THE AMERICAN MINERALOGIST, VOL. 50, MAY–JUNE, 1965

NEW MINERAL NAMES

MICHAEL FLEISCHER

Mohrite

CARLO L. GARAVELLI, Mohrite: un nuovo minerale della zona borifera toscana. *Atti Accad. Nazl. Lincei, Rend., Classe sci. fis. mat. e nat.*, **36**, 524–533 (1964).

Pale green incrustations were collected by Professor A. Pelloux in 1927 from the boriferous soffioni of Travale, Val di Cecina, Tuscany, Italy. They consisted of irregular lamina and of minute quasieuhedral crystals; these were selected under the binoculars and analyzed separately, giving respectively: SO_3 41.05, 42.69; FeO 17.49, 9.86; MnO 0.11, 0.34; MgO 0.56, 5.08; $(NH_4)_2O$ 13.13, 13.40; H_2O 27.10, 28.69; insol. in H_2O 0.16, 0.15; sum 99.60, 100.21%. These correspond to $(NH_4)_2(Fe_{0.94}Mg_{0.05}Mn_{0.01})(SO_4)_2 \cdot 6H_2O$ and $(NH_4)_2(Fe_{0.51}Mg_{0.47}Mn_{0.02})(SO_4)_2 \cdot 6H_2O$. The name mohrite is given to the end-member $(NH_4)_2Fe(SO_4)_2 \cdot 6H_2O$; a complete solid solution series probably exists with boussingaultite.

X-ray study shows the mineral to be monoclinic, space group $P2_1/c$; the unit cell constants for the two analyzed samples are, respectively a 6.237, 6.234; b 12.613, 12.618; c 9.292, 9.290 Å., β 106°53′ 106°54′, G calc. 1.870, 1.805; meas. 1.862, 1.800. *X*-ray powder data are given; the strongest lines for the first sample are 3.801 (100) (031), 4.200 (65) $(\bar{1}02)$, 2.460 (28)$(\bar{1}33)$, 3.153 (25)(040), 3.025 (20)$(\bar{2}11)$, 5.40 (18)(110). Cleavages $\{\bar{1}02\}$ perfect, and {010} distinct.

Color pale-green, luster vitreous. Optically biaxial, (+); the first sample analyzed had α 1.486, γ 1.497, 2V about 75°; the second had α 1.480, γ 1.486.

The name is for Karl Friedrich Mohr, 1806–1879, German analytical chemist. The compound has long been known as Mohr's salt. The name was approved before publication by the Commission on New Minerals and Mineral Names, I.M.A.

DISCUSSION.—Not to be confused with mooreite and moureite.

Hydroxyl-bastnaesite

A. S. KIRILLOV, A new variety of bastnaesite—hydroxyl-bastnaesite. *Doklady Akad. Nauk. SSSR*, **159** (5), 1048–1050 (1964) (in Russian).

Analysis by K. A. Baklanova gave La_2O_3 26.86, Ce_2O_3 37.50, Nd_2O_3 3.43, Sm_2O_3 1.59, $(Y+Dy)_2O_3$ 1.47, ThO_2 0.50, BaO 0.70, CaO 0.40, Na_2O 0.13, MnO 0.06, MgO 0.16, Fe_2O_3 2.17, TiO_2 0.04, H_2O^- 0.11, H_2O^+ 3.96, F 1.15, CO_2 19.70, SO_3 0.040, P_2O_5 0.23, SiO_2 0.30, sum $100.86-(O=F_2)\ 0.50=100.36\%$. After deducting a little quartz, anatase, goethite, barite, and rhabdophane, this corresponds to $(Ce, La)(CO_3)(OH, F)$ with $OH:F=0.87:0.14$. DTA curve shows endothermal effects at 420–580° and 770–800°. Dissolves in cold HCl or H_2SO_4.

Goniometric and *x*-ray data are given. The powder data are very similar to those of bastnaesite, but with larger spacings. The strongest lines are 2.92 (10)$(11\bar{2}2)$, 3.59 (9) $(11\bar{2}0)$, 2.09 (9)$(30\bar{3}0)$, 1.923 (9)$(30\bar{3}2)$. The unit cell has a 7.23 ± 0.02, c 9.98 ± 0.05 Å., c/a 1.380.

Color waxy-yellow to dark brown; rarely colorless, luster vitreous to greasy. Cleavage $\{11\bar{2}0\}$ imperfect. H about 4, G 4.745. Uniaxial, (+), ω 1.760 ± 0.003, ϵ 1.870 ± 0.006.

The mineral occurs in an unspecified massif of alkalic-ultrabasic rocks as reniform aggregates in cavities of late carbonatite veins, associated with barite, strontianite, monazite, ancylite, altered burbankite, pyrite and other sulfides.

Rauenthalite

R. PIERROT, Contribution à la minéralogie des arséniates calciques et calcomagnésiens naturels. *Soc. franç Minéral. Cristall Bull.* **87,** 169–211 (1964).

The mineral has been found only at Sainte-Marie-aux-Mines, France (Alsace); the type locality is the 40-m level of the Gabe Gottes vein. It occurs in two principal habits: (1) little rounded, irregular, polycrystalline, snow-white spherules; and (2) tiny colorless crystals either perched on type 1 spherules or separate. Radial structures were not observed. Two analyses (180 and 140 mg, respectively) gave: As_2O_5 39.67, 40.21; CaO 28.43, 29.42; MgO 0.00, 0.00; H_2O 31.89, 30.20; Sum 99.99, 99.83. These are in good agreement with the formula $Ca_3(AsO_4)_2 \cdot 10H_2O$. Optical properties: biaxial positive, $2V_Z = 85° \pm 2°$; α (calc.) $= 1.540$, $\beta = 1.552 \pm 0.002$, $\gamma = 1.570 \pm 0.002$; Y and Z lie in the plane of flattening of the crystals, and $Y \wedge$(elongation) of 5°–10°. The mean index of refraction is 1.554, compared with 1.559 calculated from the rule of Gladstone and Dale and the observed density, 2.36 gm cm^{-3}.

The symmetry is not known, but from the optical properties must be monoclinic or triclinic. The repeat distance parallel to the crystal elongation is 6.18 ± 0.02 Å ($CuK\alpha_1$, $\lambda = 1.54051$ Å). The powder pattern is in permissive agreement with a poor pattern of synthetic material. The rauenthalite pattern shows 48 spacings between 10.8 and 1.339 Å; the strongest six and their intensities are: 10.8, vvs; 3.36, vs; 2.44, s; 6.2, ms; 2.58, ms; 2.06, ms.

The name is for the Rauenthal vein system, to which the Sainte-Marie-aux-Mines deposit belongs. The type specimens are in the mineralogical collection of the École Nationale Supérieure des Mines de Paris. The name was approved by the I.M.A. Commission on New Minerals and Mineral Names.

P. Toulmin

Sainfeldite

R. Pierrot, Contribution à la minéralogie des arséniates calciques et calcomagnésiens naturels. *Soc. franç. Minéral. Cristall. Bull.* **87**, 169–211 (1964).

The mineral was first noted in 1958 by F. Permingeat in material from Jachymov, Bohemia; a powder diagram agreed with data for the synthetic compound $5CaO \cdot 2As_2O_5 \cdot 5H_2O$ but insufficient material prevented a complete description. The type material is from the −40 m level of the Gabe Gottes vein, Sainte-Marie-aux-Mines, Alsace.

Sainfeldite is transparent, colorless or light pink (said to reflect small amounts of Co), and occurs in little flattened rosettes or radiating crystals. The crystals are monoclinic, elongate parallel to c, flattened on (100). $X = b$, $Y \wedge c \sim 20°$; $\alpha = 1.600 \pm 0.002$, $\beta = 1.610 \pm 0.002$, $\gamma = 1.616 \pm 0.002$; $2V_X = 80° \pm 2°$. Analysis of a colorless specimen from Ste-Marie-aux-Mines (80 mg) gave: As_2O_5 54.7, CaO 33.4, H_2O 11.5, sum 99.6, in reasonable agreement with the formula $H_2Ca_5(AsO_4)_4 \cdot 4H_2O$. $D = 3.04 \pm 0.02$ gm cm^{-3} (meas.), 3.00 ± 0.08 gm cm^{-3} (calc.).

The space group is $C2/c$. $a = 18.64 \pm 0.08$, $b = 9.81 \pm 0.03$, $c = 10.12 \pm 0.04$ Å; $\beta = 97 \pm 1°$ (all spacings relative to γ ($CuK\alpha_1$) $= 1.54051$ Å). The unit-cell contents are $4(Ca_5H_2(AsO_4)_4 \cdot 4H_2O)$. The 35 largest spacings in the powder pattern (9.2−1.685 Å) are given; the 8 strongest of these lines are (hkl, d in Å, intensity): 420−$\bar{2}22$, 3.37, vvs; 402−222, 3.18, vs; 110, 8.7, s; 400–$\bar{2}02$, 4.64, s; 600, 3.06, s; 020, 4.86, ms; $\bar{1}12$, 4.45, ms; 415, 1.744, ms. The pattern agrees well with that of synthetic material.

The name is for P. Sainfeld, who collected the type material. The type specimens are in the mineralogical collections of the École Nationale Supérieure des Mines de Paris. The name was approved by the I.M.A. Commission on New Minerals and Mineral Names.

P. Toulmin

Gaudefroyite

G. Jouravsky, (deceased) and F. Permingeat, La gaudefroyite, une nouvelle espèce minérale. *Soc. franç. Minéral. Cristall. Bull.* **87**, 216–219 (1964).

Gaudefroyite, the first known borate-carbonate of calcium and manganese, was found on the dumps of vein no. 2, Tachgagalt, Morocco, 17 km SSW of Ouarzazate. It occurs in a gangue of white, non-manganiferous calcite, quartz, and locally brucite; it is associated with marokite ($CaMn_2O_4$), braunite, hausmannite, crednerite, polianite (as an alteration product along the gaudefroyite cleavage), and five as yet unidentified minerals.

Analysis gives MnO_2 24.86, MnO 15.87, CaO 35.06, B_2O_3 16.93, CO_2 6.57, H_2O 0.63, Sum 99.92. After correction for 5.4% polianite produced by alteration (the amount of polianite was taken as that required to equalize molar amounts of MnO_2 and MnO), this leads to the formula $Ca_4Mn_{3-x}[(BO_3)_3/(CO_3)/(O, OH)_3]$, with $x \approx 0.17$ for the specimen analyzed. Other specimens show H_2O values ranging from 0.43% to 2.7%, the ratio MnO_2/MnO increasing with increasing H_2O. The authors believe that in completely fresh gaudefroyite x may be 0, with no (OH) present; in an oxidizing environment polianite forms by oxidation of Mn^{3+} to Mn^{4+} and the resulting vacancies in the gaudefroyite structure are compensated by substitution of $(OH)^-$ for O^{2-}. The interpretation is supported by the results of DTA, thermogravimetric and microprobe studies, and the calculation of density and mean refractive index.

Gaudefroyite is hexagonal, $P6_3/m$ or $P6_3$; $a = 10.6 \pm 0.1$, $c = 5.90 \pm 0.05$ Å (rotation and Weissenberg), $c/a = 0.5562 \pm 0.0005$ (goniometric). Z=2. A 41-line powder pattern (abstract says 51) (9.1−1.26 Å), the largest 28 spacings of which are indexed, has the following strongest reflections (hkl, d, intensity): (00*2)(21*1), 2.95, vs; (22*0), 2.62, vs; (20*2), 2.46, vs; (10*0), 9.1, s; (20*0), 4.54, s; (30*1), 2.69, s; (20*3)(40*2), 1.80, s; (10*1), 4.89, m; (31*1), 2.31, m; (21*2), 2.23, m; (10*3)(31*2), 1.91, m; –, 1.49, m. Observed crystals are black, acicular hexagonal prisms up to 5 cm long, with pyramidal terminations. Luster on the slightly wavy crystal faces is brilliant to dull. Brittle, with dull conchoidal fracture. D (obs.) = 3.35–3.50 gm cm^{-3}, depending on x; 3.50 ± 0.02 gm cm^{-3} on 500 mg of the analyzed sample, but correction for polianite (5.0 gm cm^{-3}) reduces this to 3.44, identical to D (calc.) for $x = 0.17$. H=6 (Vickers 840). Uniaxial (+), $\omega = 1.81 \pm 0.01$, $\epsilon = 2.02 \pm 0.01$. Pleochroism: E=orange-red, O=light russet. In polished section strongly anisotropic but with weak color effects in gray-white; strong orange-yellow to reddish internal reflections. $R_E = 13.1 \pm 0.3$, $R_O = 10.2 \pm 0.2$ ($\lambda = 520$ mμ).

The name is for Abbe C. Gaudefroy, Moroccan mineralogist, and was approved by the I.M.A. Commission on New Minerals and Mineral Names. The type material is deposited in part in the mineralogical collection of the Division de la Géologie du Maroc à Rabat and in part in the mineralogical collection of the École Nationale Supérieure des Mines de Paris.

DISCUSSION.—The mechanism of compositional variation would be more clearly expressed by writing the formula $Ca_4Mn^{3+}{}_{3-x}[(BO_3)_3/(CO_3)/(O_{1-x}(OH)_x)_3]$.

P. TOULMIN

Compreignacite

J. PROTAS, Une nouvelle espèce minérale: la compreignacite, $K_2O \cdot 6UO_3 \cdot 11H_2O$. *Soc. franç. Minéral. Cristall. Bull.* **87**, 365–371 (1964).

The mineral occurs with other oxidation products of pitchblende ores of the Margnac deposit, Compreignac, France. It was found in only two of the approximately 30 specimens examined. The mineral is orthorhombic and forms tiny yellow crystals, flattened on (001). Twins on (110) are common. Space group *Pnmn* (probable) or $Pn2_1n$; $a = 7.16 \pm 0.02$, $b = 12.16 \pm 0.05$, $c = 14.88 \pm 0.05$ Å (spacings relative to λ ($CuK\alpha_1$) = 1.5405 Å). Unit-cell contents: $2(K_2O \cdot 6UO_3 \cdot 11H_2O)$. A 57-line indexed-powder pattern ($9.40 \text{ Å} \geq d \geq 1.590$ Å) has the following strong lines (d in Å, intensity): 7.40, vvs; 3.53, vs; 3.19, vs; 3.70, s; 3.58, s; 3.34, s; 2.554, s. Density 5.03 ± 0.05 gm cm^{-3} (meas.), 5.13 ± 0.05 gm cm^{-3} (calc.). Cleavage (001) perfect. Biaxial (−), 2V 10°–15°, without dispersion. Pleochroism intense: X(=c) colorless; Y(=a), Z(=b) yellow. Indices of refraction: α (not measured) < 1.790; $\beta = 1.798$; $\gamma = 1.802$. Qualitative microchemical analysis showed presence of U^{6+} and K^+, absence of

Ca^{2+}, Ba^{2+}, Pb^{2+}, $(SiO_4)^{4-}$, $(PO_4)^{3-}$, $(AsO_4)^{3-}$, $(SO_4)^{2-}$, $(CO_3)^{2-}$. Quantitative analysis of synthetic product having powder diagram identical to that of compreignacite gave UO_3 85.64, K_2O 4.70, H_2O 10.27, Sum 100.61; microprobe analysis of dehydrated natural material gave U 82.0, K 4.5, both ±5%. Both are in reasonable agreement with the proposed formula $K_2O \cdot 6UO_3 \cdot 11H_2O$. Preliminary results of a structural analysis indicate that compreignacite is isostructural with billietite, $BaO \cdot 6UO_3 \cdot 11H_2O$; the two minerals have very similar properties.

The name was approved by the I.M.A. Commission on New Minerals and Mineral Names. The type specimens are in the Laboratoire de Minéralogie-Cristallographie de la Sorbonne (Paris, France). The name is from the locality.

DISCUSSION.—H. Brasseur (*Soc. franc. Minéral. Cristall. Bull.* **57,** 629, 1964) suggests on several grounds that the formula may be $K_2O \cdot 6UO_3 \cdot 10H_2O$. Protas' analyses, while not completely definitive, agree better with the formula containing $11H_2O$.

The abstract of Protas' article gives $b = 12.14$ Å, whereas the text gives $b = 12.16$ Å. The latter value fits the reported axial ratios and unit-cell volume better than the former.

P. TOULMIN

Moorhouseite

J. L. JAMBOR AND R. W. BOYLE, Moorhouseite and aplowite, new cobalt minerals from Walton, Nova Scotia. *Canad. Mineral.* **8,** 166–171 (1965).

Moorhouseite has been found at the Magnet Cove Barium Corporation mine about $2\frac{1}{2}$ miles southwest of Walton, Nova Scotia. The mineral occurs as water-soluble efflorescences on a 2″×4″×8″ specimen of sulfides in a barite-siderite matrix. Moorhouseite is closely associated with aplowite (see following abstract), and both minerals probably have been derived from a cobaltian-nickelian pyrite which is an abundant constituent in the deposit. Moorhouseite is pink (close to Ridgeway's light pinkish cinnamon), has a vitreous luster, white streak, conchoidal fracture, and a hardness of $2\frac{1}{2}$.

X-ray data agree with those obtained for members of the hexahydrite group: hexahydrite ($MgSO_4 \cdot 6H_2O$), bianchite ($ZnSO_4 \cdot 6H_2O$), and ferrohexahydrite ($FeSO_4 \cdot 6H_2O$). Unit cell data for pure synthetic moorhouseite are: space group $C\ 2/c$ or Cc, $a = 10.0$, $b = 7.2$, $c = 24.1$ Å., $\beta = 98°39'$, $Z = 8$ ($a:b:c = 1.389:1:3.393$, J.A.M.). The specific gravity of natural material (by suspension in heavy liquids) is 1.97. The calculated specific gravity for pure synthetic moorhouseite is 2.006. (The specific gravity calculated for the natural material is 2.040, J.A.M.). Strongest lines in the indexed *x*-ray powder pattern are (for filtered iron radiation): 4.39(10), 4.01(6), 2.91(5), 4.13(4), 5.45(3), and 3.59(3), all in Å. Twenty-eight indexed lines plus six others are given.

There was not enough material for a complete chemical analysis. An aqueous solution of about 6 mg of hand-picked material was analyzed by *x*-ray spectrography. The cation atomic ratio found in this manner is Co:Ni:Mn:Cu:Fe:Zn = 100:45:21:9:6:1. (Recalculated for a total of 1.00, this gives $Co_{.55}Ni_{.25}Mn_{.12}Cu_{.05}Fe_{.03}Zn_{<.01}$J.A.M.). From these data and the fact that moorhouseite is a member of the hexahydrite group, the formula is essentially $(Co, Ni, Mn)SO_4 \cdot 6H_2O$, or theoretically, $CoSO_4 \cdot 6H_2O$.

Optically, the mineral is biaxial (−), $\alpha = 1.470$, $\gamma = 1.496$, $2V = 20 \pm 10°$, absorption $X \gg Z$. The material is granular to fine-grained columnar, pale pink, and pleochroic. The synthetic $CoSO_4 \cdot 6H_2O$ crystal used for the *x*-ray study gave $\alpha = 1.471$, $\beta = 1.496$, $\gamma = 1.497$, (−) 2V very small, $\gamma = b$.

It is proposed that the name moorhouseite be reserved for the Co-dominant members of the hexahydrite group. The name is for Prof. W. W. Moorhouse, Department of Geological Sciences, University of Toronto. Moorhouseite has been approved as a new mineral by the I.M.A. Commission on New Minerals and Mineral Names.

J. A. MANDARINO

Aplowite

J. L. Jambor and R. W. Boyle, Moorhouseite and aplowite, new cobalt minerals from Walton, Nova Scotia. *Canad. Mineral.* **8,** 166–171 (1965).

Apowite is an intimate associate of moorhouseite (see preceding abstract). It has a pink color (Ridgeway's La France pink) which is much brighter than the color of moorhouseite. The mineral has vitreous luster, white streak, and a hardness of 3.

On the basis of its *x*-ray data, aplowite is a member or the tetrahydrate-sulfate group of which the following natural members are known: $MnSO_4 \cdot 4H_2O$, $FeSO_4 \cdot 4H_2O$, and $MgSO_4 \cdot 4H_2O$. *X*-ray spectrographic analysis gave the following cation atomic ratio: Co:Mn:Ni:Cu:Fe:Zn = 100:50:45:3:2:2.) Recalculated for a total of 1.00, this gives: $Co_{.49}Mn_{.25}Ni_{.22}Cu_{.02}Fe_{.01}Zn_{.01}$, J.A.M.). Thus, aplowite is essentially (Co, Mn, Ni) $SO_4 \cdot 4H_2O$, or theoretically, $CoSO_4 \cdot 4H_2O$.

The unit cell data for aplowite are: space group $P2_1/n$, $a = 5.94$, $b = 13.56$, $c = 7.90$ Å, $\beta = 90°31'$, Z = 4. The observed specific gravity (by suspension in heavy liquids) is 2.33. The calculated specific gravity for $(Co_{.50}Mn_{.25}Ni_{.25})SO_4 \cdot 4H_2O$ is 2.359. *X*-ray powder data are given for filtered Cu radiation with 20 indexed lines plus 9 others. Strongest lines are (in Å): 4.46(10), 5.44(9), 3.95(8), 2.95(7), 3.39(6), and 3.22(5).

Aplowite is very fine-grained and has weak pink color. Because of the fine grain size, the complete optical constants could not be determined. Measured refractive indices are: $n_{\text{min.}} = 1.528$ and $n_{\text{max}} = 1.536$. Further study of the optical properties of synthetic aplowite is needed to define the substance optically.

The mineral is named for A. P. Low (1861–1942), Canadian geologist, and a former Director of the Geological Survey of Canada. Aplowite is reserved for Co-dominant members of the tetrahydrate sulfate group. The mineral has been approved by the I.M.A. Commission on New Minerals and New Mineral Names.

J. A. Mandarino

Galenobornite

T. A. Satpaeva, G. S. Safargaliev, T. P. Polyakova, M. K. Satpaeva, V. L. Marzuvanov and M. Z. Fursova, A new complex sulfide in the ores of the Dzhezkazgan deposits. *Izvest. Akad. Nauk Kazakh S. S. R., Ser. geol.*, 1964, No. 2, 29–41 (in Russian).

The mineral occurs in elongated prismatic crystals, 0.02 to 2 mm thick and up to 3 cm long, and as intergrowths of crystals in fissures filled by calcite, quartz, bornite, chalcopyrite and galena, in lead-copper ore of the Dzhezkazgan ore deposit, Kazakhstan. It sometimes forms the center of bands formed by bornite-galena intergrowths with an outer rim of chalcopyrite. Betekhtinite is also present. The crystals have rough or curved edges and were unsuitable for goniometric study.

Chemical analyses of four samples by S. I. Potok gave Cu 60.10, 60.70, 53.30, 55.70; Pb 1.65, 1.80, 7.10, 3.50; Fe 12.10, 10.70, 12.00, 14.20; S 25.80, 25.80, 26.60, 25.90; total 99.65, 99.00, 99.00, 99.30%, G 5.02, 4.89, 4.71, ——. The first two analyses correspond to $(Cu,Pb)_{4.7}FeS_4$. Microspectrographic analyses show Zn 0.01, Ag 0.01–0.05, As 0.01–0.10%. Etch tests—HCl, $FeCl_3$, HNO_3, NaOH, KOH, $HgCl_2$ no reaction; conc. HNO_3 lightens and becomes faint brown, KCN fine graininess appears, slowly blackens.

X-ray powder data are given. The pattern was diffuse. The strongest lines were 3.010(7), 3.469(6), 2.107(5d), 1.328(5), 1.212(5), 1.366(4). The mineral is yellowish-brown, sometimes reddish-brown, resembling bornite but of a somewhat darker red shade, grayish-brown on fresh fractures. Tarnishes dark bluish-violet or black. Luster metallic to dull. In reflected light brownish-gray to gray. Slightly anisotropic, no internal reflections. Reflecting power (given for 8 wavelengths) about 29–31, very close to that of betekhtinite. Relief similar to that of bornite. Shows a fine parting in 2 mutually perpendicular directions.

Microhardness measurements on the PMT-3 apparatus gave 3.57–3.79, hardness close to that of bornite. Brittle.

Discussion.—All the six strongest lines listed above and 7 additional weak lines agree closely with lines of the *x*-ray pattern of galena, leaving 8 weak lines (intensity 1–2) unaccounted for. The analyses indicate inhomogeneity. The validity of the mineral remains to be proved.

Yamatoite

Toyofumi Yoshimura and Hitoshi Momoi, Vanadium silicate minerals from the Yamato Mine, Kagoshima Prefecture, Japan. *Sci. Repts. Faculty Sci. Kyushu Univ., Geol.* **7,** 85–90 (1964) (Japanese with English summary).

Analysis by M. of fine-grained yellow-green to dark green material gave SiO_2 35.76, TiO_2 0.11, Al_2O_3 11.96, V_2O_3 24.90, Fe_2O_3 1.13, MnO 15.92, CaO 19.28, MgO 0.08, Na_2O 0.25, K_2O 0.04, H_2O^+ 0.54, H_2O^- 0.10, total 100.07%. This corresponds to $(Ca,Mn)_3(V,Al)_2(SiO_4)_3$ with Ca:Mn = 1.76:1.15 and V:Al = 1.70:0.20. It is therefore a manganoan goldmanite, or a member of the series $Ca_3V_2(SiO_4)_3$ (goldmanite)—$Mn_3V_2(SiO_4)_3$. The name yamatoite, for the mine, is given to the latter end member, which has not yet been found in nature.

Associated minerals are rhodonite, roscoelite, haradaite, albite, antigorite, rhodochrosite and quartz. Isotropic, *n* (Na) 1.855 ± 0.004. G. 3.91. Unit cell has *a* 11.974 Å. The strongest *x*-ray lines (18 given) are 2.678 (53), 1.600 (40), 2.445 (38), 2.995 (29), 1.661 (21).

/s/ Yu Hariya

Discussion.—It is not customary to name end members until material with more than 50% of it is found in nature (M.F.)

Zincalunite

Keichi Omori and P. F. Kerr, Infrared studies of saline minerals. *Geol. Soc. Am. Bull.* **74,** 709–74 (1963).

R. C. Erd, R. J. P. Lyon and Beth C. Madsden, Discussion: *Ibid,* **76,** 271–282 (1965).

K. Omori and P. F. Kerr, Reply: *Ibid,* **76,** 283–285 (1965).

In the first paper, an infrared spectrum, resembling that of natrojarosite, was given for material referred to as zincalunite from Laurium, Greece, $KZn_3Al(SO_4)_2(OH)_6$. The only other data given are *x*-ray diffraction data (18 lines); the strongest lines are 10.77 (100), 8.26 (55), 5.467 (50), 3.675 (45), 4.188 (40). The discussion by Erd *et al.* points out that the *x*-ray data do not correspond to those of alunite group minerals, suggest that zincaluminite, which occurs at Laurium, was meant, and state that zincalunite has no standing as a mineral name. In their reply, Omori and Kerr state that the infrared curve does not match that of zincalcuminite, and matches the curve of alunite more closely than it does the aluminite curve. *X*-ray fluorescence indicates a substantial zinc content. They state, "In the absence of confirmatory specimens and more complete analytical data, 'zincalunite' is not worthy of status as a mineral species, although such a mineral may be a possibility."

Discussion.—The name should not have been given and should be dropped. *X*-ray and chemical study of this sample and of zincaluminite are highly desirable.

NEW DATA

Hydroamesite

J. Erdelyi, M. N. Melles and V. Tolnay, Das neue Vorkommen des Hydroamesits und Lizardits in dem Anschluss des Basaltes vom Halap-Berg am Balatsonseesgebiet. *Acta Geol. Acad. Sci. Hung.* **8,** 37–69 (1964).

Hydroamesite was described as a new mineral in 1959; it was criticized by me (M.F.) *Am. Mineral.* **44,** 1328, 1960) and the name was rejected by the Commission on New Minerals, IMA. The mineral has now been found as a loose, fine platy material. A new analysis by V. T. gave SiO_2 34.09, TiO_2 trace, Al_2O_3 17.76, Fe_2O_3 0.16, FeO 0.13, MnO 0.04, CaO 0.21, MgO 28.57, K_2O 0.01, H_2O^- 3.41, H_2O^+ 16.17, CO_2 none, P_2O_5 0.05, sum 100.64%. The water was lost as follows (on a sample that had stood several weeks): to 100° 3.77, 200° 0.86, 300° 1.01, 400° 1.14, 500° 4.08, 600° 4.47, 700° 3.67, 800° 0.95, 900° 0.05, 1000° 0.07, total 20.07%. In calculating the formula, H_2O given off above 200° was used. *X*-ray study confirmed the previous results; the unit cell is identical with that of lizardite; the *x*-ray patterns show some differences in intensity. The authors state that lizardite is present in their samples.

The previous analysis gives the formula

$$(Mg_{2.33}(Al, Fe)_{0.22})(Si_{1.55}Al_{0.45})O_{3.88}(OH)_{5.12};$$

the new one gives

$$(Mg_{2.25}Al_{0.25})(Si_{1.5}Al_{0.5})O_{3.75}(OH)_{5.25}$$

It is considered to be the same as the aluminian chrysotile of Roy and Roy (*Am. Mineral.* **39,** 966–967, 1954) and the aluminous serpentine of Bailey and Tyler (*Econ. Geol.* **55,** 150–170, 1960). It differs from lizardite in the high Al content and in slightly different *x*-ray and DTA patterns.

Discussion.—If the authors are correct and their mineral is structurally distinct from amesite, the name hydroamesite is a misnomer and should be dropped. I do not believe that the data on the aluminian varieties of the serpentine-group justify a name at present.

Lillianite

L. F. Syritso and V. M. Senderova, The problem of the existence of lillianite. *Zapiski Vses. Mineralog. Obshch.* **93,** 468–471 (1964) (in Russian).

Descriptions are given of material from the Spokoinoe wolframite deposit, Eastern Transbaikal. It was found as steel-gray elongated platy crystals with no cleavage and conchoidal fracture, D 7.16±0.06 (av. of 4). A second fibrous mineral also occurred with D 7.02±0.06. Analyses of these two varieties gave, respectively, Bi 31.31, 30.44; Sb 0.57, 1.01; Pb 49.61, 49.75; Cu 0.14, 0.03; Ag 2.17, 2.39; S 15.35, 15.55, total 99.15, 99.71%. These correspond respectively, to

$$(Pb_{2.94}Ag_{0.25}Cu_{0.03})_{3.22}(Bi_{1.84}Sb_{0.06})_{1.90}\ S_{5.89}$$

and

$$(Pb_{2.90}Ag_{0.26}Cu_{0.11})_{3.27}(Bi_{1.76}Sb_{0.10})_{1.86}\ S_{5.86},$$

both close to the supposed composition of lillianite, $Pb_3Bi_2S_6$.

X-ray powder data are given for the platy and fibrous varieties; the strongest lines are, respectively: 3.36 (10); 3.40 (10); 2.91 (6); 2.92 (10); 2.09 (9); 2.08 (7); 1.764 (10); 1.788 (7); 1.339 (8); 1.323 (8); 0.9855 (8); 0.9866 (7). Single crystal study of the platy mineral by D. P. Romanov gave *a* 31±0.1, *b* 12.8±0.1, *c* 4.15±0.02 (Å., kX ?). G calc. 7.34.

The data are considered to be sufficient to establish the mineral.

Discussion.—Since the type lillianite was discredited, material having nearly the composition $Pb_3Bi_2S_6$ has been described by Ontoev, *Doklady Akad. Nauk SSSR,* **126,** 856–58 (1959) from the Bukuinsk deposit, by Kupcik *et al.* (1961) from Czechoslovakia (*Am. Mineral.* **47,** 811, 1962), and now by Syritso and Senderova. The *x*-ray powder data on all 3 are similar, but not identical, but Kupcik *et al.* obtained entirely different unit cell measurements. The status of "lillianite" therefore remains uncertain.

Felsöbanyaite

S. Koch and I. Sarudi, Data on felsöbanyaite. *Acta Mineral. Petrog. Univ. Szegediensis* **16,** 49–53 (1964).

Material from the type locality consists of spherulitic aggregates of concentrically arranged thin tabular crystals on quartz. Colorless with vitreous luster. Cleavages {001} perfect, also {100}, {010}. Extinction parallel. G 2.35. Analysis gave SO_3 14.50, Al_2O_3 37.27, Fe_2O_3 1.49, H_2O 31.53, SiO_2 15.13, sum 99.92%, corresponding to $Al_4(SO_4)(OH)_{10}\cdot 5H_2O$, the accepted formula (*Dana's System*, 7th Ed., II, 585). *X*-ray powder data by Jaroslav Bauer are given (35 lines); the strongest lines are 4.78 (10), 4.63 (10), 2.27 (5), 3.66 (4), 2.70 (4), 2.45 (4). These agree moderately well with those of Hollingsworth and Bannister, *Mineral. Mag.* **29,** 8 (1950) (not cited by K. and S.)

Molybdomenite

J. A. Mandarino, Molybdomenite from the Ranwick uranium mine, Montreal River area, Ontario. *Canad. Mineral.* **8,** 149–158 (1965).

Molybdomenite, long considered a dubious mineral, was confirmed as a valid species by Goni and Guillemin (1953) (*Am. Mineral.* **39,** 850), but the exact composition and crystallography were not known. *X*-ray spectrographic analysis showed that the ratio Pb:Se=1. The *x*-ray pattern proved the identity of molybdomenite from Ranwick and from the type locality with one of the two dimorphs of $PbSeO_3$. The mineral is monoclinic, space group $P2_1/m$, *a* 6.86, *b* 5.48, *c* 4.50 Å., β 112°45′, Z=2. G 7.07±0.05 (synthetic), 7.12 calc. from *x*-ray data.

Marrite

B. J. Wuensch and W. Nowacki, Zur Kristallchemie des Sulfosalzes Marrit. *Chimia* **17,** 381–382 (1963).

The mineral marrite (*Dana's System*, 7th Ed., **I,** 487–488) had never been analyzed. Electron probe analysis of Solly's type material gave Pb 41.0±1.0, Ag 23.7±1.5, As 17.9 ±0.5, S 18.8±1.0, sum 101.4%, corresponding to $PbAgAsS_3$. Precession and Weissenberg study gave: space group $P2_1/a$, *a* 7.291±0.008, *b* 12.68(5)±0.034, *c* 5.998±0.005 Å, β 91°13′±2′. If it is assumed (by analogy to the similar Pb-Ag-Sb mineral freieslebenite) that Z=4, G calc.=5.822.

Hellandite

Ivar Oftedal, On the chemical composition of hellandite. *Norsk. Geol. Tidsskr.* **44,** 35–37 (1964).

Spectrographic analysis of samples of hellandite from the Mineralogisk-Geologisk Museum, Oslo, showed it to contain major boron, estimated to be 12.5% B_2O_3. Hellandite is therefore a borosilicate. It also contains major Y, Yb, Sr, Al, Ca, Mn, Fe, Be as a considerable minor constituent, and small amounts of Pb. A new analysis will be made.

Guerinite

R. Pierrot, Contribution á la minéralogie des arséniates calciques et calcomagnésiens naturels. *Soc. franç. Minéral. Cristall. Bull.* **87,** 169–211 (1964).

Chemical analysis of a 90-mg sample from Sainte-Marie-aux-Mines (Alsace) gives As_2O_5 49.76, CaO 30.06, H_2O 19.18, insoluble 0.40, Sum 99.40, in good agreement with the formula $Ca_5H_2(AsO_4)_4\cdot 9H_2O$. A new density determination gives 2.68±0.02 gm cm^{-3}, in better agreement with the optical data and the Gladstone-Dale rule than the previous value, 2.76

gm cm^{-3}. A 40-line powder pattern with spacings from 14 Å to 1.755 Å, agrees very well with synthetic material. The strongest lines are (d in Å relative to λ $(CuK\alpha_1) = 1.54051$ Å, intensity): 14, vvs; 3.89, vs; 3.01, vs; 2.90, vs; 3.49, s; 11.7, ms; 4.84, ms.

DISCUSSION.—The powder pattern differs significantly from that accompanying the original description (*Am. Mineral.* **47**, 416–417, 1962). The original pattern, however, was obtained on a "relatively coarse powder" (*Vses. Nauchno-Issled. Geol. Inst.* (VSYeGYeI), *Materialy*, vyp. **45**, (*Mineralogicheskiy Sbornik no. 2*), 114, 1961).

P. TOULMIN

Vladimirite

R. PIERROT, Contribution à la minéralogie des arséniates calciques et calcomagnésien naturels. *Soc. franc. Minéral. Cristall. Bull.* **87,** 169–211 (1964).

The space group is $P\,2_1/c$. A 52-line powder pattern is given; the 39 spacings greater than 2.30 Å are indexed. The strongest reflections are (hkl, d in Å, intensity): $\bar{2}11$-125-210, 2.79, vvs; 015, 4.15, vs; 113-$\bar{1}14$, 4.00, vs; 123-$\bar{1}24$, 3.28, vs; $\bar{1}25$-124, 3.04, s; 020, 5.09, ms; 111 4.80, ms; 007, 3.20, ms; 200-$\bar{2}02$-131, 2.87, ms; 133-$\bar{1}34$, 2.67, ms; 117-$\bar{1}18$, 2.59, ms; 221-204, 2.45, ms. New optical data: $Z \wedge c = 37°$, dispersion (presumably of the optic angle) strong, $r > v$. New analyses (type material, Kovuaksi (Tuva Auton. Rep.), 90 mg; Irhtem (Morocco), 36 mg) give As_2O_5 53.3, 52.1; CaO 34.0, 33.2; MgO 0.00,—; H_2O 12.1, 12.1; Sum Sum 99.4, 97.4. These differ from Nefedov's analysis of type material (As_2O_5 48.30, CaO 34.26, MgO 0.00, H_2O 17.87, Sum 100.43) and lead to $3[Ca_5H_2(AsO_4)_4 \cdot 5H_2O]$ for the unit-cell contents. This formula is the only possible formula that gives a reasonable calculated density (3.17 gm cm^{-3}); other possibilities give 3.61 and 3.38 gm cm^{-3}, whereas the observed value is 3.14 ± 0.02 gm cm^{-3}.

P. TOULMIN

DISCREDITED MINERALS

Talmessite, Arsenate-belovite (both = Belovite of Nefedov, 1953)

R. PIERROT, Contribution à la minéralogie des arséniates calciques et calcomagnesiens naturels. *Soc. franc. Minéral. Cristallo. Bull.* **87,** 169–211 (1964).

New analyses and *x*-ray and optical studies show that the material described as talmessite (*Am. Mineral.* **45,** 1315, 1960) is identical with one (the arsenate) of the two minerals named belovite (*Am. Mineral.* **40,** 552, 367, 1955). The names "arsenate-belovite" and "phosphate-belovite" have been proposed for the two minerals (*Am. Mineral.* **42,** 583, 1957). The I.M.A. Commission on New Minerals and Mineral Names voted (by 8 to 7) to approve the name "belovite" for the arsenate, on the grounds of priority. The question was to have been submitted to the I.M.A. at New Delhi in December 1964 but apparently was not.

A résumé of the properties of the mineral follows: Triclinic $a = 5.89$ Å, $b = 7.69$ Å, $c = 5.56$ Å, $\alpha = 112°38'$, $\beta = 70°49'$, $\gamma = 119°25'$. D = 3.2–3.5 gm cm^{-3} (meas.), 3.49 gm cm^{-3} (calc.). Biaxial, $2V \sim 90°$; $\alpha = 1.672$, $\beta = 1.685$, $\gamma = 1.698$ all ± 0.002. Formula $Ca_2Mg(AsO_4)_2 \cdot 2H_2O$. It is isomorphous with beta-roselite.

DISCUSSION.—It is unfortunate that the problem of the two "belovites" could not have been resolved at the same time as the problem of the identity of one of them with talmessite.

The author, citing Bariand and Herpin (*Soc. franc. Minéral. Cristall. Bull.* **83,** 118, 1960) gives the space group as P_1 (*sic*). Beta-roselite is a member of the fairfieldite group the members of which have space group $P\bar{1}$, according to Dana. No additional evidence of noncentrosymmetry is offered.

P. TOULMIN