OCCURRENCE OF CHRYSOBERYL NEAR GOLDEN, COLORADO

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In March, 1938, chrysoberyl of unusual interest was discovered by R. V. Gaines in a small granite pegmatite dike near Drew Hill, about ten miles from Golden, Colorado. The mineral specimens first obtained from the deposit were identified as chrysoberyl by the senior author, and the identification was subsequently checked by qualitative analyses made at the Experimental Plant of the Colorado School of Mines.

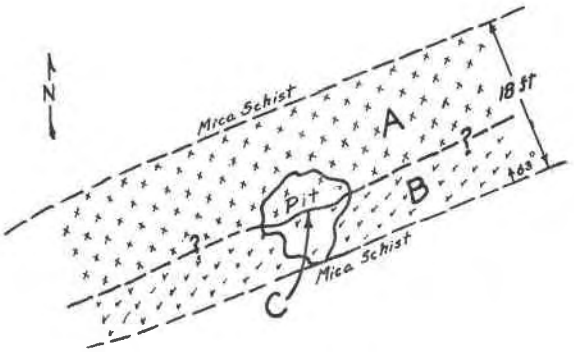

Fig. 1. Sketch of chrysoberyl-bearing dike. A. Massive orthoclase and perthite. B. Coarse granite pegmatite. C. Contact of parts A and B near which chrysoberyl occurs with massive quartz and quartz-muscovite aggregates.

The presence of a shallow pit, in and around which the first specimens of chrysoberyl were found, indicated that the dike had been prospected for feldspar. Had it not been for this early prospecting, the chrysoberyl herein described probably would have remained undiscovered. Recently, the writers deepened the prospect pit by blasting and obtained some additional specimens. Inasmuch as the crystals and crystalline masses of chrysoberyl from this deposit are exceptionally large, the writers believe that a description of them and of the dike in which they occur is well warranted.

The dike containing the chrysoberyl is rather distinctly divided into two parts as illustrated in Fig. 1. One part consists of coarse granite pegmatite in which orthoclase, quartz, muscovite and tourmaline are distributed in a relatively uniform manner. In contrast to this, the other part consists essentially of massive orthoclase and perthite. Chrysoberyl

occurs along the contact of the two parts of the dike, near segregated masses of quartz and muscovite. Some chrysoberyl crystals are practically enclosed in quartz, but extend slightly into the massive feldspar; others are virtually enclosed in the feldspar but extend slightly into massive quartz; and some small crystals are included in aggregates of quartz and muscovite. The majority of the twinned chrysoberyl crystals are closely associated with massive quartz; whereas, most of the single crystals are included in feldspar or in the quartz-muscovite aggregates.

All of the chrysoberyl thus far obtained from the deposit has a relatively uniform olive-green color. Its average specific gravity, determined

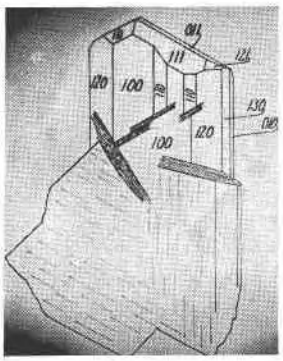

FIG. 2. Chrysoberyl.—Colorado.

from small particles obtained by screening dump material, is 3.648. Cleavage parallel to the brachypinacoid is good, but is poor or lacking entirely in other directions. All of the cleavage faces have a brilliant luster.

The composition of the chrysoberyl, as determined at the Experimental Plant of the Colorado School of Mines, is as follows:

BeO	19.15 per cent
Al_2O_3	76.34
FeO	3.60
TiO_2	0.55
SiO_2	tr.
Mn	tr.
Cr	None
Loss on ignition	0.30
Acid sol. iron	tr.
Analyst: W. P. Schoder	99.94

Only the largest and best developed specimens of chrysoberyl have been selected for illustrations and detailed descriptions. Figure 2 shows

the various forms identified on one of the well-terminated small crystals.

The specimen illustrated in Fig. 3 is the second largest of the single chrysoberyl crystals yet found in the deposit. It is 1.7 cm. thick, 4.0 cm. wide, and 9.2 cm. long. The faces of the crystal include a well-developed macropinacoid, a very narrow brachypinacoid, a good pyramid, a narrow brachydome, and a poorly developed prism. Some striations are present on the macropinacoid faces. Associated with the crystal are muscovite, orthoclase, and massive chrysoberyl. Muscovite is present

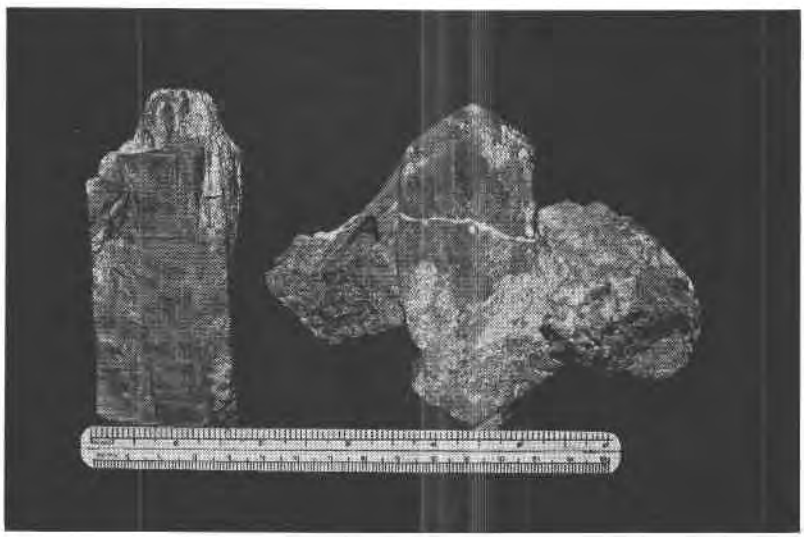

FIG. 3. Chrysoberyl. Fragment at left broken from surface marked A. Weight of group illustrated, 941 grams.

as small brilliant flakes on the crystal faces and as large flakes (6.2 cm. average diameter) between the crystal and the orthoclase. Flakes of similar size occur also between the crystal and the adjacent chrysoberyl masses. It was necessary to photograph the specimen in two parts, because the large crystalline mass of chrysoberyl, when attached to the surface "A" in the Fig. 3, obscured the termination of the crystal.

The largest twinned chrysoberyl specimen found in the deposit is illustrated in Fig. 4. It is 2.54 cm. thick, 14 cm. wide, and 12 cm. long. Attached to the crystal, but not evident in the figure, are some gray quartz and a tabular chrysoberyl mass 1.7 cm. in thickness. Small, brilliant muscovite flakes occur on the crystal and cleavage faces, and also between the chrysoberyl and massive quartz. Minute crystals of tourma-

FIG. 4. Twinned chrysoberyl. Weight 1302 grams.

FIG. 5. Chrysoberyl crystals from Colorado.

line, intergrown with muscovite, form a thin film on some of the cleavage faces. Figure 5 illustrates three well developed chrysoberyl crystals.

The quantity of chrysoberyl in the deposit described is extremely problematical. A careful study has been made of the dike along its entire outcrop, but all of the specimens thus far collected (approximately 50 kilograms) have been found in or near the prospect pit. Distribution of the chrysoberyl in the dike undoubtedly is very erratic because its occurrence, as observed, indicates that it will be found only where the texture of the dike is extremely variable, and where quartz or quartz-muscovite aggregates are present as large masses.