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NOTE ON LARGE CORDIERITE PORPHYROBLASTS, FREMONT COUNTY, COLORADO

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Cordierite occurs abundantly and, in places, conspicuously in metamorphic rocks of the Front Range, Colorado. It is most readily detected as porphyroblasts, although it is undoubtedly abundant as a more subtle constituent in granoblastic hornfelses; for example, cordierite-anthophyllite rocks, a few miles north of Salida, Colorado.

The purpose of this note is to draw attention to some unusually large porphyroblasts (four to five inches in greatest dimension) in a readily accessible exposure. This occurrence is 2.8 miles east of Texas Creek, on U. S. Highway 50 in Fremont County. At this point, a contact between Precambrian granitic rock and Precambrian metamorphic rock strikes across the highway and the Arkansas River (Fig. 1). Although the contact is generally well defined, it is complicated by abundant pegmatite dikes which thoroughly invade the metamorphic rocks giving them a sporadic distribution along the contact. Also, in some places, large masses of metamorphic rocks are included within the granitic rock at dozens, and even hundreds, of feet from the contact. Most of the metamorphic rock along the contact and within the granitic rock is cordierite-bearing schist.

Because of the pronounced, nearly vertical, foliation, the steep slopes on the highway side of the river are littered with large slabs of gray cordierite schist. The cordierite, in large black or dark gray porphyroblasts, stands out conspicuously against the gray or silvery gray groundmass (Figs. 2–4). The porphyroblasts range from $\frac{1}{8}$ inch to 5 inches in greatest dimension but commonly occur in two, and in some places, three sets of different sizes (Fig. 3). Most of them are blocky or prismatic but some are spheroidal, and in all, the greater dimensions are more or less

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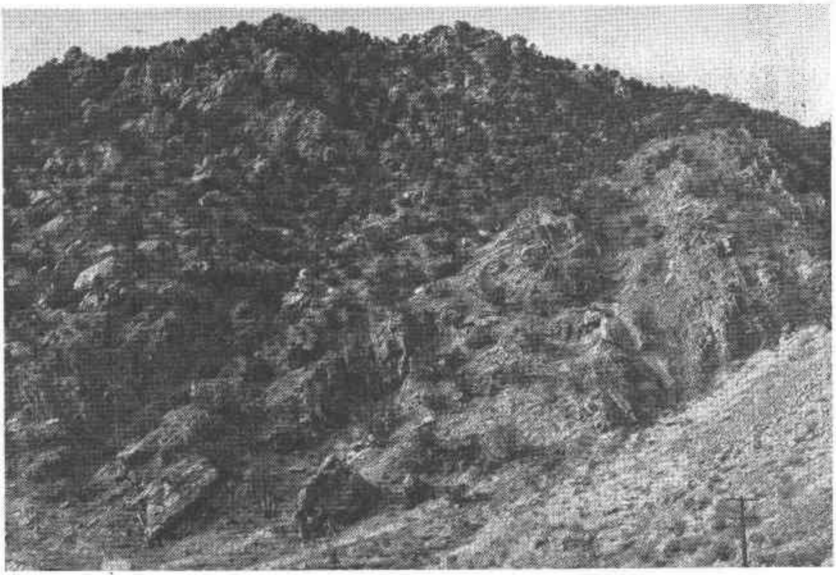

FIG. 1. Cordierite-bearing schists, lower right, in contact with granitic rock, upper left. (Photo by L. W. LeRoy.)

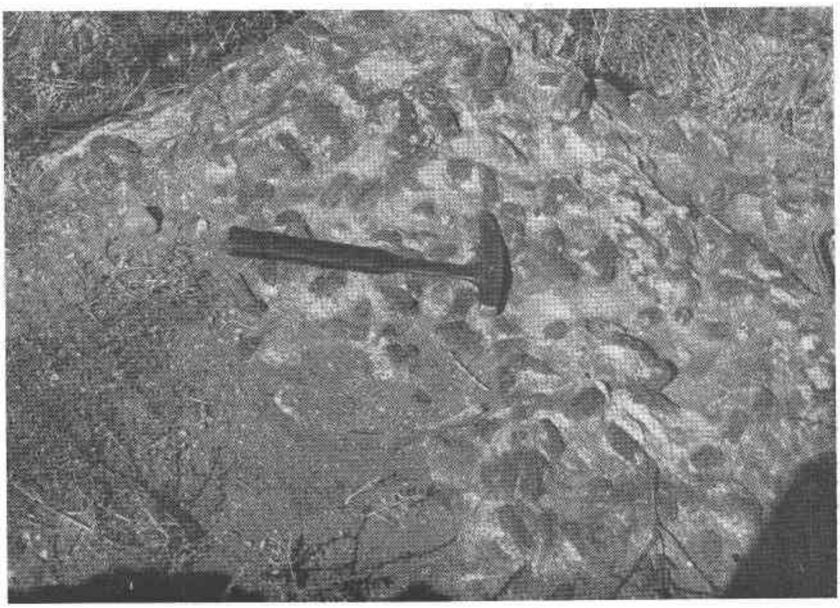

FIG. 2. Dark gray cordierite porphyroblasts in slab of silvery gray quartz muscovite schist.

FIG. 3. Slab of silvery gray schist exhibiting two sets of dark gray cordierite porphyroblasts. Those in the smaller set do not exceed ½ inch.

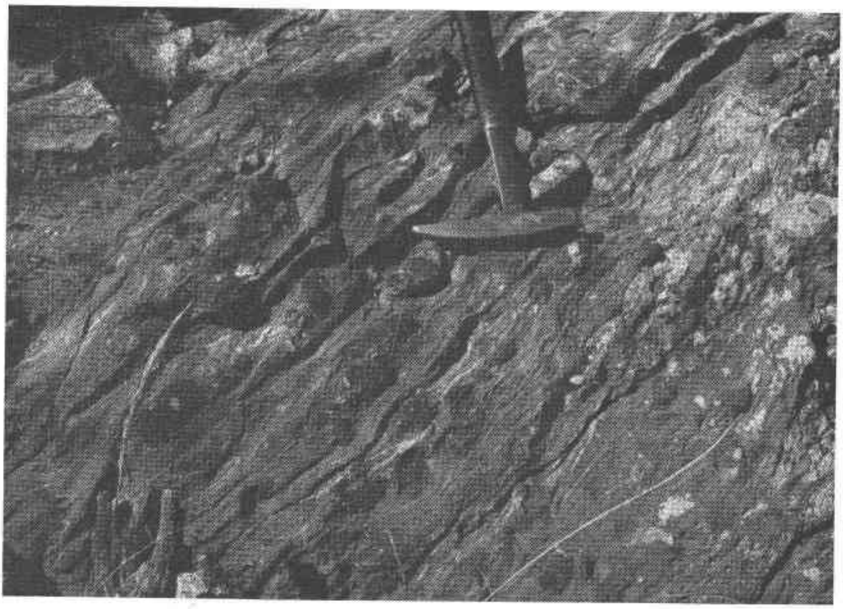

FIG. 4. Cross-sectional view of schist showing relation of porphyroblasts to foliation. Most of these are spheroidal.

aligned in the foliation plane (Figs. 2–4). The groundmass is composed chiefly of quartz and muscovite, with subordinate iron ore and minor sillimanite, plagioclase, biotite, cordierite, and green tourmaline. The total proportion of porphyroblasts in the schist ranges from about 10 to 50 per cent. However, as is rather characteristic of cordierite, these porphyroblasts are crowded with inclusions of quartz and iron ore so that cordierite does not constitute more than 60 or 70 per cent of the porphyroblasts. Small quantities of muscovite, biotite and green tourmaline also are included. Professor N. Cyril Schieltz kindly prepared an *x*-ray powder pattern, and pointed out that it is identical with one of a cordierite-quartz mixture which he had included in a paper on *x*-ray analysis techniques in 1950 (Schieltz,[1] Plate 7).

The inclusions form conspicuous trains coinciding with the foliation of the schist and, in places, delineate relic microfolds. It seems reasonable to conclude, even on such cursory examination, that the cordierite was formed by contact metamorphism of quartz-mica schist. The tourmaline is probably a relic constituent, as it conforms closely to the foliation.

Although these porphyroblasts are small compared to the classic 30 cm. ones in Finland described by P. Eskola, and although larger ones can probably be found in the Front Range, their size and easy accessibility make them worth noting.

[1] Schieltz, N. C. (1950), *X*-ray Analysis, pp. 211–239 in subsurface geologic methods, L. W. LeRoy, editor, *Colorado School of Mines, Golden, Colorado.*

HYDROTHERMAL ALTERATION OF MUSCOVITE IN STEAM GAGE-GLASSES[1]

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Sheet muscovite is used to protect sight glasses in the water-level gages of steam power stations (Ptacek, 1952), but under certain conditions the mica becomes clouded and must be replaced after as little as two weeks use. Examination of several such replaced glasses from various power stations reveals an interesting mode of hydrothermal alteration that has not been described previously for this mineral.

Mica for a gage glass consists of a sheaf of 4 or 5 splits of clear muscovite, about 3×12 in., trimmed to shape. The mica is assembled with a thick glass plate and clamped around the edge, using asbestos gaskets. All the gage-glass samples examined were muscovite, either clear or very

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