

*Notes on the Alaskitic Rocks in the Boulder Batholith
Near Clancey, Western Montana*¹

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ONE OF THE MAJOR rock types of the Boulder batholith of western Montana consists essentially of potash feldspar and quartz and exhibits a variety of textures. This rock type has been called aplite in previous papers by Weed (1897, 1901, 1912), Barrell (1901), Knopf (1913), Billingsley (1916), and Pardee and Schrader (1933). The textural complexity and the alaskitic composition have been noted by most of these workers, but the rocks have not been described in detail except at Elkhorn (Barrell, 1901). It is believed that the textural complexity of these rocks warrants further description. The alaskitic bodies herein described are in an area west of Clancey, Jefferson County, Montana, which was mapped during the 1950 field season as part of a detailed study of the ore deposits in and around the Boulder batholith by the U.S. Geological Survey.

The term aplite has been attributed to Retz (Johannsen, 1931). Originally the term was used for fine-grained granites composed of only feldspar and quartz. Johannsen (1931, p. 241) states that, "As the term is now used, aplites in the narrow sense are fine-grained diaschistites with very little dark constituents and with a peculiar saccharoidal texture. There are aplites belonging to each of the principal rock groups—thus, alaskite-aplite, granite-aplite, diorite-aplite, etc. When used alone, the word is generally taken to mean granite-aplite." Aplite sometimes has been used in a somewhat broader sense; *e.g.*, the texturally complex alaskites near Clancey were called aplites in the previous papers on the Boulder batholith cited above. The term aplite, however, according to Johannsen and other petrologists, has a rather strict textural connotation.

The name alaskite was originally proposed by Spurr (1900) for plutonic rocks composed of alkali feldspar and quartz with very sparse dark minerals. Normal alaskites differ from granites only slightly in that the alaskites contain small quantities (less than 5 per cent) of ferromagnesian minerals, and the plagioclase is albite (Johannsen, 1931). Thus, the term alaskite, as originally defined, had a strict compositional connotation.

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General Geology

The geology of the Clancey area, Montana, is described in a previous paper (Roberts and Gude, 1951). The following is a brief summary of the geology. The principal rock type of the Boulder batholith in this area is a medium-grained equigranular quartz monzonite (Knopf, 1913). This quartz monzonite is cut by younger alaskitic rocks that occur as plugs, dikes, and gently dipping sheetlike masses. Andesite and dacite porphyries also cut the quartz monzonite as plugs and nearly vertical dikes. One dacitic dike cuts an alaskitic body about a mile south of Clancey. Previous workers have assigned the aphanitic rocks to the mid-Tertiary. Many breccia and fracture zones that cut the quartz monzonite and the alaskite are cemented by cryptocrystalline silica; but only one occurrence of cryptocrystalline silica cutting dacite porphyry was observed.

The silicified zones are, in general, well exposed, and the alaskitic rocks are moderately well exposed; the quartz monzonite, however, is poorly exposed. Near Clancey, the ridges and peaks are generally underlain by alaskitic rocks or by silicified zones. The larger alaskitic bodies and the quartz monzonite weather to low, rounded outcrops forming a granular detritus. Some of the smaller alaskitic dikes and the silicified zones weather to blocky, angular rock fragments.

Alaskitic Rocks

The alaskitic bodies near Clancey range in size from dikelets about one-eighth inch thick to gently dipping sheetlike masses, which have an areal extent of almost a quarter of a square mile. Knopf (1913) mapped larger masses near Corbin that are as much as several square miles in areal extent. Weed (1897 and 1912) described sheetlike masses of aplite at Butte, and Barrell (1901) described alaskitic rocks in the Elkhorn Mountains. The writer has seen alaskitic rocks similar to those near Clancey at several localities south of the Boulder River, north and west of the town of Boulder, and southeast of Deer Lodge, Montana.

The alaskitic rocks mapped by the writer have been entirely within the borders of the Boulder batholith. Contacts with the coarser-grained batholithic rocks are generally sharp, but the fact that chilled borders of the dike-like bodies were not seen indicates that the quartz monzonite was probably solidified and about the same temperature as the intruding alaskitic rocks.

The alaskite consists essentially of quartz and potash feldspar. A clay mineral, probably kaolin, that appears to have replaced plagioclase locally forms as much as 20 per cent of the aplitic, granitic, and porphyritic facies. The potash feldspars are locally perthitic. Biotite occurs in small amounts,

generally one per cent or less, in the granitic and porphyritic textural facies and locally is a sparse component in the aplitic facies. Small amounts of hornblende, black tourmaline, muscovite, magnetite, hematite, and sphene occur locally with quartz and microcline in some of the pegmatites. About 15 per cent of the potash feldspar in one thin section of alaskite examined under the microscope shows the typical microcline crosshatch twinning, or polysynthetic twinning, according to the albite and pericline laws. One of the unusual characteristics of the alaskite is that the plagioclase is completely altered, whereas the orthoclase is almost always unaltered.

The alaskite is a composite rock of several textural varieties of nearly the same mineral composition—quartz, potash feldspar, and altered plagioclase. Textural facies recognized are aplitic, graphic, granitic, porphyritic, and pegmatitic. Aplite occurs locally as the border facies, but it occurs also throughout the composite bodies. The aplite facies generally grades into alaskite, alaskite pegmatite, and/or alaskite porphyry facies, although some outcrops suggest that the aplite has been crackled and that alaskite porphyry and alaskite cement the aplite fragments. The pegmatites are within the borders of the bodies. Bodies containing the single textural facies aplite are uncommon and small. Meschter (in preparation) reported a small dike several inches thick of the single textural facies aplite. The groundmass of the alaskite porphyry is aplitic and locally appears, megascopically, to be composed entirely of quartz. Phenocrysts of roundish quartz and of euhedral to anhedral feldspar in the porphyry range from sparse to abundant. In some outcrops ragged feldspar phenocrysts and parts of the groundmass appear to have been partly replaced by quartz.

The textural facies appear to be randomly located throughout the bodies. Textural facies grade one into the other over a fraction of an inch to several inches. Individual textural units, especially of the fine-grained aplite, are generally very small—several inches to several tens of feet along the largest exposed dimensions. Some large masses, several acres in extent, that are predominantly alaskite porphyry occur in the area mapped near Clancey. The bulk of the composite bodies appears to have a medium-grained granitic texture.

Neither of the terms, aplite or alaskite, adequately describes these rocks. The composition is alaskitic, and the texture is aplitic, granitic, graphic, pegmatitic, and porphyritic. The texture is much more variable than that of the type alaskites. If the rock is to be named on the basis of hand specimens, then the best name to apply to this texturally complex unit is alaskite.

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