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# Chapter 1 Introduction

## Area and physical features

Memoirs dealing with the geology of the southern half of Skye have been available for many years. That by A. Harker (1904) is a classic work on the Tertiary igneous rocks of the Cuillin Hills and adjacent areas. Later a memoir (Peach and others 1910) dealt with the Strath between Broadford and Torran and the peninsulas of Strathaird and Sleat. A description of the Mesozoic rocks of the east coast of northern Skye was included in a memoir by G. W. Lee (1920) on Applecross and Raasay.

The present memoir deals with the remaining part of Skye, i.e. that covered by one-inch Portree (80) and Rubha Hunish (90) sheets, whilst for the sake of completeness the coastal strip which appears marginally on one-inch Applecross (81) and Gairloch (91) sheets has been included. The small portion of Harris around Grosebay in the Outer Hebrides, an area of six square miles, has been omitted from both map and memoir because the rocks there exposed have no connexion with those appearing in N. Skye.

The area covered by the present memoir is about 670 square miles, of which about one third is sea. Topographically as well as geologically Skye falls into three very different subdivisions. The peninsula of Sleat is built exclusively of the older rocks, Lewisian to Cambrian in age, with a mature, heavily glaciated topography; the central area is one of violent contrasts including the jagged peaks of the Cuillins and the rounded Red Hills, both carved out of Tertiary plutonic rocks, whilst to the south and east are low-lying areas of Jurassic rocks. N. Skye on the other hand, together with the Strathaird peninsula, is built up of a great thickness of lava flows, Tertiary in age, resting on a platform of Jurassic rocks into which have been intruded numerous dolerite sills (Figure 1). The topography is rugged, rocky, and in places spectacular, though there are large areas of hummocky, peat-covered ground.

The coast is deeply indented, in fact no part of N. Skye is more than five miles from the sea, and the coastal scenery is impressive. On the east coast the Jurassic rocks and the included sills form step-like cliffs which, near Portree, rise more than 1200 ft above sea-level. The steep cliffs formed by the lavas on the west are even more spectacular, for example Biod Ban in Oisgill Bay rises almost vertically to 641 ft and Biod an Athair near Dunvegan Head is over 1000 ft high.

Topographically, N. Skye is in the form of three northward projecting peninsulas; the western one, Duirinish, is almost an island, whilst the central and eastern ones, Vaternish and Trotternish, project from a central area lying between Portree and Dunvegan.

This central area, except for a group of hills to the south-west of Portree, nowhere exceeds 1000 ft in height and is typically an area of complex drainage with many small lochans. Within it lie almost all the more recent of the lava-flows. It is cut off from the Trotternish peninsula by a low-lying strath which runs north-westwards from Portree and is continued by Loch Snizort Beag. Loch Greshornish, the valleys of the Red Burn and the Caroy River, and Loch Bracadale separate it from the Vaternish peninsula and Duirinish.

The Trotternish peninsula is traversed throughout most of its length by the high ridge of the lava escarpment. From Portree this ridge rises to 2360 ft at The Storr, then gradually descends to Meall nan Suireamach (1779 ft) at its northern end. At irregular intervals its edge has been scooped out by glacial action and landslip into scallops e.g. Bealach a'Chairn, Bealach Hartaval, Bealach na Leacaich, Bealach Chaiplin etc., leaving peaks between like The Storr, Creag a'Lain and Beinn Edra. To the east of the escarpment along its whole length lies the most extensive landslip in Britain. Great columns of lava have collapsed and slipped to form a confused mass of tumbled rock which extends in a series of jagged ridges some thousands of feet from the scarp, and at its northern end, the Quirang, to the sea. From the outer margin of the landslip the ground is more or less coincident with the dip-slope of the underlying Jurassic sediments to the sea-cliff.

Tertiary sills within these sediments often give rise to spectacular scenery like the Kilt Rock, Staffin, where columnar dolerite forms the upper half of the sea-cliff and Rubha Hunish where the sill forms a bastion 300 ft high. Along this east coast the rivers descend to sea-level in steep-sided gorges frequently displaying impressive waterfalls; the finest, those in the Bearreraig River which drains Loch Leathan and Loch Fada, have now been deprived of water by the Hydro-electric Scheme, but those in the R. Lealt farther north still function.

An unusual fall over a vertical cliff and dropping 170 ft directly into the sea is that draining Loch Mealt, the margin of which reaches almost to the cliff-edge.

In marked contrast to the eastern side, the western slopes of the Trotternish ridge are gentle and largely follow the low westward dip of the lavas. The slope is dissected by consequent streams which originate in glaciated corries and then flow through wide valleys into Loch Snizort. In one place, Glen Uig, the River Conan has cut through the lavas to expose in an amphitheatre the Jurassic sediments below.

The Vaternish peninsula also has a central ridge of lavas but it is mostly below 1000 ft in height and the base of the lavas is either just above or just below sea-level so that landslip topography is only developed in one or two places such as that at Score Horan on the east coast and on the northern and eastern slopes of Beinn Bhreac.

In Duirinish the lavas are lying almost flat or with a slight tilt to the east. The base emerges above sea-level in the west from Moonen Bay to Oisgill Bay, and there is landslipping at Waterstein Head.

The two best known peaks in Duirinish are Macleod's Tables, Healaval Mhor 1538 ft, and Healaval Bheag 1601 ft, both flat topped hills showing the characteristic step-like topography produced by the weathering of flat-lying lava-flows.

## Summary of geology

### Quaternary

	Freshwater and Marine alluvium
Holocene	Peat, Diatomite Landslips, Rock fall; Scree Moraine
Pleistocene	Sand and gravel Boulder Clay

### Tertiary

	Minor intrusions, sills and dykes
Igneous	Lavas, basalts, mugearites, trachytes Tuffs, agglomerates, breccias
Sedimentary	Sandstones and shales Palagonite tuffs Unconformity

### Jurassic

	Kimmeridge Clay
	Corallian Clay
	Oxford Clay
	Great Estuarine Series
	Inferior Oolite
	Upper Lias shales
	Middle Lias sandstones

The oldest rocks exposed in Northern Skye are of Liassic age and these are only seen at intervals between Camastianavaig and Holm Island on the east coast. The Inferior Oolite, again only seen in coastal exposures, forms precipitous cliffs from Camastianavaig to Upper Tote. The sediments belonging to the Great Estuarine Series underlie the Tertiary lavas over the greater part of the area. They are best seen in Trotternish where they form the ground between

the lava scarp and the east and north and north-west coasts, including the sea-cliff from Inver Tote to Staffin, and from Flodigarry to Uig Bay. Elsewhere they lie largely below sea-level and are only sporadically exposed by minor folds as in Loch Bay and in the extreme west between Moonen and Oisgill bays. The Oxford, Corallian and Kimmeridge clays are only found in Staffin Bay and in the Uig area (Figure 2).

After the close of the Jurassic Period these sediments were folded into a gentle syncline with a slight northerly pitch to its north-north-east axis. Later the syncline was eroded apparently to base-level, for the Tertiary lavas were seemingly extruded over a peneplane with only the smallest irregularities on its surface.

Tertiary volcanic activity began, perhaps in the Eocene (but see p. 79) with explosive violence and a considerable thickness of tuffs was laid down in water over the whole area. At this time there was virtually no extrusion of lava but later, fissures developed from which welled vast quantities of predominantly basic lava covering the whole area to a thickness of probably not less than 4000 ft.

Pauses in this activity were sometimes long enough for vegetation to develop and the remains of plants are found in some places preserved in a few feet of sediments.

After the cessation of this extrusive phase, magma was introduced into the Jurassic sediments to form a great series of dolerite sills and some dykes. Later still the whole area was extensively block-faulted, tilted slightly to the west, and invaded by a vast number of dolerite dykes.

In the late Tertiary there was deep weathering and extensive erosion, particularly of the lavas, and landslips developed along the Trotternish scarp.

With the onset of glaciation in the early Pleistocene most of this debris was swept away by the ice. The main ice-flow was from the Highlands westwards but this was largely diverted by the eastern cliff and lava scarp into a north-flowing stream which was only able to resume its original direction in the extreme north of Trotternish.

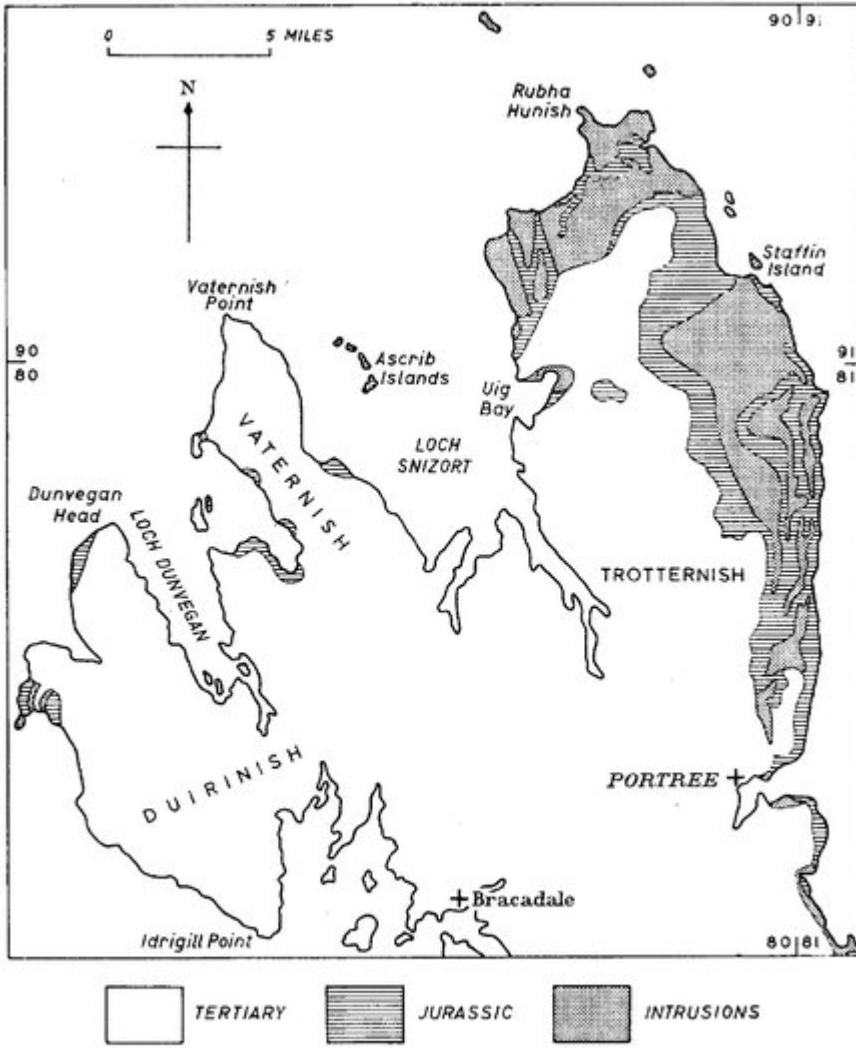
With the retreat of the ice, landslipping again developed (Plate I), followed by the formation of thick peat over most of the area.

## References

HARKER, A. 1904. The Tertiary Igneous Rocks of Skye. Mem. Geol. Surv.

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PEACH, B. N., HORNE, J., WOODWARD, H. B., CLOUGH, C. T., HARKER, A. and WEDD, C. B. 1910. The Geology of Glenelg, Lochalsh and South-East part of Skye. Mem. Geol. Surv.



**FIG. 1.** Sketch map showing distribution of main groups of rocks in Northern Skye. Figures indicate margins of one-inch sheets

(Figure 1) Sketch map showing distribution of main groups of rocks in Northern Skye. Figures indicate margins of one-inch sheets.

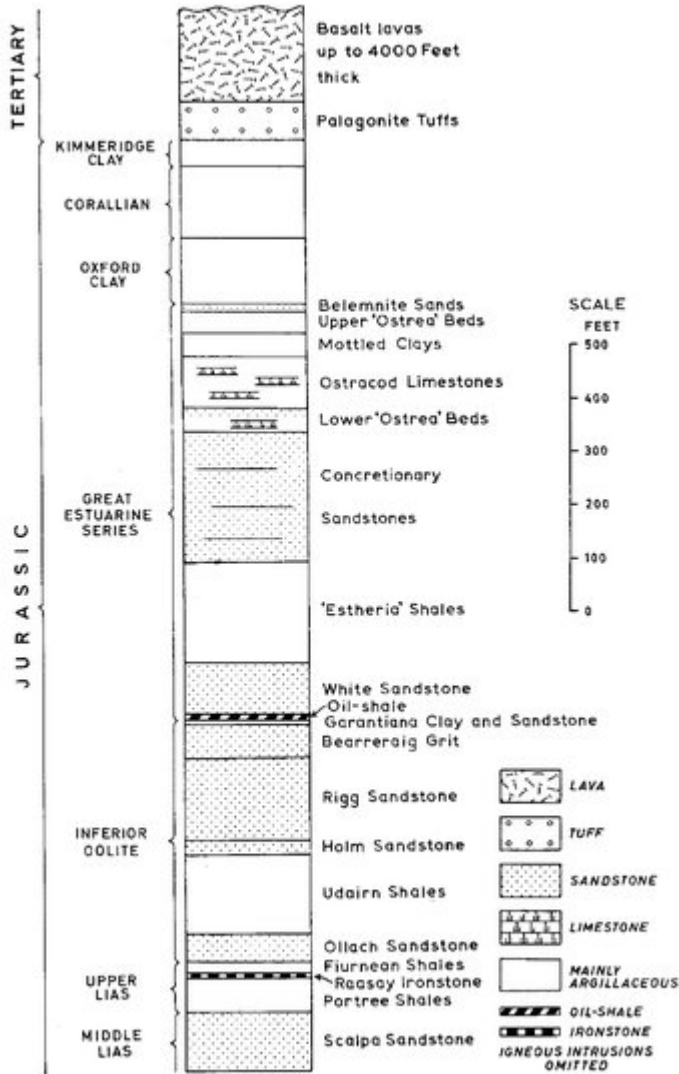


FIG. 2. Generalized vertical section of sedimentary and volcanic rocks exposed in Northern Skye

(Figure 2) Generalized vertical section of sedimentary and volcanic rocks exposed in Northern Skye.