

Granulite facies metamorphosed basic dykes of the Torngat Mountains, Labrador

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SUMMARY. In the Four Peaks region of Labrador Precambrian hornblende granulite facies metamorphosed basic dykes discordantly cross the foliation of garnet-hornblende-pyroxene granulites with sillimanite-garnet-biotite-quartz-feldspar gneiss. Most of the dykes are schistose or banded, but some are massive and undeformed with blastophitic textures. Mineral analyses are given for the equilibrium assemblage in one analysed clinopyroxene-orthopyroxene-amphibole-garnet-plagioclase-quartz blastophitic dyke. Dyke intrusion occurred after formation of the host rock foliation, while the metamorphism was about 1400 Myr ago.

IN northern Labrador several metamorphosed basic dykes of unusual character have been mapped within banded granulites and gneisses of Proterozoic age. The dykes have been variably modified by granulite facies metamorphism and deformation and may be massive and undeformed with blastophitic texture, weakly schistose, or foliated with augen structure or lenticular banding. Whereas unaltered diabase dykes are locally abundant in Proterozoic rocks throughout much of northeastern Quebec and northern Labrador (Taylor, 1969), the metamorphosed basic dykes outcrop only to the south of Four Peaks ($59^{\circ} 31' 18''$ N., $64^{\circ} 01' 20''$ W.), in the Torngat Mountains of Labrador.

Proterozoic granulites south of Four Peaks are irregularly banded, basic, intermediate, and acid and of non-migmatitic aspect with a totally 'healed' cataclastic texture. A little garnetiferous granitic gneiss occurs in these hornblende granulite facies rocks. Bands of sillimanite-garnet-biotite-quartz-feldspar gneiss, invariably with pronounced cataclastic textures, are also present. The granulites vary considerably, but are garnetiferous and contain orthopyroxene with or without diopside, hornblende, biotite, quartz, microperthitic microcline, and slightly antiperthitic plagioclase. Slight retrogressive metamorphism is indicated by altered hypersthene and minor reaction rims of hornblende surrounding both pyroxenes.

Undeformed blastophitic dykes. Northeast trending granulites, 6.5 km south of Four Peaks ($59^{\circ} 28' 00''$ N., $64^{\circ} 00' 30''$ W.), are cut discordantly by four east-southeast trending metamorphosed basic dykes that range in thickness from 0.5 m to 6 m. The dykes are massive with undisturbed sharp margins against banded granulites and show no evidence of chilled contacts, foliation, or schistosity, being blastophitic, as defined by Johannsen (1939), and containing 5 mm garnets and andesine laths set in a finer grained matrix (fig. 1). The dykes contain andesine-diopside-hypersthene-

hornblende–garnet (Table I) with minor opaques and biotite and accessory quartz and apatite. The An_{45} is twinned, highly zoned, and slightly clouded by dust-sized inclusions. Garnet does not form coronae, but aggregates of distinct poikiloblasts including opaques, diopside, hypersthene, and quartz. Hypersthene tends to form a plexus of small grains surrounded by subidioblastic brown-green hornblende. Diopside is often associated with, or included within, garnet and has stable grain boundary relationships with plagioclase, hypersthene, and hornblende. Textures indicate stable association of plagioclase–diopside–hypersthene–hornblende, garnet, and quartz.

Deformed dykes. A slightly deformed 3 m thick dyke of plagioclase–diopside–hornblende–garnet rock cuts across the southeast trending foliation of garnet–hornblende–pyroxene granulites approximately 6.5 km southwest of Four Peaks ($59^{\circ} 28' 15''$ N., $64^{\circ} 03' 45''$ W.). The contact with the country rocks is sharp and marked by a concentration of poikiloblastic garnet crystals. Small apophyses of the dyke, though schistose, are apparently undisturbed. The schistosity of parallel 2 mm long plagioclase laths is parallel to the contact. Garnet tends to be concentrated in thin lenses and bands that, in apophyses, are orientated at an angle to schistosity in both dyke and country rocks. A few plagioclase laths up to 12 mm long are scattered throughout the dyke. At the above locality a highly deformed, foliated, metamorphosed dyke cuts sharply across the granulite foliation. It has prominent augen-like aggregates and lenticular bands of poikiloblastic garnet, which parallel the internal foliation. A partially recrystallized cataclastic texture is present in this plagioclase–diopside–hornblende–garnet rock.

The composition of undeformed blastophitic dykes. Such dykes are similar in chemical composition to typical basalts (Table I) and as they have an olivine-normative character, with normative hypersthene, but lack normative nepheline they are tholeiitic according to Yoder and Tilley (1962). However, the high K_2O and TiO_2 content suggests a transitional type between olivine tholeiite and olivine alkalic basalt according to the averages of Manson (1967), whereas Poldervaart's (1964) criteria indicate an alkali basalt type with some normative hypersthene.

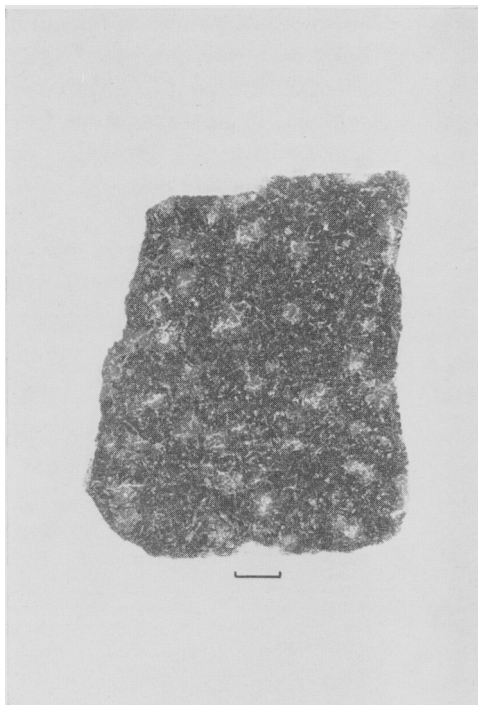


FIG. 1. Analysed sample of undeformed metamorphosed blastophitic dyke rock showing aggregates of garnet and laths of plagioclase. Bar scale = 1.0 cm.

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