

NEW MINERAL NAMES

MICHAEL FLEISCHER

Paracostibite

L. J. CABRI, D. C. HARRIS, AND J. M. STEWART (1970). Paracostibite (CoSbS) and nisbite (NiSb₂), new minerals from the Red Lake area, Ontario, Canada. *Can. Mineral.* **10**, 232-246.

A brief mention of unnamed CoSbS was made in an abstract [see *Amer. Mineral.* **55**, 1444 (1970)]. The full description now has been published.

Paracostibite occurs as irregular and subhedral grains up to about 130 microns in size. It occurs in two assemblages: (1) with sphalerite, chalcopyrite, and galena; (2) with pyrrargyrite, pyrrhotite, antimonial silver, galena, and chalcopyrite. The mineral is weakly birefracting, appearing white with a faint grayish tinge in air and in oil immersion. Reflectivity values are: 470 nm, max. 47.8, min. 46.9; 546 nm, Max. 48.1, min. 47.5; 589 nm, max. 48.4, min. 47.7; 650 nm, max. 48.8, min. 48.0. VHN microhardness with a 15 g weight gave an average value of 1009 kg/mm² (range 936-1091).

Electron-probe analyses of five grains gave the following average values (the range is given in parentheses): Co 26.4 (25.1 to 27.0), Fe 0.4 (0.0 to 0.6), Ni 0.8 (0.6 to 1.6), Sb 56.8 (56.1 to 57.6), S 14.9 (14.7 to 15.4), total 99.3 (98.5 to 100.6) wt %. These data yield an empirical formula of (Co, Fe, Ni)_{1.004}Sb_{1.000}S_{0.996}, equivalent to CoSbS (the formula CbSbS on page 237 is obviously a typographical error).

Although no single-crystal X-ray studies were carried out, the X-ray powder pattern of paracostibite is very close to that of pararammelsbergite. On this basis, paracostibite has space group *Pbca*, with *a* 5.764, *b* 5.952, *c* 11.635 (all in Å) and *Z* = 8. The calculated density is 7.1 g/cc (7.069 g/cc for synthetic CoSbS). The measured density of the synthetic material is 6.9 g/cc. The strongest spacings in the X-ray powder pattern (in Å for the Fe-filtered, Co radiation) are: 5.813 (8)(002), 2.555(10)(211,121), 2.0354 (8)(221), and 1.8525 (8)(13). The last spacing also corresponds to a chalcopyrite spacing. In the abstract of the paper, the authors list the following strongest spacings: 5.81(8)(002), 2.83(7)(113), 2.65(7)(022), 2.555(10)(211,121), 2.409(7)(122), and 2.035(8)(221). There are some obvious intensity differences between equivalent spacings in the natural and synthetic materials, and probably are caused by the presence of the other phases in the natural sample.

Paracostibite was found in drill-core from Mulcahy Township, District of Kenora, Red Lake Mining Division, Ontario. The name is for the composition and probable structured relation to pararammelsbergite. The mineral and name were approved by the Commission on New Minerals and Mineral Names, I.M.A. Type material is preserved at the National Mineral Collection, Ottawa, and the Royal Ontario Museum, Toronto.

J. A. MANDARINO

Nisbite

L. J. CABRI, D. C. HARRIS, AND J. M. STEWART (1970) Paracostibite (CoSbS) and nisbite (NiSb₂), new minerals from the Red Lake area, Ontario, Canada. *Can. Mineral.* **10**, 232-246.

As with paracostibite, a brief mention of unnamed NiSb₂ was made in an abstract [*Amer. Mineral.* **55**, 1444 (1970)]. The following data are from the full description.

Nisbite was found in two polished sections from the same drill-cores which provided paracostibite (see abstract in this issue). Nisbite occurs as irregular grains up to 20 μm in

size. It is associated with chalcopyrite, breithauptite, pyrrargyrite, galena, pyrrhotite, and tetrahedrite.

The mineral is very weakly birefracting and appears white in oil and in air. It is weakly anisotropic. The averaged reflectivity values for three grains are: 58.8% at 470 nm, 59.4% at 546 nm, 60.2% at 589 nm, and 59.6% at 650 nm. Microhardness values for 10 indentations with a 5 g weight ranged from 420 to 513 kg/mm², with an average of 479 kg/mm².

Electron probe analyses of four grains gave: Ni 19.15, Sb 80.43, total 99.58, all in wt %. The empirical formula derived from these data is Ni_{1.0}Sb_{2.15} or NiSb₂.

No single-crystal X-ray studies could be done, but from the study of Rosenqvist [*Acta Met.* **1**, 761-763 (1953)] on synthetic NiSb₂, the space group probably is *Pnmm*. Cell parameters for the natural material are *a* 5.162, *b* 6.303, *c* 3.839 all in Å. With *Z*=2, the calculated density is 8.0 g/cc. Because of the small grain size, X-ray powder patterns of nisbite free from other phases could not be obtained. The strongest spacings in the powder pattern of synthetic nisbite (in Å for Fe-filtered, Co radiation) are: 2.761(10)(111), 2.689(9)(120), 2.031(8)(211), 1.8427(7)(031), and 0.9045(7)(450).

The name is for the composition. The mineral and name were approved by the Commission on New Minerals and Mineral Names, I.M.A. Type material is preserved at the National Mineral collection, Ottawa.

J. A. MANDARINO

Unnamed Cu_{0.12}Fe_{0.94}S

A. H. CLARK (1970) An unusual copper-iron sulfide, Cu_{0.12}Fe_{0.94}S_{1.00}, from the Ylöjärvi copper-tungsten deposit. *Econ. Geol.* **65**, 590-591.

Electron microprobe analyses gave Cu 8.37±0.5, Fe 56.77±0.3, S 34.4±0.5, sum 99.6%, differing from known phases in the system Cu-Fe-S. The mineral occurs as rods or lamellae, rarely up to 200 μm long and 40 μm wide, associated with plates of orthorhombic cubanite in chalcopyrite grains. It is strongly anisotropic, from dark bluish-gray to grayish-white. In air distinctly birefringent, colors yellowish-pink to pale bluish-pink. Vickers hardness, 15 g. load, gave 32 to 75, with most readings 40-44. The reflectance in air at 546 nm was 41-48.5, average 45.5%. The mineral takes a good polish and does not tarnish. Traces of a poorly developed cleavage were seen on some grains. Heating an intergrowth of the sulfide with cubanite and chalcopyrite in vacuo gave: 125°, 6 hours, no change; 160°, 3 hours, and 200°, 1 hour, caused a marked decrease in the size of the lamellae and some were entirely absorbed in the host chalcopyrite.

Athabascaite

D. C. HARRIS, L. J. CABRI, AND S. KATMAN (1970). Athabascaite: a new copper selenide mineral from Martin Lake, Saskatchewan. *Can. Mineral.* **10**, 207-215.

This mineral, Cu₅Se₄, was abstracted previously [*Amer. Mineral.* **55**, 1444 (1970)] from an abstract as an unnamed copper selenide. The full paper now has been published with the following additional data. Refined unit cell parameters for the orthorhombic cell are: *a* 8.227 Å, *b* 11.982 Å, and *c* 6.441 Å. Athabascaite occurs as inclusions in, and replacements of, umangite, and as stringers in carbonate vein material. The mineral is found as lath-shaped grains up to 100 microns by 40 microns.

The name is for Lake Athabasca in northern Saskatchewan and Alberta, and was approved by the Commission on New Minerals and Mineral Names, I.M.A. Type material is deposited in the National Mineral Collection, Ottawa, and the Royal Ontario Museum, Toronto.

J. A. MANDARINO

Hodrushite

M. KODĚRA, V. KUPČIK, AND E. MAKOVICKÝ (1970). Hodrushite—a new sulphosalt. *Mineral. Mag.* **37**, 641–648.

Hodrushite was found on the 150- and 250-meter mining levels of the Rosalia vein in Banská-Hodruša near Banská-Štiavnica, Czechoslovakia. It is associated with quartz, hematite, and locally with chalcopyrite and wittichenite(?). It forms needle-shaped crystals less than 1 mm in length, irregular grains, or finegrained aggregates. Occasionally, columnar and platy crystals (up to 5 mm long) are found. These are striated vertically. Hodrushite has a metallic luster and a steel-gray color with a slight yellowish tint on fresh surfaces. It quickly tarnishes in air to a brownish-bronze color. The mineral is very brittle and has no distinct cleavage. The microhardness values (25 measurements) are: max. 213 kg/mm², min. 187 kg/mm², average 200 kg/mm². The measured density of hodrushite with about 15% of hematite is 6.18 ± 0.03 g/cm³. Recalculated for pure hodrushite, the density is about 6.35 g/cm³. This corresponds to a calculated density of 6.451 g/cm³.

In polished section the mineral has a creamy color with a very slight pinkish tint and no internal reflections. Birefractance (in oil only) is very weak. Anisotropy (in grayish colors) is very feeble. Reflectivity values are given for eleven wavelengths. The maximum reflectivity occurs at 5800–6000 Å. Values at 5800 Å are: max. 33.4% and min. 32.0%.

Hodrushite is monoclinic, with space group *A2/m*, *a* 27.205 ± 0.050, *b* 3.927 ± 0.015, *c* 17.575 ± 0.050 (all in Å), β 92°9' ± 10'. Strongest spacings in the X-ray powder pattern (in Å for Cu-K α radiation) are: 3.62(s)(404), 3.22(m/s)(802), 3.102(vs)(313, 511), and 2.715(s)(711, 406).

Two wet chemical analyses and an electron probe analysis were carried out. The wet analyses gave: Bi 54.49, 55.76; Cu 12.83, 13.01; S 18.04, 19.23; Fe₂O₃ 15.09, 6.28; Pb not determined, 0.93; Ag not determined, 0.24; sum 100.45, 95.45 wt.%. The electron probe analysis gave: Bi 64.92, Cu 13.88, Fe .044, S 18.98, sum 93.23 wt.%. The formula accepted for hodrushite is Cu_{8.12}Bi_{11.4}Fe_{0.29}S_{22.00} which is in good agreement with the formula derived from a crystal structure analysis: Cu₈Bi₁₀Me₂S₂₂ where Me represents metal atoms with an atomic number equal to or slightly smaller than that of Bi.

The name is for the locality.

J. A. MANDARINO

Gustavite

S. KARUP-MOLLER (1970) Gustavite, a new sulphosalt mineral from Greenland. *Can. Mineral.* **10**, 173–190.

Gustavite occurs as tabular grains up to 2×2×0.5 millimeters with an average size of 1×1×0.25 millimeters. It has a rare cleavage, parallel to the tabular plates. Grains show two types of twinning: (a) repeated twinning with the composition plane parallel to the tabular plates is most common; (b) in a few grains, the composition plane is perpendicular to the tabular grains and may be due to deformation as such grains are bent slightly.

The polishing harness of gustavite is less than that of cosalite and aikinite, but higher than that of galena. Vickers hardness number (100 g load) varies with direction: 218 parallel to tabular grain and 175 perpendicular to tabular grain; Δ VHN=43. Reflectivity measurements on two grains gave (for $\lambda=546$ nm) 42–46% in air. Reflection colours are white to gray-white in air and oil similar to those of cosalite and galena. Grains perpendicular to the polished surface show weak pleochroism in air and distinct pleochroism in oil. Grains oriented parallel to the polished surface show slight to practically no pleochroism. Anisotropy is weak in air, but distinct in oil. Anisotropy colors are bluish-black near the extinction position and grayish-white to cream in the 45° position. Gustavite is not etched by the standard reagents.

The mineral is orthorhombic, with space group *Bbmm*, *Bb2*, *m*, or *Bbm2*; $a=13.548$, $b=19.449$, and $c=4.105$ (all in Å). Axial ratio, $a:b:c=0.6966:1:0.2111$ (JAM). Strongest spacings in the Guinier powder pattern (in Å for $\text{CuK}\alpha_1$) are: 3.640(8)(121), 3.401(8)(400), 3.376(8)(250), 3.363(10)(131), 2.996(10)(311), 2.895(10)(321), and 2.751(8)(331).

Two to four electron microprobe analyses were carried out on each of four grains. All the analyses plot very close together on a $\text{Bi}_2\text{S}_3\text{-Ag}_2\text{S-Pb}_2\text{S}_2$ compositional diagram. Two analyses of one grain are given as: Ag 7.39, 7.37; Pb 22.82, 22.00; Bi 51.15, 51.71; S 17.13, 17.27; total 98.49, 98.35 wt.%. The sulfur determinations are considered low. Using stoichiometrically calculated sulfur, the formula of gustavite is $\text{Bi}_{11}\text{Pb}_5\text{Ag}_3\text{S}_{23}$. However, considering the size of the unit cell and the space group requirements, the only acceptable composition is $\text{Bi}_{11}\text{Pb}_6\text{Ag}_3\text{S}_{24}$. The formula accepted by the author is $\text{Bi}_{11}\text{Pb}_6\text{Ag}_3\text{S}_{24}$. Gustavite is considered to be an intermediate phase of a solid solution series in the $\text{PbS-Bi}_2\text{S}_3\text{-Ag}_2\text{S}$ system. While intermediate members should not be given names, the name gustavite is proposed for the end-member $\text{AgPbBi}_3\text{S}_6(\text{Ag}_4\text{Pb}_4\text{Bi}_{12}\text{S}_{24}$ based on 24 S). The other end-member of the postulated series is lillianite, $\text{Pb}_3\text{Bi}_2\text{S}_5(\text{Pb}_{12}\text{Bi}_3\text{S}_{24}$ based on 24 S). Thus the substitution involved is $2\text{Pb}^{2+} \leftrightarrow \text{Bi}^3 + \text{Ag}^+$.

Gustavite was referred to as "mineral X" in a description of berryite from Greenland [abstr. *Amer. Mineral.* 52, 928 (1967)]. Its mode of occurrence with berryite and other minerals is given in that abstract. The gustavite described in the present paper is from Ivigtut, Greenland, but the mineral has been found also in a specimen labelled "galenobismuthinite" from the Silver Bell Mine, Red Mountain, Ouray, Colorado.

Discussion: The name is for Gustav Adolf Hageman (1842–1916), chemical engineer of the Cryolite Firm. It has been approved by the Commission on New Minerals and Mineral Names, I.M.A. Another phase (phase x) with composition $\text{Bi}_6\text{Pb}_7\text{Ag}_2\text{S}_{24}$ and very similar unit cell parameters is considered to be another intermediate member of the gustavite-lillianite series and was not named.

J. A. MANDARINO

Bideauxite

S. A. WILLIAMS (1970) Bideauxite, a new Arizona mineral. *Mineral. Mag.* 37, 637–640.

Bideauxite was found on two museum specimens, one from the Harvard Mineralogical Museum and the other from the U. S. National Museum. The specimen labelled "cerargyrite" from the U. S. National Museum was used for this description. The mineral occurs as small (2 to 7 mm.) crystals and masses enveloping and replacing boleite. Other associated minerals are leadhillite, matlockite, anglesite, cerussite, covellite, and quartz. The specimen appears to have been derived from massive galena. The locality is the Mammoth-St. Anthony mine, Tiger, Pinal County, Arizona.

The mineral is colorless, has a white streak and an adamantine luster. On exposure to strong light it gradually takes on a pale lavender tint and becomes dull. The hardness is 3. Bideauxite is brittle but verges on sectile. It has a conchoidal fracture and no cleavage. The measured specific gravity is 6.274 ± 0.008 ; calculated specific gravity is 6.256. The mineral is optically isotropic with $n_D=2.178$ (measured in S-Se melts) and 2.192 ± 0.015 (by Brewster's method); the latter value is considered more reliable.

Analysis of bideauxite gave: Pb 62.66, Ag 15.74, Cl 14.74, F 3.26, OH 2.78, total 99.18%. These values are averages of duplicate analyses on 11.45 mg. and 11.15 mg. for Pb and Ag; on 3.922 mg. and 3.922 mg. for Cl; on 6.201 mg. and 8.970 mg. for F. OH was calculated to conform to charge balance requirements. The data yield a formula $\text{Pb}_2\text{AgCl}_3(\text{F, OH})_2$ with F:OH close to 1:1.

Bideauxite is isometric with space group *Fd3m*, $a 14.117 \pm 0.008$ Å, $Z=16$, cell volume 2822.34 Å³. Crystals show the following forms (in decreasing order): {100}, {111}, {011}, {113}, {114}, {112}, {116}, and {029}. Strongest spacings in the X-ray powder pattern

(in Å for V-filtered Cr radiation) are: 4.259(7)(311), 4.076(7)(222), 3.530(9)(400), 3.240(7)(331), 2.718(10)(511, 333), and 2.497(9)(440).

The mineral is named for Richard A. Bideaux, connoisseur of minerals and mineralogist of Tucson, Arizona. The mineral and name were approved by the Commission on New Minerals and Mineral Names, I.M.A. The type specimen is in the U. S. National Museum, Washington, D.C.

J. A. MANDARINO

Akdalaite

E. P. SHPANOV, G. A. SIDORENKO, AND T. I. STOLYAROVA (1970) Akdalaite, a new hydrous modification of alumina: *Zap. Vses. Mineral. Obshch.* 99, 333-339 [in Russian].

Analysis by T.I.S. gave Al_2O_3 87.26, Fe_2O_3 0.97, BeO 0.81, MgO 0.97, ZnO 0.90, CaO 0.41, SiO_2 4.74, F 0.68, H_2O^+ 4.23, sum 100.97 — ($\text{O}=\text{F}_2$) 0.28 = 100.69%. Spectrographic analysis showed also Sr 0.03, Mn, Ti, Sb 0.01, W 0.003, Sn, Pb, V, Ga 0.001, Ge 0.0003, Mo, Cu 0.0001%. This gives after deducting muscovite and fluorite the formula $(\text{Al}_{1.91}\text{Be}_{0.04}\text{Mg}_{0.03}\text{Fe}_{0.01}\text{Zn}_{0.01})\text{O}_{2.91}(\text{OH})_{0.07}\text{F}_{0.02}\cdot 0.25\text{H}_2\text{O}$, or $4\text{Al}_2\text{O}_3\cdot\text{H}_2\text{O}$, or $(\text{Al}_{4.74}\text{Be}_{0.09}\text{Mg}_{0.07}\text{Fe}_{0.04}\text{Zn}_{0.03})\text{O}_6.73(\text{OH})_{1.21}\text{F}_{0.06}$. The DTA curve shows two endothermic breaks, a rather broad one at 100-350° and a narrower one at 930-1000°.

The X-ray pattern (42 lines) is indexed on a hexagonal cell with a 12.87 ± 0.01 , c $14.97 \pm 0.01\text{Å}$, $c/a = 1.16$. Space group $D_6^2\text{-P6}_22$ or $C6^2\text{-P6}_1$, $Z = 18$, ρ . calc. 3.673, meas. 3.68 ± 0.02 . The strongest lines are 4.38 (6)(20 $\bar{2}2$), 3.24 (7)(12 $\bar{3}3$, 11 $\bar{2}4$, 22 $\bar{4}0$), 2.494 (9)(0006), 2.35 (9)(3035), 2.32 (8)(1126), 2.11 (10)(23 $\bar{5}4$, 33 $\bar{6}1$, 24 $\bar{8}0$), 1.859 (7)(60 $\bar{6}0$), 1.622 (5)(22 $\bar{4}8$), 1.547 (6)(12 $\bar{3}9$, 2680), 1.418 (10)(4485), 1.393 (10)(8080). When heated to 1100°, the mineral gives the x-ray pattern of $\chi\text{-Al}_2\text{O}_3$.

The mineral is white, translucent, luster vitreous to porcelain-like. Brittle with irregular fracture, no cleavage. Microhardness 1085 kg/sq. mm. = 7.2 on the Khrushchov scale. In section pale-greenish-yellow, optically uniaxial negative, ω 1.747, ϵ 1.741, not pleochroic. Extinction parallel to the elongation.

The mineral occurs as lens-like or nest-like accumulations consisting of tabular and elongated tabular crystals up to 0.8 mm. long and 0.1 mm. wide, showing hexagonal outline, in veinlets cutting amesite-fluorite-muscovite rock and fluorite-magnetite-diopside-vesuvianite-andradite skarn, in the Solvech fluorite deposit, Karagandin region, Kazakhstan.

The name is for the Kazakh name of the locality. Type material is preserved in the Mineralogical Museum, Academy of Sciences, USSR, Moscow. The mineral and name were approved in advance of publication by the Commission on New Minerals and Mineral Names, IMA, which ruled that the name tohdite, given in 1964 by Yamaguchi and others to a synthetic compound, $5\text{Al}_2\text{O}_3\cdot\text{H}_2\text{O}$, had no standing as a mineral name. The X-ray data for akdalaite are very close to those given for tohdite but show some extra weak lines. The Japanese authors give unit cell with a 5.576, c 8.768Å, $Z = 1$, space group $P31c$ or $P6_3mc$; this gives much simpler indices for the strong lines.

Lenoblite

FABIEN CESERON ET HÉLÈNE VACHEY (1970) La lenoblite, nouvel oxyde hydraté de vanadium (IV). *Bull. Soc. Franc. Minéral. Cristallogr.* 93, 235-241.

Lenoblite occurs with duttonite in the uranium deposit at Mounana, Gabon. When fresh it is azure blue but due to oxidation becomes greenish.

It was not possible to isolate single-crystals for X-ray study, but the X-ray powder pattern is distinct from those of other vanadium oxides. The strongest spacings (in Å for $\text{CuK}\alpha$) are: 7.46 (ms), 4.59 (vvs), 3.722 (vs), and 2.528 (s).

Chemical analyses (full details on the method are given) by Vachey gave: Fe_2O_3 0.35, Al_2O_3 1.16, V_2O_4 69.45, V_2O_5 10.27, H_2O 17.93, insol. (SiO_2) 0.50, total 99.66 wt. %. Correcting for the SiO_2 and for oxidation of V_2O_4 to V_2O_5 gives the formula $\text{V}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$. The thermal behaviors of lenoblite, duttonite, and synthetic $\text{V}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$ are very similar.

Lenoblite is named in honor of Andre Lenoble. The name and mineral were approved by the Commission on New Minerals and Mineral Names, I.M.A.

J. A. MANDARINO

Santite

STEFANO MERLINO AND FRANCO SARTORI (1970) Santite, a new mineral phase from Larderello, Tuscany. *Contrib. Mineral. Petrology* 27, 159–165.

Joan R. Clark (*Amer. Mineral.* 45, 1087–1093 (1960)) pointed out that an X-ray pattern of larderellite published by Marinelli in 1959 contained additional lines that corresponded to those of $\text{KB}_5\text{O}_8 \cdot 4\text{H}_2\text{O}$. Marinelli's original sample has been re-examined and found to consist mainly of larderellite, with some sassolite, and a third mineral, present as irregular colorless grains with maximum length 0.06 mm. Analysis of the mixture gave K_2O 4.01, $(\text{NH}_4)_2\text{O}$ 7.29%, calculated to indicate 66% larderellite, 9% sassolite, 25% $\text{KB}_5\text{O}_8 \cdot 4\text{H}_2\text{O}$. The distribution of K and NH_4 between the phases was not determined; however, comparison of unit cell sizes and optical properties indicated that the mineral was close to the pure K compound.

Orthorhombic, space group *Aba2*, *a* 11.10, *b* 11.18, *c* 9.08 (all ± 0.02) Å. Synthetic $\text{KB}_5\text{O}_8 \cdot 4\text{H}_2\text{O}$ had *a* 11.065 ± 0.002 , *b* 11.171 ± 0.001 , *c* 9.054 ± 0.0006 Å; synthetic $(\text{NH}_4)\text{B}_5\text{O}_8 \cdot 4\text{H}_2\text{O}$ had *a* 11.324 ± 0.002 , *b* 11.029 ± 0.001 , *c* 9.235 ± 0.004 Å. (Cook and Jaffe, 1957). The X-ray powder pattern is very close to that of synthetic $\text{KB}_5\text{O}_8 \cdot 4\text{H}_2\text{O}$. The strongest lines (those marked with * are also lines of larderellite or sassolite) are 5.57 (50), *3.52 (33), *3.35 (39), *2.96 (41), *2.92 (57). Optically biaxial, positive; for the mineral, α 1.422 ± 0.002 , β 1.435 ± 0.002 , γ 1.480 ± 0.001 ; for synthetic $\text{KB}_5\text{O}_8 \cdot 4\text{H}_2\text{O}$ (Cook and Jaffe, 1957) α 1.422, β 1.436, γ 1.480; for synthetic $(\text{NH}_4)\text{B}_5\text{O}_8 \cdot 4\text{H}_2\text{O}$ (Cook and Jaffe, 1957), α 1.427, β 1.431, γ 1.486.

The name is for the Tuscan naturalist Giorgi Santi (1746–1823), director for more than 40 years of the Museum of Natural History, Pisa, Italy. The mineral and name were approved in advance of publication by the Commission on New Minerals and Mineral Names, IMA.

Stenhuggarite

PAUL B. MOORE (1970) Stenhuggarite, a new mineral from Långban and new data on magnussonite. *Arkiv Min. Geol.* 5, 55–62.

Stenhuggarite occurs as very rare, minute, orange-colored, nearly equant tetragonal crystals in pockets in granular hematite ore. It is to be classed as an "early fissure" mineral in the paragenetic classification of Långban minerals. Microprobe analysis and consideration of the probable oxidation states of the cations lead to the formula $\text{Ca}_2\text{Fe}_2^{2+}\text{Sb}_2^{3+}\text{O}_3(\text{As}^{3+}\text{O}_3)_4$. The mineral has a bright yellow streak, $H=4-$, there is no diagnostic cleavage; the density is 4.63 ± 0.05 by Berman balance on 6.021 mg of material.

Crystals, measured by 2-circle goniometer, show the forms {100}, {211} and {301} in that order of prominence, in agreement with Donnay-Harker prediction. The space group is *I4₁/amd*, *a* 16.12 ± 0.04 , *c* 10.70 ± 0.03 Å, *Z* = 8. The principal lines in the indexed powder pattern are: 5.92, 3, (211); 2.985, 10, (422); 2.548, 3½, (620); and 1.845, 4, (624).

Type material is preserved in the Swedish Natural History Museum, Stockholm. The name is derived from the Swedish *stenhuggar* [= (stone)mason] in allusion to the contributions to the study of Långban minerals by Dr. Brian H. Mason. The mineral and name

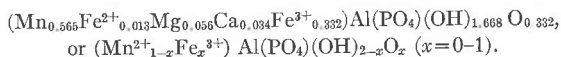
were approved before publication by the Commission on New Minerals and Mineral Names, IMA.

A. PABST

Ernstite

E. SEELIGER AND A. MUCKE (1970) Ernstit, ein neues Mn^{2+} - Fe^{3+} -Al Phosphat und seine Beziehungen zum Eosphorit. *Neues Jahrb. Mineral. Monatsh.*, 289–298.

Analysis gave P_2O_5 29.70, Al_2O_3 24.20, Fe_2O_3 11.77, FeO 0.44, MgO 1.00, MnO 17.74, CaO 0.84, SiO_2 0.48, H_2O (100°) 0.05, H_2O (200°) 0.14, ign. (500°) 13.42, ign. (800°) 0.18, sum 99.96%. After deducting SiO_2 , this gives:



X-ray study (rotation and Weissenberg) shows the mineral to be monoclinic, space group C_{2h}^6-A2/a or C_s^4-Aa , a 13.32 ± 0.01, b 10.497 ± 0.005, c 6.969 ± 0.004 Å, β 90°22' ± 20', $Z=8$, ρ . calc. 3.086, meas. 3.07. The strongest lines (34 given) are 4.364 (4)(211), 3.516 (4)(311), 2.836 (8)(231), 2.829 (10)(231), 2.438 (5)(322), 2.001 (4)(313). The unit cell volume is very close to that of eosphorite, but the b - and a -axes are interchanged.

Color yellow-brown, H. 3–3½. Cleavage {010}, {100} good. Optically biaxial, negative, n_s (Na) α 1.678, β 1.706, γ 1.721 (all ± 0.003), $2V = -74^\circ$ calcd. $Z=b$, $Y \wedge c = -4^\circ$, $r > v$. Untwinned, in contrast to eosphorite. Pleochroic, X yellow-brown, Y red-brown, Z pale yellow.

The mineral occurs as an oxidation product of eosphorite (of which relicts remain) in radiating aggregates 10–15 mm. long from granitic pegmatite near Karibib, S. W. Africa.

The name is for Professor Th. Ernst, Univ. Erlangen. The mineral and name were approved in advance of publication by the Commission on New Minerals and Mineral Names, IMA.

Meta-Vanuralite

FABIEN CESBRON (1970) Nouvelles données sur la vanuralite. Existence de la méta-vanuralite. *Bull. Soc. Fr. Mineral. Cristallogr.* 93, 242–248.

Meta-vanuralite is the less hydrated form of vanuralite (see abstract of the new data in this issue). The original analysis of vanuralite was actually carried out on meta-vanuralite. The composition is $Al(UO_2)_2(VO_4)_2(OH) \cdot 8H_2O$. The mineral is triclinic with space group $P\bar{1}$ or $P1$, a 10.46 ± 0.03, b 8.44 ± 0.03, c 10.43 ± 0.03 (all in Å), α 75°53' ± 20', β 102°50' ± 20', γ 90° ± 20', $Z=2$. The strongest spacings in the X-ray powder pattern (in Å for $CuK\alpha$) are: 9.92 (vvs)(001), 4.174 (vs)(021), 4.086 (s)(020, 102), 4.240 (s)(311), 3.155 (vs) (221, 311), and 3.073 (s)(310, 221). The mineral with $8H_2O$ is stable at 20°C in an atmosphere of relative humidity between 28 and 47%.

The name is for the relationship to vanuralite and was approved by the Commission on New Minerals and Mineral Names, I.M.A.

J. A. MANDARINO

Eakerite

P. B. LEAVENS, J. S. WHITE, JR., AND MAX H. HEY (1970) Eakerite, a new tin silicate: *Mineral. Rec.* 1, 92–96.

Microchemical analysis (MHH) on 11.5 mg. gave SiO_2 46.75, Al_2O_3 14.07, SnO_2 18.59, CaO 14.2, H_2O 6.70, total 100.3%, corresponding to $Ca_{1.96}Al_{2.12}Sn_{0.96}Si_{6.03}O_{22}H_{5.74}$ or $Ca_2SnAl_2Si_6O_{16}(OH)_6$. Semiquantitative spectrographic analyses by C. L. Waring

showed also: Li 0.3, Be 0.3, Fe 0.1, Mn, Na, K, Ti, and Mg each 0.03%. TGA analysis on 10.25 mg. showed no loss of weight below 350°, nearly 3% to 725°, about 6½ to 775° and 10% to 1175°. The mineral fuses at about 1075°; a structural analysis is in progress to help elucidate the nature of the water, taken to be present as hydroxyl. Not dissolved by acids or bases.

Goniometric study shows forms *c* (001), *d* (201), *D* (201), *k* (210), *l* (410), *p* (111); the prism zone is striated. These give $a:b:c=2.050:1:0.9633$, $\beta 101^\circ 19'$. Precession photographs show the mineral to be monoclinic, $P2_1/a_1$, $a 15.829 \pm 0.007$, $b 7.721 \pm 0.003$, $c 7.438 \pm 0.003$ Å, $\beta 101^\circ 9' \pm 2'$, $a:b:c=2.051:1:0.964$. $Z=2$, $G. 2.93 \pm 0.01$ (measured), 2.931 calcd. The strongest X-ray lines (47 given) are 7.31 (80)(001), 6.905 (50)(110), 5.944 (50)(201), 5.257 (90)(111), 4.812 (100)(111), 3.999 (50)(311), 3.882 (50)(400), 3.396 (40)(121), 3.353 (60)(112), 3.229 (50)(221), 3.021 (80)(221).

The mineral occurs as prismatic crystals up to 5 mm. long, colorless to milky-white. H about 5½, no cleavage, fracture conchoidal. Optically biaxial, positive, n_s (Na) $\alpha 1.584$, $\beta 1.586$, $\gamma 1.600$, $2V$ about +35°, $r > v$ marked, $X=b$, $Y c = +23\frac{1}{2}^\circ$.

The mineral occurs in seams in spodumene pegmatite, King's Mt., North Carolina. Crystals are implanted on quartz and albite. They are commonly intergrown with bavenite and some specimens are coated by crystals of pink apatite.

The name (pronounced ekerait) is for Mr. Jack Eaker of King's Mt., N. C., who first found the mineral. The mineral and name were approved in advance of publication by the Commission on New Minerals and Mineral Names, IMA.

NEW DATA

Allargentum

W. PETRUK, L. J. CABRI, D. C. HARRIS, J. M. STEWART, AND L. A. CLARK (1970) Allargentum, redefined. *Can. Mineral.* 10, 163-172.

Ramdohr [abstr. *Amer. Mineral.* 39, 691 (1954)] defined allargentum as the hexagonal phase in the Ag-Sb system. It was found as intergrowths with dyscrasite and cubic antimonian silver at Cobalt, Ontario.

Petruk *et al.*, show that the material called allargentum by Ramdohr is actually a variety of silver with Hg and Sb and that his "dyscrasite" is the natural equivalent of the E-phase of the Ag-Sb system. Petruk *et al.* suggest that the name allargentum be retained for the material characterized in their paper.

Allargentum has a hexagonal close-packed structure (the complete structure is under investigation) with $a 2.95$ Å, $c 4.77$ Å, $Z=2$. The mean composition determined by electron microprobe analyses of fifteen samples is $Ag_{0.86}Sb_{0.14}$ with trace amounts of Hg. The compositional range is: 84.0 to 85.6 wt % Ag; 14.4 to 15.9 wt % Sb; and 0.0 to 0.9 wt % Hg. The measured specific gravity of a synthetic sample is 10.0; calculated for the natural material is 10.12. Vickers microhardness varies between 172 and 203 with an average value of 189. Reflectivity values are: 65.4% at 470 nm, 67.5% at 546 nm, 68.7% at 589 nm, and 71.3% at 650 nm.

Strongest spacings in the X-ray powder pattern (in Å for Fe-filtered Co radiation) are: 2.548 (4) (100), 2.370 (10) (002), 2.252 (6) (101), and 1.353 (4) (103). Eight other indexed spacings down to 0.943 Å are listed. Four more spacings are listed for the synthetic material.

A type specimen from the Hi-Ho Mine, Cobalt, Ontario, is deposited in the National Mineral Collection in Ottawa. The redefinition of allargentum was approved by the Commission on New Minerals and Mineral Names, I.M.A.

J. A. MANDARINO

Weibullite

S. KARUP-MØLLER (1970) Weibullite, laitakarite, and bismuthinite from Falun, Sweden. *Geol. Foren. Förb.* **92**, 181-187.

Weibullite (*Dana's System*, 7th Ed., 1, 473) was stated by Barry and Thompson [*Geol. Soc. Amer. Mem.* **85** (1962)] to be a mixture of weibullite, selenjoseite (later called laitakarite), and bismuthinite. This is now confirmed by X-ray study, and electron microprobe analyses are given of the minerals. Three analyses of weibullite gave Ag 1.0, 0.5, 0.9; Pb 33.1, 27.8, 31.5; Bi 47.6, 48.5, 46.5; Cu 0, 0, 0.3; S 10.5, 10.2, 10.2; Se 11.5, 11.6, 11.8; sum 103.7, 98.5, 101.2%, corresponding to $\text{Bi}_4\text{Pb}_4\text{S}_9\text{Se}_4$. For $Z=2$, ρ calc. = 6.96.

Akaganeite

PAUL KELLER (1970) Eigenschaften von $(\text{Cl}, \text{F}, \text{OH})_{-2}\text{Fe}_8(\text{O}, \text{OH})_{16}$ und Akaganeit. *Neues Jahrb. Mineral., Abhandl.* **113**, 29-49.

X-ray, chemical, and infra-red study of synthetic " $\beta\text{-FeO OH}$ " shows that it is a member of the cryptomelane-hollandite group with formula as given above. The proportions of Cl, F, and OH can be varied greatly, but none of the end-members could be synthesized. Akaganeite [*Amer. Mineral.* **48**, 711 (1963)] is apparently the hydroxyl end-member.

Vladimirite

L. K. YAKHONTOVA AND T. I. STOLYAROVA (1970) New data on vladimirite. *Zap. Vses. Mineral. Obshch.* **99**, 362-364 [in Russian].

Re-analysis of material from the type locality (Tuva ASSR) gave CaO 33.65, MgO none, As_2O_5 53.44, H_2O 12.63, sum 99.72%, confirming the formula of Pierrot [*Amer. Mineral.* **50**, 813 (1965)] $\text{Ca}_5\text{H}_2(\text{AsO}_4)_4 \cdot 5\text{H}_2\text{O}$. Optical and X-ray powder data are given.

Magnussonite

PAUL B. MOORE (1970) Stenhuggarite, a new mineral from Långban and new data on magnussonite. *Arkiv Min. Geol.* **5**, 55-62.

Type material of magnussonite, $\text{Mn}_5(\text{OH})(\text{AsO}_3)_2$, from Långban proved upon single crystal X-ray examination to have a cubic cell, a 19.70 Å, space group $Ia\bar{3}d$, $Z=32$, at variance with the original description [*Amer. Mineral.* **42**, 581, (1957)]. The same species, recently discovered from the Brattfors mine, Nordmarks Odalfält, Sweden, is tetragonal, a 19.58, c 19.72 Å, space group $I4_1/amd$. This magnussonite contains ca. 12 Mg atoms per cell and a minor amount of Ca in substitution for Mn and there may be ordering of the Mg. Partly indexed powder patterns of both types of magnussonite are tabulated. They differ chiefly in the splitting of certain lines in the pattern of the tetragonal form, e.g., 1.74 20 (800) of the isometric form corresponds to 1.7396 10 (808) and 1.7314 12 (088) of the tetragonal form.

ADOLF PABST

Vanuralite

FABIEN CESBRON (1970) Nouvelles données sur la vanuralite. Existence de la métavanuralite. *Bull. Soc. fr. Mineral Cristallogr.* **93**, 242-248.

The original description of vanuralite [abstr. in *Amer. Mineral.*, **48**, 1415-1416 (1963)] contained certain data for vanuralite, but the chemical analyses were done on metavanuralite (see abstr. this issue).

New data given for vanuralite are as follows: monoclinic, $A2/a$, a 10.55, b 8.44, c 24.52 Å, β 103°, $Z=4$. The strongest spacings in the X-ray powder pattern (in Å for

Cu-K α are: 11.98 (vvs)(002), 5.98(vs)(004), 3.795(s)(006,022), 3.231(s)(31 $\bar{1}$), and 3.180(s)(31 $\bar{3}$). Chemical analysis by H. Vachey gave: UO₃ 59.03, V₂O₅ 17.74, Al₂O₃ 5.05, H₂O 18.40, total 100.22 wt. %. This gives an empirical formula close to Al(UO₂)₂(VO₄)₂(OH) · 11 H₂O.

J. A. MANDARINO

Erratum

Tazheranite

B. F. Leonard has kindly pointed out an error in my abstract of tazheranite [*Amer. Mineral.* 55, 318 (1970)]. It has n 2.25 ± 0.02 , not 2.35 as given.