RHYODACITE FROM THE TRANQUILLE PLATEAU, BRITISH COLUMBIA*

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Siliceous lavas are very uncommon in the Tertiary volcanics of the British Columbia interior plateaus, and the present paper records what is believed to be the first such occurrence to be studied in petrographic detail. The rhyodacite here described was found in the unpopulated upper Tranquille plateau area about 25 miles northwest of Kamloops, on the old wagon road from Tranquille to Red Lakes and Copper Creek. The outcrop is an elliptically shaped area 300 feet wide and 500 feet long. Flat-lying basalt flows surrounding it give a steptoe appearance suggesting a volcanic plug.

Apparently this is the rock that Dawson lists in his Tertiary volcanic groups as "dacite, Upper Tranquille Valley."[1] Dawson assigned his "Upper Volcanic Group" to the Miocene. Later Drysdale[2] reached a similar conclusion, but Daly[3] believed that the group was of Oligocene age. The decision seems to rest on paleontological evidence but, in any case, it seems agreed that these are middle-Tertiary lavas.

The rock is white, fine-grained, and porphyritic. The outcrop is homogeneous, and thin sections from many parts of the outcrop show no significant differences. Phenocrysts of oligoclase, sanidine, quartz and biotite are embedded in a microcrystalline groundmass (Fig. 1). The composition corresponds to ~~237E~~ of Johannsen's classification, a rhyodacite.[4] Eighty-six per cent of the rock is groundmass.

Plagioclase, constituting 6 per cent of the rock, is the most abundant phenocryst. It occurs as unzoned subhedra, with the usual multiple twinning. All of the plagioclase is oligoclase, Ab 78 An 22, and the few grains occurring in coarser phases of the groundmass have similar composition. The indices of refraction of the oligoclase are: $\alpha = 1.541$, $\beta = 1.545$, and $\gamma = 1.548$. The absence of zoning is probably explained by slow early crystallization with complete reaction and equilibrium.

Sanidine variety of orthoclase, making up 4 per cent of the rock, is a conspicuous feature (Fig. 2). Twinning is present, but untwinned

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[1] Dawson, George M., Report on the area of the Kamloops Map-Sheet, British Columbia: *Canadian Geol. Survey, Ann. Rept.*, **226B** (1894).

[2] Drysdale, Charles W., Transcontinental Excursion C1, Part II, Toronto to Victoria and return: *Canadian Geol. Survey, Guide Book* No. **8,** 243 (1913).

[3] Daly, R. A., Transcontinental Excursion C1, Part II, Toronto to Victoria and return: *Canadian Geol. Survey, Guide Book* No. **8,** 233 (1913).

[4] Johannsen, Albert, *A Descriptive Petrography of the Igneous Rocks*, **2,** 356–358 (1932).

euhedra and subhedra are more common. The sanidine has the following indices of refraction: $\alpha = 1.522$, $\beta = 1.526$, and $\gamma = 1.527$.

Quartz phenocrysts make up 3 per cent of the total. They are mostly corroded, egg-shaped anhedra, suggesting partial solution by a magma which was silica-poor during its later stages. Neither tridymite nor cristobalite could be discerned by ordinary microscopic methods. Slightly coarser-grained sections of the groundmass, where tridymite

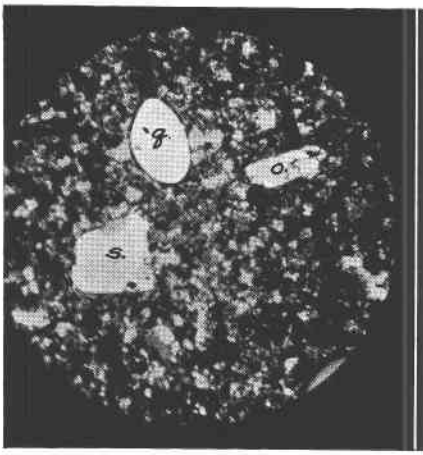

FIG. 1. Thin section showing the typical rock texture, with sanidine (s), quartz (q), and oligoclase (o) as phenocrysts. Crossed nicols. Enlarged 17 diameters.

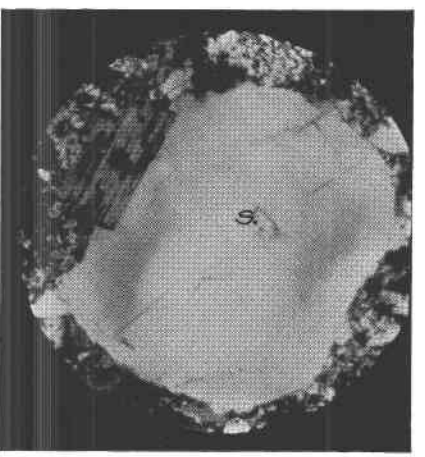

FIG. 2. Thin section showing sanidine (s). Biotite with magnetite is also prominent. Crossed nicols. Enlarged 48 diameters.

might be expected,[5] are seen to contain only quartz. However, the groundmass contains irregular spherulites, and the recent x-ray work of Hurlburt and others suggests that cristobalite may occur here.[6]

Nearly one per cent of the rock is brown biotite. No other mafics are present in the thin sections. The minor accessory minerals were studied by heavy mineral separations. Most of the heavy minerals proved to be magnetite, amounting to nearly one-half per cent of the total rock, but zircon, fluor-apatite, sphene, and common hornblende are also found.

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[5] Larsen, Esper S., and others, Petrologic results of a study of the minerals from the Tertiary volcanic rocks of the San Juan region, Colorado: *Am. Mineral.*, **21**, 693 (1936).

[6] Hurlburt, Cornelius S., Jr., X-ray determination of the silica minerals in submicroscopic intergrowths: *Am. Mineral.*, **21**, 727–730 (1936).