

## History of discovery and study of new primary minerals at Jáchymov

### Historie objevů a výzkumů nových primárních minerálů z Jáchymova

(2 figs, 1 tab.)

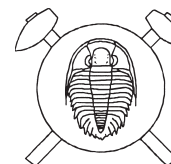
FRANTIŠEK VESELOVSKÝ<sup>1</sup> – PETR ONDRUŠ<sup>1</sup> – ANANDA GABAŠOVÁ<sup>1</sup> – JAN HLOUŠEK<sup>2</sup> – PAVEL VLAŠÍMSKÝ<sup>1</sup>

<sup>1</sup> Czech Geological Survey, Klárov 3, CZ-118 21, Prague 1

<sup>2</sup> U Roháčových kasáren 24, CZ-100 00, Prague 10

Jáchymov is the type locality for the following primary minerals: argentopyrite, krutovite, millerite, sternbergite, and uraninite. The history of their discovery is described in this contribution. The paper sums up the history of discovery of other type minerals at Jáchymov [560].

*Key words:* Jáchymov, mineralogy, history of discovery



#### Argentopyrite

(*W. Sartorius von Waltershausen 1866*)

The discovery of this mineral was reported by W. Sartorius von Waltershausen at the meeting of the Royal Society of Sciences on December 6, 1865 and published in January 1866 in a joint Newsletter of the Society and the Göttingen University [438]. He named the new mineral “*Silberkies*”. The history behind the discovery of *argentopyrite* is as follows:

During his stay in Příbram in summer 1865, W. Sartorius met the ministerial Councillor Kudernatsch, who had just returned from his inspection trip to Jáchymov, and he showed W. Sartorius a recently found unknown mineral. The specimen carried *proustite* intergrown with a mineral similar at first glance to *marcasite* or *pyrrhotite*. Councillor Kudernatsch allowed to break off a part of the specimen covered by crystals of this mineral. W. Sartorius separated 22 mg of pure material to be used in microscopic, crystallographic and chemical study. Several weeks later he visited Jáchymov and, with approval of the Mining Councillor Walther, he could inspect numerous samples. About ten samples carried the unknown mineral. However, Walther turned down the request to use these samples for study without a special permit from Vienna.

At the meeting of the Royal Society for Sciences on February 3, 1866, W. Sartorius reported on this mineral as “*argentopyrite*”, using an old specimen from the private collection of the mining administrator Lippmann. The specimen originated from the defunct mine *Neu Leipziger Glück* in Johann-Georgenstadt (W. Sartorius 1866 [529]).

As early as on June 12, 1866, G. Tschermak [469] reported his results from the study of the same mineral at the meeting of the Emperor’s Academy of Science, and published them in the Reports from this meeting. Through efforts of the Director Hörnes, 9 specimens of this mineral were found in the Emperor’s Mineral cabinet and additional 2 specimens in the University collection. Tschermak assumed that the mineral had been known before and that it was identical to the material described as

*marcasite* pseudomorphs after *stephanite* or *proustite* by Zippe in 1832. In 1852 and 1853, Kenngott described the mineral as accompanying *pyrargyrite* and by that time A. E. Reuss designated it as *pyrrhotite*. His observations led Tschermak to the conclusion that *argentopyrite* is not an independent mineral but a pseudomorph of several minerals after an unknown mineral.



Fig. 1. Label of argentopyrite in the collections of the National Museum Prague. Photo J. Sejkora.

#### Krutovite

(*Vinogradova 1976*)

The original samples were collected at Potůčky on a defunct mine dump near a former storehouse of technological samples. The mineral was described as an unusual *gersdorffite* intergrown with *nickel-skutterudite* on *quartz* by Kašpar and Paděra in 1970 [489].

Later on, the mineral was studied by Vinogradova et al. and described in 1976 [335] as a new mineral *krutovite*. The original locality of the samples was reinterpreted to Jáchymov, Svornost shaft, 8<sup>th</sup> level, Geschieber vein. It was assumed that barrels with the raw material were moved to Potůčky for silver processing.

### Millerite

(W. Haidinger 1845)

A. G. Werner described a mineral which he named “*Haarkies*” from Johann-Georgenstadt in Saxony in 1789 [223]. This mineral was reported from Jáchymov in 1803 by F. A. Reuss, medical doctor in Bílina, in his textbook on mineralogy and geognosy [614]. The current name *millerite* was introduced by Haidinger in 1845 [357], who noted that the mineral occurs in Jáchymov.

### Sternbergite

(W. Haidinger 1827)

In 1826, W. Haidinger visited the mineralogical collection in Prague in the Museum of the Kingdom of Bohemia. Its curator F. X. Zippe attracted his attention to a peculiar mineral, which could not be identified with any of the known mineral species. The same mineral appeared in the collection of the councillor Neumann, the former professor of chemistry, in Prague. Haidinger took both specimens for a detailed study to Edinburgh and found that it was a new mineral species. He named the mineral *sternbergite* after the founder of the Bohemian Museum, the Count K. Sternberg. W. Haidinger did not exclude the possibility that the malleable silver sulphide (“*argent sulfuré flexible*”) previously described by Count Bourbon [491] was identical with *sternbergite*. Zippe performed the analysis of *sternbergite* and tried to synthesize this mineral using appropriate proportions of *argentite*, *pyrite* and FeS or Ag, Fe, S, but he did not succeed. A porous and magnetic bronze-coloured mass with hardness 3 and density of 5.2–5.5 g/cm<sup>3</sup> was obtained.

A notable quantity of *sternbergite* was found in the Junghäuerzecher vein in March 1860, and most of the material was bought by the Krantz Company [363].

Preis [526] obtained two *sternbergite* analyses in 1875, using the material provided by K. Vrba. Additional analyses on material from Jáchymov were done by Rammelsberg and Janovský [525].



Fig. 2. Label of *sternbergite* in the collections of the National Museum Prague. Photo J. Sejkora.

Table 1. List of historical chemical analyses of *sternbergite*.

		Ag	Fe	S	SiO <sub>2</sub>	Total
Zippe	[526]	33.20	36.00	30.00		99.20
Preis	[526]	37.30	27.90	32.90		98.10
Preis	[526]	37.40	27.60	33.90		98.90
Rammelsberg	[525]	35.27	35.97	29.10		100.34
Janovský	[525]	30.03	34.67	33.14	1.32	99.16

### Uraninite

(F. E. Brückmann 1727)

Although *uraninite* was encountered already by early Jáchymov miners, its composition remained a mystery for a long time. It was introduced in the literature with Jáchymov locality by Brückmann in 1727 [494].

This German medical doctor and “geognosist” presented a detailed listing of Jáchymov minerals in a script entitled *Magnalia Dei in Locis Subterraneis (The Greatness of God in Subterranean Sites)*. Uraninite is listed as “*Schwartz Bech Ertz*”, i.e. black pitch ore, which contains silver, copper and lead.

I. Born [181] considered *uraninite* as a zinc ore (*Argentum zincosum nigrum squamosum opacum*) in his 1772 catalogue of Jáchymov minerals – a widespread opinion by that time – but mentioned *Pseudogalena nigra compacta*, i.e., Pechblende = pitchblende from the mines of Friedenfeld and Hohe Tanne (Vysoká jedle). In another catalogue of Jáchymov mineral collection from 1790 [197], he described pitchblende as “amorphous blende with sparkling fracture” and mentioned a yellow oxide in one sample of *uraninite*. This may be the first literature reference to the formation of yellow secondary minerals from *uraninite*. Otherwise, yellow uranium oxides were considered as resulting from tungsten oxidation.

The name *uranin* (later *uraninite*) was introduced by W. Haidinger in his mineralogical monograph published in 1845 [357].

For centuries, miners in Jáchymov treated *uraninite* as a waste and threw it on dumps. It was the application of uranium compounds as colours in glass and porcelain industry, which triggered interest in *uraninite*. Increasing demand in yellow, orange and black colours led to *uraninite* mining as well as to collecting in old dumps. The discovery by M. Skłodowska-Curie and P. Curie of the elements polonium and radium was based on processing of material remaining after production of uranium colours in Jáchymov. After the decline of demand for uranium colours, the factory changed its programme to production of radium compounds. Even this programme was stopped after the discovery of large uranium deposits in Canada and Congo, providing cheap *uraninite*.

## Historie objevů a výzkumů nových primárních minerálů z Jáchymova

Jáchymov je typová lokalita pro následující primární minerály – argentopyrit, krutovit, millerit, sternbergit a uraninit. Je popisována historie objevů a popisů těchto minerálů. Článek doplňuje historii objevů minerálů, pro které je Jáchymov typová lokalita a které byly publikovány v roce 1977 [560].