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## Excursion 13: Drumadoon and the Tormore Dykes

((Figure 17), localities 1 to 9)

The object of this excursion is the examination of the composite dykes and other intrusions which abound on this stretch of shore. It can be carried out by public transport from the main centres on the east side of the island. If private transport is used it will be found convenient to arrange for collection at the appropriate terminal point, especially if another excursion is to be made on the same day.

The Tormore shore is reached by the track which runs westwards from the main road at the old post office (grid ref. [NR 894 325]). The route follows the raised beach southwards past the houses.

1. [NR 8904 3265] The foreshore and raised beach cliff are eroded in sandstones which occupy horizons which are probably low in the Triassic succession of Arran. These sandstones are often strongly cross-laminated and careous weathering is locally striking. Irregular distribution of carbonate cementing material leads to hard, rough-weathering bands alternating with soft red sandstones and siltstones. Pseudomorphs after halite and dendritic gypsum are recognisable in places.

2. [NR 8868 3215] Along this stretch of shore numerous dykes outcrop including the composite dykes made famous by Judd (1893). The finer points of the petrography of these interesting intrusions can only be studied in the laboratory but the constituent rock-types are sufficiently diverse to enable adequate field determinations to be made. These types are pitchstone, felsite, quartz-feldspar-porphyry (quartz-porphyry of the 1:50,000 Geological Map) and dolerite (generally the tholeiitic variety). In the case of the dykes described by Judd the Roman numerals used by him have been appended to (Figure 17).

The most northerly pitchstone, although it enclosed areas of felsite, was not considered by Judd to be composite. Contrary to the information given in the Arran Memoir (Tyrrell 1928, fig. 30, p. 219) it forms a conspicuous feature on the foreshore. It is rather irregular in thickness and hade being some 5m thick at H.W.M., and it runs ENE–WSW. The predominant rock-type is a dark-green pitchstone.

Near H.W.M., a dyke (Judd I) of similar rock, about 4.6m thick and coursing generally N–S, can be examined readily. The mutual relations of these two intrusions are obscure.

Judd's dyke II consists of a central quartz-felsite 4.5 m or so thick, bounded by spheroidally-weathering tholeiites 1.2 and 1.8m thick on the north and south margins respectively. Judd records the felsite passing in places into "pitchstone-porphyry or 'vitrophyric' rock" which is stated to occur "as a band varying in width from 15 to 60 cm, sometimes forming part of the quartz-felsite mass and at other times intersecting the masses of andesite" (i.e. tholeiite).

Some 55 m south of intrusion II two dykes appear to intersect: they have irregular courses before diverging as they cut the cliff.

A short distance farther south a NW–SE dyke (Judd's No. III) shows pitchstone 1.2 to 1.8 m thick, on the north side of a thick dolerite. In this case the dolerite is an olivine-dolerite of a common Tertiary type and not of the tholeiitic type usually found in association with pitchstone and felsite. It is possible, therefore, that the association of rock types in this case is fortuitous and that the dyke is not really composite in the accepted sense.

South of dyke III and above H.W.M., the N–S trending pitchstone (Judd I) reappears. It now has a marked eastward hade. Southwards it swings round towards the south-southwest its dip gradually decreasing. By the development of felsic modifications and the presence of thin, generally rotted, marginal tholeiite, the intrusion becomes composite. The pitchstone is dark-green in colour; flow-banding is strikingly displayed, especially in dislodged blocks on the shore.

3. [NR 8834 3109] At An Cumhann a 27m composite dyke (No. IV) of quartz-feldspar-porphyry and tholeiite makes a strong feature. This body shows to advantage all the features of porphyry/tholeiite intrusions, i.e. the marginal tholeiites with xenocrysts and the zone of darkened porphyry grading into normal grey or yellowish porphyry with abundant phenocrysts of quartz and feldspar. Basic dykes and sheets cut the porphyry and the whole intrusion is traversed by a NW–SE trending dyke to the south of the headland.

At low-water passage along the shore is possible. At high-water the cliff top should be gained either by a short scramble over porphyry or by ascending by way of a path of sorts up a little spur a short distance north of the conspicuous high face of porphyry. In either case a little care is necessary. The shore is readily regained by descending along an obvious gully eroded in the eastern marginal tholeiite. Should this excursion be made from south to north the descent from the cliff top, if necessary, should be made with great care.

South of An Cumhann the cliff has been hollowed out into caves, cut during Postglacial Raised Beach times. The rocks are sandstones, mainly grey or yellowish; beds of red sandstone also occur.

The largest of the caves, known as King's Cave, is now in the charge of the Department of the Environment and is closed by a railing. The cave gets its name from the legend that it sheltered King Robert the Bruce when he was hiding in Arran. The name of Fingal has also been associated with it. Apart from the carvings on the wall it seems to have yielded little of archaeological or antiquarian interest.

4. [NR 8839 3070] A short distance south of the caves there is a recess in the cliff the north side of which shows sandstones surmounted by a thick sill of felsite which is mostly deeply weathered to sandy material, red and yellow in colour. This sill is covered by sediments which are topped by a sill of pitchstone. Pitchstone is seen again at several points in the recess and, most readily, at the base of the conspicuous knoll on its south side. Somewhat devitrified pitchstone forms a low cliff below the footpath here. For some distance to the south a felsite-pitchstone sill forms a feature at or near the top of the cliff.

The junction between the Lamlash Beds and the Auchenhew Beds is almost certainly a fault running NW–SE along the line of a little stream in the recess as noted by Tomkeieff. It can readily be appreciated that the sediments to the north are predominantly sandstones while to the south of the recess siltstones and other fine-grained sediments, generally referred to in the literature on Arran as marls, figure largely.

Between the recess and Cleiteadh nan Sgarbh the shore shows good exposures of the Auchenhew Beds. Here, these are red and green marls with thin sandstones. A few small faults can be traced and three basic dykes cross the shore, two having considerable hade to the northwest, and a third, the most southerly, showing good exfoliation. Fallen blocks at the foot of the cliffs show a range of dessication features and trace fossils.

5. [NR 8841 2992] The promontary of Cleiteadh nan Sgarbh is formed of thick dykes of quartz-feldspar-porphyry and felsite associated with marginal tholeiitic dolerites. The acid rocks are 15.5 m and 9 m thick respectively; both intrusions appear to have to the east. As they approach H.W.M., they swing round to the southeast, cross the raised beach and are last seen cutting the cliff. Near H.W.M. they are cut by an E–W dyke of dolerite. To the north of this dyke the porphyry is cut by an inclined sheet of dolerite which does not cut the felsite. The latter rock shows flow-banding; on weathering it takes on bright-red and yellow colours and locally looks deceptively like a sandstone. The porphyry is, as usual, darkened and xenolithic against the marginal dolerites.

6. [NR 8850 2939] The track which leads up from the raised beach should be taken to the north end of the Drumadoon cliff, thereafter the path along the talus slope under the cliff should be followed. From it the marly sediments underlying the sill, and also the basal parts of the Doon intrusion can be examined. The lowest member of the sill is a thin sheet of tholeiite above which rises columnar quartz-feldspar-porphyry in a sheer cliff some 25 to 30m high. The lower levels of the porphyry are darkened and rich in xenoliths of dolerite which tends to weather out. This xenolithic porphyry is best examined in the fallen blocks and columns which litter the talus slope and the shore. If the summit of the Doon is visited the thin upper sheet of tholeiite, reported by Tyrrell (1928, p. 200) as being identified by fragments, may be looked for.

7. [NR 8814 2888] The shore west of the south end of the Doon cliff shows an east-west vertical margin of the composite intrusion. As usual marginal tholeiite is present, against darkened porphyry on one side and baked sediments on the other. Just to the north of the main contact a thin porphyry-tholeiite dyke runs off into the sediments on the shore.

The main porphyry makes an extensive spread on the foreshore southwards to Drumadoon Point. It is cut by several basic dykes against some of which the acid rock is in a better state of preservation than usual.

At Drumadoon Point the eastern margin of the intrusion can be examined. Here the tholeiite margin fades eastwards and contributes, in places, to an igneous breccia having a matrix of yellowish porphyry.

8. [NR 8847 2860] At this locality a dyke of quartz-feldspar-porphyry runs out to sea in a SSW direction. Its eastern margin is dark. The continuation of this dyke to the north, again with a dark eastern margin, makes a conspicuous feature on the golf course. This intrusion has been held to continue northwards along the east side of the Doon mass, perhaps acting as a feeder to it, and to connect with the porphyry of Cleiteadh nan Sgarbh, possibly even reappearing at An Cumhann.

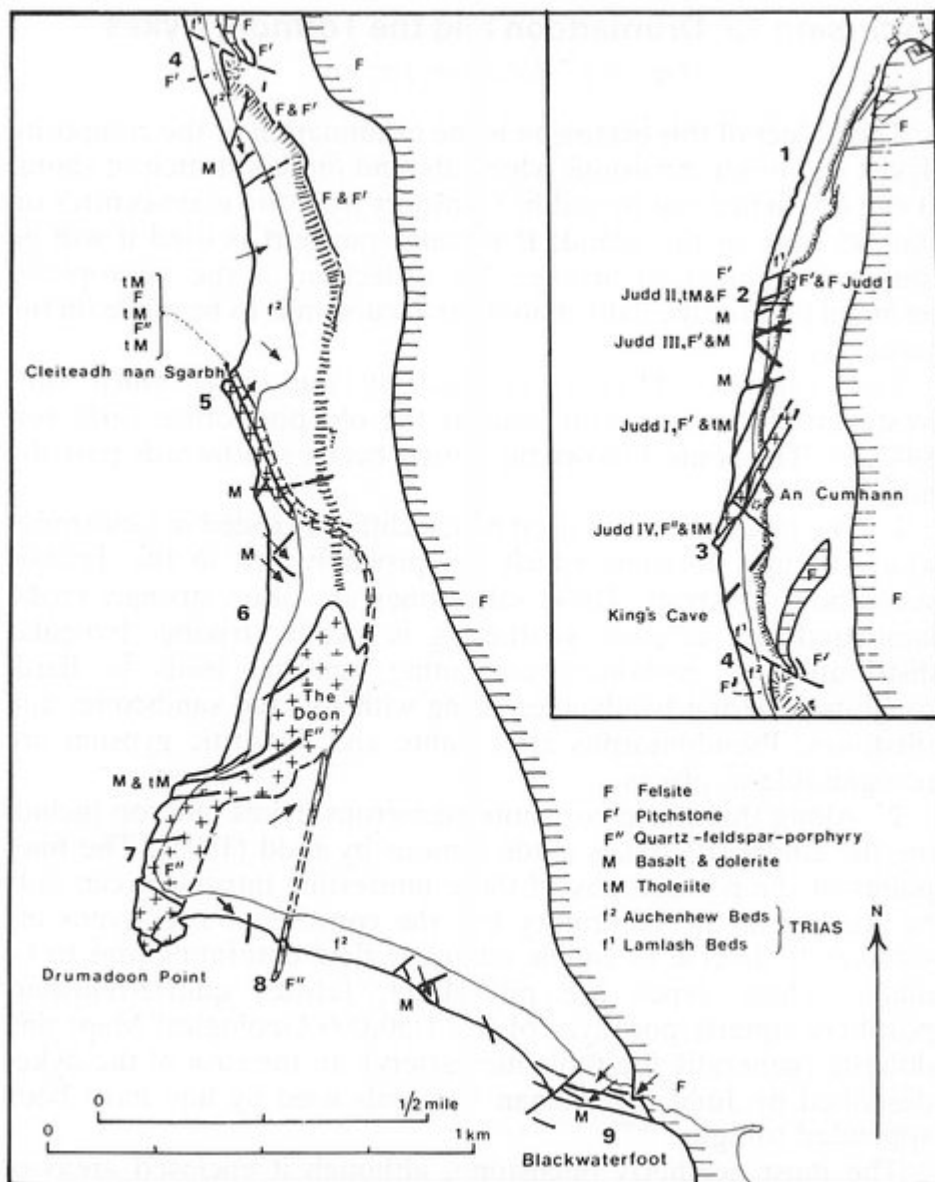
In passing it should be noted that the golf course is laid out on blown sand as is often the case in coastal courses. These sands terminate inland against a raised beach cliff of marly sediments and intrusive rocks.

9. [NR 8925 2827] The shore south of the Club House shows marls and sandstone cut by numerous basic dykes. Traced to the east the dip of these sediments increases until it reaches 50° against the near-vertical margin of the Blackwaterfoot–Torr Righ Mor felsite. At the contact the felsite shows fluxion structures; a little to the east jointing gives it a roughly stratified and, in places, a "rippled", appearance. Elsewhere columnar joints, well seen in the Black Water at the bridge, are developed.

Dykes which trend in the direction of the felsite have irregular courses "as though they were influenced by the proximity of the felsite or found it difficult to penetrate it" (Tyrrell 1928, p. 222 and fig. 32).

Just south of the Club House the remains of two old sea-stacks stand in front of the raised beach cliff. Farther to the southeast the cliff shows a patch of sediments with columnar felsite to the west, and on its east side felsite again, but now with joints disposed in an asymmetric arch. This feature was noted and figured by Bryce (1872). The stacks and arch are situated in private grounds.

## [References](#)



(Figure 17) Geological sketch-map of the Drumadoon-Tormore area to illustrate Excursion 13.