

## NEW MINERAL NAMES\*

MICHAEL FLEISCHER, GEORGE Y. CHAO AND ADOLF PABST

### Bartonite\*, unnamed NaFeS<sub>2</sub>(OH)

G. K. Czamanske, M. A. Lanphere, R. C. Erd, and M. C. Blake, Jr. (1978) Age measurements of potassium-bearing sulfide minerals by the <sup>40</sup>Ar/<sup>39</sup>Ar technique. *Earth Planet. Sci. Lett.*, 40, 107-110.

The sulfides occur with rasvumite and pyrrhotite in clots (3-6cm) of coarse nepheline, phlogopite, and sulfides, in an alkalic diatreme intruding Franciscan melange at Coyote Peak, northern California. Bartonite occurs in blackish-brown masses up to several mm across, intergrown with pyrrhotite. Microprobe analyses by GKC (standards: sodalite for Cl, synthetic Ni-Fe sulfide for Ni, crocidolite for Na, biotite for K and Mg, chalcopyrite for Cu) of bartonite gave K 9.91, 10.7; Na 0.01, 0.18; Fe 50.0, 49.0; Cu 0.52, 0.66; Ni 0.15, 0.34; S 38.2, 37.3; Cl 0.04, 1.40; sum 99.33, 99.58%, corresponding to the formula K<sub>3</sub>Fe<sub>10</sub>S<sub>14</sub>. The name is for Paul B. Barton, Jr., geologist, U.S. Geological Survey.

No data are given for the unnamed mineral.

### Discussion

Again the first publication of a new mineral name is an inadequate description, omitting all X-ray data. It is to be hoped that this practice will be discontinued. **M.F.**

### Bazirite\*

B. R. Young, J. R. Hawkes, R. J. Merriman, and M. T. Sayles (1978) Bazirite, BaZrSi<sub>3</sub>O<sub>8</sub>, a new mineral from Rockall Island, Inverness-shire, Scotland. *Mineral. Mag.*, 42, 35-40 (see *Am. Mineral.*, 61, 175, 1976).

Bazirite occurs with elpidite (Na<sub>2</sub>ZrSi<sub>6</sub>O<sub>15</sub>·3H<sub>2</sub>O) and other late-stage interstitial minerals in the aegirine-riebeckite granite of Rockall Island (57°36'N; 13°41'W), as colorless, mostly anhedral, grains. "Low" and "high" titanium varieties have the respective mean compositions: SiO<sub>2</sub> 39.71, ZrO<sub>2</sub> 26.38, BaO 33.69, TiO<sub>2</sub> 0.17, SnO<sub>2</sub> 0.06%; and SiO<sub>2</sub> 39.59, ZrO<sub>2</sub> 26.12, BaO 34.12, TiO<sub>2</sub> 0.51, SnO<sub>2</sub> 0.11%. Low- and high-refractive index types exist, probably due to differences in Ti content; uniaxial positive,  $\omega = 1.6751(3)$ ,  $\epsilon = 1.6850(3)$  and  $\omega = 1.6813(3)$ ,  $\epsilon = 1.691$  (deduced). The mineral clearly has the benitoite structure in the space group  $P\bar{6}c2$ . Cell dimensions: low R. I. variety  $a = 6.7690(5)$ ,  $c = 10.020(1)A$ , high R.I. variety  $a = 6.7622(5)$ ,  $c = 10.0158(10)A$ ,  $Z = 2$ ,  $D$  (calc) = 3.82. Strongest lines in the powder diffraction pattern are 3.80(100)(10.2), 2.800(100)(11.2), 5.85(35)(10.0), 3.38(35)(11.0). In

short-wave ultraviolet light bazirite shows moderately strong, pale bluish-white fluorescence. **A. P.**

### Boyleite\*

Kurt Walenta (1978) Boyleite, a new sulfate mineral from Kropback, southern Black Forest (in German). *Chemie der Erde*, 37, 73-79.

Analysis of a sample containing gypsum gave ZnO 29.25, MgO 2.82, SO<sub>3</sub> 39.76, remainder (CaO, H<sub>2</sub>O) 28.17, sum 100.00%. After deducting 11-6% gypsum, this corresponds to (Zn<sub>0.84</sub>Mg<sub>0.16</sub>)SO<sub>4</sub>·4H<sub>2</sub>O. The mineral dehydrates in dry rooms to gunningite. Soluble in water.

X-ray powder data (49 lines) are given; the strongest lines are 6.85(8)(011), 5.46(10)(110), 4.47(10)(120,111), 3.39(7)(040), 3.20(5)(112), 2.95(7b)(140), 2.55(S)(051,221). These are in good agreement with the data of Pannetier *et al.*, *Bull. Soc. Chim.*, 324-326 (1966), for pure ZnSO<sub>4</sub>·4H<sub>2</sub>O, who reported it as monoclinic, space group  $P2_1/n$ ,  $a = 5.95$ ,  $b = 13.60$ ,  $c = 7.96A$ ,  $\beta = 90^\circ 18'$ ,  $Z = 4$ .

The mineral occurs as white, earthy, or reniform masses. Cleavage not observed, fracture uneven. H probably about 2. Optically biaxial, negative,  $\alpha = 1.522 \pm 0.0002$ ,  $\beta = 1.531$  (calc),  $\gamma = 1.536 \pm 0.002$ ,  $2V \sim 70^\circ$ .

The mineral occurs as an alteration product of sphalerite in the quarry at Kropback, southern Black Forest, Germany. The name is for R. W. Boyle, geologist, Geological Survey of Canada, who mentioned the occurrence of ZnSO<sub>4</sub>·4H<sub>2</sub>O at Keno Hill, Yukon (*Can. Mineral.*, 7, 209-218, 1962). Boyleite is isotypic with stark-eite (leonhardtite), rozenite, ilesite, and aplowite. **M. F.**

### Brenkite\*

G. Hentschel, U. Leufer, and E. Tillmanns (1978) Brenkite, a new calcium fluor-carbonate from Schellkopf, Eifel (in German). *Neues Jahrb. Mineral. Monatsh.*, 325-329.

Analysis gave Ca 44.3, 44.7; F 21.1, 21.3, 21.3, 21.6; C 6.6, 6.6, 6.7, 6.8, corresponding closely to theory for CaF<sub>2</sub>·CaCO<sub>3</sub>. The mineral dissolves with effervescence in dilute HCl. The infrared spectrum is given.

Single-crystal study showed the mineral to be orthorhombic, space group  $Pbcn$ ,  $a = 7.650$ ,  $b = 7.550$ ,  $c = 6.548A$ ,  $Z = 4$ ,  $G$  (calc) = 3.126, (meas) =  $3.10 \pm 0.04$ . The strongest X-ray lines (32 given) are 3.276(60)(002,021), 3.028(80)(211), 3.006(80)(102,121), 2.794(100)(112), 2.486(70)(202), 2.265(60)(311), 1.835(80)(213,123), 1.790(60)(330).

The mineral occurs as radiating aggregates of lath-like crystals up to 1 mm, showing forms {010}, {110}, {102}, and {021}, at Brenk, Eifel, Germany. Colorless, streak white, hardness 5. Optically bi-

\*Minerals marked with asterisks were approved before publication by the Commission on New Minerals and Mineral Names of the International Mineralogical Association.

axial negative,  $\alpha = 1.525$ ,  $\beta = 1.590$ ,  $\gamma = 1.593$ ,  $2V = 26-28^\circ$ ,  $X = c$ ,  $Y = a$ . No distinct cleavage.

The name is for the locality. **M. F.**

#### Chabourneite\*

Paul Picot and Zdenek Johan (1977) Atlas des Mineraux Metalliques. *Mem. Bur. Rech. Geol. Minieras*, 90, 1-402 (see p. 115).

Chabourneite,  $(\text{Ti,Pb})_5(\text{Sb,As})_{21}\text{S}_{34}$ , triclinic, occurs with realgar, pierronite, routhierite, laffittite, smithite, and stibnite at Jas Roux, France. Color white. Strongly anisotropic. Reflectances are given at 15 wave lengths from 420 to 700 nm. Max. and min. are: 420 nm, 40.0, 32.1; 580, 35.1, 30.2; 700, 30.7, 26.4. **M. F.**

#### Changbaiite

Detachment No. 8, Comprehensive Geological Brigade of Tonghua Region and Petrology and Mineralogy Laboratory, Kirin Institute of Geological Science (1978) Changbaiite ( $\text{PbNb}_2\text{O}_6$ ), a new mineral of lead and niobium from eastern Kirin, China (in Chinese with English abstract). *Acta Geol. Sinica*, 1, 54-62.

Chemical analysis, after deduction of  $\text{Al}_2\text{O}_3$ ,  $\text{SiO}_2$  and LOI due to admixed kaolinite, and microprobe analysis (in parenthesis) gave: FeO 0.77 (0.94), PbO 44.12 (41.51),  $\text{Fe}_2\text{O}_3$  0.42,  $\text{TiO}_2$  0.89 (0.95),  $\text{Nb}_2\text{O}_5$  53.43 (55.62),  $\text{Ta}_2\text{O}_5$  0.37, sum 100.00 (99.02) percent. The chemical analysis corresponds to  $(\text{Pb}_{0.95}\text{Fe}_{0.05}^{2+})$  ( $\text{Nb}_{1.93}\text{Ti}_{0.05}\text{Fe}_{0.02}^{3+}\text{Ta}_{0.01}$ ) $\text{O}_6$  or  $\text{PbNb}_2\text{O}_6$ . Semi-quantitative spectrographic analysis showed Sb ~ 0.3, Si 0.1, Ba 0.2, Ca ~ 0.1, As 0.05-0.03 and traces of Al, Mg, Cu and Mn.

The mineral is trigonal,  $R3m$ ,  $a = 10.499$ ,  $c = 11.553\text{A}$ ,  $Z = 9$ . The X-ray powder diffraction pattern is identical to that of the synthetic rhombohedral  $\text{PbNb}_2\text{O}_6$ . The strongest lines are (48 plus 7  $\beta$ -lines given): 3.100(10)(113), 3.028(9)(030), 2.160(5)(223), 1.919(4)(125), 1.760(6)(143), 1.745(3)(330), 1.621(5)(036), 1.513(3)(060), 1.359(3)(253), 1.294(3)(336), 0.985(3)(636). Infrared absorption bands are: 870(m), 676(vs), 517(vs), 423(w), 366(s), 330(w, sh=shoulder), 301(m),  $279\text{cm}^{-1}$ (w,sh). DTA ( $100^\circ/\text{min}$ ) showed a strong endothermic break at 1100-1200°C (melting).

The mineral occurs as small tabular crystals and sometimes as spherules, average 0.2-0.4mm and up to 5mm in size. The crystals display  $3m$  symmetry and are bounded, in order of decreasing prominence, by {0001}, {000 $\bar{1}$ }, {01 $\bar{1}$ 1}, {10 $\bar{1}$ 1}, {10 $\bar{1}$ 2}, {01 $\bar{1}$ 2}, and {11 $\bar{2}$ 0}. The mineral is colorless, cream white, pale brown, yellowish-brown, pale yellowish-green with white streak and adamantine to pearly luster. It is transparent to translucent, brittle and non-magnetic. Basal cleavage perfect, rhombohedral cleavage distinct, fracture hackly but conchoidal for spherulitic grains. VHN = 472.4kg/mm<sup>2</sup> or 5.3 on Mohs scale, G (meas) 6.48 (6.47 in abstract), (calc) 6.51g/cm<sup>3</sup>. The mineral is not fluorescent in cathode rays and UV light. It is insoluble in HCl, HNO<sub>3</sub>, and H<sub>2</sub>SO<sub>4</sub>, slightly soluble in warm H<sub>3</sub>PO<sub>4</sub>. Optically the mineral is uniaxial positive,  $\epsilon = 2.485$ ,  $\omega = 2.476$ , and sometimes anomalously biaxial with  $2V = 0-38^\circ$  and dispersion  $r > v$ . Reflectance = 15.86 at 546 nm.

The mineral occurs with quartz and potassium feldspar in kaolinite veinlets and in kaolinite-filled cavities in potassic granite, Tonghua, southeastern Kirin, China. The name is for the Changbai Mountain where the deposit is located. The type material is preserved at the Museum of Geology (where? GYC). **G.Y.C.**

#### Cobalt-frohbergite

E. M. Spiridonov, N. F. Sokolova, A. K. Gapeev, and T. N. Chvilova (1978) Cobalt-frohbergite (mattagamite) of the Zhena-Tyube deposit in Kazakhstan (first find in the U.S.S.R.) (in Russian). *New Data on the Minerals of the U.S.S.R.* (formerly *Trudy Mineralog. Muzaya Akad. Nauk SSSR*), 26, 140-145.

Microprobe analyses are given of 23 minerals of the series frohbergite ( $\text{FeTe}_2$ )-mattagamite ( $\text{Co,FeTe}_2$ ). These are called frohbergite (Co = 0-1.00%), cobalt-containing frohbergite (Co = 1.3-3.6%), and cobalt-frohbergite (Co = 6.2-8.8, Fe = 13.1-10.1%). Optical and X-ray data are given. Two alternative nomenclatures are suggested for this ditelluride series ("the first is probably more rational"):

- I. Frohbergite  $\text{Fe}_{1-0.7}\text{Co}_{0-0.3}$   
Mattagamite or cobalt-frohbergite  $\text{Fe}_{0.7-0.3}\text{Co}_{0.3-0.7}$   
Cobalt-telluride  $\text{Fe}_{0.3-0}\text{Co}_{0.7-1}$
- II. Frohbergite  $\text{Fe}_{1-0.7}\text{Co}_{0-0.3}$   
Cobalt-frohbergite  $\text{Fe}_{0.7-0.5}\text{Co}_{0.3-0.5}$   
Mattagamite  $\text{Fe}_{0.5-0.3}\text{Co}_{0.5-0.7}$   
Cobalt-telluride  $\text{Fe}_{0.3-0}\text{Co}_{0.7-1}$

#### Discussion

Endless confusion has been caused in the past by names such as cobalt-frohbergite, which most readers would take to mean the cobalt analogue of frohbergite, not cobaltoan frohbergite, as it actually is. This name and the proposal to change the meaning of mattagamite without consulting the original proposers of the name or the IMA Commission should be rejected. The paper describing mattagamite stated that the name was to be applied to the end member  $\text{CoTe}_2$ . The two names frohbergite and mattagamite, with suitable adjectival modifiers, are sufficient to describe the series. **M.F.**

#### Emeleusite\*

B. G. J. Upton, P. G. Hill, O. Johnsen and O. V. Petersen (1978) Emeleusite: a new  $\text{LiNaFe}^{III}$  silicate from south Greenland. *Mineral. Mag.*, 42, 31-34.

Emeleusite ( $\text{Li}_2\text{Na}_4\text{Fe}_2^{3+}\text{Si}_{12}\text{O}_{30}$ ) occurs as orthorhombic (pseudo-hexagonal) euhedra within a facies of a peralkaline trachyte dike. Microprobe analysis (Li by flame photometry) gave  $\text{SiO}_2$  70.75,  $\text{TiO}_2$  0.55,  $\text{ZrO}_2$  0.10,  $\text{Al}_2\text{O}_3$  1.34,  $\text{Fe}_2\text{O}_3$  12.13, MgO 0.10, MnO 0.03, Na<sub>2</sub>O 11.98, Li<sub>2</sub>O 2.78, sum 99.76%. Diffraction symbol *Abc*\*,  $a = 10.073(2)$ ,  $b = 17.350(5)$ ,  $c = 14.010(5)\text{A}$ ,  $Z = 4$ ,  $G = 2.76(7)$  (meas),  $2.775\text{ g/cm}^3$  (calc); H 5-6; colorless, transparent, vitreous, biaxial negative, small  $2V$ ,  $\alpha$  ( $\parallel b$ ) = 1.596,  $\beta$  ( $\parallel a$ ) = 1.597,  $\gamma$  ( $\parallel c$ ) = 1.597. Emeleusite can occur as interpenetration triplets with {110} as twin planes. Prominent powder diffraction lines are: 7.001(5)(002), 4.352(10)(220,040), 3.501(7)(004), 3.209(8)(311), and 3.090(7)(124). The nonstandard setting was chosen to emphasize the pseudo-hexagonal character and the close relation to members of the milarite group. The name is for Dr. C. H. Emeleus of the University of Durham. **A.P.**

#### Kidwellite\*

P. B. Moore and J. Ito (1978) Kidwellite,  $\text{NaFe}_3^{2+}(\text{OH})_{10}(\text{PO}_4)_6 \cdot 5\text{H}_2\text{O}$ , a new species. *Mineral. Mag.*, 42, 137-140.

Kidwellite occurs in moderate abundance as a late-stage mineral associated with rockbridgeite, dufrenite, beraunite, and strengite in novaculite deposits. It has been found in several localities in the Ouachita Mountains, Arkansas, at Indian Mountain, Alabama, Irish Creek, Virginia, and the Rotläufchen mine, Waldgirmes, Germany. Kidwellite is mostly found as mats or tufts made up of the finest feathery crystals. It is lively pale chartreuse-green to greenish-yellow, greenish-white, and bright yellow with silky luster;  $H = 3$ . The tiny crystals are monoclinic, elongated parallel to [010] with perfect {100} cleavage;  $a = 20.61(7)$ ,  $b = 5.15(1)$ ,  $c = 13.75(6)$  Å,  $\beta = 112.64(15)^\circ$ ,  $Z = 2$ ;  $D$  (calc) = 3.34 g/cm<sup>3</sup>; diffraction symbol  $A^*/*$ . The five strongest lines of the diffractometer pattern are: 9.41(100)(100), 4.017(35)(502), 3.813(40)(302), 3.413(55)(602), 3.193(40)(511). Optically biaxial, negative, with  $\alpha = 1.787(5)$ ,  $\beta = 1.800(5)$ ,  $\gamma = 1.805(5)$ , large  $2V$ ,  $\beta || b$ , colorless in fine needles and not discernibly pleochroic. Analysis by Jun Ito of material from Fodderstack Mountain, Arkansas, gave P<sub>2</sub>O<sub>5</sub> 31.3, SiO<sub>2</sub> 0.27, Al<sub>2</sub>O<sub>3</sub> 0.98, Fe<sub>2</sub>O<sub>3</sub> 52.3, MgO 0.01, MnO 0.02, Na<sub>2</sub>O 1.60, H<sub>2</sub>O<sup>+</sup> 13.3, H<sub>2</sub>O<sup>-</sup> 0.3, sum 100.07%. The name is for Mr. A. L. Kidwell of Houston, Texas, diligent student of the phosphate occurrences of the Ouachita Mountains. **A.P.**

#### Manganhumite\*

P. B. Moore (1978) Manganhumite, a new species. *Mineral. Mag.*, 42, 133–136.

Manganhumite, orthorhombic,  $a = 10.54(1)$ ,  $b = 21.45(2)$ ,  $c = 4.822(9)$  Å, space group  $Pnma$ ,  $Z = 4$ ,  $(Mn_{0.88}Mg_{0.30}Fe_{0.01}Ca_{0.01})_7(OH)_2(SiO_4)_8$ , is the manganese analogue of humite. Its type locality is the Brattfors mine, Nordmark, Värmland, Sweden. Manganhumite occurs in a skarn assemblage with katoptrite, mangano-sitibite, galaxite, etc., which replace manganosite grains in magnetite–manganosite ore. The mineral is biaxial (+),  $\alpha = 1.707(3)$ ,  $\beta = 1.712(3)$ ,  $\gamma = 1.723(3)$ ,  $2V$ (obs) = 37(4)°,  $r > v$  perceptible, cleavage {010} perfect,  $H = 4$ ,  $G = 3.83(5)$ . The strongest lines in the powder pattern are: 1.777(10)(272), 2.500(7)(171), 3.371(6)(141), 2.628(6)(331), and 1.525(6)(0.14.0). Microprobe analyses on 5 grains by C. E. Nehru gave SiO<sub>2</sub> 29.8, Al<sub>2</sub>O<sub>3</sub> trace, MgO 14.2, FeO 0.98, MnO 57.1, CaO 0.34, P<sub>2</sub>O<sub>5</sub> trace, sum 102.42%. **A.P.**

#### Phurcalite\*

Michel Deliens and Paul Piret (1978) La phurcalite, Ca<sub>2</sub>(UO<sub>2</sub>)<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>(OH)<sub>4</sub>·4H<sub>2</sub>O, nouveau minéral. *Bull. Minéral. (Soc. fr. Minéral. Cristallogr.)*, 101, 356–358.

Probe analysis by J. Wautier, using analyzed meta-autunite as standard, gave P<sub>2</sub>O<sub>5</sub> 11.5, UO<sub>3</sub> 70.9, CaO 8.3, H<sub>2</sub>O by difference 9.3%. X-ray study showed it to be orthorhombic, space group  $Pbca$ ,  $a = 17.426$ ,  $b = 16.062$ ,  $c = 13.592$  Å,  $Z = 8$ ,  $G$  (calc) = 4.14, (meas) > 4.03. The strongest X-ray lines (16 given) are 8.05(100)(020), 3.39(50)(332,004), 3.10(80)(521,214), 3.09(80)(502), 2.878(70)(522).

Phurcalite occurs as tablets flattened on [010] and elongated on [001]; crystals are up to 1 mm long. Color yellow, luster vitreous to nearly adamantine;  $H = 3$ . Not fluorescent in UV. The mineral is optically biaxial, negative,  $2V = 68$ ,  $\alpha$  (calc) = 1.690,  $\beta = 1.730 \pm 0.001$ ,  $\gamma = 1.749 \pm 0.001$ . Strongly pleochroic,  $X$  bright yellow,  $Y$  very pale yellow. Elongation positive. Cleavages {001} and {010}

perfect, and {100}. The locality is Bergen, Vogtland, Saxony; the mineral is associated with specular hematite.

The name is for the composition Ph, Ur, Cal. Type material (RGM 13.388) is at the Musée royal de l'Afrique centrale, Tervuren, Belgium. **M.F.**

#### Stibiopearceite

L. I. Boček, N. I. Eremin, and V. M. Okrugin (1978) Stibiopearceite in ores of the Strezhan pyritic-polymetallic deposits, Rudnyi Altai (in Russian). *New Data on the Minerals of the U.S.S.R.* (formerly *Trudy Mineralog. Muzeya Akad. Nauk SSSR*), 26, 15–21.

The name stibiopearceite is used first in place of antimonpearceite (Frondele, *Am. Mineral.*, 48, 565–572, 1963) and then to describe an antimonian pearceite (As 6.00, Sb 1.95%), formula  $(Ag_{10.7}Cu_{5.3})(As_{1.50}Sb_{0.31})S_{11}$ . There is no excuse for the use of the name in either way. **M.F.**

#### Vikingite\*, eskimoite\*, ourayite\*, treasureite\*, new data on schirmerite

Sven Karup-Møller (1977) Mineralogy of some Ag–(Cu–Pb–Bi) sulfide associations. *Bull. Geol. Soc. Denmark* 26, 41–68.

E. Makovicky and S. Karup-Møller (1977) Chemistry and crystallography of the lillianite homologous series II. Definition of new minerals: eskimoite, vikingite, ourayite, and treasureite. Redefinition of schirmerite and new data on the lillianite–gustavite solid-solution series. *Neues Jahrb. Mineral. Abh.*, 131, 56–82.

The minerals of the lillianite homologous series consist of layers with galena-like structure, separated by discontinuous layers of Pb atoms in trigonal prismatic coordination. The general formula is  $Pb_{n-1-2x}Bi_{2+x}Ag_xS_{n+2}$ , assuming the substitution  $Ag+Bi$  for 2 Pb. All the minerals have similar optical properties; their X-ray powder patterns are also similar, so that identification is difficult.

**Vikingite:** Ideal formula  $Ag_5Pb_8Bi_{13}S_{30}$ . Microprobe analyses of 5 samples gave Ag 7.9–8.9, Cu 0.2, Pb 27.7–30.4, Bi 45.9–46.8, S 16.5, sum 100.1–102.1%. Monoclinic, space group  $B2/m$  or  $Bm$ ,  $a = 13.603$ ,  $b = 25.248$ ,  $c = 4.112$  Å,  $\gamma = 95.55^\circ$ ,  $Z = 1$ . The strongest X-ray lines (32 given) are 3.40(10)(260,141); 2.91(5)(280), 206(8)(660), 1.754(9). Weissenberg photographs showed twinning on (010). Twin lamellae parallel to [001] were observed. Reflectances at 4 wavelengths: 481 nm, 44.6–45.4; 546, 43.1–43.8; 589, 42.5–43.2; 644, 42.1–42.8. Anisotropism distinct to strong, colors light gray to steel bluish-black. Hardness (50 g load) 153–207, av. 185 ± 16. The mineral occurs in lamellar grains, av. 0.5 mm, in the gustavite–cosalite–galena paragenesis, Ivigtut, Greenland. The name is for the Vikings, early settlers of Greenland.

**Eskimoite:** Ideal formula  $Ag_7Pb_{10}Bi_{15}S_{36}$ . Microprobe analysis of two samples gave Ag 9.7, 9.6; Cu 0.3, 0.2; Pb 28.8, 30.4; Bi 46.7, 44.8; S 16.2–16.4, sum 101.7, 101.4%. Monoclinic, space group  $B2/m$  or  $Bm$ ,  $a = 13.459$ ,  $b = 30.194$ ,  $c = 4.100$  Å,  $\gamma = 93.35^\circ$ ,  $Z = 1$ . The strongest X-ray lines (24 given) are 3.36(10)(280), 2.96(5)(290), 2.87(6)(331), 2.05(5), 2.754(5). Weissenberg photographs show twinning on (010). Twin lamellae parallel to the  $c$  axis are often present. Reflectances: 481 nm, 45.4–48.2; 546, 43.7–46.5; 589, 42.8–45.6; 644, 42.0–44.8. Optically indistinguishable from gustavite and vikingite. Microindentation hardness (50 g. load)

162–223, av.  $191 \pm 20$ . The name is for the Eskimos, original settlers of Greenland.

**Ourayite:** Ideal formula  $\text{Ag}_{28}\text{Pb}_{30}\text{Bi}_{41}\text{S}_{104}$ ,  $Z = 0.5$ . The average of microprobe analyses of 11 grains is Ag 12.5, Cu 0.5, Pb 29.5, Bi 41.4, Sb 0.2, S 16.0, sum 100.1%. Orthorhombic, space group *Bbmm* or *Bb2<sub>1</sub>m*,  $a = 13.457$ ,  $b = 44.042$ ,  $c = 4.100\text{Å}$ . The strongest lines (24 given) are 3.36(10)(280), 2.96(5)(290), 2.87(6)(331), 2.05(5), 1.754(5). Optical and hardness data could not be obtained because of the grain size. The mineral occurs as laths less than 0.1 mm long in a fine-grained (exsolution?) matrix of galena+matildite, from a single sample labelled "beegerite," Old Lout Mine, Ouray, Colorado. The name is for the locality.

**Treasurite:** Ideal formula  $\text{Ag}_7\text{Pb}_6\text{Bi}_{15}\text{S}_{82}$ ,  $Z = 1$ . The average of microprobe analyses of 5 grains is Ag 12.7, Pb 19.6, Bi 50.5, S 16.4, sum 99.2%. Weissenberg photographs show the mineral to be monoclinic, space group *B2/m*, *B2*, or *Bm*,  $a = 13.349$ ,  $b = 26.538$ ,  $c = 4.092\text{Å}$ ,  $\gamma = 92.77^\circ$ ,  $G(\text{calc}) = 7.25$ . The strongest X-ray lines (15 given) are 3.63(5)(260), 3.49(10)(131), 3.22(8)(270), 2.93(5)(280), 2.86(5)(331), 1.989(6)(660,650), 1.955(6)(561,670,3·10·1).

Reflectance and microhardness could not be determined because of fine grain size. Optically indistinguishable from vikingite, eskimoite, or ourayite. *Treasurite* forms an  $1 \times 1.5$  mm aggregate in a sample, formerly thought to be schirmerite, from the Treasury Mine, Colorado.

**Schirmerite (new data):** Twenty-three new microprobe analyses gave Ag 8.8–10.7, Pb 18.9–31.5, Bi 42.8–54.4, S 15.7–16.8%, the composition field extending from  $\text{Ag}_3\text{Pb}_3\text{Bi}_9\text{S}_{18}$  to  $\text{Ag}_3\text{Pb}_6\text{Bi}_7\text{S}_{18}$ . Weissenberg photographs show that schirmerite is strongly disordered, so that cell dimensions and unit-cell contents cannot be assigned.

#### Welshite\*

P. B. Moore (1978) *Welshite*,  $\text{Ca}_2\text{Mg}_4\text{Fe}^{3+}\text{O}_2\text{Si}_4\text{Be}_2\text{O}_{18}$ , a new member of the aenigmatite group. *Mineral. Mag.*, 42, 129–132.

*Welshite* occurs as lustrous, subadamantine, thick prismatic reddish-black crystals up to 3 mm in greatest dimension with berzeliite and other rare minerals in a dolomite skarn at Långban, Sweden. It is triclinic,  $a = 10.28$ ,  $b = 10.69$ ,  $c = 8.83\text{Å}$ ,  $\alpha = 106.1$ ,  $\beta = 96.3$ ,  $\gamma = 124.5^\circ$ ,  $P\bar{1}$  with pseudomonoclinic cell  $a_m = 9.68$ ,  $b_m = 14.77$ ,  $c_m = 5.14\text{Å}$ ,  $\beta_m = 101.5^\circ$ ,  $c$ -centered. The streak is pale brown,  $H = 6$ , fracture conchoidal, no cleavage,  $\alpha = 1.81(1)$ ,  $\beta = 1.83(1)$ ,  $2E$  (obs) *ca.*  $45^\circ$ , optical sign not determinable, no noticeable pleochroism. Microprobe analyses (20 points on 3 crystals) gave CaO 14.2, MnO 1.0, MgO 15.3,  $\text{Fe}_2\text{O}_3$  9.1,  $\text{Al}_2\text{O}_3$  2.1,  $\text{SiO}_2$  19.6,  $\text{As}_2\text{O}_5$  3.6,  $\text{Sb}_2\text{O}_5$  24.8%; analysis by Jun Ito on 40 mg gave BeO 4.0%; sum 93.7%. The formula above, derived by analogy with the aenigmatite group, gives  $G(\text{calc}) = 3.71$ , (meas) = 3.77. Substitution of  $\text{Ti}^{4+}$  for  $\text{Sb}^{5+}$  and of  $\text{Al}^{3+}$  for  $\text{Be}^{2+}$  in the formula given in the title leads to the composition of rhönite, a member of the aenigmatite group. The name is for Mr. Wilfred R. Welsh of Upper Saddle River, New Jersey. A. P.

#### Sodium analogue of dachiardite

Alberto Alberti (1975) Sodium-rich dachiardite from Alpe di Suisi, Italy. *Contrib. Mineral. Petrol.*, 49, 63–66.

Takahisa Yoshimura and Shigeyuki Wakabayashi (1977) Nadiardite and associated high-silica zeolites from Tsugawa, northeast Japan. *Sci. Repts. Niigata Univ., Ser. E, Geol., No. 4*, 49–64.

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Analyses from Alpe di Suisi and Tsugawa gave, respectively,  $\text{SiO}_2$  65.72, 67.38;  $\text{Al}_2\text{O}_3$  12.15, 12.65;  $\text{Fe}_2\text{O}_3$  0.50, 0.27; MgO 0.08, 0.03; CaO 1.65, 0.51; SrO 0.01, tr.; BaO 0.06, 0.13;  $\text{Na}_2\text{O}$  4.47, 5.15;  $\text{K}_2\text{O}$  1.87, 0.97;  $\text{H}_2\text{O}$  13.50, 12.91 (1.58 at  $110^\circ$ , 9.85 at  $400^\circ$ , 1.48 at  $1000^\circ$ ); total 100.01, 100.00%. These yield  $(\text{Na}_{2.59}\text{K}_{0.71}\text{Ca}_{0.53}\text{Ba}_{0.01}\text{Mg}_{0.04})(\text{Al}_{4.27}\text{Fe}_{0.11}\text{Si}_{19.61})\text{O}_{48} \cdot 13.43\text{H}_2\text{O}$ , and  $(\text{Na}_{2.93}\text{K}_{0.36}\text{Ca}_{0.16}\text{Ba}_{0.02}\text{Mg}_{0.01})(\text{Al}_{4.37}\text{Fe}_{0.06}\text{Si}_{19.76})\text{O}_{48} \cdot 12.63\text{H}_2\text{O}$ , or  $(\text{Na}_2, \text{Ca}, \text{K}_2)_{4-5}(\text{Si}, \text{Al})_{48}\text{O}_{96} \cdot 25-27\text{H}_2\text{O}$ .

Unit-cell data: Alpe di Suisi,  $a = 18.47$ ,  $b = 7.506$ ,  $c = 10.296\text{Å}$ ,  $\beta = 108^\circ 22'$ ; Tsugawa,  $a = 18.641$ ,  $b = 7.512$ ,  $c = 10.299\text{Å}$ ,  $\beta = 108^\circ 29'$ ;  $Z = 1$ .  $G(\text{meas}) = 2.16$ , 2.16; refractive indices (Alpe di Suisi)  $\alpha = 1.480$ ,  $\gamma = 1.482$ ; (Tsugawa)  $\alpha = 1.471$ ,  $\gamma = 1.477$ , biaxial, negative,  $2V = 76-80^\circ$ , elongation negative. The X-ray powder data for both samples are very similar with strongest lines (Alpe di Suisi and Tsugawa, respectively) 8.84(100), 8.86(75)(200); 4.883(100), 4.878(92)(002); 3.454(85), 3.457(100)(220); 2.971(37), 2.973(32)(602). M. F.

#### Unnamed $\text{CaMn}_2\text{Si}_6\text{O}_{15} \cdot 2\text{H}_2\text{O}$

Yoshikazu Ohashi and R. C. Erd (1978) A new pyroxenoid  $\text{Mn}_2\text{CaSi}_6\text{O}_{15} \cdot 2\text{H}_2\text{O}$ : its structural relationship to rhodonite, baxingtonite, nambulite, and marsturite. *Geol. Soc. Am. Abstracts with Programs*, 10, 465.

Microprobe analyses gave  $\text{SiO}_2$  44.0,  $\text{Al}_2\text{O}_3$  0.04, MnO 41.8, FeO 0.23, MgO 0.20, CaO 7.08,  $\text{Na}_2\text{O}$  0.15,  $\text{H}_2\text{O}$  (microcoulometric) 5.28, sum 98.78%. Triclinic,  $P\bar{1}$ ,  $a = 9.738$ ,  $b = 9.970$ ,  $c = 7.603\text{Å}$ ,  $\alpha = 109.78^\circ$ ,  $\beta = 93.96^\circ$ ,  $\gamma = 104.97^\circ$ ,  $Z = 2$ .

The mineral occurs in chert of the Franciscan formation, Santa Clara County, California, associated with Mn oxides, quartz, calcite and harmotome. M. F.

## NEW DATA

#### Cannizzarite

R. F. Litavrina, I. M. Pomanenko, and V. M. Chubarov (1978) Cannizzarite ( $\text{Pb}_4\text{Bi}_6\text{S}_{18}$ ) from the Vysokogorsk deposit—first occurrence in U.S.S.R. (in Russian). *Dokl. Akad. Nauk SSSR*, 239, 1207–1210.

Probe analyses of 2 samples gave Pb 30.7, 31.8; Ag 1.9, 1.5; Fe 0.1,–; Bi 49.3, 49.0; Sb 0.6, 0.7; S 17.1, 16.9; Se 0.8, 0.4; Te 0.1, 0.1; sum 100.6, 100.4%, corresponding to  $(\text{Pb}, \text{Ag})_{4.14}(\text{Bi}, \text{Sb})_{6.00}(\text{S}, \text{Se})_{13.56}$  and  $(\text{Pb}, \text{Ag})_{4.19}(\text{Bi}, \text{Sb})_{6.00}(\text{S}, \text{Se})_{13.29}$ . X-ray powder data and reflectances at 9 wavelengths are given. M. F.

#### Deweylite

D. L. Bish and G. W. Brindley (1978) Deweylites, mixtures of poorly crystalline hydrous serpentine and talc-like minerals. *Mineral. Mag.*, 42, 75–79.

X-ray and chemical examination of deweylites shows that they are intimate mixtures of very poorly ordered 2:1 and 1:1 tri-octahedral layer silicates. The 2:1 mineral does not swell in the presence of ethylene glycol or water, and is best described as an extremely fine-grained and highly disordered form of talc, for which the term kerolite is often used. Stevensite is not a component of deweylites (compare *Am. Mineral.*, 47, 811, 1962). The 1:1 component most closely resembles a disordered chrysotile. The water content of deweylites exceeds that which would correspond to the ideal compositions of the components. No specific formula

can be assigned to deweylites, as they are mixtures with various proportions of the components. The name is useful, however, as a field or "box" term, similar to the use of garnierite and limonite. A.P.

#### Sarcolite

G. Giuseppetti, F. Mazzi, and Carla Tadini (1977) The crystal structure of sarcolite. *Tschermaks Mineralog. Petrog. Mitt.*, 24, 1-21.

X-ray study showed sarcolite to be tetragonal, space group  $I4/m$ ,  $a = 12.343$ ,  $c = 15.463\text{\AA}$ ,  $Z = 4$ . Electron microprobe analysis by G. Kurat and X-ray fluorescence analysis by L. Leoni gave, respectively,  $\text{SiO}_2$  36.5, 38.26;  $\text{Al}_2\text{O}_3$  17.8, 19.42;  $\text{Fe}_2\text{O}_3$  -, 1.06;  $\text{FeO}$  0.31, -;  $\text{MgO}$  0.26, -;  $\text{CaO}$  32.35, 32.36;  $\text{MnO}$  0.04, -;  $\text{Na}_2\text{O}$  4.05, not detd.;  $\text{K}_2\text{O}$  0.54, 0.66;  $\text{SO}_3$  -, 0.12;  $\text{CO}_2$  possibly present;  $\text{P}_2\text{O}_5$  -, 1.52;  $\text{Cl}$  -, 0.02%; loss at  $1100^\circ$  2.2%.

From these data and the structural study, the formula is given as  $\text{Na}(\text{Na},\text{K})_{>1}\text{Ca}_6[\text{Al}_4\text{Si}_8\text{O}_{23}](\text{OH},\text{H}_2\text{O})_{>2}[(\text{Si},\text{P})\text{O}_4]_{0.8}(\text{CO}_3,\text{Cl})_{0.5}$ . M.F.