FLUORITE FROM MADOC, ONTARIO

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At intervals for many years there has been a small production of fluorite from the vicinity of Madoc, Ontario. During the war some deposits have been developed into mines producing in all several thousand tons of fluorite per annum. The rock formation in the region around Madoc as indicated by Miller and Knight[1] consists of Precambrian (Keewatin, Grenville and Hastings), with intrusions of Moira granite, on which lies the Black River limestone. This whole series is cut by veins carrying fluorite, calcite and barite. Many years ago some of the veins were worked for barite, but during the last three years the mines have been worked for fluorite.

The object of this memorandum is to call attention to the optical and crystallographic properties of some very beautiful varieties of fluorite found at the Bradley mine, which is situated on the west half of lot 9 in the 14th concession of the township of Huntingdon, not far from Madoc.

The fluorite, which is commonly white, varies in color to green, blue, honey-yellow or rose. Sometimes the mineral appears as colorless crystals of brilliant luster which are very attractive as show specimens. This type seems to possess the characteristics of optical fluorite in color, freedom from cracks and inclusions, and in its breaking along fracture surfaces rather than along cleavage planes. The crystals are sometimes very large, some rough-surfaced crystals being almost 5 dm. in diameter. Where the crystals are embedded in barite or celestite the surfaces are smooth and brilliant, but where they are not so covered the crystal surfaces are usually rough, owing to the development of a multitude of smaller cubes approximately parallel to one another. Most of the crystals are interpenetration twins, as is usual for this mineral.

The forms observed on the crystals are the following:

octahedron, $p(111)$; rhombic dodecahedron, $d(110)$;
tetrahexahedron, $a(310)$; trisoctahedron, (441);
icositetrahedron, $n(322)$; cube, $c(100)$.

[1] Miller and Knight, *Ontario Bureau of Mines, 22d Report*, part 2, 1913.

The crystal habit and arrangement of forms present are shown in Fig. 1. The faces of the rhombic dodecahedron are always rough, while those of the cube are really very flat tetrahexahedra

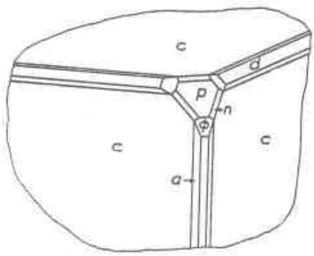

FIG. 1. Fluorite, Madoc, Ontario

and hexoctahedra. The cube faces are accordingly curved, especially when they are pierced by a corner of the second individual of a twin. The highest point of such a face is located at an angle of a projecting corner. The angles between the curved cube faces measured over the edges vary from 87° 10′ to 88° 14′. If that part of a cube face near the angle of a projecting corner be examined with the reflecting goniometer, using the small signal, a series of signals is seen, representing all the faces which combine to give rise to the pseudo-cube face. These small signals form an almost continuous series arranged more or less in the form of a circle. Each of the four quadrants of the composite figure contains a point representing a very flat tetrahexahedron and a great series of equally flat hexoctahedrons. The angle made by the flat tetrahexahedron with the cube face is 1° 40′, which is very close to the angle for the form: (35.1.0). The hexoctahedrons make with the cube face angles slightly less than this.

In the opinion of the writer, considering the brilliance, luster, perfection of crystallization and transparency of relatively large pieces this is probably the most beautiful fluorite known to science.

The American Museum of Natural History, New York City, has recently issued a 32-page Guide Leaflet (No. 49), entitled "The collection of minerals in the American Museum of Natural History," prepared by Herbert P. Whitlock, curator of mineralogy. It comprises a brief introduction to the science of mineralogy, notes on the history of the collection, the principles of mineral classification and nomenclature, and a guide to the collection, taken up group by group, with descriptive data on a few of the most important minerals in each. It is profusely illustrated with photographs of showy specimens in the collection.