Perhamite $Ca_3Al_7(SiO_4)_3(PO_4)_4(OH)_3 \cdot 16.5H_2O$

Crystal Data: Hexagonal. *Point Group:* $6/m\ 2/m\ 2/m$ (probable). As radial discoidal, platy hexagonal crystals, in rough spherules, to 1 mm.

Physical Properties: *Cleavage:* Imperfect on {0001}. *Tenacity:* Brittle. Hardness = ~5 D(meas.) = 2.64(1) D(calc.) = 2.53

Optical Properties: Translucent to nearly opaque. *Color:* Brown, white. *Streak:* White. *Luster:* Dull, vitreous on cleavage surface.
Optical Class: Uniaxial (+). *Dispersion:* $r > v$, moderate. $\omega = 1.564(2)$ $\epsilon = 1.577(4)$

Cell Data: *Space Group:* $P6/mmm$ (probable). $a = 7.022(1)$ $c = 20.182(5)$ $Z = 1$

X-ray Powder Pattern: Bell Pit, Maine, USA.
2.882 (100), 5.80 (71), 6.08 (50), 3.510 (50), 3.115 (50), 1.757 (50), 6.71 (35)

Chemistry:

	(1)	(2)
SiO_2	13.64	13.72
TiO_2	0.09	
Al_2O_3	27.09	27.17
FeO	0.26	
MgO	0.02	
CaO	12.26	12.81
Na_2O	0.02	
F	0.10	
H_2O	[24.62]	24.69
P_2O_5	21.90	21.61
Total	[100.00]	100.00

(1) Bell Pit, Maine, USA; by electron microprobe, average of three analyses, H_2O by difference.
(2) $Ca_3Al_7(SiO_4)_3(PO_4)_4(OH)_3 \cdot 16.5H_2O$

Occurrence: As rare isolated masses in a vuggy, amblygonite-rich pegmatite (Bell Pit, Maine, USA).

Association: Siderite, wardite, amblygonite, eosphorite, sphalerite (Bell Pit, Maine, USA); fluellite, minyulite, wavellite (Tom's quarry, South Australia).

Distribution: In the USA, from Oxford Co., Maine, in the Bell Pit and Dunton mines, Newry; the Emmons quarry, Greenwood; and in the Ski Pike quarry, Cobble Hill, West Paris; at the Silver Coin mine, near Valmy, Iron Point district, Humboldt Co., Nevada. From Tom's quarry, Kapunda, South Australia.

Name: For Frank Croydon Perham (1934–), American geologist and pegmatite miner of West Paris, Maine, USA.

Type Material: The Natural History Museum, London, England, 1976,424; National Museum of Natural History, Washington, D.C., USA, 135740.

References: (1) Dunn, P.J. and D.E. Appleman (1977) Perhamite, a new calcium aluminum silico-phosphate mineral, and a re-examination of viséite. Mineral. Mag., 41, 437–442. (2) (1978) Amer. Mineral., 63, 794 (abs. ref. 1).