Merwinite $Ca_3Mg(SiO_4)_2$

Crystal Data: Monoclinic. *Point Group:* $2/m$. Crystals are rare and inevitably pitted and rounded, to 3 mm; compact, massive. *Twinning:* Polysynthetic on {100}, twin axis [013], common.

Physical Properties: *Cleavage:* Perfect on {100}. Hardness = 6 D(meas.) = 3.15–3.32 D(calc.) = 3.33

Optical Properties: Transparent to translucent. *Color:* Colorless, white, very pale green; colorless in thin section. *Luster:* Vitreous.
Optical Class: Biaxial (+). *Orientation:* $Y = b$; $X \wedge c = 13°$. *Dispersion:* $r > v$, perceptible. $\alpha = 1.702–1.710$ $\beta = 1.710–1.714$ $\gamma = 1.718–1.728$ 2V(meas.) = 66°–76°

Cell Data: *Space Group:* $P2_1/a$ (synthetic). $a = 13.254(21)$ $b = 5.293(9)$ $c = 9.328(17)$ $\beta = 91.90(15)°$ Z = 4

X-ray Powder Pattern: Synthetic.
2.672 (100), 2.749 (40), 2.213 (40), 1.909 (40), 4.63 (30), 3.310 (30), 3.128 (30)

Chemistry:

	(1)
SiO_2	35.50
Al_2O_3	0.66
Fe_2O_3	0.00
FeO	1.22
MgO	11.62
CaO	49.96
Loss $< 110°$C	0.12
LOI	0.94
Total	100.02

(1) Crestmore, California, USA; corresponds to $Ca_{2.98}(Mg_{0.96}Fe_{0.06})_{\Sigma=1.02}(Si_{1.98}Al_{0.04})_{\Sigma=2.02}O_8$.

Occurrence: In siliceous dolomitic limestone in contact metamorphic zones, formed at relatively elevated temperatures, locally in substantial quantities.

Association: Gehlenite, spurrite, monticellite, vesuvianite (Crestmore, California, USA); spurrite, gehlenite, spinel (Scawt Hill, Ireland).

Distribution: In the USA, at Crestmore, Riverside Co., California; at Neihart, Cascade Co., Montana; and in the Christmas Mountains, Brewster Co., Texas. From Velardeña, Durango, Mexico. In Ireland, at Scawt Hill, near Larne, Co. Antrim. From near Kilchoan, Ardnamurchan, Argyllshire, and at Camas Mòr, Isle of Muck, Scotland. Found near Anakit Creek, at the mouth of the Lower Tunguska River, central Siberia, and in the Ozerskii massif, Lake Baikal, Russia. At Iglika, Elkhovsko district, Bulgaria. In the Hatrurim Formation, Israel.

Name: For Dr. Herbert Eugene Merwin (1878–1963), American mineralogist and petrologist, Carnegie Institute, Washington, D.C., USA.

Type Material: National Museum of Natural History, Washington, D.C., USA, 94030; The Natural History Museum, London, England, 1923,1026.

References: (1) Larsen, E.S. and W.F. Foshag (1921) Merwinite, a new calcium magnesium orthosilicate from Crestmore, California. Amer. Mineral., 6, 143–148. (2) Moore, P.B. and T. Araki (1972) Atomic arrangement of merwinite, $Ca_3Mg[SiO_4]_2$, an unusual dense-packed structure of geophysical interest. Amer. Mineral., 57, 1355–1374. (3) Deer, W.A., R.A. Howie, and J. Zussman (1986) Rock-forming minerals, (2nd edition), v. 1B, disilicates and ring silicates, 256–262.