, published posthumously in Amsterdam, 1776), of Amsterdam. His museum contained "all kinds of fossils." *[Gatterer, 1798]*

GRILL, JOHANNES (1614–1670; catalog published in Amsterdam by his wife, 1679), Dutch assayer and collector of minerals, shells and coins in Amsterdam. He was the father or grandfather of Anton Grill (1664–1727), also a mineral collector. *[Murray, 1904; Bergvelt and Kistemaker, 1992]*

GRISCOM, JOHN H. (1774–1852), American Professor of mineralogy. He was responsible for many of the translations and abstracts of foreign geological and mineralogical literature that appeared in the American Journal of Science from 1820 to 1845. *[Hazen and Hazen, 1980; Griscom, 1835]*

GROLLIER, _____, Marquis de (catalog by Romé de l'Isle published in Paris, 1780), French aristocrat. His collection of natural history presumably included minerals, considering that it was cataloged by such a famous mineralogist. [p. 52]

GRONOV, JOHANN FRIEDRICH (1690–1760; catalog published in Leiden, 1740; a subsequent auction catalog was published in 1750), Dutch physician. His collection of "*lapideae*" included some American minerals. William Borlase relates being asked to assemble a collection of Cornish minerals for him. His collection was probably bequeathed to his son (see below). *[Gatterer, 1798; WBD; Borlase, 1758; Pool, 1986; Leonhard et al., 1817; Greene and Burke, 1978]* [p. 68, 117]

GRONOV, LORENZ THEODOR (?1730–1778; catalog, *Museum Gronovianum*, published in Leiden, 1778), Dutch naturalist, son of Johann Friedrich Gronov. He owned a natural history collection probably incorporating his father's *lapideae* and other mineral specimens. *[Gatterer, 1798, WBD]*

GRUEL, _____, French Abbot in Paris. He obtained the large and much-admired collection of Madame Bandeville in 1792, and later sold it to Prince Masséna. *[Taton, 1986]*

GRUNDIG, _____ (catalog published in Freiberg, 1770's), German mineral collector in Freiberg. His very brief mineral catalog was said by Freiesleben (1828) to contain nothing of interest, at least regarding Saxon specimens.

GRUNER, GOTTLIEB SIGMUND (1717–1778; catalog published in Bern, 1775), leading Swiss geologist of the 18th century. His collection of minerals laid the foundations for the description of the mineralogy of Switzerland. *[ADB]*

GRUNER, JOHANN RUDOLF (born 1690's), Swiss clergyman and

naturalist in Bern. He assembled a considerable mineral collection, inherited by his son Gottlob Sigmund Gruner, who also became a famous naturalist. *[ADB]*

GRÜNO, ISAAK (1756–1783), Swedish physician and botanist in Hamburg; he was Linnaeus's last student. Grüno assembled a natural history collection which, upon his death, was purchased by the Hamburg Admiralty for the Hamburg City Library. The minerals are now in the collection of the University of Hamburg. *[Muhlack, 1992; Zimmermann, 1865]*

GUETTARD, JEAN ETIENNE (1715–1786), celebrated French naturalist in Paris. His collection of minerals was confiscated by the Public Welfare Committee after the French Revolution and turned over to the National School of Mines in Paris. *[BUA; Hofmann, 1981; DBF]*

GUSTAV IV ADOLF (1778–1837), King of Sweden. He donated 624 specimens of Siberian minerals to the Stockholm mining college in 1790; he also gave specimens to the Universities in Uppsala and Lund. *[Zenzén, 1921]*

GUSTAVUS III (1746–1792), King of Sweden and son of Adolphus Frederick (1710–1771). His mineral collection, perhaps obtained in part from his parents, was acquired by the University of Uppsala in 1804. *[Norin, 1962; WBD]* [p. 134]

GUSTAVUS ADOLPHUS, (1594–1632) King of Sweden. He was given the *Kunstschrank* purchased from Philipp Hainhofer in 1632 for 6,000 gulden. It contained specimens from the plant, animal and mineral kingdoms. The king died that same year. In 1694 Carl XI donated it to Uppsala University, and some years later the minerals were transferred to the Department of Chemisty. *[Boström, 1985]*

GYLLENHAL, JOHAN ABRAHAM; Swedish geologist and Bergmåstare. His mineral collection was acquired in the late 1700's by the Stockholm mining college and also the Academy of Science in Uppsala. *[Zenzén, 1921]*

HACQUET, BALTHASAR (1739–1815), French-born professor of surgery, zoology and mineralogy at Laibach, Lemberg and Krakau. He was a versatile naturalist and a frequent traveler in the Alps; his major work was *Oryctographia Carniola* (1778, 1781, 1784). His mineral collection went to the Joanneum in Graz. *[Zapfe, 1971; Meixner, 1951]*

HADIK, ANDREAS, Count von (1710–1790), Austro-Hungarian Field Marshall in Vienna. His collection was rich in minerals, especially gold specimens and amethysts. He sold his "beautiful collection" of minerals, to Maria Theresa for a great price, and later bequeathed specimens to Kaiser Leopold II in Vienna. *[Stütz, 1807; Fitzinger, 1856]*

HAHN, _____ (fl. late 1700's), Dutch professor in Leiden. His collection, which included Transylvanian golds, was purchased in 1785 by Martinus van Marum, and later incorporated into Teyler's Museum in Haarlem. *[Burchard, 1986]*

HAIDINGER, KARL MARIA (1756–1797), Austrian Bergrat and consultant to the Royal Imperial Hofkammer in Vienna; adjunct director of the Royal Naturalien-Cabinett; later a professor at the mining school in Schemnitz. He was the father of the well-known mineralogist Wilhelm von Haidinger (1795–1871).

HAINHOFER, PHILIPP (1578–1647), German merchant of Augsburg. He began building a *Kunstkammer* in 1604, and it soon became a popular attraction for scholarly visitors to Augsburg. It included numerous crystallized mineral specimens. He sold it to Gustavus Adolphus in 1632, for 6,000 gulden, and it was later transferred to Uppsala University. *[Boström, 1985]*

HALLEY, (Sir) EDMUND (1656–1742), famous British astronomer and traveler. He supplied mineral and fossil specimens to John Woodward. *[Price, 1989; DNB]*

HAMILTON, MATTHEW (collection auctioned in London, 1765). His collection included minerals and shells. *[Chalmers-Hunt, 1976]*

HAMILTON, WILLIAM (1755–1797), Irish cleric and naturalist. Forty plates in his book on Sicilian volcanoes (1776–1779) depict rock and mineral specimens he had collected. His mineral collection was acquired by Trinity College, Dublin. *[Burchard, 1986; Sarjeant, 1980]*

HANNA, GEORG (catalog published in Copenhagen, 1699). His cabinet of antiquities and natural history specimens is considered to have included minerals. *[Gatterer, 1798]*

HANNSEN, F. L. (auction catalog published in Dresden, 1817), building contractor and merchant of Leipzig. His collection of minerals was well known in its day, and considered very interesting. *[Freiesleben, 1828; Fischer, 1939]*

HANSTADT: see LANG von HANSTADT

HAPPEL, [possibly EBERHARD WERNER; 1647–1690, died in Hamburg], (catalog published in Hamburg, 1688). He had a collection of exotica including foreign rarities; it is considered to have contained minerals. *[Gatterer, 1798; ABD]*

HARRER, EMMANUEL THEOPHILUS (catalog published in Regensberg, 1787). Member of the Regensberg city council in 1775. The mineral portion of his catalog, 216 pages, was arranged according to Cronstedt's system. *[Freiesleben, 1828]*

HARTIG, FRANZ de PAULA, Count (1758–1797), Lord of Niemes and Wartenberg in Bohemia, patron of science and the arts. His natural history collection included excellent minerals. *[Wrany, 1896; Tucek, 1978]*

HARTMANN, JOHANN GEORG AUGUST, Count (1764–1849), German mineralogist in Stuttgart. His mineral collection was acquired by the Natural History Museum in Prague. *[Schenkenberg, 1842; ADB]*

HARVEY, WILLIAM (1578–1657), English physician and anatomist, discoverer of the circulation of the blood; studied under Galileo at Padua. His collection of geological specimens, presumably including minerals, was destroyed by fire in London in 1666. *[Gatterer, 1798; Torrens, 1985; WBD]* [p. 40, 41, 64]

HATCHETT, CHARLES (1765–1847), English chemist, discoverer of columbium. His fine collection of approximately 7,000 mineral specimens was purchased by the British Museum in 1799 for £700. *[Embrey and Symes, 1987; Smith, 1978; DNB; Fletcher, 1904]* [p. 46, 47, 67, 74, 78, 87]

HAUPT, CHRISTIAN; royal lapidarist (*Hofsteinschleifer*) in Vienna. He sold his substantial mineral collection to Prince Sinzendorf who, by 1806, had removed most of it to his residence in Ernsbrunn. *[Stütz, 1807]*

HAÜY, Abbé RENÉ JUST (1743–1822), French mineralogist and founder of mathematical crystallography in Paris. His 12,000-specimen mineral collection was sold to the Duke of Buckingham in 1823, whose collection was later acquired by the French National Museum of Natural History (Jardine des Plantes) in 1848. Over 6,000 specimens with labels in Haüy's handwriting have been preserved. *[Schubnel, 1987; Lacroix, 1944]* [p. 46, 47, 53–56, 84, 147]

HAWKINS, JOHN (1761–1841), English author, antiquarian, scientist and early Cornish mining geologist. He contributed many specimens to Philip Rashleigh's collection. His best Cornish minerals were sold at auction to Sir Arthur Russell in 1905, and are now in the British Museum. Much of the rest of his large mineral collection was bought by the German dealer F. Krantz. *[Embrey and Symes, 1987; Smith, 1978; Cleevely, 1983; Russell, 1952; Russell, 1954; DNB; Simmons, 1904]* [p. 71, 87]

HAZARD, SAMUEL (1714–1758), American merchant in Philadelphia. He built one of the earliest American mineral collections in the 1740's and 50's. Benjamin Franklin praised his "large collection of ores, minerals & other fossils of these parts of America" in a letter of 1764. *[CAB; Greene and Burke, 1978]* [p. 145]

HEDENBERG, ANDERS (1737–1798), Swedish physician and mineral collector. He assembled a "complete series" of Swedish minerals. Especially excellent were his suites of apophyllite and spodumene. *[Zenzén, 1930; Hausmann, 1811–1818]*

HEDENSTRÖM [GEDENSHTROM], MATVEI MATVEEVICH (ca. 1780–1845), Russian explorer in St. Petersburg. Schenkenberg (1842) mentions his mineral collection as worth seeing, particularly his vesuvianite and grossular specimens from Vilni in Siberia.

HEIDAN, KARL (undated catalog published in Leiden before 1727), German collector. His cabinet included minerals, shells, corals, gemstones, coins, marble and antiquities. *[Neickelio, 1727]*

HEIL, J. C. L. (1774–1853), German collector in Stuttgart. His 17,000 mineral and rock specimens were acquired by the University of Tübingen in 1854. The collection was purchased, along with 16,000 specimens from E. F. Glocker (1793–1858) for 77,458 Thalers. *[Burchard, 1986]* [p. 46]

HEILIGENBERG: see FÜRSTENBURG-HEILIGENBERG

HEIM, JOHANN LUDWIG (1741–1819), German geologist in Meiningen. His "very large and rich mineral collection" was given, following his death, to the University of Jena. *[Schenkenberg, 1842; ADB]*

HEIMBICHLER, _____ (fl. 1790's), Austrian collector in Vienna. His mineral collection passed to von Bienenfeld. *[Fitzinger, 1856]*

HEINEKEN, JOHANN (1761–1851), German Professor of Anatomy and Experimental Medicine in Bremen. Schenkenberg (1842) mentions his "outstanding" mineral collection. *[ADB]*

HEINRICH XLIII, Prince REUSS-PLAUISCHEN (1752–1814; catalog published in Gera, 1785), German nobleman in Köstritz. He built a natural history collection that included 774 specimens of earths, stones and ores, and which was much admired by Goethe. *[Russe, 1991]*

HELLOT, JEAN (1685–1766), French chemist and technologist in Paris, chief assayer to the mint. His mineral collection was acquired by Varennes de Béost in 1766 and is mentioned in the 1774 sale catalog of his collection. *[Laissus, 1986]* [p. 52]

HELMS, ANTON ZACHARIAS (died 1799), German or Austrian smelter director, traveler and writer. He traveled through Peru from 1788 to 1792, collecting minerals at Potosi. The collection was later acquired by Lethany in Vienna. *[Helms, 1798; Moll, 1806; Zipser, 1817]*

HELWIG, GEORG ANDREAS (1666–1748), prominent Prussian theologian, mineralogist and botanist in Angerburg, and a member of the Royal Prussian Scientific Society. His collection was composed primarily of minerals and rocks from the local area, which he described in his *Lithographia Angerburgica* (Königsberg, 1717, and Leipzig, 1720). *[Neickelio, 1727; BUA; CBM]*

HENCKEL, JOHANN FRIEDRICH (1679–1744), German chemist and mineralogist in Freiberg. His collection of 2,000 mineral specimens was bequeathed to the mineralogical museum of the Royal Academy of Science in St. Petersburg. *[Schenkenberg, 1842]* [p. 125]

HENNAH, EDWARD (1773–1835), Cornish bookseller, printer and mineral dealer in St. Austell. He supplied specimens to Philip Rashleigh, and built a personal mineral collection especially rich in "wood tin" cassiterite. *[Russell, 1952]* [p. 74]

HENNE, FERENC (died 1835), Hungarian grand provost and teacher in Zalatna and Gyulafehérvár. He was a member of the Mineralogical Society of Jena, and had a mineralogical collection. *[Esmark, 1798; Benedek, 1942]*

HERDER, SIEGMUND AUGUST WOLFGANG, Baron von (1776–1838), German mine official at the Freiberg Mining Academy. He built a personal mineral collection, and sent specimens to the Stockholm mining college in 1822. *[Zenzén, 1921; Schenkenberg, 1842]*

HERICART de THURY, LOUIS ÉTIENNE FRANÇOIS (1776–1854), French engineer and author on applied science. He collected pathological anatomy specimens and also minerals. He donated a suite of minerals from Isére to the Paris Museum of Natural History. *[Schenkenberg, 1842; DBF]*

HERMANN, ANDREAS (1693–1764), physician in Pozsony (= Bratislava). According to Bél (1723), his collection included virtually all of the important Hungarian minerals.

HERMANN, BENEDIKT FRANZ JOHANN (1755–1815), Austrian Professor of Technology in the Royal Imperial Akademie in Vienna. His mineral collection is mentioned by Fitzinger (1856).

HERMANN, JEAN (1738–1800), French physician and Professor of Medicine. He collected beautiful minerals and built a substantial natural history collection that later became the foundation for the Strasbourg Natural History Museum. *[Fischer, 1939]*

HERMANN, LEONHARD DAVID (fl. 1711), German priest in Massel; member of the Royal Prussian Scientific Society. He built a significant collection of rocks, minerals and antiquities, especially from the Massel area. *[Neickelio, 1727]*

HERMANN, PAUL (1646–1737; catalog published in Leiden, 1711), celebrated Dutch botanist. His collection consisted of "exotic animals, plants, insects and minerals." *[Gatterer, 1798; BUA]*

HERMBSTEDT, _____ von (1760–1833), German physician and Professor of Chemistry and Technology in Berlin. His substantial private mineral collection is mentioned by Schenkenberg (1842). *[ADB]*

HERMELIN, SAMUEL GUSTAF, Baron (1744–1820), Swedish mining assessor and member of the Royal Mining College. He collected minerals in northern Sweden in the 1750's and obtained part of the Adlerheim collection. All of his specimens went to the Stockholm mining college in the early 1800's. *[Zenzén, 1921]*

HEULAND, CHRISTIAN (manuscript catalog dated 1800), British mineral dealer, father of the prominent mineral dealer John Henry Heuland (1778–1856) and brother-in-law of Jacob Forster (1739–1806). He collected minerals in Peru and Chile during the years 1795–1800. *[Arias Devito, 1978]*

HEULAND, JOHN HENRY (1778–1856), major British mineral dealer in London, nephew of A. Jacob Forster. He bought many specimens from the Marquis de Drèe. The Paris School of Mines bought important specimens from him. His personal mineral collection was dispersed. He assembled a major collection for Charles Hampton Turner, the published catalog of which ran to three volumes. *[Embrey and Symes, 1987; Schenkenberg, 1842; Russell, 1949]* [p. 73, 74, 75, 78, 79, 88]

HEYER, GOTTLIEB LEBERECHT (1767–1839), German Finance Director and Cabinet Minister. He built a large collection of minerals, and especially crystals, many of great rarity. *[Fischer, 1939]*

HEYNITZ, FRIEDRICH ANTON, Baron von (1725–1802), Saxon General Mining Commissioner. He helped found the Freiberg Mining Academy in 1765, and donated mineral specimens to help establish the Academy collection. *[Weber, 1991; Fischer, 1939]* [p. 100]

HIÄRNE, URBAN (1641–1724), Swedish physician, chemist and geologist. A contemporary (Goelger) wrote in 1707 that Hiärne's cabinet contained "beautiful minerals of all sorts." *[Zenzén, 1921]*

HIEGEL, JOHANN CRAFT (catalog, *Museum Hiegelianum*, published in Konstanz, 1714), German collector in Mainz and Coblenz, physician to the Archbishop and Elector of Treves. He had a "large collection of minerals and various mining-related specimens, ores, sulfur, salts, earths, stones and the like," plus many books, shells, insects and objects of art. *[Gatterer, 1798; Neickelio, 1727]*

HILL, JOHN (1714–1775), English physician, botanist, geologist, apothecary, columnist, actor and dramatist; author of *The History of Fossils* [meaning minerals, primarily] (1748). He was an avid collector of plants and minerals, and traded mineral specimens to Emanuel Mendes da Costa. Hill described his own mineral collection, assembled for study purposes, as "rather [more] numerous than elegant." *[Rousseau, 1982; DNB]* [p. 87]

HILSCHER, PAUL CHRISTIAN (auction catalog published in Dresden, 1818). His natural history collection was established as a private museum called the *Museum für Natur und Kunst*. Thirty pages of the catalog were devoted to minerals. *[Freiesleben, 1828; Fischer, 1939]*

HIORT, JØRGEN (1737–1804), Norwegian Oberberghauptmann in Kongsberg. His collection of 3,970 mineral specimens was acquired by the Kongsberg Mining Academy and later by the University of Oslo. *[Burchard, 1986; Kjerulf, 1881]* [p. 130–131]

HISINGER, WILHELM von (1766–1852), Swedish geologist and mineralogist in Stockholm. His mineral collection was acquired by the Geological Survey of Sweden, Stockholm. *[Cleevely, 1983; Schenkenberg, 1842]*

HJELM, PETER JACOB (1746–1813), Swedish curator of minerals at the Stockholm mining college. He donated his own small collection of minerals to the mining college in 1800. *[Zenzén, 1921]*

HOBLYN, ROBERT (?1710–1756), wealthy mine adventurer of St. Columb, England. He built a collection of minerals, "amongst which were several unique specimens both of tin and copper." It was destroyed by fire in 1803. *[Embrey and Symes, 1987]*

HOEY, _____ van (late 1700's), Dutch physician in The Hague. His extensive mineral collection included extraordinary hematite crystals from Elba. *[Fischer, 1939]*

HOF i SKARA, SVEN (manuscript catalog dated 1757, *Conspectus Museii Hofiani*), Swedish geologist and lecturer in the Stockholm mining college, which obtained his collection. *[Zenzén, 1921]*

HOFF, KARL ERNST ADOLF von (1771–1837), German Director of the Ober-Consistorium in Gotha, and publisher of mineralogical works. His mineral collection, kept at the ducal palace in Gotha, was mentioned by Schenkenberg (1842). *[ADB]*

HOFFMANN, FRIEDRICH (1660–1742; catalogs published in Halle, 1736, 1741), German physician, Royal Prussian Privy Councillor, and professor of natural history and mineralogy at the University of Halle. His *Mineralienkabinett* was acquired by Johannes Goldhagen in 1777; the Goldhagen collection was purchased in 1787 by the University. *[Gatterer, 1798; Freiesleben, 1828; Kaemmel and Gaedeke, 1987]*

HOFFMANN, GEORGE (catalog published in Dresden, 1751), German author and collector. His collection consisted primarily of metallic ore specimens. *[Freiesleben, 1828]*

HOFMANN, LORENZ (1582–1630; catalog, *Thaymato Phylakion*, published in Halle, 1625), German physician. His collection contained "exotic *naturalium*" considered to have included minerals. *[Gatterer, 1798; Poggendorff, 1863]*

HOHENWARTH, SIGISMUND, Count von (1745–1825), Austrian naturalist and Bishop, Oberdirektor of the royal imperial collections in Vienna. He was a friend and collecting partner of Wulfen, and built an excellent mineral collection. In 1808 he inherited Wulfen's collection. In 1809 he sold his collections for 12,000 gulden to Count Franz von Egger in Klagenfurt. Egger donated everything to help found the Joanneum in Graz in 1816. *[Meixner, 1951]* [p. 47]

HÖLGY, GASPAR (fl. middle-1600's), Hungarian Chief Justice. He gave his mineral collection to Procopius Bonanus as a fee for planning out his castle in Laszkár. Bonanus later gave the collection to the Imperial museum in Vienna. *[Ernyey, 1912]*

HOLM (HOLMSKJOLD), THEODOR (1731–1793), Danish physician and botanist, served as Privy Councillor to the king and later as cabinet secretary to Queen Juliane Marie. His Norwegian silver specimens alone were valued at 10,000 rigsdaler, and the mineral collection as a whole at 25,000 rigsdaler. He went bankrupt in 1787 but was saved by an interest-free loan given on the condition that his mineral collection would go to the king upon his death. [p. 47, 129]

HOLTHUISEN, _____ (catalog published in Hamburg, 1793–1796), Dutch naturalist in Hamburg. His extensive collection, known as the "Museum Holthuisen," contained mammals, birds, shells and minerals. *[Ann. & Mag. Nat. Hist., vol. 3, 1899, p. 272]*

HONVLEZ, JEAN GUILLAUME FIACRE (1730–1805; catalog of minerals published in Köln, 1798), French dealer in natural history and antiques in Köln, alias "Johann Wilhelm Carl Adolph, Baron von Hüpsch, Herr zu Lontzen, zu Krickelhausen und auf der Motte." He owned a substantial personal collection of minerals, and was a frequent source for purchased and traded minerals to Caroline Louise von Baden. He bequeathed his collection to Ludwig X (1753–1810), Landgrave of Hessen-Darmstadt, and it is still preserved today in the Hessischen Landesmuseum in Darmstadt. *[Leonard et al., 1817; Mayer, 1977a; Schmidt, 1906]*

HOOKE, ROBERT (1635–1703), English experimental philosopher, Professor of Geometry at Oxford, surveyor and scientist. He collected minerals on the Isle of Wight, beginning in 1665. His home, Montague House, became the first home of the British Museum. *[Torrens, 1985; Weeks, 1945]* [p. 64, 67]

HOPE, THOMAS CHARLES (1766–1844), Scottish Professor of Chemistry in Edinburgh, and the discoverer of strontia (SrO). Mineral specimens that he collected and owned were noted by Jameson (1800), and his collection was admired by Svedenstierna. *[Dellow, 1973; Weeks, 1945]*

HOSACK, DAVID (1769–1835), American physician at Columbia University in New York. He first became interested in minerals after seeing Lord Gardenstone's collection in Scotland in 1793; he visited all the London collections, and bought minerals from the Earl of Bute's collection, among others. His mineral collection, as far as he knew, was "the first to cross the Atlantic" when he returned with it to America in 1794. By 1821 it comprised some 1,000 specimens, several of which were considered "rare and splendid." In that year he donated it to the [Princeton] College of New Jersey, along with exhibit cases and a collection of mineralogical books. *[Hosack, 1822; Green, 1822; Gordon, 1919; Greene and Burke, 1978; DAB; CAB]* [p. 70, 81, 148–149]

HOUTTUYN, MARTINUS (born 1720), Amsterdam physician. He had an extensive natural history collection, and wrote a treatise (1761) on the natural history of plants and minerals. *[Fischer, 1939]*

HUBERT, ROBERT (catalogs published in London, 1664 and 1666), British naturalist and showman. His extensive collection of curiosities and natural rarities, including minerals, "collected with great industry, cost, and thirty years' travel in foreign countries," was exhibited in London for several years. Much or all of it was purchased in 1668 by Robert Colwall on behalf of the Royal Society, and formed the foundation for that collection. *[Murray, 1904]*

HUGHES, ROBERT (collection auctioned in London, 1770), British Consul General for the Dutch and Agent for the English in Cairo. His collection included minerals, shells, fossils and corals. *[Chalmers-Hunt, 1976]*

HULST, PIETER TEYLER van der (1702–1778), Dutch naturalist. His mineral and instrument collection, as well as artworks, formed the basis for Teyler's Museum in Haarlem, which is still preserved as he established it. *[Burchard, 1986]* [p. 117–118]

HUMBOLDT, FRIEDRICH HEINRICH ALEXANDER von (1769–1859), German naturalist and traveler. His mineral collection went to the University of Halle. He also donated specimens to the King's Cabinet in Paris. *[Sherborn, 1940; Schubnel, 1987]*

HUME, (Sir) ABRAHAM (1749–1838; catalog of diamonds, 1815), British aristocrat. His mineral collection, cataloged by de Bournon, was acquired by the Sedgewick Museum in Cambridge in 1841. *[Embrey and Symes, 1987; Smith, 1978; DNB]* [p. 56, 78]

HUMPHREY, GEORGE (?1739–1826; auction catalog, *Museum Humphredianum*, published in London, 1779), British collector and mineral dealer; brother-in-law of Jacob Forster. His "large and valuable museum," consisting of "many thousand curious subjects in natural history," included minerals; it was grouped into 4,310 lots for auction. *[Gatterer, 1798; Chalmers-Hunt, 1976; Vallance, 1981]* [p. 75]

HUNTER, _____ (Mr.) (died after 1800), British collector of minerals auctioned in London in 1801. *[Chalmers-Hunt, 1976]*

HUNTER, WILLIAM (1718–1783), Scottish physiologist and anatomist. He began mineral collecting around 1763; purchased mineral collections from J. C. Fabricius, Jacob Forster, J. J. Ingen Housz, John Jeans Woulfe and Peter Woulfe between 1771 and 1781, spending over £1,500. His collection of several thousand mineral specimens was bequeathed to the University of Glasgow, which established the Hunterian Museum in his honor in 1807. *[Embrey and Symes, 1987; Burchard, 1986; Cleevely, 1983; Durant and Rolfe, 1984; DNB]* [p. 81, 89]

HÜPSCH: see HONVLEZ

HUSS, KARL (1761–1839), town executioner in Eger, Bohemia. He was an enthusiastic mineral collector; his collection was purchased by Lothar Metternich. *[Wrany, 1896]* [p. 114]

HUTTON, JAMES (1726–1797), Scottish geologist credited with originating the modern theory of the formation of the earth's crust. His mineral collection was donated to the University of Edinburgh Museum. But it languished unwanted; in 1845 it is reported as having been still in its original, unopened packing crates. By the turn of the century it had been lost. *[Murray, 1904]*

HUTTON, THOMAS (1746–1831), English tourist guide and museum owner in the Lake District. His museum, founded in 1785, included birds, fish, insects, shells, coins and especially minerals collected in the district. It was inherited by his daughters, Hannah Hutton (died 1855) and Mary Shelton (1772–1833), who continued to collect and sell "the most beautiful specimens of minerals, in every variety and colour." [Brears, 1992]

ILSEMANN, JOHANN CHRISTOPH (1727–1822), Mining Commissioner at Clausthal. He used his valuable mineral collection, which greatly impressed Goethe in 1777, for teaching purposes at the Clausthal Lyceum. *[Burchard, 1986; NDB]*

IMHOF, CHRISTOPH FRIEDRICH (died ca. 1720), German Rathsherrn in Nuremberg. He built a collection of curiosities including artworks, minerals, botanical and zoological specimens. *[Neickelio, 1727]*

IMPERATO, FERRANTE (1550–1625), Naples chemist and pharmacist. His natural history collection was among the most famous in Europe, and he frequently collected minerals in the field. His major publication was *Historia Naturale* (1599), with 119 plates illustrating specimens from his own collection. *[Torrens, 1985; Accordi, 1981]* [p. 19, 36–38]

IMPERATO, FRANCESCO, Italian lawyer and naturalist, and son of

Ferrante Imperato. He inherited his father's extensive collection of natural history, including minerals. *[Accordi, 1981; Valentini, 1714]* [p. 38]

INGEN HOUSZ, JAN (1730–1799), Dutch physician, Imperial Physician in Vienna and plant physiologist. He sold his mineral specimens to William Hunter in 1771–1781. *[Cleevely, 1983]*

INNOCENT, _____ (died after 1807), British businessman and collector of minerals, fossils and shells, all auctioned upon his retirement in 1807. *[Chalmers-Hunt, 1976]*

JACKSON, JOHN (collection auctioned in London, 1794), British F.S.A. His small collection included minerals and fossils. *[Chalmers-Hunt, 1976]*

JACOB, EDWARD (1710?–1788), English antiquary and naturalist, FAS, in Feversham. His collection of minerals, fossils, shells, corals, birds, insects, fish, etc. was sold at auction in 1789. *[DNB; Chalmers-Hunt, 1976]*

JACQMIN, PIERRE ANDRÉ (died 1773), French goldsmith and jeweler to the King in Paris. He built a collection of paintings and of minerals. Romé de l'Isle (1783) and Dezallier d'Argenville (1767) make reference to his mineral collection. His son was also a goldsmith, taking over his atelier in 1773 and probably also inheriting his collections. *[Allg. Lexicon Bildenden Künstler, 1925]* [p. 53]

JACQUIN, NIKOLAUS JOSEPH, Baron (1727–1817), Dutch-born naturalist in Vienna, professor of mineralogy at Selmecbánya (=Schemnitz) from 1764–1769, professor of botany and chemistry in Vienna after 1769. Robert Townson visited him in 1793 and wrote: "In Professor Jacquin's collection of minerals are found the most splendid specimens." His collection, begun around 1789, was later purchased for 20,000 gulden by Austrian Archduke Johann (1782–1859) and, with the Archduke's, forms the nucleus of the Styrian Provincial Museum collection (the "Joanneum") in Graz. It was rich in Icelandic zeolites, tourmaline, Zillertal minerals, galena, apatite and Hungarian minerals. Leopold von Buch called it a "treasure of mineralogy." *[Burchard, 1986; Moll, 1805; Townson, 1797; Stütz, 1807]* [p. 47, 110]

JAMES, (Col.) _____ (collection auctioned in London, 1782). His small collection (63 lots) included minerals and shells. *[Chalmers-Hunt, 1976]*

JAMES, SILVANUS (fl. late 1700's), British mineral collector in Redruth, Cornwall. Svedenstierna visited him in 1802, and saw his collection. *[Dellow, 1973]*

JAMESON, ROBERT (1774–1854), Scottish mineralogist and author in Edinburgh. His mineral collection, incorporating the collection of John Walker, was donated to the Royal Scottish Museum in 1855. *[Cleevely, 1983; DNB]* [p. 90]

JEANS, JOHN (collection auctioned in London, 1766), Scottish "fossilist" in Aberdeen. According to Philip Rashleigh he became a dealer in mineral specimens, occasionally traveling to London to make sales. He also supplied many Scottish mineral specimens to William Hunter in 1774–1777. His mineral collection included many well-labeled specimens self-collected in northern Scotland. *[Chalmers-Hunt, 1976; Durant and Rolfe, 1984; Russell, 1952]*

JEFFERSON, THOMAS (1743–1826), third President of the United States, author of the Declaration of Independence. He assembled a small "museum" of American artifacts and natural history items, including minerals and fossils, at his home (Monticello) near Charlottesville, Virginia; he included as his personal property many specimens brought back by the Lewis and Clark Expedition. *[Stein, 1993; Martin, 1952; Miller, 1988; Sowerby, 1952]* [p. 145–146, 147]

JENKIN, WILLIAM (fl. late 1700's), British mineral collector in Redruth, Cornwall. Svedenstierna visited him in 1802, and saw his collection. *[Dellow, 1973]*

JENNINGS, HENRY CONSTANTINE (1731–1819), British virtuoso and collector of minerals, shells, corals, birds, fish, insects, etc., all sold at auction in 1816, nearly 1500 lots. *[DNB; Chalmers-Hunt, 1976]*

JIRASEK, JOHANN (1754–1797), Bohemian naturalist from Libochowitz near Raudnitz. He studied forestry, and was appointed Royal Imperial *Landesingenieur* for the Zbirow district, later becoming Commissioner of Forestry in Salzburg. His mineral collection was acquired by the Scientific Society of Bohemia. *[Wrany, 1896]*

JOHANN BAPTIST JOSEPH FABIAN SEBASTIAN (1782–1859), Archduke of Austria, younger son of Emperor Leopold II. He was interested in natural history at an early age and began building his extensive collections, including minerals, especially through self-collecting. He already had a noteworthy collection by 1804, organized into two parts, one geographical (the first such in Vienna) and one systematic. In part his collection was built on an early collection of old Hungarian specimens purchased from Nikolaus Edler von Jacquin. He sponsored the Steiermark Provincial Museum, known as the "Joanneum" because he deposited his collections there. *[Moll, 1906; Huber and Huber, 1982]* [p. 55]

JOHANN GEORG I, (1585–1656), Elector of Saxony and son of Christian II (died 1611). He inherited the electoral kunstkammer founded by August (1526–1586).

JOHANN GEORG II (1613–1680; catalog published in Dresden, 1671), Elector of Saxony. He inherited the Electoral collection, which then passed to his son, Johann George III (1647–1691), and his grandson, Johann Georg IV (1668–1694). The catalog of 1671 was reprinted in 1683, under the reign of Johann Georg III.

JOHANN GEORG III (1647–1691; catalog published in Dresden, 1683), Elector of Saxony and son of Johann Georg II. He inherited the electoral kunstkammer founded by August (1526–1586).

JOHANN GEORG IV (1668–1694), Elector of Saxony and son of Johann Georg III. He inherited the electoral kunstkammer founded by August (1526–1586).

JOHNSON, _____ (fl. late 1700's), British collector in Bristol. Russell (1952) states that he had a mineral collection, and Philip Rashleigh states in the preface to his collection catalog that he obtained mineral specimens from Johnson.

JOLY de FLEURY, JEAN OMER (1700–1755), French abbot in Paris. Dezallier d'Argenville (1755) refers to his mineral collection in Paris as "famous" and illustrates some of his specimens. *[DBF]*

JONES, THOMAS WILLIAM (died 1750), English collector of shells, minerals, etc., in London. His collection was auctioned in 1750. *[Mendes da Costa, 1812]*

JOSEPH II, (1741–1790) Holy Roman Emperor and King of Germany, son of Emperor Franz Stefan and Maria Theresa. He inherited the Medici mineral collection but did nothing with it; his brother and successor, Leopold II, turned it into a public institution. *[Burchard, 1986; WBD]*

JOSEPH, JOSEPH (fl. late 1700's), Jewish mineral dealer in Redruth, Cornwall. Philip Rashleigh obtained from him "many of his finest specimens of the arseniates of copper from Wheal Gorland." *[Russell, 1952]* [p. 74]

JOSEPHINE, Empress: see TASCHER de la PAGERIE

JOUANNET: see VATAR de JOUANNET

JOUBERT, PHILIPPE LAURENT, Baron de SOMMIERES et de MONTREDON (died 1792), French aristocrat. He served as Treasurer Général of the province of Languedoc. Seven specimens from his mineral collection were illustrated in Gautier d'Agoty's *Histoire Naturelle* (1781). His collection of minerals, among the best in Paris, was confiscated by the Public Welfare Committee after the French Revolution and turned over to the National School of Mines in Paris. Some specimens were sold to the Marquis de Drèe earlier. *[Ferber, 1789; Laissus, 1986; BUA; Hofmann, 1981; Burtin, 1784]* [p. 48, 53]

JOURDAIN: see DUBOIS-JOURDAIN

JURINE, LOUIS (1751–1819), Swiss physician, professor and naturalist in Geneva and Bex. His mineral collection was recommended by Schenkenberg (1842) as one that should be seen. His natural history cabinet was considered "among the richest in Europe." *[NBU]*

KALM, PEHR (1716–1779), Professor of Economy (which included mineralogy) at the Turku Academy, Finland. He built a natural history collection, including minerals not only from Europe but probably also from North America, where he visited and collected specimens from 1747 to 1751. *[Heikel, 1940]*

KALMETER, HENRIK, Finnish Mining Councillor. In 1753 his very valuable mineral collection was purchased for 3,000 copper thalers by the Turku Academy. It was destoryed in the Great Fire of Turku in 1827. *[Heikel, 1940; Klinge et al., 1987]*

KALTSCHMIED, KARL FRIEDRICH (1706–1769; catalog published

in Jena 1770), Professor of anatomy, surgery and botany in Jena. His natural history cabinet included minerals. *[Gatterer, 1798; ADB; Freiesleben, 1825; Neickelio, 1727]*

KÄMMERER, JOACHIM (1534–1598), known as "Camerarius"; German physician and naturalist in Nuremberg, received doctorates in Leipzig, Rome and Bologna. He exchanged specimens of native silver, pyrite, lead minerals, copper minerals, and many others with Ferrante Imperato. *[Accordi, 1981]*

KAMPZ, KARL CHRISTOPH ALBERT HEINRICH von (1769–1849), Prussian statesman and geheimen Regierungsrath in Berlin. According to Schenkenberg (1842), his mineral collection consisted of 3,000 choice specimens. *[ADB]*

KANNEGIESSER, ——— von (fl. 1780's), German collector in Kiel. Around 1788 he donated a large natural history collection, including excellent mineral specimens, to Austrian Emperor Joseph II in Vienna. *[Fitzinger, 1856; Stütz, 1807]*

KARL AUGUST (1757–1828), Grand Duke of Saxe-Weimar, and friend of Goethe, in Jena. His court was frequented by many intellectuals including the mineralogist J. G. Lenz, who illustrated nearly 400 of Karl August's mineral specimens in his *Mustertafeln der bis jetzt bekannten einfachen Mineralien* (1794). *[WBD]* [p. 91]

KARL LUDWIG, Archduke of Austria (1771–1847), Austrian military commander in Vienna. His mineral collection was recommended by Schenkenberg (1842).

KARL THEODOR, Count Palatine and later Elector of Bavaria (1724–1799). He brought with him to Munich various mineral collections he had accumulated at his former residence in Mannheim. These specimens ultimately became part of the State Mineral Collection. *[Burchard, 1986]*

KÄRNER, D. (catalog, *Museum Kaernerianum*, published in Leipzig, 1826). Only pages 48–62 of his collection catalog are devoted to minerals.

KARSTEN, DIETRICH LUDWIG GUSTAV (1768–1810), German mineralogist and student of Werner; instructor at the Berlin Mining Academy (now the Technical University). He wrote the 858-page published catalog of the Leske mineral collection and assisted Werner in preparing the similarly thorough Pabst von Ohain catalog. Haüy (1801) acknowledges receiving mineral specimens from him. He donated many of his personally collected mineral specimens to the Berlin Academy. *[Strunz, 1970; ADB]* [p. 55, 96]

KEMP, JOHN (1665–1717), London antiquary and Fellow of the Royal Society. He owned a "museum of antiquities" including some minerals. *[Price, 1989; DNB]*

KENTMANN, JOHANNES (1518–1574; catalog, published in Dresden, 1565), German physician. Kentmann is considered to be the first documented mineral collector in the modern sense. He built an extraordinary collection of 1,608 specimens from 135 localities, with emphasis on the metallic and ore minerals from Saxony. *[Torrens, 1985; Prescher et al., 1980; Adams, 1938]* [p. 19, 24–25]

KIDD, JOHN (1775–1851), British mineralogist at Oxford, author of *Outlines of Mineralogy* (1809). His mineral collection went to the Ashmolean Museum and is now preserved in the University Museum (opened 1858) in Oxford. *[Zwaan and Petersen, 1977]*

KIENMAYER, MICHAEL, Baron von (1755–1828), Austrian aristocrat and royal imperial *Appellationsrath* in Vienna. Stütz (1807) called his mineral collection nice and relatively complete.

KIMAYER, THOMAS (catalog published in Hamburg, 1705). His cabinet of rarities is considered to have included minerals. *[Gatterer, 1798]*

KING, EDWARD (perhaps the Cambridge miscellaneous writer, 1735?–1807) (manuscript catalog ca. 1765 in the Mineralogical Record Library), British collector antiquary (?) and writer (?). According to his catalog, he owned 229 mineral specimens (metallic ores, pyrites, spars, including many Cornish examples) and 351 shells. *[DNB]*

KING, (Rev.) JOHN GLEN (died 1788; auction catalog published in London, 1788), English Doctor of Divinity and a well-known collector of minerals, coins, and other objects of antiquity and natural history. His collection included "a fine rich specimen of arborescent native silver in agate, with crystals, from Potosí," native gold in quartz from Sumatra, Siberian malachites, Saxon erythrite, and various other "spars," marcasite, gypsum, fluorite, cinnabar, etc. [George] Humphrey purchased many of his specimens. *[Chalmers-Hunt, 1976]*

KINGSBURY, THOMAS (1777–1854), British mineral collector. His specimens were ultimately inherited by his great grandson, Arthur W. G. Kingsbury (1906–1968), whose collection was acquired by the British Museum (Natural History). *[Museum exhibit labels]*

KINSKY, FRANTISEK JOSEF, Count (1739–1805), Bohemian aristocrat in Prague. He donated his excellent cabinet of minerals to Prague University in 1775. *[Tucek, 1978; Wrany, 1896]*

KIRCHER, ATHANASIUS (1602–1680; catalogs published in 1678, 1709, 1773), Jesuit scholar and naturalist. He bequeathed to the Jesuit College in Rome his personal museum of antiquities, instruments and natural history specimens (including minerals). *[Murray, 1904]*

KIRWAN, RICHARD (1733–1812), Irish chemist and mineralogist, author of the first systematic mineralogy in English. His collection of minerals was called "the best collection on earth" by crystallographer William Hallowes Miller. *[Greene and Burke, 1978; DNB]* [p. 82, 90]

KISNER, JOHANN GEORG (fl. 1720's), German physician and collector of general natural history in Frankfurt. He had acollection of over 700 mineral specimens. *[Neickelio, 1727; Valentini, 1714]*

KITAIBEL, PAL (1757–1817), Austrian naturalist, professor and head of the Botanical Garden of the Royal Hungarian University in Pest. His extensive collection of Hungarian minerals, 2,948 specimens, was purchased by the National Museum in 1818, but within a year over 2,000 of them had disappeared or been discarded. *[Jávorka, 1957]*

KLAPROTH, MARTIN HEINRICH (1743–1817), prominent German chemist and mineralogist, discoverer of eight chemical elements. His mineral collection was primarily for study and analytical comparison. He was given specimens, often for analysis, by most of the important mineralogists and collectors of his day. Mineral specimens from his collection were given to Haüy, and are now in the Natural History Museum, Paris. *[Burchard, 1986; WBD; Niedermayr, 1988]*

KLEVE (KLEVENFELDT), TERKEL (1710–1777), Danish historian in Copenhagen. His costly collection of valuable mineral specimens, including a native gold from Sumatra, was sold at auction following his death. The Sumatran gold was ultimately acquired by the University of Copenhagen, but was destroyed by thieves in 1982. *[Garboe, 1959; Noe-Nygaard, 1972]*

KLINGHAMMER, ——— (auction catalog published in Freiberg, 1779), German smelter director in Freiberg. His collection consisted of ore specimens. *[Freiesleben, 1828]*

KLIPPSTEIN, PHILIPP ENGEL von (1777–1866), German forester in Darmstadt. According to Schenkenberg (1842), his mineral collection was especially rich in specimens from Odenwald, Wetterau, and the Rhön Mountains. *[ADB]*

KNORR, GEORGE WOLFGANG (1705–1761; catalog published in Nuremberg, 1751–1767), German naturalist and engraver. His catalog includes many of his own hand-colored engravings depicting his minerals, corals, shells, lobsters, fish, birds, mammals and reptiles.

KOLLER, FRANZ, Freiherr von (1767–1826), Bohemian military man (Royal Imperial Field Marshall-Lieutenant) from Obristvi near Prague. He assembled a comprehensive collection of minerals, including 600 specimens from Vesuvius, while stationed for several years in Naples; following his death it was put on display in the family museum, but was later sold to the Galli Monastery in Prague, from which it was purchased in 1870 by the Agramer Museum. *[Wrany, 1896]* [p. 113]

KOLLMAN, ——— (fl. 1790's–1817), Austrian mineral dealer in Vienna mentioned by Baron Moll (1806). By 1817 he had given up his mineral business and was employed by the Royal Imperial Mineral Cabinet in Vienna. *[Zipser, 1817].*

KOLLONTAJ, HUGO (1750–1812), Priest and Royal Chancellor of Poland, in Warsaw. He purchased the extensive mineral collection of C. G. Pötzsch, over 5,000 specimens, for 900 Reichstaler. *[Fischer, 1939; Sarjeant, 1980]* [p. 46]

KOLOWRAT-KRAKOWSKI, LEOPOLD, Count (1727–1809), Imperial Austro-Hungarian statesman (Staats- und Conferenz-Minister) in Vienna; he built an "excellent museum of minerals," the manuscript

catalog of which is now in the Herbert Obodda library. His collection was sold to Prince Louis von Liechtenstein. *[Moll, 1805; Stütz, 1807]* [p. 112–113]

KOLOWRAT-KRAKOWSKY, FRANZ ANTON, Count (1778–1861), Bohemian statesman. His collection of minerals was eventually acquired by the National Museum in Prague. *[J. Svenek, personal communication 1979; WBD; Wrany, 1896]* [p. 112]

KOPP, JOHANN HEINRICH (1777–1858), German physician, Hofrath and Professor of Chemistry, Physics and Natural History in Hanau. His mineral collection is mentioned by Schenkenberg (1842).

KRISCH, JOSEF, Ritter von (died 1795?), Bohemian *Landrat* and collector in Prague. In 1795 his well-known mineral collection was purchased by Wenzel Mayer (for the Premonstratensian Monastery in Prague) for 1200 florins; it filled 12 showcases. *[Wrany, 1896]* [p. 47]

KÜBECK, KARL, Baron von KÜBAU (1780–1855), Moravian statesman in Vienna. Schenkenberg (1842) recommended his mineral collection as one to see.

KUBINYI, PÉTER (1765–1835), Hungarian landowner, historian and numismatist. He built a mineral collection in Nyustya (=Hnúst'a), and donated many specimens to the Hungarian National Museum after it was founded in 1807. *[Miller, 1818]*

KÜNAST, BALTHAZAR LUDWIG (catalog published in Strasbourg, 1668), of Strasbourg. His cabinet of rarities is considered to have included minerals. *[Gatterer, 1798]*

KUNDMANN, JOHANN CHRISTIAN (1684–1751; catalog first published in Bratislava, 1726; Breslau, and Leipzig, 1737; sale catalog in Breslau, 1753), German physician in Breslau. His natural history collection included minerals. *[Gatterer, 1798; Leonhard et al., 1817; Freiesleben, 1828; Neickelio, 1727]*

LACOSTE, PHILIBERT AUGUSTIN (1762–1848), French Abbé in Claremont, Auvergne. He assembled a collection of volcanic minerals which was acquired by the Museum of the Claremont Academy. *[Schenkenberg, 1842; BUA]*

LALANDE, _____ (collection auctioned in London, 1784), British physician. His collection consisted of 343 "lots" of minerals and fossils. *[Chalmers-Hunt, 1976]*

LAMPRECHT, BENEDICT (fl. late 1700's), Abbot of Montferat in Vienna. According to Moll (1806), he had a mineral collection specializing in Hungarian ores.

LANG, KARL NIKLAUS (1670–1741), Swiss physician and senator of Lucerne. His "Museum Lucernense Langianum," consisting mainly of minerals and fossils, was acquired by the Natural History Museum of Lucerne in 1858. *[Burchard, 1986; Leonhard et al., 1817; Sarjeant, 1980]*

LANG von HANSTADT, JOHANN NEPOMUK (1770–1842), Austrian professor at the Selmecbánya Mining Academy, and also a Royal Mining Councillor. He owned a mineral collection. *[Zipser, 1817]*

LANGE, JOHANN JOACHIM (1698–1765; catalog published in 1753), German Professor of Philosophy and Mathematics at Halle. He built a 6,000-specimen collection of minerals, ores, druses and petrifactions. It was purchased by Friedrich von Leysser. *[Mayer, 1977c; Gaedeke et al., 1984]* [p. 46]

LANGERMANN, JACOB (1700–1762), German Senator in Hamburg. In 1762 he donated his *Naturalienkabinet*, including minerals, to the University of Hamburg. *[Muhlack, 1992]*

LANGHAVEL [or LANCKHAVEL], _____ (catalog published in Leipzig, 1777 and in Wittenberg, 1784), Aulic Counsellor in Germany. His natural history collection included minerals. *[Gatterer, 1798; Freiesleben, 1828; Murray, 1904]*

LANGSDORF, JOHANN WILHELM (1745–1827), famous German salt miner, and Bergrath in Friedberg and Wetterau. His mineral collection is mentioned by Schenkenberg (1842). *[ADB]*

LASKEY, JOHN (Capt.) (died after 1807), British collector of minerals, fossils and shells auctioned in London in 1808. *[Chalmers-Hunt, 1976]*

LASSONE, JOSEPH MARIE FRANÇOIS (1717–1788; manuscript catalog, unpublished, prepared by Romé Delisle in 1783), first physician to the king and member of the French Royal Academy in Paris. He assembled a natural history collection containing minerals. *[Romé Delisle, 1783; BUA; Sage, 1777; Thiéry, 1783]* [p. 52]

LAUMONT: see GILLET de LAUMONT

LAUNOIS, _____ (fl. late 1700's), Austrian or French mineral dealer from whom Austrian Emperor Francis I purchased specimens. *[Stütz, 1807]*

LAVATER, JOHANN KONRAD (1711–1795), Swiss collector in Zurich. Thomas Pennant visited his collection in 1765, and remarked that it was "very rich in crystals." *[Pennant, 1948]*

LAVOISIER, ANTOINE LAURENT (1743–1794), French chemist and founder of modern chemistry. He was guillotined following the French Revolution, and his mineral collection was turned over to the National School of Mines in Paris. *[Hofmann, 1981; WBD]* [p. 48–49]

LAWRENCE, ANDREW (collection auctioned in London, 1762), British apothecary. His small collection included minerals. *[Chalmers-Hunt, 1976]*

LAWSON, ISAAC (died 1747), Scottish Physician General to the army. "Dr. Lawson was extremely well skilled in fossils [=minerals], had an extensive correspondence, especially in Germany, and had made large and elegant collections" of minerals. He made contact with William Borlase while in Leiden and acquired Cornish minerals from him. In 1767, Mendes da Costa purchased much of his collection from his surviving brother, but other specimens had been given away and lost. *[Borlase, 1758; Mendes da Costa, 1812; DNB]* [p. 89]

LAXMAN, ERIK (1737–1796), Finnish chemist and mineralogist, Professor of Chemistry St. Petersburg Mining Institute. He presented some of his collection of minerals to the Institute, and others he gave to Catherine the Great (1729–1796) of Russia. She later gave it to the St. Petersburg *Kunstkammer*, ca. 1785. *[Neverov, 1985; Leonhard et al., 1817; Sarjeant, 1980; Schenkenberg, 1842]*

LEDERER, LOUIS, Baron (died 1842), Austrian mineralogist and Consul General for the Austrian States. He retired to New York, selling his collection of foreign minerals to the University of Michigan; his American minerals were sold after his death. *[Silliman, 1843]*

LEERS, ARNOUD (died ca. 1767; sale catalogs published in Amsterdam and Rotterdam, 1767), Dutch collector, Lord of Ameyde and Herlaar. His extensive collection included minerals (especially gold and silver), shells, coral, bezoar stones, agates, precious stones, fossils, plants, animals, engravings and sculptures. *[Cobres, 1782]*

LEFEBVRE, SIMON (1720–1770), Prussian physician interested in geology. He corresponded with many Europeans, often supplying them with mineral and fossil specimens from his collection. *[Rousseau, 1982]*

LEHMANN, JOHANN CHRISTOPH (1675–1739), German professor of physik and medicine in Leipzig. He built a great collection of natural history and scientific instruments, including 12,000 mineral specimens plus many fossils, shells and mining instruments. *[Neickelio, 1727; ADB]* [p. 46]

LEIJEL, CARL (1718–1786), Swedish Bergmåstare and mineral collector. Specimens with his own handwritten labels are preserved in the Riksmuseet, Stockholm. *[Zenzén, 1921]*

LEITHNER, _____ (fl. late 1700's), Austro-Hungarian Bergrat in Idria. He donated some mineral specimens to the Imperial collection in Vienna. *[Stütz, 1807]*

LELIÈVRE, CLAUDE HUGHES (1752–1835), French chemist and member of the Council of Mines. He traveled extensively, visiting mines in France and especially in the Pyrenees. Specimens from his collection were illustrated by Patrin (1803). *[BUA; Ferber, 1789]*

LEMONNIER, LEWIS GUILLIAME (1717–1799), French physician botanist. In 1739 he donated specimens of antimony minerals and amethysts from Auvergne to the King's Cabinet in Paris. *[Schubnel, 1987]*

LENZ, JOHANN GEORG (1748–1832), German mineralogist and author of numerous mineralogial works; founder of the Mineralogical Society of Jena. His poorly arranged but excellent mineral collection was purchased in 1799 by Martinus van Marum and later incorporated into Teyler's Museum in Haarlem. He built another mineral collection which remained in Jena after his death. *[Forbes, 1969; Schenkenberg, 1842]* [p. 153–154]

LÉOFFROY DE SAINT-YVES, CHARLES (1717–1804), French physician in Paris, son of a famous and wealthy ophthalmologist. He inherited a considerable fortune, part of which he spent building his cabinet of art and natural history, including minerals. *[BUA]*

LEONHARD, KARL CEASAR (1779–1862), German Geheimrath and mineralogist at the University of Heidelberg; founder and publisher of one of the first mineral magazines (*Taschenbuch für die gesammte Mineralogie*). His mineral collection consisted of 8–10,000 specimens from the Harz, Switzerland, Poland, Vesuvius, Eifel, France, Iceland and elsewhere. It was acquired following his death by the University of Göttingen. *[Schenkenberg, 1842; Leonhard, 1814; G. Schnorrer, personal communication]* [p. 46, 154]

LEOPOLD (1640–1705), King of Hungary, Holy Roman Emperor. He is said to have had a mineral collection; Count Nádasdy donated mineral specimens to his collection in 1661. *[Papp et al., 1991a]*

LEOPOLD, A. D., German physician in Lubeck. He supplied 91 specimens of minerals and fossils to John Woodward in 1690-1724. *[Price, 1989]*

LEOPOLD II (1747-1792), Holy Roman Emperor and Grand Duke of Tuscany, brother and successor to Kaiser Josef II (1741-1790), and son of Franz Stefan I. He inherited the natural history collection of the Medicis, which included many minerals. In 1775 he founded the Imperial Museum in Florence, which was subsequently opened to the public in 1807; the minerals are now preserved in the Florentine Mineralogical Museum, an autonomous unit within the University of Florence. *[Burchard, 1986; BUA]*

LESCHENAULT de la TOUR, LOUIS THÉODORE (1773-1826), French naturalist. He brought back from Ceylon an excellent collection of minerals which was subsequently described in a paper by Bournon in 1823. He donated the Ceylon specimens, along with mineral suites from Brazil, Burma, Venezuela, the East and West Indies and France to the Paris Museum of Natural History. *[Schenkenberg, 1842; BUA; Schubnel, 1987]*

LERCHENFELS, _____ von (fl. late 1700's), Austrian (?) mineral collector in Nagyszeben (= Sibiu, Romania). His collection was visited by Jens Esmark in 1794. *[Esmark, 1798]*

LESCHEVIN de PRÉCOUR, PHILIPPE XAVIER (1771–1814; manuscript catalog, unpublished, prepared by Romé Delisle in 1783), head clerk of the Royal Residence at Versailles, Contrôleur de la Maison to the Countess of Artois. He built a natural history cabinet including minerals, at least one of which he loaned to James Sowerby to illustrate in 1809. *[Romé Delisle, 1783; Laissus, 1986; Thiéry, 1783; Leonhard, 1914]* [p. 52]

LESKE, NATHANAEL GOTTFRIED (1757–1786; catalog, published in Leipzig, 1789), Professor of Natural History in Marburg, Professor of Economics in Leipzig. His collection of 7,331 minerals, rocks and fossils was purchased by the Dublin Natural History Museum in 1792 for £1,350. *[Gatterer, 1798; Burchard, 1986; Leonhard et al., 1817; Fischer, 1939; N. Monaghan, personal communication]* [p. 46, 47, 93, 96]

LESUEUR, CHARLES ALEXANDRE (1778–1857), French naturalist and zoological artist; traveled with Maclure in the United States, collecting minerals along the way which he donated in 1824 to the Paris Museum of Natural History. *[Schenkenberg, 1842; BUA; Schubnel, 1987]*

LETTHENEY, JOSEF von; Austrian artillery captain and scientist in Vienna. He studied mineralogy, chemistry and physics. His mineral collection was large and "rich in varieties and contained many great rarities," especially a suite of Peruvian silver ores collected between 1788 and 1792 by Anton Zacharias Helms. He collected "small format" specimens, no larger than 2 inches in size, what we would call "miniatures" today. *[Helms, 1798; Moll, 1806; Stütz, 1807; Zipser, 1817]*

LETTSOM, JOHN COAKLEY (1744–1815), London physician and collector. He built a collection of minerals, birds and insects. He gave 700 mineral specimens to Harvard University in 1793. James Sowerby purchased at least one example at the 1816 public sale of Lettsom's collection. *[Frondel, 1970; Frondel, 1988; Abraham, 1933; Geikie, 1907; Sarjeant, 1980; Chalmers-Hunt, 1976]* [p. 147]

LEVER, (Sir) ASHTON (1729–1788; catalog published in London, 1806), British antiquarian. He built a remarkable cabinet of curiosities known as the "Leverian Museum," begun about 1752, at Alkrington Hall near Manchester. It contained 1,100 fossil and mineral specimens, especially English barites, calcites and pyrites. In 1774 he moved his museum (then called the "Holophusikon") to Leicester Square, London. In 1783 he offered the collection to the British museum but they declined. Having gone in debt, he was forced by an Act of Parliament in 1784 to dispose of it by lottery, whereby it fell to James Parkinson, who ultimately auctioned it off in 1806. The sale of 7,879 lots required 63 days. *[MacGregor, 1985; Chalmers-Hunt, 1976; BMC; Altick, 1978; Blumhof, 1813; Mullens, 1915]* [p. 86]

LEWIS, MERIWETHER (1774–1809), American explorer, private secretary to President Jefferson, and leader of the Lewis and Clark expedition to explore the Louisiana Purchase in 1804–1806. He donated a box of earths and mineral specimens to the American Philosophical Society in Philadelphia, which he had collected during his travels. *[Greene, 1969; WBD]*

LEYSSER, FRIEDRICH WILHELM von (1731–1815; catalog published in Halle, 1806), Prussian military officer and mineralogist in Halle. He collected minerals for 40 years, accumulating over 10,000 specimens. His collection catalog deals exclusively with minerals. He was a supplier of mineral specimens to Caroline Louise von Baden. His collection was purchased by Bähr. *[Leonhard et al., 1817; Mayer, 1977c]* [p. 46]

LHERMINIER, FELIX LOUIS (1779–1833), French naturalist and pharmacist in Paris. He donated a suite of mineral specimens to the Natural History Museum in Paris. *[Schenkenberg, 1842]*

LHWYD, EDWARD (1660–1709), Celtic scholar and naturalist at Oxford; keeper of the Ashmolean Museum from 1690 to 1709. He supplied specimens to John Woodward, presumably from his personal collection. *[Price, 1989; DNB]*

LICHTENFELS, JOHANN THADDÄUS ANTON von (1727–1792) of Lichtenfels, Bohemia; Professor of Mining at the Mining Academy in Banská Stiavnica. He gathered a collection of 2,000 mineral and fossil specimens later dispersed by sale in Vienna. His library (1,392 books) is preserved in the Bergacademie of Selmecbánya. *[Tucek, 1978; Zsámboki, 1979; Wrany, 1896; Schenkenberg, 1842]* [p. 112–113]

LICHTENSTEIN, _____, Count, of Bohemia. His collection of minerals, begun in the late 1700's, was donated to the Czechoslovakian Scientific Society and later became the basis for the County Museums in Opava and Olomouc. *[J. Svenek, personal communication 1979]* [p. 53]

LICHTWERS, CHRISTOPH GOTTLOB (ca. 1680–1736), Inspector of the Royal Mineral Cabinet in Dresden. His personal mineral collection was ultimately acquired by the Dresden museum. *[Fischer, 1939]*

LIECHTENSTEIN, JOHANN, Prince (1760–1836), Austrian nobleman and son of Prince Franz Josef Liechtenstein, in Vienna. His mineral collection is mentioned by Schenkenberg (1842). *[ADB]*

LIECHTENSTEIN, LOUIS [ALOYS] JOSEF von, Prince (1759–1805), Austrian nobleman in Vienna. His gallery of paintings was widely known, and he also built a mineral collection which was substantial by 1804. Friedrich Mohs (1773–1839) was enlisted to oversee the collection. Liechtenstein purchased the mineral collection of Count Leopold von Kolowrath-Krakowski. *[Moll, 1806; Stütz, 1807]*

LIERGUES, GASPARD de (brother of B. de Monconys). His collection of curiosities, presumably including minerals, was acquired by A. J. Pestalozzi in 1742, and presented by his heirs to the city of Lyon. Ravaged during the French Revolution, it survives as remnants in the Guimet Natural History Museum, Lyon. *[Burchard, 1986; Laissus, 1986]*

LIGHTFOOT, JOHN (Rev.) (1735–1788), British naturalist, clergyman and author; Chaplain to the dowager Duchess of Portland, a prolific collector. His minerals and other natural history specimens were sold at auction in 1789. *[DNB; Chalmers-Hunt, 1976]*

LIGNIVILLE, PETRONILLA von, Duchess of Calabrito (died before 1807), Italian aristocrat in Naples. She purchased the mineral collection of the Austrian Imperial Hofsekretair, Josef Wenzel von Dam, and donated specimens from Vesuvius and Sicily to the Imperial collection in Vienna. *[Stütz, 1807]*

LINCK, HEINRICH (died 1717), German pharmacist in Leipzig. He

founded the family's famous natural history collection, which contained many Saxon minerals. *[Fischer, 1939]*

LINCK, JOHANN HEINRICH (1674–1735), German pharmacist in Leipzig. He inherited and enlarged the family's famous natural history collection, established by his father, Heinrich Linck. *[Fischer, 1939; Neickelio, 1727]* [p. 92]

LINCK, JOHANN HEINRICH (1734–1807; catalog, *Index Musei Linckiani*, published in Leipzig, 1783–1786–1787), German pharmacist in Leipzig. He inherited the family's extensive natural history collection, known throughout Germany, from his father and grandfather. It included 105 drawers of mineral and rock specimens, and a 1200-volume natural science library. Following his death it was acquired by another pharmacist, named Rohde. In 1841 it was purchased from Rohde by Prince Otto Victor von Schönberg-Waldenberg. Since that time it has formed the base of the Fürstlich-Schönbergischen Naturalienkabinetts in Waldenburg, Saxony. *[Fischer, 1939]* [p. 92]

LINDACKER, JOHANN THADDEUS CHRISTIAN (1768–1816), Bohemian director of mines in Zbirow and Wosek, and possessor of a good collection of minerals. He was fond of field work, and discovered a series of new mineral occurrences in Bohemia. In 1809 he was appointed curator of Count Kaspar von Sternberg's great collection, with which his own was later merged. *[Wrany, 1896; J. Svenek, personal communication 1979]*

LINDER, _____, German Professor and Canon in Bamberg. He purchased a number of earlier mineral collections including those of Elector Franz Ludwig (1663–1732). *[Schenkenberg, 1842]*

LINNÉ, CARL von (=**LINNAEUS**, CAROLUS) (1707–1778), Swedish botanist and a father of modern systematic botany. In his *Systema Naturae* he attempted to give a classification structure for all of natural history (plants, animals, minerals). His collections grew to such a size that he had to have a special museum built to house them on his estate at Hammarby, Sweden. A few years after his death, his entire museum containing tens of thousands of pressed plants, and thousands of minerals, shells, insects and books, was purchased by James Edward Smith and transported to London where it served as the basis for the founding of the Linnean Society. *[WBD; Jenkins, 1978]* [p. 132]

LINTH: see ESCHER von der LINTH

LIPTRAP, JOHN (died after 1803), British collector of minerals and shells, auctioned in 1804 as a result of bankruptcy. *[Chalmers-Hunt, 1976]*

LISTER, MARTIN (1638?–1712), British zoologist and physician in York and London; contributed articles on minerals to the *Philosophical Transactions* of the Royal Society. He supplied mineral and fossil specimens to John Woodward. *[Price, 1989; DNB]*

LOBKOWITZ, JOSEF FRANZ MAXIMILIAN (1772–1816; sale prospectus published in Vienna, 1869), Hungarian prince in Bisin bei Töpliz. He assembled an enormous collection of minerals, expanded by his son, Prince Ferdinand Josef Lobkowitz (1797–1868), and purchased for 35,000 florins by the Hungarian National Musuem in 1870. It was by that time "the greatest and most impressive private geological collection of the Austro-Hungarian monarchy," numbering 41,217 specimens weighing a total of 80 tons, and having been built at a cost of more than 100,000 florins. *[Papp and Vincze-Szeberény, 1991; Schenkenberg, 1842; Wrany, 1896]* [p. 46, 47, 110, 112]

LOCATIN, PELEGRINO (born 1777), Italian mineral dealer in Perra di Fassa. *[Archives of the Landessammlungen für Naturkunde, Karlsruhe]*

LÖFFLER, IGNAC (fl. late 1700's), Hungarian or Austrian collector of natural history, including minerals, in Nagyszeben (ßibiu, Romania). His collection was seen by Domenico Sestini in 1778. *[Sestini, 1815]*

LOMENIE de BRIENNE, STEPHEN CHARLES de (1727–1794), French Archbishop of Toulouse, in Paris. His collection specialized in the minerals of the Champagne region, but also contained suites of quartz crystal groups, and volcanic minerals from Italy and France. He also possessed shells, insects, reptiles and birds, and a valuable library. *[Burtin, 1784; NBU]*

LÖSCHER, MARTIN GOTTH. (catalog of his museum published in Wittenberg, 1718). His collection is considered to have included minerals. *[Linné, 1777]*

LOTHRINGEN: see FRANZ STEFAN I

LOUIS XIV (1638–1715), King of France. In 1671 he issued an edict regulating the *Jardine du Roi* and royal pharmacy where medicinal plants and minerals were kept. These minerals became the beginning of the *Cabinet du Roi* ("King's Cabinet") in 1715. *[Schubnel, 1987]* [p. 61]

LOUIS XV (1710–1774), King of France. He inherited and built upon the mineral collection created by his father, appointing the famous naturalist Georges Buffon as curator in 1739. It was opened to the public in 1745, the first publicly accessible museum in Paris. *[Schubnel, 1987]* [p. 61, 62]

LOUIS XVI (1754–1793), King of France. With the help of Georges Buffon, he built the King's Cabinet of minerals up to about 2,600 specimens. Having married Marie-Antoinette, daughter of Austrian Empress Maria Theresa, he also received mineral specimens from the Imperial Cabinet in Vienna. *[Schubnel, 1987]* [p. 61]

LOUIS XVIII [LOUIS XAVIER STANISLAS] (1755–1824), King of France following the restoration of the Bourbon monarchy; brother of Charles X. He studied mineralogy while in exile in England during the Revolution. In 1814 he purchased the mineral collection of the Count de Bournon and installed the Count as its curator. *[Bournon, 1817; WBD]* [p. 57, 63, 84]

LOUISA ULRICA (1720–1782), daughter of King Frederick Wilhelm I of Prussia; she married the Swedish King Adolf Fredrik (1710–1771) and became Queen of Sweden. She was a patron of literature and science, and a friend of Linnaeus. Her mineral collection, perhaps owned jointly with her husband, was acquired in 1804 by the University of Uppsala. *[Norin, 1962; WBD]*

LOWNDES, WILLIAM (1752–1828), English mineral collector and Chief Commissioner of Taxes. Some of his specimens were figured by Sowerby (1816). He had a "splendid collection which was sold at auction in 1828." *[Embrey and Symes, 1987]* [p. 73, 79]

LOWRY: see also DELVALLE

LOWRY, WILSON (1762–1824), English artist who pioneered steel-plate engraving. He loaned specimens, perhaps from the collection of his wife, Rebecca Delvalle, to James Sowerby. Their mineral collection, highly regarded by Bournon, was dispersed at auction in 1830. *[Sowerby, 1817; Embrey and Symes, 1987; DNB]* [p. 88, 153]

LUCAS, JEAN ANDRÉ HENRI (1780–1825), French mineralogist in Paris. Thanks to his father's close connection with Buffon he grew up close to the Museum of Natural History and developed an early affinity for mineralogy. He published his *Tableau Méthodique de especies Minerales in 1806*, at the age of 26. He donated many mineral specimens which he had collected in France and Italy to the Museum. *[Schenkenberg, 1842; BUA]*

LUNDSTRÖM, ANDERS (1711–1793), Swedish Bergmästare and mineral collector. He donated specimens to the Stockholm mining college in 1786, where his original handwritten labels are still preserved. *[Zenzén, 1921]*

LUNDSTRÖM, C. J.; Swedish mining assessor, and son of Anders Lundström. Specimens bearing his own handwritten labels are preserved in the Riksmuseet, Stockholm. *[Zenzén, 1921]*

LUPIN, FRIEDRICH, Baron von (1771–1845), German aristocrat in Volkratshofen near Memmingen. He built a "great collection" of minerals through extensive field collecting in France, the Erzgebirge, the Rhöne Mountains, the Fichtelgebirge, Transylvania, Bohemia, Sweden, Hungary, the Carpathian Mountains and the Alps. *[Schenkenberg, 1842, ADB]*

LUZSÉNSZKY, IMRE, Count (fl. early 1700's), Hungarian aristocrat and chemist in Lendak. His collection of minerals and other natural history specimens from the Carpathian Mountains was admired by Brückmann in 1724. *[Tasnádi-Kubacska, 1940]*

LYONET, PIERRE (1706–1789), Dutch collector in The Hague, principally interested in shells and insects, but his collection also included minerals, and artworks. It all sold at auction in 1796 for 6,726 guilders. *[Seters, 1962]*

MACCULLOCH, JOHN (1773–1835), Scottish geologist in London. Schenkenberg (1842) recommended his "excellent Scottish collection" as one to be seen in London. *[DNB]*

MACKENZIE, COLIN (1723–1775), British physician in London. William Borlase sent mineral specimens to him in 1771. All of his books,

minerals and anatomical preparations were purchased from his heir by "Dr. Orme." *[Mendes da Costa, 1812; Pool, 1986]* [p. 69]

MACLURE, WILLIAM (1763–1840; catalog published in New Harmony, Indiana, 1840), Scottish stratigrapher, known as the "Father of American Geology." He visited the U.S. in 1782 and settled there in 1797, collecting rocks and minerals throughout the Appalachians. He had also collected in Europe. He donated a suite of Maine minerals to Charles Willson Peale's museum, sent specimens to Haüy in Paris, and donated a case of minerals and rocks from Murcia, Spain, to the American Philosophical Society in Philadelphia. *[Greene and Burke, 1978; Sarjeant, 1980; Greene, 1969]*

MACQUART, LOUIS CHARLES HENRI (1745–1808), French physician and mineralogist in Paris. He was a professor of medicine at Seine-et-Marne and was placed in charge of curating the cabinet of Fontainebleau. Romé de l'Isle (1783) refers to his mineral cabinet. *[NBG, 1860; Thiéry, 1783]* [p. 53]

MADDISON, JOHN (died ca. 1809), British collector of minerals and shells employed by the Foreign Department of the London Post Office. His specimens were sold posthumously at auction in 1809. *[Chalmers-Hunt, 1976]*

MAGIS, (Pater) ALOISIUS (died 1806), Austrian monk, founder of mineral, shell and zoological collections of the Serviten monastery in 1730. *[Fitzinger, 1856]*

MAJOR, JOHANN DANIEL (1636–1693; catalog, *Museum Cimbricum*, published in Plauen, 1668), Professor of Medicine in Kiel, author of an influential early museological tract in 1674 (*Unvorgreiffliches Bedencken von Kunst- und Naturalien-Kammern insgemein*). His natural history collection is considered to have included minerals. *[Gatterer, 1798; Leonhard et al., 1817; Schulz, 1990]* [p. 43]

MALABAILA: see CANAL

MALAKOFSKY, JOHANN, Count (fl. late 1700's), Austrian nobleman. He donated mineral specimens to the Imperial cabinet in Vienna. *[Stütz, 1807]*

MALASPINA, _____, Marquis von (fl. late 1700's), Austrian aristocrat in Vienna. His mineral collection consisted primarily of the various gem species in rare crystallizations. *[Stütz, 1807]*

MANNERS, (Lord) JAMES (died ca. 1791), British aristocrat and collector of minerals, fossils and shells, all of which were auctioned posthumously in London in 1791. *[Chalmers-Hunt, 1976]*

MANNSBERG, _____ von (catalog published in Braunschweig, 1762). His natural history collection included many ores, druses, stones, etc. *[Gatterer, 1798]*

MANTHEY, JOHAN GEORG LUDVIG (1769–1842), German pharmacist in Copenhagen, "extraordinary professor" at the University of Copenhagen. He owned a considerable mineral collection including many fine "display pieces," especially Norwegian minerals from Arendal. It was purchased for 4,000 rigsdaler by the Royal Natural History Museum in 1806. *[Garboe, 1959]* [p. 47, 55]

MARIA ANNA (1738–1789), Austrian Archduchess and daughter of Empress Maria Theresa. Her 9,980-specimen mineral collection was assembled with the help of Ignaz von Born. It is thought to have ranked as one of the best collections of the time, rich in Cornish, Hungarian, Siberian, Transylvanian and Scandinavian minerals. It, along with other natural history specimens, was purchased by the Royal Hungarian University (now Eötvös Lorand University) in 1781 for 25,000 gold florins. *[Papp and Weiszburg, 1991b]* [p. 46, 47, 106]

MARIA THERESA (or THERESIA), Archduchess of Austria (1717–1780), wife of Franz Stefen, Duke of Lorraine (later Francis I, Holy Roman Emperor). She inherited the excellent mineral collection of her husband in 1765 and subsequently created from it a public institution, today the Natural History Museum of Vienna. Her son, Leopold II, inherited through her the Medici mineral collection, which he established as a public institution in Florence in 1775. *[Burchard, 1986; WBD]* [p. 104]

MARLOW, JEREMIAH (collection auctioned in London, 1724), English goldsmith in London. His collection consisted of 172 specimens or lots of minerals. *[Chalmers-Hunt, 1976]*

MARTIN, _____ (fl. late 1700's), Hungarian mineral collector in Selmecbánya (= Banska Stiavnica, Czechoslovakia); according to Robert Townson, who saw the collection in 1793, he had "some good specimens." *[Townson, 1797]*

MARTINI, FRIEDRICH WILHELM HEINRICH (1729–1778; catalog published in Berlin, 1774), German physician and naturalist in Berlin. His exquisite collection of scientific instruments and natural history specimens is considered to have included minerals. *[Gatterer, 1798; Freiesleben, 1828]*

MARUM, MARTINUS van (1750–1837), Dutch naturalist and first Director of Teyler's museum in Haarlem. He collected extensively at famous mineral localities throughout Europe, beginning in 1785, including Freiberg, St. Andreasberg, and Mt. Vesuvius. His collection was incorporated into the museum of Teyler van der Hulst. *[Forbes, 1969]* [p. 118]

MASSÉNA, ANDRÉ (1758–1817), French Duke of Rivoli and Prince of Essling. He (or his son) purchased Madame Bandeville's shells and minerals from the Abbé Gruel, who had bought them in 1792. In 1840 his collections were purchased by Baron Delessert. *[Dance, 1966; NBU]*

MATHESIUS, JOHANNES (1504–1565), German priest in St. Joachimsthal. He gathered an extensive collection of minerals, and published a book on "advice for miners." *[Prescher, 1955; Fischer, 1964; Fischer, 1965; Bartnik, 1992]* [p. 19, 21–22, 112]

MATHIEU, CHARLES LEOPOLD (born 1756), French Professor of Mathematics in Metz, Professor of Medicine and Chemistry in Autun. He published several mineralogical studies, and donated mineral specimens to the Paris Museum of Natural History. *[Schenkenberg, 1842; BUA]*

MATTHEWS, (Rev.) THOMAS (died ca.1785), British theologian and natural history collector at Faringdon in Berkshire. His natural history collection, auctioned in 1785, was especially rich in "shells and native fossils; as gems, crystallizations and ores." *[Mendes da Costa, 1812]*

MAURITS, JOHAN (1604–1669), Dutch administrator in Nassau, appointed Governor-General of Brazil by the Dutch West-India Company in 1636. He gathered an important collection of *naturalia* into a museum in Mauritsstad (now Recife), one of the earliest such "treasure houses" in the southern hemisphere. It included gold and gold dust, and ores of silver, lead, mercury, copper, and iron as well as precious stones. In 1644 the entire museum was moved to the "Mauritshuis" in The Hague, Netherlands. *[Scheurleer, 1985]* [p. 117]

MAWE, JOHN (1764–1829), English mining engineer, geologist and London mineral dealer. He was commissioned to collect British minerals for the King of Portugal. Philip Rashleigh also acquired minerals from him. He published sales catalogs in 1816, 1821 and 1823. His mineral business and stock were acquired, upon his death, by James Tennant (1808–1881). *[Embrey and Symes, 1987; Sarjeant, 1980; Russell, 1952; DNB; Torrens, 1992]* [p. 56, 74, 83–84]

MAWE, SARAH BROWN (1767–1846), British mineral dealer and wife of dealer John Mawe. She managed the family shop in London during her husband's absence abroad (1804–1810) and was eventually appointed "Mineralogist to Her Majesty" Queen Victoria in 1837. *[Torrens, 1992]* [p. 84]

MAXIMILIAN I, (1756–1825) King of Bavaria. He "acquired a valuable collection of silver ores, from the mines of Markirch/Alsace, on the extinction of the von Rapoltstein family, its former owners." *[Burchard, 1986]*

MAXIMILIAN II (1527–1576), Emperor, King of Bohemia. He signed a royal edict reserving all mineral specimens from the Bohemian mines for his personal mineral cabinet. *[Wrany, 1896]*

MAYER, CHRISTIAN (1719–1783), German astronomer and naturalist in Mannheim. He had lived for a time in St. Petersburg, making astronomical observations at the invitation of Catherine II, and returned to Germany in 1770 with "numerous minerals and a pyramid made of expensive Russian stones." *[Glas, 1988]*

MAYER, FRANZ (1772–1809), Royal lapidarist (*Hofsteinschneider*) in Karlsruhe, and a dealer in mineral specimens. *[Archives of the Landessammlungen für Naturkunde, Karlsruhe]*

MAYNE, DAVID (fl. mid 1700's), Scottish field collector. He built a large collection of minerals, chiefly from Scotland, and all self-col-

lected. The collection was appraised for him by Mendes da Costa, and sold at auction in 1766. *[Mendes da Costa, 1812]*

M'DONNELL, JAMES (1754–1832), Irish physician. He "accumulated an extensive natural history collection, that was particularly rich in minerals from County Antrim," but its present location is unknown. *[Cleevely, 1983]*

MEAD, RICHARD (1673–1754), British physician in London, and a collector of "objects of vertu" including some minerals. *[Price, 1989, DNB]*

MEADE, WILLIAM (died 1834), Irish-American physician and mineralogist. He wrote regularly on mineral occurrences, and built "a valuable and extensive collection of minerals" numbering about 3,200 specimens. *[Silliman, 1834; Silliman, 1835]*

MEASON, GILBERT LAING; Scottish collector in Edinburgh. He was a long-time friend of James Sowerby, providing him with many specimens illustrated in his *British Mineralogy* beginning with the first volume in 1804.

MEDICI, COSIMO, called "The Great," Duke of Florence (1519–1574), Italian aristocrat and patron of libraries, the arts and natural history. He built an important cabinet of natural history (including minerals), which was added to by his successors, eventually to become the Imperial Museum of Florence in 1775. It was opened to the public in 1807. The mineral and rock collection was later separated and is now an autonomous unit within the University of Florence. *[Burchard, 1986; WBD]*

MEDICI, COSIMO II, Grand Duke of Tuscany (1590–1620), Italian aristocrat and protector of Galileo; son of Ferdinando I and grandson of Cosimo the Great (1519–1574), whose natural history cabinet he inherited. *[Burchard, 1986; WBD]*

MEDICI, COSIMO III, Grand Duke of Tuscany (1642–1723), Italian aristocrat and son of Ferdinando II, through whom he inherited the Medici collection of natural history. *[Burchard, 1986; WBD]*

MEDICI, FERDINANDO I, Grand Duke of Tuscany (1549–1609), Italian aristocrat and younger son of Cosimo the Great (1519–1574), whose natural history cabinet he inherited upon the death of his elder brother Francesco in 1587. In 1591 he founded the Mineralogical Museum in Pisa, now part of the University. *[Burchard, 1986; Zwaan and Petersen, 1977; WBD]*

MEDICI, FERDINANDO II, Grand Duke of Tuscany (1610–1670), Italian aristocrat and son of Cosimo II, through whom he inherited the Medici collection of natural history. Ferdinando's private physician, Niels Stenson (1638–1686), curated the mineral collection and in the process discovered the constancy of interfacial angles of quartz. *[Burchard, 1986; WBD]*

MEDICI, FRANCESCO, Grand Duke of Tuscany (1541–1587), Italian aristocrat and elder son of Cosimo the Great (1519–1587), whose natural history cabinet he inherited. *[Burchard, 1986; WBD]*

MEDICI, GIOVAN GASTONE, last Grand Duke of Tuscany (1671–1737), and the last of the male Medici line; Italian aristocrat and son of Cosimo III, through whom he inherited the Medici collection of natural history. Following his death it passed to the Hapsburg-Lorraines (see Franz Stefan I) when Tuscany was annexed by Austria. The minerals are preserved today in the Natural History Museum of Florence. *[Hibbert, 1974; Burchard, 1986; WBD]*

MEGERLE von MÜHLFELD, JOHANN BAPTISTE (1740–1813), Austrian adjunct director of the Royal Imperial Naturalien-Kabinett in Vienna. *[Zapfe, 1971]*

MEGERLE von MÜHLFELD, JOHANN CARL (1765–1840), Austrian curator of the Royal Imperial Natural History Cabinet in Vienna. He sold some mineral specimens, via auction, to the Imperial Cabinet. He described his personal collection of 2,158 specimens in a beautifully illustrated two-volume manuscript catalog of 1799–1800. It was acquired by Italian Archduke Massimiliano d'Este after the turn of the century and donated to the University of Modena in 1819. *[Stütz, 1807; Uzielli, 1880]* [p. 102]

MENDES: see DA COSTA

MENISH, H. (Dr.) (died after 1809), British physician in Essex. His collection of minerals, fossils, shells, corals and reptiles was auctioned in 1810. *[Chalmers-Hunt, 1976]*

MENNANDER, CARL (1712–1786), Professor at the Turku Academy, Finland. He encouraged his students to collect rock and mineral specimens and bring them in to the Academy. He donated all or part of his personal mineral collection to the Academy in 1775, following which he moved to Sweden and became an Archbishop. The collection was destroyed in the Great Fire of Turku in 1827. *[Heikel, 1940]*

MENZIES, ARCHIBALD (1754–1842), Scottish botanist. In 1800 he donated crystal specimens of pyrite, sphalerite, chalcopyrite, calcite, quartz and "pearl spar" from Chile to the British Museum. *[Fletcher, 1904]*

MERCATI, MICHELE (1541–1593; catalog published in Rome, 1717), Italian physician and naturalist; appointed Prefect of the Vatican Botanical Gardens and later Archiater to Pope Clement VIII. He assembled a remarkably large and thorough systematic mineral collection (calling it his *Metallotheca*) which he was permitted to install in a wing of the Pio-Clementino Museum at the Vatican. In its time it was the most important mineral collection in Europe. He left it to the Church; but unfortunately, within a few years of his death, all of his specimens had been stolen, piece by piece, by members of the Curia. *[Accordi, 1980]* [p. 19, 32–34]

MESMES, HENRY de, Chevalier Seigneur de Roissy (1531–1596), Chancellor to the King of Navarre in 1572, superintendent of the house of the Queen of France in 1580. Bernard Palissy admired the many pyritized fossils in his cabinet. *[Morley, 1852; NBU]*

MESSERSCHMIDT, DANIEL GOTTLIEB (1685–1735), German naturalist from Danzig. He explored portions of Siberia, collecting minerals, plants, etc. *[H. Prescher, personal communication]*

METTERNICH, KLEMENZ WENZEL NEPOMUK LOTHAR, Prince von (1773–1859), German-born Austrian politician. His excellent collection of minerals, which had absorbed many earlier private collections, became the property of the National Museum in Prague in 1945. *[J. Svenek, personal communication 1979; WBD; Wrany, 1896]* [p. 113–114]

MEULEN, _____ van der (fl. late 1700's), Dutch collector in Amsterdam. He built a great collection of rocks and minerals which was sold in 1783 to Martinus van Marum for 3,667 gold florins. Included were fine specimens of gold, silver and cassiterite. It was later to be incorporated into Teyler's Museum in Haarlem. *[Forbes, 1969]* [p. 47]

MEYBACH, _____ (catalog published in Freiberg, 1780), Freiberg mining commissioner. His collection of ore minerals, primarily from Saxony, consisted of 620 specimens. *[Freiesleben, 1828]*

MEYER, _____, Dutch collector in Amsterdam. Thomas Pennant visited him in 1765 and saw his "fine collection of animals in spirits, of fossils, ores, shells and insects." *[Pennant, 1948]*

MEYER, CHRISTIAN PAUL; Dutch merchant in Amsterdam and Utrecht. His collection focussed mainly on shells, but he also owned minerals and curiosities. *[Sander, 1783]*

MICAULT de la VIEUVILLE, [probably MATHURIN JULES ANNE, Chevalier (1755–1829), French soldier and philanthropist in Autun; he served under the Count of Artois (later Charles X), a patron of mineralogy.] Schenkenberg (1842) recommended his mineral collection as one to see. *[NBU]*

MIELICHHOFER, MATHIAS (1772–ca. 1845), Austrian naturalist and traveler, in Salzburg. He began collecting minerals at an early age; in his twentieth year an Englishman offered him 12,000 gulden for his mineral collection, but he could not bring himself to part with it. Finally in 1839 he sold his minerals to the St. Peter Monastery in Salzburg for 4,000 gulden, and his rocks later to the Joanneum in Graz. *[Freh and Paar, 1982]* [p. 47]

MIESSEL, ALOIS, Baron von ZEILEISEN (died 1815), Bohemian Mining Director. He built a mineral collection, specializing in Pribram specimens. His collection was later purchased for the National Museum in Prague. *[J. Svenek, personal communication 1979; Wrany, 1896]*

MILBERT, JACQUES GÉRARD (1766–1840), French naturalist and painter in Paris. He traveled extensively, painting, and collecting minerals, and donated mineral specimens from Iceland and the United States to the Paris Museum of Natural History. *[Schenkenberg, 1842; BUA]*

MILLESSIMO, JOSEPH, Count (died 1825), Bohemian aristocrat in

Prague. He built an excellent mineral collection. *[J. Svenek, personal communication 1979; Wrany, 1896]*

MINARD, _____ (Mrs.) (died ca. 1790), British collector of minerals, shells, coral and insects auctioned in London in 1790. *[Chalmers-Hunt, 1976]*

MITCHILL, SAMUEL LATHAM (1764–1831; catalog published in New York, 1826), Professor of Chemistry and Natural History at Columbia University, New York; regarded by some as the "Father of American Geology." His mineral collection, brought to the U.S. in 1786 from Edinburgh, was one of the first mineral collections in America. It was donated to the New York Lyceum of Natural History in 1826, but was destroyed by fire in 1866. *[Greene and Burke, 1978; Cleevely, 1983; Hall, 1934]* [p. 144, 146, 148, 153]

MITIS, FERDINAND GEORG EDLER von (catalog, *Lithophylacium Mitisianum . . . physico-mineralogicus*, published in Vienna, 1785), President of the Austrian Royal Imperial Hofkammer numismatic and mining-related collections. His was principally a mineral collection. *[Gatterer, 1798]*

MITROVSKY, _____, Countess (fl. late 1700's), Hungarian wife of Count Károly Mitrovsky (1738–1816), Royal General Mining Inspector in Selmecbánya (=Banska Stiavnica). According to Robert Townson, who saw her collection in 1793, she admitted only choice specimens into her cabinet. *[Townson, 1797]*

MITROVSKY, JOHANN NEPOMUK, Count (1757–1799) of Bohemia. His collection of minerals, begun in the late 1700's, was donated to the Czechoslovakian Scientific Society and later became the basis of the County Museum in Brno. *[Tucek, 1978; Wrany, 1896]*

MITTERPACHER, GYULA (died 1833), Croatian Major at Komárom. His mineral collection, when combined with the specimens he inherited from his uncle Lajos Mitterpacher in 1814, totaled 980 specimens. It was purchased by the Benedictine Abbey of Pannonhalma, Hungary, from his heiress in 1833. Today about 300 of the specimens can still be identified. *[Mayer and Szakáll, 1991]* [p. 111]

MITTERPACHER, LAJOS (1734–1814), prominent Croatian Jesuit monk, teacher of theology, medicine, natural history and philosophy at the Theresianum in Vienna (until 1774), professor of natural history at the Royal Hungarian University in Buda. He built a mineral collection which he bequeathed to his nephew, Gyula Mitterpacher, and which was later purchased by the Benedictine Abbey of Pannonhalma, Hungary, in 1833. *[Mayer and Szakáll, 1991]* [p. 111]

MOCRIF, _____ (fl. 1767), French abbot, Superior of the Cathedral of Autun. His cabinet contained all categories of natural history. *[Dezallier d'Argenville, 1767]*

MOHR, _____ (died after 1799), British (?) collector of minerals (50 lots) auctioned in London in 1799. *[Chalmers-Hunt, 1976]*

MOHR, JACOB (fl. late 1700's), Austrian mineral dealer in Vienna, mentioned by Stütz (1807). He and his brother specialized in French and Scandinavian specimens; traveled in Siberia in 1812–1817. [p. 56]

MOLL, KARL EHRENBART, Baron von (1760–1838), Chancellor of the Exchequer for Salzburg, retired to Munich and Augsburg. An amateur naturalist, he built a collection that was particularly rich in fine minerals, over 5,000 specimens, from Salzburg and Tyrol. Some of it was acquired by the British Museum in 1815. The Bavarian Academy of Science acquired other mineral specimens. *[Burchard, 1986; Cleevely, 1983; Schenkenberg, 1842; ADB; Freh and Paar, 1982]* [p. 46, 55]

MOLTKE, ADAM GOTTLOB, Count Bregentved (1710–1762), Danish nobleman, minister and advisor to Frederik V, and collector of natural history. His extensive collection, highly praised in his day, was donated to the Natural-husholdningskabinettet of Charlottenborg (founded 1759). *[Sarjeant, 1980; Garboe, 1959]*

MOLTKE, JOACHIM GODSKE, Count Bregentved (1746–1818), Danish nobleman and Prime Minister, patron of the University of Copenhagen, and son of A. G. Moltke. In 1810 he joined the mineral collection built by his father with specimens from other collections he had purchased (especially those of G. Wad, C. S. N. Münster and H. C. F. Schumacher, together valued then at 13,500 rigsdaler) and donated all to the University, where it continued to be known as "Count Moltke's Mineralogical Museum" until 1976. *[Burchard, 1986; Garboe, 1959]* [p. 46, 47, 129–130]

MONCONYS, BALTHAZAR de (1611–1665; brother of G. de Liergues), French traveler. His cabinet of curiosities, presumably including minerals, was acquired in 1742 by A. J. Pestalozzi, whose heirs donated it to the city of Lyon. Ravaged during the French Revolution, it survives as remnants in the Guimet Natural History Museum, Lyon. *[Burchard, 1986; BUA]*

MONNET, ANTOINE GRIMOALD (1734–1817), prominent French Inspector of Mines and an apothecary in Rouen. In 1772 he was selling small, portable reference collections of mineral specimens for 150 livres; the collections were accompanied by a printed catalog. *[Laissus, 1986; Romé de l'Isle, 1783]*

MONRAD, PETER JOHAN (1758–1834), Norwegian civil servant, studied medicine but gave it up. He built a systematic mineral collection, a crystallographic collection, a collection of large cabinet specimens and also a gemstone collection, all of which numbered 8,000 to 9,000 specimens total. These were purchased in 1839 by Christian VIII for 4,170 silver rigsbankdaler. *[Garboe, 1959]* [p. 46, 47, 129]

MONTAGERAUD, _____ (fl. late 1700's), Austrian or French mineral dealer from whom Austrian Emperor Franz I purchased specimens. *[Stütz, 1807]*

MONTICELLI, TEODORO (1759–1846), Abbot and Professor of Ethics and Chemistry, University of Naples. He donated mineral specimens to the King's Cabinet in Paris. His collection of 2,000 mineral specimens from Mt. Vesuvius was purchased by the British Museum in 1823. The rest of his mineral collection was acquired by the Real Museo Mineralogico, Naples. *[Burchard, 1986; Cleevely, 1983; Sarjeant, 1980; Schubnel, 1987]* [p. 122]

MORGENBESSER, JOHANN von (fl. late 1700's); the Morgenbesser brothers, Johann and Franz, were well-known mineral dealers in Vienna during the 1790's and early 1800's. Moll (1806) mentions in particular some beautiful red tourmaline from Siberia that was in their stock. [p. 47]

MORIN, PIERRE (III) (fl. 18th century), French gardener in Paris well known for his botanical garden and his cabinet of curiosities, which included minerals, shells, corals and insects *[Evelyn, 1955; Dance, 1966]*

MOROSINI, _____, Chevalier; Italian (?) collector. Romé de l'Isle (1783) refers to his mineral cabinet.

MORRIS, RICHARD (died 1779; collection auctioned in London, 1780), Welsh scholar and collector "late of the Tower." His small collection included minerals. *[Chalmers-Hunt, 1976; DNB]*

MORTON, CHARLES (1716–1799; collection auctioned in London, 1800), British physician, F.R.S., and Principal Librarian for the British Museum. He collected minerals and fossils in Westmoreland and Lancashire for the Royal Society. His small collection consisted of minerals and fossils. *[Chalmers-Hunt, 1976; DNB]*

MORTON, JOHN (1671?–1726), British naturalist at Cambridge; author of *The Natural History of Northamptonshire* (1712). He supplied specimens of minerals and fossils to John Woodward. *[Price, 1989; DNB]*

MOSCARDO, LODOVICO LUIGI (catalog published in Padua, 1656, 1672), Veronese nobleman and philharmonic academician. His extensive natural history museum included "minerals, stones and earths." He obtained part of the Francesco Calzolari collection around 1642. The Moscardo collection passed to the Miniscalchi family, and what remains of it is still part of the "Miniscalchi Foundation" in Verona. *[Accordi, 1977]* [p. 40]

MOSER, JOSEF; Austrian pharmacist in Vienna. He assembled a mineral collection for personal study and for pharmaceutical uses. He owned a brownish black Austrian barite which was the finest in Vienna, and was admired by Baron von Moll (1806).

MOSSON: see BONNIER de la MOSSON

MOUSSIN-POUSHKIN, APOLLOS APOLLOSEVICH, Count (1760–1805), Russian chemist and academician. He supplied 161 Russian mineral specimens to Charles Hatchett in 1799; a manuscript of the list is still preserved in the British Museum, which acquired Hatchett's collection that same year. *[Cleevely, 1983]* [p. 75, 127]

MOUTON-FONTENILLE de la CLOTTE, MARIE JACQUES PHILIPPE (1769–1837), French botanist. He sent significant mineral acquisitions from Mexico to the King's Cabinet in Paris. *[Schubnel, 1987]*

MOVERS, PETRUS JOHANN (catalog of the *Moverschen Kabinet* published in Hamburg, 1770), of Hamburg. His collection of "rarities of nature, art and antiquities" included minerals. *[Gatterer, 1798; Neickelio, 1727]*

MOYLE, (Capt.) JOHN (fl. late 1700's), British mine captain at Chacewater, Cornwall. Philip Rashleigh obtained mineral specimens from him. *[Russell, 1952]*

MÜHLFELD: see MEGERLE von MÜHLFELD

MÜLLER, JOHANN CASPAR (fl. 1720's), German Hoch-Fürstlich Rath and physician in Weimar. His collection of art and natural history included local and foreign minerals and stones. *[Neickelio, 1727]*

MÜLLER, JOHANN SEBASTIAN von (fl. 1790's), Austrian Royal Imperial Hofrath in Vienna. He built a mineral collection which, following his death, passed to his wife Theresia, then later to von Tambosch, who bequeathed it to Leopold Josef Fitzinger in Vienna. *[Fitzinger, 1856]*

MÜLLER, JOSEPH (1733–1817), German naturalist and mineral collector in Giessen. He often collected in the field with J. W. von Goethe. His collection numbered over 3,000 mineral specimens. *[Fischer, 1939; Leonhard, 1820]*

MÜLLER, PHILIPP LUDWIG STATIUS (1725–1776; catalog published in Erlangen, 1778). His "extensive and choice natural history collection" is considered to have included minerals. *[Gatterer, 1798; ADB]*

MÜLLER von REICHENSTEIN, FRANZ JOSEPH, Baron (1740–1825), Hungarian mining officer and director of all Transylvanian mines belonging to the Imperial treasury. He was also Chief of Minting and Mining for the Empire until 1818. He was a prominent naturalist, the discoverer of tellurium, and a member of the Mineralogical Society of Jena. According to Jens Esmark, who visited him in 1794, he had a "beautiful and very complete" systematic mineral collection arranged according to Born's Raab catalog. *[Esmark, 1798; Stütz, 1807; Weeks, 1945]*

MUNCHHAUSEN, HEIRONYMOUS (catalog of his *Munchhausishes Steinkabinet* published in Wölfenbuttel, 1724), German mining man in Wölfenbuttel and Dienst; appointed Chief Mining Director in 1716. He built a "stone" collection considered to have included minerals. *[Gatterer, 1798; BUA]*

MÜNSTER, CHRISTIAN S. N. (1779–1856), Danish mining engineer. His collection of minerals, which had absorbed that of G. Wad, was purchased by Count J. G. Moltke in 1812 and later donated to the University of Copenhagen. *[Garboe, 1959]*

MÜNSTER, GEORG, Count von (1776–1844), German nobleman in Bayreuth. His collection of minerals and fossils was acquired by the Bavarian state following his death. *[Schenkenberg, 1842; ADB]*

MURAWECK, NORBERT (1754–after 1817), Bohemian mineral dealer in Vienna, mentioned by Stütz (1807). He specialized in Bohemian and Hungarian specimens. *[Zipser, 1817; Schenkenberg, 1842]*

MURRAY, JOHN (died 1820), Scottish chemist in Edinburgh, fellow of the Geological Society in London. Blumhof (1813) makes note of his mineral collection as having been admired by Svedenstierna.

MURRAY, ROBERT (1608–1673), British royalist and scientist. He collected specimens of marcasite and other minerals in Wales, which he gave to the Royal Society. *[Evelyn, 1955]*

MYLIUS, GOTTLIEB FRIEDRICH (1675–1726; catalog published in Leipzig, 1716), German mineralogist and Secretary to the Elector of Saxony. His museum included 2,442 mineral specimens plus several thousand "earths," gems, fossils and marbles. *[Murray, 1904]*

NADASDY, FERENC, Count (1625–1671), Hungarian aristocrat, Governor and Chief Justice, and prominent collector of art and natural history. His treasury in Sárvár castle at Garamszentkereszt (=Ziar nad Hronom, Slovakia) was among the richest in Europe. It included polished stones and mainly Hungarian minerals, some of which were collected for him by Procopius Bonanus in 1659 (who was paid 300 gold florins). In 1661 Count Nádasdy donated many of his specimens to King Leopold in Vienna, but he later became involved in a plot against the Habsburgs, was arrested and executed. His treasury was confiscated and removed to Vienna. *[Csíky, 1991a; Papp et al., 1991a; Ernyey, 1912]*

NADLER, _____ (fl. late 1700's), Hungarian teacher in Késmárk, and a member of the Mineralogical Society of Jena. He owned a mineral collection, and donated some of the specimens to the Society. *[Benedek, 1942]*

NAGY, ISTVAN (1770–1841), Hungarian priest in Balatonfüred. He owned a mineral collection, and donated some specimens to the Mineralogical Society of Jena. *[Benedek, 1942]*

NATHUSIUS, GOTTLOB (1760–1835), German merchant in Alhaldsleben. According to Schenkenberg (1842), his mineral collection was rich in excellent specimens from old localities. *[ADB]*

NAUCLÉR, OLOF OLOFSSON (the younger)(1753–1832), Swedish jurist and mineral collector. Specimens still bearing his original handwritten labels have been preserved in the Riksmuseet, Stockholm. *[Zenzén, 1921]*

NAUMANN, _____ (catalog published in Freiberg, 1780), German physician and Freiberg Mining Commissioner. His mineral collection was sold in 1780. *[Freiesleben, 1828]*

NEERGAARD, TÖNNES CHRISTIAN, Baron de BRUUN (1776–1824), Danish traveler and writer who lived in Paris after 1800 and became famous for his very valuable mineral collection. He donated occasional specimens to assist Haüy. It is thought that he purchased Anders Christophersson's 10,000-specimen collection (ca. 1804) and Axel Cronstedt's 3,000-specimen collection (in 1803). *[BUA; Zenzén, 1921]* [p. 46, 55, 130]

NEGELEIN, GOTTFRIED (fl. 1720's), German "Berg-Gräfl. kirchbergischen Raths," Royal Saxon Eisenach County trustee and "Hof-Advocati Ordinar," i.e. a high-ranking attorney. His collection included minerals, shells and plant specimens. *[Neickelio, 1727]*

NÉLIS, CORNEILLE FRANÇOIS de (1736–1798), Belgian philosopher, historian, Grand Vicar of Tournay and Chanoine, and a deputy to the President of the state of Tournésis, in Brussels. He assembled a "very beautiful cabinet which includes the [geological] productions of different parts of the globe, but especially the fossils of our country [i.e. modern Belgium]." *[Burtin, 1784; NBU; BNB]*

NEPPERSCHMIDT, _____ (fl. late 1700's), Austrian mineral dealer from whom Austrian Emperor Francis I purchased specimens. *[Stütz, 1807]*

NERET, _____ (fl. 1780's), French naturalist and physician in St. Quentin. His cabinet consisted of two parts: a collection of minerals and fossils from Valois, and a collection of rock crystal specimens. *[Burtin, 1784]*

NEUMANN, _____ (catalog published in Berlin, 1767), German professor of mineralogy. His collection was strong in Saxon specimens. *[Freiesleben, 1828]*

NEUMANN, _____ (fl. late 1700's), Hungarian merchant in Kassa (=Kosice). He was a member of the Mineralogical Society of Jena but, according to Jens Esmark (who saw his specimens in 1794), his collection was unremarkable. *[Esmark, 1798; Benedek, 1942]*

NEUMANN, FRANZ, Abbot (1744–1816), Austrian clergyman, director of the Imperial coin cabinet, and collector in Vienna. His collection consisted exclusively of opal varieties, which he pursued with "unbelievable patience." *[Moll, 1806; Stütz, 1807]*

NEWTON, (Sir) ISAAC (1642–1727), celebrated English mathematician and natural philosopher, and a president of the Royal Society. He had an interest in minerals and mineral chemistry as well as pure mathematics; in 1669 he wrote to a friend planning a tour of Europe, asking if he would acquire for him specimens of antimony, copper, tin, iron, lead, mercury and zinc ores, and lapis lazuli, with their respective localities and names. *[Babson, 1950; DSB]* [p. 64, 67]

NICHOLSON, WILLIAM (1655–1727), English Bishop of Carlisle. He supplied 76 specimens of minerals and fossils to John Woodward in 1690–1724 and others to Hans Sloane. *[Price, 1989]*

NICOL, WILLIAM (1768–1851), Scottish physicist, inventor of the Nicol prism. His mineral collection, mentioned by Schenkenberg (1842), was sold to Alexander Bryson, and later dispersed at auction in 1868. *[Cleevely, 1983]*

NICOLAI, CHRISTOPH (first catalog published in Wittenberg, 1702; auction catalog in 1710), German apothecary in Wittenberg. His museum of curiosities is considered to have included minerals. *[Gatterer, 1798]*

NICOLAI, GOTTFRIED; German apothecary and stadt-richter in Wittenberg (probably related to Christoph Nicolai, also an apothecary in Wittenberg). His collection, which included minerals, was discussed by Valentini (1714).

NIEDERMAYER, MATHIAS von (1750–1829), Austrian *Regierungsrath* and Director of the Royal Imperial Glass and Porcelain Works in Vienna. His mineral collection was rich in silver minerals from Annaberg, Bohemian ores, and English and Saxon minerals. *[Moll, 1806]*

NOEUX: see RASSE de NOEUX

NOLIN, [or NOLLIN] ———, French abbot, Director Général of the Royal Botanical Garden in Paris. Three specimens from his large and excellent mineral collection were illustrated in Gautier d'Agoty's *Histoire Naturelle* (1781). Romé de l'Isle (1783) also makes note of his collection. *[Fischer, 1939; Dezallier d'Argenville, 1767]* [p. 50, 53, 62]

NOSSENI, GIOVANNI MARIA (1544–1620), Italian architect, sculptor and lapidarist. He came to Dresden in 1575 and was granted the right to prospect electoral lands for marble and gem minerals, an endeavor which proved very successful. Many specimens of his, including amethyst and colorless quartz crystals, were given to the elector, Augustus, for his *Kunstkammer. [Fisher, 1939]*

NOSTITZ-RHINECKU, ———, Count (18th century), Bohemian nobleman. His collection of minerals was eventually acquired by the National Museum in Prague. *[J. Svenek, personal communication 1979; Tucek, 1978]*

NÜLL, JAKOB FRIEDRICH Van der (fl. late 1700's; catalog published in Vienna, 1804), Austrian banker and businessman in Vienna. He built an exceptionally fine mineral collection, curated for him by Friedrich Mohs. Megerle von Mühlfeld described it as "not only the best private collection in Vienna, but in all of Germany as well, and technically the most instructive." This collection of 2 to 4-inch specimens was begun in 1797 and achieved major status in just three years. Between 1797 and 1807 Van der Nüll purchased no less than eleven important mineral collections. The 1804 catalog runs to three volumes describing 3,926 specimens. The collection was purchased in 1827 by the Royal Imperial mineral cabinet in Vienna. *[Moll, 1806; Greene and Burke, 1978; Niedermayr, 1988]* [p. 103, 107–108]

NYEVELT, ZUYLEN van (catalog, published in Amsterdam, 1773), Dutch collector in Amsterdam. He built a "superb collection of objects" including minerals. *[Gatterer, 1798]*

OFFERMANN, CARL ALEXANDER (1770–1842), of Brünn (now Brno), Bohemia. He sold his collection in 1842 to Frantisek Desfours-Walderode *[E. Offermann, personal communication]*

OHAIN: see PABST von OHAIN

OLAFSSON, EGGER; Icelandic student at the University of Copenhagen. He traveled in Iceland during the years 1752–1757 collecting minerals. His specimens were given to the University. *[Garboe, 1959]*

OLEARIUS, JOHANN CHRISTOPH (1668–1747; catalog published in Jena, 1750), German antiquary and numismatist in Halle. His natural history cabinet included "mineralia." *[Murray, 1904]*

OLIVIER, GUILLAUME ANTOINE (1756–1815), French naturalist and traveler. He collected minerals in the Paris environs, and elsewhere during the course of his travels. Gigot d'Orcy put his extensive mineral collection at Olivier's disposal, for study purposes. Olivier donated specimens to the Natural History Museum in Paris. *[Schenkenberg, 1842; BUA]*

OLOFF, THOMAS DIETRICH (fl. 1720's), German pharmacist in Magdeburg; Royal Prussian Hof-Apotheker. His natural history collection included specimens of gold, silver, copper, lead, bismuth, mercury and iron minerals, as well as gem species. *[Neickelio, 1727]*

OPPEL, FRIEDRICH WILHELM von (1720–1769), Chief of Mining in Saxony. He helped found the Freiberg Mining Academy in 1765, and donated mineral specimens to help establish the Academy collection. The collection "was first displayed in Oppel's own house, which today is the Academy's main administrative building." *[Weber, 1991]* [p. 100]

ORLÉANS, LOUIS PHILIPPE, Duke of (1725–1785), French aristocrat in Versailles. He was a patron and friend of several French mineralogists, and built an interesting mineral collection recommended by Thiéry (1783).

ORLOV, GRIGORI GRIGORIEVICH, Count (1734–1783), Russian general and statesman, favorite of Catherine II. Following his death, his scientific collections, including "a rich mineral cabinet," were transferred to the St. Petersburg Academy of Arts and Sciences. He was the founding President in 1765 of the Free Economic Society, for which he also assembled a mineral collection. *[Neverov, 1990; WBD]* [p. 126–127]

ORR, HUGH (1717–1798), Scottish-born inventor and American patriot and master iron-worker in Bridgewater, Connecticut. He owned a valuable collection of minerals, many acquired through his American contacts in many states. His knowledge of minerals and ores was said to be extensive. *[Frondel, 1970; DAB; CAB]* [p. 145]

ORTMANN, ——— (catalog published in Freiberg, 1793), German amalgam specialist ("Amalgamirmstr.") in Freiberg. His estate included minerals. *[Freiesleben, 1828]*

PABST von OHAIN, KARL EUGEN (1718–1784; catalog published in Freiberg, 1791–1792), German member of the Leipzig and St. Petersburg Academies, German correspondent for the Royal Sardinian Scientific Society in Turin, and an early Director of the Freiberg Mining Academy. He was among the most knowledgeable mineralogists in Saxony, and built an excellent (though poorly organized) 7,500-specimen mineral collection rich in Saxon specimens. Romé de l'Isle (1783) made note of it. Following his death, Pabst von Ohain's collection (reorganized by Werner) was sold to the government of Portugal and was shipped to the University of Rio de Janeiro for use in the teaching of mineralogy and geology. *[DSB under Werner]* [p. 53, 95–96, 100]

PAGERIE: see TASCHER de la PAGERIE

PAJOT d'ONSENBRAY, LOUIS LÉON, Count (1678–1754), French postmaster general. His natural history cabinet included a native gold specimen from Peru which was valued at 13,375 livres in 1742. He bequeathed his collection to the French Academy of Science. *[Laissus, 1986]*

PALFFY, MIKLOS, Count (1710–1763), Hungarian aristocrat, Chancellor and Chief Justice. He built a magnificent collection of minerals and other rarities in the family castle at Vöröskö, assisted by his brother, Count Rudolf Palffy (1719–1768), Royal Imperial Chamberlain in Vienna. *[Birkas, 1948; Jedlicska, 1910]*

PALFY, FERDINAND von, Count (1774–1840), Austrian aristocrat in Vienna. He built his mineral collection at great cost, traveling personally to buy specimens, especially in Hungary. Stütz (1807) recommended it as essential to see because of its great value. So did Zipser (1817), although it had by that time been acquired by Prince Esterhazy.

PALISSY, BERNARD (ca. 1510–1590), French potter and author of works on ceramics, agriculture, religion and natural philosophy. He lectured on geology in 1575–1584, supplying actual specimens from his personal mineral collection for inspection and study. *[Torrens, 1985; Murray, 1904; La Rocque, 1957; Morley, 1852]* [p. 19, 22–23]

PALLAS, PETER SIMON (1741–1811), German naturalist and traveler, especially in eastern and southeastern Russia and Siberia, and also southern Russia and Crimea, during the years 1768–1794. He gave some specimens to Philip Rashleigh. His famous collection of natural history specimens, including many Russian minerals, was purchased by Catherine II. *[Russell, 1952; Pallas, 1771–1776; Cuvier, 1860]* [p. 71, 128]

PALMA: see COSSIGNY de PALMA

PALNSTORF, JOSEPH (fl. 1764–1806), Austrian Landrat and Staatgüteradministrator in the duchy of Krain (Carniola). He built a substantial mineral collection, including 365 pounds of specimens obtained from Sigmund Zois in 1789. His collection was acquired by Friedrich Rudesch in Ljubljana, whose museum was the forerunner of the Slovenian Natural History Museum. *[Faninger, 1988]*

PALSSON, BIARNI (1719–1779), Icelandic naturalist. He studied at the University of Copenhagen and traveled in Iceland during the years 1752–1757 collecting minerals. His specimens were given to the University. *[Garboe, 1959]*

PALTZMANN, MARTIN (fl. late 1700's), Hungarian owner of iron and copper mines and smelters in Igló around 1759–1774. According to Esmark (1798) he owned a mineral collection. *[Zipser, 1817]*

PARKINSON, JAMES (1730?–1813), British collector in London who

won the museum (including over 1,000 minerals) of Sir Ashton Lever in a lottery in 1784. He held it open to the public near Blackfriars Bridge, but ultimately sold it all at auction in 1806. *[Altick, 1978; Chalmers-Hunt, 1976; DNB]* [p. 86]

PARLBY, (Rev.) S. (collection auctioned in London, 1803), British clergyman from Stoke, Suffolk. His collection included minerals, shells and corals. *[Chalmers-Hunt, 1976]*

PARSONS, JAMES (collection auctioned in London, 1792), British physician and F.R.S., F.A.S. His small collection included minerals, fossils and shells. *[Chalmers-Hunt, 1976]*

PASQUAY, PETER von (sale catalog published in Frankfurt, 1777). His was a "very beautiful collection of objects from the three kingdoms of nature, containing over nine thousand specimens." Thomas Pennant admired his "pretty collection of ores and fossils" in 1765. *[Gatterer, 1798]*

PATAKI, _____ (fl. late 1700's), Hungarian physician and mineral collector in Kolozsvár (=Cluj-Napoca). *[Benkö, 1800]*

PATIOT, _____ (fl. late 1700's), French Commissioner of War in Paris. His mineral collection was recommended by Dezallier d'Argenville (1767).

PATRIE, _____ (fl. late 1700's), German Professor in Hamburg. He sold his mineral collection, which was rich in zeolites and chalcedonies, to Austrian Emperor Joseph II for 1500 ducats. *[Stütz, 1807]*

PATRIN, EUGÈNE-MELCHIOR-LOUIS (1742–1815), French geologist and mineralogist, Librarian at the Paris School of Mines. Many of his specimens are illustrated in color in his *Histoire Naturelle des Minéraux* (1803), based largely on his ten years of mineralogical research in Germany, Hungary and Russia. He personally collected around 2,000 specimens, "the majority of great beauty," in Siberia and the Urals. Patrin donated his entire collection to the King's Cabinet around 1791. *[BUA; Leonhard et al., 1817; Patrin 1791]* [p. 48, 63]

PAUER, _____ (died <1817), Austrian mineral dealer in Vienna, mentioned by Stütz (1807). He specialized in Transylvanian specimens. *[Zipser, 1817]*

PAULA: see HARTIG

PAULI, JOHANN GEORG (fl. 1720's), German collector in Breslau. He collected paintings and engravings as well as minerals and uncut gem crystals. *[Neickelio, 1727]*

PAULLINI, ANTON (catalog published in Frankfurt, 1717). He had a cabinet of curiosities considered to have included minerals. *[Gatterer, 1798]*

PAYARD, _____, a Portuguese merchant. His collection of minerals, especially his Mexican specimens, was much admired by Count de Bournon, who obtained some of them. *[Bournon catalog, 1813]*

PEALE, CHARLES WILLSON (1741–1827), American portrait painter. His museum in Philadelphia, established in 1786, eventually grew to contain over 8,000 mineral and fossil specimens. *[Greene and Burke, 1978; Sellers, 1969, 1980; CAB]* [p. 146–147]

PEARSON, THOMAS (ca. 1760–1830), mineral dealer in Matlock Bath, England, and a competitor of John Mawe. He sold Charles Greville some of the first known specimens of phosgenite in 1785. *[Burr, 1994]* [p. 85]

PEIROUSE: see PICOT de la PEIROUSE

PEITHNER: see LICHTENFELS

PELLETIER, BERTRAND (1761–1797), French pharmacist and chemist in Paris. He began mineral collecting early in life, and built a collection which included many good specimens. He was appointed Treasurer of Mines. *[Ferber, 1789; Thiéry, 1783]*

PENDARVES, EDWARD W. W. (1778–1853), British collector in Oxford. His collection of minerals, along with that of his father, John Stackhouse (1741–1819), was acquired by Sir Arthur Russell and is now in the British Museum. *[Embrey and Symes, 1987]*

PENNANT, DAVID (1764–1841), British scientist, collector and traveler; son of Thomas Pennant (1726–1798), and Fellow of the Royal Society, 1792. His father wrote in 1796 that he had helped build the family mineral collection (acquired by the British Museum in 1913). He is mentioned by James Sowerby as having loaned specimens for illustration in *British Mineralogy* (1804, 1809, 1811). *[Smith, 1913; DNB]* [p. 71, 79]

PENNANT, THOMAS (1726–1798; manuscript catalog of his geology and mineralogy collection, ca. 1757, three vols. quarto, is in the British Museum of Natural History Library), British naturalist and traveler, born of an old Welsh family. He began collecting minerals after visiting William Borlase ca. 1746. His mineral collection of 1,250 specimens, rich in examples from Flintshire mines, was acquired by the Earl of Denbigh and presented to the British Museum in 1913. Of these, about 800 still survive. A small collection of 28 minerals and 11 rocks was given to Oxford in 1758, but all are now lost. *[Pennant, 1793; Pool, 1986; Smith, 1978; Smith, 1913; Cleevely, 1983; Gunther, 1925]* [p. 69, 70–71]

PENROSE, (Rev.) THOMAS (1742–1779; collection auctioned in London, 1781), British cleric. His collection (700 lots) included minerals, shells, corals and fossils. *[Chalmers-Hunt, 1976; DNB]*

PERKINS, BENJAMIN DOUGLAS (1774–1810), American physician, graduate of Yale, moved to London and established the Perkins Institution for medical research. In 1806 he sold his substantial collection of about 3,000 mineral specimens to Yale University for $1,000. *[Greene and Burke, 1978; Sarjeant, 1980; Zwaan and Petersen, 1977]*

PESTALOZZI, A. J.; He acquired the collections of Balthazar de Monconys and Gaspard de Liergues in 1742. It was preserved by his heirs in the city of Lyon; damaged during the French Revolution; remnants donated to the Guimet Natural History Museum, Lyon, in 1775. *[Burchard, 1986; Laissus, 1986]*

PETER ALEKSEEVICH the Great (1672–1725; catalog published in 1745), Czar of Russia. He established a private natural history collection, and later a public *Kunstkammer* in 1719. It was stocked with major collections he had recently purchased from Albert Seba, Frederich Ruysch and M. D. Gottwald, collections which included many mineral specimens. Peter's collection is preserved in the Mineralogical-Geological Museum of the Academy of Sciences in Moscow. [p. 115–116, 125]

PETIVER, JAMES JACOB (1663–1718; catalog, *Musei Petiveriani*, published in London, 1695–1703), British apothecary and botanist. His extensive natural history collections, including minerals, were purchased in 1718 for £4,000 by Sir Hans Sloane, whose collection later provided the foundation for the British Museum. *[BUA; Cleevely, 1983; Altick, 1978]* [p. 40, 47, 65, 66]

PFANNENSCHMIDT, _____ (fl. 1720's), German physician in Bernburg. His cabinet of curiosities consisted primarily of "all kinds of metals, minerals and stones." *[Neickelio, 1727]*

PHILLIPS, (Capt.) JAMES (1746–1823), British mining captain and manager of the Polgooth mine in Cornwall. Philip Rashleigh obtained mineral specimens from him. *[Russell, 1952]*

PHILLIPS, RICHARD (1778–1851), English chemist and mineralogist, son of James Phillips who printed Pryce's *Mineralogia Cornubiensis* (1778). He was a friend of, and lender of minerals to, James Sowerby beginning in 1803. According to Sowerby, he "possesses one of the finest and earliest collections of tins, etc., from Cornwall." *[Sowerby, 1804; Embrey and Symes, 1987; DNB; Chalmers-Hunt, 1976]* [p. 86, 153]

PHILLIPS, WILLIAM (1775–1828; sale catalog published by the Liverpool Museum, 1829), British mineralogist and author, elder brother of Richard. His mineral collection of about 1,000 specimens was sold by G. B. Sowerby in 1829 to Dr. John Rutter, who bequeathed it to the Medical Institution in Liverpool. It was transferred to the Liverpool Museum in 1887, where it was destroyed by bombing in 1941. *[Embrey and Fuller, 1987; Silliman, 1829; Cleevely, 1983; DNB]* [p. 86]

PICKARD, LEONARD (collection auctioned in London, 1802), British collector in York. His small collection included minerals, shells and fossils. *[Chalmers-Hunt, 1976]*

PICOT de la PEIROUSE, PHILIPPE, Baron (1744–1818), French aristocrat, naturalist, mine inspector and professor at the University of Toulouse. He specialized in the minerals of the Pyrenees, and donated specimens to the Stockholm mining college which still bear his original handwritten labels. *[Zenzén, 1921; BUA]*

PIERSON, (Rev.) Archdeacon _____ (collection auctioned in London, 1807), British cleric, Rector of Easingwould, Yorkshire. His collection included minerals, shells and fossils. *[Chalmers-Hunt, 1976]*

PILLER, MATHIAS (1733–1788), Austrian Jesuit monk (until dissolu-

tion of the order in 1773), professor at the Theresianum in Vienna, and first professor of natural history (1777) at the Royal Hungarian University (now Eötvös Lorand University in Budapest). He brought with him to Pest his extensive personal mineral collection of 11,540 specimens. Many of the specimens were from the Carpathian Basin, but a significant number came from classic localities throughout Europe. According to Esmark (who saw the collection in 1794) it was the best mineral collection in the city. It was purchased from his heirs by the University in 1800 for 20,000 gold florins. A printed catalog survives. *[Esmark, 1798; Papp and Weiszburg, 1991a]* [p. 46, 47, 110]

PINELLI, GIAN VINCENZO (1535–1601), Italian physician and naturalist from Naples. He built a large library and a personal museum of antiquities and natural history. He traded mineral specimens to Ferrante Imperato (native silver, cadmian smithsonite, etc.). *[Accordi, 1981]*

PITTON de TOURNEFORT, JOSEPH (1656–1708), French botanist. He collected a small group of minerals toward the end of the 1600's which was acquired by the King's Cabinet (now the Natural History Museum) in Paris. *[Schubnel, 1987]*

PIUS VII [LUIGI BARNABA CHIARAMONTI] (1742–1823), Italian Pope (1800–1823). He founded the mineral collection of the University of Rome in 1815. *[Zwaan and Petersen, 1977]*

PLANTA, JOSEPH (1744–1827), Swiss librarian at the British Museum, and F.R.S. In 1807 he donated a crystal of boracite in gypsum from Lüneburg to the British Museum. *[Fletcher, 1904]*

PLATTER, FELIX (1536–1614), Swiss naturalist in Basle. He had one of the most notable museums of his day; rich in mineral specimens and including the collection of Conrad Gesner. It remained in the possession of the family for many years, and was eventually acquired by the Natural History Museum in Basle. *[Murray, 1904; Burchard, 1986]*

PLAYFAIR, JOHN (1748–1819), Scottish mathematician and geologist; proponent of the Huttonian theory of the earth. His mineral collection was auctioned in Edinburgh in 1820. *[Chalmers-Hunt, 1976]*

PLOT, ROBERT (1640–1696), British naturalist and Keeper of the Ashmolean Museum from 1683 to 1690. His large collection, including "multa mineralia, exotica non pauca mineralia metalla terras, salia, lapides," etc., was given in 1691 to the Ashmolean Museum and to the Royal Society, but is now lost. *[Gatterer, 1798; Gunther, 1925; Torrens, 1985; Sarjeant, 1980]* [p. 64, 67]

PLOYER, KARL von (1739–1812), Austrian Bergrat in Carinthia. He donated some mineral specimens to the Imperial collection in Vienna. *[Stütz, 1807]*

POCOCKE, RICHARD (1704–1765), British Lord Bishop of Meath His mineral and fossil collection, accumulated in part during this travels through Scotland, was auctioned in 1766. *[Chalmers-Hunt, 1976; DNB]*

PODA, NIKOLAUS, Abbot (1723–1798), Austrian clergyman and mineralogist in Vienna. His mineral collection, mentioned by Stütz (1807), was inherited by Stromer and disposed of piecemeal around 1800. *[Moll, 1805]*

PODMANICZKY, KAROLY, Baron (1772–1833), Hungarian aristocrat, graduate of the mining school at Selmecbánya, Royal Mining Councillor in 1798, member of the Mineralogical Society of Jena. His extensive, mostly self-collected mineral and ore collection (3,524 specimens) was acquired upon the Baron's death by Anton Fauser, and sold in 1842 to the Hungarian National Museum for 896 gold florins. *[Benkö, 1786; Krenner, 1902]*

POLHEIMER, ANDERS (the elder) (1746–1811), Swedish Berghauptman. Baron Hermelin acquired some of his mineral specimens which have been preserved in the collection of the Riksmuseet, Stockholm, still bearing Pohlheimer's own handwritten labels. *[Zenzén, 1921]*

POND, ARTHUR (died 1760's), British painter and collector of shells and minerals. His collection, long managed by Jacob Neilson, was sold at auction for about £1,000, William Hunter buying many lots. *[Mendes da Costa, 1812]* [p. 47]

PONTONNERIE: see BESNIER de la PONTONNERIE

PONTOPPIDAN, ERICH LUDVIGSEN (1698–1764), Bishop of Bergen, Norway, and author of *The Natural History of Norway* (1755). In 1756 he gave 15 Norwegian mineral specimens to Thomas Pennant. The bulk of his mineral collection was purchased by Count A. G. Moltke, who donated it to the University of Copenhagen. *[Smith, 1913; Noe-Nygaard, 1972]* [p. 71, 130–131]

POPE, ALEXANDER (1688–1744), English poet, one of the foremost literary figures of his age. He built a tunnel or grotto connecting his house and garden, and lined the walls with several tons of Cornish mineral specimens supplied in four shipments by William Borlase and also from other collectors. *[Pool, 1986; Miller, 1982; Searle, 1745]* [p. 69]

PORTLAND, MARGARET CAVENDISH HARLEY BENTINCK, Duchess Dowager of (1715–1785; catalog published in London, 1786), British aristocrat. Her extensive natural history collection (4,260 lots) included mostly shells but also many "spars, ores and chrystals." It was auctioned off for £11,546 at her house in Whitehall in 1786. *[Chalmers-Hunt, 1976; DNB; Altick, 1978; Mendes da Costa, 1812; Dance 1966]*

PORTZ, J. D. V. (auction catalog published in Amsterdam, 1754), Dutch military man (colonel). His collection consisted of metallic minerals, gem species and various "petrifactions," including many "costly rarities." His specimens were auctioned in Amsterdam on 18 March 1754. *[Zenzén, 1928; Cobres, 1782]*

PÖTTING, EUSEBIUS, Count (died 1825?), Bohemian aristocrat in Prague. He built an excellent mineral collection. *[J. Svenek, personal communication 1979; Wrany, 1896]*

PÖTZSCH, CHRISTIAN GOTTLOB (1732–1805; catalog published in Dresden, 1805 and 1811), German Finance Commissioner and mineralogist. His extensive mineral collection contained over 5,000 specimens including many from the Saxon Erzgebirge. He sold it for 900 reichstaler to Hugo Kollontaj. *[Freiesleben, 1828; Fischer, 1939]* [p. 46]

POUSHKIN: see MOUSSIN-POUSHKIN

POWELL, (Mrs.) FRANCIS (fl. late 1700's), British mineral dealer at Leicester House in London. She sold many mineral specimens from the Cumberland and Durham lead mines to Philip Rashleigh. *[Russell, 1952]* [p. 71]

PREHN, HENDRIK (1733–1785), South African military man. Upon his retirement in 1780 he moved to Germany, bringing with him his collections of plants and minerals. A species he had collected at the Cape of Good Hope was named *prehnite* in his honor by Abraham Werner—the first species to be named after a person. *[Kruger, 1971]* [p. 91]

PRESCHERN, GEORG (died 1809), Austrian mineral dealer in partnership with his older brother, Simon Preschern, in Vienna. *[Faninger, 1988b]*

PRESCHERN, SIMON (died 1806), Austrian mineral dealer in Vienna. He supplied minerals to Sigmund Zois, including the type material that would ultimately be named zoisite. *[Faninger, 1988b; Stütz. 1807]*

PRINTZSKÖLD, ERIK ROLAND; Swedish Bergmästare and mineral collector. Specimens still bearing his original handwritten labels, dated 1772, have been preserved in the Riksmuseet, Stockholm. *[Zenzén, 1921]*

PRYCE, WILLIAM (1735–1790), British mine surgeon and naturalist in Redruth, Cornwall; author of *Mineralogia Cornubiensis* (1778). He traded mineral specimens with William Borlase. *[Pool, 1986]* [p. 69]

PSILANDERHJELM, NILS (1706–1768; catalog published in Stockholm, 1755), Swedish Bergrath. His mineral collection, very large for its time, was acquired by the royal mining college in Stockholm. *[Leonhard et al., 1817; Zenzén, 1921]*

QUIST, BENGT (or BENET) ANDERSSON (1726–1799; catalog published in Stockholm, 1782), Swedish mine assessor in the Stockholm mining college. His mineral collection included 1,440 gemstones; it sold for 3,092 riksdaler. *[Leonhard et al., 1817; Zenzén, 1921]* [p. 47, 135]

RAAB, ELEANOR de (fl. late 1700's; catalog by Ignaz von Born was published in Vienna, 1790), later the wife of Friedrich von Uberta of Austria. She owned a beautiful mineral collection of about 2,500 small, choice specimens "formed chiefly by donations from Mr. Born." In 1791 and 1792 Mademoiselle de Raab purchased "a collection of 41 small, choice specimens, mostly Cornish," from Philip Rashleigh. In

1793 her entire collection was put up for sale at 3,000 ducats, and was eventually purchased by Count Friess in Vienna. *[Gatterer, 1798; Moll, 1805; Townson, 1797; Estner, 1795; Molnár and Weiss, 1986; Russell, 1952]* [p. 47]

RABEN, S. V., Count (1741–1819), Danish nobleman in Skodsborg. His mineral collection, consisting mainly of Austrian specimens, was purchased following his death by the University of Copenhagen for 600 rigsdaler. *[Garboe, 1959; Noe-Nygaard, 1972]*

RACKNITZ, JOSEPH FRIEDRICH, Baron von (1744–1818), German Hofmarschall. He built a "complete and beautiful" mineral collection of 4,700 specimens which was later purchased for the Royal Museum in Dresden. *[Fischer, 1939, 1966]* [p. 46]

RACKSTROW, B. (catalogs published in London, 1780, 1782, 1787, 1794), British collector. "Rackstrow's Museum" on Fleet Street in London contained a wide range of natural and artificial curiosities including "spars and crystallizations." The minerals were auctioned in 1799. *[Chalmers-Hunt, 1976; Murray, 1904]*

RADAY, GIDEON, Count (ca. 1700–1800), Hungarian Royal Mine Councillor (1797) in Selmecbánya, and member of the Mineralogical Society of Jena. He built a mineral collection, admired by Esmark. *[Esmark, 1797; Benedek, 1942]*

RADECIUS, I., Bishop of Eger (fl. late 1500's), Hungarian clergyman. He collected minerals "with special devotion," and when his collection became known to King Rudolph in 1576 the king demanded that fine specimens be donated by the bishop to his own collection. *[Vitalis and Kecskeméti, 1991]*

RAINER (1783–1839), Austrian archduke; eldest son of Habsburg Emperor Leopold II, and brother of Johann. He owned a mineral collection which he had begun as a child, arranged according to Werner's system, including specimens from Transylvania. Although not all of his specimens were especially beautiful, his enthusiasm for them was said to have been infectious. *[Moll, 1805; Huber and Huber, 1982; ADB]*

RANGO, CONRAD TIBURTIUS (1639–1702; catalog of the *Rangonischen Naturalienkammer Schöbergisches Cabinet* published in Greifswald, 1697), German Professor of Theology in Greifswald. His collection contained 336 specimens of minerals and stones, mostly from the Meissen area of Saxony. *[Gatterer, 1798]*

RAPPOLTSTEIN, _____; German aristocrat. King Maximilian I of Bavaria (1756–1825) acquired a valuable collection of silver ores from the Markirch/Alsace area on the extinction of the von Rappoltstein family. *[Burchard, 1986]*

RASHLEIGH, CHARLES (1747–1825), British businessman and a younger brother of Philip Rashleigh in St. Austell, Cornwall. Philip obtained a large number of Cornish mineral specimens from him. *[Russell, 1952]* [p. 74]

RASHLEIGH, JOHN (1742–1803), a younger brother of Philip Rashleigh. In the preface to his detailed manuscript collection catalog, Philip cites John as among his sources for mineral specimens. *[Russell, 1952]*

RASHLEIGH, PHILIP (1729–1811), Cornish landowner, antiquary and mineral collector, Member of Parliament (1765–1802). "Through purchase, exchange, and his own collecting he formed one of the most outstanding early collections of minerals," and probably the finest Cornish collection before or since. Sowerby illustrated many of his specimens in his *British Mineralogy*, and Rashleigh himself had a two-volume catalog published with color illustrations of some of his best specimens (1797, 1802). Having died childless he bequeathed his minerals to his nephew, William Rashleigh. William added to the collection at least until 1838. In 1902 the bulk of the Rashleigh collection, still housed at Menabilly, was purchased for the Museum of the Royal Institution of Cornwall (now the Royal Cornwall Museum) at Truro, where it remains today. In 1923 Sir Arthur Russell purchased a subset of the collection which Wiliam Rashleigh had given to his son John; these were later acquired by the British Museum along with the rest of Russell's collection. Philip's 265-page manuscript catalog listing 3,902 specimens is also preserved in the Truro Museum. *[Cleevely, 1983; Russell, 1952; DNB]* [p. 71–72, 74, 78, 79]

RASHLEIGH, WILLIAM (1777–1855), British geologist and Member of Parliament from Kilmarth, Tywardreath, Cornwall. Philip Rashleigh, his uncle, acquired mineral specimens from him. And in 1811 when Philip died, William inherited his mineral collection, and continued to add to it at least until 1838. In 1902 it was acquired by what is now the Royal Cornwall Museum, Truro. *[Russell, 1952]* [p. 74]

RASPE, RUDOLPH ERICH (1737–1794), German mineralogist and author of the Baron Munchausen stories; curator of a museum in Kassel but fled to England (1775) after being charged with theft. Masqueraded as a mining expert and swindled Sir John Sinclair by pretending to discover gold and silver on his estate (1791). He built a mineral collection mentioned by Robert Jameson (1800), supplied minerals to Caroline Louise von Baden, and sold some specimens to Philip Rashleigh and Charles Hatchett. *[ADB; Russell, 1952; Mayer, 1975]*

RASSE de NOEUX, NICOLAS (died 1581), Surgeon to the King of France in Paris. Bernard Palissy described a metallic ore specimen in his collection which contained what appeared to be a fish fossil. *[Morley, 1852]*

RATZEL, JOHANN CONRAD (undated catalog published in Halberstadt, ca. 1700), German collector of natural history, including minerals. He gathered many of his specimens through "great labor and expense" during 12 years spent in China, Japan and Indonesia. *[Valentini, 1714; Cobres, 1782]*

RÄTZER, D. B. (fl. late 1700's), Swiss collector in Bern. His mineral collection, "a multitude of crystallized specimens" primarily from the Gothard Massif, was meticulously labeled. It was acquired in 1802 by Martinus van Marum and later incorporated into Teyler's Museum in Haarlem. *[Forbes, 1970]*

RAWLE, WILLIAM (died <1791; collection auctioned in London, 1790), British collector on Castle Court, The Strand, London. His small collection included minerals and shells. *[Chalmers-Hunt, 1976]*

RAZUMOVSKY, GREGORII KIRILLOVICH, Count (1759–1837), Russian nobleman and geologist. He built a collection of about 6,000 Russian mineral specimens, and also others from Germany and Switzerland, "at great expense over many years." He later lived in Paris and Lausanne, and sold his collection to George Gibbs ca. 1800. According to Fitzinger (1868) he subsequently built a second collection which was acquired at least in part by Prosper von Sinzendorf (1773–1822) and later sold to Ludwig von Skala. *[Narendra, 1979; ADB]* [p. 46, 57, 127–128, 150]

RÉAUMUR: see FERCHAULT de RÉAUMUR

REDERN, SIGISMUND EHRENREICH, Baron von (1720–1789), German curator at the Academy of Science in Berlin. Rashleigh reports obtaining mineral specimens from him. *[Russell, 1952]*

REED, LUMAN (1781–1836), American merchant in New York, and a patron of American painting. His mineral collection, along with many paintings, went to the New York Historical Society. *[DAB; L. H. Conklin, personal communication]*

REICHENSTEIN: see MÜLLER von REICHENSTEIN

REICHETZER, FRANZ (born 1770), Austrian collector in Vienna, and later Bergrath in Schemnitz. His mineral collection is mentioned by Fitzinger (1856).

REINHARD, JOHANN JAKOB (1714–1772), Markgräf of Baden-Durlach. He was "a passionate collector of minerals," and a friend of Caroline Louise von Baden. *[Mayer, 1977b]*

REINIUS, JOHAN (ca. 1775–1843), Swedish mineral collector. Specimens still bearing his original handwritten labels have been preserved in the Riksmuseet, Stockholm. *[Zenzén, 1921]*

REMPF, _____ (auction catalog published in Berlin, 1791), German lathe-master in Berlin. His collection, 773 lots, consisted of marble, semi-precious stones, zeolites, ore minerals and rocks.

RENNIE, W.; collection auctioned in London, 1791), British engraver. His small collection included minerals, fossils and shells. *[Chalmers-Hunt, 1976]*

RETZIUS, ANDERS JOHAN (1742–1821), Swedish naturalist. His geognostic collection was acquired by the University of Greifswald. *[Gross, 1956]*

REUSS, FRANZ AMBROS (1761–1830), Bohemian mineralogist and physician in Bilin. He built an excellent collection of minerals, acquired by Prince Lobkowitz in Bisin. *[Tucek, 1978; Sarjeant, 1980; Schenkenberg, 1842; Wrany, 1896]*

REYMANN, FRIEDRICH (catalog published in Vienna, 1784), Austrian collector in Vienna. His natural history cabinet is considered to have included minerals. *[Leonhard et al., 1817]*

REYMERS, TOBIAS; German collector of general natural history in Lüneburg. He was an electoral Rath and Hof-grerichts assessor of Braunschweig, and also Syndicus Primerius to the city of Lüneburg. His collection, including minerals, was discussed by Valentini (1714).

RHÉDEY, LAJOS, Count (1770–1831), Royal Imperial Austro-Hungarian Chamberlain and Lord Lieutenant in Nagyvárad (=Oradea, Romania), and member of the Mineralogical Society of Jena. He had a mineral collection. *[Miller, 1818; Benedek, 1942]*

RICARDO, DAVID (1772–1823), British political economist, Member of Parliament, and early member of the British Geological Society He is known to have assembled a mineral collection. *[Woodward, 1907]*

RICHTER, CHRISTIAN (fl. 1730's), German Inspector of Precious Stones in Saxony, and Mining Assessor in Schneeberg. Probably the originator of the family collection, which passed to his descendants (see below). In 1732 he published the first mineralogical book with color plates: *Saxoniae Electoralis Miraculosa Terra, oder des weltberühmten Chur-Sachsen-Landes bewunders-würdige Erde,* containing 61 hand-colored engraved plates of slabbed mineral and ore specimens from his collection.

RICHTER, CHRISTIAN (catalog published in Freiberg, 1784), German mining man. The Richters were Mine Assessors and mining surveyors in Freiberg. Their collection included ore specimens, surveying instruments. *[Freiesleben, 1828]*

RICHTER, GEORG GOTTFRIED (catalog, *Gazophylacium mineralium*, published in Leipzig, 1719), German businessman in Leipzig. He had a cabinet of minerals. *[Gatterer, 1798; Freiesleben, 1828]*

RICHTER, JOHANN CHRISTOPH (1689–1751; color catalog, *Museum Richterianum*, published in Leipzig, 1743). He built a collection of 2,309 minerals, plus gems, rocks, fossils and biological items, 5,631 specimens in all. The museum was sold in 1751, a few pieces being acquired by Johann Heinrich Linck. *[Wilson, 1990]* [p. 94–95, 97]

RICHTER, JOHANN THOMAS (auction catalog published in Leipzig, 1782). This estate included books, minerals and shells. *[Gatterer, 1798]*

RIEDLING, (Pater) TOBIAS (died 1785), Austrian monk, founder of the mineralogical, botanical and zoological collections of the Augustiner monastery in 1730. *[Fitzinger, 1856]*

RIES, _____ (died 1796), German Bergrat in Veckerhagen. His private collection of minerals was purchased in 1796 by the University of Marburg. *[Schürmann, 1990]*

RIO: see DEL RIO

RISSO, ANTOINE (1777–1845), French naturalist and pharmaceutical scientist in Nice. He traveled and collected widely. Schenkenberg (1842) recommended that travelers in Nice visit him to view his mineral collection. *[BUA]*

RIVINUS, AUGUST QUIRINUS (1652–1723), German Professor of Medicine and Botany in Leipzig. His personal mineral collection was acquired by the Royal Museum in Dresden. *[Fischer, 1939]*

ROBINSON, SAMUEL (died 1827; posthumous sale catalog published in New York, 1829), American mineralogist, and author of the *Catalogue of American Minerals* (1825). His "duplicate" mineral specimens, consisting mostly of New England minerals, numbered over 4,000, and were offered for exchange or sale in 1826. His main collection, rich in European minerals and numbering 1,413 specimens, was offered for sale in 1829. *[Carpenter, 1828]* [p. 46]

ROBSON, (Col.) _____, (collection auctioned in London, 1807), British F.A.S., Lieut. Governor of St. Helena. His small collection included minerals, shells and fossils. *[Chalmers-Hunt, 1976]*

ROCHEFOUCAULD-LIANCOURT, FRANÇOIS ALEXANDRE FREDERICK, Duke de la (1747–1827), French philanthropist and social reformer. His mineral cabinet was considerable in size and ranked among the more important in Paris. *[Ferber, 1789; Burtin, 1784]*

RODD, (Rev.) EDWARD (1768–1842), British clergyman of Trebartha Hall, North Hill, Cornwall; he married Harriot Rashleigh, daughter of Charles and niece of Philip. Philip Rashleigh reported acquiring mineral specimens from him. *[Russell, 1952]*

RÖDER, _____, Count von (auction catalog published in Dresden, 1817), German aristocrat from Königsbrück. His mineral collection was said to have included the "duplicates from a very old, large collection."

RÖDING, PETER FRIEDRICH (1767–1846), German naturalist and collector. His private collection of art and natural history, including minerals, was opened to the public in 1804 as the "Museum für Natur und Kunst" in Hamburg. *[Schenkenberg, 1842; ADB]*

RODT, MAXIMILIAN CHRISTOPH von (1717–1800), German Archbishop of Konstanz. His natural history collection, including minerals, was given to the Margrave of Baden. *[Burchard, 1986]*

ROGERS, JOHN (1750–1832), British Member of Parliament from Cornwall. He contributed specimens of lead minerals from Wheal Rose to Philip Rashleigh's collection. *[Russell, 1952]* [p. 74]

ROMÉ de l'ISLE, JEAN BAPTISTE LOUIS (1736–1790), French mineralogist in Paris; co-founder of modern crystallography. He published his own collection catalog in Paris (1773), limited to about 750 metalliferous specimens. Sixty-eight specimens from his collection were illustrated in color in Gautier d'Agoty's *Histoire Naturelle* (1781), for which Romé de l'Isle wrote the text. His minerals were purchased following his death by Gillet de Laumont, and later were acquired by the Natural History Museum in Paris. *[Schubnel, 1987; Wilson 1989]* [p. 50–53, 54, 57, 138–139]

ROMERO de TERREROS, PEDRO (1710–1781), wealthy Mexican silver miner in Pachuca. Around 1770 he initiated the formation of a mineral cabinet which was ultimately inherited by his son, the second Count of Regla. It is thought that original specimens from his collection may still be in the possession of the Romero de Terreros family in Pachuca. *[Del Rio, 1832; Archivo del Nacional Monte de Piedad, Mexico D.F.]* [p. 140]

ROPER, _____ (collection auctioned in London, 1789). His collection included minerals, shells, fossils and corals. *[Chalmers-Hunt, 1976]*

ROSE, VALENTIN (1762–1807), German chemist, pharmacist and Medicinal-Assessor in Berlin; father of the famous mineralogist Gustav Rose, who inherited his excellent mineral collection and built upon it. Their collection later went to the University of Göttingen. *[Schenkenberg, 1842; ADB; G. Schnorrer, personal communication]*

ROSENMÜLLER, [probably JOHANN CHRISTIAN; 1771–1820; German Professor of Anatomy and Surgery in Leipzig.] His collection of minerals was acquired by H. W. Campe. *[Freiesleben, 1828; Thomas, 1888]*

ROSINUS, MICHAEL RHEINHOLD (1687–1725), German naturalist and author. He supplied 125 specimens of German minerals to John Woodward. *[Price, 1989; CBM]*

ROSS, _____, Count von (catalog published in Dresden, 1820). German aristocrat. His collection included minerals. *[Freiesleben, 1828]*

RÖSSLER, FRANZ (died 1825?), collector in Bohemia. He donated some mineral specimens to the Imperial collection in Vienna. *[Stütz, 1807; Wrany, 1896]*

RUDESCH, FRIEDRICH (died 1836), German zoologist and naturalist in Ljubljana. His Landesmuseum, the forerunner of the Slovenian Natural History Museum, included a collection of minerals numbering 2,429 specimens by 1832. Most of these may have been acquired from the collection of Joseph Palnstorf. *[Faninger, 1988]*

RUDOLF II, Holy Roman Emperor (1552–1612). He amassed an enormous collection of art and natural history at Hradschin Castle in Prague. His court physician and curator of the large gem and mineral collections was Anselmus Boetius de Boodt (author of *Gemmarum et lapidum historia*, 1609, the most important lapidary of the seventeenth century). After his death, the minerals were eventually packed in barrels, on the order of Joseph II (1782), and sold to a number of private collectors. *[Niedermayr, 1988; J. Svenek, personal communication 1979]* [p. 19, 38, 109]

RUMIANTSEV, NIKOLAI PETROVICH, Count (1754–1826), Russian statesman and diplomat. His museum of books, manuscripts, coins, ethnographic items and 12,794 mineral specimens was given to the State following his death and became a popular public attraction. In 1921–1927 the Rumiantsev Museum was broken up and its contents distributed to other Soviet museums, the minerals going to the Moscow State Geological Museum. *[Great Soviet Encyclopedia; Schenkenberg, 1842; Wagner, 1818]* [p. 46, 127]

RUMPF, GEORG EBERHARD (1637–1706); catalog published in Amsterdam, 1705, 1711), Dutch merchant and scholar, lived many years in the East Indies. His *Rariteitkamer* included minerals, metals, stones, shells, etc. *[Gatterer, 1798; Leonhard et al., 1817]* [p. 115]

RUNDELL, W. EDMUND (fl. 1790–1815), British collector. He possessed a cabinet of minerals from which he loaned specimens to James Sowerby for illustration in his *Exotic Mineralogy*. [p. 73, 79]

RUPRECHT, ANTON (1748–1814; collection auctioned in London, 1807), Hungarian professor of chemistry, metallurgy and mineralogy at the Selmecbánya (Schemnitz) Mining Academy, and later Aulic Counsellor at the Royal Imperial Chamber of Minting and Mining in Vienna. Jens Esmark visited his mineral collection in 1794. He donated some specimens to the Imperial collection in Vienna. His collection consisted exclusively of minerals. *[Chalmers-Hunt, 1976; Stütz, 1807; Esmark, 1798]*

RUTERSHAUSEN, ROGER von (1727–1782), Austrian Counsellor of Justice. His comprehensive mineral and rock collection was acquired by the Kremsmünster Mineralogical Museum in 1792. *[Burchard, 1986]*

RUYSCH, FRIDERICH (1638–1731; catalog published in Amsterdam, 1731), Dutch anatomist in Amsterdam. He built an anatomy and natural history cabinet of 935 items, considered to have included minerals. It was purchased by Peter the Great in 1717 for 30,000 guilders. *[Gatterer, 1798; Neverov, 1985]* [p. 116]

SAGE, BALTHAZAR GEORGES (1740–1824), French mineralogist and chemist, taught chemical analysis at the Paris Mint, founded the Royal School of Mines, Paris. He built a teaching and research collection of minerals, which he sold to the National Museum of Natural History (Jardine des Plantes) and the Paris School of Mines in 1825. Seven of his specimens are illustrated in Gautier d'Agoty's *Histoire Naturelle* (1781). *[Schubnel, 1987; Guerlach, 1975]* [p. 49–50, 53]

SAINT-FOND: see FAUJAS de SAINT-FOND

SAINT-YVES: see LÉOFFROY de SAINT-YVES

SALDONNER, _____ (fl. 1790's), Austrian collector in Vienna. His mineral collection is referred to by Fitzinger (1856).

SALIS-MARSCHLINS, KARL ULYSSES von (1760–1818), Swiss naturalist in Chur. Schenkenberg (1842) recommended his mineral collection, probably built by several members of his large family. *[ADB]*

SALM, FRANZ XAVIER, Count (1749–1822), Austrian archbishop in Vienna. He was a patron of natural history, and financed expeditions to collect minerals and plants. *[Fitzinger, 1856]*

SANDE, JEAN BAPTISTE AUGUSTIN van den (1746–1820), Belgian pharmacist and physician in Brussels. His cabinet included shells and insects, but specialized mostly in minerals. *[Burtin, 1784; BNB]*

SANDELS, SAMUEL (1724–1784), Swedish Bergsrådet. His mineral collection was acquired in large part by the Stockholm mining college (now the Riksmuseet). *[Zenzén, 1921]*

SANSOM, JOSEPH (1750–1820), American collector in Philadelphia. His mineral collection was acquired by Haverford College in 1832. *[Canfield, 1923]*

SAURAU, FRANZ, Count von (fl. 1790's), Austrian Royal Imperial Hofrath in Vienna. His mineral collection was augmented by a collection of alabaster crystal models made by the crystallographers Bekkerhin and Kramp. *[Fitzinger, 1856]*

SAUSSURE, HORACE BÉNÉDICT de (1740–1799), Swiss physician and mineralogy Professor in Geneva. His mineral collection of 1,300 specimens, begun while he was quite young, is now in the Museum of Natural History, Geneva. *[Burchard, 1986; Cleevely, 1983; WBD; Sarjeant, 1980; Von Zittel, 1901]*

SAUSSURE, NICOLAS THEODOR de (1767–1845), Swiss naturalist and chemist. His rock and mineral collection was acquired in 1802 by Martinus van Marum, along with specimens from H. B. de Saussure, and later incorporated in Teyler's Museum in Haarlem. *[Forbes, 1970]*

SAVALETE de BUCHELAY, _____ (catalog published in Paris, 1764), one of the French "Farmers-General" under Louis XV. His collection consisted of "minerals, crystallizations, stones and other curious effects in the estate of Mr. Savalete de Buchelay." *[Gatterer, 1798]* [p. 52]

SAYVE, _____, Commandeur; French military man and collector. Romé de l'Isle (1783) refers to his mineral cabinet. [p. 53]

SCALI, PETER PAUL (catalog published in Geneva, 1746). His collection is considered to have included minerals. *[Gatterer, 1798]*

SCHARFF, _____ (fl. late 1700's), Hungarian mineral collector. According to Jens Esmark and Robert Townson, who saw her collection in 1794 and 1793, she had the best mineral specimens in Selmecbánya (=Schemnitz), mainly from northern Hungarian mining districts. *[Esmark, 1798; Townson, 1797]*

SCHARINGER, _____; Austrian pharmacist in Vienna. In the late 1790's he purchased a collection of minerals from the Morgenbesser brothers for 7,000 gold florins, then built a second collection on his own. According to Moll (1806), he had many excellent Hungarian and Transylvanian specimens, and also a complete collection of Romé de l'Isle's crystal models.

SCHEITLIN, PETER (1779–1848), Swiss scholar, clergyman and Professor in St. Gallen. His mineral collection is described by Schenkenberg (1842) as "handsome, consisting of minerals and fossils limited to eastern Switzerland." *[ADB]*

SCHELLHAMMER, DAVID (died 1693), German Director of the Hamburg City Library from 1679 until his death. He bequeathed to that institution his personal collection of natural history, including mineral specimens which ultimately became part of the collection of the University of Hamburg. *[Muhlack, 1992; Zimmermann, 1865]*

SCHEREMETOV, NICOLAI P., Count (fl. 1780's), Russian aristocrat. He gave specimens of Siberian gypsum to Macquart in 1789. Scheremetov and his father operated eight successful theaters in Moscow. *[Great Soviet Encycl.]*

SCHEUCHZER, JOHANN JAKOB (1672–1733), Swiss physician and naturalist in Zürich. He built a collection of fossils and minerals, many of which are today in the Landessammlungen für Naturkunde, Karlsruhe. He donated 278 specimens to John Woodward's collection. *[Sarjeant, 1980; Von Zittel, 1901; Price, 1989]* [p. 67, 120]

SCHINDEL, _____ (catalog published in Dresden, 1807), Royal Danish Chief Director of Mines. His catalog of minerals was arranged according to Werner's system. *[Freiesleben, 1828]*

SCHLEGAL, PAUL MARQUARD (1605–1653), German physician and botanist in Hamburg. He built a private herbarium and a small collection of *Naturalia* including minerals. These, along with his substantial library, were turned over to the St. Johannis Library in 1653. This institution later became the Hamburg City Library (Stadtbibliothek); the minerals, since 1753, have been in the collection of the University of Hamburg. *[Muhlack, 1992; Zimmerman, 1865]*

SCHLOTTHEIM, ERNST FRIEDRICH, Baron von (1764–1832; catalog published in Gotha, 1820), German aristocrat and collector of rocks, minerals and "petrifactions." His collection was described by Erichsen (1810). *[Freiesleben, 1822]*

SCHMEISSER, JOHANN GOTTFRIED (1767–1837), German mineralogist in London. He gave the "first course of lectures on mineralogy ever delivered in the city of London" in 1793, and wrote a *System of Mineralogy* (1795) much used in British and American colleges. David Hosack saw his mineral collection in 1793. *[Hosack, 1822; CBM]* [p. 85]

SCHMID, D. (died ca. 1768; catalog published in Augsburg, 1768), German collector. His collection included minerals, plants, animals, *artificialia*, books and various other curiosities. It was purchased by Bozenhard in 1768, and resold piecemeal in 1780. *[Cobres, 1782]*

SCHMID, IGNAZ (fl. late 1700's), Hungarian mineral dealer in Vienna, mentioned by Stütz (1807) and Schenkenberg (1842). He specialized in Hungarian specimens.

SCHMIDT, _____ (fl. late 1700's), German collector. In 1790, at Kaiser Leopold II's coronation in Frankfurt-am-Main, Schmidt laid a beautiful collection of minerals at his feet, as a gift. [Stütz, 1807]

SCHMIDT, _____ (auction catalog published in Freiberg, 1807), German Mine Captain ("Oberbergmeister"). His collection consisted mostly of Saxon specimens. *[Freiesleben, 1828]*

SCHMIDT, _____ (fl. late 1700's), Hungarian hairdresser in Selmecbánya. Townson states that in 1793 he was a mineral dealer there, "but he asks a ducat for any good specimen." *[Townson, 1797]*

SCHNEIDER, _____ (auction catalog published in Freiberg, 1792), German mine superintendant in Freiberg. His catalog consisted of 348 precious objects and minerals. *[Freiesleben, 1828]*

SCHÖEPFLIN, JOHANN DANIEL (1694–1771; catalog, *Museum Schoepflini*, published in Strasbourg, ca. 1770), Austrian historian in Strasbourg. His collection is considered to have included minerals. *[Gatterer, 1798; BUA]*

SCHÖNBERG, _____, Baron von; Saxon aristocrat. He supplied 183 specimens of minerals from the Saxon Erzgebirge to John Woodward in 1690–1724. *[Price, 1989]*

SCHREBER, DANIEL GOTTFRIED (1709–1777), German Professor of Economics in Leipzig. He was a mineral collector and trading partner of Caroline Louise von Baden. *[Mayer, 1976b]*

SCHREBER, JOHANN CHRISTIAN DANIEL von (1739–1810), German naturalist in Erlangen. His mineral collection is mentioned by Schenkenberg (1842). *[ADB]*

SCHRÖDERSTIERNA, SAMUEL (1720–1779), Swedish Bergsrådet. His mineral collection, size unknown, was acquired by the Stockholm mining college (now the Riksmusett). *[Zenzén, 1921]*

SCHROLL, KASPAR MELCHIOR BALTHAZAR (1756–1829), Austrian Chef der Berg- und Salinendirektion in Salzburg. He built a great mineral collection, and wrote important works on the mineralogy of the Salzburg area. In 1819 he sold his collection of about 10,000 mineral specimens to the St. Peter Monastery in Salzburg for 2,200 gulden. *[Freh and Paar, 1982]* [p. 46, 47]

SCHULTZ, E. CH. (catalog published in Hamburg, 1818), German physician. His mineral collection is described as including "polished and brilliant pieces," but unfortunately included no locality data. *[Freiesleben, 1825]*

SCHULZ, TOBIAS (fl. middle 1600's), Hungarian mine director in Urvölgy (=Spania Dolina). Edward Browne visited him in 1669–1670 and reported seeing "many curious minerals." *[Browne, 1673]*

SCHUMACHER, HEINRICH CHRISTIAN FREDERIK (1757–1830), German anatomist, surgeon and botanist, became professor at the University of Copenhagen in 1795. His mineral collection, over 5,000 specimens, was purchased in 1811 by Count J. G. Moltke and later donated to the University. *[Garboe, 1959; Noe-Nygaard, 1972]* [p. 46]

SCHÜRER, _____ (fl. late 1700's), Hungarian owner of a copper mill in Löcse (=Levoca). His mineral collection was seen by Jens Esmark in 1794. *[Esmark, 1798]*

SCHÜTZ, JULIUS ERNST von (1719–1793), German mining man in Erdmannsdorf. He was an "Amtshauptmann" and "Kreishauptmann" in the Saxon Erzgebirge. His mineral and ore collection was acquired in 1771 by the Royal Museum in Dresden. *[Fischer, 1939]*

SCHWÄGRICHEN, CHRISTIAN FRIEDRICH (1775–1853), German botanist and Professor of Natural History in Leipzig. His mineral collection is mentioned by Schenkenberg (1842). *[ADB]*

SCHWIBODA, JACOB (fl. middle 1600's), Hungarian pharmacist in Selmecbánya. He gave Edward Browne "many curious minerals" when Browne visited him in 1669. *[Browne, 1673]*

SCHYNVOET, SIMON (1652–1727; catalog published in Amsterdam, 1744), Dutch naturalist and friend of Everhard Rumph. He was a diligent collector of minerals and shells. His collection was dispersed by a disinterested son-in-law. *[Murray, 1904]*

SCILLA, AGOSTINO (1639–1700), Sicilian naturalist and author. He sold 210 mineral specimens from Malta, Sicily and Calabria to John Woodward. *[Price, 1989; CMB]*

SCIPANI, MARIO; Italian collector in Naples. He collected some plants, but he focussed primarily on minerals. *[Valentini, 1714]*

SCOPOLI, GIOVANNI ANTONIO (1727–1788), Italian Professor of Chemistry at Pavia, instructor at the Banská Stiavnica mining school, physician to the miners at Idria, Professor of Mineralogy at Schemnitz, and author of *Crystallographia Hungarica* (1776), which described and illustrated many mineral specimens which he acquired on a collecting trip through Hungary. Other specimens of his are described in his *Principia Mineralogia* (1772). He donated his extensive mineral collection to the museum of the University of Pavia. *[Ferguson, 1906; Wiedemann, 1991; Szakáll, 1988]* [p. 71, 121, 123]

SEBA, ALBERT (1665–1736; auction catalog published in Amsterdam, 1752), German-born apothecary in Amsterdam. His four-volume catalog of 1734–1765 contains 449 handcolored plates including nine that show mineral specimens. In 1717 he sold his entire collection for 15,000 gulden to Peter the Great of Russia, but soon began a second collection. In 1752 this second collection was auctioned for 24,440 gulden to pay for completing publication of his catalog. Pedro Dávila of Paris, Count Adam Moltke (1709–1792) of Denmark and Count Carl Gustav Tessin (1695–1770) of Sweden were among the buyers; 139 specimens of fossils and minerals from Seba's collection are preserved today in the Geological Museum, Copenhagen. *[Christie's, 1990; Bergvelt and Kistemaker, 1992; Ahlriches, 1986; Engel, 1937; 1961]* [p. 47, 115–116, 137]

SEGVELT, JOHAN Van (sale catalog published in The Hague, 1739), Dutch collector. His catalog covers "shells, marine plants, minerals and petrifactions." *[Murray, 1904]*

SECKENDORF, CHRISTOPH ALBRECHT, Baron von (1748–1834), German aristocrat and Regierungsrath in Stuttgart. His mineral collection is mentioned by Schenkenberg (1842). *[ADB]*

SENTER, HORACE GATES (1780–1804), American physician in Newport, Rhode Island. He brought a small collection of minerals with him from England, which he later sold to Gold Selleck Silliman (1777–1868) for Yale College. *[Narendra, 1979]*

SERRES: see TOUSSAINT de SERRES

SESSE, MARTIN (died 1809), Spanish naturalist. He was sent to Mexico in 1785 to serve as Director of the Royal Botanical Gardens. He collected minerals as well as plants. His mineral collection was ultimately sold for 500 pesos to the National Mining College in Mexico City where it became the basis for the first official collection of minerals in the country. *[Bargallo, 1955]* [p. 140]

SETTALA, LODOVICO (1552–1633), Italian collector in Milan whose museum is said to have been "rich in minerals." His collection passed to his son, Manfredo Settala. *[Aimi et al., 1985]*

SETTALA, MANFREDO (1600–1680; catalog published in Tortona, 1664, 1666), Italian collector in Milan. His collection of "curious and exotic *naturalia*" was "rich in minerals," becoming "the most celebrated collection" in Milan. It contained quartz, metallic ores, gems, etc. *[Gatterer, 1798; BUA; Aimi et al., 1985]* [p. 39, 40]

SEUMOY, _____ (fl. 1780's), Receveur de la Fondation du St. Esprit de N. D. de la Chapelle, in Brussels, and a prominent local naturalist. His collection specialized in the minerals and fossils of the Brussels area, but also contained shells, birds and preserved animals, and the superb insect collection of his wife, Madame Lens. *[Burtin, 1784]*

SEYBERT, ADAM (1773–1825; partial catalog published in 1806), American chemist and mineralogist in Philadelphia. He owned one of the earliest American mineral collections, brought to Philadelphia in 1796. He had purchased it in Göttingen for $15 while engaged there in his chemical studies. It eventually grew to 2,000 specimens. In 1812 he sold his mineral collection for $750 to the Philadelphia Academy of Natural Sciences. *[Canfield, 1923; Frondel, 1970; Greene and Burke, 1978; Greene, 1969; DAB; CAB]* [p. 149]

SHAW, THOMAS (1694–1751), British clergyman and traveler. He traveled to "Barbary and the Levant" (the description of his trip was published in 1738), and collected African minerals. He also donated specimens of "curious things," probably minerals, to Jonathan Woodward. *[Mendes da Costa, 1812]*

SIBBALD, (Sir) ROBERT (1643–1720; catalog, *Museum Sibbaldianum*, published in Edinburgh, 1697), Scottish founder of the College of Physicians in Edinburgh, author of the first systematic natural history of Scotland. He inherited the natural history collection of Sir Andrew Balfour in 1694. His collection passed to the University of Edinburgh in 1697, where it was soon entirely dissipated. *[Gatterer, 1798; MacGregor, 1985; DNB; BUA]* [p. 41, 89]

SINZENDORF, PROSPER von, Prince (1773–1822), Austrian nobleman and collector of art and naturalia. He had a particularly fine mineral cabinet, the foundation of which was a collection he purchased from the royal lapidarist Christian Haupt. Stütz (1807) complained that, had the prince not removed most of the collection to his residence in Ernstbrunn, it would have equalled or surpassed most of the collections in Vienna. Sinzendorf also acquired much or all of Count Razumovsky's second collection. *[Fitzinger, 1868]*

SKARA: see HOF i SKARA

SLOANE, (Sir) HANS (1660–1753; catalogs published in London, 1762; and in Berlin, 1764 and 1766), British physician and naturalist, succeeded Isaac Newton as President of the Royal Society. He began collecting minerals ca. 1690, eventually acquiring over 10,000 mineral specimens and absorbing the collections of numerous other mineral collectors. His enormous accumulations, including 50,000 books, were donated to the nation, forming the basis for the British Museum. *[Gatterer, 1798; Cleevely, 1983; DNB; Sweet, 1935]* [p. 40, 46, 65–67, 120, 144]

SMITH, MATHEW (Col.) (died ca. 1812), British antiquary, FAS, and collector of minerals and corals which were auctioned posthumously in 1812. *[Chalmers-Hunt, 1976]*

SMITH, THOMAS P. (died 1802), American chemist in Philadelphia, self-educated. He built an extensive collection of minerals during a "mineralogical tour" of Britain, France, Switzerland and Scandinavia in 1800–1802. He was mortally wounded on the return voyage by the accidental explosion of one of the ship's guns. He left more than 15 boxes of specimens to the American Philosophical Society. *[Greene and Burke, 1978]*

SMITHSON, JAMES LEWIS (MACIE) (1765–1829), British chemist and mineralogist; illegitimate son of Hugh Smithson Percy, 1st Duke of Northumberland. Upon his death he donated his mineral collection, consisting of 8,000 to 10,000 specimens, and £100,000 in gold to the United States to found the Smithsonian Institution. The mineral collection was described in a government report dated 1841 as a "choice and beautiful collection" of "exquisite crystallized minerals . . . decidedly the richest and rarest collection in the country. The specimens, though generally small, are extremely perfect." Smithson's collection was destroyed by fire in Washington, DC, in 1865. *[DNB; DSB; Langley, 1897]* [p. 46, 82–83]

SOMOZA, ANTONIO PÁRAMO; Spanish mineral collector in Santiago de Compostela. He presented his collection to the Real Sociedad Económica de Amigos del Pais de Santiago in 1784. It was transferred to the University of Santiago de Compostela in 1790. *[Llorente et al., 1990]* [p. 136]

SONNENFELS, JOSEPH von (1733–1817), Austrian Hofrath in Vienna. In 1797 he had, according to Leopold von Buch, a very nice little collection of rare minerals including fine sulfur crystals, Elba minerals and the "problematical gold ore" from Nagyag. *[Moll, 1806]*

SONNENSCHMIDT, FREDERICK TRAUGOTT (born 1763), German mining engineer. In 1788 he was commissioned by the Spanish King Carlos III to explore and report on the mines and minerals of Mexico, a task which took 12 years. Part of his personal collection of minerals was sold to Martin Sesse. *[Bargallo, 1955; Howe, 1949; Salomon, 1990; Prieto, 1973]*

SOWERBY, JAMES (1757–1822), British natural history artist and publisher in London. His five-volume *British Mineralogy* (1804–1817) contains 550 colored plates, mostly of minerals, and his two-volume *Exotic Mineralogy* (1811–1817) contains 167 colored plates. He began building a mineral collection in the last years of the 1700's specifically to use in the preparation of his books; many of the specimens depicted were his own, and he often collected in the field. He purchased or was given the "valuable" mineral collection of William Day. Some of his specimens were ultimately given away to friends; others were retained by the family, and a few ended up in the British Museum, but most are unaccounted for. His son, George Brettingham Sowerby (1788–1854), gave private classes in mineralogy in London ca. 1819 (Phillips, 1819) and was a mineral dealer. His grandson, George Brettingham Sowerby (1812–1884), is recorded as auctioning off mineral specimens when he turned 21 (in 1833 and also in 1835), which may have been inherited from his father. *[Embrey and Symes, 1987; Chalmers-Hunt, 1976; Wheeler, 1974]* [p. 56, 74, 76–81]

SOWTER, JOHN (fl. 1690's), British merchant in London. He donated a collection of Cornish and Devon copper and tin minerals, including native copper from Polgouth and Trevascus, to the Ashmolean Museum in 1694. All are now lost. *[Gunther, 1925]*

SPADAM, GIOVANNI JACOPO (catalog published in Verona, 1739, 1744), Italian collector of rocks and minerals. *[Cobres, 1782]*

SPAITS, ISTVAN (1743–1804), Hungarian ex-Jesuit who taught in Hungary at various mining towns and at Buda. He built a natural history collection of plants, animals and 920 mineral specimens (especially from mines in Transylvania) purchased by the Benedictine Abbey of Pannonhalma in 1802. Today about 350 items can still be identified as having come from his collection. *[Mayer and Szakáll, 1991; Benedek, 1942]* [p. 110–111]

SPALLANZANI, LAZZARO (1729–1799), Italian naturalist and professor at the University of Pavia. He founded the University Mineralogical Museum in 1772, and donated many mineral specimens, particularly from Austria and the Appenine Front. None are identifiable today, with the exception of a meteorite which fell in the Siena area in 1794. *[NBA; Encyclopedia Brit., 1911; A. Callegari, personal communication]*

SPARRMAN, ANDERS (1748–1820), Swedish naturalist. He donated mineral specimens personally collected in the South Sea Islands to the Stockholm mining college (now the Riksmuseet). *[Zenzén, 1921]*

SPENER, CHRISTIAN MAXIMILIAN (1678–1714; catalog published in Berlin, 1718), German Professor of Anatomy in Berlin. His natural history collection covered the plant, animal and mineral kingdoms, including about 1,000 rare specimens of minerals such as gold, silver, quartz, marcasite, talc, spars, pyrite, sphalerite, copper, cobalt minerals and other metallic ores. *[Gatterer, 1798; Murray, 1904; Valentini, 1714]*

SPENER, JOHANN JACOB (died 1692: catalog published in Leipzig, 1693), German Professor in Halle. His collection is considered to have included minerals. *[Gatterer, 1798]*

SPENGLER, LORENZ (1720–1807), Swiss naturalist, moved to Copenhagen in 1743 and was attached to the Royal Cabinet of Curiosities. He was an avid collector of shells and also possessed a rich collection of minerals. *[Annemarie Brantsen, personal communication; Dance, 1966]*

SPESCHA, PLACIDUS a, (Pater) (1752–1833), famous Swiss monk, naturalist, mineral collector, trader and dealer in Trun/Disentis. His first mineral collection, which he had built to give to the Benedictine monastery of Disentis, was confiscated by the French Army as a war prize, but he subsequently assembled an even larger second collection, valued at 24,000 Gulden in 1913, acquired by the Naturforschende Gesellschaft in Chur. *[Flurin Maissen, 1955]* [p. 121]

SPIELMANN, JAQUES RENAUD (1722–1783), French professor, physician and pharmacist who practiced in Nuremberg, Frankfurt, Berlin, Freiberg and Paris. He built a beautiful mineral collection, praised by C. H. Titius. *[Fischer, 1939]*

SPÖRING, HERMAN (1701–1747), Professor of Medicine at the Turku Academy, Finland. His extensive mineral collection and library were purchased by the Academy following his death, and became the foundation for the Museum of Natural History there, but were destroyed in the Great Fire of Turku in 1827. *[Heikel, 1940]*

SPORK, _____, Count (died 1807), Austrian Field Marshall-Lieutenant living in Vienna as of 1804. Moll (1806) mentions his mineral collection, as does Stütz (1807).

SPRUNGLI, DANIEL (1721–1801), Swiss ornithologist and mineral collector in Stettlen. Thomas Pennant visited him to see his collections in 1765. *[Pennant, 1948]*

ST. AMANS: see BOUDON de ST. AMANS

ST. AUBYN, ELIZABETH WINGFIELD, Lady (died 1796), Cornish mineral collector, wife of Sir John St. Aubyn (1726–1772) and mother of the prominent mineral collector Sir John St. Aubyn (1758–1839). She sent a collection of Cornish ore minerals to William Hunter in 1764 or 1765. *[Durant and Rolfe, 1984; Hartley, 1977]* [p. 81]

ST. AUBYN, (Sir) JOHN (1758–1839), British mineral collector in Cornwall. He acquired the mineral collections of Richard Greene (1799) and William Babington (which included the Earl of Bute's great collection), forming the nucleus of his own collection. Most of his collection was given to the Civil and Military Library at Davenport; part was also given to the Saffron Walden Museum; and part was auctioned off. Some of his specimens today are preserved in the Plymouth City Museum. *[Cleevely, 1983; Smith, 1978; DNB; Torrens, 1977; Hartley, 1977]* [p. 56, 70, 78, 80, 81]

ST.-HILAIRE: see GEOFFROY de ST.-HILAIRE

ST. MEMIN: see GODON ST. MEMIN

STACKHOUSE, JOHN (1741–1819), British botanist at Oxford. His

mineral collection and that of his son, Edward Pendarves, were acquired by Sir Arthur Russell and are now in the British Museum. *[Embrey and Symes, 1987]*

STAHL, GEORG ERNST (1660–1734; catalog published in Berlin, 1773), German chemist, physician and professor in Berlin. His *Naturalienkabinet* included minerals, some of which he donated to the Natural History Museum in Paris. *[Gatterer, 1798; Weeks, 1945; Schenkenberg, 1842; Cobres, 1782]*

STARK, MICHAEL (1777–1812), Hungarian Lutheran minister and teacher in Késmárk and Szepesbéla. He was a member of the Mineralogical Society of Jena, and donated some of his mineral specimens to the Society. *[Benedek, 1942]*

STEELE, EDWARD (collection auctioned in London, 1759), British painter. His small collection of natural history included minerals. *[Chalmers-Hunt, 1976]*

STEIGER, _____ (fl. late 1700's), Austrian Imperial economist for the Cadet Corps in Neustadt, and also a mineralogist and mineral dealer. His mineral collection is mentioned by Stütz (1807), but he is accused of falsifying locality information in order to obtain higher prices.

STEIN, K., Baron von (1757–1831), German chief mining officer in Wiesbaden. Part of his mineral collection formed the nucleus of the mineralogy department of the Wiesbaden Museum of Natural Sciences. Other specimens were acquired by the University of Bonn. *[Burchard, 1986]*

STEINHEIL, FABIAN GOTTHARD (1762–1831). His mineral collection, purchased in 1832, formed the nucleus of the Mineralogical Museum of the University of Helsinki. *[Burchard, 1986]*

STEINMÜLLER, JOHANN RUDOLF (1773–1835), German clergyman in Rheineck am Bodensee; collecting partner of Ulysses von Salis-Marschlins. His mineral collection is mentioned by Schenkenberg (1842). *[ADB]*

STERNBERG, JOACHIM, Count (1755–1808), Bohemian nobleman. He built an extensive natural history cabinet, including an excellent collection of 2,800 mineral specimens. It was inherited by his younger brother, Count Kaspar von Sternberg (1761–1838), who founded the National Museum in Prague in 1818 using Joachim's great collection as a nucleus. *[Burghardt, 1950; Sarjeant, 1980; Wrany, 1896]* [p. 112–114]

STERNBERG, KASPAR MARIA, Count (1761–1838), Bohemian botanist and mineralogist. He inherited the excellent mineral collection of his elder brother, Joachim, and in 1818 donated it to help found the National Musuem in Prague. *[J. Svenek, personal communication 1979; Tucek, 1978; Sarjeant, 1980; Wrany, 1896]*

STEWART, DONALD (died 1811), Irish "itinerant mineralogist" employed by the Dublin Society in 1786–1794 to travel about Ireland collecting rocks and minerals. A 142-page catalog of the specimens he collected was published in 1800. *[Stewart, Trans. Dublin Soc., vol. I, 1800]*

STIEGLITZ, CHRISTIAN LUDWIG (born 1724; catalog, *Spicilegium Quarundam Rerum Naturalium Subterranearum*, published with 21 hand-colored mineral specimen plates in 1769; full catalog in 1772), German Supreme Court Justice in Leipzig. His mineral collection contained 4,263 numbered specimens. After his death, his collection was acquired by the Theresian College, and later by the Royal Imperial Mineral Cabinet in Vienna. *[Freiesleben, 1828; ADB; BUA; Fitzinger, 1856]* [p. 46, 96–98]

STOBAEUS, KILIAN, (1690–1742), Swedish mineral collector in Lund. His collection, acquired by the University of Lund in the 1730's, was studied by Wallerius (1709–1785). *[Mitchell, 1986]*

STOKES, WHITLEY (1763–1845), Irish Regius Professor of Medicine in Dublin. His mineral collection and catalog were acquired by Trinity College Museum, Dublin. *[Burchard, 1986; WBD]*

STROGANOV, ALEKSANDR SERGEEVICH, Count (1733–1811), Russian nobleman and heir to his family's salt pits and ironworks in the Ural Mountains. Schenkenberg (1842) especially admired his native gold specimens from the Urals. He built a two-story cabinet for his collection of Siberian minerals at Stroganov palace, which survives today but unfortunately without the original mineral specimens. *[Great Soviet Encycl., 1973; Macquart, 1789]* [p. 127]

STROMER, _____ (died before 1807), Austrian instructor at the Royal Imperial Institute for the Deaf and Dumb in Vienna. He inherited the mineral collection of the Abbé Poda in 1798, and sold it off piece by piece around 1800. *[Stütz; 1807]*

STROMEYER, FRIEDRICH (1776–1835), German chemist and mineralogist in Göttingen, discoverer of cadmium. He presented mineral specimens from his collection to Haüy. Schenkenberg (1842) made note of his collection. It was later acquired by the University of Göttingen. *[Burchard, 1986; WBD; Schnorrer, personal communication]* [p. 79]

STONESTREET, (Rev.) WILLIAM (fl. 1690's), British cleric and antiquary who had a museum of antiquities and curiosities (including some minerals) in London. *[Price, 1989]*

STRUTT, JOSEPH (1765–1844), British collector. Although his mineral collection is recorded as having been purchased in 1822 for 100 guineas by the Manchester Museum, no specimens have been identified there. *[Cleevely, 1983]*

STRUVE, HEINRICH CHRISTIAN GOTTFRIED von (1772–1851), German mineralogist, diplomat and Russian Resident Minister in Hamburg. He had a well-known mineral collection. Oberkammerherr von Friesen purchased 99 Norwegian mineral specimens from his collection for 100 gold ducats. The rest of his collection was acquired by the St. Petersburg Academy of Science, and by the Hamburg Natural History Society and later by the University of Hamburg. *[Fischer, 1939; Burchard, 1986; Schenkenberg, 1842]* [p. 125]

STUART, JOHN: see BUTE, Earl of

STUKELEY, WILLIAM (1687–1765; collection auctioned in London, 1766), British antiquary, physician and F.R.S. His small collection consisted of minerals and fossils. *[Chalmers-Hunt, 1976; DNB]*

STÜTZ, ANDREAS XAVIER (1747–1806), Austrian mineralogist, former Augustinian monk, and one of the early curators of the Museum of Natural History in Vienna; he cataloged the earth science collection in 1797–1806 (*Catalogus Stützianus*). He had a private collection which included "various interesting mineralogical varieties." He may well have been the first person to collect "thumbnail" specimens. According to Stütz (1807), his specimens were "small format . . . not many over one inch square in size." After his death his collection passed to his brother Franz Stütz. *[Moll, 1806; Zapfe, 1971]* [p. 102]

STÜTZ, FRANZ (fl. late 1700's), Austrian collector in Vienna. He inherited the thumbnail mineral collection of his brother, Andreas Stütz (1747–1806), curator of the Natural History Museum in Vienna. *[Moll, 1806]*

SULLIVAN, (Sir) RICHARD JOSEPH (1752–1806), British miscellaneous writer, FRS, FSA, MP. His small collection of minerals was auctioned as a single lot in 1808. *[DNB; Chalmers-Hunt, 1976]*

SULLY, _____, Duke of (catalog published in Paris, 1762), French aristocrat in Paris. He built a "complete collection of natural history" including especially marine plants, "congelations," shells, fossils, and "crystallizations." *[Gersaint, 1736]*

SUMNER, JOHN (collection auctioned in London, 1804), British collector in Brompton. His collection included minerals, shells and corals. *[Chalmers-Hunt, 1976]*

SWAB, ANTON ANTONSSON (1702–1768), Swedish mine inspector, member of the mining council, Bergmästare at Skåne and Kronoberg, prominent metallurgist and mineralogist, and pioneer in blowpipe analysis. His "extremely beautiful and valuable collection of 4,000 specimens of minerals" was purchased by Uppsala University in 1751 for 18,000 riksdaler. *[Norin, 1962]* [p. 46, 47, 133]

SWAB, ANTON von (1763–1809), Swedish mining assessor. His mineral collection was obtained by the Stockholm mining college (now the Riksmuseet). *[Zenzén, 1921]*

SWAMMERDAM, JAN JAKOBSZOON (1637–1680; catalog published in Amsterdam, 1679), Amsterdam apothecary and collector. His natural history collection is considered to have included minerals. *[Gatterer, 1798; WBD]*

SWEDENSTJERNA, ERIC THOMAS (1765–1825), Director of the Naturalien Kabinets in Stockholm, also Director of Eisenfabrikation at numberous Swedish mining districts. His collection of 6,090 mineral specimens was acquired after his death by Swedish King Oscar I (1799–

1859) and later presented to the University of Uppsala. *[Norin, 1962]* [p. 46, 134]

SWINBURNE, HENRY (1743–1803; collection auctioned in London, 1803), British travel writer. His small collection consisted exclusively of minerals. *[Chalmers-Hunt, 1976]*

SWISTUNOV, _____ (died ca. 1812), Russian government official (*Kammerherr*) in St. Petersburg. Wagner (1818) describes his mineral collection as consisting of over 7,000 specimens from worldwide localities. It was well organized and instructive. [p. 46]

SYNNOT, (Sir) WALTER (1741–1821), Irish collector in Ballymoyer, County Armagh. Philip Rashleigh acknowledged having received most of his Derbyshire specimens from him. *[Russell, 1952]* [p. 74]

SZAJBÉLY, ISTVAN (1777–1855), Hungarian mining official in Rézbánya, Transylvania. He donated his extensive collection of Transylvanian minerals to the Hungarian National Musuem and the University of Budapest (now Eötvös Lorand University). *[Bancroft, 1988]*

SZAPARY, P., Count; Hungarian aristocrat. He donated a large collection of minerals to the Hungarian Natural History Museum in 1809. *[Papp et al., 1991b]*

SZÉCHÉNYI-FESTETICS, JULIANNA, Countess (1753–1824), Hungarian noblewoman and wife of Ferenc Széchényi, founder of the Hungarian National Library (Museum). She donated her large collection of minerals to the museum in 1803. *[Miller, 1818; Papp et al., 1991b]*

TALBOT, (Sir) CHARLES (died ca. 1814), British collector of minerals and fossils auctioned posthumously in 1814. *[Chalmers-Hunt, 1976]*

TANNENBERG, JOHANNES von (fl. late 1600's), Bohemian Bishop of Königgrätz. His collection included gold specimens. *[Wrany, 1896]*

TASCHER de la PAGERIE, MARIE JOSÉPHINE ROSE (1763–1814), widow of the Vicomte de Beauharnais; wife of Napoleon, crowned Empress of France. She had formed a mineral collection and is thought to have tried to obtain some of Gigot d'Orcy's specimens from George Gibbs before he left France, but was too late. *[Narendra, 1979]*

TASSIE, JAMES (1735–1799; collection auctioned in London, 1800), British artist and modeller. He also collected minerals. *[Chalmers-Hunt, 1976; DNB]*

TAUBE, DANIEL JOHANN (1727–1799; catalog published in Zelle, 1765), German physician in Zelle. He built a mineral collection. *[Gatterer, 1798; Leonhard et al., 1817]*

TELEKI, DOMOKOS, Count (1773–1798), Hungarian aristocrat, Royal Imperial Chamberlain, Judge in the Court of Transylvania, and first President of the Mineralogical Society of Jena. He assembled a substantial family mineral collection perhaps begun by his father, Count Samuel Teleki (1739–1822), Chancellor of Transylvania. Some minerals were donated by his son Samuel Teleki to the Society in 1802, and others were deposited in the Teleki Library at Marosvásárhely in 1811. The library became a public institution in 1913 and is now part of the College of Marosvásárhely, Transylvania. Roughly 100–150 original Teleki specimens are still identifiable. *[Benedek, 1942; Szakáll, 1991; Schwabe, 1802; Csíky, 1991b]* [p. 153]

TENNANT, SMITHSON (1761–1815), English professor of chemistry at Cambridge; he discovered osmium and iridium in 1804; and was the first to prove that diamond consists entirely of carbon. He apparently maintained a small personal mineral collection; the Swedish chemist Carl Wilhelm Scheele gave him a number of mineral specimens. Tennant loaned a fine sapphire crystal to James Sowerby for illustration in *Exotic Mineralogy* (1811–1817). *[Weeks, 1945; DNB]* [p. 73–79]

TERREROS: see ROMERO de TERREROS

TESSIN, CARL GUSTAV, Count (1695–1770; catalog, *Museum Tessinianum*, by Linnaeus, published in Stockholm, 1753), Swedish diplomat and Linnaeus' benefactor. His mineral and fossil collection is illustrated by 12 engraved plates in the catalog. *[Gatterer, 1798; Thomas, 1888]* [p. 133]

TETTAU, CARL CHRISTIAN von (died 1747), Saxon mining official ("Oberberghauptmann"). His mineral collection was acquired by the Royal Museum in Dresden. *[Fischer, 1939]*

TEYLER: see HULST

THALEAKER, _____ (fl. late 1700's), Austrian or German mineral dealer from whom Austrian Emperor Franz I purchased specimens. *[Stütz; 1807]*

THAVONAT, _____, Baron (fl. late 1700's), Austrian aristocrat in Vienna. His mineral collection is mentioned by Baron Moll (1806). Stütz (1807) described him as an aggressively acquisitive collector with a vast number of specimens of all types.

THEOBALD, JAMES (collection auctioned in London, 1768), British collector and F.R.S., F.A.S. His collection included minerals. *[Chalmers-Hunt, 1976]*

THOMSON, THOMAS (1773–1852), Scottish chemist and mineralogist in Glasgow. He presented specimens from his mineral collection to Haüy. His collection was acquired following his death by the Museum of Victoria in Melbourne, Australia. *[Burchard, 1986; WBD; M. P. Cooper, personal communication]*

THOMSON, WILLIAM (later GUGLIELMO) (ca.1760–1806), Scottish physician in Edinburgh and Oxford; later active as a mineralogist and geologist in Naples and Sicily. He is credited with field-collecting the first specimens of sarcolite, at Mt. Vesuvius. Most of his extensive mineral collection arrived back in Edinburgh in 1808; a small portion is still identifiable in the Royal Scottish Museum. Others of his specimens were acquired by Lady Hippisley at Ston Easton, near Bath, in 1807; and a small part of the collection, rescued by Arthur Kingsbury, is now in the Natural History Museum, London. *[Livingstone, 1984]* [p. 90]

THORESBY, RALPH (1658–1725; catalog, *Museum Thoresbianum*, published in London, 1713; an auction catalog of the same title was published in 1764), British collector in Leeds. His collection of antiquities and natural rarities included minerals. *[Gatterer, 1798; MacGregor, 1985; Brears, 1989]* [p. 67]

THOTT, OTTO, Count GAUNO (1703–1785), Danish nobleman and Minister to Frederik V. He collected books, manuscripts, objets d'art and natural history (including minerals). These collections were dispersed by auction following his death. *[Garboe, 1959]*

THURNEISSER, LEONHARDT (1530–1596), German traveler, chemist, botanist and mineralogist. He was the first person in Brandenburg to form a natural history collection (plants, seeds, shells, rocks and minerals). *[Murray, 1904]*

THURY: see HERICART de THURY

TIDSTROM, _____; French or Scandinavian collector. Romé de l'Isle (1783) refers to his mineral cabinet. [p. 53]

TIHAWSKY, FRANZ von (fl. late 1700's), Austrian (Polish or Hungarian?) lieutenant-colonel in Vienna. According to Baron Moll (1806) he built a collection of volcanic minerals, especially zeolites, while stationed in Italy. It was acquired before 1835 by Freulein Hamsa von Zabiedovitz. *[Fitzinger, 1868]*

TILAS, DANIEL (1712–1772), Swedish mineral collector in Stockholm. His first mineral collection was destroyed, along with his house, in the Stockholm fire of 1751. Ultimately he rebuilt his collection and, when it was acquired by the Stockholm mining college, it consisted of 2,326 Swedish and 1,497 foreign specimens, including numerous examples of gold, silver and precious stones. In later years the museum cut up his catalog into squares and wrote mineral labels on the blank sides. *[Zenzén, 1921]* [p. 135]

TITIUS, CARL HEINRICH (1744–1813; catalogs published in Saxony 1821; Leipzig 1805). He was a physician and also the Inspector of the Royal Saxon *Naturalien-Gallerie* in Dresden. His own collection consisted of 5,200 mineral specimens. *[Freiesleben, 1828; Fischer, 1939]*

TOBIN, JAMES (fl. late 1700's), British mineral collector in Bristol. He was the first to discover celestine at Redland, Bristol, in 1794. Philip Rashleigh acquired mineral specimens from him. *[Russell, 1952]* [p. 74]

TODHUNTER, WILLIAM (died early 1830's), English hatter and bookseller who opened a museum in Kendal near the Lake District in the 1780's. His collections included "crystals, spars, minerals, basalt from the Giant's Causeway, fossils [and] petrifactions," and he sold a "great variety of minerals and fossils." The sale of his collections in 1835 included "large, fine chrystalisations . . . ores and singular combinations, &c, some foreign minerals and precious stones; [and] sets of minerals." *[Brears, 1992]* [p. 86–87]

TOLLOT, _____; French (?) collector. Romé de l'Isle (1783) refers to his mineral cabinet. Possibly the Tallot in Geneva mentioned by Schenkenberg (1842). [p. 53]

TOUR: see LESCHENAULT de la TOUR

TOUR D'AUVERGNE, _____ (catalog published in Paris, 1784), French Marshall of His Majesty's camps and armies. His large and rich collection of natural history, auctioned in 1784, included minerals, shells (mostly) and animals. *[Dance, 1966]*

TOURNEFORT: see PITTON de TOURNEFORT

TOUSSAINT de SERRES, PIERRE MARCEL (1780–1862), French naturalist. He collected many mineral specimens in Austria which he later donated to the King's Cabinet in Paris. *[Schubnel, 1987]*

TOWNSEND, (Rev.) JOSEPH (1739–1816), English clergyman and geologist. He built an "extensive, exquisitely beautiful collection of minerals" sold in 1819. *[Cleevely, 1983; Sarjeant, 1980; Chalmers-Hunt, 1976]*

TRADESCANT, JOHN (Sr., 1587–1638, Jr. 1608–1662; catalog, *Museum Tradescantianum*, published in London, 1656 and 1686), British antiquaries and Royal Gardeners to Charles I and Charles II. This important collection of rarities included minerals, divided into seven categories in accordance with a classification like that of Agricola. John Tradescant Jr. passed the collection to Elias Ashmole (1617–1692), who donated it to the University of Oxford in 1677, where it became the nucleus for Oxford's Ashmolean Museum (now the Oxford University Museum). Little of it remains. *[Burchard, 1986; Smith, 1978; Gatterer, 1798; WBD; Sarjeant, 1980]* [p. 40]

TRAVAGINI, _____ (catalog, *Museum Travaginianum*, published in Venice, 1679). His collection is considered to have included minerals. *[Gatterer, 1798]*

TREBRA, FRIEDRICH WILHELM HEINRICH, Baron von (1740–1819; catalog published in Clausthal, 1795 and 1797, and posthumously in 1822, for auction), German economic geologist and Saxon Government Chief Inspector of Mines. His was a *Mineralienkabinet* "collected and described by the author from experience in the interior of mountains." Philip Rashleigh received some specimens from him. *[Gatterer, 1798; BUA; Leonhard et al., 1817; Freiesleben, 1828; Sarjeant, 1980; Russell, 1952]* [p. 71, 93–94, 99]

TREGONING, JOSEPH (1762–1841), British printer, bookseller and mineral dealer in Truro, in business from around 1791. He eventually developed a stock of several thousand mineral specimens, and prepared small study collections. *[Embrey and Symes, 1987]*

TREMAYNE, HARRIET (fl. late 1700's), Cornish wife of Rev. Henry Hawkins Tremayne, part owner in Wheal Gorland and Wheal Unity, Gwennap. Philip Rashleigh obtained mineral specimens from her. *[Russell, 1952]*

TREUTLER, FRIEDRICH AUGUST (1766–1819; catalog published in Dresden, 1820 and 1822), German physician and professor of medicine, Privy Councillor ("Hofrath") and Inspector of the Royal Saxon *Naturalien-Gallerie* in Dresden. His collection consisted primarily of minerals. *[Freiesleben, 1828; Fischer, 1939]*

TRIER, _____ (died before 1827), German parliament member ("Kammerrath"). His collection was rich in metallic minerals from Schneeberg, Freiberg and other Erzgebirge mining districts. It was acquired by the merchant H.W. Campe, who died before 1827. *[Freiesleben, 1828]*

TROMMSDORF, JOHANN BARTHOLOMÄUS (1770–1837), German pharmacist and chemist, Professor at the University of Erfurt. His mineral collection is mentioned by Schenkenberg (1842). *[ADB]*

TROUART [or TROUARD], _____ (fl. late 1700's), French architect and controller-inspector of buildings for the King in Versailles and Paris. His beautiful cabinet included minerals, rocks, corals and shells. *[Dezallier d'Argenville, 1767; Taton, 1986]*

TSCHARNER, FRANZ LUDWIG (1768–1805), Swiss Captain and civil servant, son of one of the last Bernese governors in Lausanne. His mineral collection, accompanied by his own handwritten catalog, was discovered just recently as part of an estate sale, and was acquired by the Natural History Museum in Bern. *[Stalder, 1984]*

TUNSTALL, MARMADUKE (1743–1790), British naturalist. His collection of minerals, shells, corals, fossils and insects was acquired from him by William Constable. *[Chalmers-Hunt, 1976; DNB]*

TÜRK, WILHELM von (1774–1846), German Regierungsrath in Potsdam. His mineral collection is referred to by Schenkenberg (1842). *[ADB]*

TUSSOLT: see DUSSOLT

TUTHILL, (Sir) GEORGE LEMAN (1772–1835), English physician in London. He assembled a mineral collection, including specimens purchased at the 1827 auction of Alexander Crichton's collection. In 1835 his collection was acquired by Sir Francis Chantrey (1781–1841), a London sculptor. The mineral dealer J. Henry Heuland later sold Chantrey's minerals, many going to Gerard Troost (1776–1850) in Nashville, Tennessee, and now preserved in the Louisville Museum of History and Science. *[M. P. Cooper, personal communication, based on his copy of the Crichton sale bid book; DNB; Goldstein, 1984]* [p. 82]

TUX, KARL SIGMUND (1716–1798), German Privy Councillor in Stuttgart. He was a mineral collector and supplier of specimens to Caroline Louise von Baden. *[Mayer, 1974b]*

UBERTA: see RAAB

ULLMANN, JOHANN CHRISTOPH (1771–1821), German chemist and mineralogist. Specimens from his mineral collection were acquired by the University of Göttingen. *[Schnorrer, personal communication; Mitchell, 1979]*

UNDERWOOD, THOMAS RICHARD (1765–1836), British watercolorist who executed many of the plates in Philip Rashleigh's *Specimens of British Minerals* (1802). Underwood was a Fellow of the Geological Society. Rashleigh reports receiving mineral specimens from his collection. *[Russell, 1952; Vollmer et al., 1939]* [p. 74]

UNGER, JOHANN FRIEDRICH von (1716–1781), German collector in Brunswick. Philip Rashleigh acquired mineral specimens from him. *[Russell, 1952]*

URE, (Rev.) DAVID (died 1798; collection advertised for sale at auction in 1798), British clergyman and geologist. His collection included "ores and stones." It was purchased by a Mr. Shore, who gave it to the Museum of the Royal Society in Edinburgh, now the Edinburgh Museum of Science and Art. *[Murray, 1904; Sherborn, 1940; DNB]*

VALENTINI, MICHAEL BERNHARD (1657–1729; catalog of his *Natur-und Materialien Kammer* published in Frankfort am Main, 1704 and 1714), Princely Hessian physician, professor of Medicine at Giessen University. He built a collection of natural history specializing in minerals. *[Linné, 1777]* [p. 43]

VALLERIUS, GÖRAN (1683–1744), Swedish mineral collector, mine assessor and member of the Mining College. *[Zenzén, 1930]*

VALLISNERI, ANTONIO (1661–1730), Italian Professor of Natural History at Padua University. His collections of mineralogy, geology, zoology and anatomy formed the foundations for several natural history museums in Padua; the minerals went to the University. *[Burchard, 1986; BUA]*

VALMONT de BOMARE, JACQUÉS CHRISTOPHE (1731–1807; catalog published in Paris, 1758), French Pharmacist and Professor of Natural History in Paris. His natural history collection including minerals, was acquired by Prince de Condé in 1787. *[Gatterer, 1798; Leonhard et al., 1817; Laissus, 1986; Thiéry, 1783]*

VAN DER HULST: see HULST

VARENNES de BÉOST, CLAUDE MARC ANTOINE (1722–1788; catalog published in Paris, 1774), French Secretary of State for Burgundy, Receiver General of Finances for Brittany. His cabinet of natural history was already well known in Dijon in 1757, and was prominent in Paris in 1767. Rich in minerals, it was enlarged even more through the acquisition of most of Savalette de Buchelay's mineral specimens in 1764, and part of Jean Hellot's collection in 1766. *[Laissus, 1986]* [p. 52]

VATAR de JOUANNET, FRANÇOIS (1765–1845), French archeologist and naturalist in Bordeaux. He built a geological/mineralogical collection mentioned by Schenkenberg (1842). *[BUA]*

VATER, ABRAHAM (1684–1751; catalog published in Wittenberg, 1726), German Professor of Medicine at the University of Wittenberg. He had a museum of varied exotica, including minerals. *[BUA; Gatterer, 1798; Neickelio, 1727]*

VATER, CHRISTIAN von (1651–1732), German physician and professor at the University of Wittenberg. His collection consisted of minerals, figured stones, petrifactions and shells. *[Neickelio, 1727; ADB]*

VAUQUELIN, LOUIS NICOLAS (1763–1829), French inspector of mines, chemist and mineralogist, discoverer of chromium. He gave specimens from his mineral collection to Haüy, which are now in the Natural History Museum, Paris. *[Burchard, 1986; WBD]*

VERNEDE, HENRI MARIE (died ca. 1815; catalog published in Amsterdam, 1815), Dutch collector of "très belle mineraux." *[Freiesleben, 1822]*

VERNON, WILLIAM, British collector, supplied 58 specimens of minerals and fossils to John Woodward in 1690–1724. *[Price, 1989]*

VIERA y CLAVIJO, JOSÉ de (1738–1799; manuscript catalog prepared ca. 1780 by Christian Heuland, mineral dealer and father of J. Henry Heuland), Spanish naturalist and author of a natural history of the Canary Islands. His mineral collection consisted of over 2,000 specimens from Germany, Hungary, Spain, Central Asia, Ceylon, India, Mexico, Peru, Chile, Brazil, North America and the Canaries. [p. 136]

VIEUVILLE: see MICAULT de la VIEUVILLE

VILLIERS: see BROCHANT de VILLIERS

VILLIEZ, _____ (catalog published in Nancy, 1775), French collector. His natural history museum is considered to have included minerals. *[Gatterer, 1798]*

VINCENT, LEVINUS (died ca. 1730; catalogs published in Amsterdam, 1706–1715, and the Hague, 1779), Dutch merchant in Haarlem. His *Wunderkammer* (begun in 1674 by his brother-in-law, Anthony Breda) was among the most famous in Europe, and was visited by Carlos III of Spain and Czar Peter the Great. It covered the three Kingdoms of Nature, including a considerable number of very rare minerals. The collection, valued at more than 200,000 French livres, was auctioned off in 1779. *[Gersaint, 1736; Gatterer, 1798]* [p. 118, 156]

VIVANT, _____ (fl. 1727–1736), French collector of natural history in Paris. His collection was rich in minerals, particularly the various gem species, and its arrangement was admired by Dezallier d'Argenville. *[Laissus, 1986]*

VOIGT, JOHANN CARL WILHELM (1752–1821), German mineralogist and geologist, a student of Werner, and a close friend of Goethe (who learned his mineralogy from Voigt). He traveled and collected throughout Germany, and became Mining Director, overseeing especially the silver mine at Ilmenau. Much of his collection was sold in 1798 to Martinus van Marum and later incorporated into Teyler's Museum in Haarlem. *[DSB]* [p. 99]

VOIGT, JOHANN GOTTFRIED (fl. late 1700's), Dutch mineral dealer in Amsterdam. In 1791 he sold a collection of 200 calcite, fluorite and zeolite specimens (mainly from St. Andreasberg and Iceland) to Martinus van Marum for 1,000 gold florins. It was later incorporated into Teyler's Museum in Haarlem. *[Forbes, 1969]* [p. 47]

VOITH, IGNAZ EDLER von (1759–1848), German geologist and Ober-Bergrath in Regensburg. His mineral collection is referred to by Schenkenberg (1842) *[ADB]*

VOLCKMANN, GEORG ANTON (1663–1721), German physician in Lignitz; naturalist, and collector. His minerals were acquired by the Royal Museum in Dresden. *[Fischer, 1939; Neickelio, 1727]*

VONDERTHON, AMBROSIUS (1763–1806), Austrian clergyman at the St. Peter Monastery in Salzburg. As a student he went on mineralogical field-collecting trips to the Salzburg Alps with Kaspar Schroll. Vonderthon's collection formed the beginning of the St. Peter mineral collection. *[Freh and Paar, 1982]*

VÖRÖS, ANTAL (fl. late 1700's), Hungarian Protonotary of the Court of Appeal, later Vice-Governor. He collected minerals in the Transylvanian Banat, which he later donated to the Royal Hungarian University in Pest in 1780, where at least one of his specimens is still identifiable. *[Magyar Hirmondó, 1780, no. 40]*

VOSMAER, ARNOUT (1720–1799; catalog published in The Hague, 1800), Dutch zoologist. His collection included minerals, shells, medical instruments and cut gemstones. He edited the third and fourth volumes of Seba's catalog. He sold his first collection in 1756 to the widow of the Prince of Orange, Willem IV (1711–1751), and became advisor to Willem V and curator of his cabinet, which included minerals. *[Dance, 1966]*

WACHTLER, _____ (fl. late 1700's), Hungarian mineral collector in Pécs. Count Johann Centurius Hofmansegg visited her in 1794, and reported that her small mineral collection contained many beautiful specimens. *[Hofmansegg, 1887]*

WAD, GREGERS (1755–1832), German professor of mineralogy and zoology in Copenhagen. His mineral collection, 6,089 specimens, was purchased by C. S. N. Münster in 1808, and his in turn was bought in 1812 by Count J. G. Moltke and later donated to the University of Copenhagen. *[Garboe, 1959; Noe-Nygaard, 1977]* [p. 46, 129–130]

WALDSTEIN, ANTON, Count (18th century), Bohemian nobleman in Duchov (Dux) in western Bohemia. He built an excellent mineral collection. *[Tucek, 1978; Wrany, 1896]*

WALDO, PETER (fl. mid 1700's), British collector in Mitcham, Surry. Around 1740 he inherited the mineral collection of Charles Dubois, and retained it for at least 20 years. *[Mendes da Costa, 1812]*

WALKER, [GEORGE?] (collection auctioned in London, 1791). His collection included minerals, fossils, shells and corals. *[Chalmers-Hunt, 1976]*

WALKER, JOHN (1731–1803), Scottish geologist and mineralogist, and Professor of Natural History at Edinburgh University. His mineral collection was removed from the University Museum by the trustees of his estate in 1804, and is said to have been acquired by Robert Jameson, whose collection was donated to the Royal Scottish Museum in 1855. *[Cleevely, 1983; DNB]* [p. 89]

WALLERIUS, JOHAN GOTTSCHALK (1709–1785), Swedish physician and mineralogist renowned for his *Mineralogia* (1747), plus later editions in German and French. He began collecting minerals around 1732, and visited many Swedish mining districts, eventually amassing a mineral collection of over 4,000 specimens. *[Mitchell, 1986; DSB]* [p. 46, 132]

WATERHOUSE, BENJAMIN (1754–1846), American physician and professor at Harvard, first curator of mineralogy there and first to teach mineralogy in New England. He had a personal collection of about 500 mineral specimens, as of 1793, but its eventual disposition is unknown. *[Frondel, 1988; CAB]* [p. 144, 147–148]

WATSON, HENRY (died 1786), British marble worker and mineral dealer in Bakewell, Derbyshire. He sold small collections of minerals from his shop, and inspired the mineralogical interests of his nephew, White Watson (1760–1835). *[Ford, 1973]*

WATSON, WHITE (1760–1835), British sculptor and mineral dealer in Derbyshire, and a pioneer in the study of Derbyshire geology. He began collecting minerals at the age of 14, eventually accumulating over 1,000 specimens, mostly from Derbyshire. He sold many specimens to the Duchess of Devonshire which are still preserved at Chatsworth House in Derbyshire; other specimens of his (found built into a "rockery" in 1914) were purchased by the British Museum. *[Cleevely, 1983; Smith, 1969; M. P. Cooper, personal communication; Ford, 1973]* [p. 85]

WAVELL, WILLIAM (died 1829), English physician in Devonshire, discoverer of wavellite. He donated specimens to Archibald Bruce in 1807. *[Greene and Burke, 1978; Mitchell, 1979]*

WEDGWOOD, JOSIAH (1730–1795), famous British potter, Fellow of the Royal Society and the Society of Antiquaries, and the maternal grandfather of Charles Darwin. He collected minerals in Wales, Derbyshire and probably elsewhere in England. In 1790 he gave a small collection of 77 (mostly Derbyshire) mineral specimens to John Hawkins. *[Russell, 1954]* [p. 75]

WEICKMANN, CHRISTOPH (catalogs published in Ulm, 1655, 1659 and 1741). His *Naturalienkammer* included ore specimens, mining memorabilia, gems and stones. *[Gatterer, 1798]*

WEIDHASE [or WEIDHAASS], ADAM (died 1769), Saxon mining official. His mineral collection was acquired by the Royal Museum in Dresden. *[Fischer, 1939]*

WEIGEL, CHRISTIAN EHRENFRIED von (1748–1831), German professor of mineralogy, chemistry and pharmacy in Greifswald; Archiater and Ritter. He possessed a small mineral collection of his own which he used for teaching purposes. *[Gross, 1956]*

WEINMANN, JOHANN WILHELM (fl. 1720's), German pharmacist in Regensburg. His natural history collection included figured stones, shells, botanical specimens and minerals of gold, silver, copper, lead, iron, tin, antimony and mercury. *[Neickelio, 1727]*

WEISS, _____. He built a very fine mineral collection of 1,690 specimens, purchased by the French National Museum of Natural History (Jardine des Plantes) in 1802. *[Schubnel, 1987]*

WEISS, JOHANN (fl. 1790's–1804), Austrian mineral dealer in Vienna and later in St. Petersburg. He owned a personal mineral collection rich in gem species and Russian and Siberian specimens, including a green beryl 46 cm long by 15 cm in diameter. *[Moll, 1806; Stütz, 1807]*

WEISS: see DERCSÉNYI

WELCH, ANN (Mrs.) (died ca. 1811), British collector of minerals in Aylesbury. Her specimens (91 lots) were auctioned posthumously in 1811. *[Chalmers-Hunt, 1976]*

WERNER, ABRAHAM GOTTLOB (1749–1817), prominent German mineralogist of the Freiberg Mining Academy. He sold his extensive collection of over 10,000 mineral specimens to the Academy for 40,000 talers. It is among the few great early collections that still remain intact. *[Bancroft, 1988; Weber, 1992; Adams, 1938]* [p. 46, 47, 96, 99–100]

WESSELÉNYI, FERENC, Count (1605–1667), Hungarian nobleman, military leader and Palatine of Hungary. He is known to have collected minerals and fossils. *[Benkö, 1786]*

WHITE, JOHN (collection auctioned In London, 1788), British naturalist. His collection included minerals. *[Chalmers-Hunt, 1976]*

WHITE, JOSEPH (died ca. 1811), British collector of minerals, shells and corals in Islington. His specimens were auctioned posthumously in 1811. *[Chalmers-Hunt, 1976]*

WHITEHURST, JOHN (1713–1788), British naturalist in London; friend of Benjamin Franklin. His mineral collection was "confined to the productions of Derbyshire; but was an assemblage of objects suitable to form a basis of a mineralogical description" of the county. *[Geikie, 1907]*

WIDENMANN, JOHANN FRIEDRICH WILHELM (1764–1798), German professor in Stuttgart, custodian of the minerals in the Würtemberg ducal natural history collections at Stuttgart from 1791 to 1797. He sold his personal mineral collection, 2879 specimens, for 800 gulden to a Stuttgart pharmacist named Walz, who later sold it to Tübingen University. *[Burchard, 1986; Leonard et al., 1817]*

WILLEM FREDERICK (1772–1843), King of the Netherlands. During the Napoleonic wars his mineral collection was looted by the French and taken to Paris, but it was returned in 1815. It is today preserved in the National Musuem of Geology and Mineralogy in Leiden. *[Burchard, 1986]* [p. 115]

WILLEM V (1748–1806; catalog published in Amsterdam, 1767), Dutch Prince of Orange and Nassau. His collection of "very rare and very marvelous products of nature" is considered to have included minerals. *[Gatterer, 1798]*

WILLIAMS, JOHN (1753–1841), British agent for the North Down and Gwennap mines in Cornwall. A contemporary wrote in 1796 that Williams had "the most valuable variety of mineral specimens of any house in Europe." The British Museum was given 550 of his mineral specimens in 1893, and 585 more were acquired for the Museum in 1948 by Sir Arthur Russell. *[Cleevely, 1983; Smith, 1978; DNB]* [p. 84–85]

WILLIAMS, JOHN (1777–1849), British chemist, mineralogist and businessman, son of John Williams (1753–1841), and principal builder of the famous family mineral collection begun by his father. It was purchased by his brother Michael Williams (1785–1858) in 1852, then passed to his son John Michael Williams (1813–1880), who added to it. Following John Michael's death it was dispersed, 550 specimens going to the British Museum in 1893, and 585 more to the British Museum later through the collection of Sir Arthur Russell. Several thousand specimens were given to the Basset Memorial Museum of the Camborne School of Mines in 1891. *[Embrey and Symes, 1987; DNB; Sowerby, 1804–1817]* [p. 84–85]

WILSON, W. (died after 1808), British collector of minerals, fossils, shells and corals. His specimens were sold at auction in 1809. *[Chalmers-Hunt, 1976]*

WINCH, NATHANIEL JOHN (1768–1838), English naturalist and pioneer plant ecologist in Newcastle-upon-Tyne. His herbarium of 20,000 plants, and probably also his collection of Northumberland and Durham minerals, were left to the Linnean Society and later turned over to the Hancock Museum. *[Davis and Brewer, 1986; DNB]*

WINTHROP, JOHN (1681–1747), American politician in New England, grandson of John Winthrop (1606–1676). He built a large collection of natural history specimens, including metals and ores. He gave some of his collection, over 600 specimens, to the Royal Society in 1734. Other specimens he gave to Hans Sloane. *[Frondel, 1970]* [p. 67, 144]

WINTHROP, JOHN (1606–1676; catalog published in 1734), American colonial governor in Massachusetts and Connecticut. He built the first known collection of minerals in New England. *[Frondel, 1970]* [p. 42]

WISTER, CHARLES J., American merchant in Philadelphia. He became an enthusiastic collector of minerals through association with his neighbor Adam Seybert, and built up a cabinet "second only to Seybert's." As of 1919 it had been preserved intact in Germantown, Pennsylvania. *[Greene and Burke, 1978; Gordon, 1919]*

WITHERING, WILLIAM (1741–1799), English physician and naturalist. He collected minerals and plants, and published an English translation of Torbern Bergman's *Sciagraphia Regni Mineralis* in 1783. *[Partington, 1962]*

WITSEN, NICOLAES (1641–1717; catalog published in Amsterdam, 1728), Dutch statesman and geographer in Amsterdam. His large collection included minerals but consisted primarily of art, antiques, mathematical instruments and shells. It was all sold at auction in 1728. *[Bergvelt and Kistemaker, 1992]*

WODROW, ROBERT (1679–1734), Scottish ecclesiastical historian in Eastwood near Glasgow. He owned a collection of curiosities said to include minerals. *[Price, 1989; DNB]*

WOLFF, CHRISTIAN (1679–1754; catalog, *Museum Wolffianum*, published in Leipzig, 1714), German physician. His collection, consisting of insects and minerals, was for sale. *[Gatterer, 1798; Freiesleben, 1828]*

WOLLASTON, WILLIAM HYDE (1766–1828), English chemist and mineralogist, discoverer of palladium and rhodium, inventor of the reflecting goniometer. He presented specimens from his mineral collection to Haüy. Part of Wollaston's mineral collection was acquired by Henry Warburton and later given to the University of Cambridge in 1858 by H. W. Elphinstone. *[Burchard, 1986; WBD; DNB; Smith, 1978]* [p. 56, 78, 79, 143]

WOLNY, ANDRAS RAFAEL (1759–1827), Hungarian head of the secondary school in Karloca (=Karlovica, Croatia), and later director of the alum works at Nagymuzsaj. He was a naturalist, member of the Mineralogical Society of Jena, and a collector of rocks and minerals. His collection was noted by Beudant on his visit in 1818. *[Beudant, 1822]*

WOLTERSDORFF, JOHANN LUKAS (1721–1772; catalog published in Berlin, 1772), German theologian and mineral collector in Berlin; he published a systematic mineralogy in 1748. His was strictly a mineral collection. *[Gatterer, 1798; Leonhard et al., 1817; BUA]*

WONDRATSCHECK, _____; Austrian collector in Vienna. He collected many remarkable mineral specimens during his travels, especially in Moravia and Bohemia. *[Von Buch, 1797–1798, quoted in Moll, 1906]*

WOODD, JOHN (died ca. 1814), British collector on Old Burlington Street, London. His minerals, fossils and shells were auctioned posthumously in 1814. *[Chalmers-Hunt, 1976]*

WOODHOUSE, JAMES (1770–1809), American physician and chemist in Philadelphia, Professor of Chemistry at the University of Pennsylvania. His collection of minerals was bequeathed to the American Philosophical Society. *[Greene and Burke, 1978; Greene, 1969]* [p. 149]

WOODWARD, JOHN (1665–1728; catalog published in London, 1728–1729), British Professor of Medicine at Gresham College, London; physician and naturalist. He is considered to be "the first truly scientific collector of geological objects." He began collecting minerals in 1688, and wrote a book (1696) on rigorous scientific field collecting procedures. His 9,377 mineral and fossil specimens in four cabinets were

acquired by the Sedgewick Museum, Cambridge University, in 1728 and have been preserved intact. Others were sold at auction in 1728. *[Torrens, 1985; Cleevely, 1983; Eyles, 1971; Embrey and Symes, 1987; Frondel, 1971; Price, 1989; DNB; Chalmers-Hunt, 1976]* [p. 40, 46, 67–68]

WORM, OLE (1588–1654; catalog, *Museum Wormianum*, published in Leiden and Amsterdam, 1655), Danish physician, archeologist and Professor of Natural Philosophy and Medicine. He began collecting natural history specimens in 1620, and devoted the first of four chapters in his catalog to mineralogy. His museum in Copenhagen became famous throughout Europe, and was a model for others. It was purchased upon his death by Danish King Frederic III (reigned 1648–1670) for incorporation into the royal *Kunstkammer*, which he had founded in Copenhagen in 1650. *[Schepelern, 1985]* [p. 41, 128]

WOULFE, PETER (1727?–1803), English chemist in London and Paris. He built one of the most beautiful English collections of minerals including over 500 mercury ore specimens, 500 ores of metals and semimetals, and over 100 specimens of Derbyshire fluorite, among others. With his brother, John, he sold minerals (over 1,000 specimens) to William Hunter. *[Cleevely, 1983; Durant and Rolfe, 1984; Fischer, 1939]* [p. 86]

WRBNA von FREUDENTHAL, RUDOLPH, Count (1761–1823), Austrian nobleman and president of the royal imperial *Bergkammer* in Vienna. He had a costly collection rich in Hungarian minerals, but as a matter of propriety ceased collecting when he was put in charge of the royal imperial collections. His personal collection may have been acquired later by the National Museum in Prague. *[Von Buch, 1797–1798, quoted in Moll, 1806; Wrany, 1896]*

WREN, (Sir) CHRISTOPHER (1632–1723), British architect, Professor of Astronomy at Gresham College and Oxford, founding member of the Royal Society. He supplied mineral specimens to John Woodward. *[Price, 1989; DNB]*

WULFEN, FRANZ XAVIER, Baron von (1728–1805), born in Belgrade, became a Jesuit cleric and naturalist in Klagenfurt. He described wulfenite, with color illustrations of specimens, in his *Abhandlung vom Kärnthrerischen Bleyspate* (1785). He also built a personal mineral collection which in 1816 was acquired by the Joanneum in Graz. *[Meixner, 1951; Zapfe, 1971]* [p. 102, 105]

WURTTEMBURG, Prince FERINAND FRIEDRICH AUGUST, Duke of (1763–1834), Royal Imperial Field Marshall and Commandant of the city of Vienna. He traveled to Russia, acquiring many beautiful Russian and Siberian mineral specimens which were later given to the Imperial cabinet. *[Stütz, 1807]*

WUTKY, MICHAEL; Viennese landscape painter. His collection specialized in Italian minerals. *[Moll, 1806; Stütz, 1807]*

WYNDHAM: see GRENVILLE, WILLIAM

WYTTENBACH, JAKOB SAMUEL (1748–1830), Swiss clergyman and naturalist in Bern. He founded the Gesellschaft vaterländischer Naturfreund (later the Naturforschende Gesellschaft of Bern). He built a mineral collection, of which not only specimens but many of his original handwritten labels survive. He served as president of the Natural History Museum in Bern from its founding in 1804 until his death, following which a major portion of his collection was acquired by that institution. *[Huber et al. 1982; Stalder, 1982]*

ZABERSCHNIGG, _____ (fl. late 1700's), Austrian mineral dealer in Vienna, mentioned by Stütz (1807).

ZANNICHELLI, GIOVANNI GIROLAMO (1662–1729; catalog of his *Museo Zannichelliano* published in Venice, 1726 and 1736), Italian naturalist and apothecary. His natural history museum specialized in fossils and included minerals. *[Gatterer, 1798; BUA]*

ZANONI, GIACOMO (1615–1682), Italian botanist and naturalist in Bologna. His museum was remarkable for its collection of rocks and minerals (which he called a *Lithotameion*). *[Murray, 1904]*

ZANONI, PELLEGRINO; Italian naturalist in Bologna. He inherited and maintained the collection built by his father, Giacomo Zanoni (1615–1682), which included rocks and minerals. *[Murray, 1904]*

ZEILEISEN: see MIESSEL

ZEISIG, JOHANN CASPAR (mid-1700's), German lexicographer in Chemnitz (?). He collected minerals, ores, rocks, uncut gem materials and coins. In 1730 he published in Chemnitz a glossary of mineral and mining terminology; later editions appeared in 1743 and 1784. He was probably originally from Freiberg, as his pseudonym was "Minerophilo Freibergensi." *[Kuhner and Rizzo, 1980]*

ZOIS, SIGMUND, Baron von EDELSTEIN (1747–1819), Slovenian businessman, scholar and writer. His extensive mineral collection of 5,000 specimens was sold to the Slovenia Natural History Museum in Ljubljana. *[Bancroft, 1988; Faninger, 1984; Wurzbach, 1891; Meixner, 1951]* [p. 46, 108–109]

ZRINYI, MIKLOS, Count (1620–1664), Hungarian military leader, poet, and Viceroy of Croatia. His large art collection, housed in his family castle at Csáktornya (now Cakovec, Yugoslavia), included crystallized mineral specimens, native gold and gemstones. It is believed that the collection went to the Imperial treasury in Vienna following his death. *[Benkö, 1786]*

ZUMBACH de COESFELT, C. (1679–1780), Dutch physician and naturalist. He sold his extensive collection of minerals, gemstones, rocks and fossils to Leiden University in 1754. *[Brongersma, 1978]*

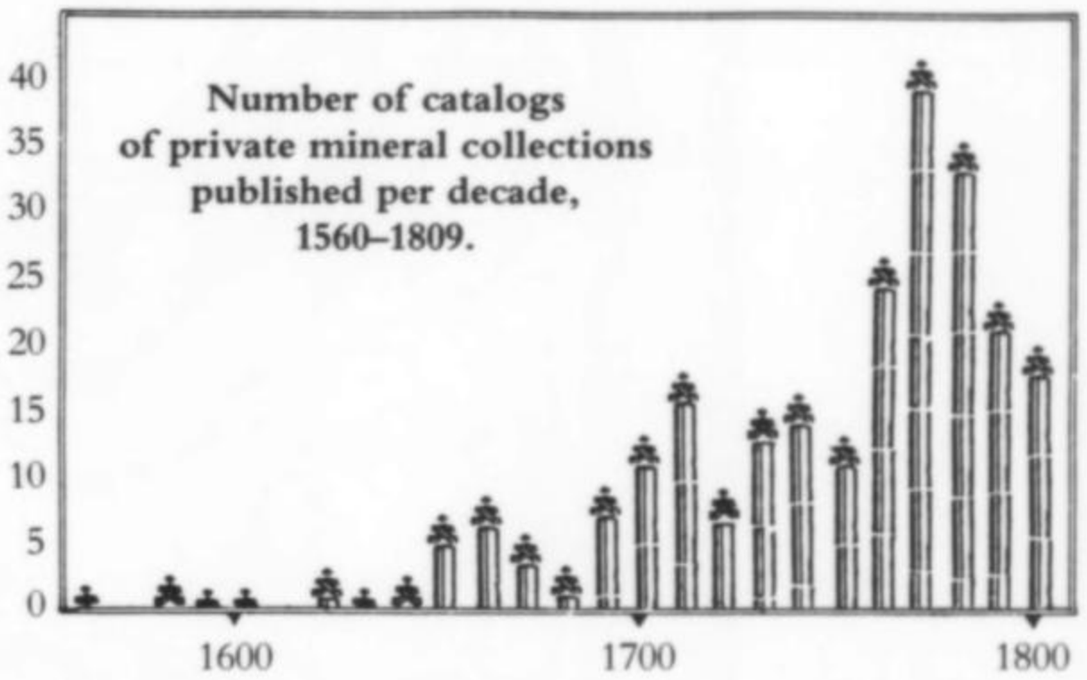
ZWEIBRUCKEN, _____, Duke of; German aristocrat. His collection included excellent specimens from mercury deposits in the Pfalz ore. It was ultimately incorporated into the Bavarian National Collection in Munich. *[Burchard, 1986]*


VALENTINI
NATUR=
und
MATERIALIEN
Kammer
Auch
Ost=Indianische
Send=Schreiben
und
RAPPORTEN
Montalegre fec:
CONCHILIA
MAPINA
ANIMALIUM PARTES
METAL
LAPIDES
TERRÆ
RADICES
COCHLEÆ
TURBINATÆ

BIBLIOGRAPHY OF COLLECTION CATALOGS

The following bibliography of collection catalogs is arranged alphabetically by collector [name in square brackets]. If the author of the catalog is known, and is someone other than the collection owner, that name is given next. Catalogs listed may be devoted exclusively to mineralogy, or may include a number of different specimen types or categories, minerals being one of them. Titles given may be larger works, only portions of which constitute the actual collection catalogs. Generally these are published catalogs of private collections, although in a few instances important catalogs which have remained unpublished and exist only in manuscript form are also included. Many more unpublished catalogs survive in museum archives and libraries than are listed here; this bibliography does not attempt an exhaustive listing of them, concentrating instead on the publications prepared for formal distribution to other collectors and scholars.

This list was compiled in part from secondary sources, and, in some instances, it has been impossible to confirm the accuracy of the citations as worded. Nearly all of these catalogs are extremely rare, and are not listed in the National Union Catalog or other national library catalogs; they may exist as only a few copies in European libraries, and some cited in early works may not have survived at all.



The above bar graph of the publication dates shows that the trend in the publication of collection catalogs, initiated by Johannes Kentmann in 1565 and encouraged by writers such as Neickelio, grew steadily over the decades, peaking in the 1770's and 1780's. The decline thereafter continued on into the 19th and 20th centuries. The publication of private collection catalogs was never again as popular as it had been toward the end of the 18th century, when for a time the rate averaged more than four per year in Europe.

[ADOLPH FREDERICK] BALK, L. (1746) *Museum Adolpho-Fridericianum seu museum principis Adolphi Friderici propositum a L. Balk.* Uppsala; 4to.

[ALDROVANDI] AMBROSINUS, B. (1648) *Ulyssis Aldrovandi Patricii Bononiensis Musaeum Metallicum in Libros IIII distributum a Bartholomaeus Ambrosinus compositum, edito Marco Antonio Bernia. Labore et Studio composuit.* Bologna; folio.

[ALDROVANDI] KELLNER, D. (1701) *Synopsis Musaei Metallici, Viri Incomparabilis, Ulyssis Aldrovandi Omnium Metallorum materiam, proprietates, differentias, generandi & praeparandi rationem & usum succincte tradens, innexis variis curiositatibus, scitu lectuque dignis.* Johann Herebord Klosium, Leipzig; 12mo., 258p.

[ALEXANDER I] AGOROFSKY (1803) *Descriptio corporum min-*



ALDROVANDI

ralium in amplissimo Russorum Imperio existentium, Augustissimo Imperiali jussu in duas partes distributa et constituta, corpora mineralia i numerosâ aulicâ collectione electa, in ordinem Systematicum disposita complectens. May 27.a. die: anno 1803. Petropoli. [Manuscript catalog of the collection given by Russian Czar Alexander I to Friedrich Wilhem III of Prussia in 1803; now in the Humboldt University collection.]

[AMES] (1760) *A Catalogue of the Genuine and Entire Collection of Coins, Medals, Shells, Fossils, Ores, Minerals, Natural and Artificial Curiosities, Inscriptions and Antiquities of Mr. Joseph Ames, F.R.S. and Secretary to the Society of Antiquaries, lately Deceas'd; which will be sold by Auction . . . on Wednesday the 20th and Thursday the 21st of this Instant February 1760.* Mr. Langford, auctioneer; London, 10 pp.

[ANDERSSON] (1782) *Benet Quist Andersson tal inne hallande Anmerkningar om en nyttig mineralsamlare.* Stockholm; 8vo.

[ANONYMOUS] (1706) *Catalogus Rerum Naturalium & Mineralium tam Exoticarum quam Domesticarum, nec non Artificiosarum, quae . . . die Sept. 1706 . . . venum exponuntur. Verzeichniss vieler natürlicher und mineralischer, so wohl aus- als inländischer, wie nicht weniger durch Kunst verfertigter Dinge, ingleichen ein Cabinet bestehend aus alten, raren, genuinen so wohl Griechischen als Römischen göldenen Müntzen, welche . . . den ___ Sept. 1706 . . . verauctioniret werden sollen. Durch Joh. Theod. Boetium.* Leipzig; 8vo, 45 pp.

[ANONYMOUS] (1788) *Verzeichniss von Edlen und unedlen Steinen, Versteinerungen, Mineralien, Conchylien, Seegewächsen, Naturalien und einigen Kunstasachen, welche den 5ten May 1788, im rothen Collegio gegen baare Bezahlung verauctionirt werden sol-*

SYNOPSIS

MUSÆI METALLICI,

Viri Incomparabilis,

ULYSSIS ALDROVANDI,

Omnium Metallorum materiam, proprietates, differentias, generandi & præparandi rationem & usum succincte tradens, innexis variis curiositatibus, scitu lectuque dignis.

In Gratiam Tyronum

edita

a

DAVIDE KELLNERO

Medicin. Doctore, Practico Nordhusano & diversorum Dominorum Archiatro.

LIPSIÆ,

Apud JOHANN HEREBORD KLOSIUM.

ANNO M DCC I.

ALDROVANDI

len. Leipzig, gedruckt bey G. A. F. Löper. 8vo, 94 p. [1161 mineral lots; 375 lots gemstones; 814 lots shells and misc.]

[ANONYMOUS] ROMÉ DE L'ISLE, J. B. L. (1777) *Catalogue raisonné d'un cabinet d'histoire naturelle, composé de mineraux du plus beau choix*. Paris; 8vo.

[ANTON] (1780–1796) *Anzeige von den Sammlungen einer Privatgesellschaft in der Oberlaufitz, Als Handschrift für die Mitgleider*. 4to; sections 1–4 (1780–1783), 5–7 (1784–1793), 8–10 (1794–1796). [Freiesleben (1828) says this catalog described the mostly Saxon mineral collection developed by Dr. Carl Gottlob Anton and later owned by the Görlitzer Wissenschaftlichen Gesellschaft.]

[BAART] (1762) *Catalogus van een Kabinet van allerley Zoorten van zeer ongemene fraaije en schoone gepolyste Hoorens en Doublet-Schelpen, extra fraaije Coraal en Zeegewassen, Petrifacta goude en zilvere Mineralien . . .* Amsterdam; 8vo. (a sale catalog)

[BABINGTON] (1795) *A Systematic Arrangement of Minerals . . .* [based on the Earl of Bute's collection, later acquired by Babington]. London; 30 p. A second larger edition was published in 1796.

[BABINGTON] (1799) *A new system of mineralogy in the form of [a] catalogue after the manner of Baron Born's Systematic Catalogue of the collection of fossils of Mlle. Eleonore de Raab*. London; 4to, 287 p.

[BAIER] (1730) *Jo. Jac. Bajeri . . . Sciagraphia Musei sui, accedunt supplementa Oryctographiae Noricae cum fig. aen*. W. M. Endteri, Nuremberg; 4to, 64 pp. plus three plates.

[BAILLOU] ST. LAURENT, JEAN de (1746) *Description abregée du fameux Cabinet de Mr. le Chevalier de Baillou pour servir à l'histoire naturelle des pierres précieuses, metaux, mineraux et autres fossiles*. Luques; 4to, 156 p.

[BAKER] (1775) *A Catalogue of the Elegant Cabinet of Natural and Artificial Rarities of the Late Ingenious Henry Baker, Esq., Fellow of the royal and Antiquary Societies; and one of the Founders of the flourishing Society for the Improvement of Arts, Manufacture and Commerce, Deceased: Comprehending a beautiful Collection of Shells and Corals; native and extraneous Fossils, many of which are remarkably fine and scarce; Ores and Petrifactions; Rough and polished Gems, Marbles, Agates and Pebbles; fine Bitumens and Ambers, Parts of Animals and Insects, dryed and in Spirits; various Antiquities, Coins and Medals, and other Curiosities: Which will be sold by Auction . . . on Monday, 13th of March 1775, and the Nine following Days*. Samuel Paterson, auctioneer; London, 52 pp.

[BALFOUR] (1697) *Museum Sibbaldianum, sive Auctuarium Musei Balfouriani*. Edinburgh; 12mo.

[BARBERI] PANAROLI, D. (1656) *Musaeum Barberianum*. Rome; 4to.

[BARING] (1744) *Museographia Brunsvico-Luneburgica oder Nachricht von Kunst- und Raritätenkammern, so curieuse Herren in den Braunschweig-Lüneburgischen Landen gesammlet haben*. Lemgo; 4to.

[BAYLY] (1799) *A Catalogue (Part Second.) Comprising the valuable Collection of Shells, Fossils, Stuffed Birds, Minerals, Insects, &c. of All Descriptions, from the most remote Parts of the World . . . and Miscellaneous Articles of Mr. G. Bayly, Late of Piccadilly, (Deceased.) Which will be Sold by Auction . . . on Thursday, May 2, 1799, and Three following Days*. King (auctioneer); London, 4to, 20 p.

[BAYREUTH] WAGNER, P. C. (1762) *Nachricht von einer Ausgabe der Abbildungen der seltensten und schönsten Stücke des hochfürst-*

DESCRIPTION ABREGÉE DU FAMEUX CABINET DE *M.r LE CHEVALIER* DE BAILLOU,

POUR SERVIR A L'HISTOIRE NATURELLE

DES

PIERRES PRÉCIEUSES,

MÉTAUX, MINÉRAUX,

ET AUTRES FOSSILES.

PAR JOANNON DE S. LAURENT.

A LUQUES, MDCCXLVI.

Chez Sauveur & Jean-Dominique Marescandoli.

Avec permission des Supérieurs.

BAILLOU

lichen Naturalien-kabinets in Bayreuth. Nuremberg; folio. Third edition, Erlangen (1764), with plates.

[BECCELER] CAPELLO, D. (editor) (1684) *Rariora Becceleriana.* Hamburg; folio with copperplate engravings.

[BENKÖ] (1800) *Parnassusi Idotoltes. 1796.* Hetedik Darab. Enyedri Ritkaságok. Martón, Kolosvar.

[BENTINCK, Count] (1815) *A Catalogue of a very fine Collection of Antique Gems, Coins (chiefly English), in Silver and Gold Bronzes, Enamels, Curious Snuff Boxes, Mathematical Instruments, Shells and Minerals, and other very Valuable Curiosities, the Property of a Nobleman Deceased* [Count Bentinck] . . . *Which will be Sold by Auction . . . on Monday, March 20, 1815.* Leigh and Sotheby, auctioneers; London, 10 pp.

[BERNON] (1670) *Recueil des pieces curieuses apportées des Indes, d'Egypte & d'Ethiopie, qui se trouvent dans le Cabinet de Leonard Bernon.* Paris; 8vo.

[BEROLDINGEN] (before 1799) Catalogue of the Collection of Baron Franz Cölestine von Beroldingen (1740–1798), Purchased by the British Museum in 1816 from his nephew Count Joseph Ignaz von Beroldingen (1780–1868). Manuscript, 2 vols., in the BM(NH) library.

[BERTRAND] (1763) *Eliae Bertrand Museum.* Bern; 8vo, 16 p. There was also a later edition (1775).

[BESLER] (1606) *Basilius Besler Fasciculus rarioram & adspectu dignorum, quae collegit & suis impensis ad vivum incidi curavit & evulgavit.* Nuremberg; folio. Continuations published in 1616 and 1622, folio.



BESLER

[BESLER] (1642) *Gazophylacium rerum naturalium e regno vegetabili, animali & minerali depromptarum nunquam hactenus in lucem editarum, fidelis cum figuris aeneis ad vivum incisis representatio, opera Mich. Rupert. Besleri.* Nuremberg; folio with 34 copperplate engravings.

[BESLER] BESLER, B., and BESLER, M. R. (1716) *Rariora Musei Besleriani quae olim Basilius et Michael Rupertus Besleri collegerunt, aeneisque tabulis ad vivum incisa evulgarunt: nunc commentariolo illustrata a Johanne Henrico Lochnerus.* Nuremberg; folio 136 p. with 40 plates. An edition of 1733, folio with 35 plates, was published in Leipzig.

RARIORA
MVSEI BESLERIANI
quae olim
BASILIVS
et
MICHAEL RVPERTVS
BESLERI
collegerunt,
AENEISQVE TABVLIS AD VIVVM
INCISA EVVLGARVNT:
nunc commentariolo illuſtrata
a
JOHANNE HENRICO
LOCHNERO,
VT VIRTVTI TOY MAKARITOY
EXSTARET MONVMENTVM, DENVO LVCI
PVBLICAE COMMISIT ET LAVDATIONEM EJVS
FVNEBREM ADJECIT
maeſtiſſimus Parens
MICHAEL FRIDERICVS
LOCHNERVS
ARCHIATER CAES. ACAD. LEO-
POLD. CAROL. NAT. CVR. EPHEM.
DIRECTOR.

ANNO O. R. M DCC XVI.

BESLER

[BESLER] BESLER, B., and BESLER, M. R. (1733) *Grazophylacium Rerum Naturalium e Regno Vegetabilii, Animali & Minerali depromptarum, cum figuris aeneis ad vivum incisis, oder Merckwürdige Naturalien-Cammer, welche besonders Stücke, sowohl aus dem Gewächs- als Thier- und Mineralien-Reiche, unter schönen lebhafften Kupffer-Stichen, vor Augen legt, mit Lateinischer und Teutscher Erklärung und Register versehen.* Leipzig in der Zedlerischen Buchhandlung; folio, 7 pp. plus 35 copperplate engravings.

[BEUTH] (1776) *Juliae & Montium Subterranea, sive Fossilium variorum per utrumque Ducatum hinc inde repertorum Syntagma, in quo singula breviter recensentur ac describuntur, quae quidem Collecta hucusque servantur in Museo Francisci Beuth . . .* J. A. Zehnpfennig, Düsseldorf; 8vo, 181 pp. with 2 engraved plates.

[BEYER] (undated, ca. 1760) *Vollständiger Catalogus über eine so schöne als zahlreiche Erz Stuffen Collection, welche weyland Herr*



August Beyer fast an die 60 Jahr lang gesammlet hat.

[BIEHLER] (1735) *Biehler's Erzstuffen = Collection.* Dresden; 8vo. (Auction catalog; sale 23 May 1735; 3,536 numbered lots.)

[BISCARI] CASTELLO, I. P. (1777) *Descrizione de Museo d'Antiquaria & del Gabinetto d'historia naturale di S. J. Principe de Biscari.* Ign. Paler. Castello dell' Abbate Domin. Sestine. Florence; 8vo.

[BLANCKLEY] (1766) *A Catalogue of a Collection of Greek, Roman, Saxon and English Coins and Medals, in Gold, Silver and Brass, Ancient Seals, Busts, and Basso Relievos, in Marble, &c. Arms, Armour, Roman Lamps, Cameos, Intaglios, some matchless antique Chrystal Cups, &c. with great variety of other natural and artificial Curiosities* [including minerals, shells and fossils], *together with some Books and Prints, the Property of Mr. Blanckley, late of Crutched Friars, Apothecary, deceased, and of an Antiquarian, Who was many Years making the above Collection, Which will be sold by Auction . . . on Wednesday the 9th of April, and the Three Following Days . . . 1766.* W. Bristow, auctioneer; London, 20 pp.

[BLANK] (1810) *Uebersicht des Blankischen, jezt der grossherzoglichen Universität zu Würzburg gehörigen Naturalien- und mosaischen Kunstkabinetts etc.* Bamburg and Würzberg; 8vo.

[BLOCK] (1818) *Auctionsverzeichniss der fünften Abtheilung des Herrn von Block Naturalien- und Mineralien-Kabinets . . . , welche 1818 denen Meistbietenden a. l. zugeschlagen werden sollen, durch W. F. Ziesemer.* Dresden; 8vo.

[BOCK] (1774) *Verzeichniss einer Conchyliensammlung, nebst Anhange von Mineralien und andern Natur = und Kunstsachen von Johann Georg Christ. Bock gesammlet.* Hamburg; 8vo, 48 p.

[BONNIER de la MOSSON] GERSAINT, E. F. (1737) *Catalogue d'une collection considérable de curiositiés de différens genres, dont la vente doit commencer le lundi 2 décembre 1737 à deux heures après-midi, chez Gersaint, marchand Pont Notre-Dame. Ces curiositez consistent en . . . une grande quantité de coquilles rares; de madrépores et autres plantes marines; de animaux dans des phioles; des minéraux; des papillons étrangers; de très belles pierres arborisées . . . et autres curiosités de la nature et de l'art.* Prault, Paris; 12 mo, 64 p., 1 plate.

[BONNIER de la MOSSON] GERSAINT, E. F. (1744) *Catalogue raisonné d'une collection considérable de diverses curiosités en tous genres, contenues dans les cabinets de feu M. Bonnier de la Mosson, bailly et capitaine des chasses de La Varenne des Thuilleries et ancien colonel du régiment Dauphin . . .* Barois et Simon, Paris; 8vo, 234 p. + frontispiece engraving.

[BORN] (1772) *Lithophylacium Bornianum, seu Index Fossilium quae collegit, et in classes ac ordines disposuit Ignatius S. R. I. Eques a Born.* Prague; 8vo, 162 p., in two parts, with 6 copperplate engravings. Part II published in 1775.

MUSEUM CALMETIANUM.

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[BOSC de la CALMETTE] (1778) *Museum Calmetianum; A Catalogue of a Capital Collection of Natural and Artificial Curiosities: Consisting of An exquisite Variety of Gold, Silver, Tin, Lead, Copper, Iron and all Sorts of Ores; fine Petrifactions and Ambers; Beautiful Marbles, Pebbles, Porphyries, Jaspers, Agates, Mocoas, Crystals, Precious Stones, and other choicest Subjects of the Mineral Kingdom; Rare Shells and Corals; Insects and Animals Dried and in Spirits; Exotic Plants, Mosses and woods; Gold, Silver, and Copper Medals, various Antiquities, and many foreign Rarities: Including the entire and valuable Museum of Colonel Bosc de la Calmette of Maestricht; with Many fine Specimens from Davila's, Hedlinger's and other celebrated French, German and Dutch Cabinets. Which will be sold by Auction . . . on Monday, 23d of March 1778, and the Sixteen following Days (Sundays excepted).* Mr. Paterson, auctioneer; London, 99 pp.

[BOUCHER] REMY, P. (1771) *Catalogue raisonné des Tableaux, Desseins, Estampes, Bronzes, . . . Meubles curieux, Bijoux, Minéraux, Cristallisations, Madrepores, Coquilles & autres Curiosités, qui composent le Cabinet de feu Mr. Boucher . . .* Chez Musier, Paris; 8vo, 262 p.

[BOULTER] (ca. 1793) *Museum Boulterianum; A Catalogue of the Curious and Valuable Collection of Natural and Artificial Curiosities in the Extensive Museum of Daniel Boulter, Yarmouth: Consisting of English and Foreign Birds and Beasts in high Preservation. Reptiles, Fish and Insects, dried and in Spirit. Elegant Shells, Corals,*

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Faites par lui-même.
ET DANS LEQUEL SONT PLACÉS
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Qui jusqu'ici n'avoient pas été décrits, &c.
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DE
M. L'ABBÉ HAÜY,
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[BOURNON] (1813) *Catalogue de la Collection Mineralogique du Comte de Bournon . . . fair par lui-même. Et dans lequel sont placés plusieurs Observations et faits interessants qui jusqu'ici n'avoient pas été décrits, &c. Ainsi qu'une Réponse au Mémoire de M. l'Abbé Haüy, concernant la Simplicité des Lois auxquelles est soumise la Structure des Cristaux, Ec.* London; 8vo, 582 p. and 21 engraved folding plates.

[BOURNON] (1817) *Catalogue de la Collection Minéralogique Particulière du Roi, appartenant à l'auteur de ce même catalogue, lorsque Sa Majesté en a fait l'acquisition.* Par M. le Comte de Bournon, etc. de l'Imprimerie d'Abel lanoe, Paris; 559 p.

[BOZENHARD] (1780) *Catalogus einer auserlesenen Kunst- und Naturaliensammlung welche aus allen dreyen Reichen der Natur sowohl, als an treflichen Gemälden, schätzbaren Kunststücken, seltenen Alterthümern, raren Büchern und andern Merkwürdigkeiten einen wohl geordneten Vorrath hat und allhier zu Augsburg aus freyer Hand oder an den Meistbiethenden zu verkauffen ist.* Augsburg; 8vo, 54 pp.

[BRACKENHOFFER, ELIAS] BOCKENHOFFER, J. J. (1677) *Musaeum Brackenhofferianum. Delineatum à Joh. Joachimo Bockenhoffero Argentinensi.* Strasbourg; 4to, 52 p. A German 8vo edition of 160 pages was published in Strasbourg in 1683.

[BRANDER] (1766) *Fossilia Hantonensia collecta et in Museo Britanico deposita a Gustavo Brander.* 4to.

Verzeichniß
des
von seel. Herrn Doct.
Johann Philipp Brayne
nachgelassenen berühmten
Naturalien Cabinets
welches
in Danzig in der Langgasse
für
baares Danziger Geld
den 1765.
an
den Meistbiethenden soll verkaufet
werden
von
Johann Gottfried Barthelsen.

Danzig,
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BREYNE

[BREYNE] BARTHELSEN, J. G. (1765) *Verzeichniss des von seel. Herrn Doct. Johann Philipp Brayne nachgelassenen berühmten Naturalien Cabinets welches in Danzig . . . 1765 an den Meistbiethenden soll verkaufet werden von Joh. Gottfried Barthelsen.* J. F. Bartels, Danzig; 8vo, 54 pp.

[BROMEL] (1698) *Catalogus generalis. Prodromus indicis specialioris rerum curiosarum, quae servantur in Pinacotheca Olai Bromelii.* Göteborg; 4to.

[BROWN] (1797) *Catalogue of the Mineral Substances on Sale at Brown and Co. No. 5 Tavistock Street, Covent Garden.* Brown and Company.

[BRÜCKMANN] (1742) *Epistolae itinerariae.* Cent. i, ii; Wölfenbuttel.

[BRÜCKMANN] (1814) *Verzeichniss einer Sammlung . . . aus dem Nachlasse U. F. B. Brückmanns.*

[BÜCHNER] (1771) *Abhandlung von Naturalien-Cabinetten, oder Anleitung wie Naturalien-Cabinette eingerichtet, die natürlichen Körper gesammlet, aufgehoben und conservirt werden müssem. Aus dem lateinischen übersetzt, und mit Anmerkungen herausgegeben von C. v. M[urr].* Leipzig; 8vo, 72 pp.

[BUSS] (1767) *Verzeichniss der Bussischen Sammlung von Conchilien, Fossilien und Kunstsachen.* Berlin; 8vo.

[BUTE] (1793) *A Catalogue (Part I) of Duplicates of Ores, Petrifactions, Spars, Gems, Crystals, and other Articles of Natural History, Selected from the Extensive and Valuable Collection of the Late Right Honorable John Earl of Bute, which will be sold by Auction by Mr. King, at his Great Room, King-Street, Covent-Garden, on Monday, March 4, 1793, and five following days . . .* London, 62 pp. Part II, *May 8* (crossed out in ink, 15 overwritten), 60 pp.; part III, *May 5*, 48 pp. The three parts listed 632, 480 and 494 lots respectively, requiring a total of 14 days to auction, netting a total of £1225.

[BUTE] (1793) *A Catalogue of the Compleat Apparatus and Contents of the Laboratory at Luton House, Bedfordshire, late the property of John Earl of Bute, Deceased, comprising a numerous Assortment of Retorts, Recipients, and other Glass Vessels, Black Lead and other Crucibles, Iron and other Mortars, Furnaces, Bellows, with many other Utensils, Preparations, &c., as well on a large as small scale; Together with a great Variety of Ores of Silver, Copper, Iron, Lead, Cobalt, &c. Spars, Crystals, Marcasites, and other Minerals; some curious Petrifactions of Fish, Corals, &c. chiefly foreign; And other interesting Subjects of Natural History; Also a Magnificent Air Pump on a New Construction, not finished; Copper Scales and Weights, Shelves, Fixtures, &c. Which will be sold by Auction, by Messrs. Skinner and Dyke, at Mr. Hutchins's Rooms in King-Street and Hart-Street, Covent-Garden, on Monday, June 3d, at Twelve O'Clock.* London. (Minerals are lots 183–264 on p. 17–23.)

[BUTE] BABINGTON, W. (1795) *A Systematic Arrangement of Minerals . . .* [based on the Earl of Bute's Collection]. London; 30 p.

[BUTE] BABINGTON, W. (1799) *A new system of mineralogy in the form of [a] catalogue after the manner of Baron Born's Systematic Catalogue of the collection of fossils of Mlle. Eleonore de Raab.* London; 4to, 287 p.

A
CATALOGUE
Of the
Whole Contents of the CELEBRATED MUSEUM
Formed by
M. DE CALONNE,
At Paris; and late his Property:
CONSISTING OF
Rare and Beautiful Subjects in Mineralogy, Conchology, Entomology, and other Branches of
NATURAL HISTORY;
Including
Moft of the Ores of Gold, Silver, Copper, Tin, &c. Diamonds, Opals, Rock Cryftal, Agates, Spars, and other beautiful Stones; as well in the Native as Polifhed State; Curious Shells, Corals, and other Marine Productions, both in the Recent and Foffil ftate, from various parts of the Globe; together with a great variety of uncommon works of Art, including many Singular Houfehold and Warlike Inftruments; Cloth, Garments, Fifhing Tackle, and other Strange Inventions of the Natives of Otaheite, New Zealand, New Caledonia, Nootka, and other newly difcovered Countries in the South Sea; Glafs Temples, Shell Work, Elaborate Carvings in wood, Glafs Cafes, and other Articles too numerous to mention.

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CALONNE



CALZOLARI

[BYTEMEISTER] (1731) *Jo. Henr. Bytemeister, Bibliothecae appendix, s. apparatus curiosorum artificialium & naturalium, subiunctis experimentis.* Helmstedt; 8vo; an auction catalog edition was published in 1735; large 4to, with 58 p. and 28 copperplate engravings. "Includes excellent illustrations of all kinds of fossils, figured stones, etc." (Gatterer, 1798).

[CALDECOT] (1764) *A Catalogue of the Rare and Valuable Collection of Roman, British, Saxon, and English Gold, Silver and Copper Coins and Medals, Various Shells, Fossils* [including minerals], *and Petrifactions, With great Variety of Natural and Artificial Curiosities, a Library of Books, a few Prints, &c. Of that well known Antiquarian Mr. Caldecot, Surgeon, Late of Peterborough, deceased; Which will be sold by Auction . . . on Tuesday and Wednesday the 27th and 28th Instant* [Nov. 1764]. W. Bristow, auctioneer; London, 16 pp.

[CALONNE] (1801) *A Catalog of the Whole Contents of the Celebrated Museum formed by M. de Calonne, at Paris; and late his Property: Consisting of Rare and Beautiful Subjects in Mineralogy, Conchology, Entomology, and other Branches of Natural History; Including Most of the Ores of Gold, Silver, Copper, Tin &c. Diamonds, Opals, Rock Crystal, Agates, Spars, and other beautiful Stones; as well in the Native as Polished State; Curious Shells, Corals, and other Marine Productions, both in the Recent and Fossil state, from various parts of the Globe; together with a great variety of uncommon works of Art, including many singular Household and Warlike Instruments; Cloth, Garments, Fishing Tackle, and other Strange Inventions of the Natives of Otaheite, New Zealand, New Caledonia, Nootka, and other newly discovered Countries in the South Sea; Glass Temples, Shell Work, Elaborate Carvings in wood, Glass Cases, and other Articles too numerous to mention. Which will be Sold by Auction . . . on Monday, May 25, 1801, and Twenty-four following Days (Sundays excepted).* Mr. King, auctioneer; London, 170 pp.

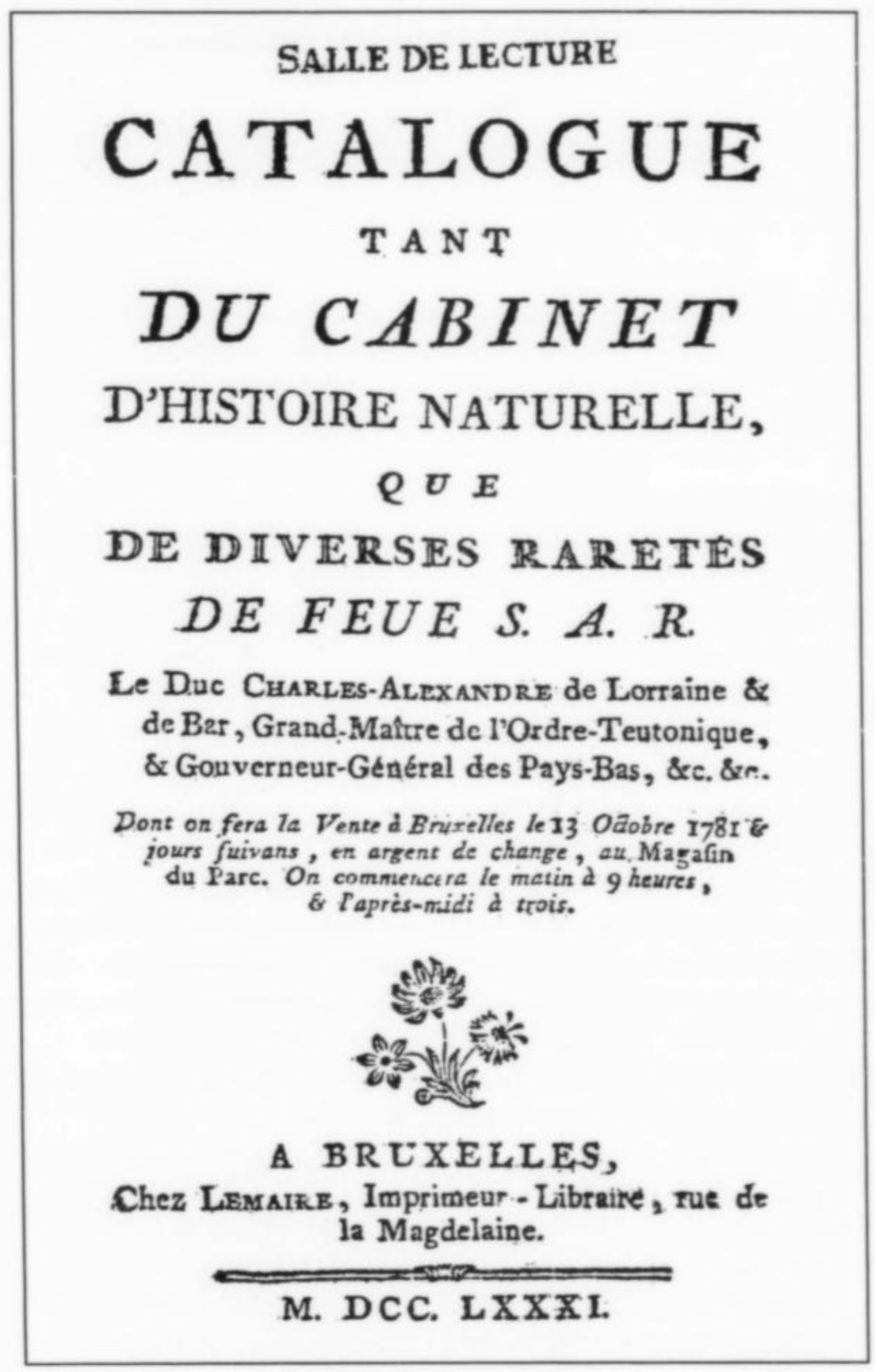
[CALONNE] HWASS, C.H. (1797) *Museum Calonnianum. Specification of the various articles which compose the magnificent museum of natural history collected by M. de Calonne in France . . . consisting of an assemblage of the most beautiful and rare subjects in entomology, conchology, ornithology, mineralogy, etc. . . . all which are now exhibiting at Saville House, on the north side of Leicester square, previous to the sale there of.* London; sm. 4to, viii + 84 p.

[CALZOLARI] CERUTO, B., and CHIOCCO, A. (1622) *Museum Franc. Calceolarii a Bened. Ceruto incoeptum, & ab Andr. Chiocco perfectum, Sect. VI.* Verona; folio, 637 leaves, with plates. There was also a Verona edition of 1625.

[CALZOLARI] OLIVI, J. B. (1584) *De reconditis & praecipuis collectaneis a Franc. Calceolario in Museo asservatis.* Venice; 4to. There was also a Verona edition, 4to, 84 pages, published in 1593.

[CAMPE] (1827) *Verzeichniss der Mineralien, geognostischen Suiten, Versteinerungen . . . welche 1827 in dem Campeschen Hause gerichtlich versteigert werden sollen.* Leipzig; 8vo, 174 p.

[CAVENDISH] WATSON, W. (1804) *Catalogues of Several Collections of Fossils, in Her Grace the Duchess of Devonshire's Cabinets at Chatsworth* [including collections of Derbyshire Fossils, Volcanic Fossils, A Systematic Collection, Cornish Fossils, and a



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M. DCCC. XVIII.

CRICHTON

Collection from Scotland]. Manuscript catalog preserved with the collections at Chatsworth.

[CHAIS] MEUSCHEN, C. F. (1766) *Catalogus Musei Ch.[aisiani] of the systematische Naamlyst etc., Catalogue syst. d'une tres belle collection de Coquillages et Crustacés et autres curiosités naturelles etc.* par Mr. Ch . . . par F. C. M[euschen], Amsterdam; 116 p., 8vo.

[CHARLES ALEXANDRE] (1781) *Catalogue tant du Cabinet d'Histoire Naturelle, que de Diverses Rarities de feue S. A. R. Le Duc Charles-Alexandre de Lorraine & de Bar, Grand-Maître de l'Ordre-Teutonique, & Gouverneur-Général des Pays-Bas, &c. &c. Dont on fera la Vente à Bruxelles le 13 Octobre 1781 & jours suivans, en argent de change, au Magasin du Parc. On commencera le matin à 9 heures, & l'après-midi à trois.* Chez Lemaire, Bruxelles.

[CHICHESTER] (1800) *A Catalogue of an extensive and valuable Collection of Curious Subjects of Natural History. Including Beautiful and uncommon Shells, Corals, Birds, Fossil Remains of Animals and Vegetables, Gold and Silver Ores, Crystallizations of the Ores of other Metals, as well as of the various calcareous, siliceous, and other Earths, Opals, Gems, Pearls, Agates, Jaspers, miscellaneous Indian and other Articles &c. Late the Property of the Marquis of Donegall, Deceased, and brought from his late Residence at Fisherwick in Leicestershire, Which will be Sold by Auction . . . on Wednesday, September 3, 1800, and Five Following Days.* King (auctioneer); London, 4to, 42 pp.

[CHRISTIAN ALBRECHT] OLEARIUS, A. (1666) *Gottorssische kunstkammer, worinnen allerhand ungemeine Sachen, so theils die Natur, theils künstliche Hände hervorgebracht; nebst Olearii Holsteinischen Chronica.* Schleswig; 4to, 88 p. plus 36 copperplate engravings. A later edition, *Aus neue übersehen und zum andern mal gedruckt*, was published in 1674, in Schleswig; 4to, 90 p. with 37 plates.

[CHRISTIAN V] JACOBAEUS, O. (1696) *Museum Regium seu Catalogus rerum tam naturalium, quàm artificialium, quae in Basilica Bibliothecae Augustissim Daniae Norwegiaeque; Monarchae Christiani Quinti Hafniae asservantur.* Copenhagen; folio, with 18 plates. A later edition was published in 1710.

[CLASS] (1808) *Verzeichnis eines Fossilienkabinets, welches in Freyberg 1808 versteigert werden soll.* Freiberg; 8vo, 63 p. [According to Freiesleben (1828) this was the collection of "Herr Class."]

[CLAVIJO] HEULAND, C. (ca. 1780) *Catalogue de la Collection de Mineraux et Cristallisations pierreuses de Monsieur de Clavijo.* n.p. (Spain or Paris ?), folio, 285 p. (in manuscript) [Listed in an unpublished bookseller's catalog.]

[CLOSTER] (1746) *Museum Closterianum, sive Catalogus Rerum tam Artefactarum, quam Naturalium, tam exoticarum, quam domesticarum, ex triplici Naturae Regno, quas Fridericus Laurentius von Jemgumer Closter . . . singulari industria paravit atque collegit, consignatum ab ipso collectore.* Halae Suevor; 4to, 60 pp. with one engraved plate.

[COSPI] LEGATI, L. (1667) *Museo Caspiano annesso a quelle del famoso Ulisse Aldrovandi & donato alla sua patria dall' illustrissimo Signor Ferdinando Cospi, descrizione di Lorenzo Legati.* Bologna; folio, 532 p. with many woodcuts. [There was also a 1677 edition.]

[COSPI] LEGATI, L. (1680) *Inventario semplice di tutte le materie esattamente descritte che si trovano del Museo Caspiano, non solo le notate nel libro già stampato, e composta dal Sig. Dottore Lorenzo Legati, mà ancora le aggiunteui in copia dopo la fabrica.* Bologna; 8vo, 31 p.

[CRICHTON] SOWERBY, G. B. (1827) *Sir Alexander Crichton's Minerals. Catalogue of a Magnificent Collection of Minerals, and Precious Stones, formed with unremitting attention and at unsparing expence during thirty years, By Sir Alexander Crichton, M.D. F.R.S. &c. which will be Sold by Auction, by Mr. G. B. Sowerby, at his room, No. 107, Quadrant, Regent Street, on Friday, April 20th, 1827, and following days, at half past Twelve o'Clock precisely each Day.* Printed by Stirling, Cheapside; 4to, 128 p.

[CRICHTON] WAGNER, J. F. (1818) *Notizen über die Mineralien-Sammlung Sr. Excellenz des Herren Dr's Alexander's von Crichton, wirklichen Staatsrathes, Kais. Russ. Leibarztes, General-Stab-Doctor's des Medicinal-Civil-Wesens, Ritters des Heil. Wladimir's Zweyter Classe, und vieler gelehrten Gesellschaften Mitgliedes.* August Semen, Moscow; 4to, 147 p., with 18 engraved plates.

[D***] ROMÉ DE L'ISLE, J. B. L. (1778) *Catalogue d'une Collection de Minéraux, Cristallisations, Fossiles, Pétrifactions, Agates, Cailloux, Jaspes, Madrépores, Coquilles, &c. du Cabinet de M. D***.* Chez Dufresne, Paris; 52 p. 8vo.

[DACQUET] (1708) *Henr. Dacquet, Catalogus insignium naturalium & artificialium undique compositorum.* Delft; folio.

[D'ANGIVILLER] BUFFON, G. L. L. (1783) *Catalogue raisonné du cabinet de M. le comte d'Angiviller, mss.* (Ce Manuscrit est actuellement entre les mains de M. le comte de Buffon, qui a fait l'acquisition de ce cabinet pour la réunir à celui du Roi.)

[DAUM] (1812) *Verzeichniss des von dem verstorbenen . . . angelegten berühmten Cabinets von Konchylien, Naturalien, Mineralien, physikal. und mathemat. Instrumentten . . . Kunstsachen, Curiosis . . .* Berlin; 8vo. (a sale catalog)

[DAVILA] ROMÉ de l'ISLE, J. B. L., and Abbé DUGUAT (1767) *Catalgue systematique & raisonné des Curiosités de la Nature & de l'art, qui composent le Cabinet de Mr. Davila.* Paris; 8vo, 3 vols., bound as 4, 571 p., 656 p., 290 p. and 286 p. with 7 copperplate engravings.

[DECKER] LANGE, J. J. (1753) *Vollständiges Mineralien-Cabinett von 6,000 Stück Metallen, Ertzen, Drusen, Mineralien, Kräuter- und Fisch-Schiefen, auch andern Petrefactis, welches verschiedene*

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DE MINÉRAUX,

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Le préſent Catalogue ſe diſtribue,
Chez M. DUFRESNE, Huiſſier-Priſeur, rue Princeſſe.

M. DCC. LXXVIII.

D***

CATALOGUE
SYSTÉMATIQUE ET RAISONNÉ
DES CURIOSITÉS
DE
LA NATURE ET DE L'ART,
QUI COMPOSENT LE CABINET
DE M. DAVILA,

AVEC Figures en taille-douce, de pluſieurs morceaux qui n'avoient point encore été gravés.

TOME PREMIER.

A PARIS,
Chez BRIASSON, rue Saint-Jacques, à la Science.

M. DCC. LXVII.
Avec Approbation & Permiſſion.

DÁVILA

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[DELISLE] ROMÉ DE l'ISLE, J. B. L. (1780) *Catalogue raisonné des minéraux, cristallisations, &c. qui composient le cabinet de feu M. de l'Isle.* Paris; 8vo.

[DEMIDOFF] (1817) *Museum Demidoff; ou catalogue systematique & raisonnée de curiosités de la nature & de l'art; données à l'Université Imperiale de Moscou par Mr. Paul de Demidoff.* Moscow and Leipzig; 3 vols., large 4to.

[DEMIDOFF] FISCHER, G. (1806) *Museum Demidoff, mis en ordre systematique et décrit.* Moscow; vol. 2, 4to, with plates (minerals and petrifactions).

[DEUTSCH] (undated, 1770's) *Verzeichnis von Mineralien und Naturalien, als ein Anhang zur Bibliothek des seel, Hrn. Geh. Finanzrath Deutsch.* 8vo, 24 p.

[DE WITT] (1820) *A Catalogue of Minerals Contained in the Cabinet of the Late Benjamin De Witt, Professor of Mineralogy in the College of Physicians and Surgeons, New York, Consisting of more than 11,000 specimens Collected in Europe and America.* G. J. Loomis and Company, Albany; 108 p.

[DEZALLIER d'ARGENVILLE] REMY, P. (1766) *Catalogue raisonné des Tableaux, Estampes, Coquilles, & autres Curiositiés; après le décès de Feu Monsieur Dezalier d'Argenville, Maitre des Comptes, & Membre des Sociétés Royales des Sciences de Londres & de Montpellier.* Chez Didot, Paris; 8vo, xii + 152 p., frontispiece engraving.

[DILLNER] (1777) *Verzeichniss der von Weil. S. T. Herrn Georg Sebastian Dillner etc. gesammleten Naturalien und Kunstsachen.* Regensburg; 8vo, 72 p.

[DOLOMIEU] NOSE, K. W. (1797) *Beschreibung einer Sammlung von meist vulkanischen Fossilien, die Deodat=Dolomieu im Jahre 1791 von Maltha aus nach Augsburg und Berlin versandte, mit verscheidenen dadurch veranlassten Aufsätzen herausgegeben von Karl Wilhelm Nose.* Frankfurt; folio, 82 p.

[D'ORVILLE] (1622) *Wilh. d'Orville Catalogus van een uytmuntend Kabinet, bestaande in Hoorns, Schelpen en raare Zeegewassen, schoone Agate, Carneolyne en andere edele Gesteentens.* Amsterdam; 8vo. There was a much later Amsterdam 8vo edition published in 1736.

[DRÉE] (1811) *Catalogue des huit collections qui composent le Musée minéralogique de Et. de Drée. Avec des notes instructives sur les substances pierreuses qui sont employées dans differens arts et douze planches en taille-douce.* Paris; 4to, 133 p. with 12 plates.

[DUBOIS-JOURDAIN] REMY, P. (1766) *Catalogue raisonné des Curiosités, qui composient le Cabinet de Feu Mme. Dubois-Jourdain par Mr. Pierre Remy.* Paris; 8vo, 162 p.

[DUBUISSON] (1830) *Catalogue de la collection minéralogique, géognostique et minéralurgique du département de la Loire-Inférieure appartenant à la mairie de Nantes, recueillie et classée par F.-R.-A.*

Dubuisson. Imprimerie de Mellinet, Nantes; 8vo, 319 p.

[ECKHOF] (1732) *Museum Eckhofianum, s. Catalogus rerum curiosarum & memorabilium, ab Herm. Eckhof collectarum, auctionis ritu 1732 Lubecae vendendarum*. Lubeck; 8vo.

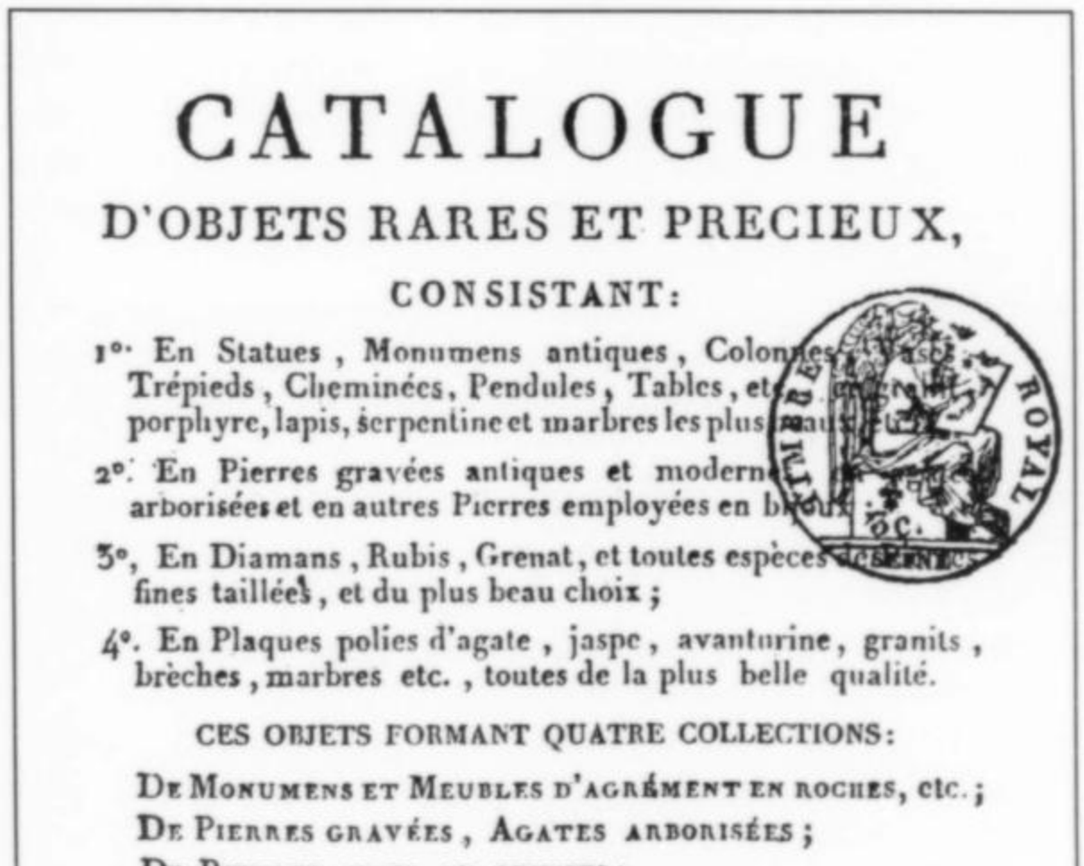
[ELLER] (1723) *Jo. Theod. Eller, Gazophylacium sive Catalogus rerum mineralium & metallicarum*. Bernberg; 8vo.

[EVERS] WÖNIGER (1768) *Verzeichniss einer sehr ansehnlichen Sammlung von Naturalien aus allen Reichen der Natur welche nach dem seligen Ableben ihres ehemaligen Besitzers Herrn Heinrich Evers weiland Kauf- und Handelsmanns in Hamburg . . . entweder unzertrennt oder durch eine öffentliche Auctions*. J. L. C. König, Hamburg; 4to, 128 pp. with portrait.

[FAGEL] (1709) *Catalogus van twee uytmundende Cabinetten met Hoorns, Schelpen, en zeerkeurlyke Zeegewassen, door Benj. Fagel*. The Hague; 8vo.

[FAILLE] (1731) *De la Faille, Catalogus van het uitmunted Cabinet, met alle bedenkelyke Soorten van Hoorens, Schelpen, en rare Zeegewassen, benevens veele Mineralien*. The Hague; large 8vo.

[FALCONAR] (1778) *Museum Falconarianum. A Catalogue of the Entire and Capital Museum of Anatomical Preparations, and other Subjects of Natural History* [including minerals] *. . . and other Effects of the late Mr. Magnus Falconar, Surgeon, and Professor of Anatomy, deceased: Which, by Order of the Administration, will be*



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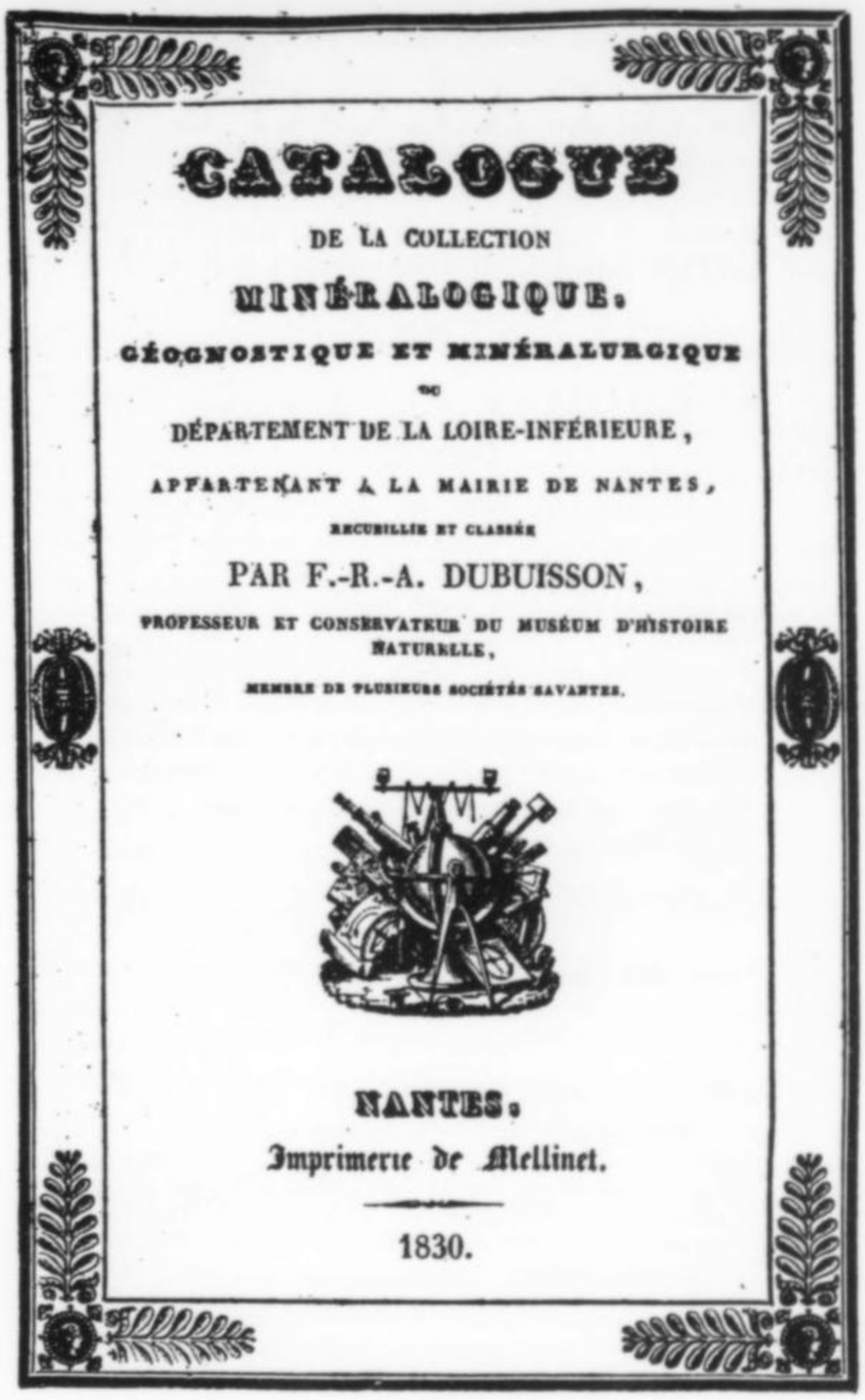
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1816.

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CATALOGUE

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MINÉRALOGIQUE,

GÉOGNOSTIQUE ET MINÉRALURGIQUE

DU

DÉPARTEMENT DE LA LOIRE-INFÉRIEURE,

APPARTENANT A LA MAIRIE DE NANTES,

RECUEILLIE ET CLASSÉE

PAR F.-R.-A. DUBUISSON,

PROFESSEUR ET CONSERVATEUR DU MUSÉUM D'HISTOIRE NATURELLE,

MEMBRE DE PLUSIEURS SOCIÉTÉS SAVANTES.

NANTES,

Imprimerie de Mellinet.

1830.

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[FELDMANN] (1781) *Verzeichniss des D. Feldmann's zu Neu=Ruppin nachgelassenen Naturalienkabinets*. Ruppin; 8vo, 261 p.

[FERDINAND II] ANONYMOUS (1888) Inventar des Nachlasses Erzherzog Ferdinands II in Ruhelust, Innsbruck und Ambras von 30 Mai 1596. *Jahrbuch der Kunsthistorischen Sammlungen des Allerhöchsten Kaiserhauses*, 7, cclviii–ccxiii, 10, i–x.

[FLEMING] (1767) *A Catalogue of the Genuine Cabinet of Roman, British, Saxon, and a Series of English Coins, and some Medals; A Collection of Prints and Drawings, and Some Choice Books, Chiefly Numismatical, or Relating to English Antiquities* [also some minerals and fossils] *of Mr. George Fleming (Late of Wakefield), Painter, Deceased. Which will be sold by Auction . . . on Tuesday the 2d of June, 1767, and the Following Day*. Samuel Paterson, auctioneer; London, 8 pp.

[FLUDYER] (1769) *A Catalogue of the Large and Capital Museum of Sir Thomas Fludyer, Knt., Deceased, at his late Seat at Lee in Kent: Consisting of Rich Gold and Silver Ores, Fossils, Petrifactions, Shells, Corals, Minerals, &c. Variety of beautiful English and foreign Flies, Beetles, and other Insects, all Kinds of uncommon Animals in Spirits; Also his Cabinet of Gold, Silver, and other Coins, large Sideboard of chased Plate, his Collection of Pictures by the best Masters, Library of Books, fine china, Household Furniture, Brewing*

A

CATALOGUE

OF THE

Large and Capital MUSEUM

OF

Sir THOMAS FLUDYER, Knt.

Deceaſed,

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CONSISTING OF

Rich Gold and Silver Ores, Foſſils, Petrefactions, Shells, Corals, Minerals, &c. Variety of beautiful Engliſh and foreign Flies, Beetles, and other Inſects, all Kinds of uncommon Animals in Spirits; alſo his Cabinet of Gold, Silver, and other Coins, large Sideboard of chaſed Plate, his Collection of Pictures by the beſt Maſters, Library of Books, fine China, Houſhold Furniture, Brewing Utenſils, &c. Alſo a Poſt-Chaiſe, Phaeton, and Chariot.

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[FORSTER] ROMÉ DE'L'ISLE, J. B. L. (1769) *Catalogue raisonné d'une collection choisie de minéraux, cristallisations, madrepores, coquilles & autres curiosités de la nature & de l'art.* (pour la premiére vente publique de Jacob Forster). Paris; 8vo.

[FORSTER] ROMÉ DE L'ISLE, J. B. L. (1772) *Catalogue raisonné d'un collection choisie de minéraux, cristallisations, &c.* (pour la seconde vente publique de Jacob Forster). Paris; 8vo.

[FORSTER] ROMÉ DE L'ISLE, J. B. L. (1780) *Catalogue raisonné d'une collection de minéraux, cristallisations, &c.* (pour la troisieme vente publique de Jacob Forster). Paris; 8vo.

[FORSTER] ROMÉ DE L'ISLE, J. B. L. (1783) *Catalogue raisonné d'une collection choisie de minéraux, cristallisations, &c.* (pour la quatrième vente publique de Jacob Forster). Paris; 8vo.

[FREDERICK AUGUSTUS II] EILENBURG (1755) *Description du Cabinet royal de Dresde, touchant l'histoire naturelle (par Mr. Eilenburg).* Dresden; large 4to, 101 p. A German edition was issued simultaneously: *Kurzer Entwurf der königl. Naturalienkammer zu Dresden (von Eilenburg).* Dresden; large 4to, 102 p. and 2 plates.

[FREDERICK AUGUST II] LUDWIG, C. G. (1749) *Terrae Musei regii Dresdensis, quas digessit, descripsit, illustravit D. Christ. Gottl. Ludwig, accedunt terrarum sigillatarum figurae.* Leipzig; large folio, 298 p. with 12 plates.

[FREDERICK AUGUST III] (1770) *Kurzer Entwurf der konigl. Naturalienkammer zu Dresden, nebst den Grundrissen von dem sogenannten Zwinger und der darinnen befindlichen Naturaliengallerie und Curiositätenkabinetten.* Dresden; folio.

[FREDERIK IV] LAUERENZEN, J. (1703) *Auctuarium variorum, quae in Museo regio Hafniae per triennium accesserunt.* Copenhagen; folio.

[FREDERIK IV] LAUERENZEN, J. (1710) *Museum regium, nunc magna ex parte auctius, uberioribusque commentariis, praesertim quoad antiquitares illustratum, accurante Joh. Lauerenzen.* Copenhagen; large folio, with 27 plates.

[FREDERIK IV] LAUERENZEN, J. (1726) *Index alphabeticus Musei regii bipartitus: Pars I de rebus naturalibus, II artificialibus.* Copenhagen; folio.

[FREDERIK V] (1759) *Stiftung für die königl. Dänische auf dem Schlosse Charlottenberg zu Koppenhagen errichtete Natural= und Haushaltungs= Sammlung.*

[FUIREN] FUIREN, T. (1663) *Rariora Musei Henrici Fuiren, edita a Thom. Fuiren.* Copenhagen; 4to.

[GALOIS] ROMÉ de l'ISLE, J. B. L. (1780) *Catalogue raisonné des minéraux, cristallisations, &c. qui composent le cabinet de M. Galois.* Paris; 8vo.

[GEISSLER] (1792–1799) *Verzeichniss der Geisslerischen Mineralien-Sammlung zu Leipzig.* Part 1 (1792), 368 p.; part 2 (1792), 336 p.; first supplement (1796), 16 p.; second supplement (1798), 32 p.; third supplement (1799), 22 p. [According to Freiesleben (1828) this is the catalog of Johann Gottlob Geissler of Leipzig.]

[GELLERT] (1795) *Verzeichniss der Fossilien des Mineralien-Kabinets des verstorbenen Hrn. Bergrath Gellert, welche 1795 verauctionirt werden sollen.* Freiberg; 8vo, 98 p.

[GEOFFROY] (1753) *Catalogue raisonné des minéraux, coquilles; et autres curiositiés naturelles, contenues dans le cabinet de feu M. Geoffroy de l'Académie royale des sciences.* Guérin et Delatour, Paris; 8vo, viii + 94 p.

[GEVERS] MEUSCHEN, C. F. (1787) *Museum Geversianum sive Index rerum naturalium, continens instructissimam copiam pretiosissimorum omnis generis ex tribus regnis naturae objectorum, dum in vivis erat, comparavit Abr. Gevers (ex descriptione C. F. Meuschen).* Rotterdam; 8vo, 655 p.

[GIGOT D'ORCY] (1804) *Catalogue abrégé des minéraux, coquilles, madrépores, et autres objets faisant partie du Cabinet de feu M. Gigot d'Orcy.* 8vo, 24 p.

[GOETHE] PRESCHER, H. (1978) *Goethes Sammlungen sur Mineralogie, Geologie und Paläontologie, Katalog.* KTO Press, Akad Verlag, Berlin; 716 p.

[GOTTWALD] (1714) *Cph. et Ioh. Cph. Gottwaldi, Museum sive Catalogus rerum rariorum t. natural q. artific.* Gedani (Danzig); folio.

[GÖTZINGER] (1827) *Verzeichniss derer von dem verstorbenen Pastor Herrn. M. Götzinger hinterlassenen Mineralien-Sammlungen, welche im Juny 1827 zu Dresden verauctionirt werden sollen.* Dresden; 8vo, 31 p.

[GRAMBS] (1741) *Designatio naturalium quae in Museo D. J. Grambsii, secundum tria regna distributa asservantur, inque simul methodi conspectus, quomodo secundum naturae dictum pro facilitanda memoria sint collocata.* Frankfurt; 8vo.

[GRAVEL] (1772) *Museum Gravelianum, sive Collectionis regni mineralis, praecipue historiam naturalem illustratis, a Joh. Phil. Gravel magna solertia comparatae, a Filio ejus pie nuper defuncto egregie auctae recensio.* Strasbourg; 8vo, 184 p.

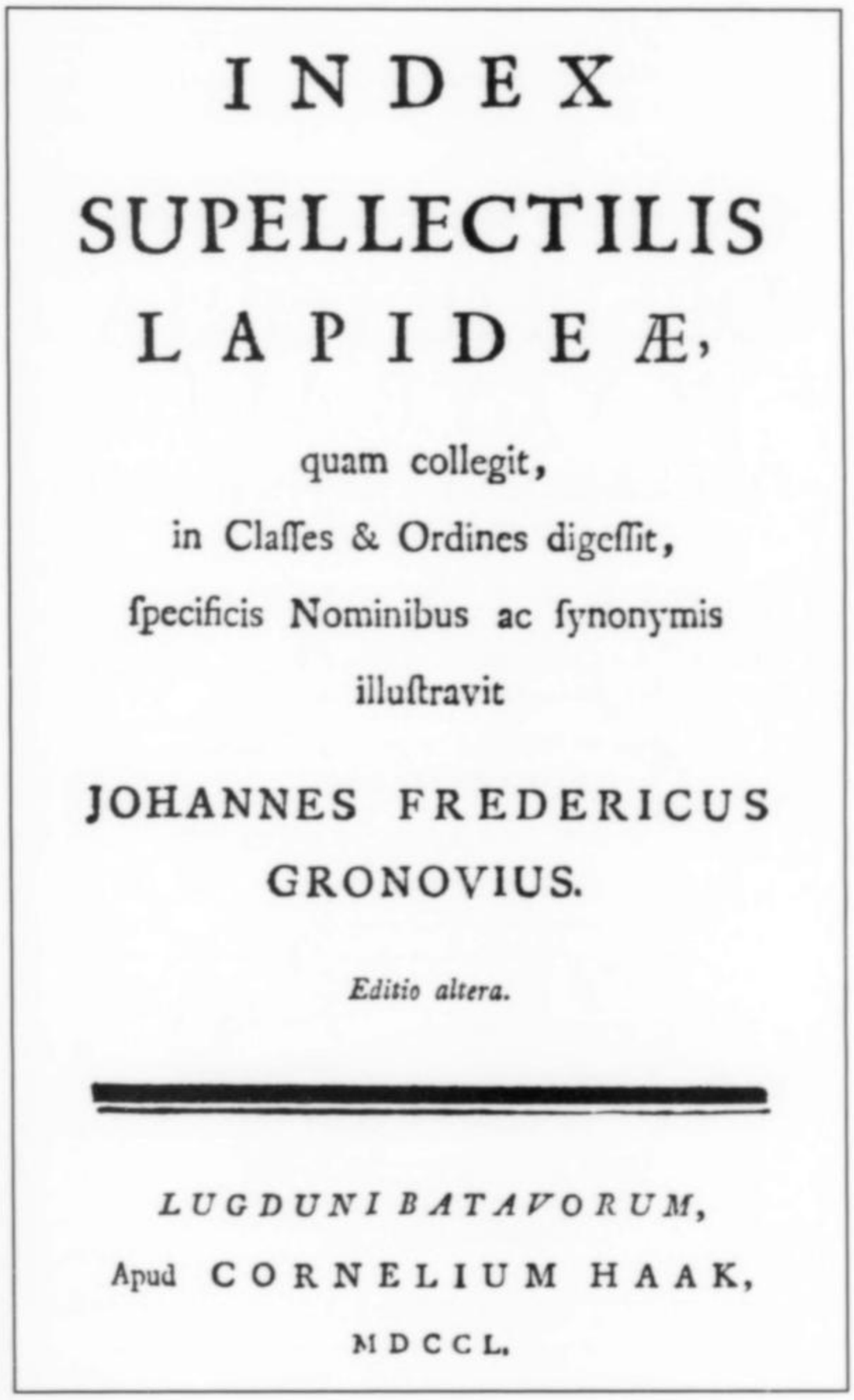
[GRILL] (1728) *Catalogus van een extraordinair schoon en uytmuntend kabinet van veelderlei ongemene Rariteiten . . . nagelaten door den Heer Anthony Grill.* Amsterdam; 8vo.

[GRILL] ENGELBRONNER, C. E. (editor) (1776) *Musei Grilliani Catalogus, continens praestantissima & rarissima pretiosissima omnis generis Fossilia, quae reliquit Anton Grill, latine & belgice.* Amsterdam; 8vo.

[GRILL] LINDROTH, P. G. (1788) *Museum naturalium Grillianum, Söderforssiense institutum 1783 & in Catalogo redactum ano 1788 a Petr. Gustav. Lindroth.* Stockholm; large 4to, 21 p.

[GRILL, J.] (1679) *Catalogus . . . Numismatum Graecorum et Latinorum: necnon Metallorum ac Fossilium Conchyliorum et Fruticum marinorum, exquisitae raritatis.* Latin and Dutch. Amsterdam; 12mo. (A sale catalog by his widow.)

[GROLLIER] ROMÉ de l'ISLE, J. B. L. (1780) *Description du cabinet d'histoire naturelle de M. le marquis de G*** (Grollier).* Paris; 8vo.



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LAPIDEÆ,

quam collegit,

in Claſſes & Ordines digeſſit,

ſpecificis Nominibus ac ſynonymis

illuſtravit

JOHANNES FREDERICUS
GRONOVIUS.

Editio altera.

LUGDUNI BATAVORUM,

Apud CORNELIUM HAAK,

MDCCL.

GRONOV

[GRONOV] (1740) *Index suppellectilis lapideae, quam collegit, in classes & ordines digessit, specificis nominibus ac synonymis illustravit.* Leiden; 8vo. An auction edition of 112 pages, 8vo, was published in Leiden in 1750.

[GRONOV] MEUSCHEN, C. F. (1778) *Museum Gronovianum. Sive index Rerum Naturalium tam Mammalium Amphibiorum Piscium Insectorum Conchyliorum Zoophytorum Plantarum & Mineralium exquisitissimorum quam Arte factarum nonnullarum. Inter quae eminet Herbarius Siccus Plantarum a Tournefortio Claitonio Linnaeo aliisque Botanicis collectarum. Quae omnia multa cura & magnis sumptibus sibi comparavit Vir Amplissimus & Celeberrimus Laur. Theod. Gronovius . . .* Theo. Haak, Leiden; 8vo, 255 pp.

[GRONOV] MEUSCHEN, C. F. (1778) *Index Musei Gronoviani. Sive Elenchus Rerum Naturalium tam Animalium & Plantarum quam Mineralium pro maxima parte in Zoophylacio descriptarum a Celeb. Defuncto adjectis Linnaei Pallasii aliorumque Auctorum nominibus trivialibus ut & denominationibus belgicis.* Theo. Haak, Leiden; 8vo, 255 pp.

[GRUNDIG] (undated, 1770's) *Verzeichniss der Grundigschen Mineralien-Sammlung.* Freiberg.

[HANNA] (1699) *Georg. Hannaei, Physicotheca s. Catalogus rerum antiquarum & novarum, naturalium & artificialium &c.* Copenhagen; 4to.

[HANNSEN] (1817) *Verzeichniss einer weil. Hrn. Baumeister und Kaufmann Hannsen zu Leipzig gehörig gewesenen Mineraliensammlung, zugeschlagen werden sollen, durch W. F. Ziesemer.* Dresden; 8vo, 64 p.

[HAPPEL] (1688) *Thesaurus exoticorum, oder die mit ausländischen Raritäten wohl versehene Schatzkammer.* Hamburg; folio, with engraved plates.

[HARRER] (1787) *Verzeichniss einer auserlesenen Naturaliensammlung, welche weil Hr. Emmanuel Theophil. Harrer . . . hinterlassen und zu Regensberg versteigert werden soll.* Regensberg; 8vo, 348 p.

[HEIDAN] (no date; pre-1727) *Caroli Heidani Thesaurus elegantissimorum Numismatum, Inscriptionum, Marmorum & supellectilis Antiquariae; nec non Conchyliorum, Coralliorum, Mineralium, Gemmarum ac Caelaturarum plurimarumque Rerum pretiosarum.* Leiden; 12mo.

[HEINRICH XLIII] (1785) *Verzeichniss der Gräflich Reuss-Plauischen Naturaliensammlung zu Köstitz.* Heinrich Gottlieb Rothen, Gera.

[HERMANN] (1711) *Paul Hermanni, Museum indicum continens varia exotica animalia, vegetabilia, insecta, mineralia.* Leiden; 8vo. There was also a 4to edition, Leiden, 1711.

[HEULAND] LEVY, A. (1838) *Description d'une collection de minéraux formée par M. Henri Heuland et appartenant à M. Ch. Hampden Turner, etc.* London; 3 vols. and atlas.

[HEULAND, C.] (1800) *Catalogue de la collection mineralogique du Chile.* Manuscript procedente del Archivo del Museo Nacional de Ciencias Naturales, Madrid.

[HIEGEL] (1714) *Museum Hiegelianum.* Constanz; 4to, with plates.

[HILSCHER] (1818) *Naturalien-, Mineralien-, und Kunst-Auctions-Verzeichniss Nr. XVI ago. 1818, welche a.l. zugeschlagen werden sollen, durch C. E. Heinrich.* Dresden; 8vo, 74 p. [Accoring to Freiesleben (1828) this is the collection of Hrn. Hilscher, which had formerly been known as the Museum für Natur and Kunst in Dresden. Minerals are listed on p. 1–30.]

[HOFFMANN] FRISCH, J. L. (1741) *Musei Hoffmanniani petrefacta & lapides, oder ausführlicher Beschreibung der versteinerten Dinge und anderer curieusen und raren Steine, welche in dem vollständigen Cabinet Herrn D. Friedrich Hoffmanns befindlich sind.* Halle; 4to. A 54-page edition was issued in Leipzig in 1742.

[HOFFMANN] LESSER, F. C. (1736) *Epistola de praecipuis naturae et artis curiosis speciminibus musei, vel potius physiotechnotamei Friederici Hoffmanni ad D. F. E. Bruckmannum, perscripta a Frid. Christ. Lessero.* Halle; 4to, 16 p.

[HOFFMANN, GEORG] (1751) *Vollständiger Catalogus über eine so schöne als zahlreiche Erz-Stuffen-Collection . . . welche zu Dresden den Meistbietenden zugeschlagen werden sollen (Nov.) 1751.* Dresden; 8vo, 200 p.

[HOFMANN] (1625) *Laur. Hofmanni Thaymato Phylakion s. Thesaurus variarum rerum antiquarum, et exoticarum s. naturalium et*

artificialium collectus, latine et germanice. Halle; 8vo.

[HOLTHUISEN] LICHTENSTEIN, A. A. H. (1793–1796) *Catalogus Rerum Naturalium rarissimarum Hamburgi . . . auctionis lege distrahendarum. Sectio prima cóntinens Mammalia et Aves; Sectio secunda cóntinens Conchylia, item Mineralia; Sectio tertia cóntinens Insecta. Verzeichniss von höchstseltenen . . . Naturalien &c.* Octavo, Hamburg.

[HONVLEZ (HÜPSCH)] (1798) *Synoptische und systematische Tabellen des ganzen Naturalienkabinetts des Freih. von Hüpsch. Zum öffentlichen Unterrichte in der Naturgeschichte. 1. Th. Mineralreich.* Köln; 8vo.

A

CATALOGUE

OF MANY

Natural RARITIES,

WITH

Great Induſtry, Coſt, and thirty Years travel in Foraign Countries,

COLLECTED BY

ROBERT HUBERT, aliàs *FORGES*, Gent. and ſworn Servant to His Majeſty.

And dayly to be ſeen, at the place called the *Muſick Houſe*, at the *MITER*, near the Weſt end of St. *Pauls* Church.

London, Printed by *Tho. Ratcliffe*, for the Author, 1664.

HUBERT

[HUBERT] (1664) *A Catalogue of Many Natural Rarities, with Great Industry, Cost, and thirty Years travel in Foreign Countries, Collected by Robert Hubert, alias Forges, Gent. and sworn Servant to His Majesty. And dayly to be seen, at the place called the Musick House, at the Miter, near the West end of St. Pauls Church.* Thomas Ratcliffe, London.

[HUBERT] (1666?) *A Catalog of part of those Rarities Collected in thirty years time with a great deal of Pains and Industry, by one of his Majesties sworn servants. R. H. aliàs Forges, Gentleman. They are to be seen at the place formerly called the Musique-House at the West end of Pauls.* (no date, no place.)

[HUME] BOURNON, J. L. (1815) *Descriptive Catalogue of Diamonds in the Cabinet of Sir Abraham Hume, M.P., translated from the French.* London; 4to, with 4 plates.

[HUMPHREY] (1779) *Museum Humfredianum: Catalogue of the Large and Valuable Museum of Mr. George Humphrey; which is presumed to be the most capital of the kind ever offered to public Sale in this Kingdom: Comprehending many Thousand curious subjects in Natural History, collected with great Judgment and Expence, from most Parts of the known World, during a Course of upwards of thirty Years: particularly Shells, Corals, other Marine Productions, Reptiles, Insects, and other Animals . . .; most of the Species in the Fossil Kingdom; among them many rare and elegant Spars, Crystals (some of them matchless), Marbles, Agates, and other Stones; Ores and Minerals; Petrifactions . . .; a Variety of Mahogany and other Cabinets, adapted for containing Subjects in Natural History; a range of elegant Mahogany Cases of the best Jamaica Wood, nine feet high, glazed with large Panes . . .; a Mahogany Table, near thirty feet long, with large Show Glasses on the Top, and near 300 Drawers beneath, all glazed; a range of Mahogany Shelves with Cabinets containing 128 Drawers, glazed . . . and great Number of other Articles . . . Which will be sold by Auction . . . on Monday, April 5, 1779, and the Twenty-nine following Days.* Paterson (auctioneer); London, 4to, 168 p.

DELL'HISTORIA NATVRALE

DI FERRANTE IMPERATO NAPOLITANO.

LIBRI XXVIII.

NELLA QVALE ORDINATAMENTE SI TRATTA della diuerſa condition di miniere, e pietre.

Con alcune hiſtorie di Piante, & Animali; ſin' hora non date in luce.

CON PRIVILEGIO.



IN NAPOLI,

Nella Stamparia à Porta Reale. MDIC.
Per Coſtantino Vitale.

IMPERATO

[IMPERATO] (1599) *Dell' Historia Naturale di Ferrante Imperato Napolitano Libri XXVIII Nella quale ordinatamente si tratta della diversa condition di miniere, e pietre. Con alcune historie di Piante, et Animali; sin' hora non date in luce.* Naples; folio. Second edition (1672), greatly enlarged by Giovanni Maria Ferro, published in Venice; folio, 710 p., with 1 engraving and many woodcuts.

[JOHANN, B. J. F. S.] AICHHORN, S. J. N. (1855) *Das Mineralien-Kabinet am Steiermärkisch-ständischen Joanneum zu Gratz.*

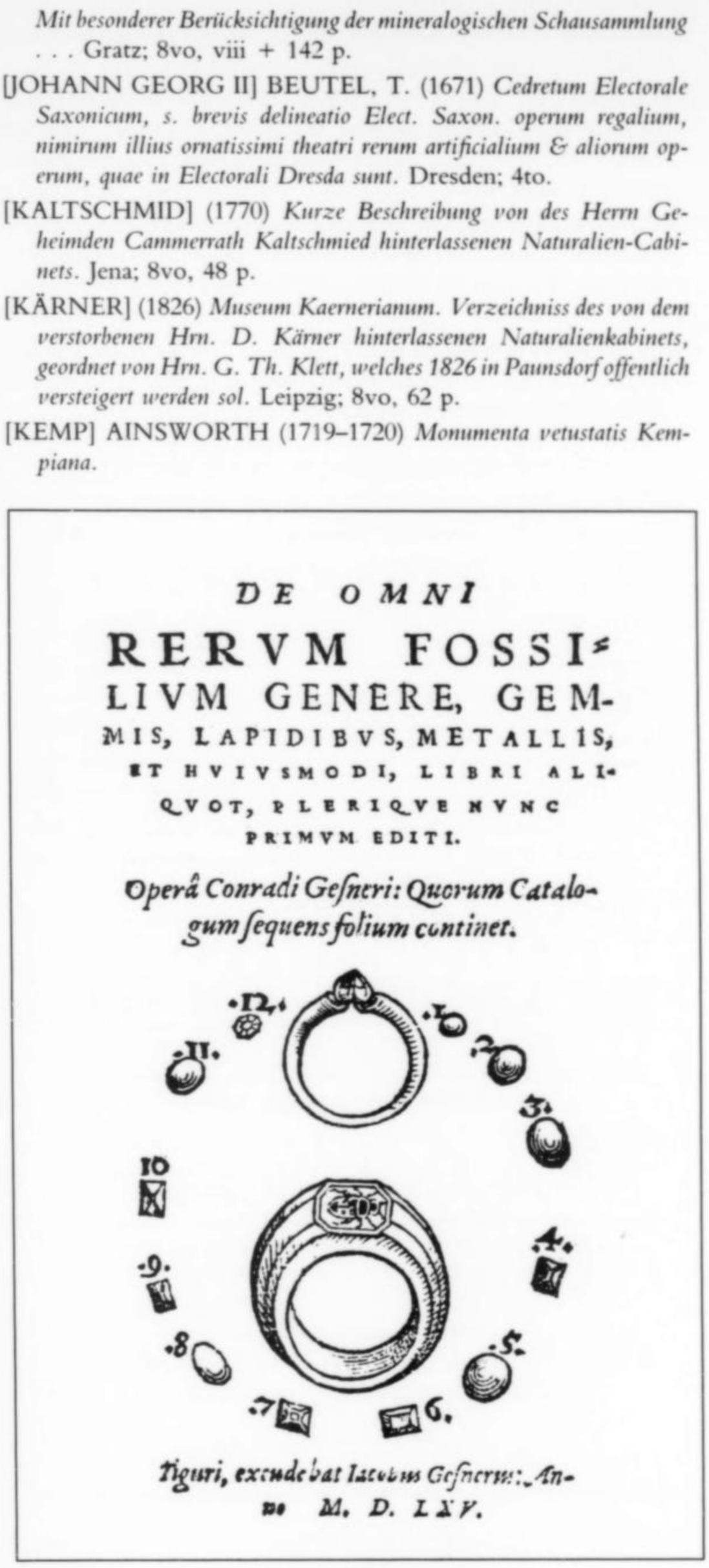
Mit besonderer Berücksichtigung der mineralogischen Schausammlung . . . Gratz; 8vo, viii + 142 p.

[JOHANN GEORG II] BEUTEL, T. (1671) *Cedretum Electorale Saxonicum, s. brevis delineatio Elect. Saxon. operum regalium, nimirum illius ornatissimi theatri rerum artificialium & aliorum operum, quae in Electorali Dresda sunt.* Dresden; 4to.

[KALTSCHMID] (1770) *Kurze Beschreibung von des Herrn Geheimden Cammerrath Kaltschmied hinterlassenen Naturalien-Cabinets.* Jena; 8vo, 48 p.

[KÄRNER] (1826) *Museum Kaernerianum. Verzeichniss des von dem verstorbenen Hrn. D. Kärner hinterlassenen Naturalienkabinets, geordnet von Hrn. G. Th. Klett, welches 1826 in Paunsdorf offentlich versteigert werden sol.* Leipzig; 8vo, 62 p.

[KEMP] AINSWORTH (1719–1720) *Monumenta vetustatis Kempiana.*


DE OMNI
RERVM FOSSI-
LIVM GENERE, GEM-
MIS, LAPIDIBVS, METALLIS,
ET HVIVSMODI, LIBRI ALI-
QVOT, PLERIQVE NVNC
PRIMVM EDITI.
Operâ Conradi Gesneri: Quorum Catalogum sequens folium continet.
Tiguri, excudebat Iacobus Gesnerus: Anno M. D. LXV.

KENTMANN

[KENTMANN] (1565) *Nomenclaturae rerum fossilium, que in Misnia praecipue, & in alijs quoque regionibus inveniuntur.* Jacobus Gesnerus, Tiguri; 8vo, 97 p.

[KIMAYER] (1705) *Thom. Kimayer's neu eröffnetes Raritätenkabinet Ost= West= Indianischer und ausländischer Sachsen.* Hamburg; 8vo.

[KING, J. G.] (1788) *A Catalogue of the Collection of Greek, Roman, Saxon, English, and other Coins and Medals in Gold, Silver, and Copper; Antiquities, Miniatures, Minerals, Shells, and other curious Subjects of Natural History; of a late well-known Collector* [Rev. John Glen King, D.D.], *Deceased; Also, 127 sets of unpublished Plates of Roman, Consular, and Imperial, Coins, Which by Order of the Executrix, will be Sold by Auction . . . on Wednesday, April 30, 1788, and the Two Following Days.* Mr. Gerard, auctioneer; London, 14 pp.

[KIRCHER] BONANNI, P. (1709) *Musaeum Kircherianum sive Musaeum a P. Athanasio Kirchero in Collegio Romano Societatis Jesu jam pridem incoeptum, nuper restitutum, auctum, descriptum, & Iconibus illustratum Excellentissimo Domino Francisco Mariae Ruspolo antiquae Urbis Agyllinae Principi oblatum, a P. Philippo Bonanni Societatis Jesu.* Rome; folio, 522 pp. with 172 copperplate engravings.

[KIRCHER] BONANNI, P. and BATARRA, J. A. (1773) *Rerum naturalium historia, nempe quadrupedum, insectorum, piscium, variorumque marinorum corporum, fossilium, plantarum ac praesertim testaceorum existentium in Museo Kircheriano, edita iam a Philip. Bonanno, nunc cero nova methodo distributa, notis illustrata, in tabulis reformata, novisque observationibus locupletata a Joh. Anton. Batarra.* Rome; folio, 347 p. with 51 copperplate engravings and many vignettes. There was also a 1782 edition.

[KIRCHER] SEPIBUS, G. de (1678) *Athan. Kircheri, Museum Romani Collegii Soc. Jesu, novis & raris inventis locupletatum per Georg. de Sepibus.* Amsterdam; folio, 66 p. with copperplate engravings and woodcuts.

[KLINGHAMMER] (1779) *Verzeichniss einiger Mobilien . . . und Erzstuffen, welche 1779 vom Oberhüttenamte zu Freyberg verauctionirt werden sollen.* [Freiesleben (1828) says this was the auction catalog of "Freyberger Oberhüttenvorsteher Klinghammer."]

[KNORR] (1771) *Deliciae Naturae Selectae, of Uitgelezen Kabinet van Natuurlyke Zeldzaaheden; welke de drie Ryken der Natuur aanbieden . . .* Blusse, Dordrecht; 2 vols., large folio, engraved frontispiece and 91 hand-colored plates. [Philip Muller's translation of the original German edition published in Nuremberg, 1766.]

[KNORR] MÜLLER, P. L. S. (1766) *Delices Physiques Choisies, ou choix de tout ce que les trois Regnes de la Nature renferment de plus digne des recherches d'un amateur curieux, pour en former un Cabinet choisi de curiositez naturelles, ouvrage communiqué cy-devant au public par G. W. Knorr, etc. continué par ses Heritiers, avec les descriptions & remarques de P. L. S. Müller.* [French translation by M. Verdier de Blaquiere.] Nuremberg; folio, 2 vols., 304 pp. with 91 hand-colored plates.

[KNORR] MÜLLER, P. L. S. (1766) *Deliciae naturae selectae oder auserlesenes Naturalien Cabinet welches aus den drey Reichen der Natur zeiget, was von curiösen Liebhabern aufbehalten und gesammlet zu werden verdienet.* G. W. Knorr, Nuremberg; folio, 2 vols., 304 pp. with 91 hand-colored plates. [A second German edition appeared in 1778.]

[KOLOWRAT, L.] (undated) *Index Fossilium quae in musaeo excellentissimi Dni. Dni. Leopoldi Sac. Rom. Imp. Comitis de Kollowrath asservantur.* Manuscript catalog in three volumes, 105 sheets, 174 sheets, 172 sheets; Herbert Obodda library.

[KÜNAST] (1668) *Verzeichniss derjenigen Raritäten, so sich in Balth. Ludw. Künast's zu Strassburg Kunstkammer befinden.* Strassburg; 8vo.

[KUNDMANN] (1726) *Promtuarium rerum naturalium & artificialium Vratislaviense, praecipue quas collegit D. Joh. Christianus Kundmann Med. Vratisl.* Bratislava; 4to, 380 p., with plates.

[KUNDMANN] (1737) *Rariora naturae & artis, item in re medica, oder Seltenheiten der Natur und Kunst des Kundmannischen Naturalien= Cabinets, wie auch in der Artzenen= Wissenschaft. Darinnen abgehandelt werden, I. Examen Fossilium & Lapidum quorumdam rariorum . . .* Breslau and Leipzig; folio, 1312 p., with index, 18 copperplate engravings and several woodcuts.

[KUNDMANN] (1753) *Johann Christian Kundmanns Sammlung von natür- und künstlichen Sachen, auch Müntzen, welche dieses*

1753 Jahr . . . verkaufet werden soll. Nebst einem Verzeichnisse vortrefflicher Malereyen . . . und einem Catalogo nützlicher Medicinisch-Physik. Bücher . . . Breslau bey J. J. Korn. Jo. Ch. Kundmanni Collectio rerum naturalium artificialium & nummorum quae hoc 1753 anno . . . publica auctionis lege distrahetur. Accedit Descriptio Tabularum variarum . . . pictarum . . . & Catalogus librorum medico-physicalium . . . [Dutch and Latin]. Breslau; 8vo, 601 pp.

[LANCKHAVEL] (1784) *Ausführlicher Katalogus des Lanckhavelschen Naturalien- und Kunstkabinets zu Zerbst*. Wittenberg. [According to Freiesleben (1828), the Lanckhavel collection was described in 1777 by Jakobäer, and published in Leipzig but following Lanckhavel's death the responsibility for overseeing the publication of the description fell to Johann Ernst Stutz, resulting apparently in the 1784 edition. Pages 51–78 deal with minerals.]

[LANCKHAVEL] JACOBÄERN, F. G. (1777) *Des Herrn Hofrath Lanckhavels in Zerbst Kunst- und Naturalienkabinet für Fritzen, und alle, die es zu kennen wünschen, beschrieben*. Leipzig; 8vo, 120 pp.

[LANGE] (1753) *Vollständiges Mineralien-Kabinet von 6,000 Stück Mineralien, Erzen, Drusen, Kräuter- und Fisch-Schiefern, auch andern Petrifaktis*.

[LASKEY] (1808) *A Catalogue of a small, genuine Collection of Natural History, principally collected among the British Isles; consisting of Minerals, Shells, Fossils, Some British and other Antiquities, Old China, Glass, And a few Articles of Jewellery; the Property of A Gentleman* ["Capt. John Laskey" handwritten in], *Removing to the Country* . . . Friday, July 29, 1808. Squibb (auctioneer); London, 8 pp.

[LASSONE] ROMÉ de l'ISLE, J. B. L. (1783) *Catalogue raisonné du cabinet de M. de Lassone, de l'Academie Royale des Sciences, & premier Médecin de la Reine, à Versaille*. (unpublished manuscript)

[LAWRENCE] (1762) *A Catalogue of the Genuine and Entire Collection of Curious Silver and Copper Coins and Medals (chiefly English), Likewise the Shells and other Curiosities* [including minerals], *of Mr. Andrew Lawrence, of Pallmall, Apothecary, Lately Deceas'd; Which (by Order of the Executrix) Will be Sold by Auction . . . on Wednesday the 7th and Thursday the 8th of this Instant April 1762*. Mr. Langford, auctioneer; London, 12 pp.

[LEERS] MEUSCHEN, F. C. (1767) *Catalogus Musei Leersiani of te . . . Catalogue systématique & raisonné ou Liste détaillée d'une très belle Collection de Coquillages & Crustacés, & autres Curiosités naturelles . . . Delaissés par feu Mr. Arnoud Leers en son vivent Seigneur d'Ameyde & Herlaar . . . Publié à Amsterdam le 20 Mai 1767*. Amsterdam; 8vo, 239 pp. with one copperplate engraving. Also: *Index Catalogi Musei Leersiani of te Aanwyzing der Pryzen, &c. Registre du Catalogue du Cabinet de Leers, ou Specification des Prix auxquels ont été vendus chaque Numero du Catalogue du Cabinet de Coquillages & autres Curiosités Naturelles . . . vendues publiquement à Amsterdam le 20 May 1767* . . . Herman de Wit & Pierre Holsteyn Libraires, Amsterdam; 8vo, 24 pp.

[LEERS] MEUSCHEN, F. C. (1767) *Systematische Catalogus van een uitmuntend Kabinet . . . Catalogue Systematique d'un magnifique Cabinet de très belles Coquillages & Crustacés parmi lesquelles il y en a d'extrêmenent rares, & d'autres gravées & sculptées avec art par Belckin; de Coraux; Plantes Marines; Animaux Terrestres, & Aquatiques; de Pierres de Porc de Malacca, & de Bezoars . . . de superbement figurées Dendrites, Agates & Pierres precieuses orientales; de Mineraux d'Or, d'Argent & Petrifications . . . Rassemblés pendant plusieurs Années avec un zéle infatigable, & delaissés par feu Mr. Arnoud Leers . . . Toutes lesquelles choses seront vendues Mecredi le 20 May 1767 à Amsterdam*. chez P. Holsteyn, Rotterdam; 8vo.

[LÉOFFROY DE SAINT-YVES] REGNAULT-DELALANDE, F. L. (1805) *Catalogue raisonné du Cabinet de feu Mr. Charles Léoffroy de Saint-Yves* . . . xiv. + 336 p., 8vo, F. L. Regnault & Silvestre, Paris.

[LEONHARD] (1814) Die oryktognostische Mineralien-Sammlung des Geheimenrathes Leonhard, von dem Besizzer beschrieben. [*Leonhard's] Taschenbuch für die gesammte Mineralogie*, **8**, 7–15.

[LESCHEVIN] ROMÉ de l'ISLE, J. B. L. (1783) *Description du cabinet de M. Leschevin, premier Commis de la Maison du Roi, à Versailles*. (unpublished manuscript)



Des Herrn

Nathanael Gottfried Leske

weil. ordentl. Profeſſor der Naturgeſchichte und Kameralwiſſenſchaften zu Marburg; der kaiſerlichen freien ökonomiſchen Geſellſchaft zu Petersburg; der Königl. - Schwediſchen patriotiſchen Geſellſchaft zu Stokholm; der Geſellſchaft ſittlich und landwirthſchaftlicher Wiſſenſchaften zu Burghauſen; der phyſiographiſchen Geſellſchaft zu Lund; des Muſée zu Paris, der Berliner Geſellſchaft Naturforſchender Freunde; der Frankfurter Geſellſchaft zum Nuzzen der Wiſſenſchaften und Künſte, der Leipziger ökonomiſchen, der oberlauſizziſchen der Wiſſenſchaften, und der Bienengeſellſchaft Mittgliede, auch der Königl. Geſellſchaft der Wiſſenſchaften zu Göttingen Korreſpondenten,

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MINERALIENKABINET

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auch mit vielen wiſſenſchaftlichen Anmerkungen und mehreren äuſſern Beſchreibungen der Foſſilien begleitet,

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Der Weltweisheit Doktor; der Naturforſchenden Geſellſchaft zu Halle ordentlichem, und der Leipziger Oekonomiſchen Societät auswärtigem Mittgliede.

Erſter Band.

Mit ill. Kupfern.

Leipzig,

im Verlage der I. G. Müllerſchen Buchhandlung.

1789.

LESKE

[LESKE] KARSTEN, D. L. G. (1789) *Museum Leskeanum quo ordine systematico disposuit atque descripsit D. L. Gustavus Karsten. Volume 2: Regnum minerale: Des Herrn Nathanael Gottfried Leske hinterlassenes Mineralienkabinet, systematisch geordnet und beschrieben, auch mit vielen wissenschaftlichen Anmerkungen, und mehreren äussern Beschreibungen der Fossilien begleitet von Dietrich Ludwig Gustaf Karsten*. Leipzig; large 8vo, 2 vols., 578 p. and 280 p., with plates.

[LESKE] KARSTEN, D. L. G. (1798) *A Description of the Minerals in the Leskean Museum.* Translated by G. Mitchel, 2 vols., London; 8vo.

[LEVER] DONOVAN, E. (1806) *Catalogue of the Leverian Museum.* Octavo, London. [Sale catalog.]

[LEYSSER] (1806) *Fr. Wilh. von Leysser's Verzeichniss der von ihm gesammelten Mineralien, mit mineralogischen Bemerkungen. 1. Theil, die Erd- und Steinarten enthaltend.* Halle; 8vo. [Freiesleben (1828) says this was the collection of the late Kriegsrath von Leysser of Halle.]

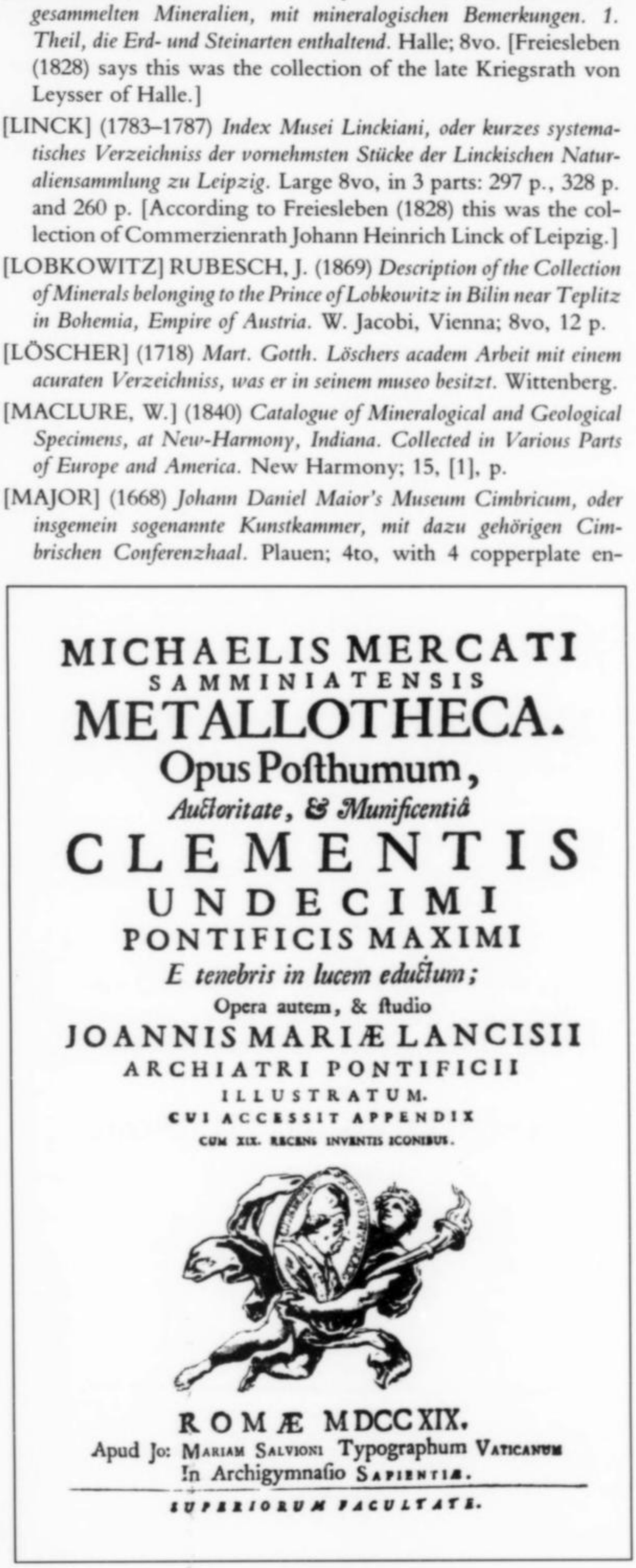
[LINCK] (1783–1787) *Index Musei Linckiani, oder kurzes systematisches Verzeichniss der vornehmsten Stücke der Linckischen Naturaliensammlung zu Leipzig.* Large 8vo, in 3 parts: 297 p., 328 p. and 260 p. [According to Freiesleben (1828) this was the collection of Commerzienrath Johann Heinrich Linck of Leipzig.]

[LOBKOWITZ] RUBESCH, J. (1869) *Description of the Collection of Minerals belonging to the Prince of Lobkowitz in Bilin near Teplitz in Bohemia, Empire of Austria.* W. Jacobi, Vienna; 8vo, 12 p.

[LÖSCHER] (1718) *Mart. Gotth. Löschers academ Arbeit mit einem acuraten Verzeichniss, was er in seinem museo besitzt.* Wittenberg.

[MACLURE, W.] (1840) *Catalogue of Mineralogical and Geological Specimens, at New-Harmony, Indiana. Collected in Various Parts of Europe and America.* New Harmony; 15, [1], p.

[MAJOR] (1668) *Johann Daniel Maior's Museum Cimbricum, oder insgemein sogenannte Kunstkammer, mit dazu gehörigen Cimbrischen Conferenzhaal.* Plauen; 4to, with 4 copperplate engravings. A later edition, *kurzer Vorbericht betreffend Joh. Dan. Maior's Museum Cibribum oder insgemein sogenannte Kunstkammer,* was published in 1688 in Plauen; 4to with plates.



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E tenebris in lucem eductum;
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ARCHIATRI PONTIFICII
ILLUSTRATUM.
CUI ACCESSIT APPENDIX
CUM XIX. RECENS INVENTIS ICONIBUS.

ROMÆ MDCCXIX.
Apud Jo: Mariam Salvioni Typographum Vaticanum
In Archigymnasio Sapientiæ.

SUPERIORUM FACULTATE.

MERCATI



LITHOPHYLACIUM
MITISIANUM,

DISSERTATIONE PRAEUIA,
ET
OBSERUATIONIBUS PERPETUIS
PHYSICO MINERALOGICIS
EXPLICATUM
A
FRANCISCO GÜSSMANN.

VIENNÆ,
Typis Iosephi Nobilis de Kurzbeck.
1785.

MITIS

[MANNSBERG] (1762) *Von Mannsberg's Verzeichniss von vielerley Naturalien, oder auserlesene Sammlung von Versteinerungen, Seemuscheln, Schnekken, Meergewächsen, Erzten, Drusen, etc.* Braunschweig; 8vo.

[MARIA THERESA] (1771) *Versuch einer Beschreibung der kaiserl. königl. Schatzkammer zu Wien.* Nürnberg; 8vo.

[MARIA THERESA] (1782) *Eintheilung der kaiserl. königl. Naturaliensammlung zu Wien.* Vienna; 8vo.

[MARTINI] (1774) *D. Friedrich Wilhelm Heinrich Martini's Verzeichniss einer auserlesenen Sammlung von Naturalien und Kunstsachen, auch physikalischen Instrumenten, nebst einer systematischen Tabelle und Erklärung von dessen Konkylienkabinette.* Berlin; 8vo, 152 p. and 1 table.

[MEGERLE, J. C.] (1799, 1800) *Systematisches mit äussern und chemischen Kennzeichen erläutertes Mineralien Verzeichniss. Erster Theil. Diamant, Erden und Steine* (1799). *Zweyter Theil. Salze, verbrennliche Mineralien, Quicksilber und Metalle* (1800). Two manuscript vols., folio, 372 p. and 463 p.

[MERCATI] (1717) *Metallotheca [Vaticana]. Opus Posthumum. Auctoritate et Munificentia Clementis Undecimi P.M. e tenebris in lucem*

eductum: Opera autem et studio Ioannis Lancisii Archiatri Pontificii illustratum. Rome. [Appendix published 1719.]

[MEYBACH] (1780) *Catalogus verschiedener Sachen, als unter andern Erzstuffen . . . welche 1780 zu Freyberg in dem Meybachischen Hause an die Meistbietenden verkauft werden sollen.* 8vo. [Freiesleben (1828) says the owner of this collection was a Bergcommissionrath in Freiberg, and that the catalog consists of 640 well arranged numbered specimens accompanied by interesting notes.]

[MITCHILL] (1826) *Catalogue of the Organic Remains and Other Geological and Mineralogical Articles Contained in the Collection Presented to the New York Lyceum of Natural History . . .* New York.

[MITIS] GÜSSMANN, F. (1785) *Lithophylacium Mitisianum. Dissertatione praevia et observationibus perpetuis physico mineralogicis explicatum a Francisco Güssmann.* J. N. von Kurzbeck, Vienna; large 8vo, [iv], 632, [4] p., 1 engraved plate.

[MONNET] (1772) *Catalogue raisonné pour un cabinet de minéralogie, ou introduction à cette science, propre pour diriger dans l'arrangement d'un pareil cabinet.*

[MORRIS] (1780) *A Catalogue of the valuable and well chosen Collection of Silver and Copper Coins, Shells, Fossils* [including minerals], *Pieces of Rock-work, Corals, Stones, and many other Articles, in fine Preservation. Late the Property of Richard Morris, Esq; Deceased, (Late of the Tower), Together with a Mahogany Nest of 45 Drawers and a small Cabinet. Which will be Sold by Auction . . . on Thursday the 6th of April, 1780.* Samuel Burton, auctioneer; London, 7 pp.

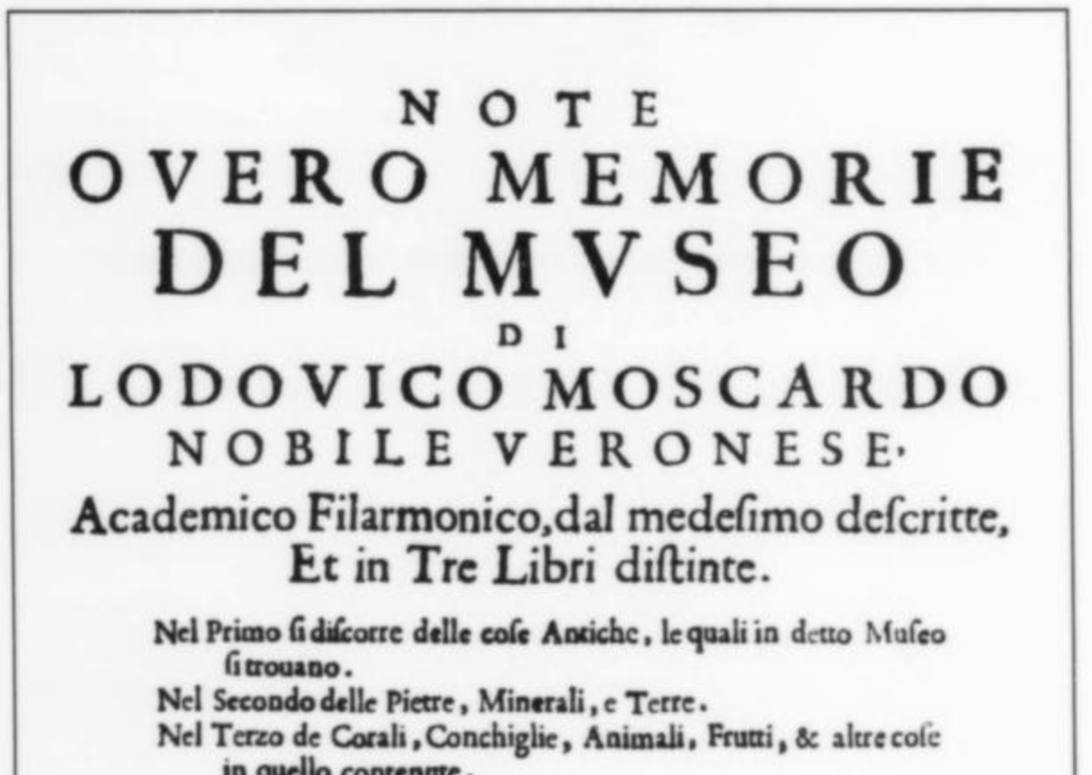
[MOSCARDO] (1656) *Note overo memorie del Museo di Lodovico Moscardo nobile veronese.* Padua; folio, with plates. There was also a Verona edition, folio, with plates, in 1672, 286 p.

[MOVER] SCHULZE, E. C. (1770) *Beschreibung verschiedener Seltenheiten der Natur, der Kunst und des Alterthums, welche in dem Moverschen Kabinet zu Hamburg einige Betrachtung verdienen, herausgegeben von einem Freunde de Naturhistorie.* Hamburg; large 8vo, 214 p. and 1 copperplate engraving.

[MÜLLER] (1778) *Verzeichniss einer zahlreichen und auserlesenen Sammlung von Naturalien, besonders von Conchylien und andern Seeproducten, Erd- Stein- und Ertzarten, auch Versteinerungen, dann einigen Artefactis und Schreinerzeug, die bey der Hochfürstl. Friedrichs-Alexanders Universität den 26 Oct. 1778 . . . verkauft werden sollen.* Erlangen; 8vo, 86 pp.

[MUNCHHAUSEN] WOLTEREK, C. (1724) *Christ. Wolterek's Munchhausisches Steinkabinet.* Wolfenbüttel; 8vo.

[MYLIUS] (1716) *Gottlieb Friedrich Mylii, Museum seu Catalogus rerum naturalium & fossilium tam exoticorum quam domesticorum, lat. & germ.* (German title:) *Gottlieb Friedrich Mylii Cabinet, oder kurtze Beschreibung Aller Natürlicher und aus der Erden sowohl frembder als absonderlich im Sachsenlande gefundener Sachen, wie er sie durch grose Mühe colligiret und von ihm selbsten in diese consignation gebracht worden und durch Auction Ostermesse 1716.*



NOTE
OVERO MEMORIE
DEL MVSEO
DI
LODOVICO MOSCARDO
NOBILE VERONESE.
Academico Filarmonico, dal medesimo descritte,
Et in Tre Libri distinte.

Nel Primo si discorre delle cose Antiche, le quali in detto Museo si trouano.
Nel Secondo delle Pietre, Minerali, e Terre.
Nel Terzo de Corali, Conchiglie, Animali, Frutti, & altre cose in quello contenute.

CONSACRATE
ALL' ALTEZZA SERENISSIMA
DI FRANCESCO DVCA
DI MODENA, E REGGIO.

IN PADOA, MDCLVI.

Per Paolo Frambotto. Con Licenza de' Superiori.

MOSCARDO



DES HERRN

JAC. FRIED. VON DER NULL

MINERALIEN-KABINET,

nach
einem, durchaus auf
äufsere Kennzeichen gegründeten Syfteme
geordnet, befchrieben,
und
durch Hinzuthuung vieler, dem gegenwärtigen Zuftande der Mineralogie angemefsener, erläuternder Anmerkungen und nöthiger Berichtigungen,
als
HANDBUCH DER ORYCTOGNOSIE
brauchbar gemacht
von
F. Mohs.

Erfte Abtheilung.

Wien.
Auf Koften des Befitzers, und in Commifsion
der Camesinaifchen Buchhandlung.

1804.

NÜLL

feil gebothen werden sollen. Leipzig; 8vo.

[NAUMANN] (1780) *Systematischer Auszug aus dem Katalog einer zu Freyberg zum Verkauf stehenden Mineraliensammlung.* Freiberg. [Freiesleben (1828) says this was the catalog of Bergcommissionrath Dr. Naumann, and that it was written by A. G. Werner himself, or under his direction.]

[NEUMANN] (1767) *Verzeichniss einer sehr seltnen Sammlung von Kunst- und Natur-Sachen, welche 1767 in Berlin verauctionirt werden sollen.* Berlin; 136 p.?

[NICOLAI] WARLITZEN, C. (1702) *Museum curiosum, oder Beschreibung derer ausländischen Sachsen, so bey Christ. Nicolai zu befinden, untersucht und erlautert von Christian Warlitzen.* Wittenberg; 4to. Another catalog, *Museum curiosum auctum, oder neue verbesserte Beschreibung . . .* was published in 1710, in Wittenberg; 4to, 56 p.

[NÜLL] MOHS, F. (1804) *Des Hrn. J. F. von der Nüll Mineralienkabinett, nach einem durchaus auf äussere Kennzeichen gegründeten Systeme geordnet; beschrieben und durch Hinzuthuung vieler dem gegenwärtigen Zustande der Mineralogie angemessener, erläuternder Anmerkungen und nöthiger Berichtigungen als Handbuch der Oryktognosie brauchbar gemacht von F. Mohs.* Vienna; 3 vols., large 8vo.

Ausführliches und sistematisches

Verzeichnis

des

Mineralien-Kabinets

des

weiland kurfürstlich sächsischen Berghauptmans

Herrn

Karl Eugen Pabst von Ohain,

der Leipziger und St. Petersburger ökonomischen Gesellschaft Mitgliede, und der königlich sardinischen Gesellschaft der Wissenschaften zu Turin Korrespondenten,

herausgegeben

von

A. G. Werner.

Erster Band.

Freiberg und Annaberg,
in der Crazischen Buchhandlung,
1791.

PABST VON OHAIN

DISCOVRS AD-

MIRABLES, DE LA NA-

TVRE DES EAVX ET FONTEINES, TANT NATVRELLES QV'ARtificielles, des metaux, des ſels & ſalines, des pierres, des terres, du feu & des emaux.

AVEC PLVSIEVRS AVTRES EXCELlens ſecrets des choſes naturelles.

PLVS VN TRAITE' DE LA MARNE, FORT vtile & neceſſaire, pour ceux qui ſe mellent de l'agriculture.

LE TOVT DRESSE' PAR DIALOGVES, ESquels ſont introduits la theorique & la practique.

Par M. BERNARD PALISSY, *inuenteur des ruſtiques figulines du Roy, & de la Royne ſa mere.*

A TRESHAVT, ET TRESPVISSANT ſieur le ſire Anthoine de Ponts, Cheualier des ordres du Roy, Capitaine des cents gentils-hommes, & conſeiller treſfidele de ſa maieſté.

A PARIS,
Chez Martin le Ieune, à l'enſeigne du Serpent, deuant le college de Cambray.
1580.
AVEC PRIVILEGE DV ROY.

PALISSY

[NYEVELT] (1773) *Systematisch beredeneerde Naamlyst van en uitmuntende Verzaameling van Voorwerpen uit de drie Ryken de Natuur: ou Catalogue systematique & raisonnée d'une superbe Collection d'objets des trois regnes de la Nature.* Amsterdam; 8vo.

[NYEVELT] MEUSCHEN, C. F. (1773) *Catalogus Musei N(yveltiani); Catalogue systematique &c., le tout rassembé avec beaucoup d'intelligence par Mr. v. Z. v. N., rangé presque entiérement suivant les Systêmes de Linné, Wallerius &c.* Amsterdam; 8vo, 410 p.

[OLEARIUS] BRUCKMANN, F. E. (1750) *Franc. Ernst Bruckmann's Verzeichniss der vornehmsten Stücke, welche in dem nunmehr zertheilten Curiositäten= und Naturalien=Kabinet Joh. Christ. Olearii befindlich gewesen sind.* Jena; 4to.

[ORLOV] SEVERGIN, V. M., and ATTEROM, K. A. (1815) [New Systematic Description of the Mineralogical Cabinet of the Imperial Free Economic Society] (*In Russian*).

[ORTMANN] (1793) *Verzeichniss verscheidener Mobilien und Mineralien, welche ans des zu Freyberg verstorbenen Hrn. Amalgamirmstr. Ortmanns Nachlasse 1793 an die Meistbietenden überlassen werden sollen.*

[PABST von OHAIN] WERNER, A. G. (1791–1792) *Ausführliches und systematisches Verzeichnis des Mineralien-kabinets des weiland kurfürstlich Sächsischen Berghauptmans Herrn Karl Eugen Pabst von Ohain.* Freiberg and Annaberg; 2 vols. large 8vo, 368 p. and 286 p.

[PALISSY] (1580) *Discours Admirables, de la nature des eaux et fon-*

teines, tant naturelles qu'artificielles, des metaux, des sels et salines, des pierres, des terres, du feu et des esmaux . . . Chez Martin le Jeune, Paris; 399 p.

[PARLBY] (1803) *A Catalogue of the genuine Collection of Minerals, Shells, Corals, And other Curious Articles of Natural History, some singular works of Art, &c. of the Rev. S. Parlby, of Stoke, near Nayland, Suffolk, (lately Deceased.) . . . Which will be sold by Auction . . . August 22, 1803 and five following Days.* King (auctioneer); London, 4to, 64 p.

[PASQUAY] (1777) *Verzeichniss einer sehr schönen, aus mehr als neun tausend Stücken bestehenden Naturalien-Sammlung aus den drey Reichen der Natur, welche von weyland S. T. Herrn Peter Pasquay . . . zu Frankfurt am Mayn, mit vielem Fleiss gesammlet, und jetzo den Liebhabern unzertheilt zum Verkauf angeboten wird . . . .* Frankfurt; 8vo, 496 pp.

A

CATALOGUE

OF THE

PORTLAND MUSEUM,

LATELY THE PROPERTY OF

The Duchefs Dowager *of* Portland,

DECEASED:

Which will be SOLD by AUCTION,

BY

Mr. SKINNER *and* Co.

On MONDAY the 24th of APRIL, 1786,

AND THE

THIRTY-SEVEN following DAYS,

At TWELVE O'CLOCK,

Sundays, and the 5th of June, (the Day his Majesty's Birth-Day is kept) excepted;

At her late DWELLING-HOUSE,

In *PRIVY-GARDEN, WHITEHALL;*

By ORDER of the ACTING EXECUTRIX.

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N°1091

PORTLAND

[PASQUAY] (1777) *Catalogue d'une très belle collection d'objets de trois Regnes de la Nature, contenant passé neuf mille pieces recueillis avec beaucoup de soins par feu M. Pierre Pasquay . . . à Francfort sur le Mein, & qu'on offre à vendre ensemble, sans partage, aux amateurs . . .* Frankfort; 8vo, 496 p.

[PAULLINI] (1717) *Anton Paullini curieuses Kabinet ausländischen und anderer Merkwürdigkeiten.* Frankfurt and Leipzig; 8vo.

[PETER the Great] GMELIN, E., and LOMONOSOV, M. V. (1745) *Catalogus Minerarum.*

[PETIVER] (1695–1703) *Musei Petiveriani centuria prima rariora naturae continentes, videlicet animalia, fossilia, plantas, ex variis mundi plagis advecta, ordine digesta, et nominibus propriis signata a Jacob Petiver.* London; 8vo, with copperplate engravings. Centuriae I (1695), II–III (1698), IV–VII (1699), VIII (1700), IX–X (1703).

[PETIVER] (1702) *Jacobi Petiver, Gazophylacium naturae & artis, decades X, in quibus animalia, vegetabilia, fossilia, corpora marina, descriptionibus & iconibus illustrantur.* London; folio, with 102 copperplate engravings. There was also a London folio edition of 1709, and a 4to index volume dated 1706.

[PHILLIPS] (1829) *Catalogue of Minerals, Collection of W. Phillips, 1829.* Liverpool Museum.

[PORTLAND] LIGHTFOOT, J. (1786) *A Catalogue of the Portland Museum, lately the property of the Duchess Dowager of Portland, deceased, which will be sold by Auction . . . the 24th of April, 1786, and the thirty-seven following days, &c.* London; quarto, viii + 194 p. [Horace Walpole attended the auction and wrote a description of the collection on a sheet bound into his copy of the auction catalog. This description was published in 1936 as *The Duchess of Portland's Museum by Horace Walpole*, with an introduction by W. S. Lewis (New York).]

[PORTZ] (1754) *Catalogus van een Uytmuntent en Overheerlyk Cabinet van Petrificata, off versteende Zaaken Uyt alla Gewesten des Waerelds. Mitsgaders een dito Versameling van Mineralen als Goud, Zilver, &c. Nevens diverse soorten van Kostbaare Rariteyten, als eedele Gestentens, Agaaten, &c. alles met veel moeyten en kosten*

CATALOGUE

METHODIQUE ET RAISONNÉ

DE LA

COLLECTION DES FOSSILES

DE

MLLE. ELEONORE DE RAAB.

PAR M^R. DE BORN.

TOME PREMIER.



I. Adam fr.

A VIENNE

Aux Dépens de J. V. Degen, par I. Alberti 1790.

RAAB

by een versamelt en nagelaaten by wylen der Heer Collonel J. D. V. Portz, al het welke verkogt zal werden op 18 Maart 1754. Amsterdam; 8vo, 63 pp.

[PÖTZSCH] GERLACH, J. H. S. (1805) *Ch. G. Potzsch kurze Beschreibung des Naturalienkabinets in Dresden.* Dresden; 8vo, one engraved plate.

[PÖTZSCH] GERLACH, J. H. S. (1811) *Ch. G. Potzsch Beschreibung des Churf. Naturalienkabinets in Dresden . . . mit kurzen Nachrichten von einigen Privatsammlungen.* Dresden.

[PSILANDERHJELM] (1755) *N. Psilanderhjelm tal am mineralsamlingar.* Stockholm; 8vo.

[RAAB] BORN, I. (1790) *Catalogue méthodique & raisonné de la Collection des Fossiles de Mlle. Eleanore de Raab (par Mr. Ignaz de Born).* Vienna; 8vo, 2 vols., 500 p. and 499 p. [Only 70 copies printed.]

[RAAB] GALLITZIN, G. (1797) *Lettre à Mr. de Crell, ou observations sur le Catalogue méthodique & raisonné de la Collection des Fossiles de Mlle. de Raab par Mr. de Born, par le Prince Dimitri de Gallitzin.* Brunswick; 8vo, 62 p.

[RACKSTROW] (1794) *A descriptive Catalogue of Rackstrow's Museum, consisting of a large and very valuable Collection of most curious Anatomical Figures and real Preparations; also figures resembling life, with a capital Collection of Natural and Artificiai Curiosities.* London; 8vo. [Murray (1904) says there were also editions of 1780, 1782, 1787 and others later.]

[RACKSTROW] (1799) *A Catalogue of the Natural and Artificial Curiosities of Rackstrow's Museum, Which will be Sold by Auction . . . on Monday, April 29, 1799, and two following days.* King (auctioneer); London, 4to, 8 p.

[RANGO] (1697) *Conr. Tiburtius Rango, der Rangonischen Naturalienkammer Schönbergisches Cabinet, darinnen 336 Stück meist Meissnische Mineralien und Steine zu sehen.* Greifswalde; folio.

[RASHLEIGH] (1797, 1802) *Specimens of British Minerals Selected from the Cabinet of Philip Rashleigh.* London; 2 vols., 56 p. and 33 plates, 24 p. and 21 plates.

A

CATALOGUE

OF THE

Natural and Artificial Curiosities

OF

RACKSTROW's MUSEUM.

Which will be Sold by Auction,

By Mr. K I N G,

ON THE PREMISES,

No. 197, FLEET-STREET,

On MONDAY, APRIL 29, 1799,

And Two following Days,

At TWELVE o'Clock.

To be Viewed by Tickets at One Shilling, during the Week preceding the Sale, and Catalogues then had on the Premises.

RACKSTROW

SPECIMENS

OF

BRITISH MINERALS,

SELECTED FROM

THE CABINET

OF

PHILIP RASHLEIGH,

OF MENABILLY, IN THE COUNTY OF CORNWALL, ESQ. M.P. F.R.S. AND F.A.S.

WITH

GENERAL DESCRIPTIONS OF EACH ARTICLE.

LONDON:

PRINTED BY W. BULMER AND CO.

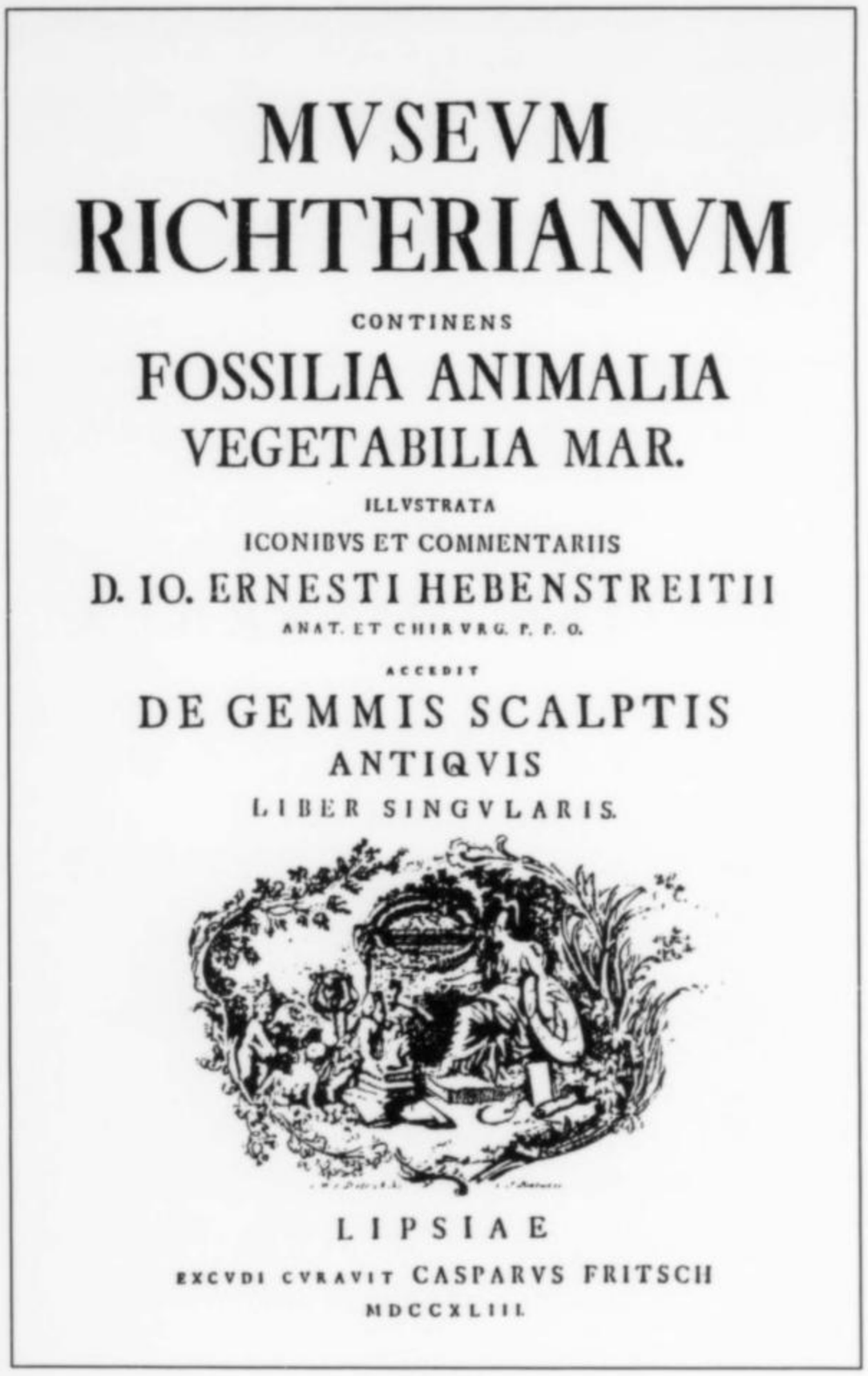
AND SOLD BY G. NICOL, BOOKSELLER TO HIS MAJESTY, PALL-MALL, AND MESSRS. WHITE, BOOKSELLERS, FLEET-STREET.

1797.

RASHLEIGH

[RATZEL] (no date, ca. 1700) *Catalogus, oder eine in ordentlichen Classen abgetheilte Specification vieler aus dem Regno Animali, Vegetabili und Minerali, raren Colligirten Natural- auch einiger Artificial-Cabinet-Stücke alle mit grosser Mühe und Kosten von Japonia, China, Ceram, Amboina, Banda, Timor, Macassar, Java majore & minore und vielen andern alda herumliegenden Inseln in einer 12. Jährigen Zeit in Asien mit allen Fleiss colligiret und nun zum andernmahl, wegen gantzlichen Abgang der Exemplarien, auf Verlangen guter Gönner und Freunde aufgelegt von Johann Conrad Rätzeln.* Halberstadt; 8vo, 46 pp.

[REMPF] (1791) *Verzeichniss einer Naturalien Sammlung bestehend in Marmorplatten, Florentiner Ruinen-Marmor, Jaspissen und versteinertem Holz in Jaspis, Egyptischen Steinen, Achaten, Chalcedoniern, Chroysoprasern, Puddingsteinen, Quarzen, Crystallen, Amethysten, Carneolen, Fischschiefern, Serpentinsteinen, Zeo-*


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RICHTER

lithen, Graniten, Drusen und einigen Erzstufen, Versteinerungen allerley Arten, Bernstein, oriental- und occidentalischen Bezoarsteinen u.s.w. welche den 4. Aprill 1791. Nachmittags um 2 Uhr und folgende Tage, durch den Konigl. Auctions-Commissarius Prillwitz, im Hause des Drechslermeisters Herrn Rempf, in der Edlerstrasse neben Rolletshof gegen gleich baare Bezahlung in Courant verauctioniret werden sollen. [Berlin] 8vo, ii + 60 p. [773 lots]

[REYMANN] (1784) *Verzeichniss des Naturalienkabinetts, welches sich bei Hrn. Fr. Reymann in Wien befindet.* Vienna; 8vo.

[RICHTER] (1719) *Georg. Gottfr. Richter, Gazophylacium mineralium, oder Mineralkabinet.* Leipzig; 8vo. An 8vo edition, *Catalogus rerum mineralium et metallicarum*, was also published in 1719 in Freiberg; 8vo.

[RICHTER] (1782) *Verzeichniss von Büchern, Landkarten, ingleichen Mineralien, Conchylien und Versteinerungen, welche von dem verstorbenen Cammerrath Joh. Thomas Richter gesammelt worden sind, und 1783 verauctionirt werden sollen, durch Ch. F. Heckt.* Leipzig; 8vo, 307 p.

[RICHTER] (1784) *Verzeichniss von allerhand Silberwerk . . . Markscheider-Instrumenten auch Erzstuffen, welche von dem Churfürstlich Sächsische Bergamte zu Freyberg 1784 an die Meistbietenden überlassen werden sollen.* 8vo, 24 p. [According to Freiesleben (1828) this catalog describes the family collection of the Richters, who were Bergamts-Assessors and Markscheiders.]

[RICHTER] HEBENSTREIT, J. E. (1743) *Museum Richterianum, continens fossilia, animalia, vegetabilia marina, illustrata iconibus & commentariis D. Jo. Ernest. Hebenstreiti, acc. de Gemmis scalptis antiquis liber singularis.* Leipzig; folio, with 20 plates.

[RICHTER, C.] (1732) *Saxoniae Electoralis Miraculosa Terra, oder des weltberühmten Chur-Sachsen-Landes bewunders-würdige Erde . . .* J. E. Schultz, Schneeberg; 4to, 74 p. with 61 hand-colored engraved plates.

[ROBINSON] (1829) *Descriptive Catalog of a Collection of Rare Minerals, Proper for the Study of Crystallography, recently arranged after Phillips; with localities and references for the figures of crystals to his third edition. This collection can be obtained at private sale on application to who will exhibit specimens.* G. H. Carvill, New York; 8vo, 49 p. [Attributed to Samuel Robinson for the sale of his personal collection; preface dated 1827, the year of his death.]

[ROBSON] (1807) *A Catalogue of the Valuable Museum of Natural and Artificial Curiosities, collected by the late Col. Robson, Fellow of the Antiquarian Society, and many Years Lieutenant-Governor of St. Helena, a Station that afforded many Opportunities of acquiring choice Articles of Vertu; Comprising a select Assemblage of Natural History, in scarce and fine Shells, from the East Indies, and other Parts of the World; particularly the Venteltrap, the Weaver's Shuttle, the Orange Flag, the High Admiral, &c.; rare Fossils and Minerals; Oriental Idols in Bronze . . .; Antiquities . . .; Various Specimens of Art, from the South-Sea Islands; Implements of War; a Cabinet of Coins and Medals; Books, Prints, and Two Missals on Vellum, beautifully illuminated; Also a Town Coach and a Gold Watch, &c.; Which (by Order of the Executrix) will be sold by Auction . . . on Monday, April 13, 1807, and Two Following Days.* Mr. Abbott, auctioneer; London, 25 pp.

[RÖDER] (1817) *Verzeichniss einer Mineralien-Sammlung, welche den Meistbietenden a. l. zugeschlagen werden sollen, durch W. F. Ziesemer.* Dresden; 8vo, 48 p. [According to Freiesleben (1828) this was the collection of Herrn Grafen von Röder of Königsbruck, and the duplicate specimens are from a very old, large collection.]

[RÖDER] (1820) *Auctions-Verzeichniss einer sehr gut gehaltenen Mineralien-Sammlung . . . welche 1820 zu Dresden den Meistbietenden a. l. überlassen werden sollen, durch C. E. Heinrich.* Dresden; 8vo, 123 p. [According to Freiesleben (1828) this auction catalog includes minerals from the collections of Hofrath Dr. Treutler, Gräflich Röder, and Ross.]

[ROMÉ de l'ISLE] (1773) *Description methodique d'une collection de Mineraux du Cabinet de M. D. R. D. L. par Mr. Romé de l'Isle.* Paris; 8vo.

[ROSS] (1820) *Auctions-Verzeichniss einer sehr gut gehaltenen Mineralien-Sammlung . . . welche 1820 zu Dresden den Meistbietenden a. l. überlassen werden sollen, durch C. E. Heinrich.* Dresden; 8vo, 123 p. [According to Freiesleben (1828) this auction catalog includes minerals from the collections of Hofrath Dr. Treutler, Gräflich Röder, and Ross.]

[RUDOLPH II] BAUER, R., and HAUPT, H. (eds.) (1976) Das Kunstkammerinventar Kaiser Rudolfs II, 1607–11. *Jahrbuch der Kunsthistorischen Sammlungen in Wien*, **72**.

[RUMPH] (1705) *D'Amboinische Rariteitkammer, behelzende eene beschryvinge van allerhand zoo weeke als harde Schaalvischen &c. daar beneven zommige mineralien, gesteenten, en soorten van aarde &c., verteelt in drie Boeken.* Amsterdam; folio, with 60 copperplate engravings. Second edition: Amsterdam, 1741.

[RUMPH] (1711) *Georg. Eberh. Rumphii, Thesaurus piscium, testaceorum & cochlearum, quibus accedunt conchylia, mineralia, metalla, lapides, variis in locis reperta.* Leiden; folio with plates.

[RUYSCH] (1731) *Frider. Ruyschii, Museum s. permagnae eiusdem elegantissimae collectionis Catalogus, constans praeparatis anatomicis,*

animalibus, plantis, rebus naturalibus variis. Amsterdam; 4to.

[SAGE] (1784) *Description méthodique du Cabinet de l'école Royal des Mines.* Paris; 8 vo, xvi + 487 + xi pages.

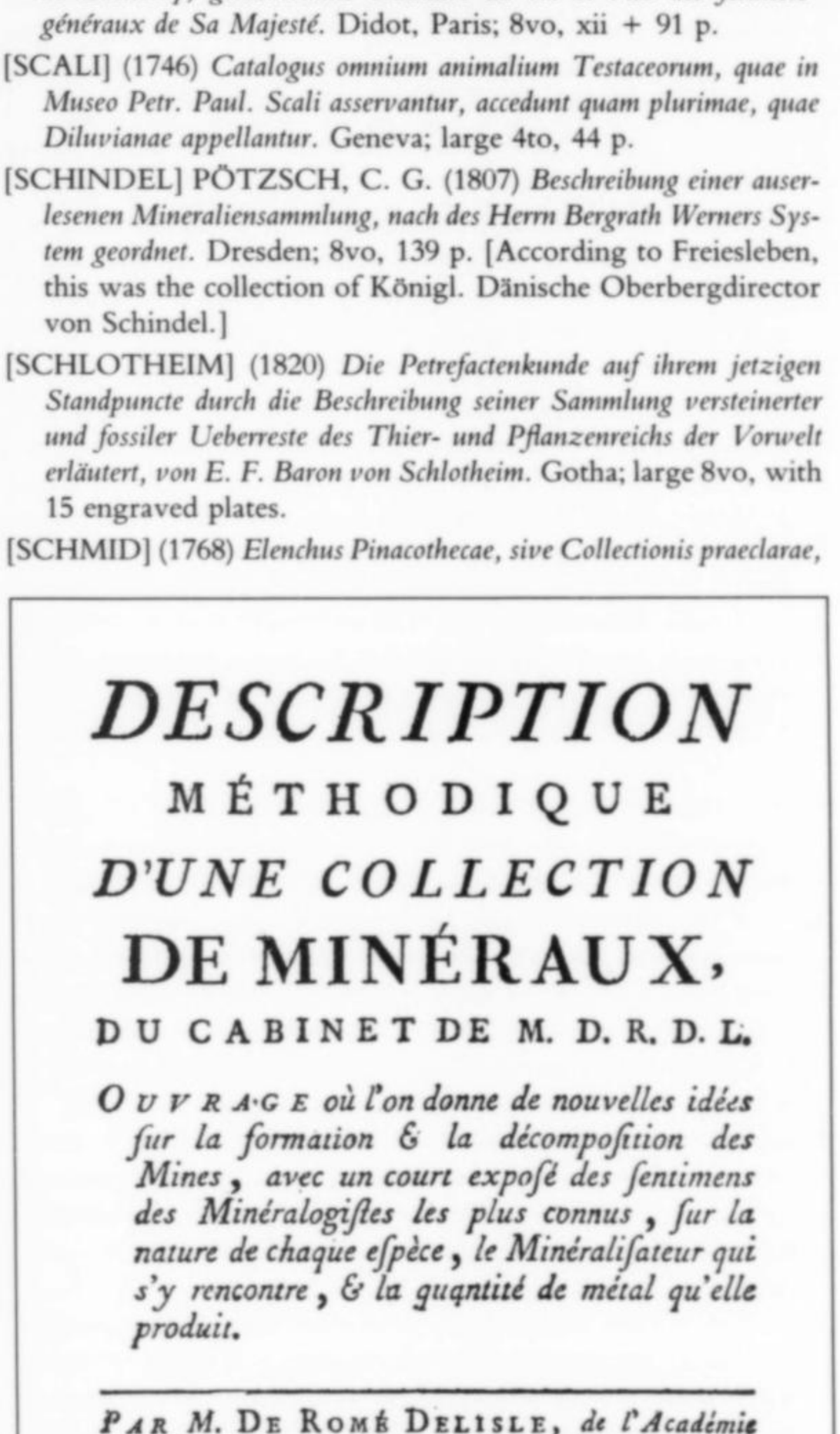
[SAVALETE de BUCHELAY] REMY, P. (1764) *Catalogue raisonné de minéraux, cristallisations, cailloux, jaspes, agates arborisées, pierres fines . . . et aitres effets curieux de la succession de M. Savalete de Buchelay, gentilhomme ordinaire du roi et l'un des fermiers-généraux de Sa Majesté.* Didot, Paris; 8vo, xii + 91 p.

[SCALI] (1746) *Catalogus omnium animalium Testaceorum, quae in Museo Petr. Paul. Scali asservantur, accedunt quam plurimae, quae Diluvianae appellantur.* Geneva; large 4to, 44 p.

[SCHINDEL] PÖTZSCH, C. G. (1807) *Beschreibung einer auserlesenen Mineraliensammlung, nach des Herrn Bergrath Werners System geordnet.* Dresden; 8vo, 139 p. [According to Freiesleben, this was the collection of Königl. Dänische Oberbergdirector von Schindel.]

[SCHLOTHEIM] (1820) *Die Petrefactenkunde auf ihrem jetzigen Standpuncte durch die Beschreibung seiner Sammlung versteinerter und fossiler Ueberreste des Thier- und Pflanzenreichs der Vorwelt erläutert, von E. F. Baron von Schlotheim.* Gotha; large 8vo, with 15 engraved plates.

[SCHMID] (1768) *Elenchus Pinacothecae, sive Collectionis praeclarae,*



DESCRIPTION

MÉTHODIQUE

D'UNE COLLECTION

DE MINÉRAUX,

DU CABINET DE M. D. R. D. L.

OUVRAGE où l'on donne de nouvelles idées sur la formation & la décomposition des Mines, avec un court exposé des sentimens des Minéralogistes les plus connus, sur la nature de chaque espèce, le Minéralisateur qui s'y rencontre, & la quantité de métal qu'elle produit.

PAR M. DE ROMÉ DELISLE, *de l'Académie Électorale des Sciences utiles de Mayence.*

A PARIS,

Chez { DIDOT jeune, Libraire, Quai des Augustins, près le Pont Saint-Michel. / KNAPEN, Libraire-Imprimeur, au bas de la Place du Pont Saint Michel.

M. DCC. LXXIII.

Avec Approbation & Privilége du Roi.

ROMÉ DE L'ISLE



D'AMBOINSCHE

RARITEITKAMER,

Behelzende eene BESCHRYVINGE van allerhande zoo weeke als harde

SCHAALVISSCHEN,

te weeten raare

KRABBEN, KREEFTEN,

en diergelyke Zeedieren,

als mede allerhande

HOORNTJES en SCHULPEN,

die men in d'Amboinsche Zee vindt:

Daar benevens zommige

MINERAALEN, GESTEENTEN,

en soorten van AARDE, die in d'Amboinsche, en zommige omleggende Eilanden gevonden worden.

Verdeelt in drie Boeken,

En met nodige PRINTVERBEELDINGEN, alle naar 't leven getekent, voorzien.

Beschreven door

GEORGIUS EVERHARDUS RUMPHIUS,

van Hanauw, Koopman en Raad in Amboina, mitsgaders Lid in d' *Academie Curieuse Natura*, in 't Duitsche Roomsche Ryk opgerecht, onder den naam van

PLINIUS INDICUS.

TAMSTERDAM,

Gedrukt by FRANÇOIS HALMA, Boekverkoper in Konstantijn den Grooten.

1705.

RUMPH

ex tribus Naturae Regnis, cum multis Artificiosis & diversis Curiosis, quae existit Augustae Vindel. Augsburg; 8vo, 96 pp.

[SCHMIDT] (1807) *Verzeichnis des Fossilienkabinets des verstorbenen Hrn. Oberbergmeister Schmid, welches in Freyberg 1807 verauctionirt werden soll.* Freiberg; 54 p.

[SCHNEIDER] (1792) *Verzeichniss von verschiedenen Pretiosis . . . auch Mineralien, welche zu Freyberg 1792 verauctionirt werden sollen.* [According to Freiesleben (1828), this is the catalog of Oberbergamtsverwalter Schneider; it lists 348 numbered entries.]

[SCHOEPFLIN] (1770) *Museum Schoepflini. Pars I: Museum lapidarium.* Strasbourg.

[SCHULZ] (1818) *Verzeichniss einer Mineralien-Sammlung, welche sowohl aus rohen, als angeschliffenen und brillantirten Stücken bestehet. Mit Sachkenntniss gesammelt von dem verstorbenen Dr. E. Ch. Schultz.* Hamburg; 8vo, 139 p.

[SCHYNVOET] POSTHUMUS, V. (1744) *Catalogus Musaei praestantissimi Fossilium omnis generis rarissimorum, inter quae eminent Glebae Mineraeque Auri, Argenti, Cupri, &c. omnivariae; Inprimis Lapidum pretiosorum ingens numerus ac multa varietas, Achatae, Dendrachatae, Jaspides, Lazuli, &c. tum & Petrefactorum rarissimorum speciosa collectio &c. &c. quae omnia magnis sumtibus, labore indefesso, multorum annorum decursu, collegit ac reliquit Celeberrimus Hist. Nat. Cultor Simon Schynvoet. Nunc autem integra ac illibata, imo aucta, possidet ex unica ejus Filia Gener Vincentius Posthumus, Proxeneta Amstelaedamensis. Naam-Lyst van het seer vitmuntend Kabinet.* Amsterdam; 8vo, 56 pp. with one engraved

plate. Sometimes bound together with (1744) *Catalogue d'un . . . cabinet . . . très fameux & très exellent*. Amsterdam.

[SEBA] (1734–1765) *Albert Sebae, Locupletissimi rerum naturalium thesauri accurata descriptio, & iconibus artificiosissimis expressio per universam physices historiam*. Amsterdam; large folio, 4 vols. with 449 color plates.

[SEBA] (1752) *Catalogus van de Uitmuntende Cabinetten, Met allerley soorten van ongemeene schoone Gepolyste Hoorns, Dublet-Schelpen, Coraal- en Zeegewassen, Benevens het zeldzame en vermaarde Cabinet van Gediertens in Flessen en Naturalia, en veele Raare Anatomische Preparata Van den Professor Ruysch: als mede een Verzameling van diverse Mineralen, Versteende Zaaken, Agaate Boomsteenen, Edele Gesteentens, En verscheide andere Rariteiten*. Huybert de Wit, Amsterdam.

CATALOGUS
Van de Uitmuntende
CABINETTEN,
Met allerley ſoorten van ongemeene
ſchoone Gepolyſte
HOORNS,
DUBLET-SCHELPEN,
CORAAL- en ZEEGEWASSEN;
Benevens het zeldzame en vermaarde
CABINET van
GEDIERTENS in FLESSEN
En
NATURALIA,
En veele RAARE
ANATOMISCHE PREPARATA
Van den Profeſſor RUYSCH:
Als mede een Verzameling van diverſe
MINERALEN
Verſteende Zaaken, Agaate Boomſteenen, Edele Geſteentens,
En verſcheide andere
RARITEITEN.
Met veel moeite en koſten in een reeks van
Jaaren vergadert.
En nagelaten door wylen den Heere
ALBERTUS SEBA,
Lid van de Keizerlyke Leopoldiſche Caroliniſche en Koningl. Engelſche Societeit der Wetenſchappen, als ook der Academie van Bolonië n.
Dewelke Verkogt zullen worden door de Makelaars *Th. Sluyſter, J. Schut* en *N. Blinkvliet*, op Vrydag den 14. April 1752. en volgende dagen, 's morgens ten 9, en 's namiddags ten 3 uuren, te Amſterdam, ten huize van HUYBERT de WIT, Caſtelyn in 't Oudezyds Heeren Logement.
Zullende alles des Woensdags voor de Verkooping van een ieder kunnen gezien werden.
De CATALOGUS is te bekomen by de voornoemde Makelaars.

SEBA

[SEGVELT] (1739) *Catalogus . . . Concharum . . . Plantarum submarinarum, Mineralium, Petrifactorum, aliarumque rerum naturalium quae continentur in tribus Thesauris*. Hague; 8vo. (a sale catalog)

[SETTALA] SCARABELLI, P. F. (1666) *Museo o Galeria &c; tradotti in Italiano dal Pietr. Franc. Scarabelli*. Tortona; 4to with plates.

[SETTALA] TERZAGI, P. M. (1664) *Museum Septalianum Manfredi Septalae Patritii Mediolanensis industrioso labore constructum; Pauli Mariae Terzagi Mediolanensis Physici collegiati geniali laconismo descriptum; Politioris literaturae Professoribus erudita humanitate adapertum: cum Logocentronibus, sive Centonibus eiusdem Terzagi de natura Crystalli, Coraly, Testaceorum Montanorum & Lapidificatorum, Achatis, Succini, Ambari, & Magnetis*. Dertonae; 4to, 324 pp. with plates.

[SEYBERT] (1806) A catalogue of some American minerals which are found in different parts of the United States. *The Philadelphia Medical Museum*, **5**, 152–159, 256–268. [Describes 40 mineral specimens from his personal collection.]

[SIBBALD] (1697) *Museum Sibbaldianum, sive Auctuarium Musei Balfouriani*. Edinburgh; 12mo.

[SLOANE] (1764) *Brittisches Museum, nebst der Beschreibung des berühmten Naturalien und Antiquitaeten Cabinets des Hrn. Ritters Hans Sloane, zum Unterricht derer welche solches mit Nutzen besehen wollen, aus dem Englischen nach der neuesten Ausgabe*. F. W. Birnstiel, Berlin; 8vo, 338 pp. with one title plate.

[SMITH] (1812) *A Catalogue of a few Jewels, viz. A Pair of Top and Drop Cluster Brilliant Ear-rings, a Cluster Diamond Ring, &c., also, small Sideboard of Plate. And the Collection of Valuable Coins & Medals, Greek, Roman and English, in Gold, Silver and Bronze, including several of great Rarity and Beauty. A few Antique Marble Busts, and articles of miscellaneous Antiquity and Natural History* [including minerals], *of Col. Mathew Smith, F.A.S., deceased, and brought from his late Residence in the Tower of London, Which by Order of the Administrator, will be Sold by Auction . . . on Wednesday, April the 29th, 1812*. Mr. Christie, auctioneer; London, 12 pp.

[SPADAM] (1739) *Catalogus Lapidum Veronensium, id est propria forma praeditorum, qui apud Joannem Jacobum Spadam . . . asservantur*. Dionysii Ramanzini, Verona; 4to, 31 pp.

[SPADAM] (1744) *Corporum Lapidefactorum agri Veronensis Catalogus quae apud Joan. Jacobum Spadam Gretianae Archipresbyterum asservantur. Editio altera multo auctior, cui accedunt Annotationes, & Marmorum quae in eodem agro reperiuntur Elenchus*. Dionysii Ramanzini, Verona; 4to, 80 pp. with 10 copperpiate engravings.

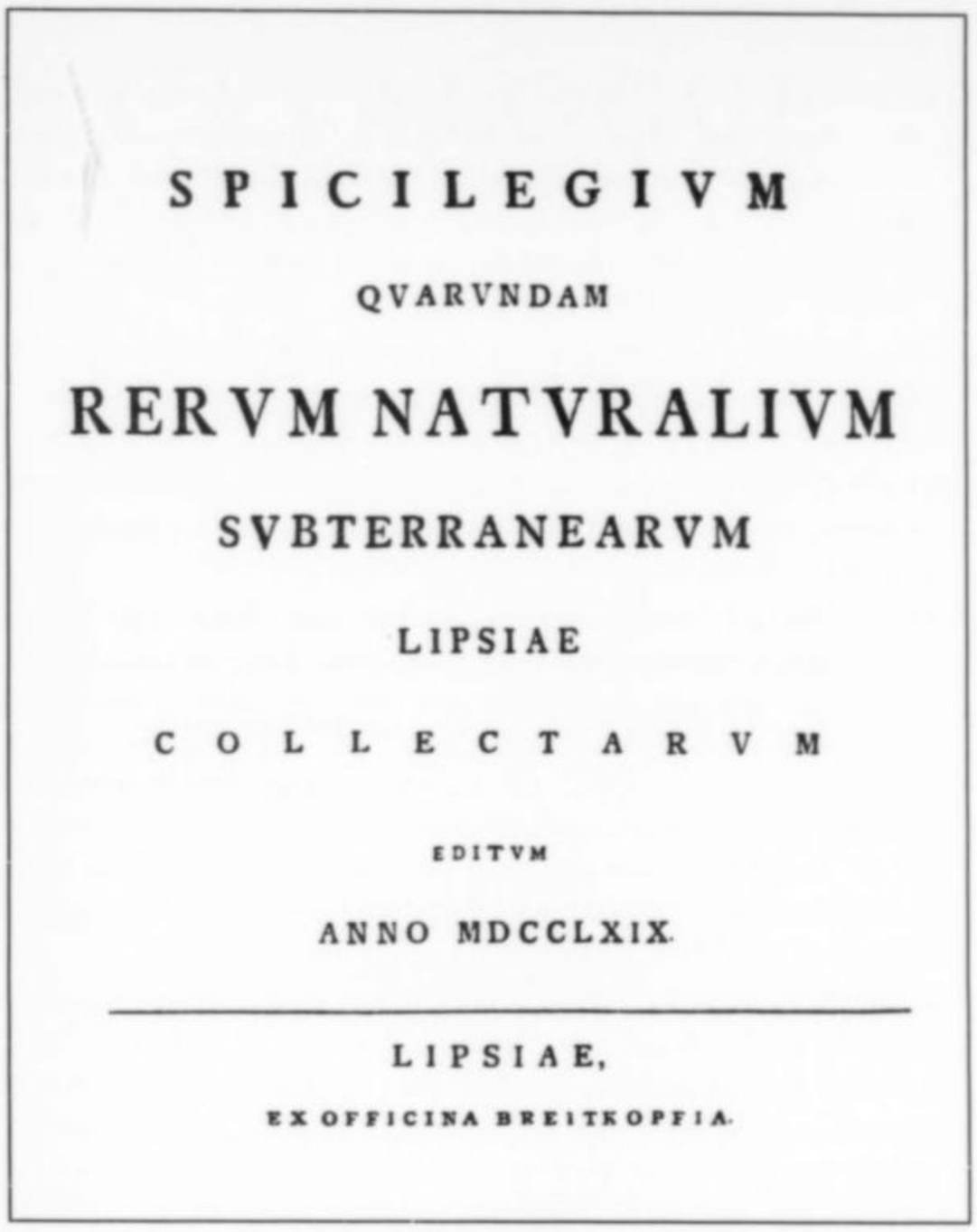
[SPENER] (1693) *Das Spenersche Cabinet, oder kurtze Beschreibung aller sowohl künstlicher als natürlicher alter und neuer, fremder als einheimischer curieuser Sachen, welche Herr Joh. Jac. Speners sel. auf der Academie zu Halle mit unermüdetem Fleisse coligiret*. Leipzig.

[SPENER] (1718) *Catalogus zahlreicher, nützlicher, und sonderbahrer von Natur- und Kunst gebildeter Seltenheiten, in Regno Animali, &c. Vegetabili, &c Minerali, &c. Welche ehemals &c. gesammlet, und zusammen gebracht hat D. Christ. Maximil. Spener &c.* G. Schlechtiger, Berlin; 8vo, 204 pp.

[SPENER] MICHAELIS, J. M. (1693) *Joh. Jac. Speneri Museum, latine & germanice consignatum a Joh. Mart. Michaelis*. Leipzig; 8vo.

[STAHL] MARTINI, F. W. H. (1773) *Verzeichniss des Naturalien-Cabinets, der Bibliothek, Kupferstiche und Musikalien, ingleichen der mathematischen, physikalischen und optischen Instrumente des seligen Hofraths . . . Georg Ernst Stahl, welche den 1 März 1773 . . . verauctioniret werden sollen*. C. M. Vogel, Berlin; 8vo, 182 pp.

[STEELE] (1759) *A Catalogue of Natural and Artificial Rarities, Fossils, Ores, Shells, Plaisters, Bronzes, Pictures, Prints, and Drawings, Greek, Roman, English and Foreign, Gold, Silver and Copper Coins and Medals, Mathematical Instruments, and other Curiosities, Including the Entire Collection of Edward Steele, Painter. Which will be sold by Auction . . . on Friday the 27th of April 1759*. Samuel Paterson, auctioneer; London, 4 pp.



STIEGLITZ

[STIEGLITZ] (1769) *Spicilegium quarundam rerum naturalium subterranearum Lipsiae collectarum*. Ex Officina Breitkopfia, Leipzig; 24 p. and 21 color plates.

[STIEGLITZ] (1772) *Vollständiger Catalogus einer Suiten Mineralien-Sammlung, welche aus 4263 Nummern bestehet*. Leipzig; 301 p. [Freiesleben (1828) says the owner of this collection was a Dr. Stieglitz of Duckwitz, and that the "very numerous Saxony suite" covered pages 180–290. It is likely, but unconfirmed, that the owner was Christian Ludwig Stieglitz.]

[STUKELEY] (1766) *A Catalogue of the Genuine Collection of Coins and Medals, Various Antiquities, Fossils* [including minerals], *and other Curiosities, together with the remaining Copper-Plates, some Manuscripts, Prints and Drawings, of the late Revd. and Learned William Stukeley, M.D., Fellow of the College of Physicians, and of the Royal and Antiquary Societies, Deceased; Which will be sold at Auction . . . on Thursday and Friday, the 15th and 16th of May, 1766*. Samuel Paterson, auctioneer; London, 20 pp.

[SULLY] HELLE and REMY, P. (1762) *Catalogue d'une très belle Collection de Bronze & autres curiosités Egyptiennes, Etrusques, Indiennes & Chinoises; Figures, Bustes & Bas-Relief de Bronze, d'Albâtre & de Marbre, antiques & modernes; Pierres gravées, montées en Bague; Monnoies & Médailles d'Or, d'Argent &c. Desseins, Estampes, Coquilles, & autres objets qui ont rapport a l'Histoire Naturelle; Ouvrages de Lacqs, &c. Livres d'Hist. Nat. &c. du Cabinet de feu m. Le Duc de Sully . . . par les Sieurs Helle & Remy*. Didot, Paris; 8vo, 98 pp. with title plate.

[SVEDENSTIERNA] (1806–1811) *Samlingar i Bergsvettenskapen af E. T. Svedenstierna och C. F. Lidbeck*. Stockholm; 8vo, with plates.

[SWAMMERDAM] (1679) *Catalogus musei, exhibens curiosam suppellectilem variaram rerum exoticarum tam naturalium quam artefactorum, quas 50 annorum spatio collegit Jacob. Schwammerdam*. Amsterdam; 8vo.

[SWINBURNE] (1803) *A Catalogue of extensive and very Valuable Library, Elegant Persian Manuscripts, Pictures, Prints, Coins, Cabinets, and other Curiosities* [including minerals], of Henry Swinburne, Esq., Author of the Travels into Spain, &c. &c., Which will be Sold by Auction . . . on Monday, January 10, 1803, and seven following days (Sunday excepted). Leigh, Sotheby, & Son, auctioneers; London, 60 pp.

[TAUBE] VOIGT, C. W. (1765) *Joh. Taube Commentatio epistolaris ad C. W. Voigt*. Zelle; 4to, 14 p.

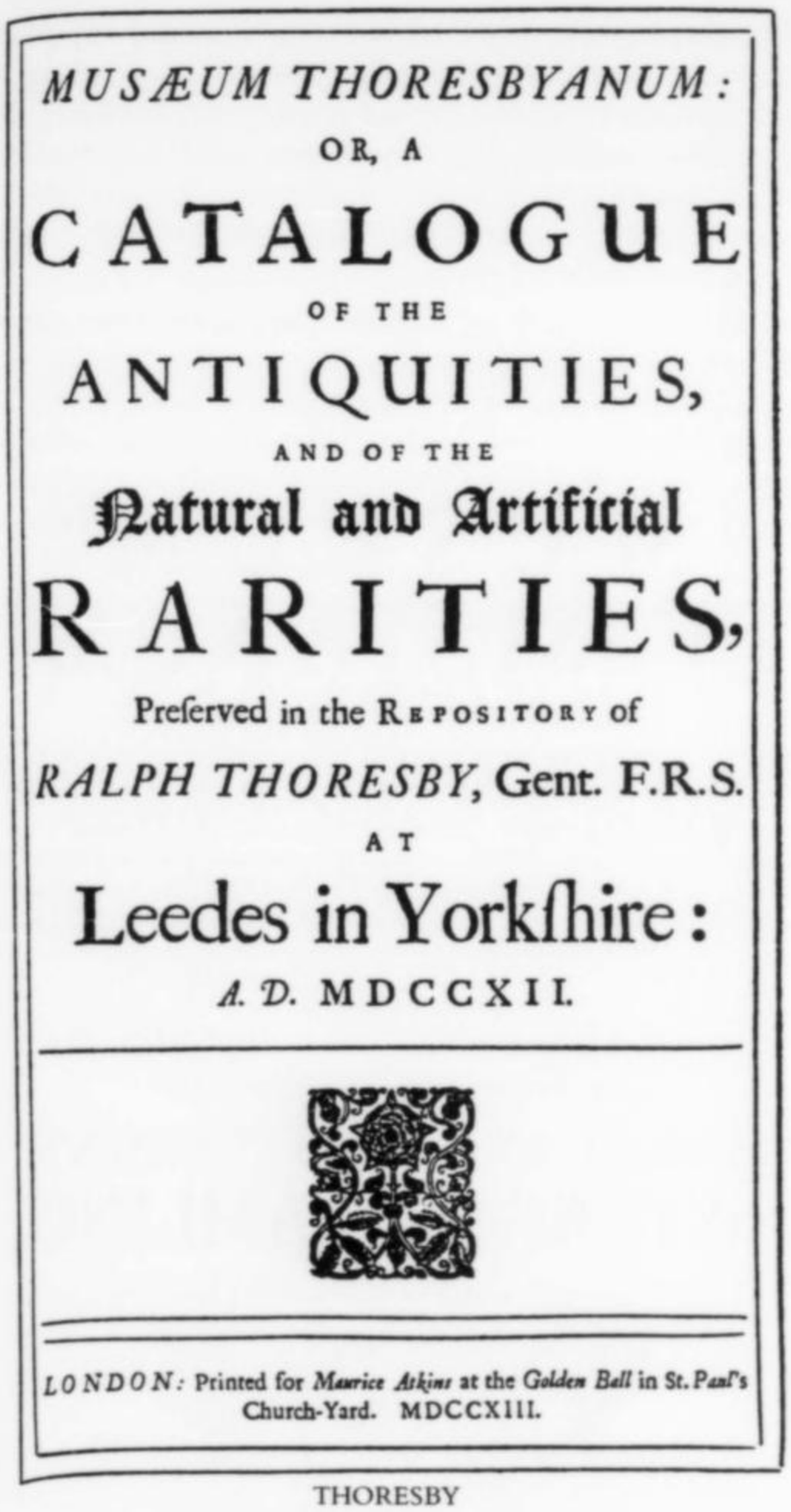


TESSIN

[TESSIN] LINNÉ, C. von (1753) *Museum Tessinianum, & opera illustrissimi comitis Dom. Car. Gust. Tessin . . . Collectum. Hans Excellence, Riks-Rådets Herr Gr. Carl Gust. Tessins Naturalie-Samling*. Stockholm; folio, 135 p., with 12 engraved plates.

[THEOBALD] (1768) *A Catalogue of the Genuine Collection of Shells, Fossils* [including minerals], *Pictures, Specimens of Penmanship, Coins and Medals in Gold, Silver and Brass, and various other Articles of the late James Theobald, Esq; F.R.S. and F.A.S. which (by Order of the Executor) Will be Sold by Auction . . . on Tuesday and Wednesday the 14th and 15th of this Instant June 1768*. Mr. Langford and son, auctioneers; London, 10 pp.

[THORESBY] (1713) *Musaeum Thoresbyanum, or a Catalogue of the antiquities and of the Natural and Artificial Rarities, preserved in the Repository of Ralph Thoresby, Gent. F. R. S., at Leedes in Yorkshire: A.D. MDCCXII*. (dated MDCCXIII at bottom of title page) London; folio.



MUSÆUM THORESBYANUM:

OR, A

CATALOGUE

OF THE

ANTIQUITIES,

AND OF THE

Natural and Artificial

RARITIES,

Preſerved in the REPOSITORY of

RALPH THORESBY, Gent. F.R.S.

AT

Leedes in Yorkſhire:

A. D. MDCCXII.

LONDON: Printed for *Maurice Atkins* at the *Golden Ball* in St. *Paul's* Church-Yard. MDCCXIII.

THORESBY

[TITIUS] (1805) *übersicht einer (zu verkaufenden) Mineraliensammlung, so nach der Classification . . . von Dr. C. H. Titius geordnetist.* Leipzig; large 4to, 7 p.

[TITIUS] (1821) *Auctions-Verzeichniss einer weil. Herrn Hofrath Dr. Titius, Inspector der Konigl. Sächs. Naturalien-Gallerie zugehörigen, zehr vollständigen und gut gehaltenen Mineralien-Sammlung.* Large 8vo, 286 p. [Lists 4,984 specimens.]

[TOUR D'AUVERGNE] FAVANNE, J. G. (1784) *Catalogue systématique et raisonné, ou description du magnifique cabinet appartenant cidevant à M. le C[ount] de [la Tour d'Auvergne].* Paris.

[TRADESCANT] (1656) *Museum Tradescantianum, or a collection of rarities preserved at South-Lambeth near London by John Tradescant.* London; 8vo, 199 p. There was also an 8vo London edition of 1686.

[TRAVAGINI] PETREII, P. P. (1679) *Museum Travaginianum.* Venice; 12mo.

[TREBRA] (1795) *Mineralienkabinet, gesammlet und beschrieben von dem Verfasser der Erfahrungen vom Innern der Gebirge. (Friedrich Wilhelm Heinrich von Trebra).* Clausthal; 8vo, 212 p., with 1 plate.

[TREBRA] (1797) *Verzeichniss von dem Mineraliencabinet des Königl. Grossbrittan. Berghauptmann v. Trebra, welches derselbe zu Clausthal durch Auction will vereinzeln lassen.* 216 p.

[TREBRA] (1822) *Auctions-Verzeichniss zweyer sehr gut gehaltener Minerlien-Sammlungen aus der Verlassenschaft des verstorb. Herrn Oberberghauptmann v. Trebra zu Freyberg, welche 1822 zu Dresden den Meistbietenden a. a. überlassen werden sollen, durch C. E. Heinrich.* 8vo, 71 p.

[TREUTLER] (1820) *Auctions-Verzeichniss einer sehr gut gehaltenen Mineralien-Sammlung . . . welche 1820 zu Dresden den Meistbietenden a. l. überlassen werden sollen, durch C. E. Heinrich.* Dresden; 8vo, 123 p. [According to Freiesleben (1828) this auction catalog includes minerals from the collections of Hofrath Dr. Treutler, Gräflich Röder, and Ross.]

[TREUTLER] (1822) *übersicht der von dem verstorbenen Inspector der Königl. Naturalien-Gallerie In Dresden, Herrn Hofrath Dr. Treutler hinterlassenen Mineralien-Sammlung.* Dresden; 8vo, 23 p.

[VALENTINI] (1704) *Museum Museorum, oder Natur und Mineralien Kammer, auch ostindische Sendschreiben und Raporten.* Frankfurt-am-Main; folio. (Second edition, 1714.)

[VALENTINI] (1714) *Museum museorum, oder Vollständige schau bühne aller materialien und specereyen, nebst deren natürlichen beschreibung, election, nutzen und gebrauch, aus andern material-, kunst- und naturalien-kammern, oost- und west-indischen reiss-beschreibungen . . . [Vol. 1:] Valentini Natur- und materialien Kammer auch Ost-indianische send-schreiben und rapporten. [Vol. 2:] D. Valentini Museu museorum oder der allgemeiner Kunst- und Naturalien-Kamer.* 2nd edition, J. D. Zunner and J. A. Jungen, Frankfurt am Main, folio.

[VALMONT de BOMARE] (1758) *Catalogue du cabinet d'histoire naturelle de M. Bomare de Valmont, démonstrateur d'histoire naturelle et membre de la Société littéraire de Clermont-Ferrand, comprenant les minéraux, végétaux, animaux et quelques productions, tant de la nature que de l'art . . .* l'Auteur, Paris; 8vo, 120 p.

[VARENNES de BÉOST] ROMÉ de l'ISLE, J. B. L. (1774) *Catalogue des curiosités naturelles, qui composent le cabinet de M. de ***, et dont la vente se fera à Paris . . .* Hérissant, Paris; 8vo, viii + 310p., with frontispiece.

[VATER] (1726) *Catalogus variorum exoticorum, maxime ignotorum, quae in Museo sue possidet Abrah. Vater.* Wittenberg; 4to.

[VERNEDE] VAN HOMRICH, W., and COMMELIN, I. (1815) *Catalogue d'une Collection trés éntendue, & très belle de mineraux, delaissée par feu Henr. Marie Vernede, revue du amasseur renommé, feu du très noble Seigneur G. N. P. Hasselaer.* Amsterdam; 8vo. (Probably a sale catalog)

[VILLIEZ] (1775) *Catalogue du Cabinet d'histoire naturelle du feu M. Villiez.* Antoine et Barbier, Nancy; 8vo, 166 p. and 2 copperplate engravings.

[VINCENT] (1706) *Wondertooneel der Nature, geopent in eene korte Beschryvinge der Hoofddeelen van de byzondere Zeldsaamkeden daar in begrepen; in orde gebragt en bewaart door Levinus Vincent.* François Halma, Amsterdam; 4to, 43 pp. plus six copperplate engravings and one title plate. (Part I.)

[VINCENT] (1715) *Het Tweede Deel of Vervolg van het Wondertooneel der Nature, ofte een korte Beschryvinge zo van Bloedelooze, Zwemmende, Vliegende, Kruipende, en Viervoetige Geklaauwde Eijerleggende Dieren, als van Hoornen, Sculpen, Koraalen, Zee-Heesters, Metallyke en in Steen veranderte Dingen, &c. Van de welke een zeer groote Meenigte word bevat in de Kabinetten van Levinus Vincent.* Gerard Valk, Amsterdam; 4to, 278 pp. plus seven copperplate engravings and one title plate. (Part II.)

[VINCENT] BOUT, P. (1779) *Catalogus van eene uitmuntende fraaije Verzameling van meerendeels Uitheemsche Viervoetige, Vliegende, Kruipende, Zwemmende Dieren, en Zee-Koraalen . . . Zynde dit alles, meerendeels, het voor veele Jaaren reeds zo beroemde Natuur-Kabinet van L. Vincent, gekocht, en nu onlangs nagelaaten door wylen den Hoog Welgebooren Jonkheer P. Bout . . .* H. Backhuysen, The Hague; 8vo, 74 pp.

[VOSMAER] (1800) *Catalogue de livres . . . de portraits . . . d'instruments de physique . . . , de pierres taillées . . . , de curiosités*

CATALOGUE

DES CURIOSITÉS

NATURELLES,

QUI COMPOSENT LE CABINET

DE M. DE ***

Et dont la Vente ſe fera à Paris, rue de la Sourdiere, le Lundi 4 Juillet 1774 & jours ſuivans, trois heures préciſes de relevée.

A PARIS,
Chez CLAUDE HÉRISSANT, Imprimeur-Libraire, rue neuve Notre-Dame, à la Croix d'Or & aux trois Vertus.

M. DCC. LXXIV.

VARENNES DE BEOST

. . . de coquillages et de mineraux délaissés par feu M. Arnout Vosmaer. The Hague.

[WEICKMANN] (1655) *Christoph Weickmann's Verzeichniss unterschiedlicher Thiere, Vögel, Fische, Meergewächse, Erzt= und Bergarten, edlen und andern Steinen.* Ulm; 8vo.

[WEICKMANN] (1659) *Christoph. Weickmann Exoticophylacium oder Kunst= und Naturalienkammer.* Ulm; 4to. An 8vo edition was published in Ulm in 1716.

[WEICKMANN] (1741) *Exoticophylacium Weickmannianum. Oder: Verzeichniss unterschiedlicher Thier, Vögel, Fisch, Meer-Gewächs, Ertz- und Berg-Arten, &c. so in der Kunst- und Natural-Kammer des weyland Herrn Christoph Weickmanns seel. in Ulm zum verkauffen zu finden.* E. D. Süss, Ulm; 8vo, 77 pp. with two engraved plates.

[WHITE] (1788) *A Catalogue of the Entire Collection of Greek, Roman, British, Saxon, English, and other Coins and Medals, in Gold, Silver and Copper; with a select Assemblage of Antiquity in Bronze, Earthenware, and choice painted Glass. Early-printed Books; Engravings and Drawings, antient and modern. Likewise a neat Variety of Shells, and other Subjects of Natural History* [including minerals]; *Curiosities from the new-discovered Islands in the South Seas, &c. Being the Property of the late Mr. John White, of Newgate Street, London. Part III. Consisting of Shells, Fossils, and other curious Subjects of Natural History . . . Which, by Order of the Executor, will be Sold by Auction . . . on Wednesday the 12th, Thursday the 13th, and Friday the 14th, of March, 1788.* Mr. Gerard, auctioneer; London, 20 pp.

[WILLEM V] VOSMAER, A. (1767) *Description générale naturelle & historique des plus rares & des plus merveilleuses productione de la nature, qui se trouvent & sont conservées dans le riche depôt de Msgr. le Prince d'Orange & de Nassau par Mr. A. Vosmaer.* Amsterdam; large 4to with plates.

[WINTHROP] WINTHROP, J. (1734) Selections from an ancient catalogue of objects of natural history formed in New England more than 100 years ago. *Journal Book of the Royal Society*, **15**, 451–487. Reprinted in *American Journal of Science*, **47** (1844), 282.

[WITSEN] (1728) *Catalogus van de uitmuntende en zeer vermaarde Konst-en Natuur-Kabinetten, bestande in Goude, Zilvere en Kopere Antique en Moderne Medialjes; Vreemde Munten en Goude Cieraden; als mede Antique Beelden, Bas-Relieven, Urne en andere Antiquiteyten van Mamer, Koper, &c. benevens eenige Oude Manuscripten. Verder . . . Ook ongemeene schoone Hoorns, Doubletschelpen, Coral en Zeegewassen, Mineraalen, Versteende Zaken, Drogeryen, Insecten droog en in Liquor, en andere Naturalia meer. Zeerkeurlyk by een vergadert en naargelaten door den Wel Ed: Heer en Mr. Nicolaas Witsen . . .* J. Lescailje and D. Rank, Amsterdam.

CATALOGUS

Van de uitmuntende en zeer vermaarde

KONST- EN NATUUR-

KABINETTEN,

Beſtaande in *Goude*, *Zilvere* en *Kopere* ANTIQUE en MODERNE MEDAILJES; ook veel *Vreemde* MUNTEN en *Goude Cieraden*; als mede ANTIQUE BEELDEN, *Bas-Relieven*, *Urne* en andere *Antiquiteyten* van Mamer, Koper, &c. benevens eenige Oude MANUSCRIPTEN.

Verder

OOST-INDISCHE en andere KONSTWERKEN en *Rariteyten*, als *Agate Koppen*, *Edele Geſteentens*, *Heyligdommen*, *Chineeſe Tartarije* en andere *Afgoden*, *Japanſe Chineeſe* en *Mogolſe Miniaturen* en geteekende *Kaarten*, fraije geſchilderde *Turkſe* en andere *Portraiten*, een *Atlas van Blaauw* in 9 deelen, *Mathematiſche Inſtrumenten* en zeer veel andere *Curieusheden*.

Ook ongemeene ſchoone

HOORNS, DOUBLETSCHELPEN, *Coraal* en *Zeegewaſſen*, *Mineraalen*, *Verſteende Zaken*, *Drogeryen*, *Inſecten* droog en in Liquor, en andere NATURALIA meer.

Zeer keurlyk by een vergadert en naargelaten door den Wel Ed: Heer en

Mr. NICOLAAS WITSEN,

In zyn Wel Ed. Leeven Burgermeeſter en Raad der Stad Amſteldam, &c. &c.

Welke Verkogt zullen werden door de Makelaars *Dirk van Hagé*, *Vincent Poſthumus*, *Pieter Kerkhoven* en *Jan Lempjes*, op Dingsdag, den 30 Maart 1728. en volgende dagen, 's morgens ten 9, en 's namiddags ten 2 uuren precys, tot Amſteldam, in de Kalverſtraat, het derde huis van de Gapertſteeg, in de Spiegel Winkel. Alwaar deze RARITEYTEN drie dagen, te weeten Woensdag, Donderdag en Vrydag den 24, 25 en 26 Maart voor de Verkoopinge te zien zullen zyn.

De CATALOGEN zyn by de voornoemde Makelaars te bekomen.

Te AMSTELDAM,
By de Erven van J. LESCAILJE en D. RANK, op de Beursſluis.

WITSEN

AN

ATTEMPT

Towards a

Natural Hiſtory

OF THE

FOSSILS of ENGLAND;

IN

A CATALOGUE of the *Engliſh* FOSSILS in the COLLECTION of

J. WOODWARD, M. D.

Containing

A DESCRIPTION and HISTORICAL ACCOUNT of each; with Obſervations and Experiments, made in order to diſcover, as well the Origin and Nature of them, as their Medicinal, Mechanical, and other Uſes.

PART I.

Of the FOSSILS that are real and natural: *Earths*, *Stone*, *Marble*, *Talcs*, *Coralloids*, *Spars*, *Cryſtals*, *Gemms*, *Bitumens*, *Salts*, *Marcaſites*, *Minerals*, and *Metals*.

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WOODWARD

MUSEUM WORMIANUM.

SEU

HISTORIA

RERUM RARIORUM,

Tam Naturalium, quam Artificialium, tam Domeſticarum, quam Exoticarum, quæ Hafniæ Danorum in ædibus Authoris ſervantur.

Adornata ab

OLAO WORM, MED. DOCT.

&, in Regiâ Hafnienſi Academiâ, olim Profeſſore publico.

Variis & accuratis Iconibus illuſtrata.



LUGDUNI BATAVORUM,
Apud IOHANNEM ELSEVIRIVM, Acad. Typograph.
CIↃ IↃC LV.

WORM

[WOLFF] (1714) *Museum Wolfianum, oder Verzeichniss von allerhand Insectis, Papilionibus, Offibus und Partibus von mancherley Thieren, Mineralibus, Petrefactis, pretieusen und configurirten Steinen, Artefactis . . . welche Herr Christian Wolff, Ph. & Med. Doctor und Practicus allhier, mit sonderbarem Fleiss vormals colligiret, und nach der Ostermesse 1714. durch Auction sollen verkauffet werden.* Leipzig; 8vo, 110 p.

[WOLTERSDORF] (1772) *Vollständiges Verzeichniss vom Woltersdorfischen Mineralienkabinet.* Berlin; 8vo, 110 p.

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Abbreviations used in the Census:

ABD = *Allgemeine Deutsche Biographie* (1875), 56 vols., reprinted (1967) by Duncker & Humblot, Berlin.

BCP = *Burke's Complete Peerage* (1970), 105th edition, Burke's Peerage Ltd., London, 3,262 p.

BUA = *Biographie Universelle, Ancienne et Moderne* (1854) J. F. Michaud, 45 vols., reprinted (1966–1970) by Akademische Druck- und Verlagsanstalt, Graz.

CAB = *Appleton's Cyclopedia of American Biography* (1887–1915), 6 vols., Appleton & Company, New York. Continued as *Cyclopedia of American Biography* (1931), another 6 vols, The Press Association Compilers, New York.

CBM = *Catalog of the Books, Manuscripts, Maps and Drawings in the British Museum (Natural History)* (1903), 8 vols., British Museum, London.

DAB = *Dictionary of American Biography* (1927–1936), 12 vols., Charles Scribner's Sons, New York.

DBF = *Dictionnaire de Biographie Française* (1982–1992), 18 vols. as of 1992 (A-Jum), Letouzey et Ané, Paris.

DBI = *Dizionario Biografico degli Italiani* (1960–1984), 30 vols. as of 1984 (A-Cri), Istituto della Enciclopedia Italiana, Rome.

DNB = *Dictionary of [British] National Biography, from the Earliest Times to 1900* (1917), 21 vols., Oxford University Press.

DSB = *Dictionary of Scientific Biography* (1970–1976), 14 vols., Charles Scribner's Sons, New York.

NBG = *Nouvelle Biographie Générale* (1857–1883), 46 vols., Firmin Didot Frères, Paris.

NBU = *Nouvelle Biographie Universelle* (1852), 46 vols., reprinted 1963–1969 by Rosenkilde and Bagger, Copenhagen.

NCA = *National Cyclopedia of American Biography* (1898–1984), 63 vols., James T. White and Company, New York.

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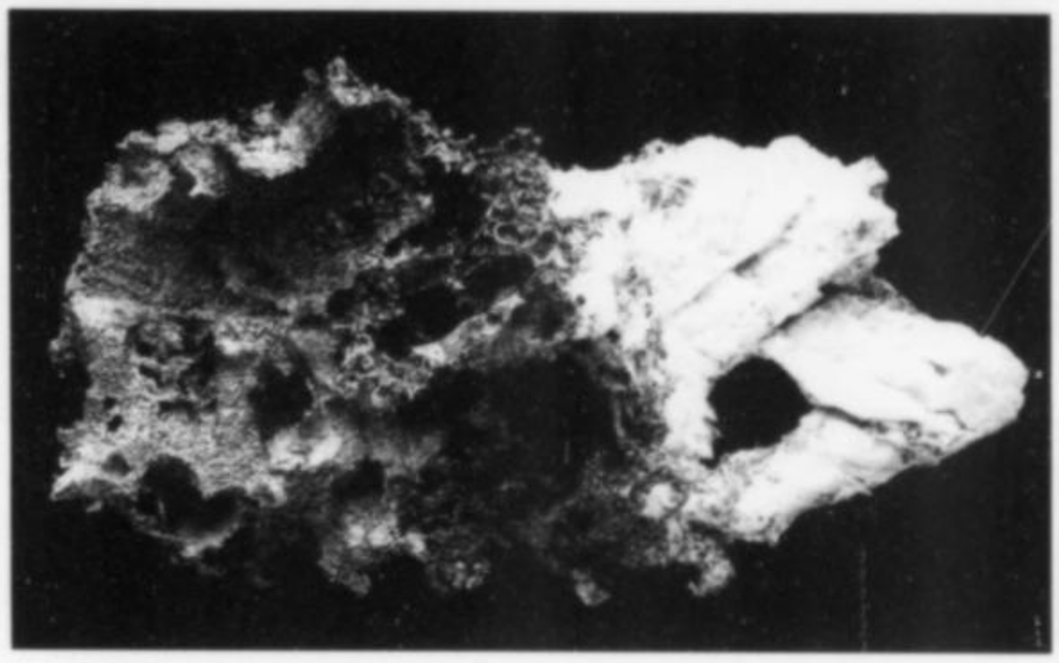
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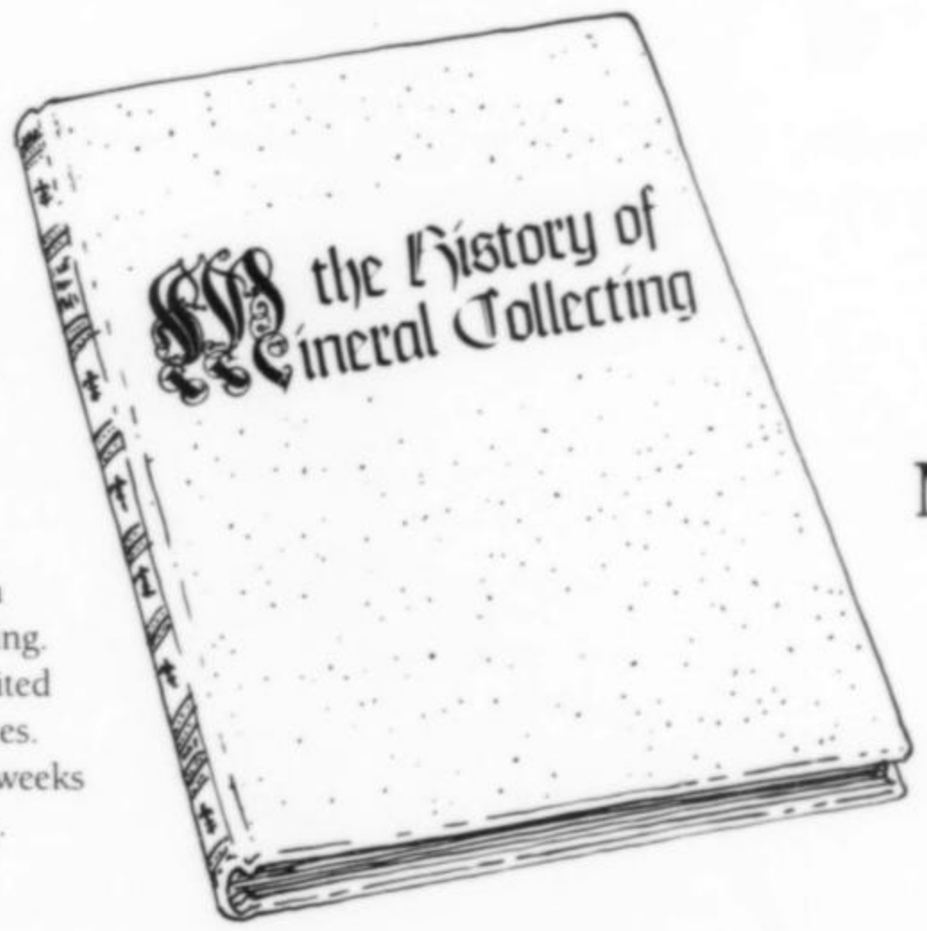
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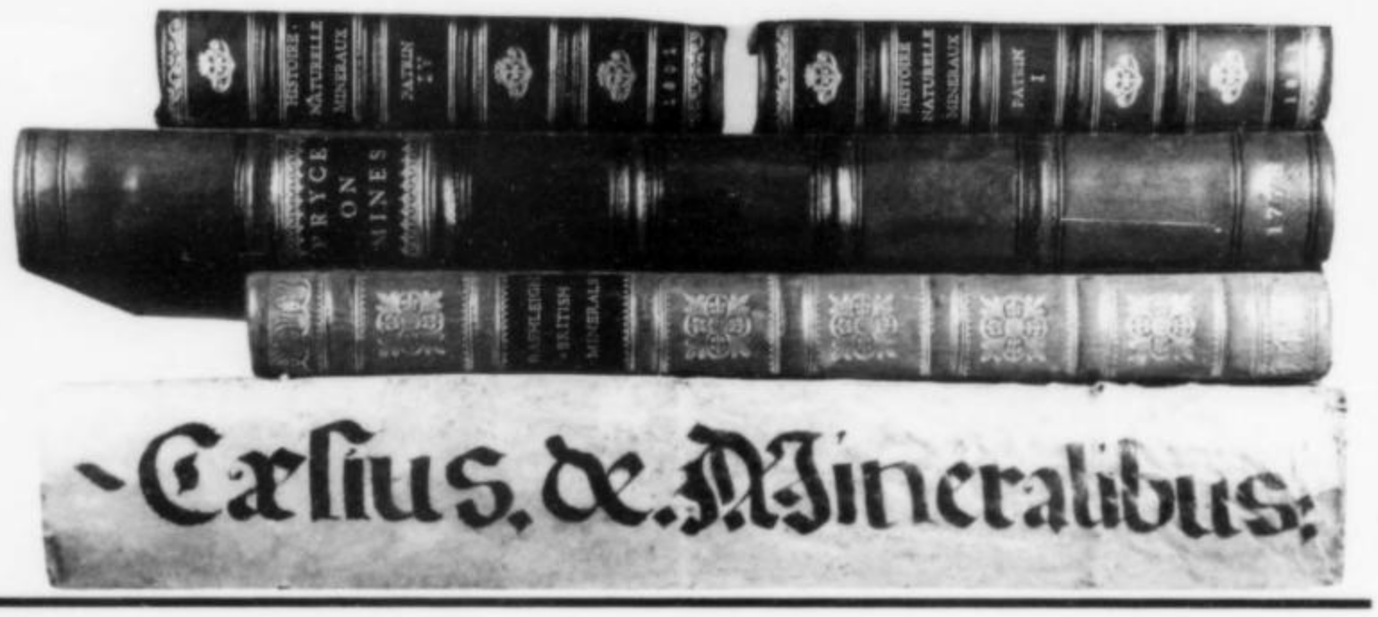
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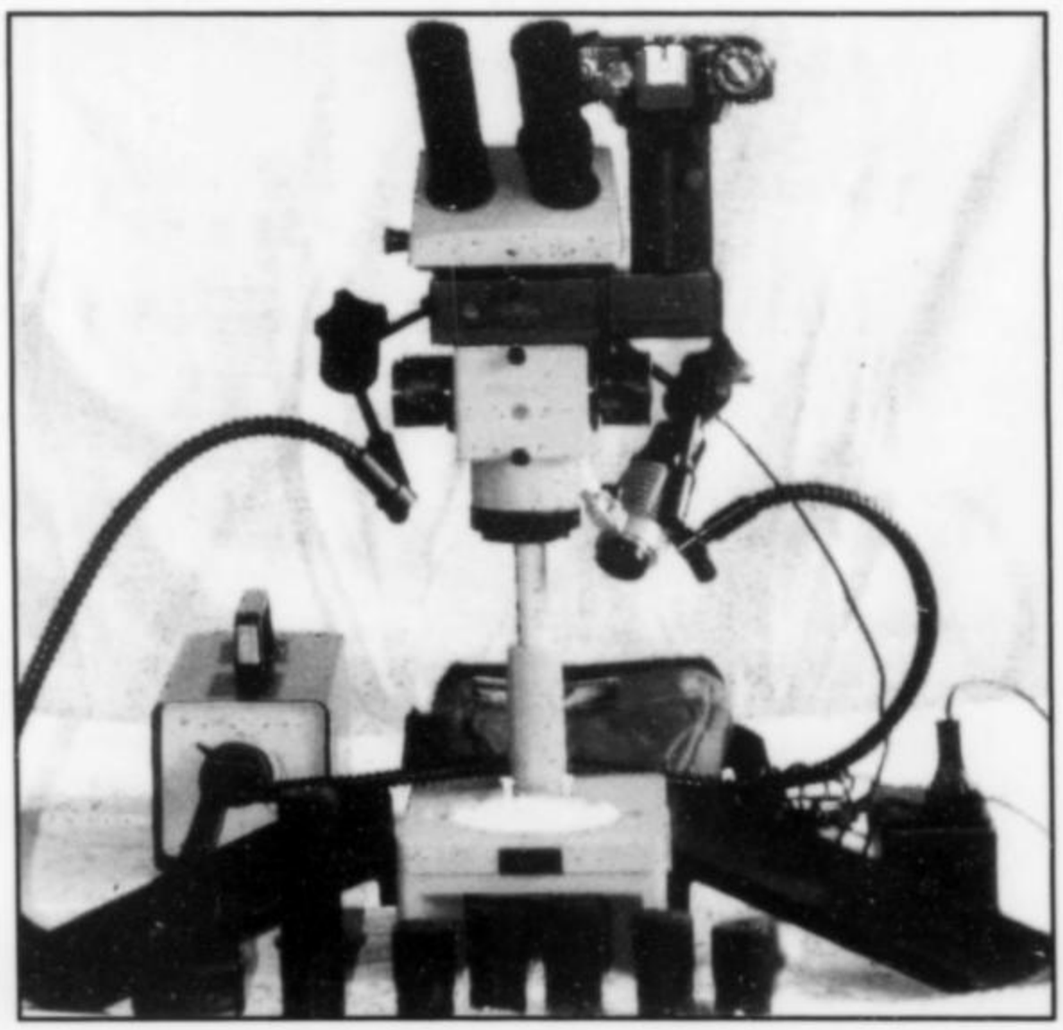
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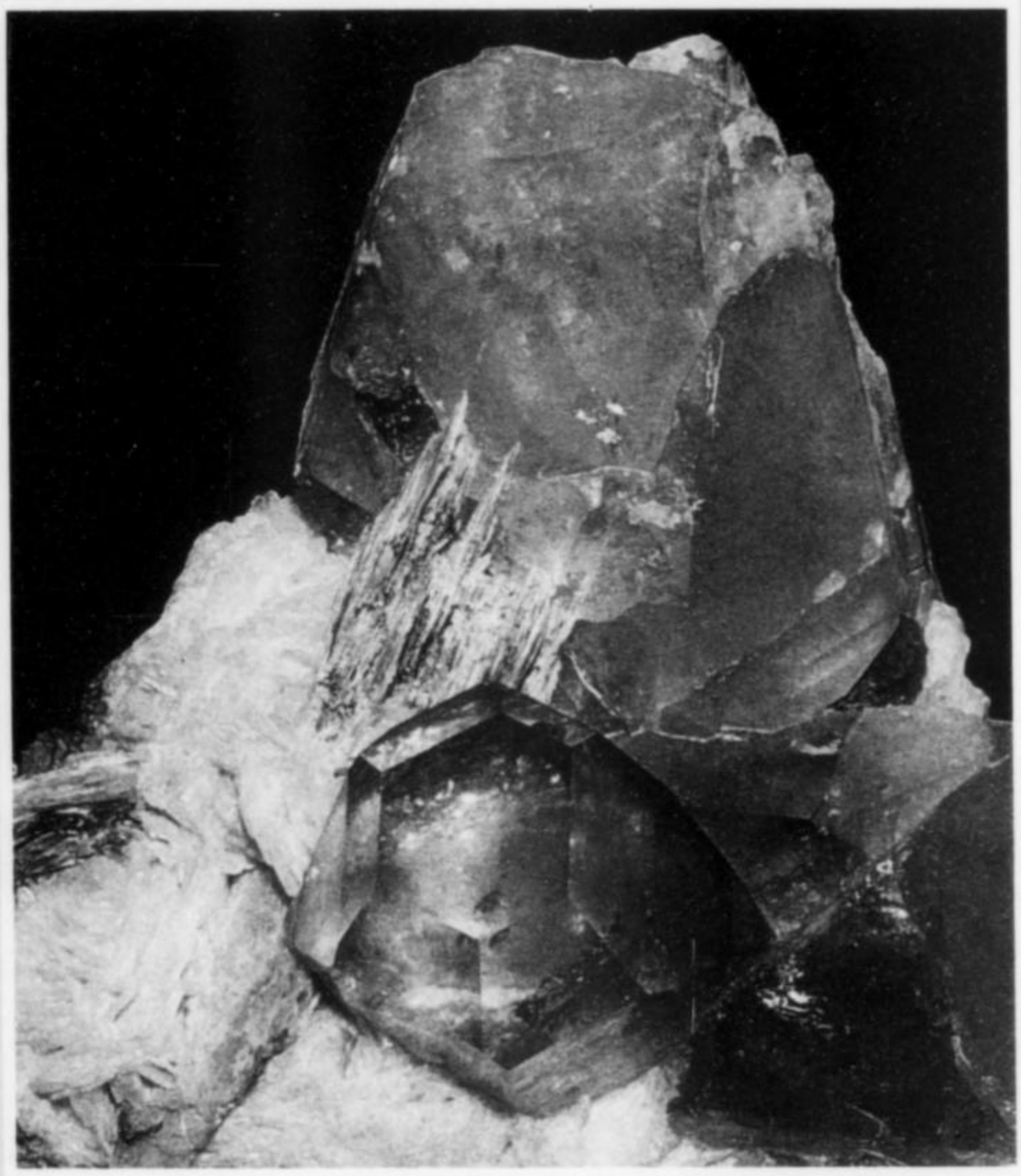
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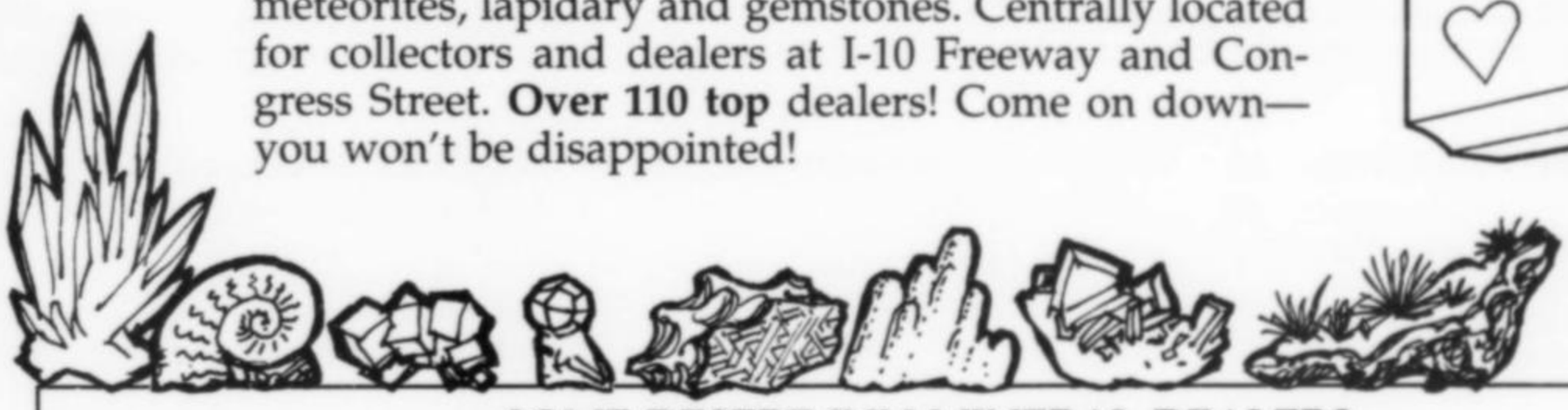
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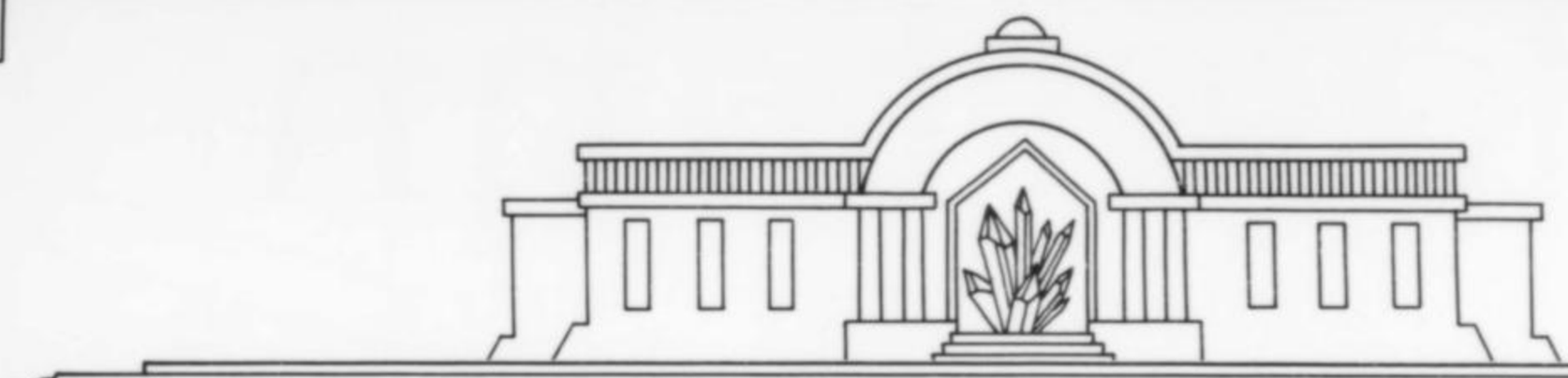
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Sterling Hill Mining Museum
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Adrien-Pouliot Building
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Hours: 8:30–5 M–F
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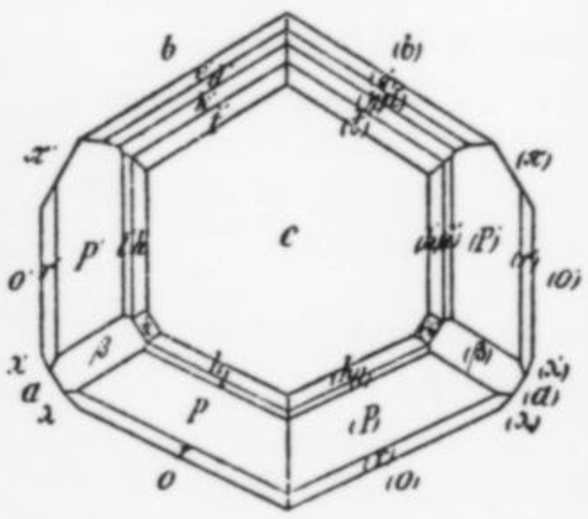
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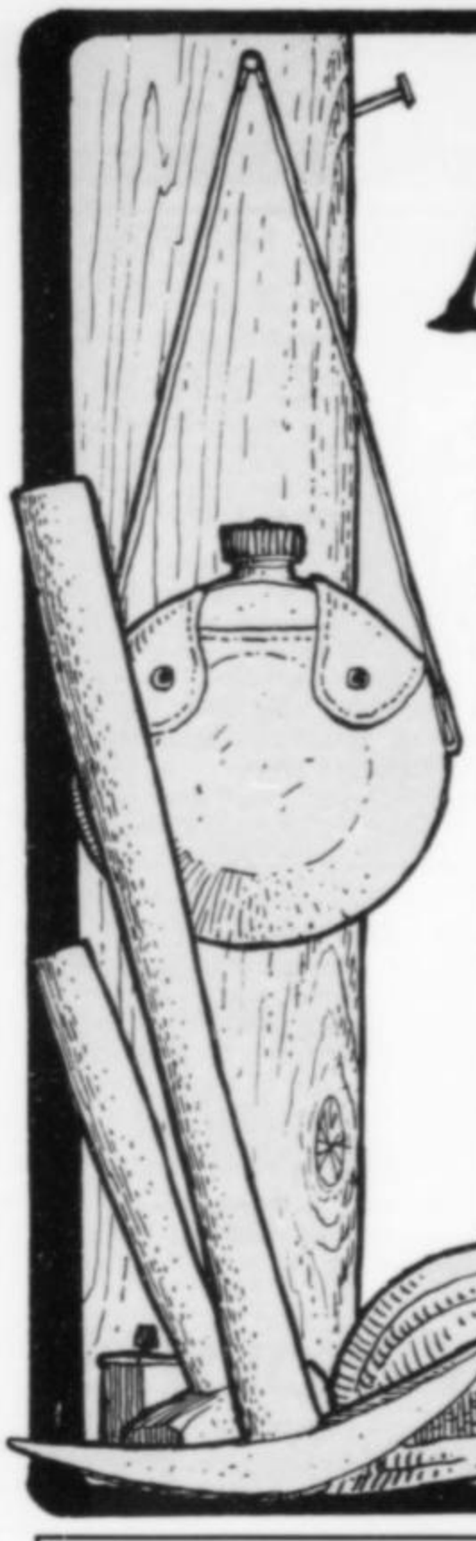
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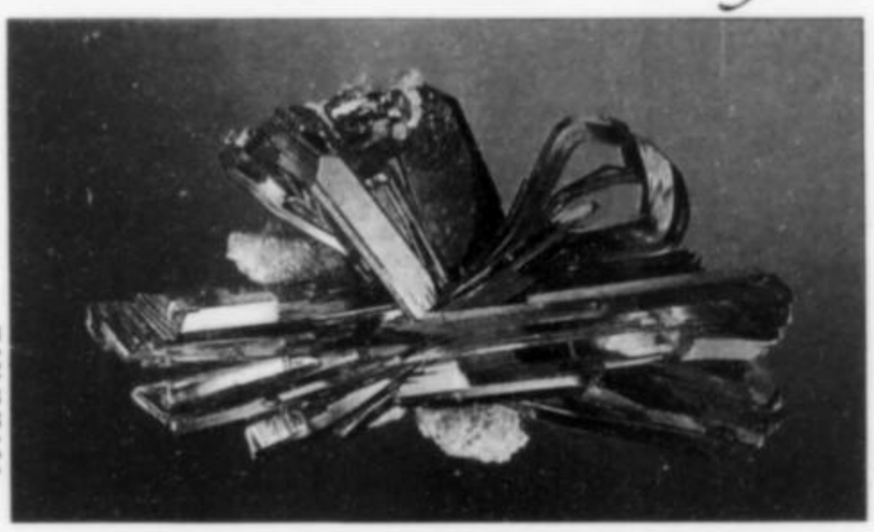
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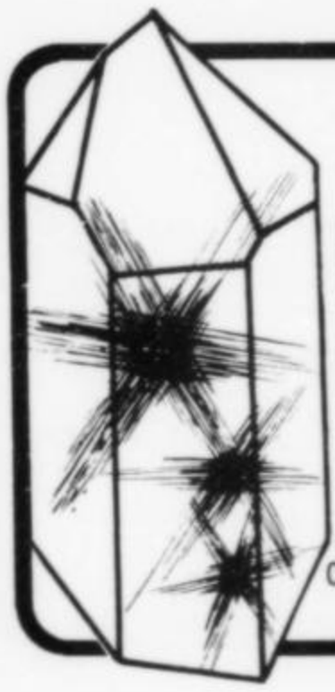
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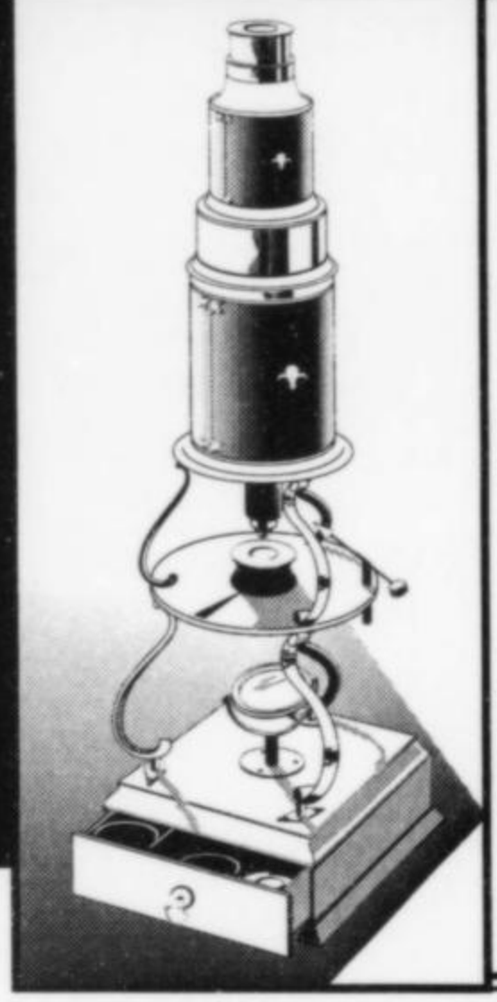
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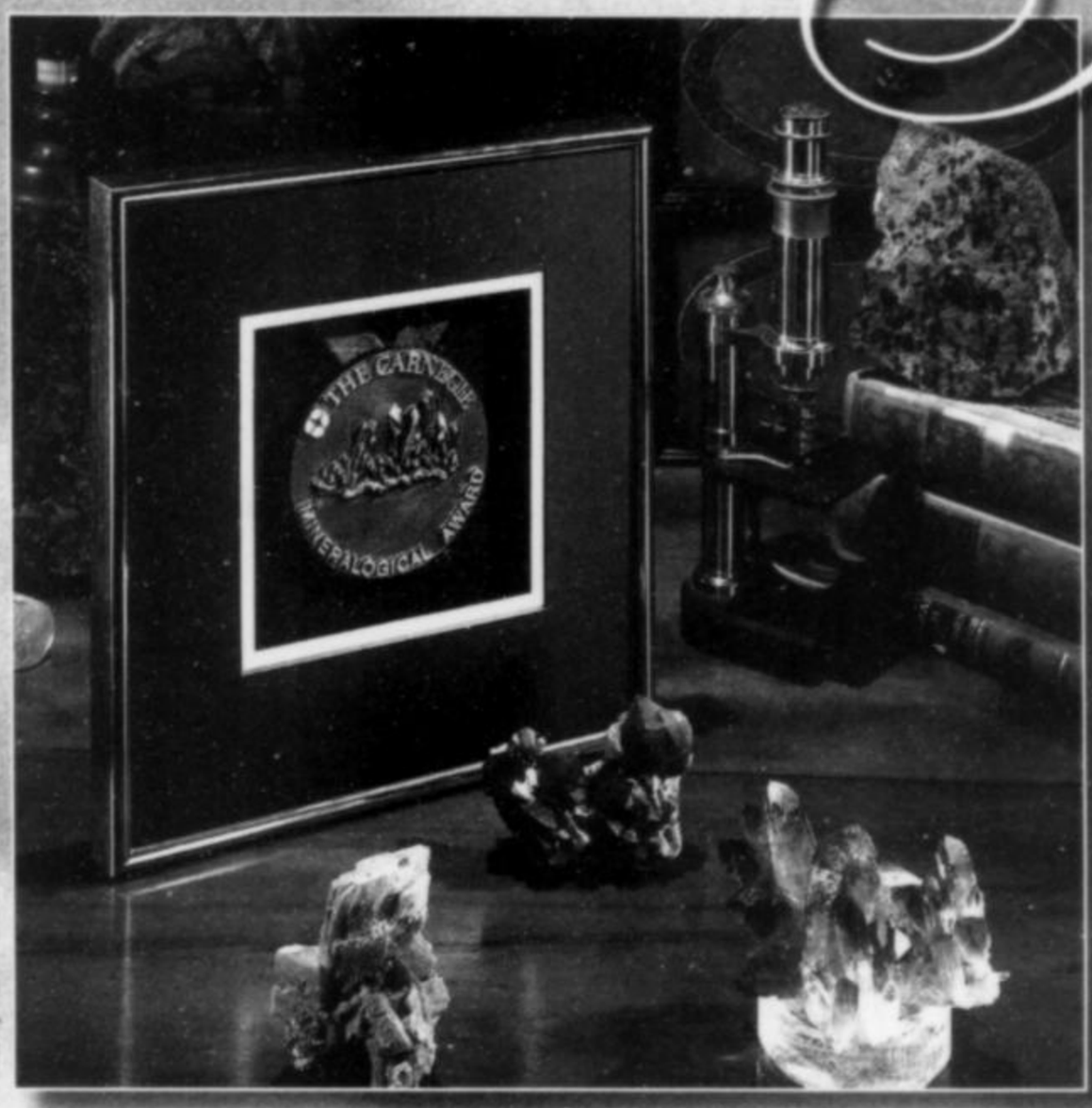


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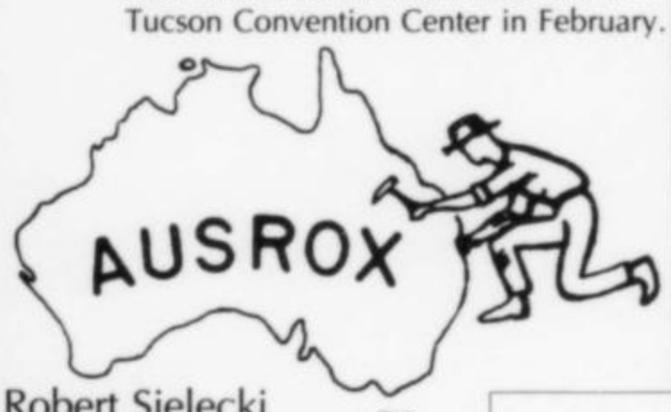
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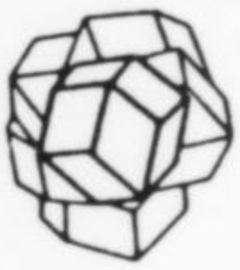
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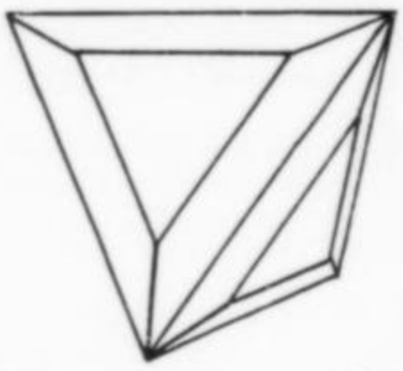
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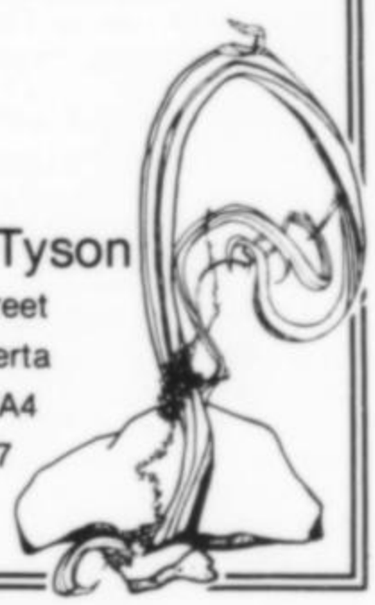
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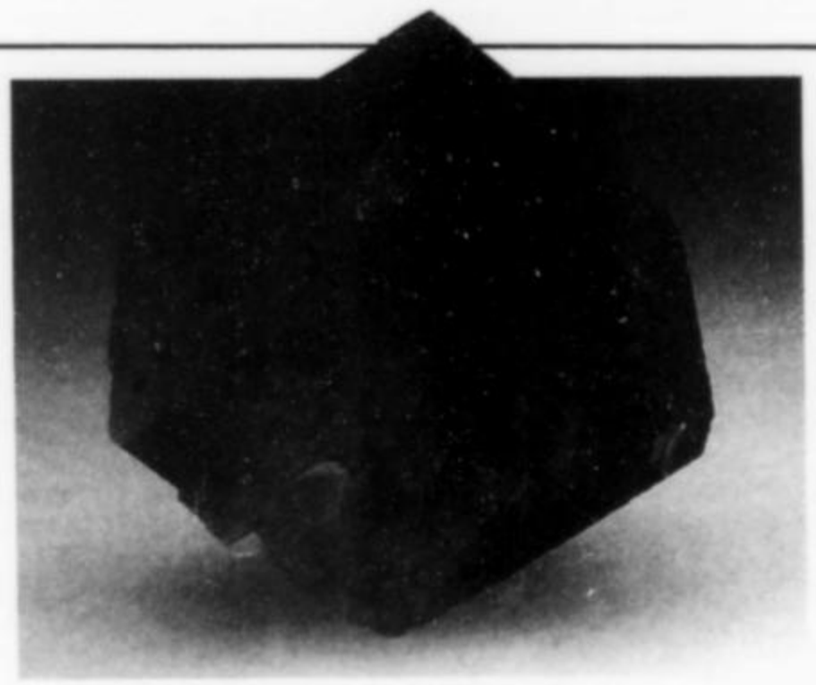
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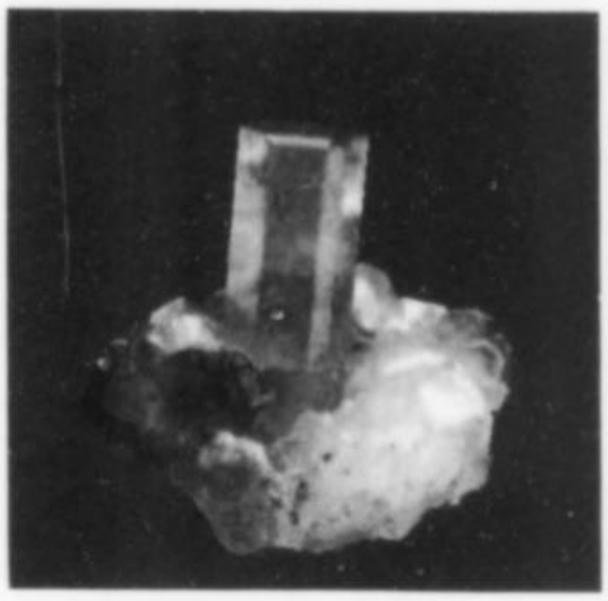
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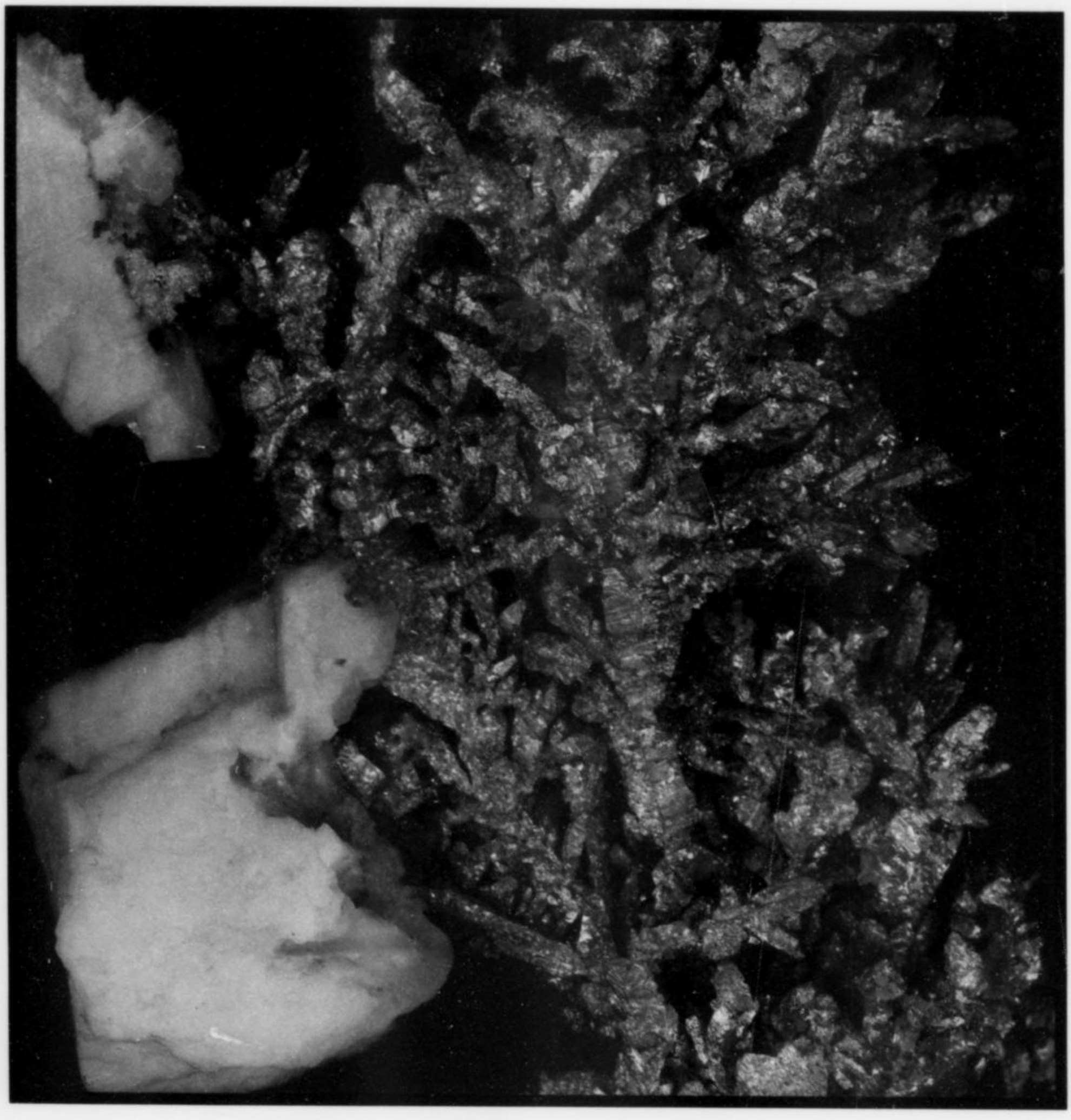
Dr. Wendell Wilson in his video review in *M.R.*, Nov/Dec 1992, p. 504, says "The collector of aesthetic mineral specimens will find much to savor in Keith Proctor's video catalog of his collection. . . . It really delivers in terms of extraordinary mineral images and specimen information and will stand for many years to come as a historically valuable documentation of one of the great private collections of our time."

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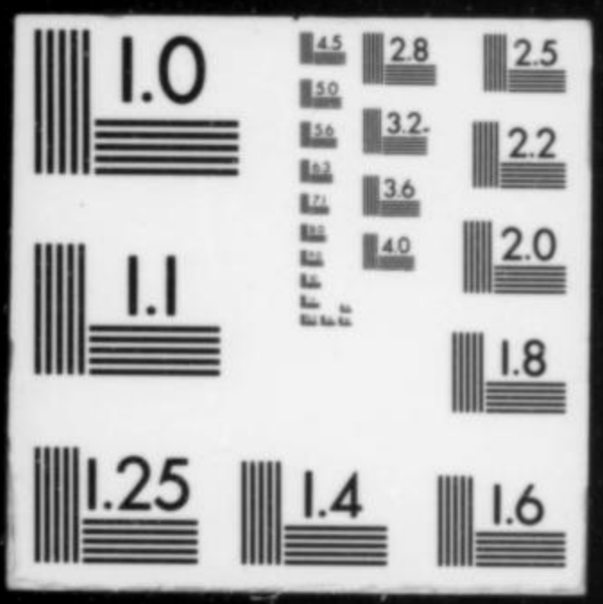
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