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## Appendix 1 Itineraries

### Ardnamurchan

The Ardnamurchan district may be conveniently explored from Kilchoan as a centre, where there is a hotel and where a steamer normally calls from Oban three times a week. A motor road runs to Kilchoan from Fort William, and a Post Office motor bus connects up Kilchoan with the Loch Shiel — Glenfinnan boat and train daily service. From Kilchoan, roads fit for motoring, which are shown on the Memoir-map, extend to almost all parts of the district. Only the extreme nose of the Ardnamurchan peninsula is somewhat difficult to reach, but from Achosnich a track to the Lighthouse may be used for part of the way.

Suitable day-excursions from Kilchoan are outlined below. The order in which the excursions are arranged is, in a general way, the order in which the rocks met with are described in the Memoir. Page references are given to the relevant Memoir accounts. In the descriptions of routes to be taken, mileages by roads and by tracks or cross-country are indicated separately.

#### **1. Plateau Lavas, Volcanic Vents, and Major Intrusions of Centre 1, Ben Hiant.**

This hill lies within the Glenborrodale deer-forest and may be out of bounds during the stalking season. Suggested route is by road to east side of Ben Hiant (6 miles) and walk back (5 miles). Inclined base of Ben Hiant Intrusion crossing an eastern spur of Ben Hiant is well seen at a distance, from the road south of Loch Mudle (p. 165).

Features of interest to be seen on walk back include: vent-wall against basalt lavas, E. face of Ben Hiant (p. 123); adjoining plateau-basalt lavas, with pipe amygdales (p. no); pitchstone lavas, S.E. of summit (p. 127); Porphyritic Dolerite intrusive in tuff, S. of summit (p. 150); basal scarps of Ben Hiant Intrusion proper and of outlying mass on Stallachan Dubha (p. 163); pitchstone lava in stream S.E. of Stallachan Dubha (p. 128); agglomerate cliffs with recurring tuff beds, N.E. of Maclean's Nose (may be seen from above) (p. 127); traverse of South-west Vent and of Ben Hiant Intrusion along higher ground above the S.W. coast (p. 160), with columnar variolitic portion exposed in a stream W.S.W. of the summit (p. 167); basal scarp of Ben Hiant Intrusion, north side of Beinn na h-Urchrach (p. 162); across complex of cone-sheets, Augite-diorite (p. 153), and sediments, by track to Camphouse corner; and thence by road to Kilchoan.

#### **2. Eastern Schists, Mesozoic Strata, Basalt Lavas, Northern Vents, Cone-sheets and Major Intrusions, of Centre 1.**

By road to Achateny (5.5 miles). From there eastwards along the coast to beyond Ockle Point (4.5 miles). Return by road from Swordle or Ockle (7.5 miles).

By roadside just S. of Camphouse, Porphyritic Dolerite of Glas Bheinn (p. 142). In stream-bank E. of Camphouse, Quartz-dolerite of Camphouse (p. 152). E. of road between Camphouse and Achateny, note scarp-featuring due to massive cone-sheets of Centre 1 (p. 178).

Along shore eastwards of Achateny: agglomerate with large masses of Mesozoic strata (p. 130); contact, vent-agglomerate, and wall of Lower Lias limestone (p. 130); Lower Lias limestone, a mile N.E. of Kilmory (p. 40); Trias S.S.W. of Ockle Point (p. 36); folding of Moine Gneiss, one mile E. of Ockle Point (p. 31), and massive false-bedded pebbly Moine Gneiss farther east (p. 31).

By roadside, 0.75 mile E. of Swordle, Pabba shales (p. 42) and edge of vent (p. 130); and at Kilmory School, large Mesozoic blocks in vent.

#### **3. Kilchoan Schists, Mesozoic Strata, Basalt Lavas, Outer Cone-sheets of Centre 2, Glas Eilean Vent, and Dykes**

Shore section from Mingary Pier, south of Kilchoan, westwards around Kilchoan Bay (6.5 miles).

As a guide to the section near the Pier see (Figure 23), p. 174; for descriptions of cone-sheets and composite sills see pp. 173, 184; Glas Eilean Vent, later than the cone-sheets (p. 131); Mesozoic strata west side of Kilchoan Bay to beyond Sròn Bheag ((Figure 3), p. 34, and descriptions, pp. 41–49); Pegmatite-bearing dyke (p. 351); Pre-Glacial Coast-line ((Figure 54), p. 366); Sròn Bheag composite intrusion (p. 197): note, Sròn Bheag Point is accessible only at low tide; base of basalt lavas on Tertiary mudstone in cliff W. of Sròn Bheag (pp. 104, 112); Xenolithic dyke on shore, W. of Sròn Bheag ((Figure 51), p. 348). Return from coast can be made by a steep path up the sea-cliff just S. of outcrop of Upper Lias shown on (Figure 3).

#### **4. Outer and Inner Cone-sheets and Ring-dykes, Centre 2**

By road from Kilchoan to Free Church ( $\frac{3}{4}$  mile). Thence cross-country towards the twin lochs south-east of Beinn na Seilg to west side of Beinn na Seilg; from there along Beinn nan Ord to its north-west end; across to Aodann ( $5\frac{1}{2}$  miles). Home by road (3 miles).

Features of interest include the following: outer margin of Hypersthene-gabbro (p. 219) and Outer Cone-sheets with baked chilled edges outside it (p. 182), hillside E.N.E. of twin lochs; xenolithic strips in Hypersthene-gabbro on rocky hill north of twin lochs and E. of Beinn na Seilg (p. 222); banded Hypersthene-gabbro cut by Quartz-dolerite of Sgùrr nam Meann, both traversed by Inner Cone-sheets, W. of Beinn na Seilg ((Figure 27), p. 205); difficult intrusive junctions of Quartz-dolerite of Sgùrr nam Meann with Quartz-gabbro of Beinn na Seilg (p. 272), and of the latter with Eucrite of Beinn nan Ord (p. 273), west side of Beinn na Seilg; Quartz-gabbro of Garbh-dhail with flinty crush-rock, cut by Inner Cone-sheets, against Beinn nan Ord Eucrite, in valley at south-east end of Beinn nan Ord (p. 265); brecciation of Eucrite towards north-west end of Beinn nan Ord ((Figure 37), p. 266); traverse from this point, east across old Quartz-gabbro cut by Inner Cone-sheets (p. 242), western part highly sheared (p. 243), to junction with Old Gabbro of Lochan an Aodann (p. 244); thence north along Old Gabbro to hybrid Quartz-gabbro of Aodann on its inner side due W. of Aodann (p. 251). Home by road from Aodann.

#### **5. Ring-dykes of Centre 2, northern portion**

By road to Achosnich (4 miles). Thence along track to west coast east of Lighthouse; return *via* summits of Sgùrr nam Meann and Beinn Bhuidhe to Achosnich ( $3\frac{1}{2}$  miles). Home by road (4 miles).

Various ring-dyke margins seen. Porphyritic margin of Quartz-gabbro (? of Aodann) against Old Gabbro crosses track S.W. of Achosnich (p. 251); junction of Grigadale Granophyre with Old Gabbro S. of track (p. 246); fine-grained margin of Older Quartz-gabbro of Beinn Bhuidhe cut by Inner Cone-sheets against Grigadale Granophyre, S. of track and E. of Grigadale Loch (p. 249); brecciated Eucrite of Beinn nan Ord, and margin of Quartz-gabbro of Loch Caorach against baked Quartz-dolerite of Sgùrr nam Meann, N. of track and N.W. of Grigadale Loch (p. 271); veining of the Quartz-dolerite by granophyre along coast S.W. of Sgùrr nam Meann ((Figure 34), p. 257), and its intricate junction with the Hypersthene-gabbro, same locality and also N.W. of Sgùrr nam Meann (p. 258); xenolithic strips in Hypersthene-gabbro, Eilean Carrach (p. 222); granophyre sheets net-veining roof of Hypersthene-gabbro, shore E. of Eilean Carrach (p. 260); summit of Sgùrr nam Meann, Quartz-dolerite veined by granophyre and traversed by a cone-sheet, all these rocks being highly contact altered (p. 257); vertical contact of Younger Quartz-gabbro of Beinn Bhuidhe with Eucrite of Beinn nan Ord, hillside N.W. of Beinn Bhuidhe (p. 276); junction of Younger Quartz-gabbro with Older Quartz-gabbro of Beinn Bhuidhe, near south summit of Beinn Bhuidhe (p. 275).

Home by road from Achosnich. On the way home, margins of Great Eucrite of Centre 3 against Quartz-gabbros of Centres 2 and 3 may be seen: margin against Quartz-gabbro (? of Aodann) at N. end of Achosnich (p. 303); and against the same intrusion above road E.N.E. of Aodann (p. 303); margin against Quartz-gabbro of Centre 3, E. of road and 2 miles from Kilchoan (p. 302).

#### **6. Ring-dykes of Centre 3.**

Along Kilchoan–Achnaha, road to Interior Complex (2½ miles). Thence cross-country *via* Sìthean Mòr to Achnaha; by track from Achnaha to Plocaig and thence cross-country *via* northern coast to Sanna (4.5- miles). Return by road (the portion from Sanna to Achnaha not shown on Memoir-map) from Sanna (5 miles).

Near (300 yds. E. of) Kilchoan–Achnaha road; sapphire locality at margin of Hypersthene-gabbro (pp. 222, 233); by road, difficult junctions of Quartz-gabbro of Centre 3 against Hypersthene-gabbro (p. 285), and of Great Eucrite against the same Quartz-gabbro (p. 301). 'View of various ring-dykes on east side of Beinn na Seilg and on west side of Meall an Tarmachain ((Figure 39), p. 286). Circle of crags of Great Eucrite surrounding Interior Complex (p. 295, and see (Plate 6); thence cross-country across Quartz-dolerite Ring-dyke (p. 327 and (Figure 46)); apophysis of Fluxion Biotite-gabbro of Sìthean Mòr cutting Great Eucrite (p. 331); banding in the Fluxion Biotite-gabbro (p. 330); Inner Eucrite (p. 326) and Quartz-biotite-gabbro; across Kilchoan-Achnaha road to junction of Quartz-biotite-gabbro and Fluxion Biotite-gabbro of Glendrian (p. 335); Tonalite with more acid margin (p. 337), and screen-like mass chiefly of Quartz-biotite-gabbro (p. 329); central mass of Quartz-monzonite (p. 340); thence to Achnaha and *via* track to Plocaig: junction of Inner Eucrite and Biotite-eucrite by track (p. 322); pegmatite veins in Great Eucrite E. of Allt Sanna (p. 296). N. or N.W. of Plocaig, granophyre cone-sheet (pp. 185, 197); quartz-dolerite margin of Hypersthene-gabbro against granulitized Outer Cone-sheet complex E. of Sanna Point (p. 220); junction of Great Eucrite against banded granulitized Hypersthene-gabbro, Sanna Bay (p. 303). Home by new road from Sanna.

## **7. Ring-dykes of Centre 3 and Major Intrusions and Vent of Centre west of Faskadale.**

By road to a mile north of Camphouse (2¾ miles). Thence alongside stream to summit of Meall nan Con; from there traverse west-north-west across Great Eucrite to Interior Complex, and thence north towards northern coast west of Faskadale (6 miles). Home by road from Faskadale (6¾ miles).

In above-mentioned stream: basic portion of Beinn an Leathaid Composite Intrusion cut by thin Outer Cone-sheets (p. 157); Quartz-gabbro of Faskadale (p. 283); Fluxion Gabbro of Faskadale (p. 289); Outer Eucrite (p. 311). Highly altered screen of Meall nan Con (p. 312): contact of screen with Great Eucrite W. of Meall nan Con summit ((Figure 41), p. 299), and again on south-west side of this ridge (p. 300). Traverse across Great Eucrite to base of crags on its inner side, N.W. of Meall Meadhoin, where margin of Quartz-dolerite Ring-dyke of Interior Complex is exposed (p. 328); recross Great Eucrite ridge, noting pegmatite veins (p. 296), towards northern coast, Granulitized Outer Cone-sheet complex with Major Intrusions of Centre 1 (Quartz-gabbro and Granophyre west of Faskadale) ((Figure 16), pp. 146 and 183); agglomerate well exposed, west side of Faskadale Bay (p. 131); margin of Faskadale Quartz-gabbro against quartz-dolerite cone-sheet rock, east side of bay (p. 284). Home by road from Faskadale. J.E.R.

## **North-West Mull**

A convenient Centre is afforded by Dervaig, while the eastern part of the district is within easy reach of Tobermory, 1½ miles east of the one-inch Map boundary (lat. 56° 37' N.). At both places there is hotel accommodation. The one-inch Map is sufficient guide to such objects of interest as lavas (p. 107), dykes (p. 343), sheets (p. 363), the 'S Airde Beinn plug (p. 361), and the pre-Glacial beach-notch (p. 365). The base of the lavas resting on red sandstone, indicated by a note at the eastern margin of the Map, E.S.E. of Ardmore farm, is specially noteworthy.

## **Coll**

There is a hotel at Arinagour, the port of call. During a short visit the main feature to be studied is the interbanding of sedimentary and igneous material in the Lewisian Complex of the western half of the island. It is advisable to concentrate on coast sections, and these are clearly indicated on the one-inch Map. For the sedimentary material see especially Ben Feall (p. 21), and for the intrusive relationship of the associated igneous material see the west shore of Crossapol Bay (p. 20). Flinty crush-rock occurs at intervals along the coast north-east of Loch Eatharna (p. 26). The Coll camptonites are well represented by a dyke 100 yds. south of Arinagour pier (p. 359). The Mull Swarm of Tertiary basalts is a feature of coast sections in the north-east part of the island (p. 357). The best exposure of 100 ft. raised-beach gravel is beside the road near Grishipoll farm, 2.5 miles N.W. of Arinagour (p. 369). E.B.B.

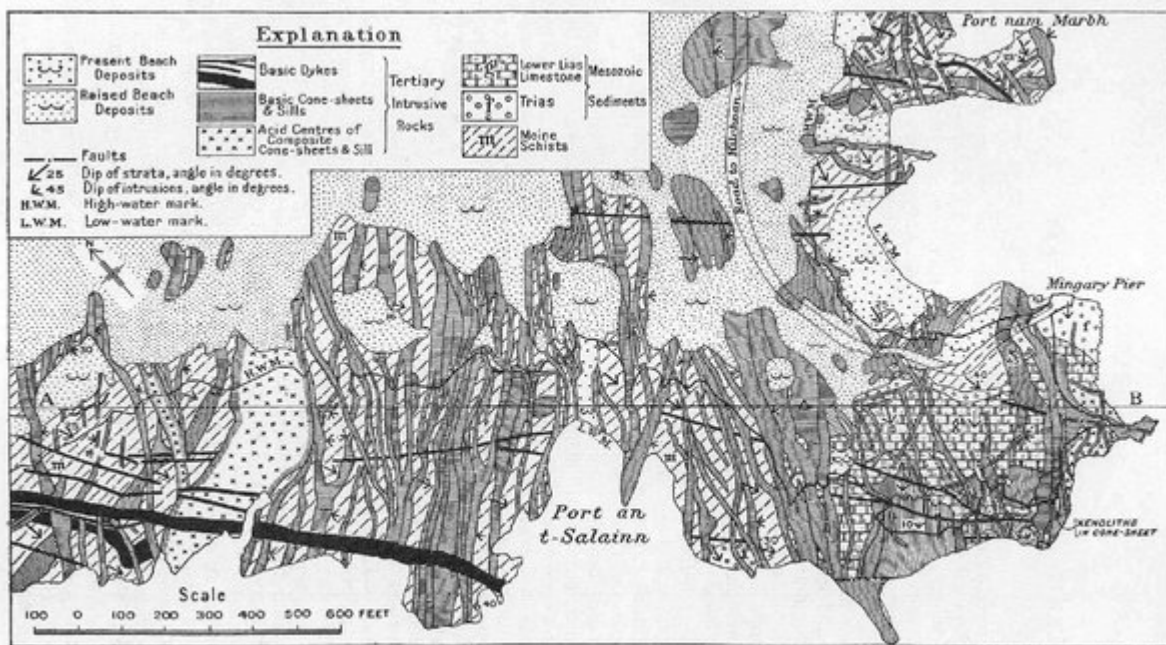


FIG. 23.—Map of Outer Cone-sheets of Centre 2, shore south of Kilchoan.

(Figure 23) Map of Outer Cone-sheets of Centre 2, shore south of Kilchoan.

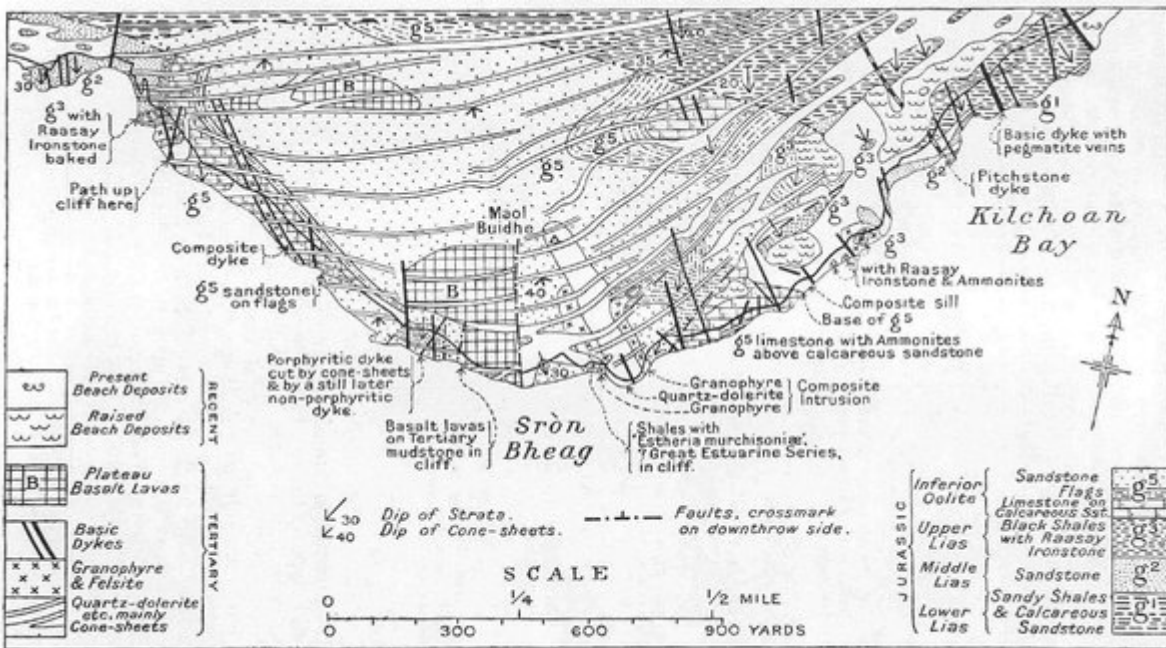


FIG. 3.—Map of Mesozoic strata and Tertiary basalt lavas cut by Tertiary minor intrusions, west of Kilchoan Bay.

NOTE.—Tertiary cone-sheets are mainly represented diagrammatically.

(Figure 3) Map of Mesozoic strata and Tertiary basalt lavas cut by Tertiary minor intrusions, west of Kilchoan Bay. Note. Tertiary cone-sheets are mainly represented diagrammatically.

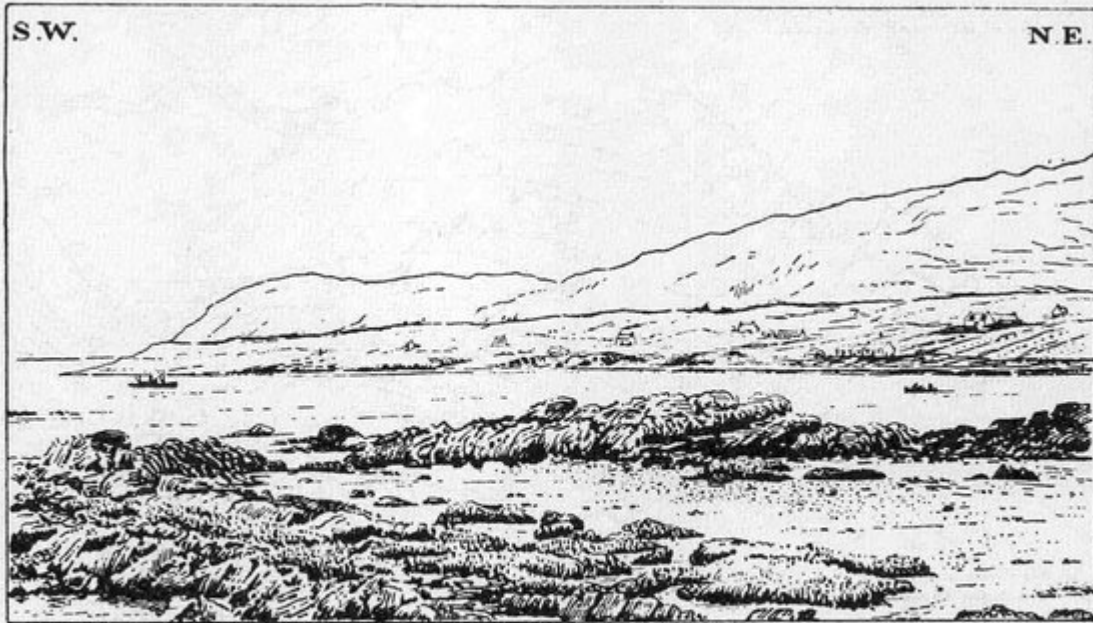
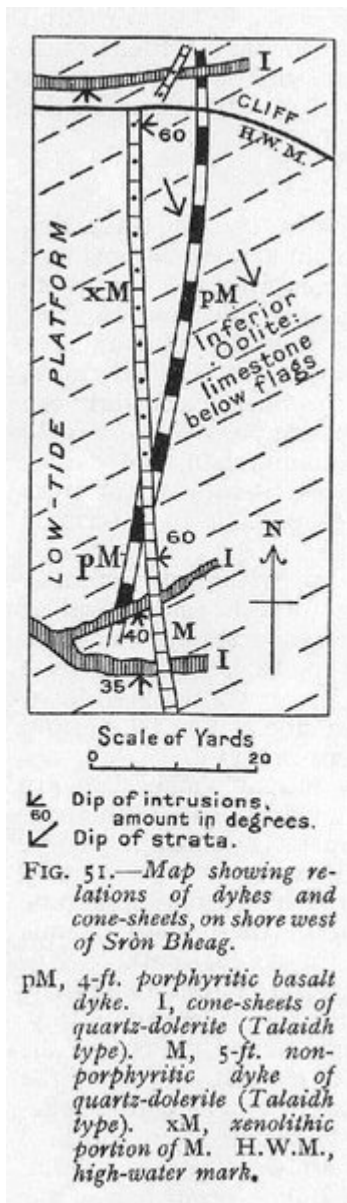


FIG. 54.—*View of Kilchoan Bay, from the east, showing Pre-Glacial Marine Rock-notch at 140 ft. along west side of bay.*

Drawn from Geological Survey Photograph No. C. 2821.

(Figure 54) View of Kilchoan Bay, from the east, showing Pre-Glacial Marine Rock-notch at 140 ft. along west side of bay. Drawn from Geological Survey Photograph No. [C2821](#).



60  
60  
40  
35

CLIFF  
H.W.M.  
LOW-TIDE PLATFORM  
xM  
pM  
Inferior Oolite, limestone below flags  
I  
N  
I  
I

60  
60  
40  
35

CLIFF  
H.W.M.  
LOW-TIDE PLATFORM  
xM  
pM  
Inferior Oolite, limestone below flags  
I  
N  
I  
I

60  
60  
40  
35

CLIFF  
H.W.M.  
LOW-TIDE PLATFORM  
xM  
pM  
Inferior Oolite, limestone below flags  
I  
N  
I  
I

FIG. 51.—Map showing relations of dykes and cone-sheets, on shore west of Sròn Bheag.

pM, 4-ft. porphyritic basalt dyke. I, cone-sheets of quartz-dolerite (Talaith type). M, 5-ft. non-porphyrific dyke of quartz-dolerite (Talaith type). xM, xenolithic portion of M. H.W.M., high-water mark.

(Figure 51) Map showing relations of dykes and cone-sheets, on shore west of Sròn Bheag. pM, 4-ft. porphyritic basalt dyke. I, cone-sheets of quartz-dolerite (Talaith type). M, 5-ft. Non-porphyrific dyke of quartz-dolerite (Talaith type). xM, xenolithic portion of M. H.W.M., high-water mark.

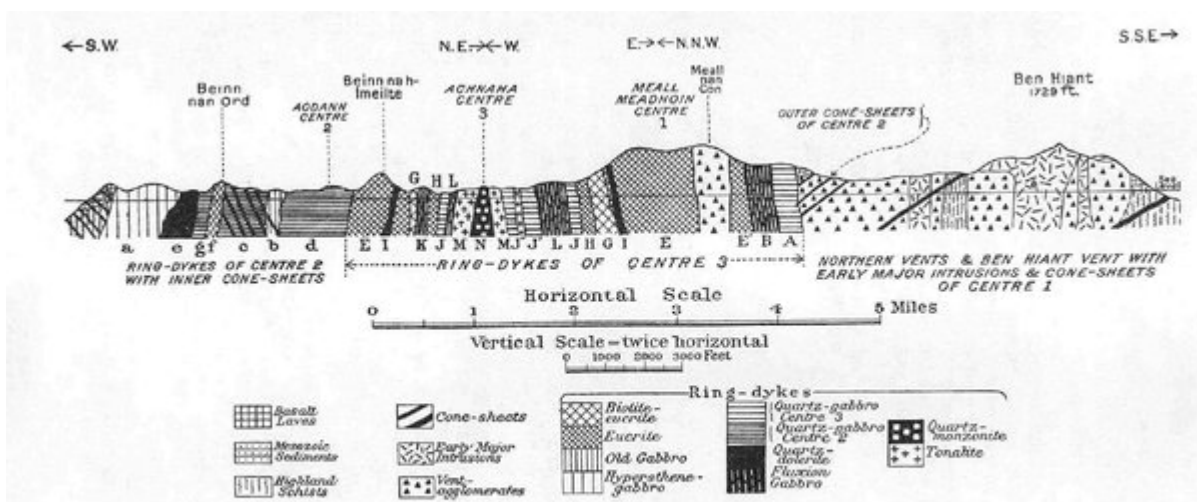


FIG. 27.—Section across Tertiary Intrusive Complex of Ardnamurchan.

Index-letters for ring-dykes are explained in Table VII, pp. 201–202.

(Figure 27) Section across Tertiary Intrusive Complex of Ardnamurchan. Index-letters for ring-dykes are explained in (Table 7), pp. 201–202.

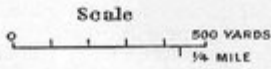
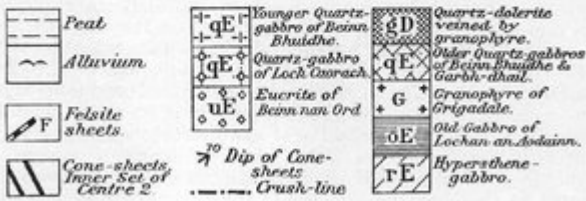
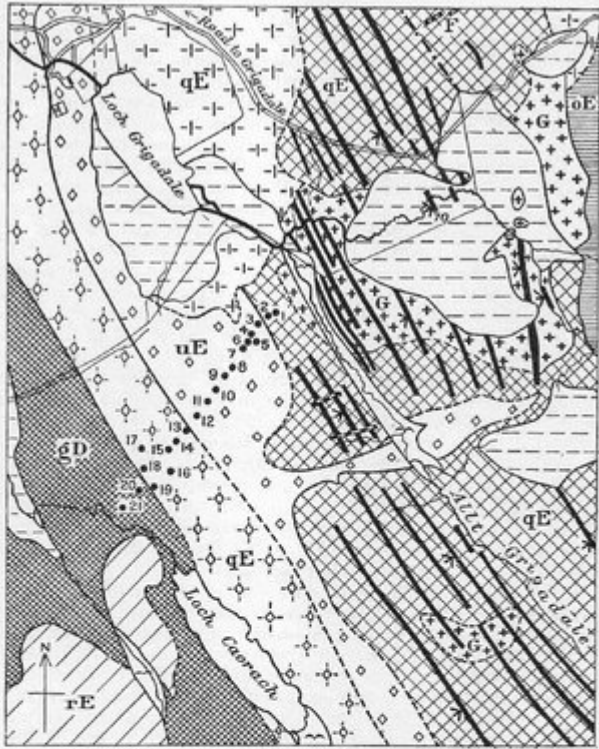


FIG. 37.—Map of portion of Ring-dyke Complex of Centre 2, north of Beinn nan Ord.

NOTE.—Localities of a serial collection of rock-specimens are indicated by black dots numbered 1–21 (see pp. 268–270, 274, 275).

(Figure 37) Map of portion of Ring-dyke Complex of Centre 2, north of Beinn nan Ord. Note. Localities of a serial collection of rock-specimens are indicated by black dots numbered 1–21 (see pp. 268–270, 274, 275).

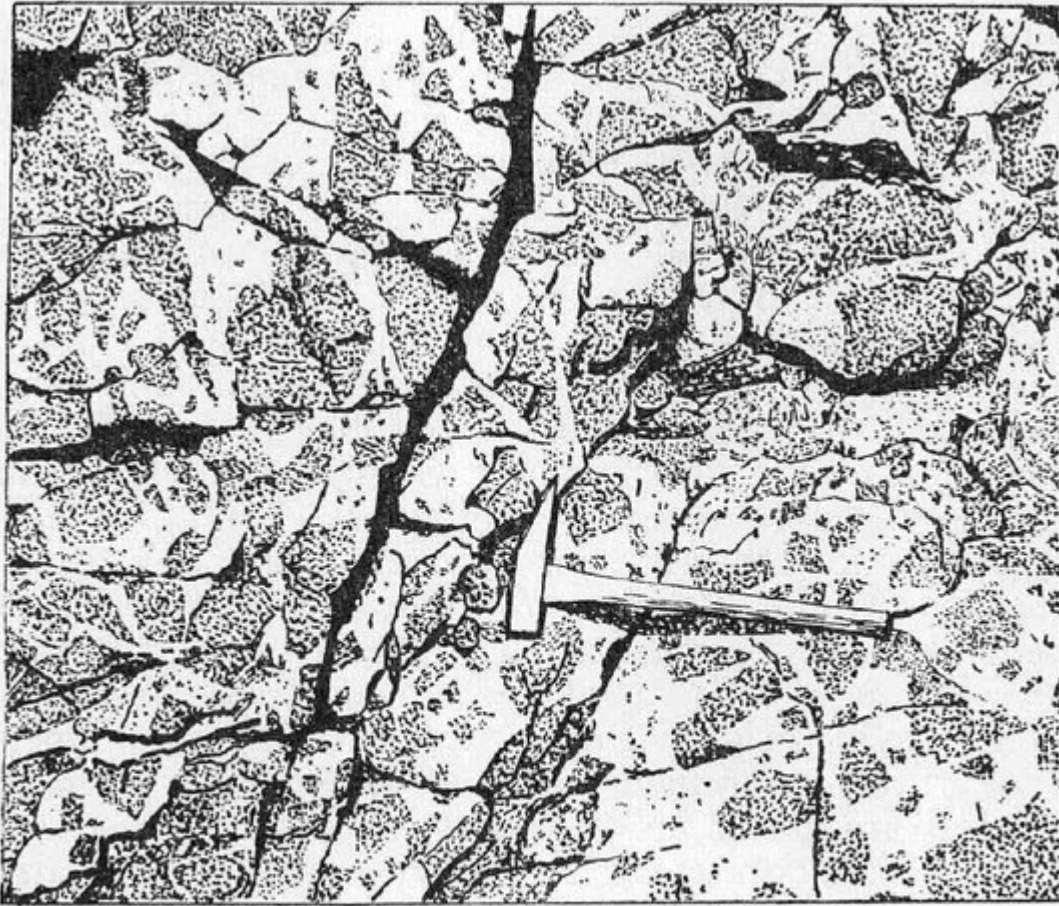


FIG. 34.—Quartz-dolerite net-veined by granophyre, Sgùrr nam Meann Ring-dyke, on shore south-west of Sgùrr nam Meann.  
 Drawn from Geological Survey Photograph, No. C. 2773.

(Figure 34) Quartz-dolerite net-veined by granophyre, Sgùrr nam Meann Ring-dyke, on shore south-west of Sgùrr nam Meann. Drawn from Geological Survey Photograph, No. C. 2773.

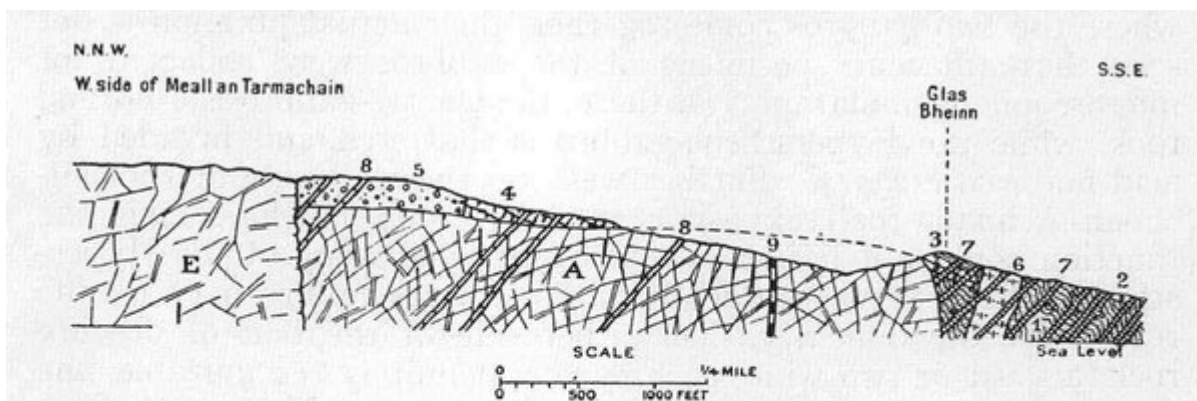


FIG. 39.—Section from Meall an Tarmachain to Glas Bheinn, north of Kilchoan.

1, Moine Schists. 2, Trias. 3, Lower Lias (limestone and shale). 4, Tertiary basalt lavas. 5, Vent-agglomerate (Centre 1). 6, Porphyritic Dolerite of Glas Bheinn (Centre 1). 7, Outer Cone-sheets of Centre 2. 8, Cone-sheets (Centre 3). 9, Quartz-felsite dyke. A, Quartz-gabbro Ring-dyke (Centre 3). E, Great Eucrite Ring-dyke (Centre 3).

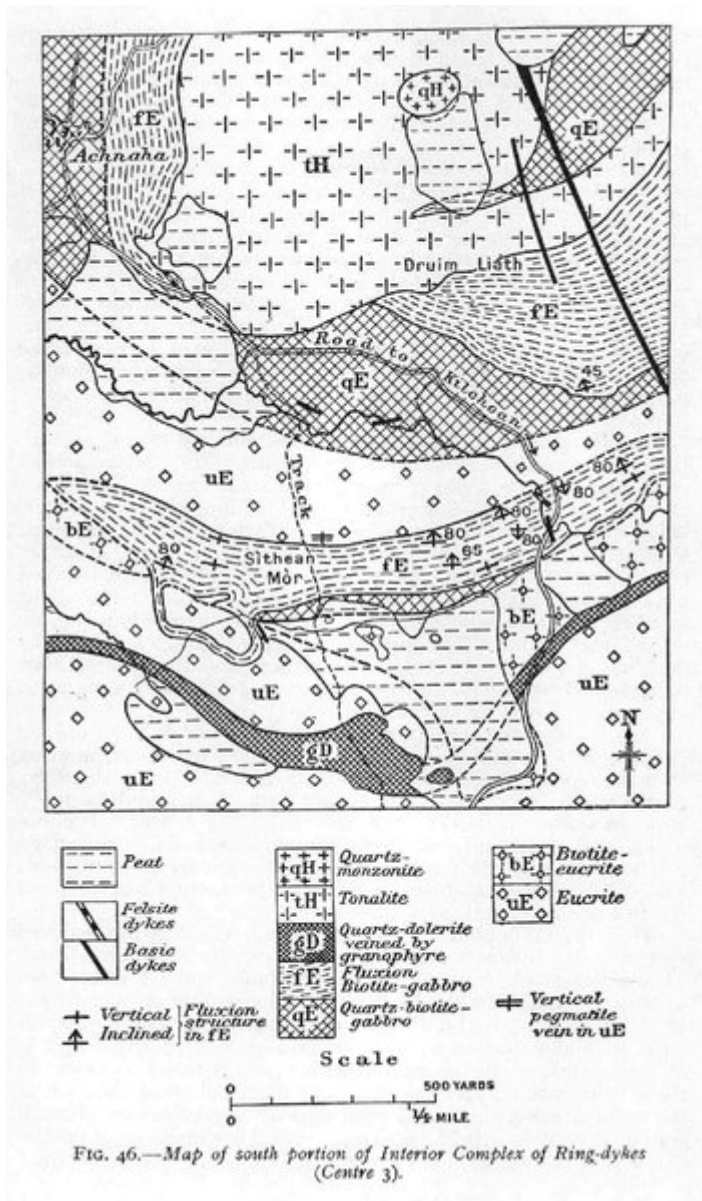
(Figure 39) Section from Meall an Tarmachain to Glas Bheinn, north of Kilchoan. 1, Moine Schists. 2, Trias. 3, Lower Lias (limestone and shale). 4, Tertiary basalt lavas. 5, Vent-agglomerate (Centre 1). 6, Porphyritic Dolerite of Glas Bheinn (Centre 1). 7, Outer Cone-sheets of Centre 2. 8, Cone-sheets (Centre 3). 9, Quartz-felsite dyke. A, Quartz-gabbro



Ring-dyke (Centre 3). E, Great Eucrite Ring-dyke (Centre 3).



(Plate 6) Panorama of Great Eucrite and Interior Complex of Ring-dykes of Centre 3, Ardnamurchan, from north-east, with Meall an Tarmachain and Beinn na Seilg in distance. Outer ring of hills and dark foreground mark the outcrop of the Great Eucrite. Low inner ring surrounding central knob of Quartz-monzonite is the Fluxion Biotite-gabbro of Glendrian. The distance from Meall Meadhoin across the Interior Complex to Meall Sanna is three miles. Drawn from Geological Survey Photographs Nos. [C2806](#), [C2807](#), [C2808](#), [C2809](#).



(Figure 46) Map of south portion of Interior Complex of Ring Dykes (Centre 3).

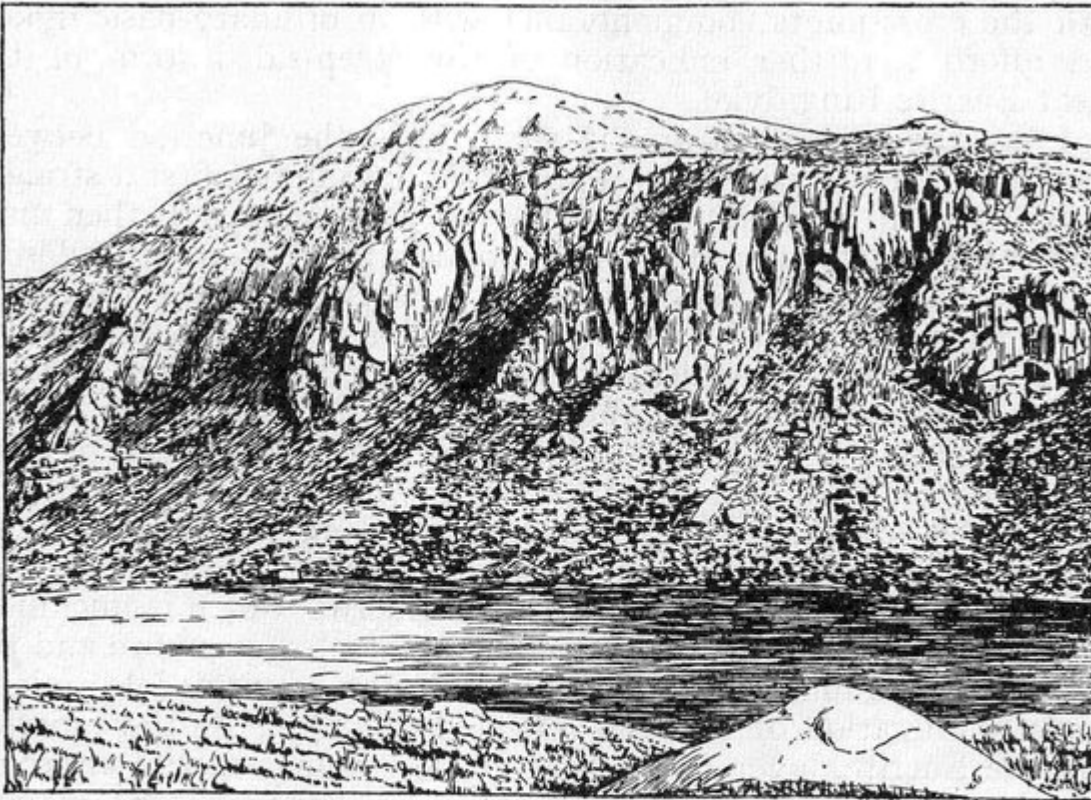


FIG. 41.—View of crags on west side of Meall nan Con.

Broken line indicates junction of granulitized rocks of Meall nan Con Screen with Great Eucrite Ring-dyke, that forms vertically-jointed crag overlooking loch.

Drawn from Geological Survey Photograph No. C. 2817.

(Figure 41) View of crags on west side of Meall nan Con. Broken line indicates junction of granulitized rocks of Meall nan Con Screen with Great Eucrite Ring-dyke, that forms vertically-jointed crag overlooking loch. Drawn from Geological Survey Photograph No. C. 2817.

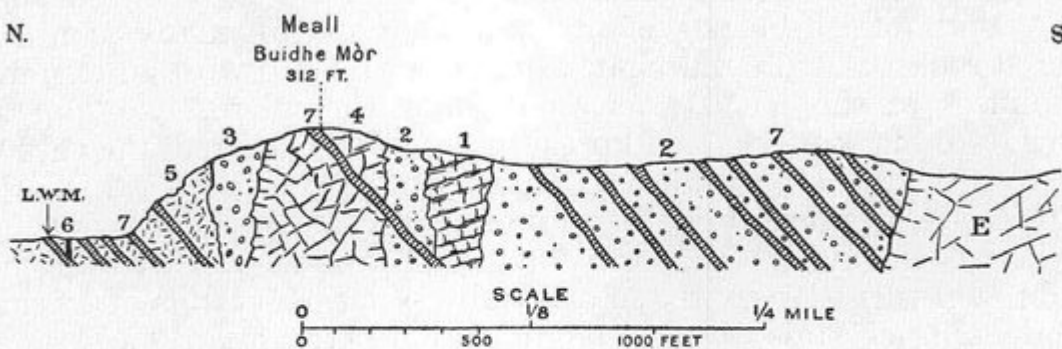


FIG. 16.—Section, west of Faskadale Bay.

1. Basalt lava in vent. 2, Vent-agglomerate. 3, Screen of vent-agglomerate separating intrusions 4 and 5. 4, Gabbro of Centre 1. 5, Granophyre of Centre 1. 6, Basic E.N.E. dyke, seen to cut some cone-sheets and to be cut by others. 7, Cone-sheets of Centre 2. E, Great Eucrite Ring-dyke of Centre 3. L.W.M., Low-water Mark.

(Figure 16) Section, west of Faskadale Bay. 1. Basalt lava in vent. 2. Vent-agglomerate. 3. Screen of vent-agglomerate separating intrusions 4 and 5. 4. Gabbro of Centre 1. 5. Granophyre of Centre 1. 6. Basic E.N.E. dyke, seen to cut some cone-sheets and to be cut by others. 7. Cone-sheets of Centre 2. E, Great Eucrite Ring-dyke of Centre 3. L.W.M., Low-water Mark.