

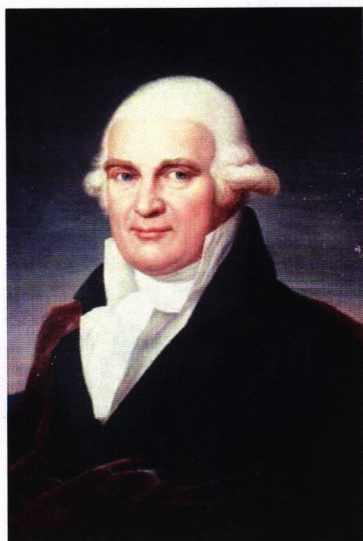
# The mineralogical collections of the TU Bergakademie Freiberg

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Three mineralogical exhibits can be found in the centre of the university and mountain town of Freiberg, each complementing the other. Along with the Mineralogical Institute, the Abraham-Gottlob-Werner building houses one of the oldest and largest mineralogical collections in the world, built up under scientific criteria. Although it was only opened in 2008 in Freudenstein Castle, the terra mineralia exhibit has become much more popular, having already been visited by over 500,000 guests. The mineralogical world tour on which you can embark in the terra mineralia exhibit will be expanded in October 2012 by yet another building block – a mineralogical journey through Germany in the 'Krüger Haus', also located in the castle square.

## On the history of the mineralogical collections

After the Seven Years' War, the flatlining Saxon economy was in need of a kick-start. The commissary general of mountain troops F. A. v. Heynitz (1725-1802) and the chief mining officer F. W. v. Opper (1720-1796) convinced Prince Xavier to create an independent educational establishment to educate experts in mining and metallurgy. So as to be able to educate the students as practically as possible, Heynitz and Opper, the founders of the Bergakademie mining college, combined their private collections into a 'cabinet of specimens' which was situated in Opper's home. The former education building now houses the administration of the TU Bergakademie Freiberg in Akademiestrasse. J. F. W. T. v. Charpentier (1738-1805) expanded this initial collection into a suite and minerals collection. A few years later, the Saxon mining office initiated the 'storage of marketable minerals' at the Bergakademie. It lasted until 1956 and was mainly designed to supply the collection with new material from Germany and abroad. Its first administrator, C. H. Lommer (1735-1787) acted at the same time as the steward of the Bergakademie's collection of specimens, which was already open to the public at set times. When Lommer left office in 1772, J. F. Scheuchler (1740-1791) took over his tasks and carried them out until the functions were taken over by A. G. Werner (1749-1817) in 1775.



Abraham Gottlieb Werner (1749-1817).

Werner taught the subjects of mineralogy, geology, palaeontology, preparation, mining machine operation and ironworking. Werner paid the collection little attention. While he was still a student in Leipzig in 1774, he already published his first book entitled 'Von den äußeren Kennzeichen der Fossilien' ('on the exterior features of fossils'), which was the first mineral identification book in the world. With this book he also developed a mineral classification scheme which categorised minerals based on their properties. As a visual aid for his lectures and as a basis for his scientific work, he built up a private collection over his many years of work, which he sold to the Bergakademie in 1814 for 40,000 thaler. By taking over this significant collection which even today consists of approximately 10,000 specimens, the mineralogical collection in particular was given a great development stimulus. It is one of the most valuable historical collections in the entire TU Bergakademie. Werner's intensive collecting plus his meticulous identification and description of the material were the basis of his scientific success. He himself wrote the original descriptions of 12 new minerals. Wemerite, named after him, is a new variety of mineral belonging to the scapolite group. His collections were of great significance to the teaching work of Abraham Gottlob Werner. By directly viewing the materials, he was able to teach the students in an extraordinarily practical fashion. He also provided original ideas on how best to subdivide geoscientific collections. For example, he built up a systematic mineral collection and a geological collection so as to best be able to use the collections for his various lectures. After Werner's death, the chair was split into two professorships. The collections were adapted to the new chairs, causing two separate collections to develop from then on; the mineralogical and geological partial collections. More and more chairs were created in later years, causing both of these main fields to be constantly divided in order to optimise them for their purpose of serving to help educate the students. The 'university town' was built in the fifth decade of the 20<sup>th</sup> century and with this, the geologists received in the Humboldt building their own department building and exhibition areas for the collections. This meant that the mineralogical and geological collections were finally physically separated.

Today, in addition to the actual mineralogical collections, five more geoscientific partial collections are accommodated: the Petrological and Ore Deposit Collections in the Mineralogical Institute and the Paleontological and Stratigraphical Collections in the Geological Institute. The Collection of Fuel Geology was transferred in recent years and can now be found on the site of the 'Reiche Zeche' ('rich pit') training and research mine. These will each be introduced after the developments after the death of Werner.

In 1817, C. F. C. Mohs (1773-1839), as the professor of mineralogy, also assumed responsibility for the development of the collection. His fundamental work in mineral identification was in creating the abrasive hardness scale consisting of 10 levels.



Carl Friedrich Christian Mohs (1773-1839).



Johann Friedrich August Breithaupt (1791-1873).

For 40 years from 1826, F. A. Breithaupt (1791-1873) managed the mineralogical education of miners and metalworkers at the Bergakademie. Alongside his numerous scientific works, he oversaw the collection as a steward. His interest lay in expanding the collection and the resulting new acquisitions originated both from his own collections during excursions and from purchases and gifts. When classifying the specimens, he wrote out the tags himself, many of which are still traceable today. His successful scientific work (roughly 500 publications) is recorded by 45 original descriptions. Breithaupt's most significant work, 'Die Paragenese der Mineralien' ('mineral paragenesis'), is an important contribution to the establishment of education in ore deposits. In 1840, in recognition of the merits of Breithaupt, a newly discovered nickel antimonide mineral was named breithauptite.

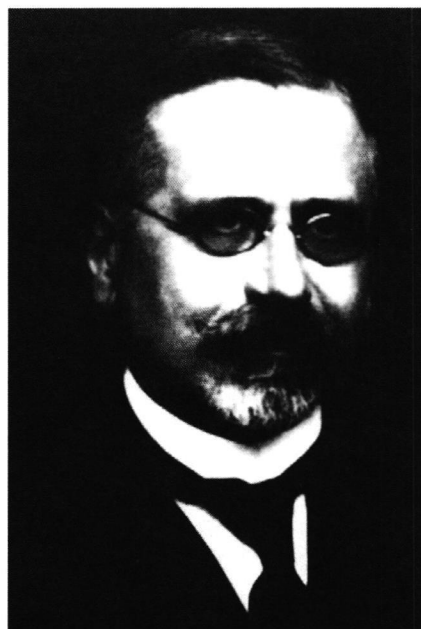


Albin Julius Weisbach (1833-1901).

In 1866, A. J. Weisbach (1833-1901) became the professor of mineralogy. As the steward of the collection, he examined the mineralogical composition of every specimen until the end of his office in 1900. He broke away from the Linnaean taxonomy and worked with the internationally recognised mineral nomenclature for the first time. Weisbach reprocessed and

reorganised the collection, which worthily concluded in his publishing the 'Tabellen zur Bestimmung der Mineralien' ('tables for the identification of minerals'). Eleven original descriptions of minerals can be traced back to him. One important mineral of these eleven is argyrodite, in which C. Winkler discovered germanium. The 'find of the decade' of the 'Weißer Hirsch' mine in Schneeberg in 1871 is worthy of mention in this regard. Weisbach identified five new secondary uranium minerals in this mine.

At the transition into the 20<sup>th</sup> century, by which time the collection had grown to around 30,000 specimens and new accommodation was urgently required for it, Freiberg was seen as the centre of geosciences.



Friedrich Ludwig Wilhelm Kolbeck (1860-1943).

When appointed professor of mineralogy and blowpipe docimacy in 1901, F. L. W. Kolbeck (1869-1943) assumed the office of steward of the collection. Together with R. Beck (1858-1919), the professor of geology, ore deposits and petrification and future vice chancellor, he prompted the Saxon government to construct a new mineralogical and geological institute which was dedicated in 1916. Thanks to Kolbeck, the relocation into the newly constructed building went off smoothly and with no losses. He built up various special collections in order to support the education of the students. A mineral discovered in the Sadisdorf copper mine was named kolbeckite in his honour. Before teaching recommenced at the Bergakademie after the Second World War, the collection was restored to its old location after being transferred to Freudenstein Castle. With the creation of the post of custodian in 1952, for the first time F. Leutwein created a group of employees dedicated solely to the collections. In the period that followed, the custodian of the collection worked very closely with the chair of mineralogy. In this way, a great international system of exchange was created during the term of H.-J. Rösler in order to overcome the stagnation in the state of completion of the collection caused by the period of National Socialism and to create a basis for continuous development.

From 2004, events in Freiburg began to follow in quick succession. After collecting for over 60 years, Dr Erika Pohl-Ströher, originally from the Saxon Vogtland region and now living in Switzerland, decided to make her collection of tens of thousands of specimens available to a wider audience. The collection built up over decades was not to be cast to the winds one day by traders, but rather the wish was to keep it as united as possible and display it prestigiously

to the public in a museum or exhibition. Therefore, with a total of over 35 million euros in subsidies from the European Union, the federal government and the Free State of Saxony combined with Freiberg's own resources, the ailing Freudenstein Castle was transformed into a treasure chest over the next four years. A modern exhibition concept, developed by employees of the TU together with the architectural firm AFF in Berlin, it was designed to appeal above all to young people and to arouse interest in issues of natural science.

Alongside this large project, in 2007 the Krüger Foundation began to restore the former district offices directly in front of the gates of Freudenstein Castle, intending to create a geoscientific exhibition to complement terra mineralia that would allow visitors to embark on a mineralogical journey through Germany. To realise this idea, the 'Mineralogische Sammlung Deutschland' ('mineralogical collection of Germany') foundation was created in 2008 by the then rector of the TU Bergakademie and future Saxon finance minister Professor Georg Unland. This foundation became a nucleus for a national German collection. Here, minerals of scientific, historical or aesthetic significance and geoscientifically relevant exhibits are collected with the aim of securing and preserving mineralogical assets whilst using them for research and teaching work at the same time.



Abraham-Gottlieb-Werner-Building.  
Photo: Andreas Massanek.

### **A journey through the world of the mineral classification**

The exhibition in the large room in the Abraham-Gottlob-Werner building is based on the mineralogical classification scheme and was also adapted to the TU Bergakademie Freiberg using the 'special mineralogy' lecturing concept. This classification scheme takes the crystallochemical data, chemical bonds and geochemical and genetic relationships of the minerals into consideration and in doing so represents a combination of the Strunz and Kostov classification schemes.

At present approximately 4,400 different types of mineral are known, around 3,100 of which are present in the collection. It is impossible to exhibit examples of all minerals. The selection covers the most important minerals from their most famous places of discovery around the