Georgeite $Cu_5(CO_3)_3(OH)_4 \cdot 6H_2O$

Crystal Data: Amorphous. *Point Group:* n.d. As thick to thin pulverulent to massive coatings.

Physical Properties: *Fracture:* Subconchoidal. *Tenacity:* Brittle. Hardness = "Very soft". D(meas.) = 2.55(10) D(calc.) = n.d.

Optical Properties: Transparent to translucent. *Color:* Pale Cerulean blue to Calamine blue; pale blue in transmitted light. *Streak:* Very pale blue. *Luster:* Vitreous to earthy. *Optical Class:* Isotropic. $n = 1.593(2)$

Cell Data: *Space Group:* n.d. Z = n.d.

X-ray Powder Pattern: Carr Boyd Rocks mine, Australia; amorphous by X-ray and electron diffraction analysis.

Chemistry:

	(1)	(2)
CO_2	19.3	19.59
CuO	58.3	59.02
ZnO	0.6	
H_2O	22.0	21.39
Total	[100.2]	100.00

(1) Carr Boyd Rocks mine, Australia; IR confirms OH^{1-} and H_2O; recalculated after deduction of chalconatronite 12.35% from an original analysis totalling 100.5%; then corresponds to $(Cu_{5.01}Zn_{0.05})_{\Sigma=5.06}(CO_3)_3(OH)_{4.12} \cdot 6.3H_2O$. (2) $Cu_5(CO_3)_3(OH)_4 \cdot 6H_2O$.

Occurrence: A rare secondary mineral in oxidized portions of a Ni–Cu sulfide deposit.

Association: Malachite, chalconatronite, nickelian magnesite, gypsum.

Distribution: From the Carr Boyd Rocks nickel mine, Yerilla district, 80 km north-northeast of Kalgoorlie, Western Australia.

Name: Honors George Herbert Payne (1912–1989), Chief of the Mineral Division, Government Chemical Laboratories, Perth, Western Australia.

Type Material: Western Australian Museum, Perth, Australia, 5775; National Science Museum, Tokyo, Japan; The Natural History Museum, London, England, 1979,323; National Museum of Natural History, Washington, D.C., USA.

References: (1) Bridge, P.J., J. Just, and M.H. Hey (1979) Georgeite, a new amorphous copper carbonate from the Carr Boyd mine, Western Australia. Mineral. Mag., 43, 97–98. (2) (1979) Amer. Mineral., 64, 1330 (abs. ref. 1). (3) Pollard, A.M., R.G. Thomas, P.A. Williams, J. Just, and P.J. Bridge (1991) The synthesis and composition of georgeite and its reactions to form other secondary copper(II) carbonates. Mineral. Mag., 55, 163–166.