
Figure and tables

(Front cover)

The Dalradian rocks of the South-West Highlands — introduction

(Figure 1) Simplified geological map of the Dalradian rocks in the South-west Highlands of Scotland, showing the axial traces of the major folds according to Roberts and Treagus (1977). Place-names in capitals give the locations of the various field-areas covered by this series of excursion guides. Note that the stratigraphic units correspond to the various sub-groups as given in (Table 1) and (Figure 2).

(Figure 2) Diagrammatic cross-sections through the Dalradian rocks in the South-west Highlands of Scotland, showing the structural relations of the major folds established in (Figure 1). Arrows give the facing of the early folds. These sections have been drawn on the assumption that the upper limb of the Ardrishaig–Aberfoyle Anticline is much less deformed than the lower limb.

(Table 1) Lithostratigraphy compiled for the Dalradian rocks in the South-west Highlands of Scotland after Harris and Pitcher (1976).

1 The Dalradian rocks of Rosneath and south-east Cowal

(Figure 1) Geological map of Rosneath and south-east Cowal (after sheets 29 (Rothesay) and 30 (Glasgow) of the Geological Survey of Scotland). See (Figure 1) of the introductory guide for the axial traces of the major folds recognized in this area.

(Figure 2) Geological map (after Roberts 1966) of the southern end of the Rosneath Peninsula showing the various lithologies developed within the Beinn Bheula Schists, the Dunoon Phyllites and the Bullrock Greywacke.

2 The Dalradian rocks of Knapdale and North Kintyre

(Figure 1) Geological map of Knapdale and North Kintyre (after sheets 28 (Jura) and 29 (Rothesay) of the Geological Survey of Scotland). See figure 1 of the introductory guide for the axial traces of the major folds recognized in this area.

(Figure 2) Left: Geological map of the section between Kilmory Bay and the Point of Knap (Excursion 1, localities 1–14). Right: Geological map of the section between Barmore Island and Tarbert (Excursion 2, localities 17–24).

3 The Dalradian rocks of the west coast of the Tayvallich peninsula

(Figure 1) Guide to the localities described in the text.

(Figure 2) Vertical and lateral variations in a basic submarine lava flow.

(Figure 3) Stratigraphic column at Port nan Clach Cruinn. Key 1 Vesicular lava with basal pipe amygdales. Load structures cause sediment to be squeezed upwards into lava. Toes of lava project downwards and northwards into the sediment causing minor fold disturbances. 2 Interbedded cream limestone (1–3 cm) and cream calcareous phyllite (0.5–1 cm). 3 Channel filled by limestone containing boulders of grey limestone in a matrix charged with angular fragments of quartz. Whole unit is cross-bedded, indicating derivation from south. 4 Pure grey limestone with beds 1–10 cm thick. 5 Parallel laminated (0.5–1 cm) limestone. 6 Graded limestone with fragments of quartz (1–1.5 cm) and black calcareous slate. Channelled base trending 110°. Intruded from below by a sedimentary dyke of 7. 7 Laminated (0.2–2 cm) limestone with sand-sized quartz fragments. 8 Conglomerate with boulders of dark grey limestone. 9 As 7. 10 Conglomerate of rusty weathering black limestone with largest fragments measuring 100 × 50 cm. 11 As 7. 12 Grey

limestone with fragments (0.5–1 cm) of malachite and quartz. 13 As 7 with ripple marked base.

4 The Dalradian rocks of Jura

(Figure 1) General map of the area described in this guide. The Ordnance Survey 1:50,000 sheet 61 covers the whole of Jura.

(Figure 2) Stratigraphical relationships of the formations described in this guide.

(Figure 3) General map of the area described in text.

5 The Dalradian rocks of Lunga, Luining and Shuna

(Figure 1) General map of the area described in this article.

(Figure 2) Guide to localities described in the text

6 The Dalradian rocks of the northern Loch Awe district

(Table 1) Stratigraphic sequence for the northern Loch Awe District after Borradaile (1973). + = Lower Cambrian, ++ = Late Precambrian, from the micropalaeontological evidence of Downie et al. (1971).

(Figure 1) Diagrammatic cross-section of the major structures of the Illtay Nappe Complex on which are indicated the approximate structural positions of the localities described in this guide. The stippled regions in this cross-section correspond to the areas illustrated by geological maps (Kilmelford), 4 (Kilchrenan) and 5 (Loch Avich). The localities at Oban and Strone Point are, respectively, localities 11 and 12.

(Figure 2) Distribution of the principal lithologies of the Dalradian rocks in the Northern Loch Awe District (after Borradaile, 1973). N.B. The maximum number of passengers that may be carried in one vehicle on certain roads is as follows:(a) the road along the north shore of Loch Melfort: 15 persons. (b) The road from Loch Melfort to Loch Awe passing Loch Avich: 15 persons.(c) The road along the West shore of Loch Awe, south from Kilchrenan: 21 persons. No restrictions exist for the other roads illustrated.

(Figure 3) Geological map of the Kilmelford district with localities 1 and 2 indicated. Areas in which the Dalradian rocks are less well exposed have been left unornamented and outcrops of post tectonic igneous intrusions have been omitted.

(Figure 4) Geological map of the Kilchrenan district with localities 3, 4, 5, 6 and 7 indicated. Areas in which the Dalradian rocks are poorly exposed have been left unornamented and outcrops of many minor post-tectonic igneous intrusions have been omitted.

(Figure 5) Geological map of the ground to the North-East of Loch Avich with localities 8, 9 and 10 indicated. Areas in which the Dalradian rocks are poorly exposed have been left unornamented and outcrops of minor post-tectonic igneous intrusions have been omitted.

7 The Dalradian rocks of the Loch Leven area

(Table 1) Stratigraphy of the Loch Leven area

(Figure 1) Geological map of the Loch Leven area showing the lithostratigraphy. Modified from sheet 53 (Ben Nevis) of the Geological Survey of Scotland. See (Figure 1) of the introductory guide for the axial traces of the major folds recognized in this area.

(Figure 2) Diagrammatic cross-section through the Moine and Dalradian rocks from Loch Linnhe (West) to the Blackwater Reservoir (East). Abbreviations as follows: FWSI Fort William Slide; Asc Appin Syncline; TMAc Tom Meadhoin Anticline; BaSc Ballachulish Syncline; SBSf Stob Bhan Synform; MnGF Mam na Gualainn Folds; BaSI Ballachulish Slide; KAc Kinlochleven Anticline; MSc Mamore Syncline; KAf Kinlochleven Antiform; MAc Mamore Anticline; BSf Blackwater Synform; BAf Blackwater Antiform.

(Figure 3) Geological map of the Ardsheal peninsula (Excursion 1, localities 1–5).

(Figure 4) Geological map of the Onich section (Excursion 2, localities 6–16).

(Figure 5) Geological map (after Roberts, 1976) of the area between Callert and Stob Bhan (inset), (Excursion 3–5, localities 17–27).

(Figure 6) Geological map (after Treagus, 1974) of the Kinlochleven area (Excursion 6, localities 28–33).

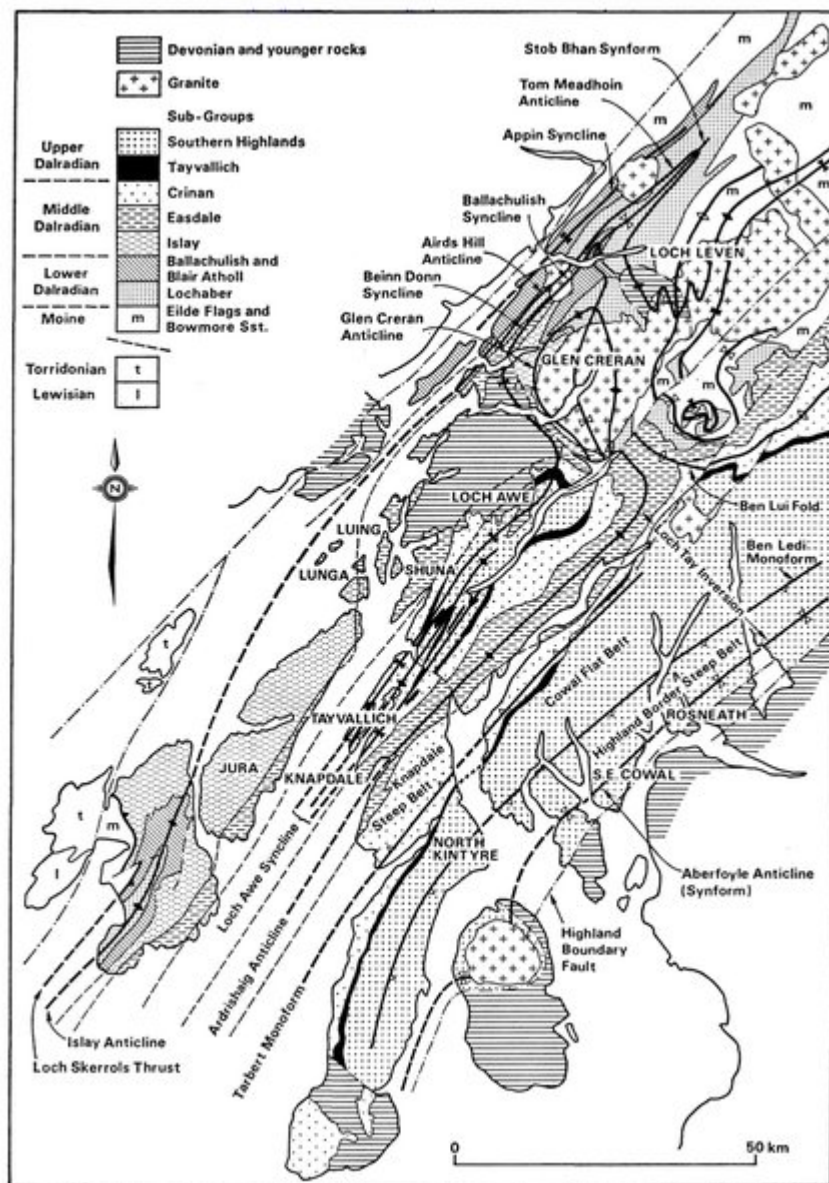
Scottish Journal of GEOLOGY



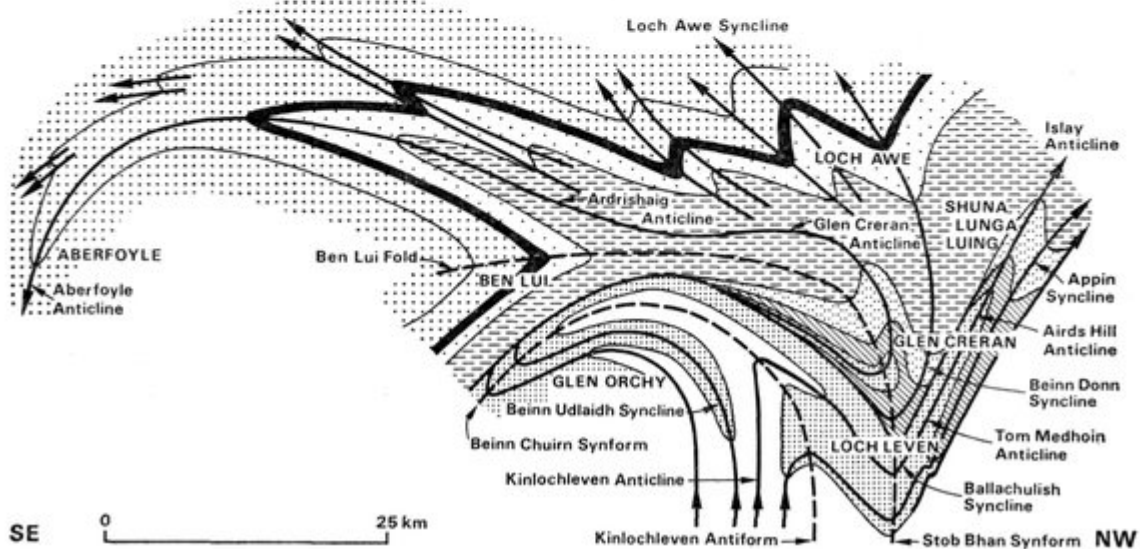
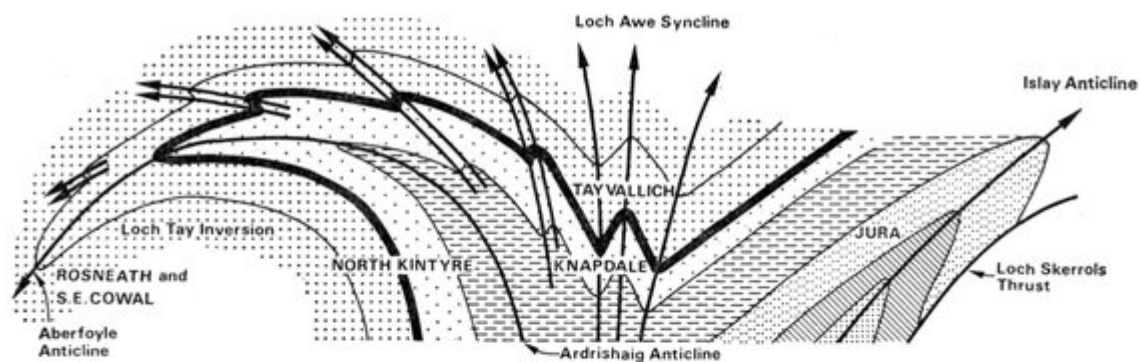
Volume 13, Part 2, pages 85–184

1977

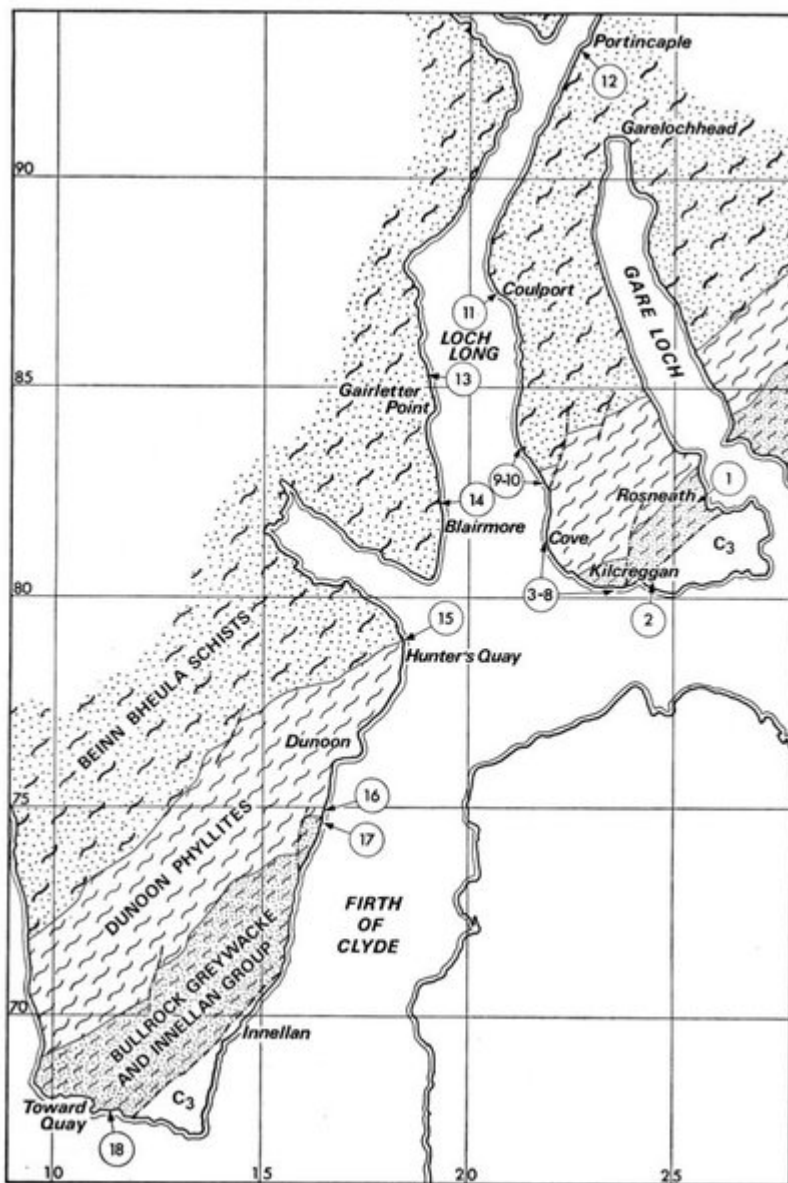
Published for the Geological Societies of Edinburgh and Glasgow by
SCOTTISH ACADEMIC PRESS



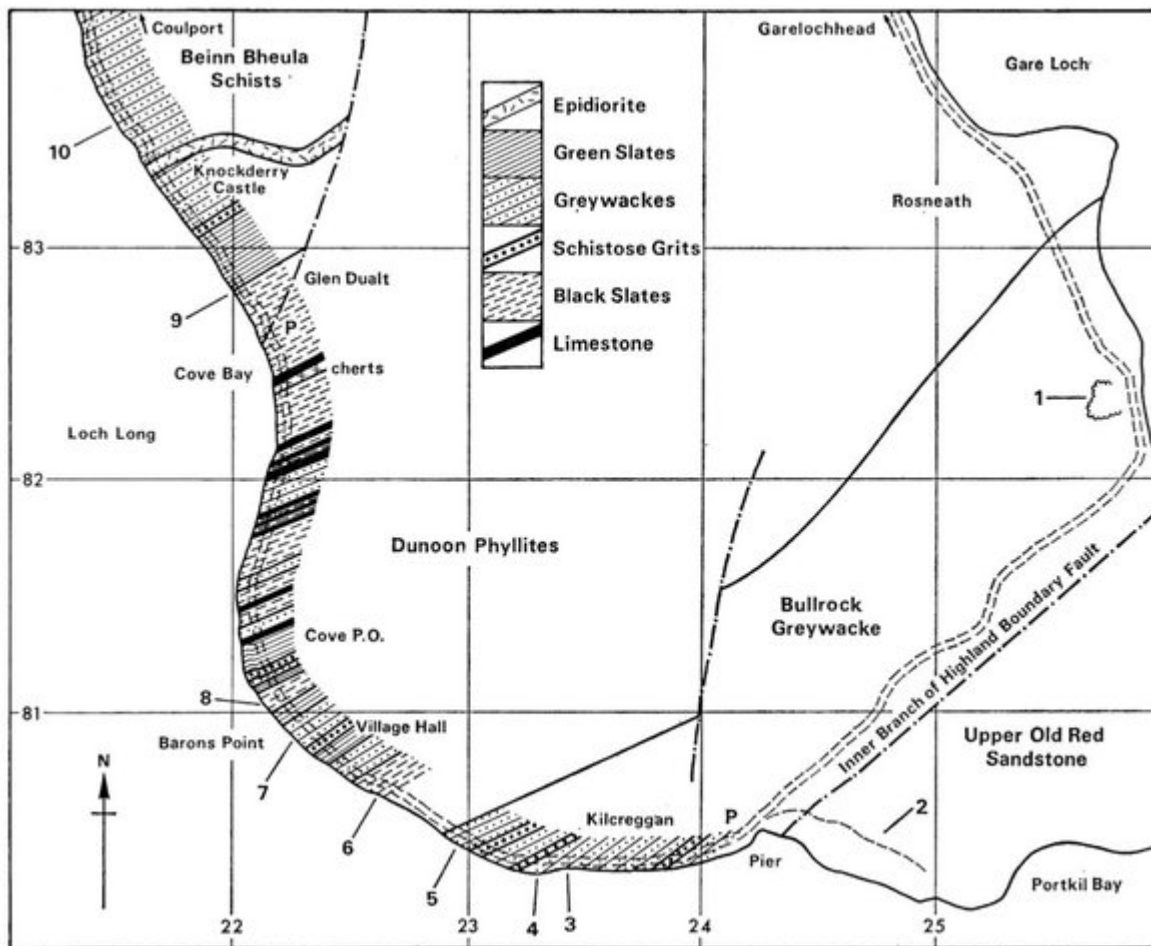
(Figure 1) Simplified geological map of the Dalradian rocks in the South-west Highlands of Scotland, showing the axial traces of the major folds according to Roberts and Treagus (1977). Place-names in capitals give the locations of the various field-areas covered by this series of excursion guides. Note that the stratigraphic units correspond to the various sub-groups as given in (Table 1).jpg



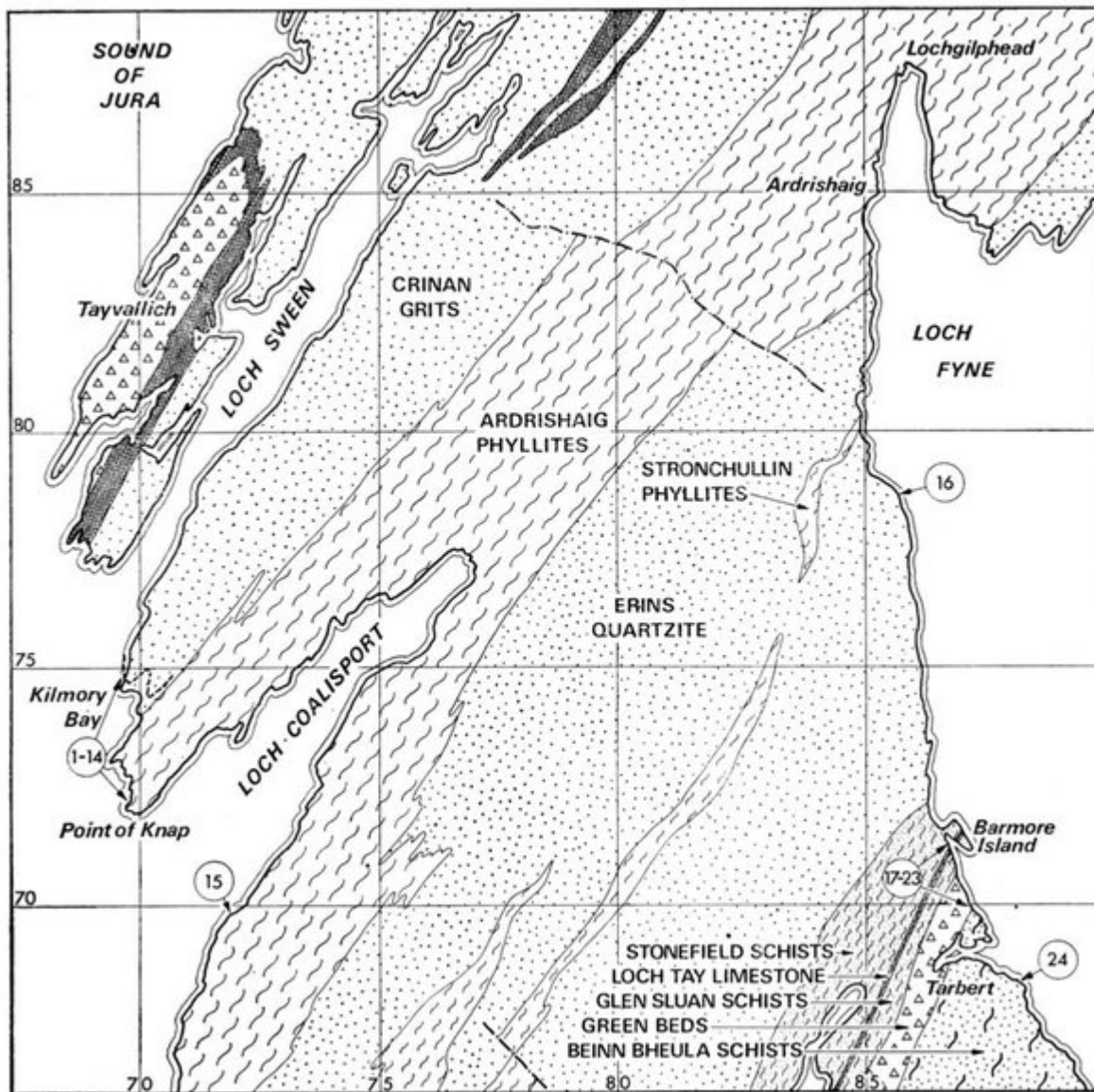
(Figure 2) Diagrammatic cross-sections through the Dalradian rocks in the South-west Highlands of Scotland, showing the structural relations of the major folds established in (Figure 1). Arrows give the facing of the early folds. These sections have been drawn on the assumption that the upper limb of the Ardrishaig–Aberfoyle Anticline is much less deformed than the lower limb.



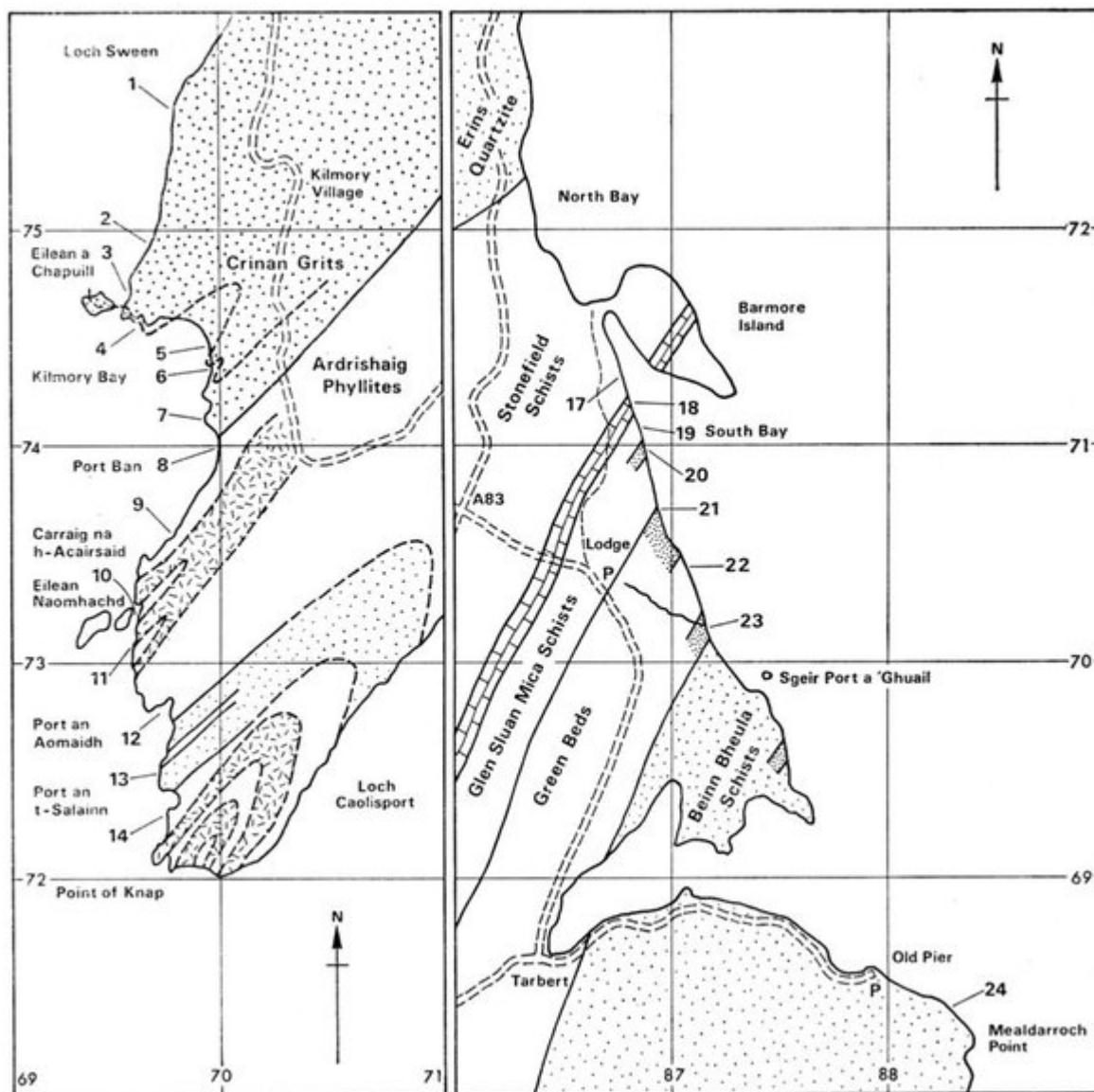
(Figure 1) Geological map of Rosneath and south-east Cowal (after sheets 29 (Rothesay) and 30 (Glasgow) of the Geological Survey of Scotland).



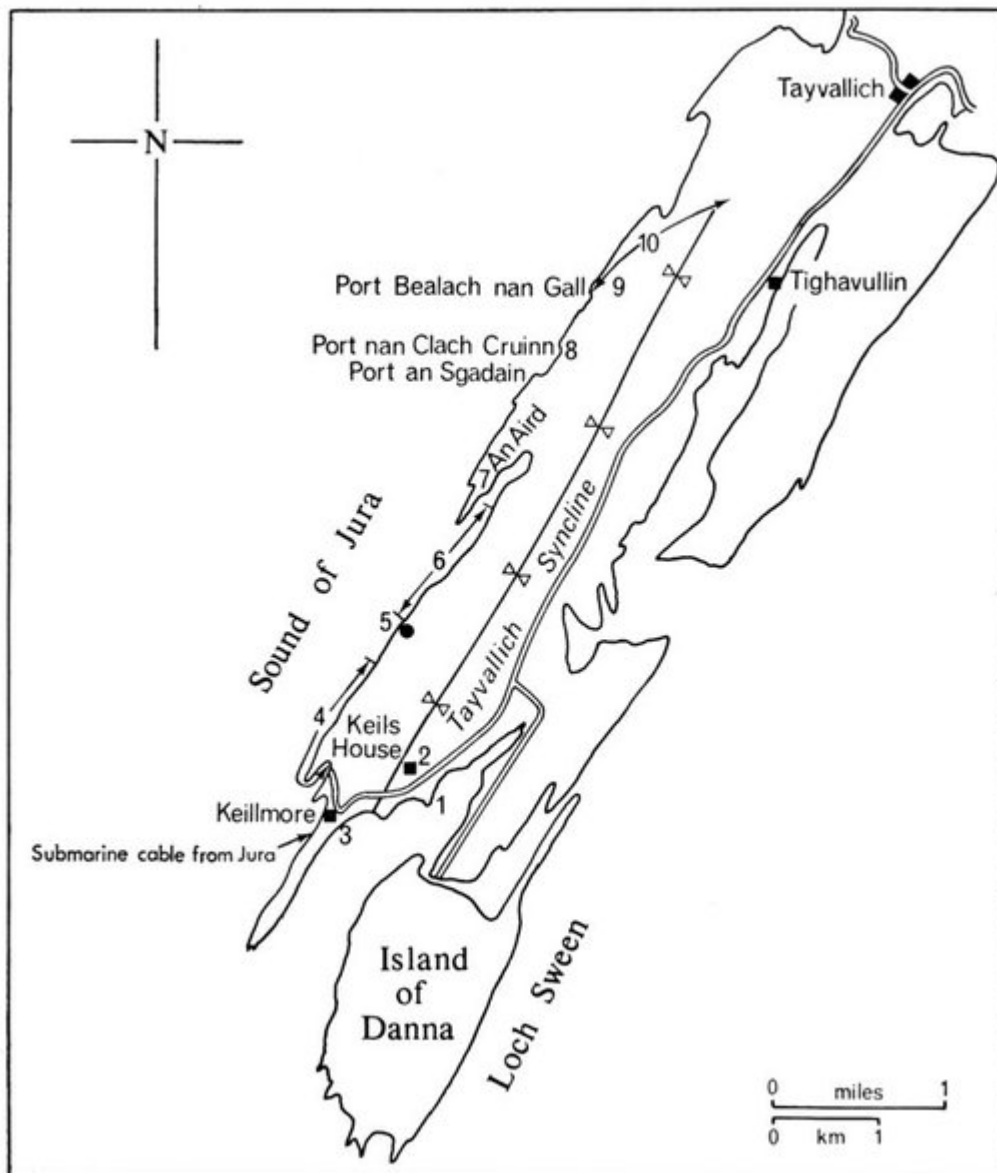
(Figure 2) Geological map (after Roberts 1966) of the southern end of the Rosneath Peninsula showing the various lithologies developed within the Beinn Bheula Schists, the Dunoon Phyllites and the Bullrock Greywacke.



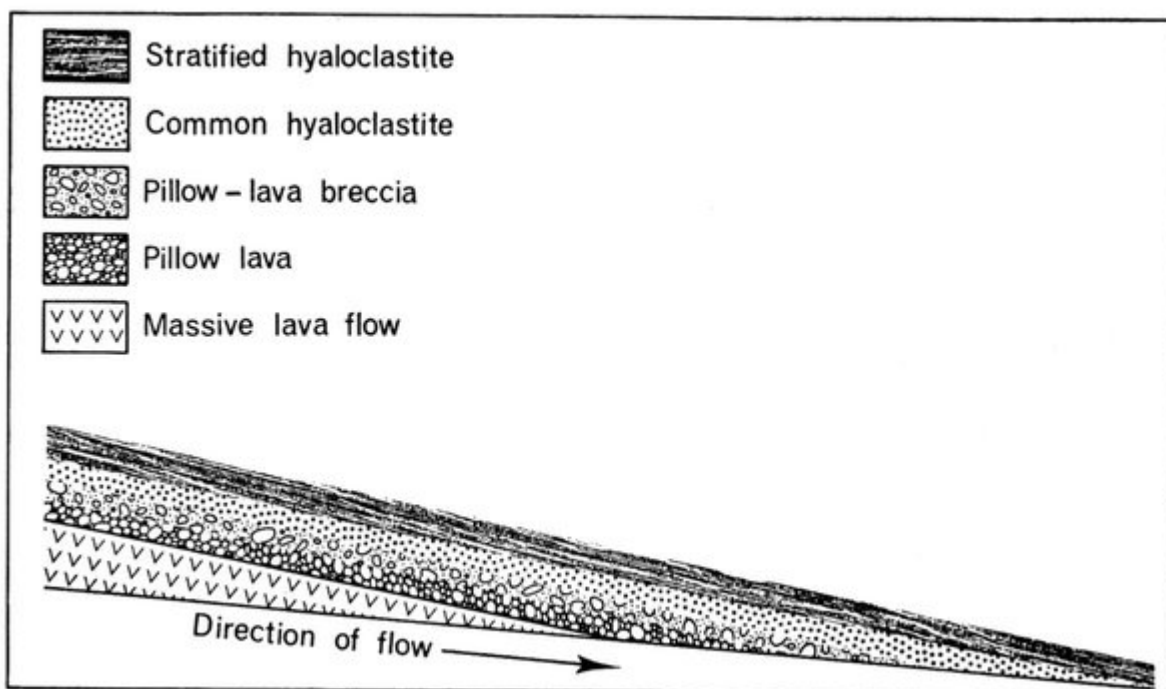
(Figure 1) Geological map of Knapdale and North Kintyre (after sheets 28 (Jura) and 29 (Rothesay) of the Geological Survey of Scotland). See figure 1 of the introductory guide for the axial traces of the major folds recognized in this area.



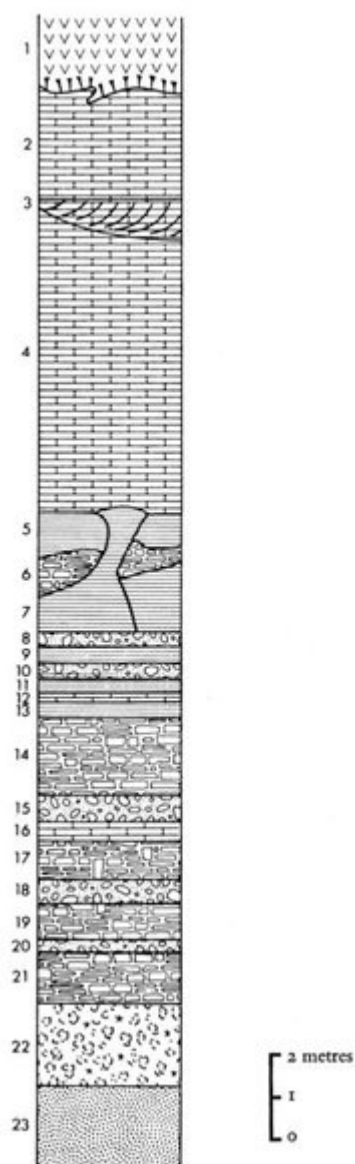
(Figure 2) Left: Geological map of the section between Kilmory Bay and the Point of Knap (Excursion 1, localities 1–14). Right: Geological map of the section between Barmore Island and Tarbert (Excursion 2, localities 17–24).



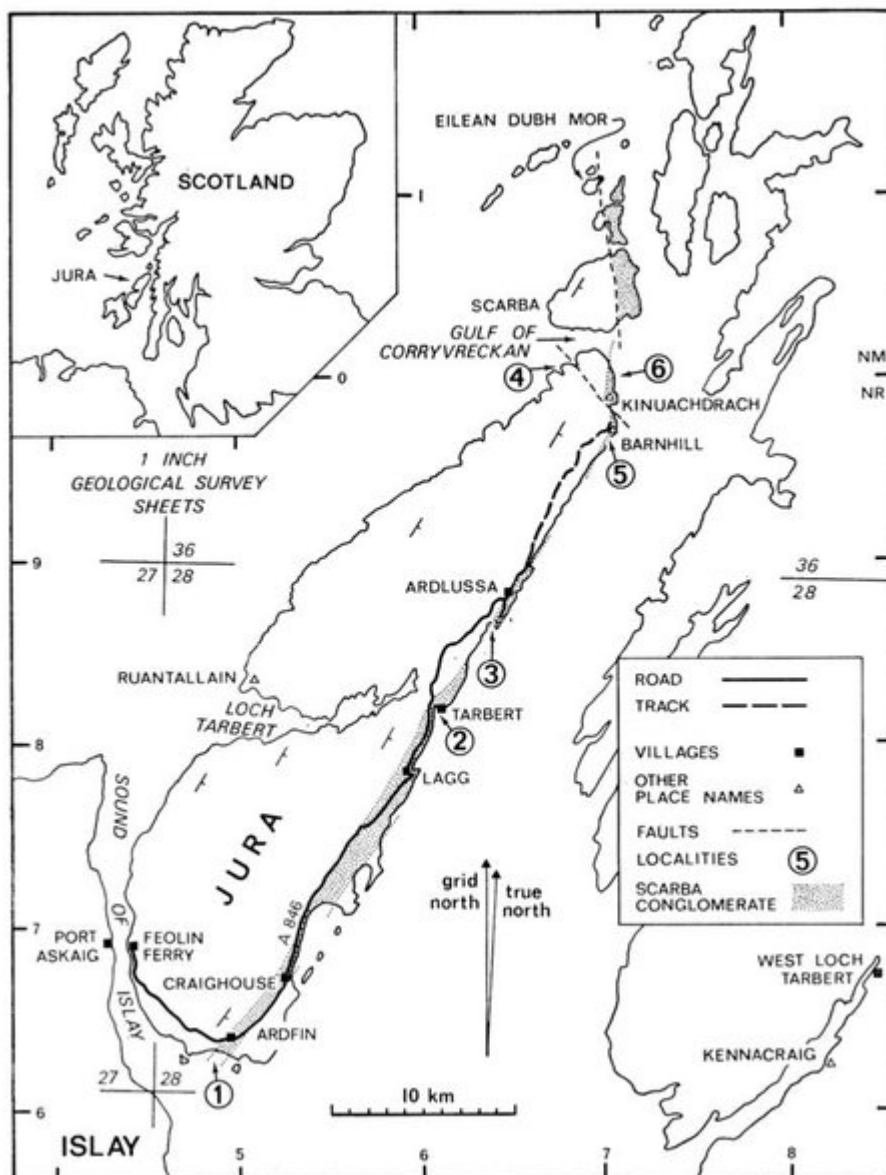
(Figure 1) Guide to the localities described in the text.



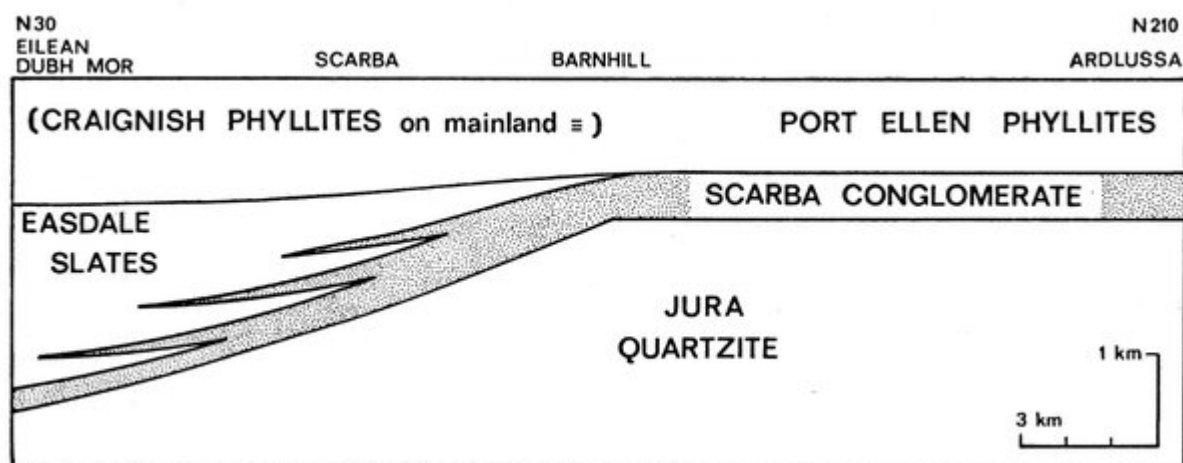
(Figure 2) Vertical and lateral variations in a basic submarine lava flow.



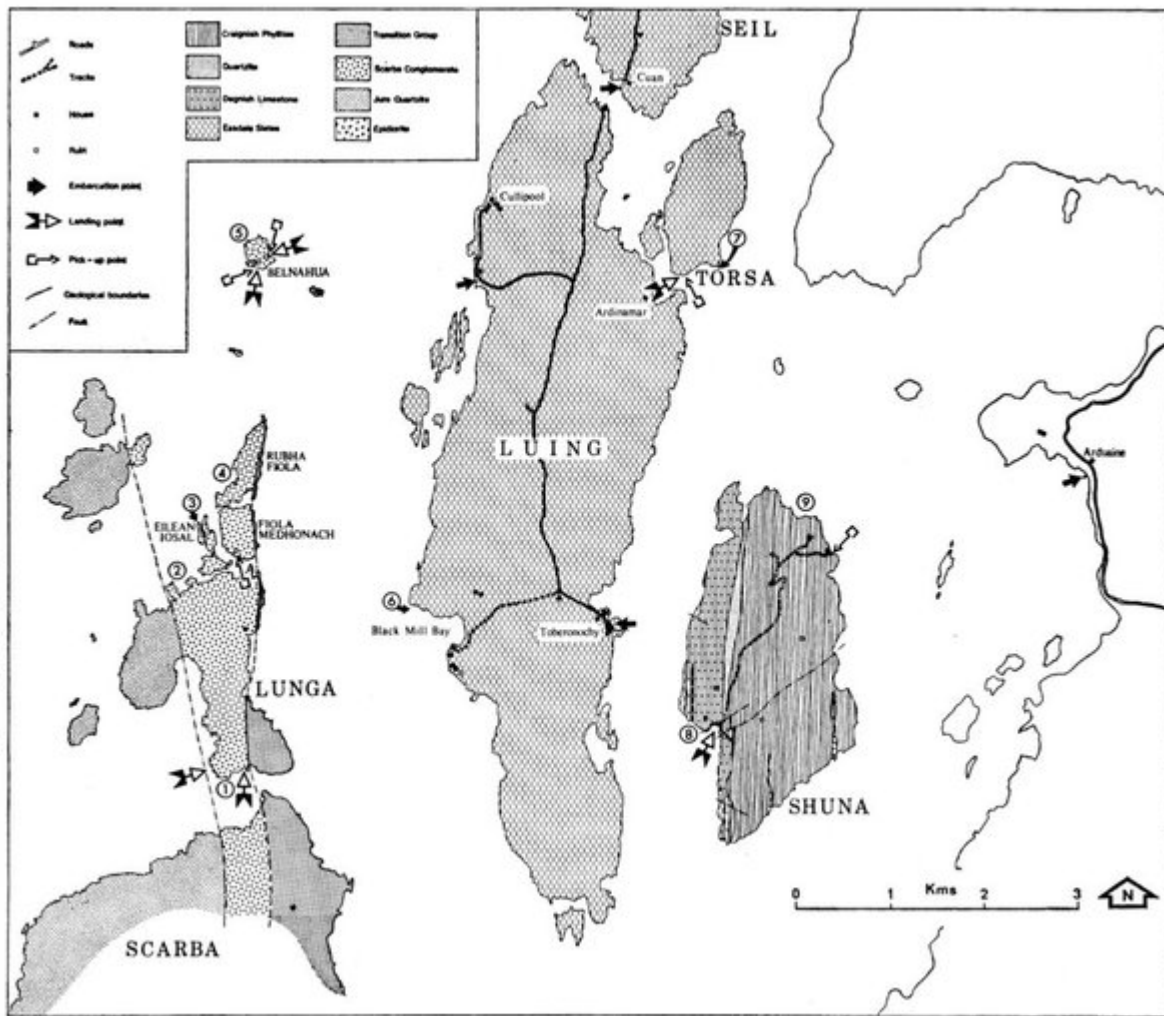
(Figure 3) Stratigraphic column at Port nan Clach Cruinn. Key 1 Vesicular lava with basal pipe amygdales. Load structures cause sediment to be squeezed upwards into lava. Toes of lava project downwards and northwards into the sediment causing minor fold disturbances. 2 Interbedded cream limestone (1–3 cm) and cream calcareous phyllite (0.5–1 cm). 3 Channel filled by limestone containing boulders of grey limestone in a matrix charged with angular fragments of quartz. Whole unit is cross-bedded, indicating derivation from south. 4 Pure grey limestone with beds 1–10 cm thick. 5 Parallel laminated (0.5–1 cm) limestone. 6 Graded limestone with fragments of quartz (1–1.5 cm) and black calcareous slate. Channelled base trending 110°. Intruded from below by a sedimentary dyke of 7. 7 Laminated (0.2–2 cm) limestone with sand-sized quartz fragments. 8 Conglomerate with boulders of dark grey limestone. 9 As 7. 10 Conglomerate of rusty weathering black limestone with largest fragments measuring 100 x 50 cm. 11 As 7. 12 Grey limestone with fragments (0.5–1 cm) of malachite and quartz. 13 As 7 with ripple marked base.



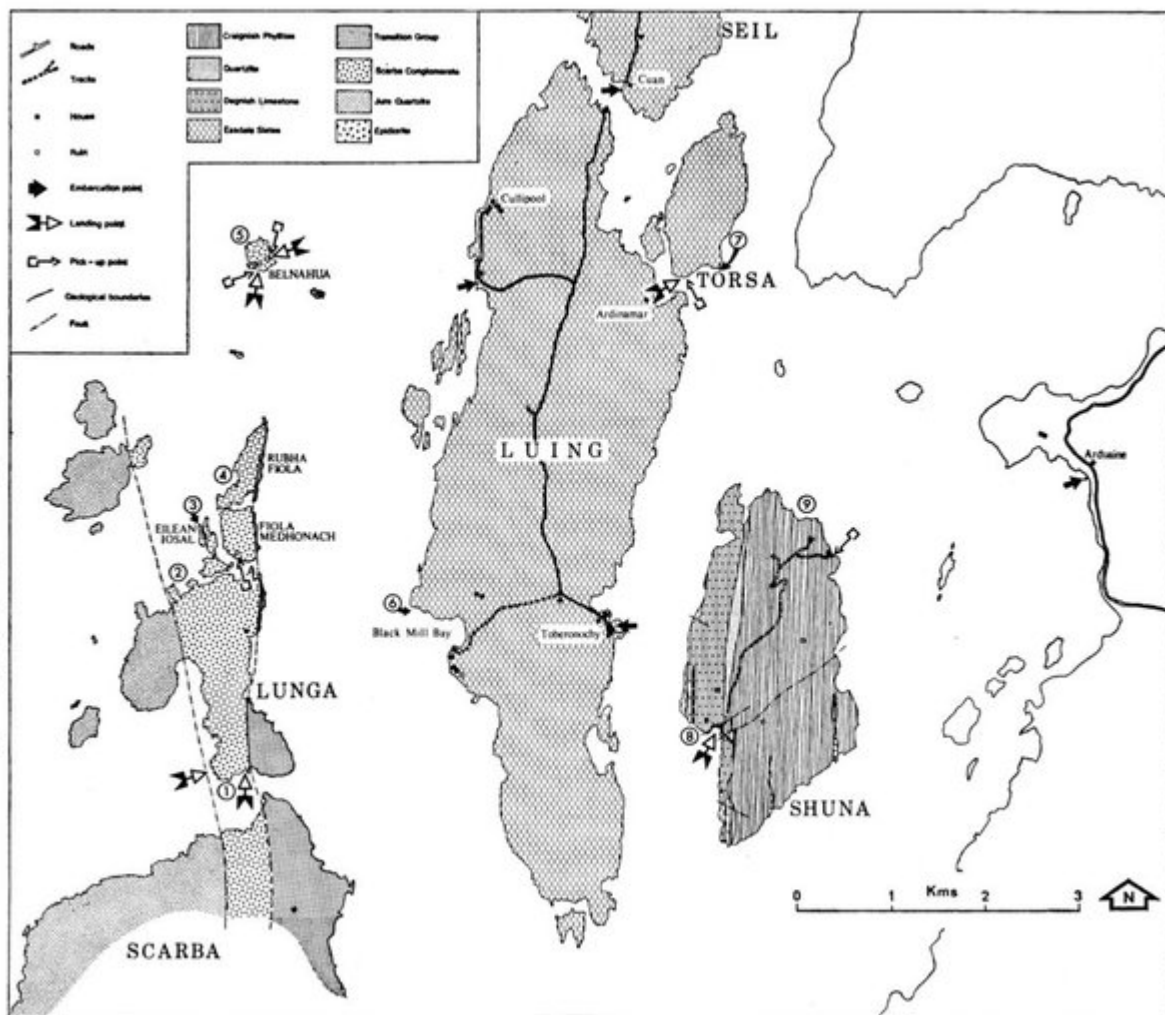
(Figure 1) General map of the area described in this guide. The Ordnance Survey 1:50,000 sheet 61 covers the whole of Jura. From: Anderton, R. 1977. 4: The Dalradian rocks of Jura. *Scottish Journal of Geology* v 13. p135–142.



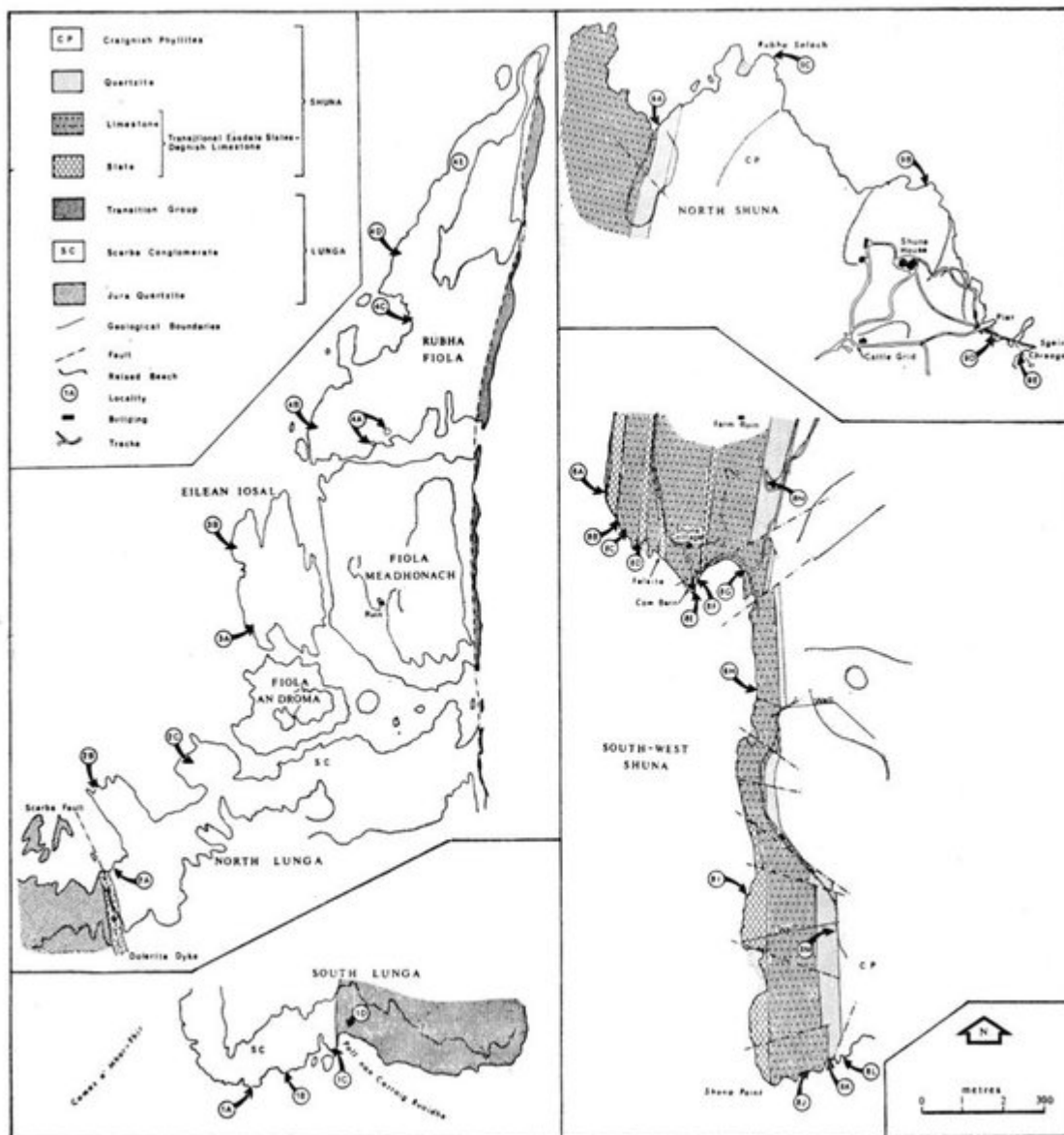
(Figure 2) Stratigraphical relationships of the formations described in this guide. From: Anderton, R. 1977. 4: The Dalradian rocks of Jura. *Scottish Journal of Geology* v 13. p135–142.



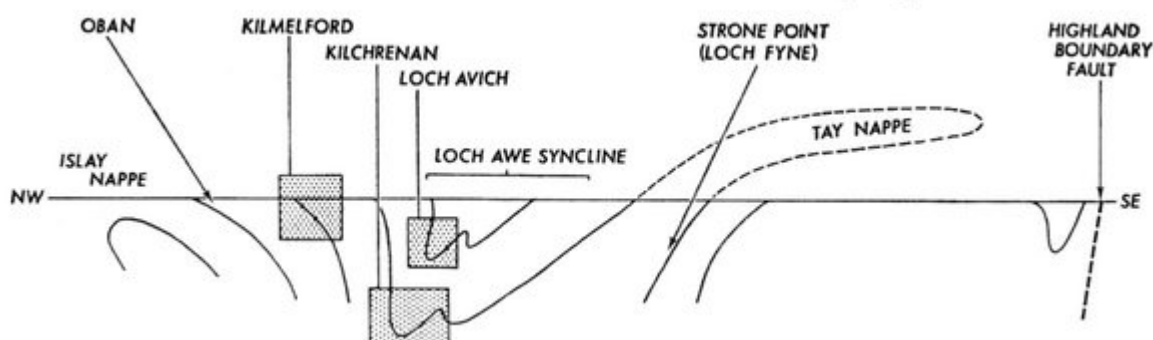
(Figure 3) General map of the area described in localities 4,5 & 6. From: Baldwin, C.T. and Johnson, H.D. 1977. 5: The Dalradian rocks of Lunga, Luing and Shuna. *Scottish Journal of Geology* v 13. p143–154.



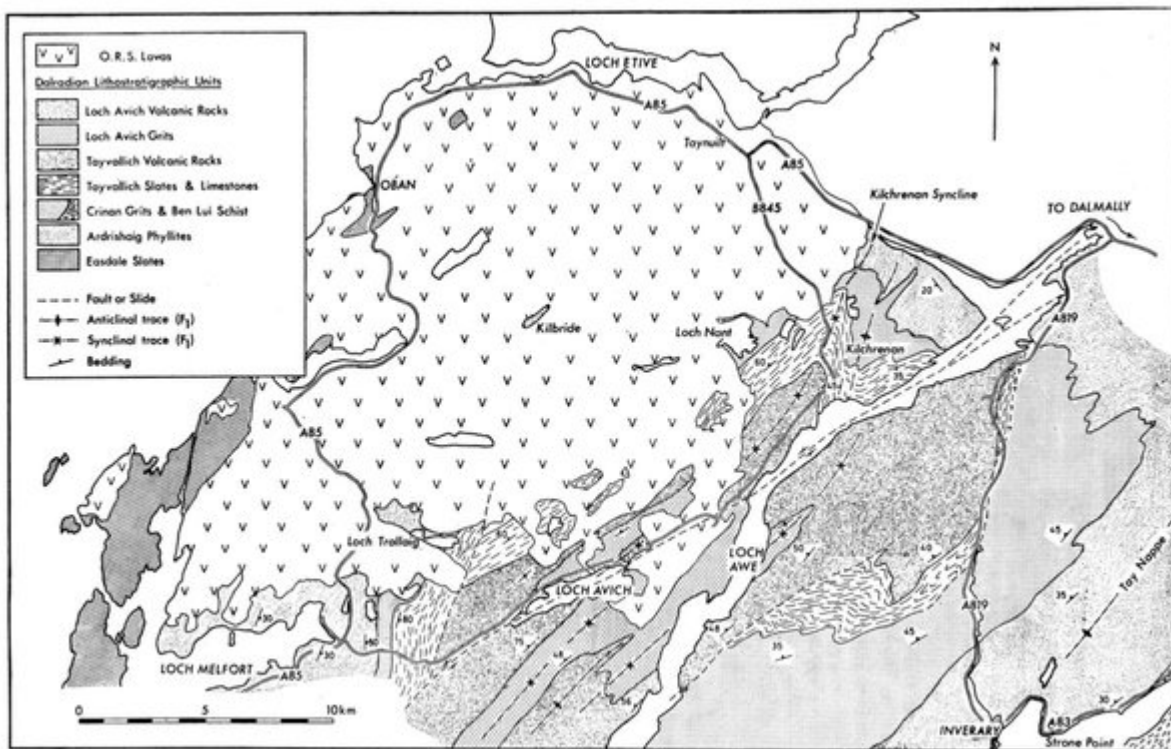
(Figure 1) General map of the area described in this article.



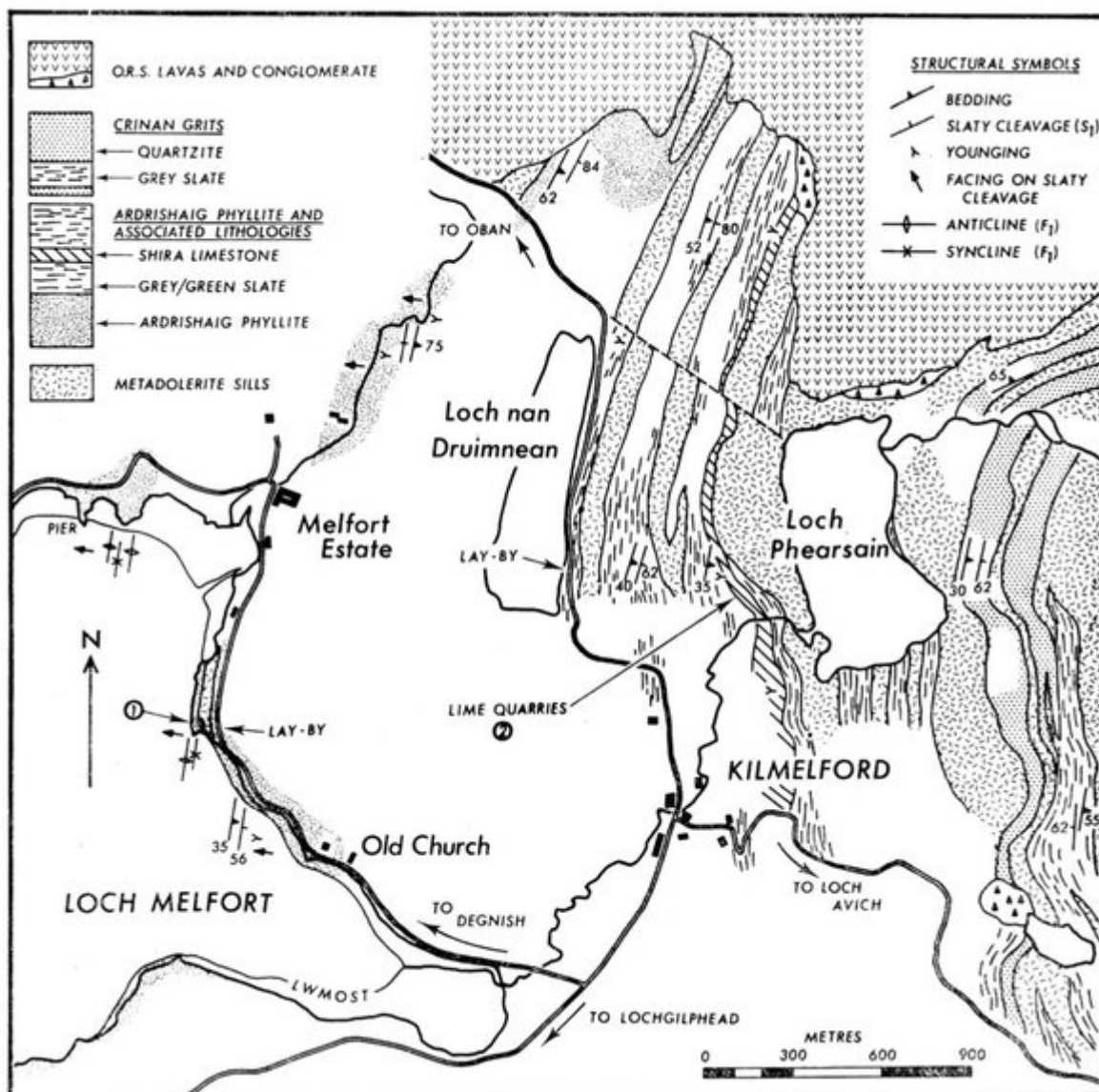
(Figure 2) Guide to localities described in localities 1-9



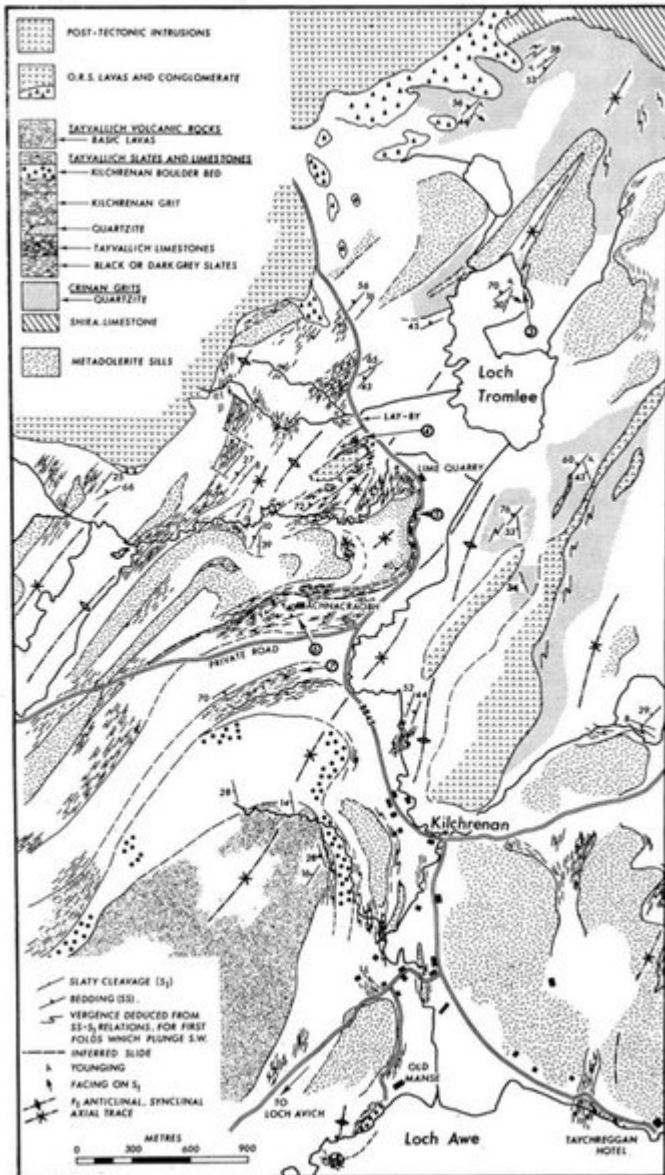
(Figure 1) Diagrammatic cross-section of the major structures of the Ilray Nappe Complex on which are indicated the approximate structural positions of the localities described in this guide. The stippled regions in this cross-section correspond to the areas illustrated by geological maps (Kilmelford), 4 (Kilchrenan) and 5 (Loch Avich). The localities at Oban and Strone Point are, respectively, localities 11 and 12.



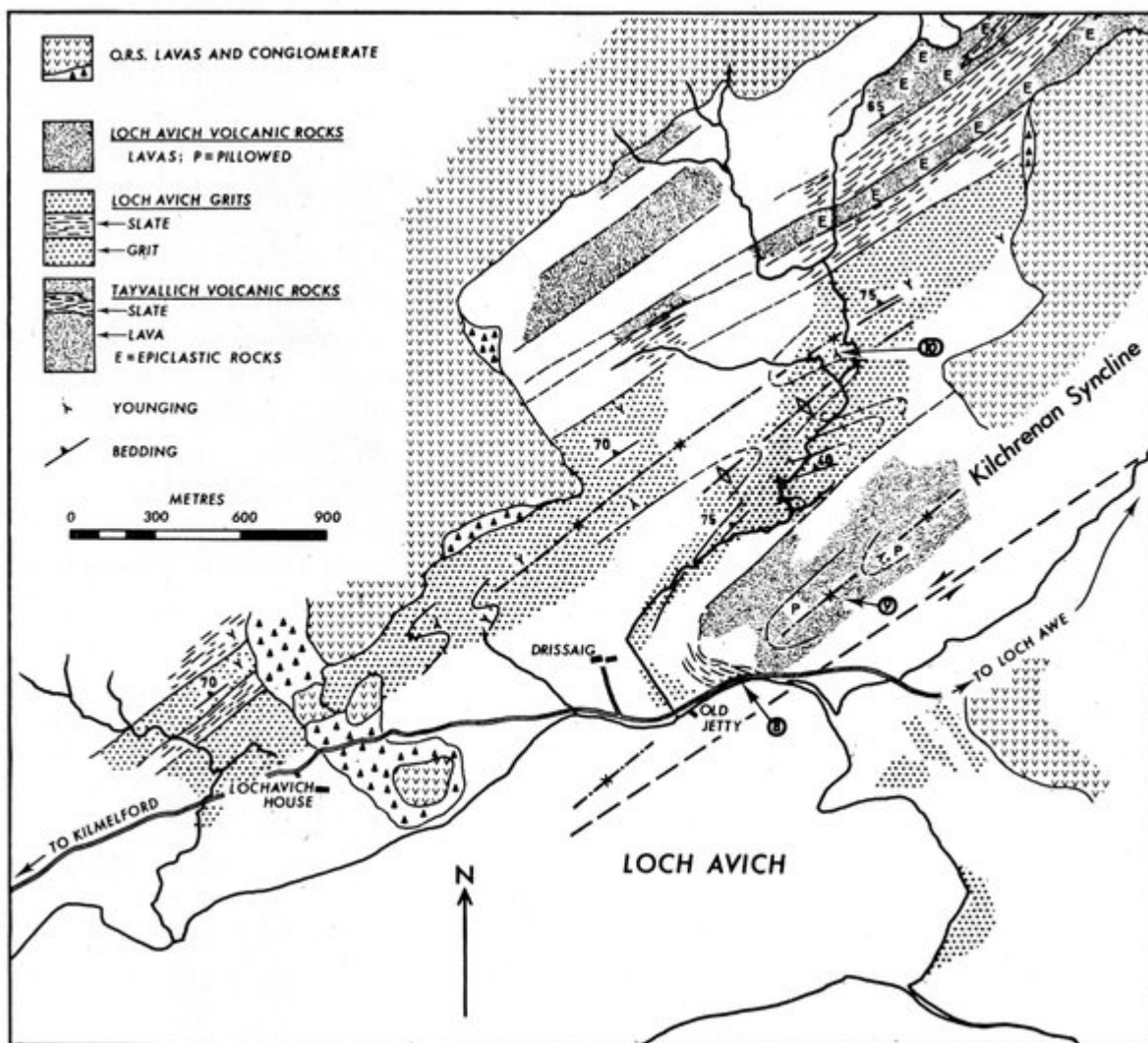
(Figure 2) Distribution of the principal lithologies of the Dalradian rocks in the Northern Loch Awe District (after Borradaile, 1973).



(Figure 3) Geological map of the Kilmelford district with localities 1 and 2 indicated. Areas in which the Dalradian rocks are less well exposed have been left unornamented and outcrops of post tectonic igneous intrusions have been omitted.



(Figure 4) Geological map of the Kilchrenan district with localities 3, 4, 5, 6 and 7 indicated. Areas in which the Dalradian rocks are poorly exposed have been left unornamented and outcrops of many minor post-tectonic igneous intrusions have been omitted.

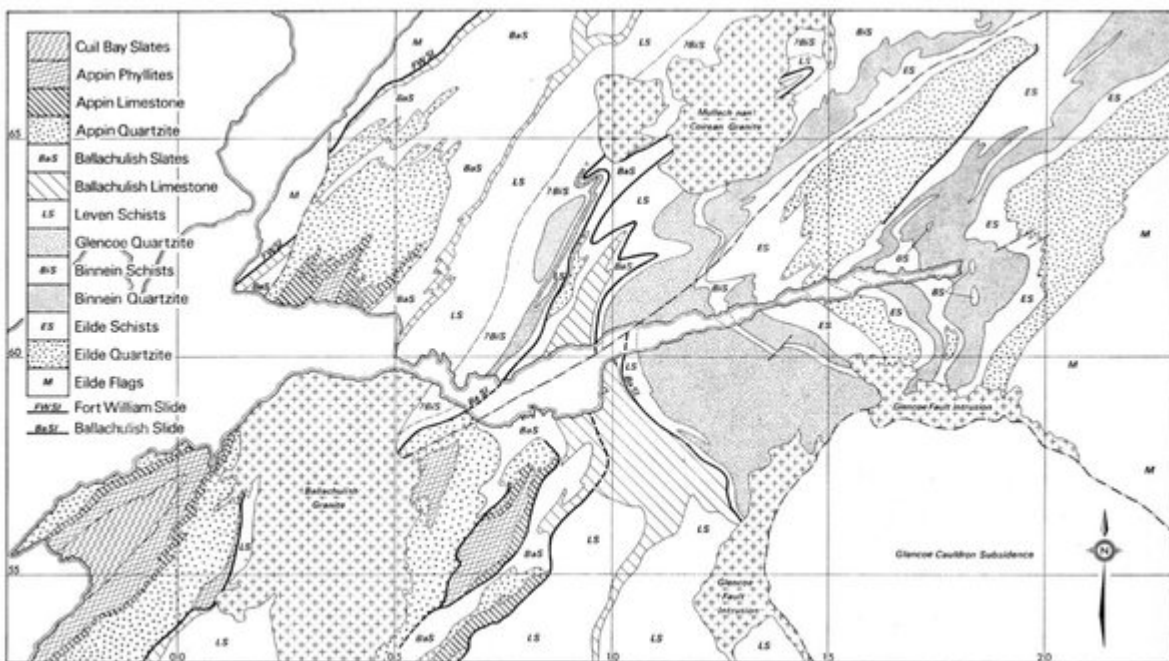


(Figure 5) Geological map of the ground to the North-East of Loch Avich with localities 8, 9 and 10 indicated. Areas in which the Dalradian rocks are poorly exposed have been left unornamented and outcrops of minor post-tectonic igneous intrusions have been omitted.

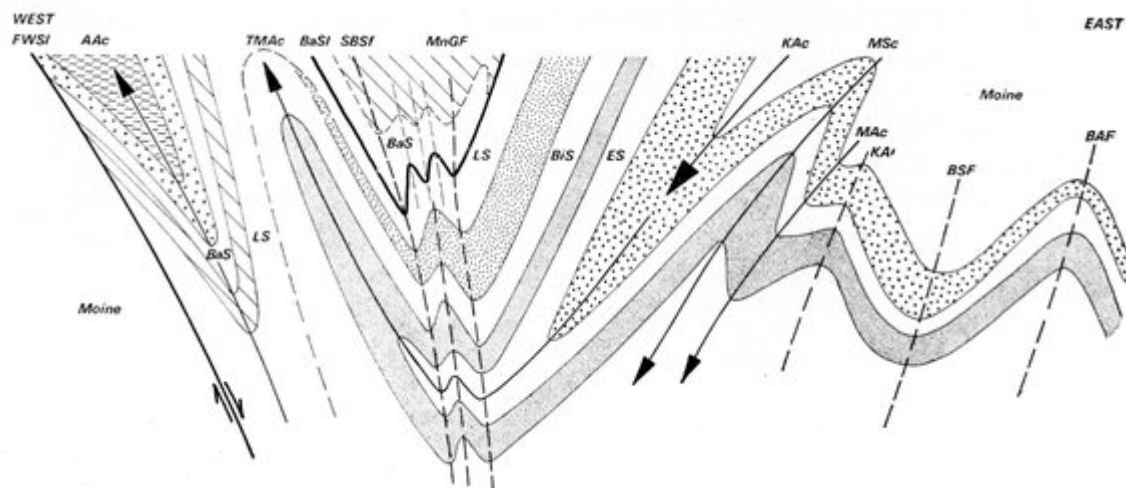
TABLE I. Stratigraphy of the Loch Leven area

Cuil Bay Slate	Black slates or phyllites
Appin Phyllite	Grey semi-pelitic phyllites with psammitic ribs
Appin Limestone	Mostly creamy, dolomitic and sandy
Appin Quartzite	Upper part massive, white, gritty; lower part (Transition Series) striped quartzite and black slate
Ballachulish Slate	Black slate
Ballachulish Limestone	Grey, banded; lower part creamy
Leven Schist	Green-grey phyllite or schist
Glen Coe Quartzite	Grey, feldspathic
Binnein Schist	Dark grey schists with psammitic ribs
Binnein Quartzite	Pure white, often with rusty spots
Eilde Schist	Dark grey schists with psammitic ribs
Eilde Quartzite	Grey to white, feldspathic

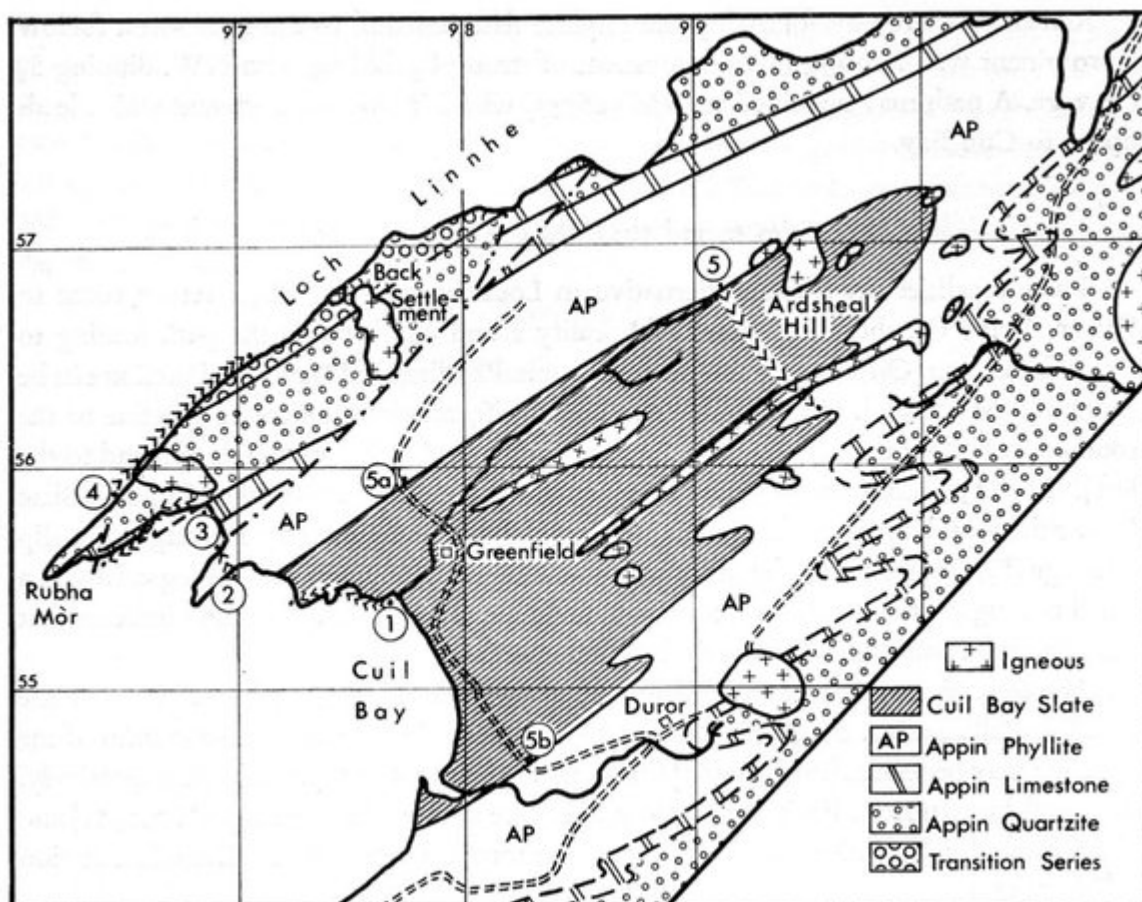
(Table 1) Stratigraphy of the Loch Leven area



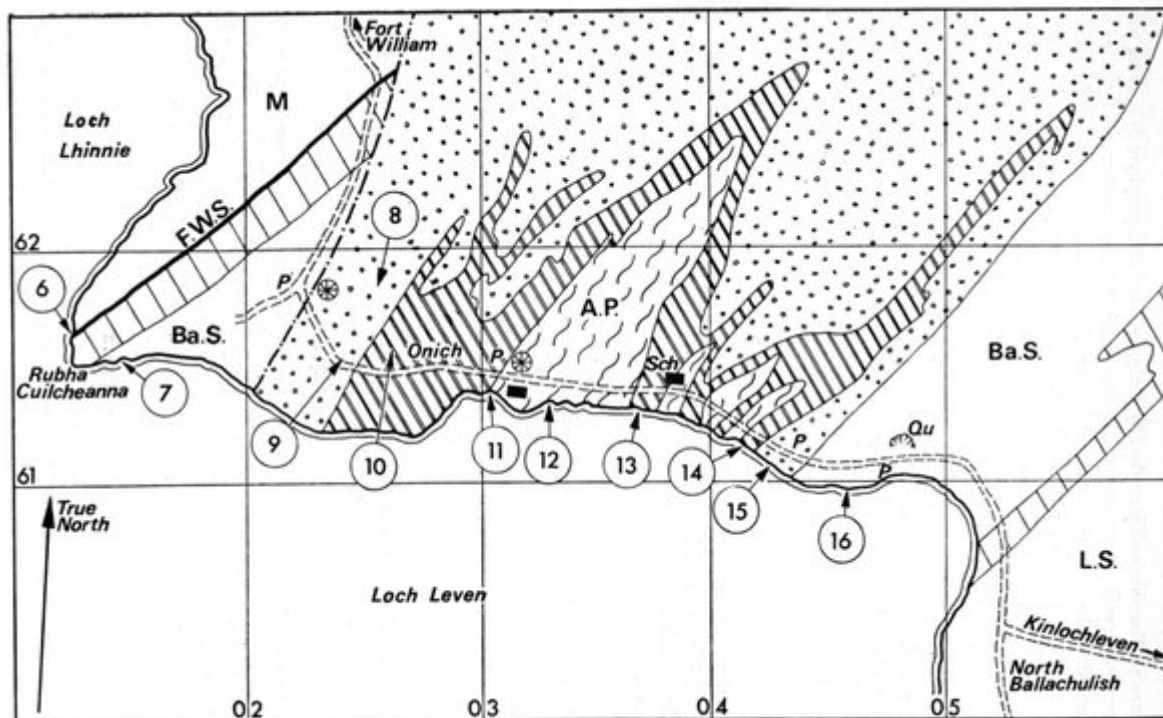
(Figure 1) Geological map of the Loch Leven area showing the lithostratigraphy. Modified from sheet 53 (Ben Nevis) of the Geological Survey of Scotland.



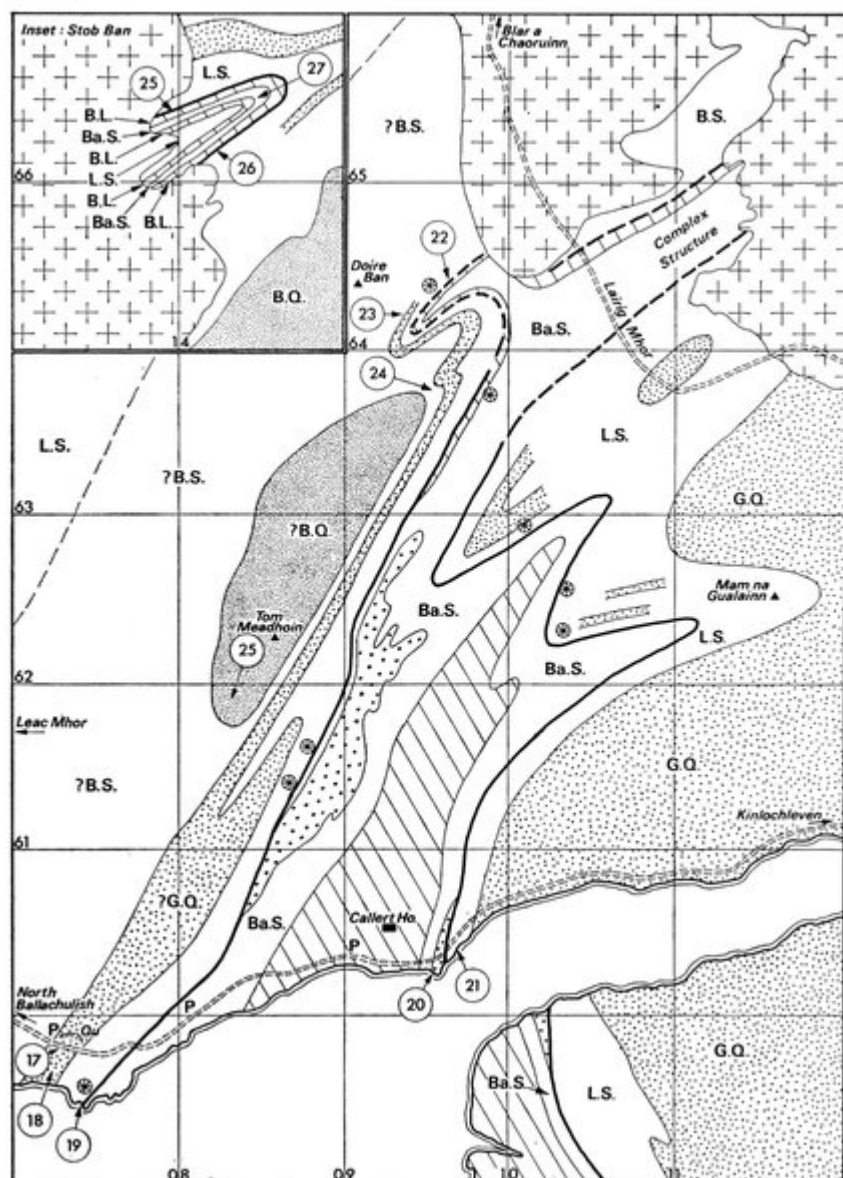
(Figure 2) Diagrammatic cross-section through the Moine and Dalradian rocks from Loch Linnhe (West) to the Blackwater Reservoir (East). Abbreviations as follows: FWSI Fort William Slide; Asc Appin Syncline; TMAc Tom Meadhoin Anticline; BaSc Ballachulish Syncline; SBSf Stob Bhan Synform; MnGF Mam na Gualainn Folds; BaSl Ballachulish Slide; KAc Kinlochleven Anticline; MSc Mamore Syncline; KAf Kinlochleven Antiform; MAc Mamore Anticline; BSf Blackwater Synform; BAF Blackwater Antiform.



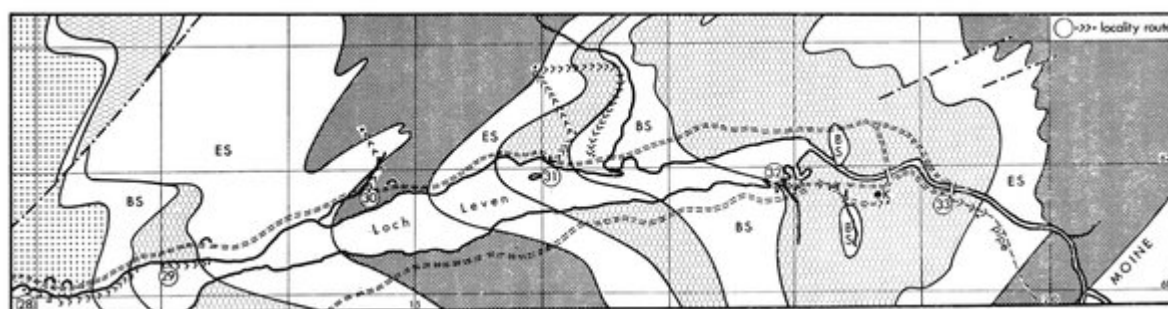
(Figure 3) Geological map of the Ardsheal peninsula (Excursion 1, localities 1–5).



(Figure 4) Geological map of the Onich section (Excursion 2, localities 6–16).



(Figure 5) Geological map (after Roberts, 1976) of the area between Callert and Stob Bhan (inset), (Excursion 3–5, localities 17–27).



(Figure 6) Geological map (after Treagus, 1974) of the Kinlochleven area (Excursion 6, localities 28–33).

		Islay & Tayvallich	Ballachulish & Loch Awe	Glen Cieran	Knapdale & Cowal	Central Perthshire
Southern Highland (Upper Dalradian)					Inveran Group with Loch Faid Conglomerate Bullrock Greywacke Dunrobin Phyllite	Highland Border Series Upper Lery Grit Lery Limestone and Shale Lower Lery Grit ?Albertville Slate Correlation uncertain
		Kells Grit Tayvallich Volcanics	Loch Avich Lavas Loch Avich Grit Tayvallich Volcanics		Benn Eithula Schist Green Beds Glen Sluan Schist	Ben Ledi Grit with Green Beds Pillchry Schist
Argyll (Middle Dalradian)	Tayvallich	Tayvallich Limestone	Kilchrean Conglomerate Tayvallich Slate and Limestone (thin ash bands)		Loch Tay Limestone	Loch Tay Limestone
	Crinan	Crinan Grit Ardmore Grit Conglomerate Limestone and Laphroaig Quartzite Port Ellen Phyllite	Crinan Grit		Stonfield Schist Garnetiferous Mica Schist Erns Quartzite (Upper part)	Ben Lui Schist
	Easdale	Scarba Conglomerate Jura Slate	Shira Limestone and Slate Ardishaig Phyllite Degnish Limestone	Ardishaig Phyllite (Bonawe Succession) Pebble Quartzite Group	Stronachullin Phyllite Erns Quartzite (Lower part) Ardishaig Phyllite Easdale Slate	Farragon Beds Ben Lawers Schist Ben Eigach Schist Carn Maing Quartzite
	Islay	Bonahaven Dolomite Port Askaig Tiltite	Islay Quartzite Dolomitic Beds Tiltite	Creagan Cieran Bridge Quartzite Cieran Flags	Perthshire Quartzite Series	Killicrankie Schist Schichallion Quartzite Dolomitic Beds & Boulder Bed Schichallion Boulder Bed
Appin (Lower Dalradian)	Blair Atholl	Islay Lst. (No correlation implied) Mullach Dubh Phyllite Ballygrant Limestone Baharadail Phyllites	Lismore Limestone Cull Bay Slate	Lismore Limestone	Pale Group Dark Group	Pale Limestone Banded Group Dark Limestone Dark Schist
	Ballachulish	Cnoc Donn Quartzite (Transition Group) Cnoc Donn Slate Kendra Limestone Kendra Phyllite Maol an Phrithich Quartzite	Appin Phyllite and Lst. Appin Quartzite (Transition Group) Ballachulish Slate Ballachulish Limestone Leven Schist Glencoe Quartzite Binnon Schist Binnon Quartzite Eide Schist Eide Quartzite Eide Flags (Moine?)	Appin Phyllite and Lst. Appin Quartzite (Transition Group) Ballachulish Slate Ballachulish Limestone Leven Schist Glencoe Quartzite	Relationship Uncertain	Kinlochlaggan Limestone Local Boulder Bed Kinlochlaggan Quartzite
	Lochaber (Transition)	Bowmore Sandstone				Manadhath Schist Eide Quartzite Struan Flags (Moine)

(Table 1) Lithostratigraphy compiled for the Dalradian rocks in the South-west Highlands of Scotland after Harris and Pitcher (1976).

Lithostratigraphic units		Principal lithologies	Observed thicknesses (km)
UPPER DALRADIAN (Southern Highland Group)	Loch Avich Volcanic Rocks	Basic pillow lavas.	0.3–0.5
	Loch Avich Grits	Graded felspathic grits with green and black slates.	0.65–1.1
	Tayvallich Volcanic Rocks	Basic lavas, some pillowed. Epiclastic volcanic material.	2.0
	+Tayvallich Slates and Limestones	Black slates and black limestones (slumped and graded in places).	1.0–1.2
	Crinan Grits	Quartzites, graded in places.	0.1–3.0
MIDDLE DALRADIAN (Argyll Group)	Ardishaig Phyllites and associated lithologies	Black sandy Shira Limestone and grey slates at top. 'Phyllites' are well bedded sandy limestones and fine-grained quartzites interbedded with green-grey pelite. Degnish Limestone at base.	4.0–4.5
	++Easdale Slates	Black slates with black limestones and silty horizons.	

(Table 1) Stratigraphic sequence for the northern Loch Awe District after Borradaile (1973). + = Lower Cambrian, ++ = Late Precambrian, from the micropalaeontological evidence of Downie et al. (1971).