NEW MINERAL NAMES

MICHAEL FLEISCHER

Grantsite

A. D. WEEKS, M. L. LINDBERG, AND ROBERT MEYROWITZ. Grantsite, a new hydrated sodium calcium vanadyl vanadate from New Mexico and Colorado—a preliminary description. *U. S. Geol. Survey Prof. Paper* **424-B,** p. 293 (1961).

The mineral occurs as dark olive-green to greenish-black fibrous aggregates that coat fractures or form thin seams in sandstone or limestone. Occurrences are at the F-33 mine, near Grants, Valencia County, New Mexico (in Todilto limestone), the La Salle mine, and the Golden Cycle mine, the latter two in Montrose County, Colorado (in Salt Wash sandstone).

The three chemical analyses (not given) lead to the formula $2Na_2O \cdot CaO \cdot V_2O_4 \cdot 5V_2O_5 \cdot 8H_2O$; "the amount of calcium and V^{4+} varies slightly in the samples".

Grantsite is monoclinic, elongation of fibers parallel to *b*. Precession and rotation photographs give a unit cell *a* 17.54, *b* 3.60, *c* 12.45 Å, β 95°15′, Z=1. The strongest *x*-ray lines are 8.7 s, 12.4 ms, 3.607 ms, 3.008 ms, 4.34 m, 3.719 m, 2.866 m, 2.715 m, 2.275 m, 2.240 m.

Luster silky, pearly, to subadamantine. G. 2.94. Soft, smears easily when rubbed. Optically biaxial, neg., α between 1.81 and 1.83, $\beta > 2.0$, $\gamma > 2.0$. Fibers are length slow. X is normal to blade, green; Y parallel to the intermediate dimension of the blade, greenish brown; Z=*b*, brown. Absorption Z>Y>X.

The name is for the town of Grants, New Mexico.

DISCUSSION.—At the meeting of the Commission on New Minerals at Copenhagen in 1960, there was unanimous agreement that publishing new mineral names without giving full data, as so often done in the past by many mineralogists including this abstractor, should be discouraged.

Behierite

MARY E. MROSE AND H. J. ROSE, JR., Behierite, $(Ta, Nb)BO_4$, a new mineral from Manjaka, Madagascar. *Geol. Soc. Am., Abstracts* 1961 *Ann. Meetings,* p. 111A (1961).

The mineral occurs as 4 grayish-pink octahedral crystals, 0.5 to 7.0 mm in size, from pegmatite, associated with rubellite, pollucite, manganoan apatite, lepidolite, quartz, and albite. *X*-ray fluorescence analysis showed Ta:Nb:Zr=18:1:0.4 and *x*-ray data agreed with those for synthetic $TaBO_4$.

The mineral is tetragonal (zircon type, but with smaller unit cell), $I4_1/amd$, *a* 6.206, *c* 5.472 (both ±0.005 Å), $c/a = 0.882$, Z=4. The only form observed is *e*, {011}. The strongest *x*-ray lines are 4.10 (100), 3.10 (71), 2.32_7 (71), 2.47_8 (50), 1.600 (50), 1.93_9 (35). Cleavages {110} and {010} distinct, fracture subconchoidal.

The mineral has adamantine luster, white streak, H 7–7.5, G 7.86±0.05 (meas.), 7.91 (calc.). It is infusible, insoluble in hot or cold acids. Optically uniaxial, positive, *ns* above 2.00, birefringence high, mean index calculated by Gladstone and Dale 2.12.

The name is for Jean Behier, mineralogist, Service geol. Malgache, who collected the mineral. A preliminary note without data was abstracted in *Am. Mineral.,* **46,** 767 (1961).

Hallimondite

KURT WALENTA AND WOLFHARD WIMMENAUER. Die Mineralbestand des Michaelganges im Weiler bei Lahr (Schwarzwald). *Jahreshefte geol. Landesamtes Baden-Württemberg,* **4,** 7–37 (1961).

The mineral occurs as finely crystalline yellow material in druses of hornstone breccia, associated with hügelite and mimetite, rarely as crystals up to 0.3 to 0.4 mm on hügelite. Translucent to transparent. The tabular crystals show (010), (110), $(1\bar{1}0)$, and (001). No cleavage, fracture conchoidal. Apparently triclinic. Chemical tests showed U, As, and Pb, no P. Not fluorescent in ultra-violet light. The *x*-ray pattern is nearly identical with that of parsonsite, so the formula is assumed to be $Pb_2(UO_2)(AsO_4)_2 \cdot nH_2O$. Optically positive (presumably biaxial), α 1.882±0.005, γ 1.915±0.005, 2V large, extinction inclined on both (010) and (001).

Occurs in the Michael vein, Weiler near Lahr, Black Forest, Germany, in the oxidation zone of a deposit containing various sulfides and much native As, along with zeunerite, novacekite, meta-heinrichite, kasolite, mimetite, adamite, hügelite, and the other U minerals mentioned below.

The name is for Arthur F. Hallimond, mineralogist, of London.

DISCUSSION.—See remarks on grantsite above.

Widenmannite

KURT WALENTA AND WOLFHARD WIMMENAUER. Die Mineralbestand des Michaelganges im Weiler bei Lahr (Schwarzwald). *Jahreshefte geol. Landesamtes Baden-Württemberg*, **4**, 7–37 (1961).

The mineral occurs with hügelite and hallimondite as fragile tabular yellow crystals in radiating bundles in cavities in hornstone and with cerussite on altered galena. Soluble in dilute HNO_3 with evolution of CO_2, gives tests for Pb and U, hence presumably a lead uranyl carbonate. No analysis. Does not fluoresce in ultra-violet light.

Orthorhombic, thin tabular, faces observed (100), (010), (001) or (?) (011). Perfect cleavage on (100). The *x*-ray pattern (not given) is stated to differ from those of all other uranyl carbonates.

Luster pearly to silky. Optically biaxial, negative, α 1.803, β 1.905, γ 1.945, all ±0.005, 2V 63°. Non-pleochroic. Elongation positive. X = a, axial plane parallel to (010).

The name is for Bergrat J. F. Widenmann (1764–1798), who first discovered uranium micas in the Black Forest.

DISCUSSION.—See remarks on grantsite above.

Weilerite

KURT WALENTA AND WOLFHARD WIMMENAUER. Die Mineralbestand des Michaelganges im Weiler bei Lahr (Schwarzwald). *Jahreshefte geol. Landesamtes Baden-Württemberg*, **4**, 7–37 (1961).

The mineral occurs as a white earthy crust, associated with adamite and mimetite, on hornstone and barite. Under the microscope it is seen to consist of idiomorphic crystals less than 10 microns in size, apparently cubes, but actually rhombohedrons. The crystals are zoned; mean *n* 1.690, birefringence about 0.01. Tests showed that the main components are Ba, Al, SO_4, and AsO_4; some Zn may also be present. Scarcely attacked by HNO_3 or HCl, dissolved by hot H_2SO_4. The *x*-ray powder diagram (not given) is stated to agree well with those of the beudantite group and the formula is therefore suggested to be $BaAl_3(AsO_4)(SO_4)(OH)_6$.

The name is for the locality, Weiler.

DISCUSSION.—See remarks on grantsite above. The name is too close in pronunciation to wöhlerite and violarite.

Wegscheiderite

J. J. FAHEY, K. P. YORKS, AND D. E. APPLEMAN, Wegscheiderite, a new saline mineral from the Green River formation, Wyoming. *Geol. Soc. Am., Abstracts* 1961 *Ann. Meetings*, p. 48A–49A (1961).

The mineral was found in drill cores from the Perkins Well no. 1, the Perkins Well no. 2, and the Grierson Well no. 1, Sweetwater County, Wyoming. In the Perkins Well no. 1, it occurs in a pink stratum at depth 1609′6″; the color is due to organic matter (4.38%); a trace of halite is also present. Precession data show the mineral to be triclinic, $P\,1$, a 10.04±0.03, b 15.56±0.04, c 3.46_6±0.01 Å, α 91°55′, β 95°49′, γ 108°40′ (all ±0.05′), Z=2 ($Na_2CO_3 \cdot 3NaHCO_3$), G. 2.34, (obs.), 2.334 (calc.). The strongest *x*-ray powder lines are 2.95_7 (100), 2.64_6 (60), 2.21_4 (50), 2.83_1 (30), 2.79_3 (30), 3.68 (30). The mineral is optically biaxial, negative, 2V not given, α 1.433, β 1.519, γ 1.528. The material consists of fibrous aggregates of tiny acicular to bladed crystals. No chemical analysis is given.

The name is for R. Wegscheider, Austrian chemist, who first synthesized the compound in 1913.

Tunellite

R. C. Erd, Vincent Morgan, and Joan R. Clark, Tunellite, a new hydrous strontium borate from the Kramer borate district, California. *U. S. Geol. Survey Prof. Paper* **424-C,** 294–297 (1961).

The mineral occurs as compact fine-grained nodules and as prismatic and tabular crystals up to 1.5 cm in length as a secondary mineral in the open pit, Kramer, and also in the Furnace Creek area, Death Valley, California. Analysis by V. M. gave B_2O_3 53.70, SrO (including 0.3 BaO determined by *x*-ray spectroscopy) 27.71, H_2O 18.71, sum 100.12%, corresponding to $SrO \cdot 3B_2O_3 \cdot 4H_2O$. An analysis of synthetic material is also given. Crystals up to nearly 4 cm long from the open pit has G. 2.46 and contain up to 15% BaO. The mineral dissolves in cold dilute acid or strong alkali solutions. Heated in a closed tube, tunellite exfoliates perpendicular to the cleavage, turns silvery-white, then chalky-white, finally melts to a clear glass. The water driven off has a pH of 4 (probably contains B_2O_3). DTA shows 2 endothermal breaks at 200° (initial) to 255° (trough) and 405–430° and an exothermic break at 625–670°.

Tunellite is monoclinic, $P2_1/a\text{-}C^5_{2h}$, a 14.36±0.05, b 8.198±0.02, c 9.93_0±0.02, β 113°55′, Z=4, G. 2.40±0.01 (meas.), 2.39 (calc.). It is isostructural with the Ca mineral nobleite (*Am. Mineral.*, **46,** 560, 1961); the extent of possible solid solution is not known. Cleavage {100} perfect, {001} distinct. Faces noted {100}, {001}, {110}, {011}, {111}. Faces of the form {okl} are striated parallel to [001].

Tunellite is colorless, luster subvitreous to pearly on {100}. H. 2½. Optically biaxial, positive, (Na) α 1.519±0.003, β 1.534±0.002, γ 1.569±0.002, 2V 68° (calc.), r>v weak, $X \wedge a$ 29°, Y=b, $Z \wedge c = -5°$.

Indexed *x*-ray powder data (52 lines) are given for 2 natural and 1 synthetic materials; the strongest lines (Death Valley) are 6.57 (100)(200), 4.525 (11)(002), 3.867 (9)(310); 5.138 (8)(210), 3.592 (8)($\bar{4}01$); 2.503 (8)($\bar{3}23$, 510); 6.78 (7)($\bar{2}01$), 3.045(7)(410, 022), 2.202 (7).

The name is for Professor George Tunell, Univ. of California, Los Angeles.

Guerinite

E. I. Nefedov. Guerinite, a new mineral. *Materialy Vses. Nauchno-Issled. Geol. Inst.*, **45** (Mineralog. Sbornik No. 2), 113–115 (1961) (in Russian).

The mineral was found on two museum samples, one labelled "wapplerite" from the Daniel Mine, Schneeberg, Saxony, the other labelled "pharmacolite," from Richelsdorf, Hessia. It occurs as spherulites and rosettes, rarely as single crystals 0.2–0.3 mm long, acicular to wedge-shaped. Colorless, white in aggregates, luster vitreous to pearly. H 1½, G 2.76. Optically biaxial, neg. 2V 7–15°, rarely higher. Dispersion strong usually r>v, but sometimes r<v. (Na) α 1.574, β 1.582, γ 1.582, all ±0.001. Three cleavages: perfect

parallel to the plane of the plates, medium parallel to the elongation of the crystals and nearly perpendicular to the first, and less perfect, nearly perpendicular to the first, and at 87° to the second. Z corresponds to the elongation of the crystals, X is 10° from the perpendicular to the plane of the plates. The mineral is therefore monoclinic or triclinic. Unindexed *x*-ray powder data are given (30 lines); the strongest are 1.87 (8) (broad), 3.48 (7), 3.88 (6), 3.26 (5)(broad), 2.69 (5), 2.47 (5).

Spectrographic analysis showed major Ca and As, with Mg "as an admixture." No chemical analysis was made. The mineral was identified as $Ca_5H_2(AsO_4)_4 \cdot 9H_2O$ ($5CaO \cdot 2As_2O_5 \cdot 10H_2O$) by the identity of the *x*-ray patterns with that of this compound synthesized by the method of Guerin (*Ann. chim.*, **16**, p. 101–153 1941). Guerin reported G 2.78, *ns* α 1.568, γ 1.577, monoclinic or triclinic. He found that the compound to be a stable phase in the system CaO—As_2O_5—H_2O at 17° C., but not at 40°, 60°, and 90°, where the phase $5CaO \cdot 2As_2O_5 \cdot 5H_2O$ appeared instead.

The name is for Henri Guerin.

Discussion.—Apparently a valid mineral, differing from the Ca arsenates pharmacolite and haidingerite, but the lack of chemical data, especially the Mg content, is unfortunate. The name is too close to guarinite.

Halurgite

V. V. Lobanova. A new borate, strontioborite. *Doklady Akad. Nauk S.S.S.R.*, **135**, 173–175 (1960); abstract by E. M. Bonshtedt-Kupletskaya, *Zapiski Vses. Mineral. Obshch.*, **90**, 448 (1961).

Composition unknown; referred to without any description in the paper by Lovanova on strontioborite as an associate of the latter.

Note.—The mention of a mineral name never used up to now and the introduction of a new name without explanation or basis is completely inadmissible.

Niobo-eschynite, Titano-eschynite

A. G. Zhabin, G. N. Mukhitdinov, and M. E. Kazakova, Paragenetic associations of accessory rare-element minerals in exocontact fenitized rocks of the miaskite intrusive of Vishnevye Gor. *Trudy inst. mineral., geokhim. i kristallokhim. redkikh elementov*, **4**, 51–73 (1960) (in Russian).

Analysis by M.E.K. gave RE_2O_3 28.17, CaO 4.82, ThO_2 2.52, SrO none, Nb_2O_5 41.41, Ta_2O_5 none, TiO_2 18.73, Fe_2O_3 2.75, MnO tr., MgO tr., Al_2O_3 0.35, SiO_2 0.35, H_2O^- 0.04, H_2O^+ 0.41, sum 99.55%, corresponding to AB_2O_6 with Nb:Ti = 1.05:0.79, therefore unlike all previously analyzed eschynites in having Nb greater than Ti. The rare earths consist of La 14, Ce 42, Pr 9, Nd 25, Sm 3.1, Eu 0.4, Gd 1.3, Tb 0.2, Dy 1.2, Ho 0.2, Er 0.3, Tu 0, Yb 0.2, Lu 0, Y~3%. Color black, red in fine splinters, luster resinous. Fracture conchoidal. G 5.1323. Microhardness 593–683 kg/mm², = 5.3–5.6. Isotropic *n* 2.26. *X*-ray amorphous; the pattern obtained after heating is given; strongest lines 3.03 (10), 2.96 (10), 1.55 (6). Occurs in prismatic crystals in quartz-arfvedsonite veinlets cutting fenites at Vishnevye Gor. It is suggested that the existence of "titano-eschynite" with Nb/Ti less than 0.5 is probable.

Discussion.—Since normal eschynite has Nb/Ti less than 1, the name titanoeschynite is unnecessary.

Sulfate-monazite

A. A. Kukharenko, A. G. Bulakh, and K. A. Baklanova. Sulfate-monazite from carbonatites of the Kola Peninsula. *Zapiski Vses. Mineral. Obsh.*, **90**, 373–381 (1961) (in Russian).

Analysis showed high contents of CaO (4.60%) and SO_3 (3.12%), leading to the formula

$$(RE_{0.77}Ca_{0.20}Th_{0.05})_{1.02}(P_{0.89}S_{0.09}Si_{0.03})_{1.01}O_4 \cdot O \cdot 2H_2O.$$

The mineral is optically biaxial, positive, with α 1.730, β 1.730, α 1.776, 2V not more than 5° and has unit cell dimensions a 6.73±0.02, b 6.93±0.01, c 6.45±0.01 Å.

Discussion.—An unnecessary name for sulfatian monazite.

Unnamed Pb-Zn Arsenate

Kurt Walenta and Wolfhard Wimmenauer. Die Mineralbestand des Michaelganges im Weiler bei Lahr (Schwarzwald). *Jahreshefte geol. Landesamtes Baden-Württemberg*, **4,** 7–37 (1961).

The mineral occurs as yellow-brown finely crystalline aggregates and crusts, associated with mimetite and isotropic hydrous Fe oxide ("siderogel") and in colorless crystals up to 0.1 mm long in druses in barite. Monoclinic with (110) and (001); penetration twins were observed. Microchemical tests showed Pb, Zn and As, and in the yellow-brown material Fe. Optically negative (?), 2V near 90°, β 1.926±0.005, birefringence about 0.04; dispersion $r > v$. Axial plane parallel to (010).

Unnamed Pb-Fe Arsenate

Kurt Walenta and Wolfhard Wimmenauer. Die Mineralbestand des Michaelganges im Weiler bei Lahr (Schwarzwald). *Jahreshefte geol. Landesamtes Baden-Württemberg*, **4,** 7–37 (1961).

Brown crusts on barite contain an isotropic component, n about 1.74 (Pb-containing pitticite ?), plus a strongly birefringent mineral in grains a few microns in size. Probably ±uniaxial, negative, α 1.695, γ 1.785, both ±0.01. X is brighter yellow-brown than Z. Soluble in warm HNO_3, contains Fe, Pb, As and some Zn. The x-ray powder diagram (not given) is stated to show some relation to that of arseniosiderite.

Unnamed Sodium Carbonate

Semenov, P. K. Villiaumite of Kukisvumchorr Mt., Khibina. *Material. mineral. Kol'skogo Poluostrova, Izd. Akad. Nauk S.S.S.R.*, 1959, **1,** 112–115; abstract by E. M. Bonshtedt-Kupletskaya in *Zapiski Vses. Mineral. Obshch.*, **90,** 440 (1961).

Preliminary analysis by V. S. Bykova gave Na_2CO_3 84, H_2O 14.5, R_2O_3 about 1, P_2O_5 about 1%, corresponding to $Na_2CO_3 \cdot H_2O$. Loses 96% of its water at 110°. White to dark-gray with a greenish tint. H. 3½. Uniaxial positive, ϵ 1.518, ω less than 1.455. Occurs as fine-grained cryptocrystalline fissure fillings in villiaumite veins of subsurface workings of the Kukisvumchorr apatite deposits, Khibina tundra, Kola Peninsula.

Discussion.—Differs from thermonatrite in higher hardness and in being uniaxial, positive, whereas thermonatrite is biaxial negative. Inadequate data.

NEW DATA

Hügelite

Kurt Walenta and Wolfhard Wimmenauer. Die Mineralbestand des Michaelganges im Weiler bei Lahr (Schwarzwald). *Jahreshefte geol. Landesamtes Baden-Württemberg*, **4,** 7–37 (1961).

Hügelite was described by Dürrfeld (1913) as a hydrous lead zinc vanadate from Reichenbach near Lahr, Baden, probably from the Michael vein. It occurs rarely, filling cavities in hornstone breccia, where it is associated with hallimondite, widenmannite, zeunerite, mimetite, and cerussite.

Transparent to translucent crystals are brown to orange-yellow, up to 2–3 mm long. They are more or less tabular on (100), elongated towards the *c*-axis. Dürrfeld described the forms *m* (110), *n* (011), and *c* (001); the form (100) was also noted. Monoclinic, with a good cleavage (100). Striated parallel to the *c*-axis.

Optically biaxial, positive, to uniaxial, positive; α 1.898, γ 1.915, both ±0.005. Moderately strong pleochroism: X yellow, Y yellow with an orange shade, Z colorless to pale yellow. 2V varies greatly with wave length; it decreases in the region 580 to 600 microns to 0° and the mineral becomes uniaxial, positive. Because of the dispersion, shows under crossed nicols anomalous interference colors and incomplete extinction.

Microchemical tests showed Pb, U and As as main components, but no Zn, V or P. The *x*-ray powder diagram (not given) is very similar to that of dumontite, so the formula is proposed as $Pb_2(UO_2)_3(AsO_4)_2(OH)_4 \cdot 3H_2O$. This requires PbO 23.5%; Dürrfeld reported 32.6%.

New data on Rhabdophane group
New names Silicorhabdophane, Silicosmirnovskite, Titanorhabdophane
Erikite (=Rhabdophane ?)
New data on Karnasurtite, Hydrocerite, Smirnovskite

Grayite

E. I. Semenov. Minerals of the rhabdophane group in alkalic massives. *Akad. Nauk SSR, Kol'skii Filial, Materialy Mineral. Kol'skii Poluostrova,* **1,** 91–101 (1959) (in Russian).

New analyses, *x*-ray powder data, and optics are given for (a) "silicorhabdophane," Lovozero, Kola Peninsula; (b) "silicosmirnovskite," Lovozero; (c), (d) "titanorhabdophane," (c) from Nepkha Mt., (d) from Karnasurt Mt.; 3 other partial analyses given.

	(*a*)	(*b*)	(*c*)	(*d*)
P_2O_5	18.79	3.08	3.64	6.81
SiO_2	13.90	21.35	8.76	24.91
BeO	0.60	—	—	—
Nb_2O_5	0.23	—	2.86	2.20
TiO_2	0.43	2.98	13.11	12.33
ZrO_2	0.69	—	—	1.20
Fe_2O_3	3.95	1.90	0.45	1.07
Al_2O_3	8.06	—	1.37	5.52
MgO	0.88	0.87	0.42	0.60
MnO	—	2.40	0.40	—
ThO_2	0.33	45.27	0.78	6.04
$(Ce, etc.)_2O_3$	35.76	3.57	48.53	16.66
CaO	3.37	2.90	3.07	3.20
$(Na, K)_2O$	0.19	—	—	—
H_2O^+	12.07	10.24	15.09	7.29
H_2O^-		5.50		12.29
	99.25	100.06[a]	98.48	100.12

(a) analysis as corrected in *Zapiski Vses. Mineral. Obsh.*, **90,** 446 (1961).

Analyst: M. E. Kazakova.

G	3.19	3.33	3.70	—
Optic sign	+	+	+	—
ϵ	1.64	1.65	1.90	1.604
ω	1.63	(mean *n*)	1.75	(mean *n*)

Rhabdophane, $(Ce, La)PO_4 \cdot H_2O$, and the closely related pseudohexagonal ningyoite, $(Ca, U, Ce)PO_4 \cdot H_2O$ are the only well-established minerals of the rhabdophane group. By analogy to the monazite group, one might expect to find minerals with Ce replaced more or less by Ca, U, or Th, and P replaced by Si. "Silicorhabdophane" exemplifies the latter. However, the *x*-ray pattern given (7 lines) fits monazite as well or better than it does rhabdophane. It is therefore either a silicatian rhabdophane (P:Si=26:23) or a silicatian monazite; in either case the name is unnecessary.

Erikite from the type locality in Greenland was shown by Dannø and Sørensen (*Am. Mineral.*, **44,** 1329, 1959) to be monazite pseudomorphous after eudialyte. Semenov gives *x*-ray powder data for material from Greenland and from the Kola Peninsula, the latter pseudomorphous after belovite. He considers that both give the rhabdophane pattern. But his data fit the monazite pattern better! In any case, the name erikite should be dropped.

The double substitution of Th for Ce and Si for P could yield a mineral with formula $(Th, Ce)(Si, P)(O, OH)_4 \cdot H_2O$, which would then be a dimorph of thorite or thorogummite. If the material were metamict, as is likely, it would not be possible to distinguish it from thorite. Intermediate members of the series were described a few years ago as smirnovskite (*Am. Mineral.*, **43,** 386, 1958). Most samples were amorphous to *x*-rays; one gave 4 lines (3.03, 2.13, 1.857, 1.676), on the basis of which smirnovskite is placed in the rhabdophane group. But all these could be lines of the monazite group mineral huttonite, $ThSiO_4$! The present paper described "silicosmirnovskite," close to the thorium-end member, the formula being given as $(Th, Ce)_3(Si, P)_4(O, OH)_{16} \cdot 4H_2O$. Usually amorphous to *x*-rays; one sample gave the lines 3.03 and 1.87 Å. When heated, it gave a thorite pattern. In view of all these uncertainties, the names are not acceptable.

Material called "hydrocerite" (*Am. Mineral.*, **45,** 1132, 1960) is similar in composition to "silicosmirnovskite" except that the rare earths and thorium are present in nearly equal amounts. Semenov states that similar material gave a very weak powder pattern of rhabdophane, and after heating the *x*-ray pattern of the monazite group.

The analyses of "titanorhabdophane" can be calculated to give a very poor fit with the rhabdophane formula only if Ti, Fe, and Al are assigned to P, Si positions, as Semenov states. The *x*-ray pattern gives 4 weak lines (3.06, 2.85, 2.13, 1.875); when heated it gives a complex pattern with that of CeO_2 predominating. The data are clearly inadequate to establish the validity of the mineral.

Material similar in composition to "titanorhabdophane" was described in 1959 as karnasurtite (*Am. Mineral.*, **45,** 1133–1134, 1960), but differs in being optically negative. Semenov states that karnasurtite from Mt. Punkaruaiv gives a weak *x*-ray pattern of rhabdophane, and after being heated a distinct *x*-ray pattern of monazite.

The name "grayite," Bowie, *Summary of Progress, Geol. Survey Gt. Brit.* for 1956, p. 67, 1957 and *Chronique mines outre-mer et recherche minère* **279,** 1959, was given to a thorium phosphate containing a little Pb, Ca, and minor U and rare earths. It gives an *x*-ray pattern like that of rhabdophane, and when heated above 850° a monazite-type of pattern. Similar thorium phosphates with minor Ca and Si were recently described from two localities by Dooley and Hathaway, *U. S. Geol. Survey Prof. Paper* **424-C,** 339–341, 1961. These also gave a rhabdophane-like *x*-ray pattern, and a monazite-type pattern after ignition.

Kilchoanite

In the abstract in *Am. Mineral.*, **46,** 1203, kilchoanite is stated to be optically biaxial, postive. Dr. S. O. Agrell has kindly informed me that the original paper was in error and that the mineral is optically biaxial, negative.