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NEW MINERAL NAMES

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Tochilinite

N. I. ORGANOVA, A. D. GENKIN, V. A. DRITS, S. P. MOLOTKOV, O. V. KUZ'MINA, AND A. L. DMITRIK (1971) Tochilinite, a new sulfide–hydroxide of iron and magnesium. *Zap. Vses. Mineralog. Obshch.* 100, 477–487 [in Russian].

Electron probe analyses by V. A. Moleva of isometric grains and radiating-fibrous aggregates gave, resp., S 21.39, 23.00; Fe 37.48, 40.25; FeO 7.34, 6.56; MgO 15.72, 16.87; Al_2O_3 5.04, 1.60; H_2O 12.70, 11.25; sum 99.67, 99.53%. Recalculation, deducting 8% gibbsite from the first, 2.5% gibbsite from the second, gives the formulas-

$2(Fe_{0.91}S)\cdot 1.67\ [(Mg_{0.71}Fe_{0.29})(OH)_2]$ and

$2(Fe_{0.88}S)\cdot 1.67\ [(Mg_{0.71}Fe_{0.29})(OH)_2]$, *i.e.,* the Fe analogue of valleriite. The DTA curve showed an endothermic effect at 430–500°.

X–ray study of the two varieties showed the mineral to be monoclinic with unit cells, resp., *a* 5.37, 5.42; *b* 15.65, 15.77, *c* 10.72, 10.74Å., β 95°, 95°, $Z = 6$. Cleavage {001}. The strongest X-ray lines (21 lines given) are 10.68 (9) (001), 5.34 (> 10) (002), 2.20 (6, broad) ($20\bar{3}$, $13\bar{2}$), 2.04 (5 broad) (203), 1.845 (7 broad) (204, 261, 064), 1.537 (5, very broad) (0.10.0). G. calc. 3.03, measured 2.99, 2.96.

Color bronze–black. Strongly birefringent, anisotropy strong, from pinkish-cream to gray. Reflectances (Rg' and Rp') are given at 12 wavelengths from 450 to 950 nm.: 450, 15.4, 9.1; 550, 18.1, 8.5; 589, 18.9, 8.4; 650, 20.2, 8.0; 750, 21.4, 7.7; 950, 19.3, 6.8%. Microhardness 15.0–48.8 kg/sq. mm. with 5 g. load.

The mineral occurs as aggregates of small grains and as aggregates up to 5–6 mm of acicular crystals in serpentinite (lizardite) from drill cores of the Cu–Ni deposits of the Lower Mamon intrusive complex and in basic rocks of the Staromelovatskii intrusive, Voronezh region, USSR.

The name is for the late Mitrofan Stepanovich Tochilin, professor at Voronezh University. Type material is deposited in the Fersman Mineralogical Museum, Acad. Sci. USSR, Moscow. The mineral and name were approved before publication by the Commission on New Minerals and Mineral Names, IMA.

Clinosafflorite

DENNIS RADCLIFFE AND L. G. BERRY (1971) Clinosafflorite, a monoclinic polymorph of safflorite. *Can. Mineral.* 10, 877–881.

Microbe analyses of 3 samples from Cobalt, Ontario, where the mineral occurs in intimate intergrowth with skutterudite, gave compositions $(Co_{0.76}Fe_{0.14}Ni_{0.10})As_2$, $(Co_{0.73}Fe_{0.26}Ni_{0.01})As_2$, and $(Co_{0.70}Fe_{0.21}Ni_{0.09})As_2$ (actual analyses not given). These gave unit cells (in the safflorite setting) *a* 5.040, 5.062, 5.121; *b* 5.862, 5.851, 5.847; *c* 3.139, 3.149, 3.094Å.; β 90°13', 90°18', 90°17', $Z = 2$, G. calc. 7.46, apparent space group $P2_1/n$. The true cell has *a* and *c* doubled and is *B*–centered monoclinic. The strongest lines (14 given) (indexed on the subcell) are 2.671 (40) ($\bar{1}01$), 2.531 (100) (120), 2.427 (80) ($\bar{1}11$), 2.422 (80) (111).

The mineral is therefore a dimorph of orthorhombic safflorite. The mineral and name were approved before publication by the Commission on New Minerals and Mineral Names, IMA.

Oosterboschite

ZDENEK JOHAN, PAUL PICOT, ROLAND PIERROT, AND THEODORE VERBEEK (1970) L'oosterboschite, $(Pd, Cu)_7Se_5$, une nouvelle espèce minérale, et la trogtalite cupro-palladifère de Musonoi (Katanga). *Bull. Soc. Franc. Mineral. Cristallogr.* **93**, 476–481.

Electron microprobe analyses by R. Giraud gave Se 38.8, 39.2; Pd 44.9, 44.1; Cu 17.1, 16.7; sum 100.8, 100.0%, corresponding to $(Pd_{4.28}Cu_{2.73})Se_5$ and $(Pd_{4.17}Cu_{2.64})Se_5$.

X–ray powder data are indexed on an orthorhombic cell with *a* 10.42, *b* 10.60, *c* 14.43Å. (all ± 0.02Å.), Z = 8, G. calc. 8.48. The strongest X–ray lines (29 given) are 4.48 (6) (121, 211), 2.736 (7d) (133), 2.647 (10) (040), 2.600 (8) (400, 041), 2.244 (7d) (242, 413), 1.935 (7) (405), 1.903 (7) (415), 1.847 (8) (441).

Color in reflected light white–yellow with a cream tint; anisotropy medium strong with bluish-gray to brownish-gray colors. Reflectances given at 12 wave lengths show maxima at 560 nm; with min. and max. values of *R*: 460 nm, 40.9, 44.5; 560, 45.5, 49.8; 640, 43.0, 48.1%. Microhardness 340 kg/sq. mm.

The mineral occurs as grains up to 0.4 mm. Twinning polysynthetic. It occurs in the zone of oxidation of the Musonoi Cu–Co deposit, Katanga, associated with trogtalite and selenian digenite and covellite.

The name is for M. R. Oosterbosch, active for many years in the development of the Katanga mines. The mineral and name were approved before publication by the Commission on New Minerals and Mineral Names, IMA. Type material (1 polished section) is preserved at the Ecole Natl. Superieure des Mines, Paris.

Hakite

ZDENEK JOHAN AND MILAN KVACEK (1971) La hakite, un nouveau minéral du groupe de la tétraédrite. *Bull. Soc. Franc. Mineral. Cristallogr.* **94**, 45–48.

Electron microprobe analyses by R. Giraud gave Cu 26.6, 26.6; Hg 15.3, 14.3; Sb 15.5, 19.1; As 3.2, 0.7; Se 34.0, 38.5; S 3.5, —; sum 98.1, 99.2%, corresponding to the formulas: $(Cu_{2.52}Hg_{0.46})$ $(Sb_{0.77}As_{0.26})$ $(Se_{2.60}S_{0.66})$ and $(Cu_{2.65}Hg_{0.45})$ $(Sb_{0.95}As_{0.06})$ $Se_{3.09}$, the Se analogue of tetrahedrite. Turns brown with 20% KCN solution; other reagents negative.

X–ray study showed the mineral to be cubic, probably T_d^3–$I\bar{4}3m$, *a* 10.83 ± 0.01 (anal. 1), 10.88 ± 0.01 (anal. 2), (20 given) are 3.140 (10) (222), 2.910 (7) (321), 2.568 (6) (411, 330), 2.133 (5) (510, 431), 1.985 (7) (521), 1.925 (9) (440), 1.764 (6) (611, 532), 1.639 (8) (622).

The mineral occurs in xenomorphic grains up to 0.3 mm. in size. Color gray–brown, luster metallic. In reflected light isotropic, color creamy white (anal. 2) to clear brown (anal. 1). Reflectances are given at 12 wave lengths (max. at 480 nm) for anal. 1 and 2, resp.: 420 nm, 32.8, 31.5; 480, 34.0, 33.5; 580, 33.2, 33.6; 640, 33.6, 33.2%. Microhardness (anal. 1) 352 kg/sq mm. for 20 g. load, 306 for 40g. load.

The mineral occurs in epithermal calcite veins at Predborice, Bohemia, Czechoslovakia, associated with berzelianite, clausthalite, umangite, 6 other selenides, as well as chalcopyrite, pyrite, pitchblende, hematite, goethite, and native gold. The name is for Jaroslav Hak, mineralogist, Institute of Ore Research, Kutna Hora, Czechoslovakia. The mineral and name were approved before publication by the Commission on New Minerals and Mineral Names, IMA. Type material is preserved at Charles Univ., Prague, and the Ecole Natl. Superieure des Mines, Paris.

Fischesserite

ZDENEK JOHAN, PAUL PICOT, ROLAND PIERROT, AND M. KVACEK (1971) La fischesserite, Ag_3AuSe_2, premier séléniure d'or isotype de la petzite. *Bull. Soc. Franc. Mineral. Cristallogr.* **94**, 381–384.

Electron microprobe analyses by R. Giraud gave Ag 47.5, 48.6; Cu —, 0.3; Au 27.4, 27.2; Se 24.4, 22.8; sum 99.3, 98.9%, corresponding to $Ag_{2.97}$ $Au_{0.94}$ $Se_{2.09}$ and $(Ag_{3.07}$ $Cu_{0.03})$ $Au_{0.94}$ $Se_{1.97}$, the selenium analogue of the telluride petzite and the first known gold selenide.

The X-ray powder data show the mineral to be isostructural with petzite: cubic, I 432, a 9.967 ± 0.003Å., Z = 8, G. calc. 9.05. The strongest X-ray lines (23 given) are 7.08 (6) (110), 2.662 (10) (321), 2.229 (8) (420), 2.035 (8) (422), 1.954 (6) (510, 431), 1.820 (8) (521), 1.332 (6) (642), 1.266 (7) (732, 651).

In reflected light pink, close to the color of enargite. Isotropic. Reflectances at 15 wave lengths (420–700 nm) are given, showing a minimum at 540: 480 nm, 32.3; 540, 29.7; 640, 33.8; 700, 36.0%. Microhardness 31.9 (25 g. load), 32.7 (50 g. load) kg/sq. nm. = Mohs 2. Cleavage not observed. Polishes well.

The mineral occurs in xenomorphic grains, associated with naumannite, clausthalite, and native Au in carbonate veins at Predborice, Czechoslovakia. The name is for Raymond Fischesser, director of the Ecole Natl. Superieure des Mines, Paris, where type material is preserved. The mineral and name were approved in advance of publication by the Commission on New Minerals and Mineral Names, IMA.

Permingeatite

ZDENEK JOHAN, PAUL PICOT, ROLAND PIERROT, AND MILAN KVACEK (1971) La permingeatite, un nouveau minéral du groupe de la luzonite. *Bull. Soc. Franc Mineral. Cristallogr.* **94**, 162–165.

Electron microprobe analysis by R. Giraud gave Cu 30.7, Sb 17.4, As 1.5, Se 50.4, sum 100.0%, corresponding to $Cu_{3.01}$ $(Sb_{0.89}As_{0.12})$ $Se_{3.98}$, or $Cu_3(Sb, As)Se_4$, the selenium analogue of famatinite.

Rotation and Weissenberg photographs showed it to be tetragonal, space group probably $I\,\bar{4}\,2\,m$, a 5.63 ± 0.002, c 11.23₀ ± 0.005Å., Z = 2, G. calc. 5.82. Synthetic Cu_3SbSe_4 has been reported to have a 5.654, c 11.256Å. The strongest X-ray lines (16 given) are 3.251 (10) (112), 1.980 (9) (204), 1.697 (8) (312), 1.503 (large) (314), 1.408 (5) (400, 008), 1.290 (6) (332, 316), 1.148 (7) (424, 228), 1.082 (5) (512, 336, 110).

In polished section light brownish pink. Anisotropy strong with colors ranging from rose to green. Twinning is observed; no cleavage, no internal reflections. Reflectances (av. of 2) measured at 12 wave lengths showed a max.

at 460 nm. R_{max} and R_{min} are: 420 nm, 29.8, 29.1; 460, 31.5, 30.1; 480, 29.9, 29.1; 540, 26.2, 25.9; 640, 25.0, 24.2%. Microhardness 234 kg/sq mm (50g. load) = Mohs 4–4$\frac{1}{2}$.

The mineral occurs in microscopic grains containing inclusions of hakite at Predborice, Czechoslovakia, associated with many other selenides (see above). The name is for Francois Permingeat, mineralogist, Univ. Toulouse, France. The mineral and name were approved in advance of publication by the Commission on New Minerals and Mineral Names, IMA. Type material is preserved at Charles Univ., Prague, and at the Ecole Natl. Superieure des Mines, Paris.

Bariandite

Fabien Cesbron and Helene Vachey (1971) La bariandite, nouvel oxyde hydraté de vanadium (IV) et (V). *Bull. Soc. Franc. Mineral. Cristallogr.* **94,** 49–54.

Analysis by H. V. gave V_2O_5 63.26, V_2O_4 14.19, Fe_2O_3 0.17, Al_2O_3 3.75, H_2O 18.11, sum 100.08%. Deducting Fe and Al as impurities, this corresponds to $V_2O_4 \cdot 12H_2O$. Dehydration at 14 and 5 mm. Hg pressure is rapid down to $2H_2O$. The DTA curve shows a double endothermic break with peaks at 100° and 135°C and another large endothermic break at 676° (fusion of V_2O_5).

Rotation and Weissenberg photographs show the mineral to be monoclinic, *Cc* or *C 2/c*, *a* 11.70 ± 0.03, *b* 3.63 ± 0.01, *c* 29.06 ± 0.05Å., *β* 101°30′ ± 20′, *Z* = 2. The strongest X-ray lines (29 given) are 14.20 (VVS) (002), 5.72 (MS) (200), 3.480 (S) (110), 3.430 (S) (111), 2.852 (MS) (400), 1.939 (MS) (510), 1.827 (MS) (4.0.10).

The mineral occurs in fibers up to 3 mm. long, platy on (001), which is a perfect cleavage. G. 2.7. Nearly opaque, but shows pleochroism: greenish-brown on [010], bottle-green perpendicular to [010]. Extinction parallel, *ns* above 1.85. In reflected light, shows green internal reflections, strongly pleochroic in brownish-gray. Reflectance lower than that of duttonite.

The mineral occurs in the oxidation zone of the uranium deposit at Mounana, Gabon, associated with duttonite and lenoblite (*Amer. Mineral.* **56,** 635). The mineral is named for Pierre Bariand, curator of mineralogy, Univ. Paris. The mineral and name were approved in advance of publication by the Commission on New Minerals and Mineral Names, IMA.

DISCUSSION—Apparently a member of the corvusite group of minerals, which shows variable ratios V^{+4}/V^{+5}.

Romarchite, Hydromarchite

R. M. Organ and J. A. Mandarino (1971) Romarchite and hydroromarchite, two stannous minerals. *Can. Mineral.* **10,** 916 (abst.).

Tin pannikins lost from the overturned canoe of a voyageur between 1801 and 1821 were recovered 15 feet below the surface of the water at Boundary Falls, Winnipeg River, Ontario. Some of the surfaces have a thin crust of alteration products of black crystals and white crystals.

The black crystals give an X-ray powder pattern essentially identical with that of synthetic SnO. Tetragonal, *P 4/nmm*, *a* 3.79, *c* 4.83Å. The strongest lines are 2.98 (10) (101), 2.670 (6) (110), 1.799 (7) (112), 1.601 (9) (211), and 1.491 (6 b) (202,103). X-ray spectrographic scans showed only tin and a trace of iron.

It is named romarchite (pronounced romarkite) for the *R*oyal *O*ntario *M*useum of *Arch*aeology.

The X–ray pattern of the white crystals was identical with that of $5SnO \cdot 2H_2O$, which is triclinic with *a* 11.5, *b* 6.03, *c* 19.8,Å., α 99°, β 60°30′, γ 88°30′ (Donaldson, *Acta Crystallogr.* **14**, 65, [1961]). The strongest lines are 3.50 (10), 2.961 (8), 2.773 (9), 1.924 (7), 1.906 (7). X–ray spectrographic scans showed only Sn. The mineral is named hydromarchite.

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

DISCUSSION—There was some dissent in the Commission (approved 10-4) on the ground that these were not minerals, man having intervened. Compare the problem of the lead oxychlorides from Laurium.

Holtite

M. W. Pryce (1971) Holtite: A mineral allied to dumortierite. *Mineral. Mag.* **38**, 21–25.

Analysis by J. R. Gamble gave SiO_2 20.30, Sb_2O_5 4.61, Al_2O_3 46.43, Ta_2O_5 11.24, Nb_2O_5 0.76, Fe_2O_3 0.27, TiO_2 0.09, BeO 0.05, B_2O_3 1.82, MnO 0.05, Sb_2O_3 13.89, H_2O^+ 0.38, H_2O^- 0.08, sum 99.97%. Neglecting water, this gives a unit cell content $Al_{24.5}Sb^{3+}_{2.56}\ Sb^{5+}_{0.76}Ta_{1.36}Nb_{0.16}–Ti_{0.03}Fe_{0.10}Be_{0.05}Mn_{0.02}B_{1.40}Si_{9.09}O_{66.85}$ or approximately 4 $(X_{10}O_{17})$; compared to dumortierite, 4 $[(Al, Fe)_7BSi_3O_{18}]$ or 4 $(X_{11}O_{18})$. The analyzed sample was better than 99.5% pure, containing a little tantalite and stibiotantalite.

Weissenberg photographs showed holtite to be orthorhombic, *P mcn, a* 11.905 ± 0.005, *b* 20.355 ± 0.005, *c* 4.690 ± 0.001Å.; weak spots indicate a supercell with 2*a*, 2*b*, *c*. The strongest X–ray lines (48 given) are 10.28 (100) (110, 020), 593 (32) (200), 5.89 (34) (130), 5.12 (24) (220), 5.08 (32) (040), .94 (40) (260), 2.362 (24) (510), 2.344 (24) (370,002), 2.338 (26) (280). The X–ray pattern is unchanged after the mineral is heated to 1000°C.

The mineral occurs as intergrown prisms and acicular coatings on stibiotantalite and as acicular replacements of tantalite. Mainly finely crystalline but a few pseudohexagonal crystals up to 1 mm were noted. Good cleavage or parting parallel to {010}, multiple twinning on {110}. Color buff to greenish to brown, luster dull to resinous to vitreous. G. 3.90 ± 0.02 by sink-float, H. 8½. Fluoresces dull orange in U. V. at 2537 Å., bright yellow at 3660 Å. Optically biaxial, negative, α 1.743–1.746, β 1.756–1.759, γ 1.758–1.761, 2 V 49–55°, $r < v$; $X = c$; pleochroic, *X* various shades of yellow, *Y* and *Z* colorless.

Holtite occurs as alluvial pebbles near Greenbashes, Western Australia. The name is for the late Harold Edward Holt (1908-1967), Prime Minister of Australia 1966-1967. Type material is preserved at the Government Chemical Laboratories, Perth, Australia. The mineral and name were approved before publication by the Commission on New Minerals and Mineral Names, IMA.

Schubnelite

Fabien Cesbron (1970) La Schubnélite, nouveau vanadate de fer hydraté. *Bull Soc. Franc. Mineral. Cristallogr.* **93**, 470–475.

Microchemical analysis by H. Vachey gave V_2O_4 16.95, V_2O_5 31.40, Fe_2O_3 41.05, H_2O 10, sum 99.40%. Microprobe analysis gave V 29.1, Fe 28.2 (microchem. V

28.15, Fe 28.71%). These give $Fe^{3+}_{1.93}$ $V^{4+}_{0.77}$ $V^{5+}_{1.30}$ $O_{7.69}\cdot 2H_2O$, probably best considered $FeVO_4\cdot H_2O$. The DTA curve shows an endothermic peak at 238°C (dehydration), another at 883° (melting), and an exothermic peak at 441° (oxidation of V^{4+}?).

Goniometric and Weissenberg study show schubnelite to be triclinic, $P\bar{1}$, a 6.59, b 5.43, c 6.62 (all ± 0.02)Å., α 125°, β 104°, γ 84°43′ (all ± 20′), $Z = 1$. The crystals, not exceeding 0.5 mm in size, are elongated [001] and show the forms {010}, {100}, and {001}; twinned on {$2\bar{1}2$}. The strongest X-ray lines (26 given) are 6.41 (s) (100), 5.15 (VS) ($0\bar{1}1$), 4.47 (VVS) (010), 3.21 (VVS) ($0\bar{1}2$), 3.19 (VS) (200, $11\bar{2}$), 3.07 (S) ($20\bar{1}$). The pattern differs from that of fervanite.

Color brilliant black, splinters are transparent yellowish- to greenish-brown. G. measured 3.28–3.29. Pleochroism observed. Reflectances were measured at 12 wave lengths (420–640 nm); calculated values of α' and γ' are 420 nm, 2.43, 2.58; 4.80, 2.25, 2.43; 560, 2.14, 2.31; 640, 2.10, 2.26. Magnetic.

The mineral occurs at the base of the zone of oxidation of the V deposit of Mounana, Gabon. The name is for H.-J. Schubnel, mineralogist of the Bur. Rech. Geol. Minieres, France. The mineral and name were approved before publication by the Commission on New Minerals and Mineral Names, IMA.

Schoenfliesite

George T. Faust and W. T. Schaller (1971) Schoenfliesite, $MgSn(OH)_6$. *Z. Kristallogr.* **134**, 116–141.

Analysis by F. S. Grimaldi of altered hulsite from Brooks Mountain, Alaska, gave (no. of determinations in parentheses) averages: B_2O_3 (2) 0.65, MgO (5) 4.27, MnO (1) 0.97, FeO (6) 0.76, Al_2O_3 (5) 0.98, Fe_2O_3 (5) 72.24, TiO_2 (1) 0.37, SnO_2 (6) 12.36, CaO (5) 0.43, H_2O^- (2) 0.06, H_2O^+ (4) 6.07, insol. (largely silica) (6) 1.04, sum 100.20%. Electron probe analyses showed that nearly all the Sn and Mg were in the new mineral. The analysis was recalculated, deducting impurities, the amounts of which were estimated from optical and X-ray study, as follows: fluorite 0.60, hulsite 4.3, goethite 17.45, magnemite plus a little hematite 57.4%. The remainder (19.51%) recalculated to the composition SnO_2 61.5, MgO 16.5, H_2O 22.0%, corresponding to $MgSn(OH)_6$ (some Fe may be present). The mineral is a member of a group including the Mn analogue wickmanite (*Amer. Mineral.* **53**, 1063), the unnamed Fe analogue (*Amer. Mineral.* **56**, 1488), and stottite, $FeGe(OH)_6$ (*Amer. Mineral.* **43**, 1006).

Dissolved by HCl, slowly by NaOH. DTA study showed a large endothermic break at 390° (348° for synthetic material); the heated material gave X-ray lines of Mg_2SnO_4, $MgSnO_3$, cassiterite, and hematite. The compound is readily synthesized from solutions at room temperature or hydrothermally.

X-ray study of the mineral gave measurements essentially identical with those on synthetic $MgSn(OH)_6$, for which the strongest lines are 4.48 (50) (111), 3.88 (100) (200), 2.74 (25) (220), 2.34 (20) (311), 1.938 (20) (400), 1.733 (25) (420), and 1.582 (20) (422), corresponding to a 7.759 ± 0.006Å. Cubic, space group T_h^2–$Pn3$., $Z = 4$, G. 3.483 calc.

The mineral occurs as very fine-grained particles, less than 10 microns in size. Mean n for synthetic material 1.590. It was formed by the hydrothermal alteration of hulsite (for paragenesis, see Dana's System, 7th Ed., **2**, 326).

The name is for Artur Moritz Schonflies (1853–1928), professor of mathematics at the University of Frankfurt, Germany. The mineral and name were approved before publication by the Commission on New Minerals and Mineral Names, IMA.

Tsumcorite

B. H. GEIER, K. KAUTZ, AND G. MULLER (1971) Tsumcorit (e), $[PbZnFe(AsO_4)_2]\cdot H_2O$, ein neues Mineral aus den Oxidationszonen der Tsumeb-Mine, Südwest afrika. *Neues Jahrb. Mineral., Monatsh.* **1971**, 304–309.

Three analyses by the laboratory of the Tsumeb Corporation gave PbO 32.10, 31.66, 31.7; ZnO 15.19, 14.69, 16.1; FeO 10.90, 10.99, 11.1; CaO 1.40, 0.98, 1.0; CuO 0.06, 1.50, 1.5; MgO n.d., 0.02, 0.3; As_2O_5 34.67, 34.80, 34.8; SiO_2 0.14, n.d., 0.5; Ge 0.03, 0.09, 0.1; H_2O^+ 4.40, 4.40, 4.4, sum 98.89, 99.13, 101.5%. Probe analyses indicated that Ca, Cu, Mg, and Sn were due to impurities. The water is lost at about 500°. Dissolved by HCl.

Weissenberg and precession study showed the mineral to be monoclinic, $C\,2/m$, a 9.131, b 6.326, c 7.583Å., (all ± 0.02Å), β 115.3 ± 0.3°, $Z = 2$. A relation to brackebuschite is suggested. The strongest X-ray lines (45 given) are 4.663 (90) ($\bar{1}11$), 3.244 (100) ($\bar{1}12$), 3.021 (60) (201), 2.863 (90)(021), 2.742 (70)($\bar{3}11$), 2.573 (50)($\bar{3}12$).

Color red–brown, streak yellow. G. 5.2, H. 4-5. n approx. 1.90, $2V$ near 90°, dichroic from yellow to yellow-green. The mineral occurs in radiating-fibrous crusts of the oxidized zone of the Tsumeb Mine, S. W. Africa, associated with beudantite, anglesite, mimetite, and other arsenates. Also found in a sample from the British Museum collection from Thasos, Greece.

The name is for the Tsumeb Corporation. The mineral and name were approved before publication by the IMA Commission on New Minerals and Mineral Names.

Cerotungstite

TH. G. SAHAMA, OLEG VON KNORRING, AND MARTTI LEHTINEN (1970) Cerotungstite, a cerian analogue to yttrotungstite, from Uganda. *Bull. Geol. Soc. Finland,* **42,** 223–228.

Analysis by O. von K. gave WO_3 70.68, Al_2O_3 0.05, Fe_2O_3 0.15, CaO 0.17, Re_2O_3 24.12, H_2O^+ 4.80, sum 99.97%, corresponding to (Ce, Nd) W_2O_6 $(OH)_3$. Analysis of the rare earths by X-ray fluorescence and spark source mass spectrometry, by Olavi Erämetsä and K. Kukkasjärvi, gave (at. %) La 5.5, Ce 41.8, Pr 6.0, Nd 24.8, Sm 6.8, Eu 1.1, Gd 3.4, Tb 0.3, Dy 1.6, Ho 0.2, Er 0.3, Tm 0.07, Yb 0.3, Lu 0.07, Y 7.7.

Precession and Weissenberg photographs showed the mineral to be monoclinic, space group $P2_1$ or $P2_1/m$, a 5.874, b 8.700, c 7.070 (all ± 0.005)Å., β 105°27′ ± 0.05′, $Z = 2$. The strongest lines (33 given) are 6.83 (36)(001), 3.405 (100)(002), 3.337 (18)($10\bar{2}$), 2.627 (17)(102), 2.273 (52)(003), 1.767 (21)($10\bar{4}$).

Color orange–yellow. H. about 1. Cleavage perfect {100}. Twinned on {001}. Under the microscope yellow with a slight greenish tint. ns α' 1.89m, β' 1.95, γ 2.02 (all ± 0.01), $Z = b$, Y nearly ⊥ to (001), X nearly parallel to α.

The mineral occurs in the Kirwa and Nyamulilo mines, Kigezi district, Uganda, as radiating group of bladed crystals up to 100 microns long, showing {001} (dominant), {101}, {100}, {011}, and {110}, associated with ferberite.

The name is for the composition. Type material is preserved at the University of Helsinki. The mineral and name were approved before publication by the Commission on New Minerals and Mineral Names, IMA.

Takovite

Z. Maksimovic (1957) Takovite, a new mineral from Takova, Serbia. *Zap. Srpskog Geol. Drustva* **1955**, 219 [*Mineral. Abstr.* **13**, 624 (1958)].

Z. Maksimovac (1970) Features and genesis of takovite. *Zap. Vses. Mineral. Obshch.* **99**, 595–600 [in Russian].

Analysis by J. H. Scoon on 0.1 g. gave SiO_2 10.17, Al_2O_3 20.16, Fe_2O_3 1.78, NiO 37.24, CaO 0.46, Na_2O 0.46, K_2O 0.09, H_2O^- 3.48, H_2O^+ 26.60, sum 100.45%; after deducting SiO_2 as quartz, 2% goethite, and 0.8% calcite, this corresponds to $Ni_5Al_4O_2(OH)_{18}\cdot 6H_2O$. Spectrographic analysis shows (ppm): Cr 424, Ce 209, Mn 220, Sc 16, Sr 10, Ba 13. DTA study shows endothermic reactions at 185–230° and at 350–375°. The water is lost gradually up to about 320°. The infra-red spectrum shows bands of hydroxyl and of molecular water.

The mineral is bluish-green, massive. Electron microscope photographs show plates, about 1 micron in size. Extinction parallel, elongation positive, ns α' 1.598, γ' 1.605. The strongest X-ray lines (17 given) are: 7.566 (10), 3.767 (9), 2.552 (9), 2.264 (8), 1.917 (9), 1.708 (7, broad), 1.613 (6, broad), 1.510 (8), 1.481 (8), 1.373 (6).

The mineral occurs at Takovo, Serbia, at the contact of limestone and metamorphosed serpentinite, associated with gibbsite, allophane, and "aidyrlite." It has also been reported in Grecian bauxite and in altered peridotite, Mueo, New Caledonia.

Unnamed MoS_3, Molybdenum Silicate?

A. H. Clark (1971) Evidence for the geological occurrence of molybdenum trisulphide. *Nat. Phys. Sci.* **234**, 177–178.

A sample of oxidized ore from the Potrerillos porphyry copper deposit, northern Chile, consisted of a finely banded chrysocolla vein, crossed by hair-line veinlets of a bluish-black powdery material. The latter, in polished section, consisted of two optically distinct components.

One of these is opaque, and dull gray in polarized light, the second is transparent medium-blue. X-ray study of the intergrowths gave a few weak and diffuse lines corresponding closely to those of chrysocolla.

The gray component is slightly birefringent and shows marked anisotropy in oil immersion, from bluish-gray to pale creamy yellow. It occurs as an aggregate of platy grains (0.5–5 microns). Electron probe analyses of 4 samples, using molybdenite as standards, gave compositions $MoS_{3.1}$–$MoS_{2.85}$, but the summations did not exceed 95%, suggesting the presence of a third, light element.

The blue phase showed by electron probe only major Mo and Si ($S < 0.1\%$) in variable proportions. It may be a molybdenum analogue of chrysocolla.

NEW DATA

Pisekite

V. L. Bouska and Z. Johan (1972) New data on pisekite. *Lithos,* **5**, 93–103.

Pisekite (Dana's System, 7th ed., **1**, 807–808) is a metamict niobate-tantalate, which has not been generally accepted as a valid species. A new electron probe analysis gave Nb_2O_5 35.2, Ta_2O_5 5.9, TiO_2 3.6, SnO_2 0.9, WO_3 1.5, HfO_2 0.1, Al_2O_3 0.4, FeO 2.2, MgO 0.1, MnO 0.1, As_2O_3 8.5, CaO 2.4, ΣCe_2O_3 4.2, ΣY_2O_3 9.3, Sc_2O_3 0.2, UO_2 8.6, ThO_2 1.8, H_2O^- 3.3, H_2O^+ 0.8, SiO_2 2.3, Cr_2O_3 4.1, sum 95.5%. Neutron activation analysis showed that the Ce earths included La_2O_3 2.51%, the Y earths Th_2O_3 0.21, Yb_2O_3 0.94, Lu_2O_3 0.13%. Disregarding the Cr_2O_3, introduced by the use of abrasives in preparing polished sections, the analysis is calculated to the formula:

$$(Y_{0.24}Ce_{0.08}As_{0.25}Ca_{0.13}Fe_{0.09}U_{0.09}Th_{0.02}Al_{0.03}Sn_{0.02}Mg_{0.01}Sc_{0.01})$$

$$(Nb_{0.78}Ta_{0.08}Ti_{0.13}W_{0.02})O_{3.75}OH_{0.25},$$

or

$$(Y, Ce, Ca, As, Fe, U)(Nb, Ti, Ta)(O, OH)_4.$$

DTA and TGA curves are given. The DTA curve shows endothermic breaks at 160°, 420°, and 990°, and an exothermic peak at 770°.

Heating in air at 800° gave a predominant trigonal phase (U Nb_2O_8?) with *a* 3.654, *c* 4.086Å., a phase of pyrochlore type with *a* 10.34Å., and a weakly developed tetragonal phase of rutile type. Hydrothermal recrystallization at 590–600° and 3000 atm. for 21 days gave a monoclinic phase, $P2_1/n$, *a* 6.570, *b* 6.840, *c* 6.217_5Å., β 95°25′ (near those of monazite, except β). Poor patterns of the same phase were obtained by heating pisekite in air at 600–700°. If this monoclinic phase corresponds to the original mineral before it became matamict, pisekite is distinct from samarskite.

Ramdohrite

Yu. S. Borodaev, O. L. Sveshnikova, and N. N. Mozgova (1971) The inhomogeneity of ramdohrite. *Dokl. Akad. Nauk SSSR,* **199**, 1138–1141 [in Russian].

Ramdohrite (Dana's System, 7th ed., **1**, 450–451) was assigned the formula $Ag_2Pb_3Sb_6S_{13}$; Nuffield [*Trans. Soc. Can.* **39**, 41–50 (1945)] showed that it is related to andorite and gave the formula $Ag_4Pb_6Sb_{10}S_{23}$.

Re–examination of material from the type locality, Potosi, Bolivia, showed that the material is an intergrowth of light and dark phases that give practically identical X-ray powder patterns that agree with Nuffield's. Microprobe analyses gave Ag 9.6, Pb 35.7, Sb 36.1, S 19.6, sum 100.8%, and Ag 11.2, Pb 27.3, Sb 41.9, S 19.5, sum 99.9%, corresponding respectively to $Ag_{0.9}$ $Pb_{1.8}Sb_3S_{6.1}$ and $Ag_{0.9}$ $Pb_{1.2}$ $Sb_3S_{5.3}$.

Eskebornite

D. C. Harris and E. A. J. Burke (1971) Eskebornite, two Canadian occurrences. *Can. Mineral.* **10**, 786–796.

Various formulas had previously been suggested for this copper iron selenide. Microprobe analyses of samples from the Martin Lake mine and from the Eagle claims near Hal Lake, both in the Lake Athabasca area, northern Saskatchewan, gave (averages of several analyses) Cu 23.62 ± 0.2, 230 ± 0.5; Fe 19.75 ± 0.2, 19.7 ± 0.4; Se 55.96 ± 0.3, 57.5 ± 0.4; sum 99.32, 100.2%. Both correspond closely to $CuFeSe_2$. Optical and X–ray powder data are given.

Alloclasite

P. W. Kingston (1971) On alloclasite, a Co–Fe sulpharsenide. *Can. Mineral.* **10,** 838–846.

Alloclasite (Dana's System, 7th ed., v. **1**, p. 324) has been considered to be a mixture or a bismuthian glaucodot. The crystal form had been found by Tschermak to differ from that of cobaltite but the analyses (Dana's System, 6th ed., p. 102), apparently made on massive material, showed Bi 23–33%. New electron microprobe analyses on museum samples in order, 2 from type locality, Oravicza, Roumania, 1 from Westphalia, Germany, and 1 from the Dogatani mine, Japan, gave Co 25.4, 28.5, 23.6, 23.3; Fe 8.4, 4.0, 9.1, 7.7; As 44.3, 44.9, 45.5, 47.3; S 18.7, 17.8, 20.9, 20.7; sum 96.8, 95.2, 99.1, 99.0%, corresponding to (Co, Fe) AsS with Co:Fe 0.71:0.29 to 0.87:0.13.

X–ray study showed the mineral to be orthorhombic, $P\ 22_12_1$, a 4.641, 4.631, 4.662; b 5.606, 5.605, 5.606; c 3.415, 3.430, 3.415Å for the first 3 analyzed specimens; $Z = 2$. The strongest lines (27 given) are 2.750 (10) (101); 2.469 (9) (111), 2.401 (5) (120), 1.817 (7) (211). Synthetic material prepared by heating the components *in vacuo* in quartz at 400° for 4 days gave a different space group.

Alloclasite is therefore a valid dimorph of cobaltite.

DISCREDITED MINERALS

Ashtonite = Strontian Mordenite

A. Reay and D. S. Coombs (1971) Ashtonite, a strontian mordenite. *Mineral. Mag.* **38,** 383–385.

A new analysis and X–ray study of a type sample of ashtonite (*Amer. Mineral* **10,** 132) shows that it is a strontian mordenite (CaO 4.66, SnO 1.27%).