

**Crystal Data:** Monoclinic. *Point Group:* 2, *m*, or 2/*m*. Tabular crystals heavily striated parallel to elongation. *Twinning:* Exhibits very fine twin lamellae.

**Physical Properties:** *Cleavage:* {100}, perfect. Hardness = n.d. VHN = 154 (50 g load). D(meas.) = n.d. D(calc.) = 5.72

**Optical Properties:** Opaque. *Color:* Lead-gray to black. *Streak:* Black. *Luster:* Metallic. *Pleochroism:* Strong, white to brownish gray.

R<sub>1</sub>–R<sub>2</sub>: n.d.

**Cell Data:** *Space Group:* P2, P*m*, P2/*m*, P2<sub>1</sub> or P2<sub>1</sub>/*m*. *a* = 45.4 *b* = 8.29 *c* = 21.3  
β = 92°30(30)' *Z* = 4

**X-ray Powder Pattern:** Madoc, Canada.

3.39 (100), 3.32 (100), 2.785 (70), 2.086 (60), 3.98 (40), 3.49 (40), 2.97 (40)

Chemistry:	(1)	(2)	(3)	(4)
Pb	51.0	47.2	50.7	48.15
Sb	28.0	28.2	26.3	31.83
As	2.4	2.8	3.3	
S	18.8	20.3	21.3	20.02
Cl		0.18		
Total	100.2	98.68	101.6	100.00

(1) Madoc, Canada; by electron microprobe, average of three analyses, corresponding to Pb<sub>17.32</sub>(Sb<sub>16.18</sub>As<sub>2.25</sub>)<sub>Σ=18.43</sub>S<sub>41.25</sub>. (2) Do.; by electron microprobe, corresponding to Pb<sub>15.46</sub>(Sb<sub>15.71</sub>As<sub>2.54</sub>)<sub>Σ=18.25</sub>Cl<sub>0.34</sub>S<sub>42.95</sub>. (3) Novoye, Kyrgyzstan; by electron microprobe; corresponding to Pb<sub>16.12</sub>(Sb<sub>14.23</sub>As<sub>2.90</sub>)<sub>Σ=17.13</sub>S<sub>45.75</sub>. (4) Pb<sub>16</sub>Sb<sub>18</sub>S<sub>43</sub>.

**Occurrence:** As masses and stringers through dolomitic and calcitic marbles. At the edges of other sulfosalt minerals, and extending into them along microscopic veinlets.

**Association:** Boulangerite, jamesonite, antimonian baumhauerite, zinkenite, semseyite, geocronite, robinsonite, madocite, launayite (Madoc, Canada); sphalerite, pyrite, galena, sorbyite, twinnite, guettardite, baumhauerite, realgar, orpiment, cinnabar, fluorite, quartz (Novoye, Kyrgyzstan).

**Distribution:** From Madoc, Ontario, Canada [TL]. At Novoye, Khaydarkan, Fergana Valley, Alai Range, Kyrgyzstan.

**Name:** In honor of John Playfair (1748–1819), Professor of Natural Philosophy, Edinburgh, Scotland.

**Type Material:** Canadian Geological Survey, Ottawa, 12168; Canadian Museum of Nature, Ottawa, Canada.

**References:** (1) Jambor, J.L. (1967) New lead sulfantimonides from Madoc, Ontario. Part 2 — mineral descriptions. *Can. Mineral.*, 9, 191–213. (2) (1968) *Amer. Mineral.*, 53, 1424 (abs. ref. 1). (3) Mozgova, N.N., N.S. Bortnikov, Y.S. Borodaev, and A.I. Tzépine (1982) Sur la non-stoechiométrie des sulfosels antimonieux arséniques de plomb. *Bull. Minéral.*, 105, 3–10 (in French with English abs.). (4) Jambor, J.L., J.G.H. Laflamme, and D.A. Walker (1982) A re-examination of the Madoc sulfosalts. *Mineral. Record*, 13, 93–100.