Figures and plates

Plates

(Plate 2) Micro-sections of some typical Arran rocks. Fig. 1. Permian sandstone, old quarries at Corrie. x12. Grains of quartz, felspar and quartzite, the surfaces of which have been rounded by wind abrasion ("millet seed" grains), are coated and cemented loosely by limonite. Fig. 2. Lower Carboniferous Sandstone, south side of String Road, 915m SW of Brodick Church. x13. Angular grains of quartz (dusty with fluid inclusions) and of decomposed felspar and siliceous rock are loosely cemented by clay. Fig. 3. Lower Old Red Sandstone, shore cliff, 800m S of Dougrie. x 11.5. Angular and unsorted grains of quartz (clear), decomposed felspar (grey) fragments of mudstone, igneous rocks and oxidized iron ore are compactly cemented by the fine-grained waste of similar material. Fig. 4. Pebbly grit, Dalradian, near SE end of Creag Ghlas Laggen, North Arran. x 10.5. Fig. 5. Cleaved grit, Dalradian, shore 69m ESE of Loch Ranza pier. x9–5. The rock has been sheared. Quartz and quartzite pebbles have been deformed and ground away until their long axes lie parallel to the schistosity which is strongly developed by parallel orientation of the chlorite and muscovite flakes of the matrix. Fig. 6. Slate, Dalradian, old quarries on hillside 2.4km E of head of Loch Ranza. x 13. The paler and darker bands represent more silty and more clayey alternations of the original strata. Within the paler bands the effect of shearing can be seen in the development of a lenticular schistosity on a microscopic scale. Fig. 7. Pitchstone dyke, Schoolhouse, Brodick. x12. Small euhedral crystals of quartz lie in a matrix of rock-glass from which numerous crystallites of pyroxene have grown. In other parts the rock contains euhedral prisms of zoned plagioclase and pyroxene which are not shown in this figure. (Figure 8). Granite, Glen Rosa. x12. The rock is composed of oligoclase (showing straight cleavage lines), orthoclase (turbid), quartz (clear, with tiny inclusions and cracks), and biotite (dark, with straight close cleavage). A small prism of zircon lies on the left side of the topmost biotite). Fig. 9. Olivine basalt lava, Lower Carboniferous, Corrie shore opposite schoolhouse. x10.5. Euhedral phenocrysts of purplish augite (bottom right) and olivine serpentinized along cracks (centre) lie in a matrix composed mainly of plagioclase laths, augite grains, and iron ore granules.

Tables

(Table 1) The geological systems and rock-formations of Arran.

(Table 2) Quaternary geological events and climate phases

(Table 3) major subdivision of the Carboniferous

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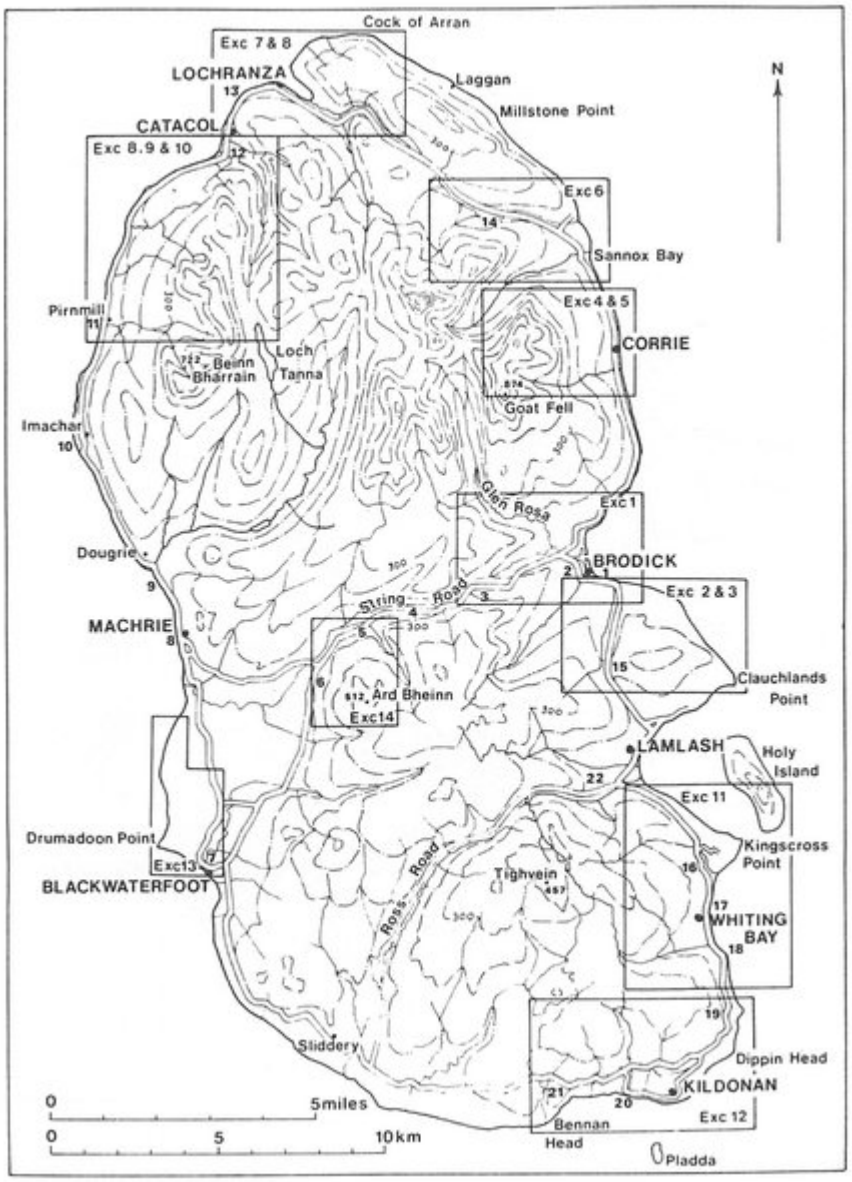
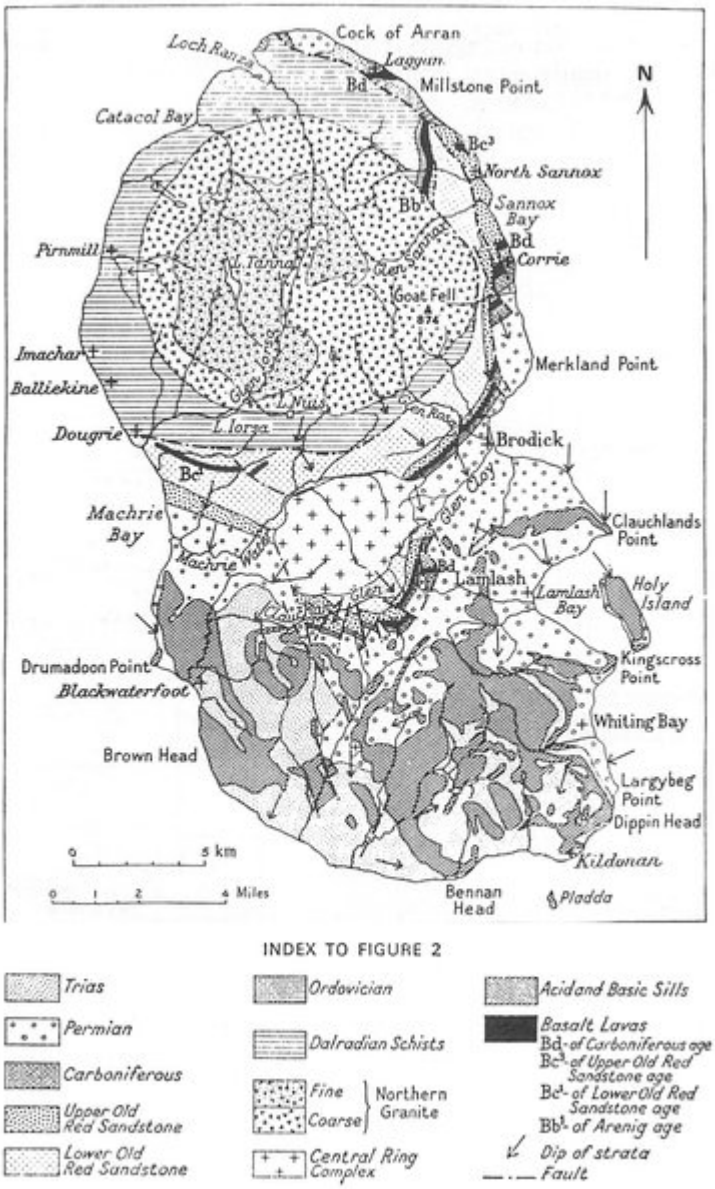
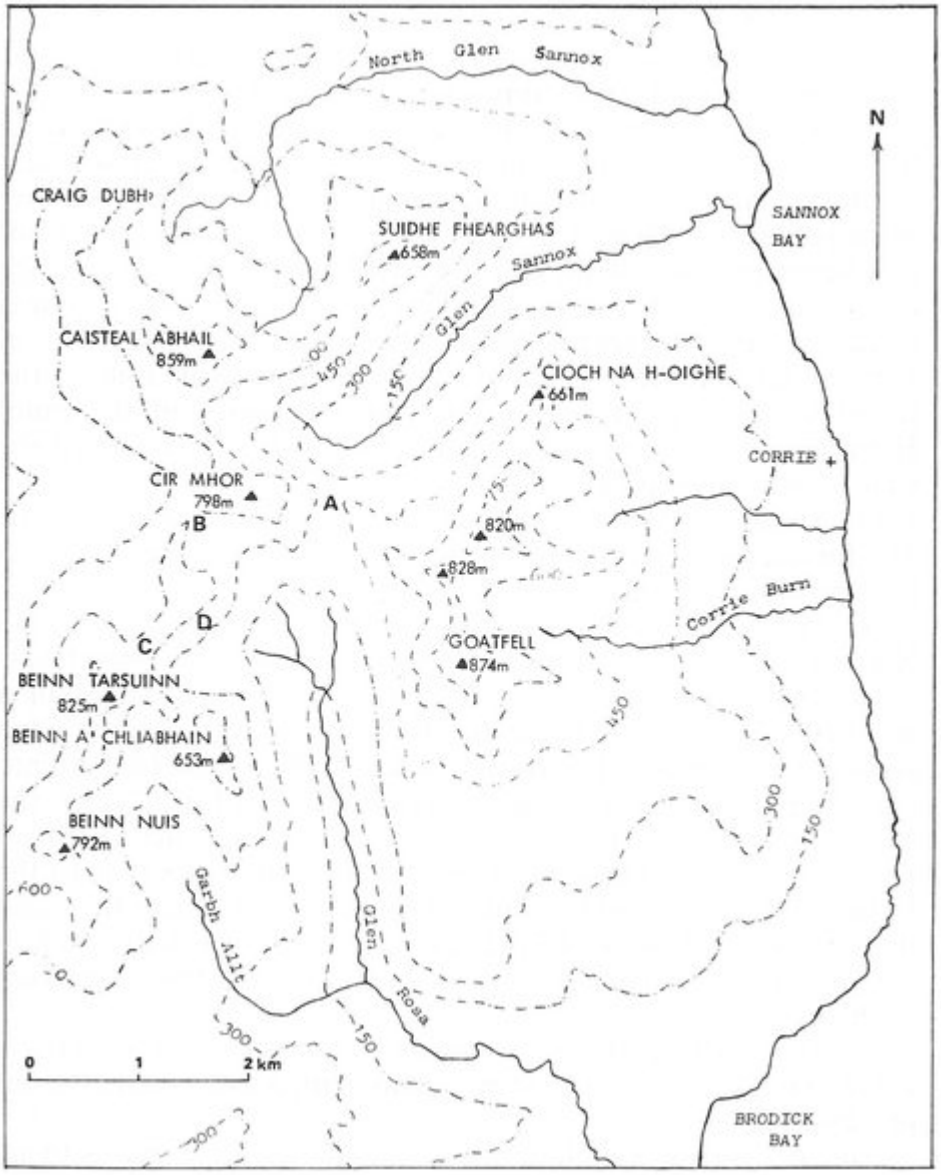
References



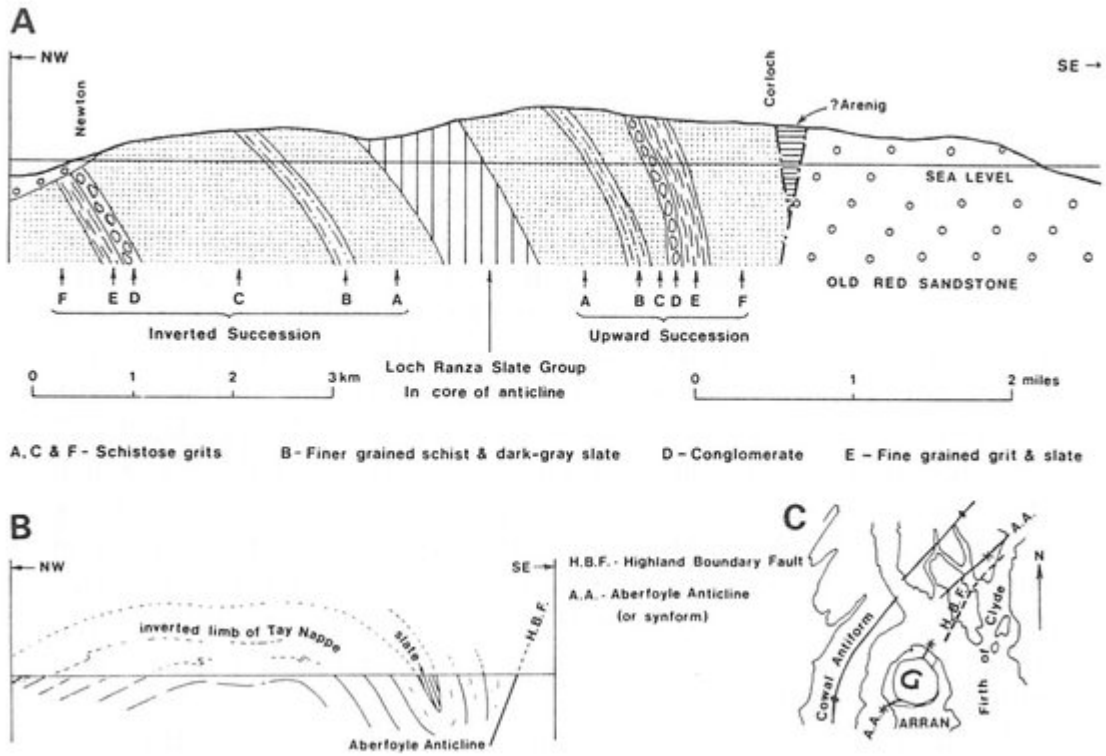
(Figure 1) Simplified physiographic map of Arran showing areas covered by the excursion itineraries. Road log localities indicated by numbers. Contour interval 100 metres.



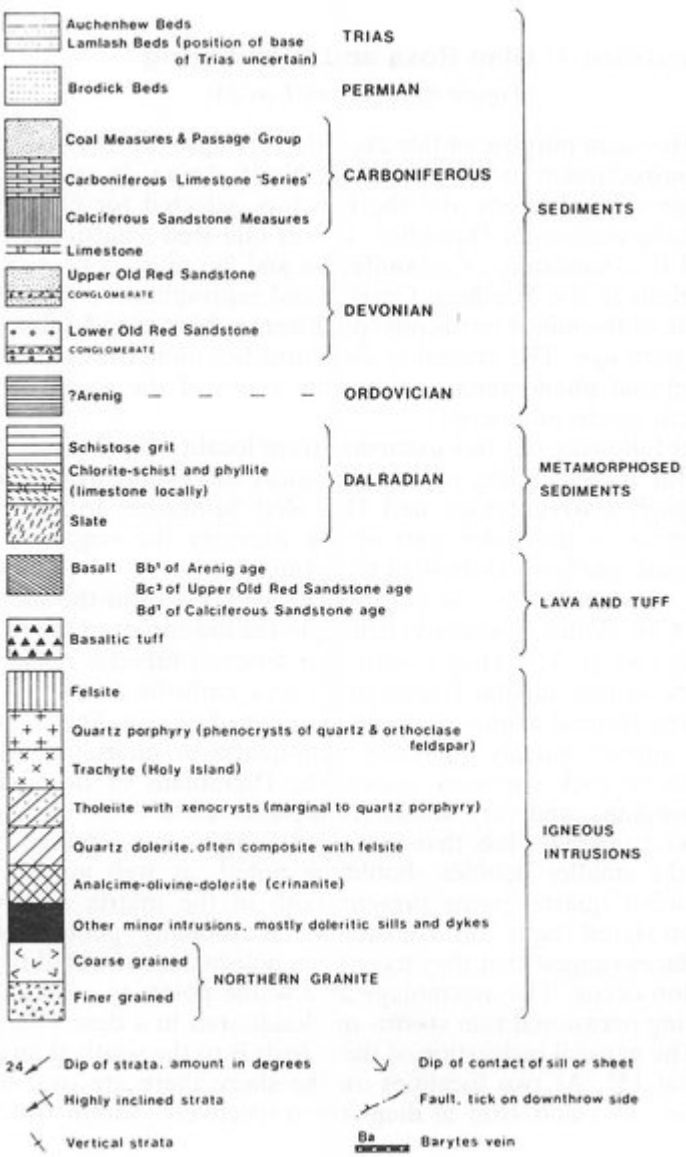
(Figure 2) Simplified geological map of Arran; based on the Geological Survey one-inch map.



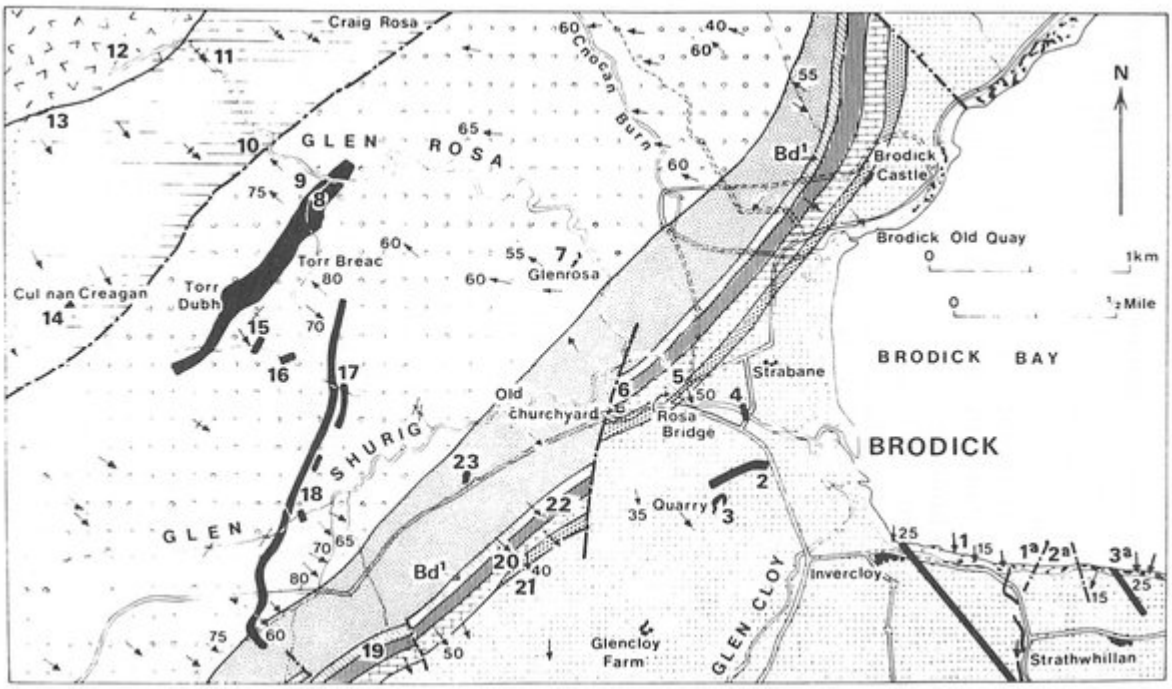
(Figure 3) The granite mountains of North Arran. Contour interval 150m. A. The Saddle. 431 m; B. The Archer's Pass, a little over 610m; C. unnamed pass, about 610m; D. A'Chir ridge, about 713m.



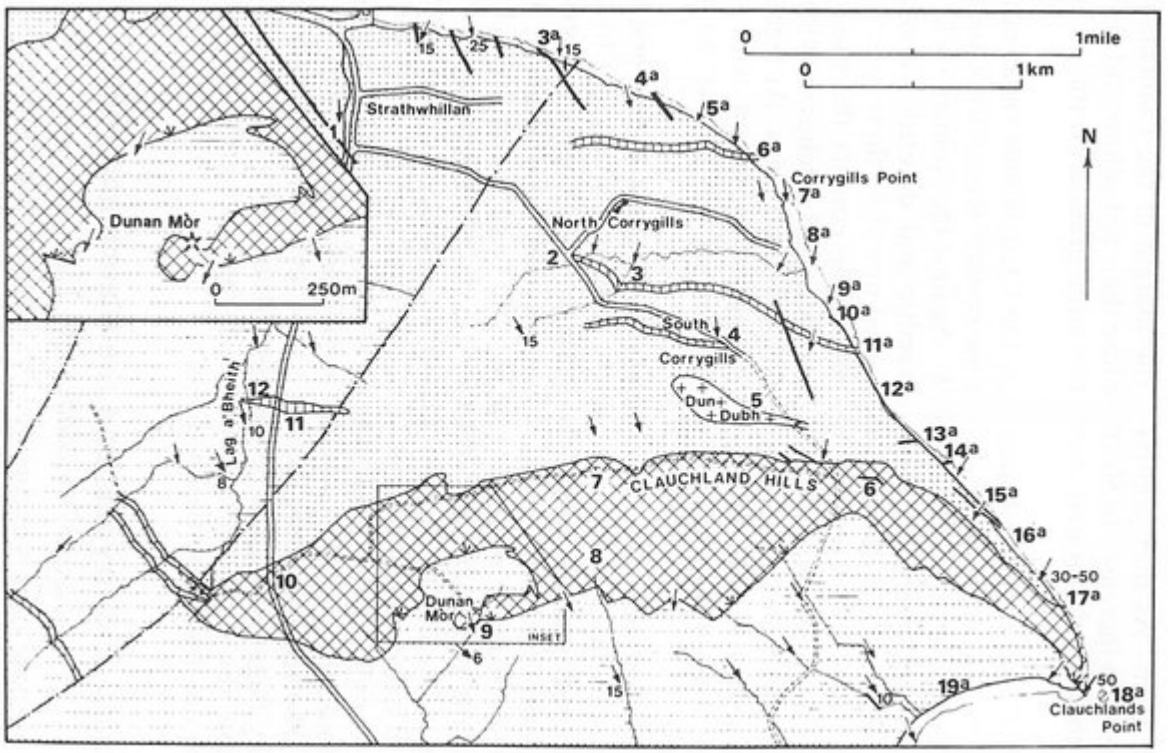
(Figure 4) A, Cross section of Dalradian of North Arran from Newton to Corloch. B. Structural model of the Tay Nappe according to Shackleton (1958). Note the position of the slate at the core of the Aberfoyle Anticline corresponding with the Loch Ranza Slate Group in section A. Length of section B is about 30km. C. Major structures in the Clyde Area. Note how the Aberfoyle Anticline has been distorted by the intrusion of the granite (G).



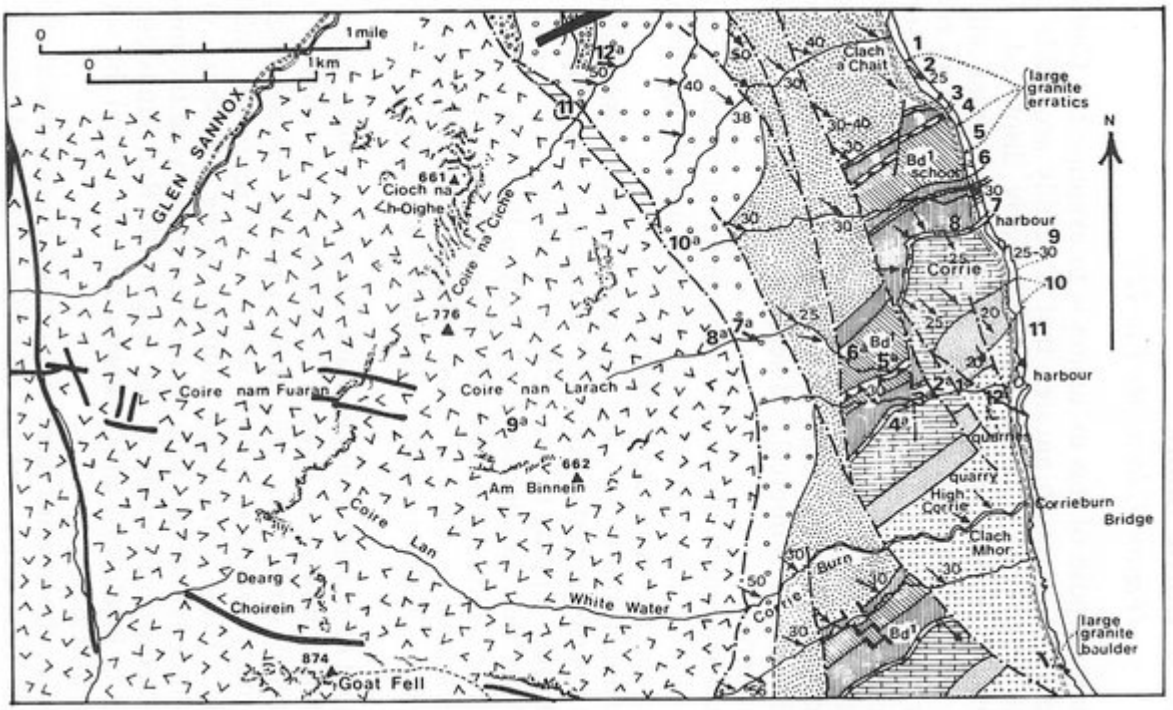
(Figure 5) Index to the geological sketch-maps. (Figure 6), (Figure 7), (Figure 9), (Figure 11), (Figure 13), (Figure 14), (Figure 16).



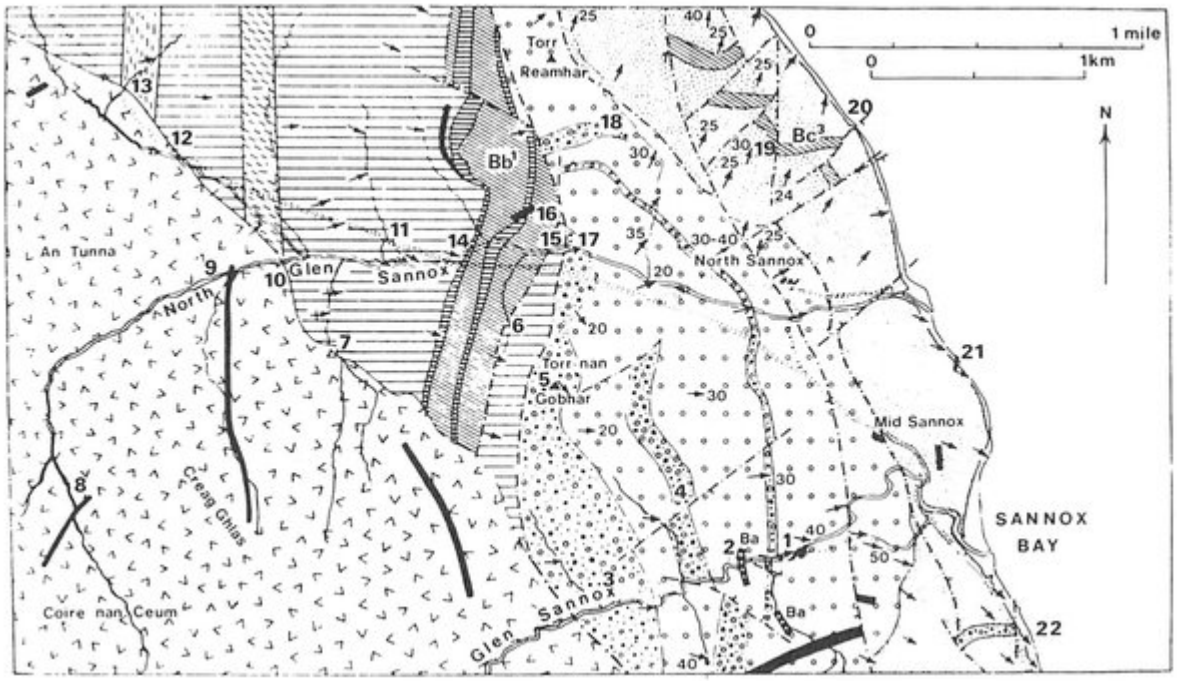
(Figure 6) Geological sketch-map of the Brodick area to illustrate Excursion 1 and part of Excursion 2.



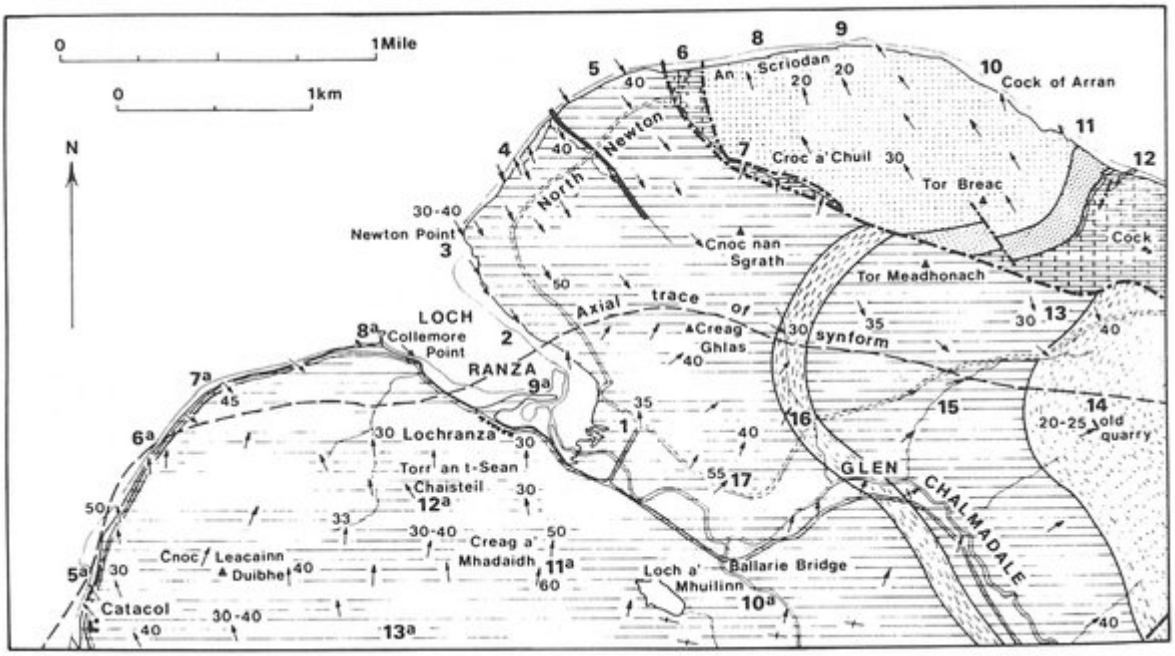
(Figure 7) Geological sketch-map of the Brodick–Lamlash area to illustrate Excursions 2 and 3. For key see Figure 5.



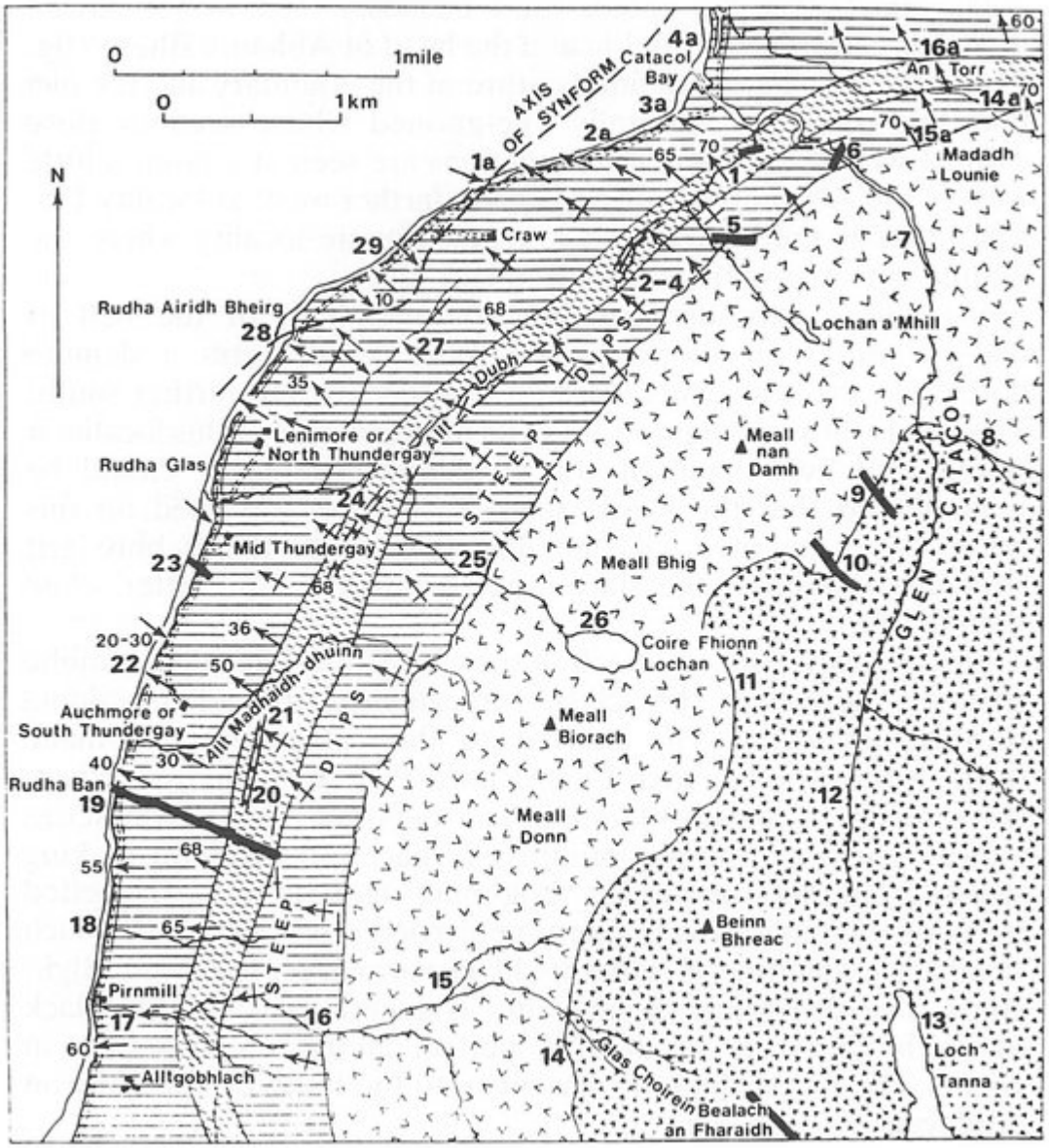
(Figure 9) Geological sketch-map of the Corrie area to illustrate Excursions 4 and 5. For key see Figure 5.



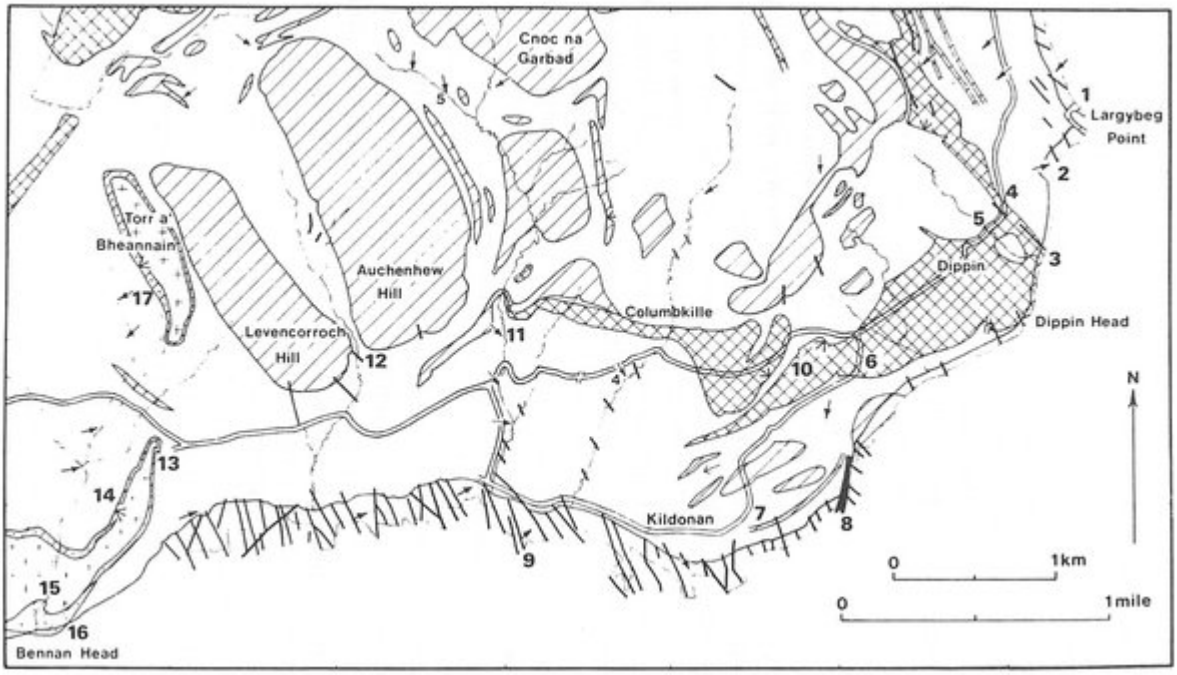
(Figure 11) Geological sketch-map of the Glen Sannox and North Glen Sannox area. For key see Figure 5.



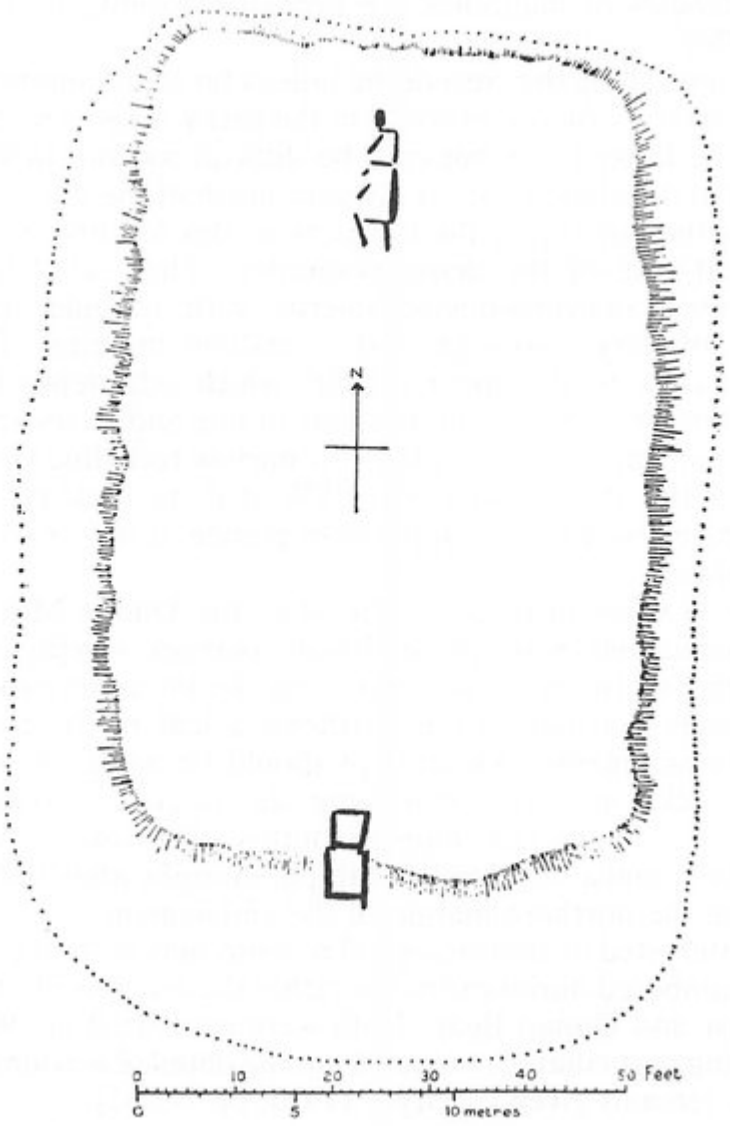
(Figure 13) Geological sketch-map of the Loch Ranza–Cock of Arran area to illustrate Excursions 8 and 9. For key see Figure 5.



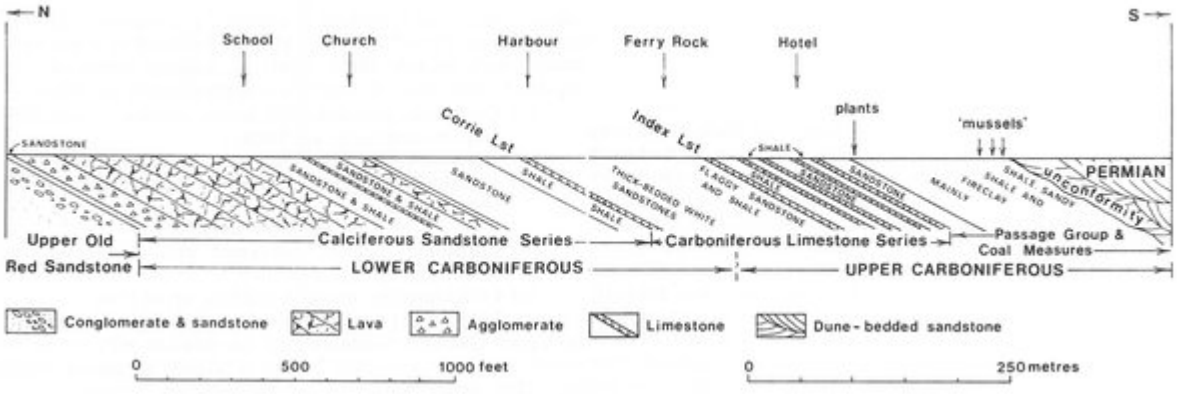
(Figure 14) Geological sketch-map of the Catacol–Pirnmill area to illustrate Excursions 9 and 10. For key to map, see p. 78.



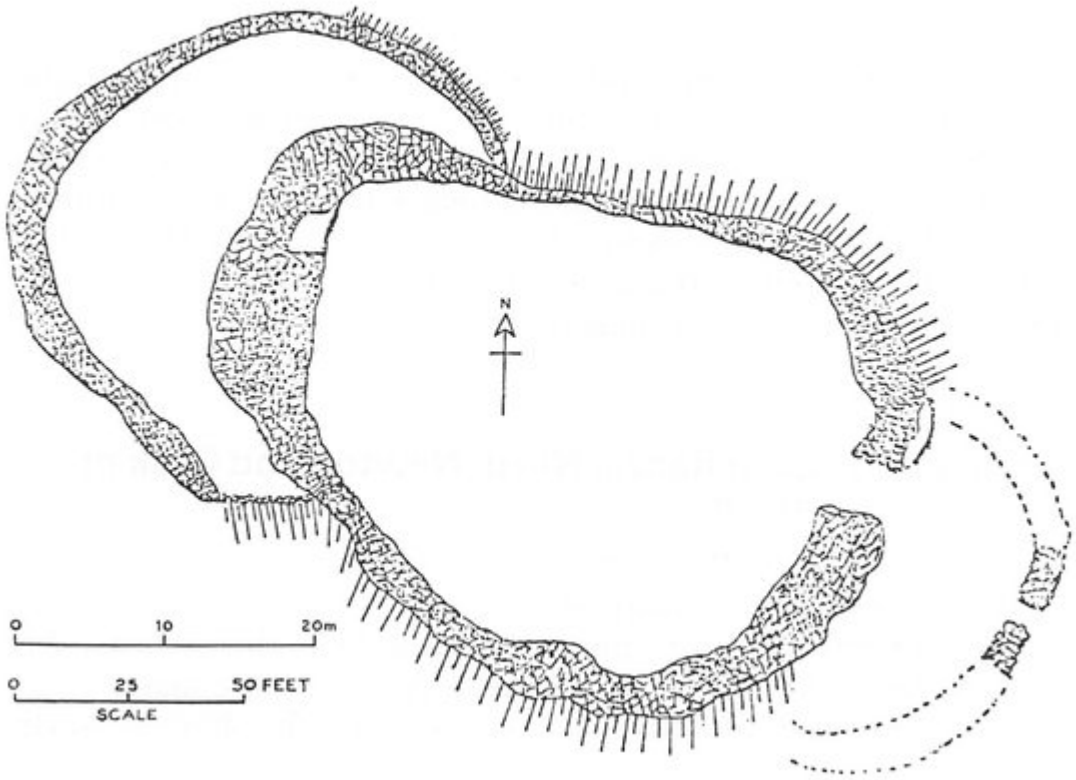
(Figure 16) Geological sketch-map of the Largybeg–Kildonan area to illustrate Excursion 12. For key to map see Figure 5, p. 78. Note that the area occupied by Triassic sediments has been left blank.



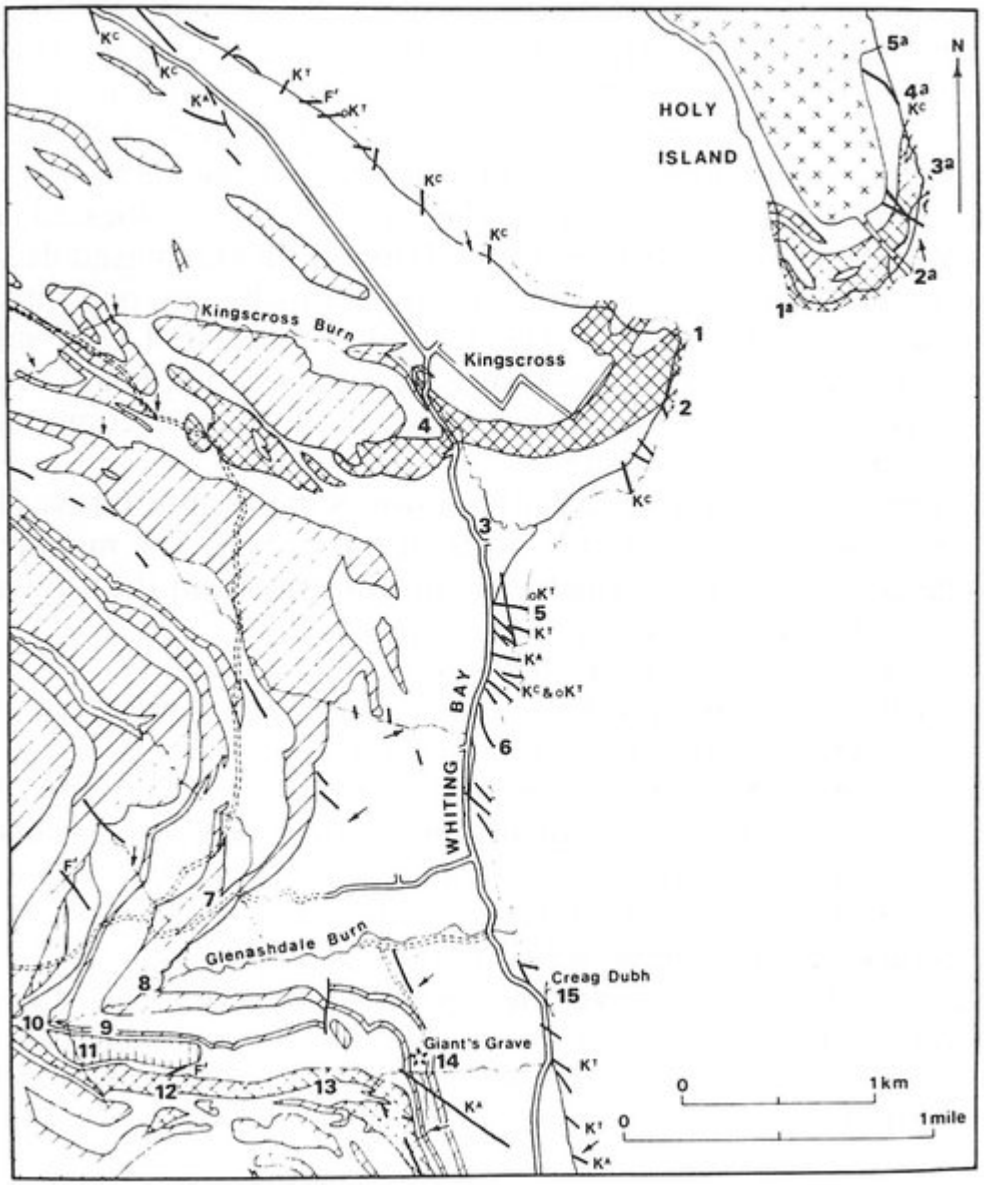
(Figure 8) Plan of Dunan Beag Cairn, Lamlash: from The Book of Arran, 1910. p. 76.



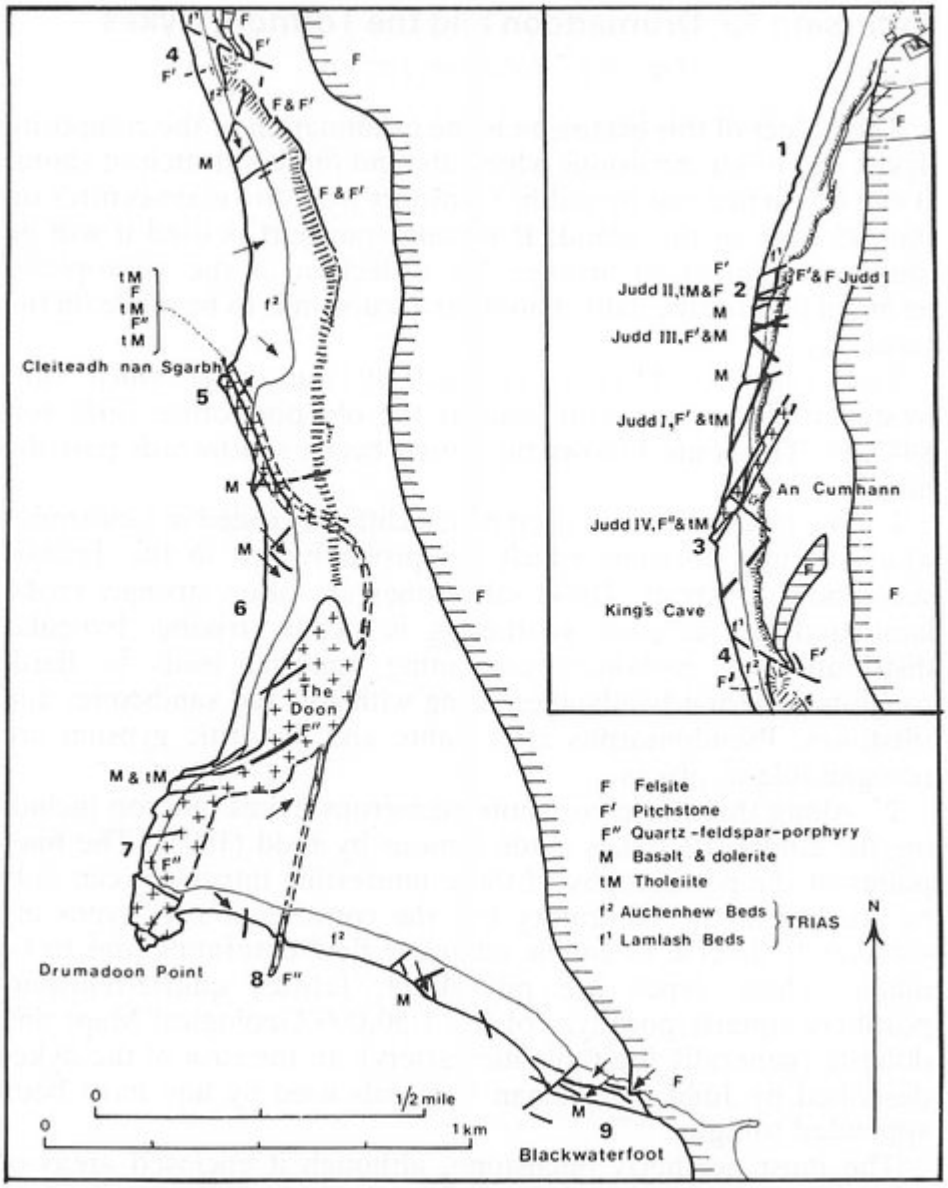
(Figure 10) Diagrammatic cross-section of the rock succession on the Carrie Shore.



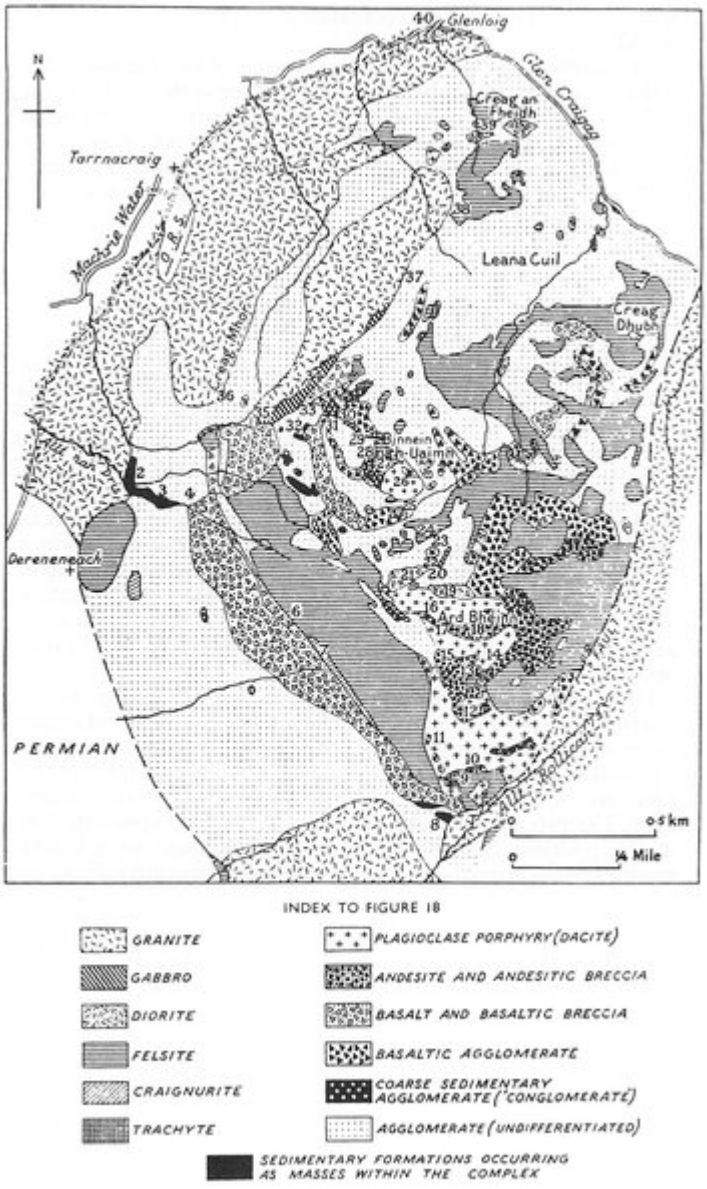
(Figure 12) Plan of the fort at Torr an t-Sean Chaisteil, Sannox; from The Book of Arran, 1910. p. 176.



(Figure 15) Geological sketch-map of the Kingscross—Whiting Bay area to illustrate Excursions 11 and 11a. Note that the Triassic sediments have been left blank. Where indicated the identity of the dykes is as follows: K^C crinanite, K^T tholieiite $^OK^T$ olivine-tholeiite K^A 'andesitic' quartz-dolerite, F^I pitchstone



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



(Figure 18) Geological sketch-map of the area around Ard Bheinn in the Central Ring Complex, to illustrate Excursion 14.

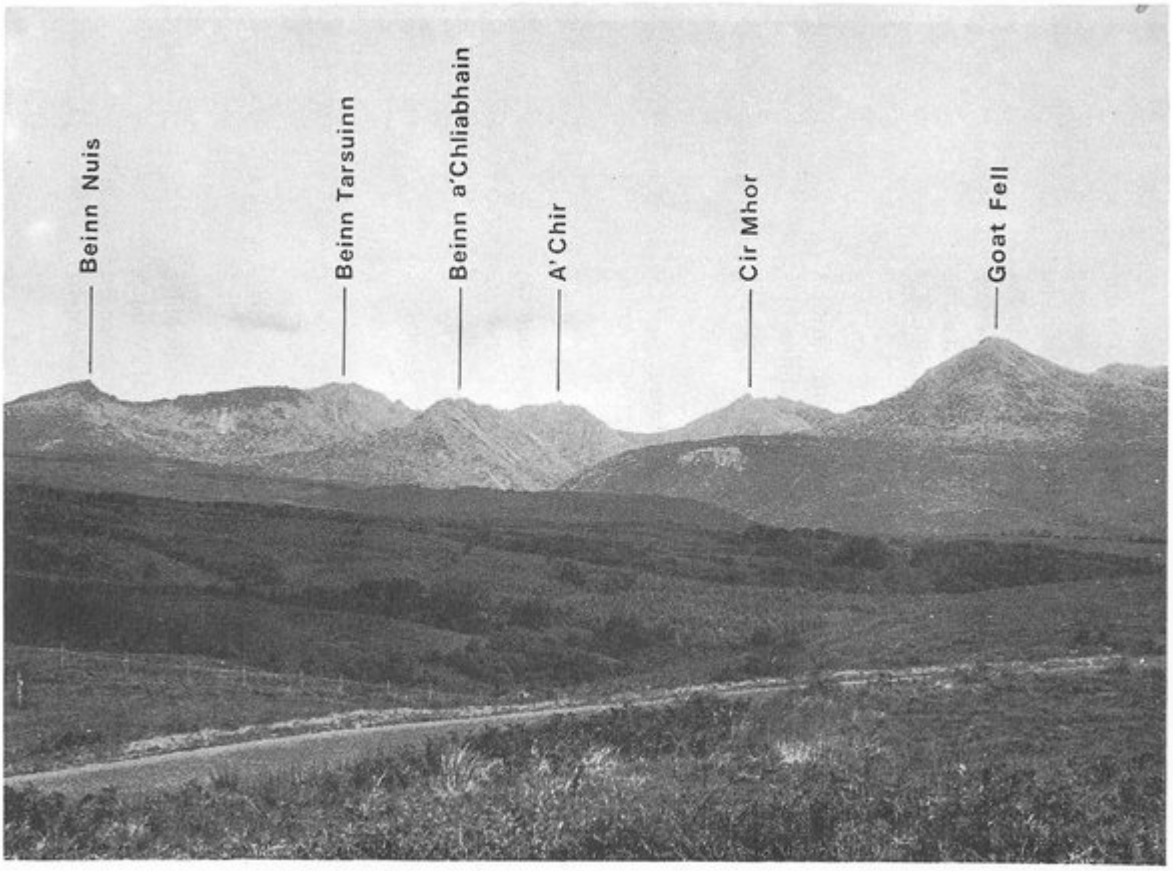


PLATE I. The Northern Granite Mountains. (*For explanation, see page 8*)

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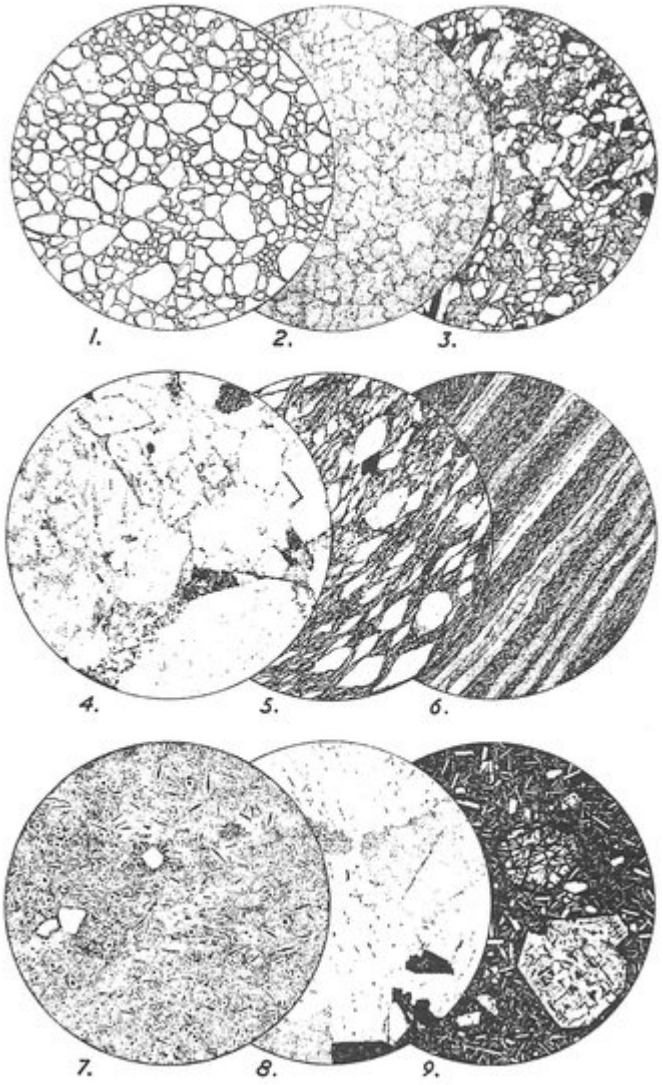

PLATE II. Micro-sections of some typical Arran rocks.

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ERA	SYSTEMS AND SUB-DIVISIONS		CONDITIONS OF DEPOSITION	THICKNESS (in metres)	IGNEOUS ROCKS		AGE in m.y.
					CONTEMPORANEOUS	INTRUSIVE	
QUATERNARY	RECENT AND PLEISTOCENE	Blown sand : Peat Alluvium	Fluviatile				1.8
		Raised beach deposits	Marine				
		Moraines	Glacial				
		Boulder clay	Glacial				
TERTIARY	No sedimentary rocks				Lavas in Central Ring Complex	Granite, Central Ring Complex: Sills and dykes	65
MESOZOIC	CRETACEOUS / JURASSIC	Only as masses and fragments in the Tertiary Central Volcanic Ring Complex					195
	TRIASSIC	Marls and sandstones	Lacustrine: fluviatile	700			230
UPPER PALAEOZOIC	PERMIAN	Sandstones & breccias	Aeolian: torrential	200	lava (in conglomerate)		280
	CARBONIFEROUS	Coal Measures	Deltaic	293 (at Corrie)		quartz-dolerite dykes	345
		Passage Group (Millstone Grit)	Deltaic		Lavas locally		
		Carboniferous Limestone Series	Marine; estuarine		Lava, agglomerate	a few dykes	
		Calciferous Sandstone Series	Lagoonal				
	OLD RED SANDSTONE	Upper	Fluviatile	920	Lavas locally		395
		Lower	Lacustrine : fluviatile	1200	Lavas locally	a few sills	
LOWER PALAEOZOIC	SILURIAN	Not represented					
	ORDOVICIAN	Arenig	Marine	? 300	Lavas	Gabbro	500
	DALRADIAN (? Cambrian)	North Sannox schistose-grits, schists and slates		1800 +			

(Table 1) The geological systems and rock-formations of Arran.

GEOLOGICAL EVENTS		CLIMATIC PHASES	APPROXIMATE TIME-RANGE B.C.	POLLEN ZONES
Period of Maximum Glaciation	.....	.....	Ending at 23,000	
Lateglacial Period:[1]				
Confluent Glacier Stage	High Lateglacial Raised Beach	Arctic to Sub-Arctic	23,000 to 9,000	I to III
Valley Glacier Stage				
Corrie Glacier Stage				
Final Disappearance of the Ice	.....	.....	8,300	
Postglacial Period:				
Submerged Peat and Forest Bed	Main Postglacial Shoreline	Pre-Boreal Phase	8,300 to 7,000	IV–V
		Boreal Phase[2]	7,000 to 5,500	VI
		Atlantic Phase	5,500 to 3,000	VII
		Sub-Boreal Phase	3,000 to 1,000	VII
Present-day Conditions		Sub-Atlantic Phase	1,000 to 0	VIII

[1]During this period there were two re-advances of the glacier ice, their limits marked by prominent moraines: these are the Perth and Loch Lomond Re-advances. The latter took place after an interval between 14,000 and 11,000 years ago when ice disappeared from Arran only to be followed by a deterioration in climate again before the final retreat of the ice at about 8,300 years ago.

[2]Material from a bed of peat underlying the carse clays of the Main Postglacial Shoreline (25 foot Raised Beach) at Airth Colliery, southeast of Stirling has been assigned by carbon dating to 6,461±157 B.C. (Godwin 1961).

TABLE 2. Lateglacial and Postglacial events.

(Table 2) Quaternary geological events and climate phases

			Laggan m	*Corrie* m
UPPER CARB.		Coal Measures Passage Group (Millstone Grit)	91	84
	Carboniferous Limestone Series	Upper Limestone Group Limestone Coal Group Lower Limestone Group	229	130
LOWER CARB.	Calciferous Sandstone Series	Upper Sedimentary Group	175	84
		Volcanic Group	114	137
		Lower Sedimentary Group	214	23
		Total thickness of Sediments	709	321

(Table 3) major subdivision of the Carboniferous

Faunal Zones	*Laggan*	*Corrie*	*Merkland Burn*	*Sliddery Water*
Lower *similis-pulchra* zone	Absent	Absent	×	×
modiolaris zone	?×	×	Absent	Absent
communis zone	?×	?	Absent	Absent

(Table 4) Faunal zones. Coal Measures.

Stratigraphic divisions according to Warrington (1973, after Craig 1965)	*Subdivisions of Tyrrell (1928, pp. 76–77; after Gunn 1903, p. 67)*
	7. Levencorroch Marls and Cornstones
Auchenhew Beds (c. 300 m)	6. Auchenhew Sandstones and Shales
	5. Lag a'Bheith Marls and Cornstones
TRIASSIC	
Lamlash Beds (c. 400 m)	4. Glen Dubh Sandstone
——?——	3. Lamlash and Machrie Sandstone
PERMIAN	
Brodick Beds (c. 200 m)	2. Brodick Breccia
	1. Corrie Sandstone

(Table 5) Major subdivisions of the Permian