Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. Crystals are usually tabular on {100}, or equant, showing {001}, {010}, {100}, {021}, {102}, {111}, many other forms, to 2.5 cm; powdery, compact.

Physical Properties: *Cleavage:* {010}, perfect; {001}, imperfect. Hardness = 3–3.5 D(meas.) = 2.10 D(calc.) = [2.13] Slightly soluble in H_2O.

Optical Properties: Transparent. *Color:* Colorless to gray. *Luster:* Vitreous. *Optical Class:* Biaxial (+). *Orientation:* $X = a$; $Y = b$; $Z = c$. *Dispersion:* $r < v$, perceptible. $\alpha = 1.514(3)$ $\beta = 1.517(3)$ $\gamma = 1.533(3)$ 2V(meas.) = 44°46′

Cell Data: *Space Group: Pbca.* $a = 10.203$–10.24 $b = 10.679$–10.74 $c = 9.99$–10.018 Z = [8]

X-ray Powder Pattern: Paoha Island, California, USA and Skipton lava tube caves, Australia.
5.34 (100), 4.71 (60), 3.460 (40), 3.083 (40), 2.580 (40), 5.94 (30), 3.039 (30)

Chemistry:

	(1)	(2)
P_2O_5	40.73	40.71
Fe_2O_3	0.85	
Mn_2O_3	0.21	
MgO	22.37	23.12
H_2O	[35.84]	36.17
Total	[100.00]	100.00

(1) Skipton lava tube caves, Australia; H_2O by difference. (2) $Mg(PO_3OH)\cdot 3H_2O$.

Occurrence: In caves, formed directly from bat guano.

Association: Hannayite, struvite (Skipton lava tube caves, Australia); biphosphammite (Petrogale Cave, Australia); monetite, struvite (Paoha Island, California, USA).

Distribution: In the Skipton lava tube caves, 40 km southwest of Ballarat, Victoria, and the Petrogale Cave, near Madura, Western Australia. At the Niah Great Cave, Sarawak, Malaysia. Around Mt. Erebus, Victoria Land, Antarctica. On Réunion Island, Indian Ocean. From Ascension Island, south Atlantic. In the USA, on Paoha Island, Mono Lake, Mono Co., California. From near Mejillones, Antofagasta, Chile. From Ficus and Boon's Caves, Transvaal, South Africa.

Name: To honor James Cosmo Newbery (1843–1895), geologist, Melbourne, Australia, who initially found the mineral.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 709–711. (2) Cohen, L.H. and P.H. Ribbe (1966) Magnesium phosphate mineral replacement at Mono Lake, California. Amer. Mineral., 51, 1755–1765. (3) Bartl, H., M. Catti, W. Joswig, and G. Ferraris (1983) Investigation of the crystal structure of newberyite, $MgHPO_4\cdot 3H_2O$, by single crystal neutron diffraction. Tschermaks Mineral. Petrog. Mitt., 32, 187–194.