
Chapter 14 Vementry Granite

Field relationships

Granite crops out in the north-eastern part of the Island of Vementry, where it occupies an area of a third of a square mile (0.85 km²) (Plate 24). Its outcrop may, however, continue northward under the Swarbacks Minn, possibly linking with the granophyre of Muckle Roe. The Vementry Granite, which forms Muckle Ward, 298 ft (91 m) OD, the highest hill on Vementry Island, consists of two lithological types, an outer coarse-grained pink leucocratic quartz-rich granite with a very low proportion of dark minerals, and an inner porphyritic granite composed of quartz and feldspar phenocrysts in a medium-to fine-grained rather darker matrix. The inner granite occupies an area of less than one-eighteenth sq. mile (0.14 km²). Its boundary with the surrounding coarse-grained granite is not everywhere clearly defined, and in one area there is a transitional zone up to 100 yd (90 m) wide.

The granite is intruded into metamorphic rocks of the Vementry and Neeans groups (pp. 39–44) and the junction is everywhere clearly defined. It is best seen in the sea cliffs east of Cow Head, at the eastern end of the granite outcrop (Plate 23B) where it is very straight, and inclined at 47° to SW with a number of apophyses up to 2 ft 6 in (0.75 m) thick passing into the overlying slightly indurated gneiss. The southern margin of the granite between Cow Head and Suthra Voe, though clearly defined, is not well enough exposed for an assessment of its inclination to be made. At the head of Suthra Voe, a 100 to 150 yd wide (90–135 m) tongue of granite extends for at least 300 yd (270 m) south-westward from the main granite mass. The western margin of the granite is bounded by a thin band of crush-breccia on the north shore of Suthra Voe, but farther north, close to the head of Northra Voe, it is unaffected by shearing and inclined very steeply to the south-west. Chilling of granite against gneiss is confined to a 1-ft (30-cm) wide zone, in which the normal coarse-grained granite becomes porphyritic, medium- to fine-grained. Effects of induration in the adjoining rocks are not marked (see p. 58).

Crush belts and jointing

The Vementry Granite and adjoining metamorphic rocks are traversed by a number of crush belts and the granite has strong joints. Many of these give rise to strong linear depressions inland and deeply cut geos along the coast. In the western part of the outcrop the mean trend of the major joints is N30°E to N40°E with inclinations of 60°–65° to the south-east. In the central part of the outcrop their trend is more variable but mainly between N20°E and N10°E. In the east the predominant joint direction is N35°W to N40°W, with a large number of closely spaced near-vertical joints developed north of Cow Head and in the Holms of Uyea Sound. North-easterly cross joints, are, however, also present in the Cow Head peninsula, while in the western part of the outcrop particularly on the west and south-west slopes of Muckle Ward and the east shore of Northra Voe there is a suite of closely spaced N40°W-trending minor joints which are steeply inclined to the north-east but do not form major topographic features.

Petrography

Outer Granite

The outer granite (S50139), ([S30737](#)) [HU 307 610], ([S30734](#)) [HU 294 614] is a characteristically pale pink coarse-grained rock, with prominent quartz and generally a lower proportion of dark ferromagnesian minerals than the typical Sandsting Granite. In thin section it is composed of up to 70 per cent feldspar and 30 per cent quartz.

Potash Feldspar

Approximately 70 per cent of the feldspar occurs as large anhedral crystals of microperthite which range in diameter from 5 mm to 1.2 mm with an average size of 1.8 x 1.6 mm. In the microperthite the exsolved sodic plagioclase most commonly takes the form of irregular branching, roughly parallel rods and ribs which in some instances form a reticulate network. The rods average 0.03 mm in width. Some microperthite has a replacement texture, consisting of irregular

linked blebs of sodic plagioclase with closely spaced albite twinning in potash feldspar. Individual replacement blebs reach a maximum size of 0.15 x 0.1 mm.

Plagioclase

Plagioclase is mid- to sodic-oligoclase and forms about 30 per cent of the total feldspar. The crystals are platy, euhedral to subhedral, with an average diameter of 0.8 mm and a maximum of 2 mm. The smaller plagioclase crystals are commonly totally enclosed in perthite.

Quartz

Quartz forms rounded to subrounded crystals, which are usually grouped in clusters and range in diameter from 2.5 to 0.8 mm. There are no liquid inclusions as in the quartz of the Sandsting Granite. Margins of quartz crystals vary from straight to irregular and are rarely serrate. Locally a thin vein of secondary quartz, composed of minute acicular crystals whose axes are perpendicular to the length of the vein, is developed between the crystals of quartz and microperthite and more commonly between adjacent microperthites. The maximum widths of these veinlets is 0.6 mm and in some specimens incipient graphic texture is developed along the junction with microperthite.

Ferromagnesian minerals

Ferromagnesian minerals are usually subordinate, consisting mostly of irregular wispy crystals of strongly pleochroic biotite, locally associated with chloritic patches, and small clusters of subhedral grains of the ore minerals, ilmenite or pyrites ([S30712](#)) [HU 294 605].

Accessory minerals

Accessory minerals are very rare. Rutile forms small euhedral crystals. Finlay (1930, p. 687) has recorded fluorite in the granite, but this has not been confirmed.

Vementry Granite

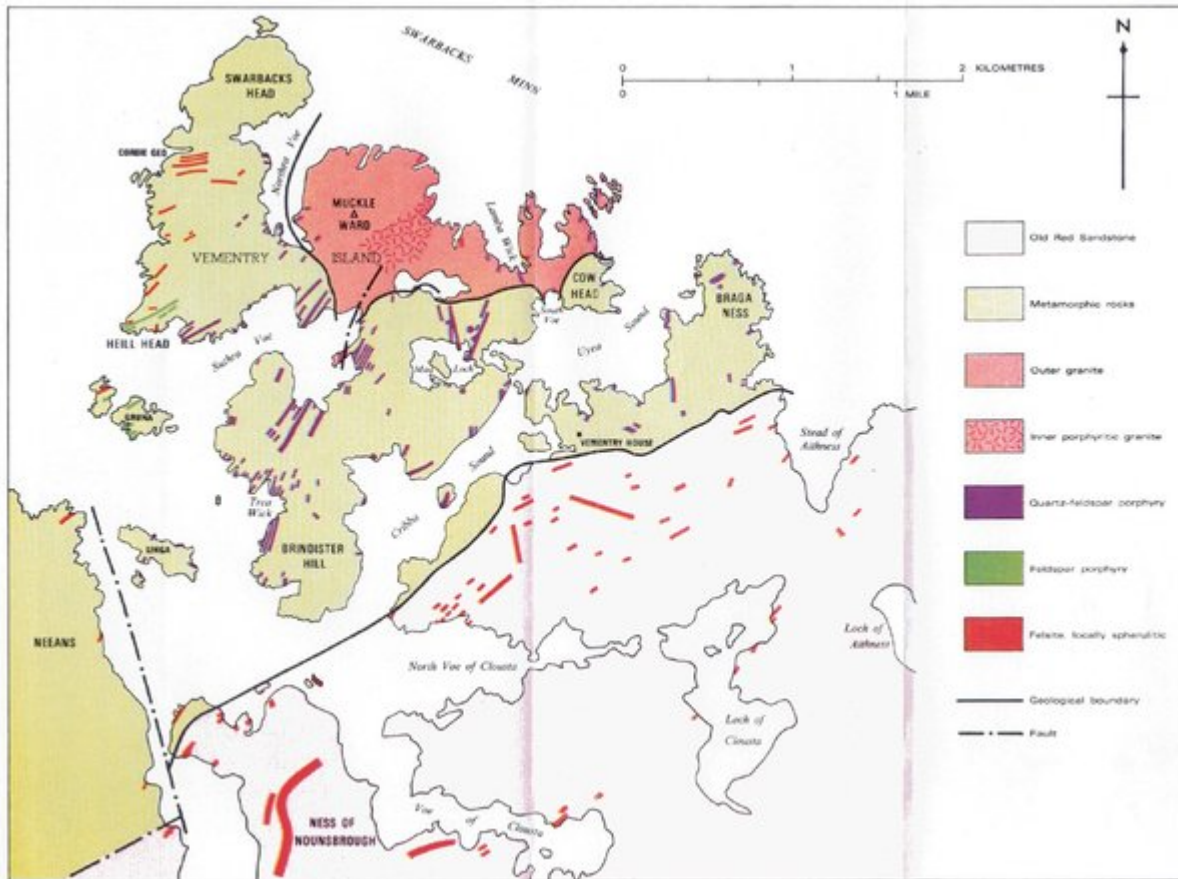
The Vementry Granite differs from the typical Sandsting biotite-granite in its relative lack of ferromagnesian minerals, the absence of apatite and sphene and the complete lack of liquid inclusions in the quartz. The presence of secondary quartz between adjacent microperthites has not been recorded in the Sandsting Granite. There is, however, a very wide range in composition and texture within the Sandsting Granite, and the Vementry Granite corresponds most closely to the coarse quartz-rich varieties from the eastern part of the Sandsting Complex.

Inner Porphyritic Granite

The inner granite of the Vementry Complex ([S30713](#)) [HU 296 607] consists of feldspar and quartz phenocrysts set in a fine-grained matrix. There is a slightly higher proportion of dark minerals than in the outer granite. Phenocrysts form about 40 per cent of the total volume of the rock. Of these, 60 per cent are micro-perthite and untwinned orthoclase, the former reaching 4 mm in diameter; 20 per cent are quartz which is up to 1.7 mm in diameter and about 10 per cent are smaller phenocrysts, up to 0.9 mm long, of cloudy sodic-oligoclase. There are also some clusters of strongly pleochroic biotites, up to 1.3 mm long. The texture of the microperthites is more irregular than in the coarse-grained granite, and the exsolved phase consists of irregular rods which show little sign of orientation. Commonly plates of microperthite are clustered into groups about 5 mm in size, with adjacent crystals separated by thin veinlets of crystalline quartz.

The matrix is formed of roughly equidimensional grains of quartz (50 % to 60% of volume), microperthite (30 %) and plagioclase (about 10 %), the grain size ranging from 0.3 to 0.15 mm. In some areas, however, quartz is interstitial, forming highly poikilitic patches up to 0.6 mm in diameter. Irregular scattered grains of opaque minerals (mainly ilmenite-leucosene) are usually associated with biotite, and there are also isolated small euhedral crystals of allanite.

Reference



(Plate 24) Vementry Granite and related acid minor intrusions.



(Plate 23B) East shore of Cow Head, Vementry Island [HU 309 607]. Straight clean-cut junction between Vementry granite (pale) and metamorphic rocks. (D904).