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## Dva zajímavé typy phillipsitu z čedičů v severovýchodních Čechách.

### Two Interesting Types of Phillipsite from the Basalts of N-E. Bohemia.

(3 obr. v textu.)

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Čedičové erupce v Podkrkonoší poskytly v poslední době dva zajímavé typy srostlic phillipsitu.

V dutinách olivinického čediče na západě v okolí Kumburka (c. 640), západně od Nové Paky, byl nalezen MUDr. LAD. KAIZLEM vzácný typ phillipsitu, tvořený sněhobílými, 3—4 mm velikými *pseudooktaedry*, mezi — 2 R špinavě šedého, silně korodovaného kalcitu. Plochy těchto srostlic jsou silně druzovité, schodovitě parketované a často zřetelně rýhované. Na hranách pseudooktaedrů možno pozorovati i rýhování zpeřené, pro phillipsit charakteristické. — Velmi podobný typ phillipsitu popsal STADTLANDER (6) ze Stempelu jv. od Marburgu v západním Německu.

Druhý, neméně vzácný typ phillipsitu tvoří droboučké, maximálně 0.75 milimetru veliké krystaly v porfyrické facii olivinického čediče v Supí hůrce (c. 502) u Stupně, sv. od Nové Paky. Dvojčata podle (001) jsou v prismatickém pásmu omezena (010), uzoučkými ploškami (110) a značně vyvinutou plochou (100), která je u phillipsitu málo obvyklá. Čtyřčata podle (011), která zde převládají, jsou povětšinou nepravidelná, neboť jedno z dvojčat obyčejně převládá. Podobný, ještě však jednodušší typ, byl popsán WERNEKINCKEM (8) ze známé lokality Annerode u Giessenu v Hessensku. LACROIX (3) nazývá tento typ sruštěm Bow-

ling sk ý m a popisuje jej z čedičů yrchu Simiouse u Montbrisonu (dept. Loire) ve Francii.

Není pochyby, že dalším detailním výzkumem čedičů podkrkonošských bude zeolithová paragenese i zde značně obohacena.

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The eruptions of the young volcanic rocks in Northern Bohemia present in their hydrothermal phase a rich paragenesis of zeolites of which chiefly the zeolites of the České Středohoří are known. Comparatively less known are the zeolites of basalt necks and dykes in Northeastern Bohemia, especially in the region south of the Giant's Mountains, evidently because these rocks do not form there large mountains; they form peaks and dykes very rarely dispersed, frequently of very small dimensions.

On collecting minerals in this territory, two interesting types of phillipsite crystals have been found, which were not yet described from the Bohemian localities. Both occur in olivinic basalts, which break through permocarbonian strata.

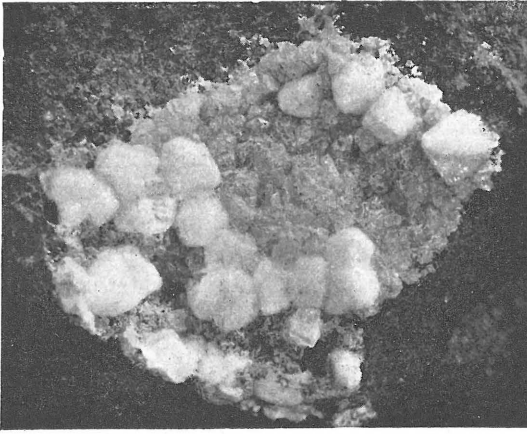
### 1. Phillipsite from Kumburk Hill near Nová Paka.

To the west from the peak of the Kumburk Hill (c. 640), W. from Nová Paka in basaltic dyke a large quarry is open, which is land's propriety. In crevasses and cavities of this compact, dark grey olivinic basalt the crystals of phillipsite have been found by doctor LAD. KAIZL, physician at Nová Paka. They form striking snow white twins sticking out between the dirty grey — 2 R of *calcite*, the surfaces of which are distinctly drusy and partly strongly etched. They are sometimes covered with greyish yellow, delicately fibrous *chlorite*, which covers on other places continuously the surface of the cavities. Paragenetically, phillipsite is the oldest mineral sitting directly on the basalt and after it the crystals of calcite were formed, with which the phillipsite is often entirely surrounded, and the most recent mineral are the films of chlorite.

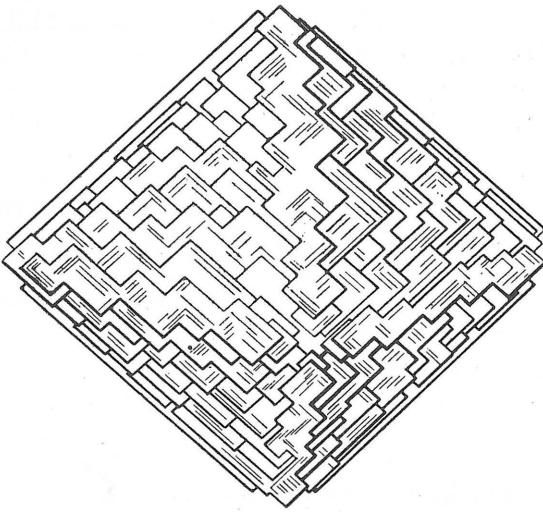
*Phillipsite* forms there clearly white, 3—4 mm large crystals of strong vitreous luster and has the *rare pseudooctahedral type*. Already macroscopically we see, that the faces of the pseudooctahedrons are formed distinctly by subindividuals. By the detailed investigation we recognize, that only the exterior layer is transparent and of vitreous luster, the interior is opaque and sugar-white, often also porous enough. On the surface and in the inside these twins are often covered with fine dendritic coatings of *psilomelane*. Especially the porous inside of the crystals usually contains many of them and frequently also abundant parts of chlorite are infiltrated.

The form and the habitus of the crystals of phillipsite are unusually interesting. By gradual growth of monoclinic individuals parallelly to the planes (001), (011) and (110) have not produce a pseudododecahedron, which

is the most frequent on the phillipsite, but a very rare pseudooctahedral type which STADTLANDER (6) suppose to be a peculiar phenomenon of growth. These forms have been produced probably by a rapid growth and the lack



1. Phillipsite twins with the crystals of calcite in olivine basalt (Enlargement  $\frac{1}{2}$ ).



2. The sketch of pseudooctahedral type of phillipsite twins.

of the building material. The surface of the pseudooctahedrons have generally a drusy character; they consist equally orientated and stairlike arranged tabular crystals, which are on all the surfaces frequently very strongly and often also featherlike striated. Were the solid angle of a pseudododecahedron is on the common type formed, many small points arranged in

the plane are developed. On the edges we observe rather continuous small faces showing the characteristic featherlike striation. On the whole one observe the notorious fact which has been detailly studied by LEHMANN (4), namely that by a quick crystalization of a strongly diluted solution, the crystals grow more quickly on edges and solid angles than in the planes. Therefore also here in the same conditions the solid angle of pseudododecahedron could not be formed. Also the porous inside of the twins proves a relatively quick growth. The qualitative tests of the crystals gave an essential content of Ca and Al, and only an insignificant one of Ba. The powder preparate of the mineral showed a low birefringence, an indistinct cleavage, a mean refraction index between 1.498 and 1.506 and many regularly arranged inclusions. The density was determined by the pycnometric methode to 2.13.

The pseudooctahedric type of phillipsite twins is on the whole very rare. Quite similar crystals have been described by STADTLÄNDER (6, p. 124, 132) from the Stempel Hill S. E. of Marburg in Western Germany. From the well known localities of zeolites in the České Středohoří (Bohemian Middle Mountains), the complete list of which is published by HIBSCH (2), this type of phillipsite is not yet known. But quite frequent are other crystal types with a rough and often also delicately druzi and stairlike surface. Near Zálezly S. from Ústí nad Labem (Aussig) occur in the basalt many round aggregates of phillipsite. Quite similar ones are known also from the Vinařická hora (Vinařice Hill), N. of Kladno, where, on the contrary, one can see very well the inclination to the genesis of pseudododecahedric types and only rarely to the pseudooctahedric form which is never so perfectly developed like on the locality just described. Very good pseudododecahedrons of phillipsite with stairlike and druzi surfaces have been recently described by MAURITZ (5) from the region of the Balaton lake in Hungary. Round aggregates are known also from the leucitites of Capo di Bove (namely from the localities Acquacetosa and Schizanello near Rome).

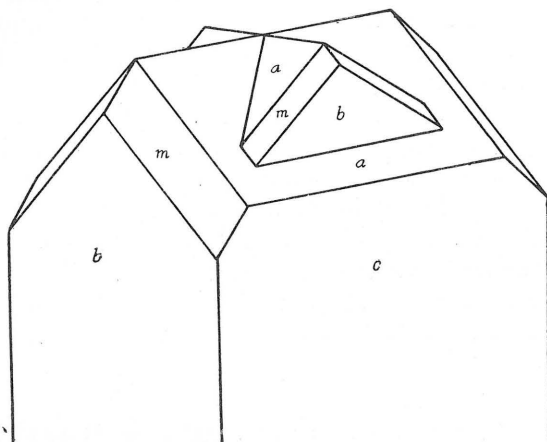
For the basalts of Northern Bohemia the pseudooctahedric type of phillipsite here described is the only known till now. Unfortunately it is not possible to obtain further specimens from the quarry, working there having been interrupted.

## 2. The Phillipsite from Stupná, N. E. of Nová Paka.

The second equally rare and interesting type of phillipsite was discovered in the basaltic hill Supí hůrka (c. 502) near the village Stupná, N. E. of Nová Paka. The greatest part of this isolated basalt hill is formed of *basaltic tuf*, in which an extensive, in present time deserted quarry is established. The compact, dark grey basalt with frequent *chrysolite* grains is found only in the bottom of the quarry. On the northwestern slope of the hill near the way only a small part of the porphyric facies of basalt is uncovered, which is

striking by its *amphibole* individuals, attaining till 8 cm in length and rather fresh. Numerous crevasses and cavities, mostly of small dimensions, usually have their sides covered with compact coatings of very small crystals of zeolites, namely of *phillipsite* and *chabasite*. The occurrence of these zeolites has not yet been described.

The crystals of *phillipsite* attain a maximum size of 0.75 mm; they are mostly of a dirty white colour and usually have a thin cover of limonite. Only rather rarely occur there translucent penetration-twins of the common type with  $(001)$  as twinning plane, with the forms  $(001)$ ,  $(010)$  and  $(110)$ . Much more frequently occur there rare and unusual types:



3. *Phillipsite* from Stupná. — Penetration fourling with  $(011)$  as twinning-plane. a  $(100)$ , b  $(010)$ , c  $(001)$ , m  $(110)$ .

thick clinopinacoidal tabular crystals with  $(100)$  predominating over  $(110)$  in the prismatic zone.  $(110)$  forms often only narrow faces cutting off the edges between  $(010)$  and  $(100)$ . The faces of the prismatic zone are distinctly striated parallelly to the edge  $(100)$  and  $(010)$ . The simple penetration twins of this type with  $(001)$  as twinning plane are on the whole rare. The most usual type of this locality is a cruciform penetration fourling with the twinning plane  $(011)$ . Usually one of the twins predominates strongly over the other and we observe very often that it forms only a step on  $(100)$  of the larger twin. The prisms of both twins are usually parallel. There exist of course also cases, where both twins are in equal extent developed. By filling of their angles between the faces  $(100)$  of both twins, an usual fourling with  $(011)$  as the twinning plane would be developed. The polar edges of both twins cut each other rectangularly and form a perfect cross justifying the old German name *Kreuzstein*, with which formerly both, *harmotone* and *phillipsite*, have been designated.

Observed forms:	measured	calculated
(010) : (100)	91° 35'	90° 00'
(010) : (110)	59° 37'	59° 19'
(010) : (100)	32° 58'	30° 41'

In powder prepare a relatively low birefringence and the mean refraction index about 1.49 have been found. The density, determined with the Westphal weight, is 2.28.

Similar and very related types of phillipsite are very rare. They have been described for the first time from the classic locality Annerode near Giessen in Hessen (Germany), where WERNEKINCK (8) because of the content of Ba discerned the harmotome from the phillipsite. There are here also fourlings without any prismatic faces and every transition to crystals with gradually increasing and finally predominating faces of (110). Here too repeats again the fact, that the individuals of the twins are not equally developed. The fourling without the faces (110) from the basalt of Aschbach in Rhineland (Germany) have been described also by vom RATH (7). Very similar crystals described LACROIX (3) from the Simiouse Hill by Montbrison (Dép. Loire) in France, where they occur also in basalt, together with chabasite. They have been called by him Bowlingtype after Bowling in Scotland, where the harmotome is of the same type. HEDDLE (1) describes from the basalts in region of Edinburgh and Renfrewshire in Scotland phillipsite twins with predominating faces of (100).

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Doubtless by further discoveries of basalts in Northeastern Bohemia many new and interesting mineral types especially of the zeolite-group may be found.

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