Weddellite $Ca(C_2O_4)\cdot 2H_2O$

Crystal Data: Tetragonal. *Point Group:* $4/m$. Typically as isolated crystals, with {011}, elongated along [010], terminated by {001}, to 4 cm; commonly corroded. *Twinning:* Single or multiple twins may have been noted.

Physical Properties: *Fracture:* Subconchoidal. Hardness = ∼4 D(meas.) = 1.94(1) D(calc.) = 1.962 Dehydrates to whewellite on exposure to the atmosphere.

Optical Properties: Transparent. *Color:* Colorless to white, may be yellowish brown to brown from organic impurities; colorless in transmitted light.
Optical Class: Uniaxial (+). $\omega = 1.523(3)$ $\epsilon = 1.544(3)$

Cell Data: *Space Group:* $I4/m$. $a = 12.371(3)$ $c = 7.357(2)$ Z = 8

X-ray Powder Pattern: Husvik, Antarctic Ocean.
2.744 (100), 6.19 (72), 3.35 (66), 2.231 (63), 1.892 (49), 4.43 (40), 2.792 (38)

Chemistry: (1) Analyses of natural material are lacking. Identification is by correspondence of optical and X-ray powder data with those of synthetic material.

Occurrence: Authigenic in bottom muds and in peat sediments; in calcareous lake-bottom sediments; may be formed by reaction of calcite with oxalic acid produced by lichens.

Association: Whewellite, urea, phosphammite, aphthitalite (from bat guano).

Distribution: From the central and marginal Weddell Sea, Antarctica. On South Georgia Island, southern Atlantic Ocean. In sediments from the Japan Sea and the Coral Sea. At Jingemia Cave, Toppin Hill Cave, and Petrogale Cave, near Madura, Western Australia. From Gcwihaba Cave, 280 km west of Maun, northwestern Botswana. In the Tyllakh brown coal deposit, left bank of the Olenhinskii channel near its mouth, estuary of the Lena River, Bulun district, polar Sakha, Russia. From the Milltown quarry, Milltown, Derbyshire, England. In Canada, in the Saguenay and St. Lawrence Rivers, Quebec; from the east side of Moore Lake, near Norland, Ontario; and from Cape Herschel, Ellesmere Island, North West Territories. Large crystals from the Sami Tsubota jasper mine, four km south of Biggs, Sherman Co., Oregon, USA.

Name: For its first-noted occurrence in the Weddell Sea, Antarctica.

Type Material: The Natural History Museum, London, England, 1936,975–1936,977.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 1101–1102. (2) Tazzoli, V. and C. Domeneghetti (1980) The crystal structures of whewellite and weddellite: re-examination and comparison. Amer. Mineral., 65, 327–344. (3) Van de Vijver, B., R. Vochten, J. Geys, C. Verbruggen, and L. Beyens (1997) Mineralogical observations of weddellite from South Georgia, Subantarctica. Neues Jahrb. Mineral., Monatsh., 193–202.