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# NEW MINERAL NAMES

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### Schachnerite ($Ag_{1.1}Hg_{0.9}$)
### Para-schachnerite ($Ag_{1.2}Hg_{0.8}$)

E. SEELIGER, AND A. MÜCKE (1972) Para-Schachnerite, $Ag_{1.2}Hg_{0.8}$, und Schachnerite, $Ag_{1.1}Hg_{0.9}$, vom Landsberg bei Obermoschel, Pfalz. *Neues Jahrb. Mineral. Abhandl.* **117,** 1–18.

The known phases in the system Ag-Hg are listed by Strunz (*Mineralog. Tabellen,* 1970) as the α-phase (cubic, *Fm3m*, Hg 0–37 atomic percent, mercurian silver of Dana and Hey, kongsbergite of Strunz and present authors); the β-phase (hexagonal, $P6_3$ *mmc*, Hg 40–47 atomic percent, previously known only from synthesis), and the γ-phase (cubic, *Im3m*, Hg, 55–57 atomic percent, moschellandsbergite of Dana and Hey, landsbergite of Strunz and present authors). This paper reports the occurrence of the β-phase, named schachnerite, and of a new, crystallographically closely related orthorhombic phase named, para-schachnerite.

Spectrographic analyses showed only Ag and Hg in the two minerals. Microprobe analyses gave unsatisfactory results because of high absorption by Ag. Syntheses were accomplished by heating wire silver with Hg in closed tubes at 150° for 24 hours. Heating material with Ag 40.1 percent ($=Ag_{1.1}Hg_{0.9}$) gave homogeneous schachnerite (X-ray and optical study). Heating material with Ag 44.65 percent gave as main product schachnerite with Ag 38.43 percent ($=Ag_{1.07}Hg_{0.93}$). Heating material with Ag 61.73 percent gave as main product a phase with Ag 47.85 percent ($=Ag_{1.26}Hg_{0.74}$), corresponding in optics and X-ray pattern to para-schachnerite.

Schachnerite is hexagonal, $P6_3mmc$, *a*2.978, *c*4.842Å, $Z = 2$, G calc 13.52. The strongest lines (15 given) are 2.420 (5)(0002), 2.273 (19)($10\bar{1}1$), 1.268 (5)($11\bar{2}2$), 0.954 (5)($21\bar{3}1$), 0.8595 (6)($30\bar{3}0$). Paraschachnerite is orthorhombic, space group probably *Cmcm*, possible $Cmc2_1$ or *C2cm*, with *a*$2.96_1$, *b*5.13, *c*4.83, $Z = 2$, G calc 12.98. The strongest lines (19 given) are 2.404 (6)(002), 2.267 (10)(021,111), 1.481 (4)(130, 200), 1.361 (5)(023, 113), 1.263 (6)(132,202); the pattern resembles that of dyscrasite.

The two minerals are very similar to one another and to allargentum in optical properties. Crystals are up to 1 cm long, but most are much smaller. Schachnerite in reflected light is gray, homogeneous, untwinned, birefringence not observed, anisotropy very weak. Polishing hardness low, equal to or less than that of moschellandsbergite. Reflectance $R_m = 72.2$ percent · in air for orange light. Para-schachnerite is creamy white, reflectances in air for orange light *Rc* 70.9 percent, Ra = Rb = 73.7 percent, birefringent with colors brownish-rose-white on *c*, creamy white on *a* and *b*. Always twinned in complex fashion with trillings common, twin plane (110). Polishing hardness distinctly higher than that of moschellandsbergite.

The minerals occur in the zone of oxidation of the old mercury mine at Landsberg near Obermoschel, Pfalz, Germany, and were formed by the alteration of moschellandsbergite on edges and along cracks. Other associated minerals are mercurian silver, which replaces the two new minerals, limonite and a little ankerite, argentite, and cinnabar.

The names are for Professor Doris Schachner, Techn. Hochschule, Aachen, Germany. Type material (perhaps 3–5 g) is preserved at the Technical University, Berlin. The minerals and names were approved before publication by the Commission on New Minerals and Mineral Names, IMA.

### Unnamed $Cu_6Sn_5$

A. H. CLARK (1972) A copper-tin alloy ($\eta'$-$Cu_6Sn_5$) from Panasqueira, Portugal. *Neues Jahrb. Mineral. Monatsh.* 108–111.

Small (max. diam. 1 mm) rounded bodies of sectile material were found in oxidized ores from the dumps of this wolframite-cassiterite mine. Probe analyses gave Cu 38.7 38.5; Sn 61.1, 61.2, sum 99.8, 99.7 percent, close to $Cu_6Sn_5$. X-ray powder data were close to those given for synthetic eta'-$Cu_6Sn_5$ (pseudohexagonal, *a* 4.20, *c* 5.09Å.); the strongest lines (9 given) are 2.96 (9)(101), 2.09 (9)(110), 2.08 (10)(102), $1.70_5$ (7)(201), $1.54_6$ (10)(103), $1.48_5$ (9)(202), $1.32_2$ (8)(211).

The material is a soft, highly reflectant white phase, rimmed by malachite. Non-birefringent, shows strong anisotropy in oil, with colors from pale to dark gray with a bluish tint. Polishes well, max. and min. reflectances (av. of 5) were: 470 nm, 62.4, 61.4; 546, 62.9, 61.7; 589, 62.6, 61.0; 650, 62.0, 60.5 percent. Vickers hardness (15 g load) 61.5.

Material of the same composition had previously been described by Stumpfl and Clark, *Trans. Inst. Mining Met.* **74,** 933–946 (1965) from placers in Borneo.

### Berndtite-C27, Berndtite-6C

A. H. CLARK (1972) On the natural occurrence of tin sulphides (Berndtite): *Naturwissenschaften,* **59,** 361.

A new hexagonal polytype of berndtite is described with *a* $3.65_0$, *c* 11.81Å, from the Panasqueira tin-tungsten mine, Portugal. Berndtite was previously known as trigonal, *P3m*, *a* 3.639. *c* 5.868Å; this is referred to as berndtite-C6.

### Unnamed Cu-Bi-sulfosalt

Yu. N. Yakovlev, L. S. Dubakina, and V. P. Bykov (1972) Occurrence of parkerite in copper-nickel ores of the Allarchensk region, Murmansk district. *Dokl. Akad. Nauk SSSR* **203,** 1382–1385 (in Russian).

"Mineral B" was observed as a thin rim around parkerite. Microprobe analysis showed approximately S 20, Bi 47.0, Cu 21.5, Ni present, not determined, sum 88.5 percent. The mineral in section is gray with a slight olive tint. Birefringence not observed in air, weak in immersion; anisotropy weak in air, distinct in immersion without color effects. Relief less than for parkerite. Reflectances are given for 9 wavelengths: 441 nm, 32.8; 471, 33.7; 553, 34.1; 593, 33.8; 625, 32.1 percent.

### Brunogeierite

Joachim Ottemann, and Bernhard Nuber (1972) Brunogeierit, ein Germanium-Ferritspinell von Tsumeb: *Neues Jahrb. Mineral. Monatsh.* 263–267.

Microprobe analyses with standards of pure Fe and Ge gave $GeO_2$ 37.0, 40.5; FeO (total Fe as FeO) 63.8, 60.7; MnO trace, trace, sum 100.8, 101.2 percent, corresponding to $(Ge_x, Fe_{1-x})Fe_2O_4$, with $x = 0.87, 0.95$, respectively. X-ray study showed the mineral to be cubic, *Fd3m*, $a = 8.409 \pm 0.004$Å, $Z = 8$, *G* calc 5.51. Synthetic $GeFe_2O_4$ had a $8.4080 \pm 0.0002$Å. The strongest lines (9 given) are 2.972 (6)(220), 2.540 (10)(311), 1.615 (7)(511), 1.484 (9)(440), 1.095 (6)(731).

The mineral is gray, opaque. Isotropic, reflectance lower than that of magnetite. Hardness higher than those of tennantite and stottite. Ferromagnetic. The mineral occurs in the lower oxidation zone at a depth of 930 meters in the Tsumeb ore body, S. W. Africa, as crusts 40–50 microns thick on tennantite, which encloses renierite. It is surrounded by stottite.

The name is for Dr. Bruno H. Geier, chief mineralogist of the Tsumeb Corporation. The mineral and name were approved in advance of publication by the Commission on New Minerals and Mineral Names, IMA.

### Silicomonazite

I. Ya. Nekrasov (1972) New data on a mineral of the monazite-cheralite-huttonite group. *Dokl. Akad. Nauk SSSR,* **204,** 941–943 (in Russian).

Analyses of minerals from placers, N. E. USSR gave $SiO_2$ 12.04, 13.18; $P_2O_5$ 24.08, 25.52; $TiO_2$ 0.33, 0.42; $Al_2O_3$ 0.50, 0.80; $Fe_2O_3$ 2.76, 1.09; MgO 0.42, 0.31; CaO 0.80, 0.60; PbO 1.03, 0.74; $ThO_2$ 1.14, 1.01; $U_3O_8$ 0.41, 0.41; $RE_2O_3$ 54.01, 55.34; $H_2O$ 2.03, 1.04; sum 99.55, 100.46 percent. *G* 4.3, H 3½, optically biaxial positive, $2V$ 16–23°, $\alpha$ 1.773, $\gamma$ 1.812 (both ±0.003). The rare earths (analyses given) are predominantly Ce-La-Nd. Monoclinic, *a* 6.87, *b* 6.91, *c* 6.51Å., $\beta$ 104°36′.

*Discussion.* The analyses give ratios P/Si = 1.69, 1.64. These are therefore silicatian monazites and the name is unnecessary.

### Plumboallophane

B. Kolkovski, and D. K. Dimitrov (1970–1971) Plumboallophane from the Petrovitsa lead-zinc deposit, Madan region. *Godishnuk Univ. Sofia, Fak. Geol.-Geogr., Geol.* **63,** 217–224 (Bulgarian with German summary).

Analysis by L. Ivchinova gave $SiO_2$ 27.59, $Al_2O_3$ 33.27, $Fe_2O_3$ trace, MgO 2.20, CaO 1.25, PbO 2.07, $Na_2O + K_2O$ 0.89, $H_2O^+$ 13.78, $H_2O^-$ 18.82, sum 99.87 percent, $SiO_2:Al_2O_3:H_2O = 1.41:1:5.56$. Spectrographic analysis also showed As, Zn, Mn 0.1–0.01, Ba, Be 0.01–0.001, Ge, Ni, Cu 0.001 percent. DTA curves showed an endothermic break at 150° and an exothermic break at 925–940°. The infrared absorption spectrum shows indications of structure. The mineral has a fibrous to mossy structure. Optically isotropic, *n* 1.500–1.504. X-ray patterns gave only broad and diffuse lines, one at 4.35–4.47Å.

*Discussion.* Insufficient evidence for a new name.

## NEW DATA

### Pavonite

S. Karup-Møller (1972) New data on pavonite, gustavite, and some related sulphosalt minerals. *Neues Jahrb. Mineral. Abhandl.* **117,** 19–38.

New microprobe analyses of pavonite from four localities (including the type locality) suggest the formula: $Ag_2Cu[(Bi,Sb)_{1-x}Pb_x)]_9S_{16}$, *x* is 0.1 max. X-ray and optical data are given.

### Tocornalite

Brian Mason (1972). Tocornalite. *Smithsonian Contrib. Earth Sci.* **9,** 79-80.

C. J. Barclay, and J. B. Jones (1971) The Broken Hill halides. *J. Geol. Soc. Aust.* **18,** 149–157.

Tocornalite (Domeyko, 1867) is described in Dana's System, 7th Ed., v. 2, p. 25, as a yellow iodide of silver and mercury from Chanarcillo, Chile. Mason describes soft, bright yellow material from Broken Hill, New South Wales, in a cavity in embolite, that rapidly turns gray-green, then black, on exposure to light. It gave a powder pattern identical with that given by a sample (no. C906) in the U. S. National Museum, labelled Tocornalite, Chanarcillo, Chile.

The strongest lines (22 given) are 6.37 (7), 3.76 (9), 3.61 (9), 2.644 (10), 2.254 (7), 2.036 (5). Attempts to index the pattern or to synthesize it failed; neither specimen provided sufficient material for analysis. Tocornalite is therefore a valid species, but more data are needed.

Barclay and Jones also report on material of deep yellow color in kaolinite matrix from Broken Hill with a red powder; both blackened on exposure to light. Qualitative spectrographic analysis showed that both contained major Ag, Hg, I, traces of Cu, with Cl, Br, P, and S absent. Both gave multilined, unrecognizable X-ray patterns that differ from each other and from Mason's data on tocornalite.

## DISCREDITED MINERALS

### Alaskaite = mixture

S. Karup-Møller (1972) New data on pavonite, gustavite and some related sulphosalt minerals. *Neues Jahrb. Mineral. Abhandl.* **117,** 19–38.

Re-examination of material from the type locality show it to contain pavonite, gustavite, tetrahedrite, and sphalerite.

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# BOOK REVIEWS

PROBLEMES DE CRISTALLOGRAPHIE. By Pierre Ducros and Janine Lajzerowicz-Bonneteau. Dunod, Paris, 1967. xxii + 118 pages. Paperback. 15.5 × 24 cm. 18.50 Fr.

The reorganization of university degrees in France was already under way at the time this book appeared. The former "Licence" was to be replaced with the "Maîtrise" (master's degree), but crystallography examinations would still have to be prepared at about the same level as before. The book is intended to help the candidates, in this acutely examination-oriented system. As the jacket tells us, it is the first one of its kind ever published in France. Published sets of crystallographic problems are indeed rare. I know only two: one in English by Terpstra (1952), the other in Spanish by Garrido (1949). The present one came out as Number 3 in a series devoted to collecting problems in all kinds of sciences, which is being published under the direction of Henri Cabannes.

Such a book should prove intensely interesting to professors and students alike, outside of France, in that it will show them what is expected of their counterparts in a country that has a long crystallographic tradition. After a quick review of notations and definitions pertaining to symmetry, forty-three problems (Fr. *exercices*) are solved in detail, with sundry comments for the reader's benefit. They stress symmetry theory, crystal geometry and structure, diffraction, tensor properties, including crystal optics, without skipping either morphology or twinning. This first part reflects the teaching of Professor Ducros and his *Maître Assistant* at the University of Grenoble. The crowning testimony, however, comes in Part II in the form of sixteen sets of actual examination questions, asked in six universities (Caen, Grenoble, Lille, Nancy, Orsay, Paris) in the period 1959–1966. Answers are given, tersely. Each set of questions is referred to as one *problème,* although such a problem represents one complete final examination and may comprise up to eight related questions—a unified little research project, as it were. This type of examination is hard on the student, since a mishap in a single question can jeopardize the whole paper, and it certainly takes personal maturity as well as subject mastery for granted.

Without undue display of mathematical virtuosity, the authors simply use what they need: vectors throughout, matrices for symmetry operations and for tensor properties. They claim that, in matters of symbolism, they follow the *International Tables for X-ray Crystallography,* and indeed they do, though not blindly! Bravais' definition of the crystal systems, based on the point symmetry of the lattice, is faithfully maintained (bravo!). Another departure will be found in the symbol **n**, instead of **L**, for a lattice vector (if this was done to avoid using a capital letter for a vector, why not keep **r**—the initial of *réseau?*). The French conventional setting of co-ordinate axes requires turning the drawing 90° or 120° in its plane. The zero meridian and the sense of increasing $\phi$ on stereographic projections are also different from ours. The term *position* is still mostly used as a collective noun, as in "there are 8 atoms in the general position"—a very good usage. Two French advances are passed by: Ungemach's (1935) use of multiple indices in morphology, and the application of black-white symmetry to twinning, due to Curien and LeCorre (1958), are not mentioned in the relevant problems. (*Nul n'est prophète en son pays!*)

Better proofreading could have caught some omissions of the scalar-product dot between vectors and disconcerting insertions of said dot between scalars. It might also have detected a few bad slips, such as the 230 space groups being referred to as point groups (p. xxi), the *C*-centered cell of urea being oriented $\bar{4}2m$ instead of $\bar{4}m2$ (Problem No. 4) or the symmetry of a Laue diagram shown as a 2-fold axis and a single mirror through it (same Problem).

The language is particularly clear and simple. It should present no difficulty to an English-speaking crystallographer, who will readily understand such French newcomers as *indexer* and *indexation,* and should recognize *Laüe*'s name under the incongruous dieresis. This is a book worth buying.

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## References

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