Chapter 13 Economic geology

Ironstone

Chamositic ironstone averaging 8 ft in thickness occurs in the Upper Lias of Raasay and was successfully worked for some years (Lee 1920, pp. 31–41; Macgregor 1920, pp. 196–202).

In bores put down at the mouth of the Bearreraig River in Skye the ironstone was found to be 5 ft 9 in thick and in the same stratigraphical position as in Raasay. Here, however, the rock is a greenish, ferruginous, oolitic limestone of much lower grade and different in composition. The iron in the Raasay workings is in the form of a silicate, here it is as a carbonate. The average iron-percentage in a sample analysed by Messrs. Baird was 11.96 per cent. A mile south of Bearreraig the ironstone was only 2 ft thick. Southwards, though Upper Lias strata occur at intervals as far as Tianavaig Bay, no ironstone has been observed. Were ironstone proved in the area north of or west of Bearreraig it would be under a great thickness of Inferior Oolite, Great Estuarine Series etc. and a variable thickness of Tertiary lavas. This together with its low grade makes the ironstone in Skye an uneconomic proposition.

Jet

A thin band of jet was found by Tait in the exaratum Subzone of the Upper Lias, three-quarters of a mile south of Holm. The well-known Jet Rock horizon of Yorkshire is at this same stratigraphical level (Lee 1920, p. 39).

Oil-shale

The base of the Great Estuarine Series in Skye and Raasay is in some areas marked by oil-shale 8 to 10 ft thick which follows conformably on the clay of the garantiana Zone (Lee 1920, p. 47). In Raasay this is a true oil-shale similar to those worked in the Lower Carboniferous strata of the Lothians. Weathered samples analysed by Mr. D. R. Steuart of the Broxburn Oil Works gave 12 gallons of crude oil per ton of shale.

In Skye the oil-shale forms the base of the Great Estuarine Series from Ollach to Bearreraig. The seam is about 7 ft thick capped by some 3 ft of sandy bituminous shale. A compound sample from between Holm and Prince Charles's Cave yielded 12.8 gallons of crude oil per ton.

To the south the shale tends to pass laterally into an impure coal. Northwards it is replaced by a black sandstone.

Lignite

Lignite is found in small quantities at various horizons in the Jurassic rocks. As mentioned above, the oil-shale at the base of the Great Estuarine Series passes into a 'coal' south of Portree. Coal burnt by a dolerite sill occurs in thin streaks on the shore east of Achnahannait, south of Camastianavaig. Further south at Upper 011och attempts have been made to extract coal from a lenticular seam between tide-marks. Impure coal is known from higher horizons in the Great Estuarine Series ; for example, coal was at one time dug at Port na Cagain in baked shale (Ostracod Limestone), on the east side of Lovaig Bay and on the shore of Loch Bay, in Vaternish.

Tertiary lignite is more abundant but still not present in any economic amount. It occurs in the Palagonite tuffs at the base of the lavas ; less frequently in the interbasaltic sediments which separate the main periods of eruption. A seam said to have been from 1 to 3 ft in thickness and to have yielded 500–600 tons was once wrought in Camas Ban on the south side of Portree Harbour (Macculloch 1819, p. 360). This and the occurrences at Loch Cuithir (MacCallum 1920) at Camastianavaig, Scoribreck and at Peinvraid in the Conon valley near Uig, were in the basal tuffs. Interbasaltic lignites are known near the head of Loch Greshornish, near Dunvegan, just south of An Ceannaich where a 1 ft 3 in-coal can be seen in shales and sandstones about 26 ft up the cliff; in shaly sandstone between two lava flows in the Hamra River; in

tuffs just west of Airigh Neil; in bole half a mile south of Cnoc nan Braonar below a mugearite flow; and in dark shales in the Tungadal River, one mile north-east of Roineval. None of these are of any economic value, though that at An Ceannaich was reported by Geikie (1896, p. 342) to be glossy, hard, and of remarkable purity.

Peat

Until recent years peat was the chief, indeed almost, the only fuel of the inhabitants but apart from this domestic use the economic possibilities of this material have not been exploited in Skye.

Much of the island is peat covered sometimes to considerable depth, but accurate figures for the thickness of peat are not available. When the road to the diatomite mine at Loch Cuither was made some 10 ft or so of peat had to be cut through before a firm foundation was reached and a similar thickness is known near Loch Mealt. In general peat-cutting has gone on to an average depth of 5–6 ft in most parts of the island.

The appearance of the old peat hags suggests that peat formation to-day is negligible and it is thought to have been at its maximum in the relatively cold, wet period immediately following the Atlantic climatic optimum.

Diatomite

Diatomite, used as an absorptive for nitro glycerine, as a polishing medium, filler, insulator, filter and in the manufacture of paint, is found in several places in Skye. For further details of the composition and uses of Diatomite the Geological Survey Wartime Pamphlet No. 5 should be consulted (Haldane, Eyles and Davidson 1940).

1. Sartil. Diatomite has been worked commercially at Sartil, 2 miles west of Stenscholl on the north side of the Stenscholl-Uig road, but the deposit is now exhausted. It was found in a small loch in the Quirang landslip which was drained and the diatomite taken by aerial ropeway to the village of Digg, a mile to the north-east, where a pier, now destroyed by the sea, had been built.

Analysis of the Sartil diatomite, air-dried, gave silica 8809 per cent, lime etc. 0.75 per cent, ferric oxide 3.36 per cent, organic matter 7.79 per cent. After calcination the silica percentage rose to 95.54 per cent. Its absorptive value, calculated as increase in weight of the calcined diatomite after saturation was 2.84 (a good diatomite would have an absorptive value of 4.0).

The Sartil deposit was worked by the British Diatomite Company from 1908 until, in 1911, the workings were taken over by the Skye Mineral Syndicate Ltd. of Manchester. Work was finally abandoned in 1913.

2. Loch Vallerain. The old lake basin due east of Loch Vallerain and just north of Digg shows indications of diatomite. The extent of the deposit is unknown but is likely to be small.

3. Glashvin. A thin layer of diatomite was disclosed in a cutting at Glashvin during the reconstruction of the road from Staffin to Flodigarry, in 1937. The deposit occurs about 900 yd north of the road fork at Brogaig and quite close to the lowest point on the rim of a hollow lying just west of the road. The alluvium which occupies the floor of this depression might therefore, repay investigation.

4. Loch Cleat. Bordering this small loch just east of Duntulm, good quality diatomite has been found beneath the peat. But again the extent of the deposit is not likely to very great.

5. Loch Sneosdal. In the old loch basin west of Loch Sneosdal and about one and a half miles south-east of Heribusta, diatomite has been found below the peat. The extent of the deposit is unknown but the sample analysed from here was of good quality though the iron content was rather high. The air-dried material had the composition—silica 83.79 per cent, lime etc. 3.80 per cent, ferric oxide 7.75 per cent, organic matter 4.63 per cent. After calcination the silica percentage was 87.87 per cent and the absorption value 3.27.

6. Loch Chaluim Chille. This lake basin lying between Balgown and the east coast is almost one square mile in extent. It has now been drained but round the margin of the old loch diatomite has been found in several places. The deposit is very irregular. At the southern end it is mixed with sand and mud but to the north of the ruins of the old monastery which once stood on an island in the loch, the diatomite ranges from one to five feet in thickness with a like thickness of peat and mud above. In places the deposit is contaminated with mud and silt and in one instance there is a bed of sand in the middle of a three-foot thickness of diatomite. Two samples of the diatomite were analysed by Macadam.

They gave I. silica 63.69 per cent, lime etc. 4.17 per cent, ferric oxide 9.13 per cent, organic matter 23.01 per cent. After calcination the silica rose to 82.72 per cent. The absorption value was 3.59. II. silica 82.91 per cent, lime etc. 0.93 per cent, ferric oxide 4.78 per cent, organic matter 11.38 per cent. Silica after calcination 93.55 per cent. Absorption value 2–66. The silica percentage is rather lower than the average but the absorption value remains high.

7. Loch Mealt. Diatomite is present in the marshy ground bordering the loch on the western side. The material is of good quality but lies below 10 ft of peat. The full extent of this deposit has not been explored.

8. Loch Beinnichte and a nearby dry lochan on the Score Horan landslip in Vaternish contain some diatomite deposits but their full extent, which cannot be great, has not been established.

9. Loch Cuithir. The loch named Cuithir is situated on landslip north-east of Creag a' Lain. The present loch is a much diminished remnant of a body of water which at one time must have covered about 24 acres. Within it the largest diatomite deposit so far known in Skye was formed. The diatomite ranges from 8 ft to 18 ft in thickness (40 ft in Strahan and others 1917, p. 38) and is covered by an average thickness of 3 ft 8 in of peat. The material is very pure with no included bands of mud or silt.

Macadam's analyses show that the calcined diatomite contains over 96 per cent of silica (98.78 per cent in Strahan and others 1917, p. 38), and has an absorptive value of over 3–56.

The Loch Cuithir diatomite was originally worked by the British Diatomite Company, later by the Skye Mineral Syndicate Company. A three-mile tramway connected the diggings with the shore at Inver Tote.

Road metal

Most of the Skye roads are constructed of local material usually dolerite taken from small conveniently adjacent quarries in the Tertiary sills. This provided hard core and the top dressing, before the relatively recent introduction of macadam, was the fine brown chloritic material found where the sill has been deeply weathered or rotted by a transcurrent dyke.

Inverness County Council have extensive diggings in the 25-ft Raised Beach at Sconser just south of the Portree (80) Sheet from which sands and gravels composed of granite, quartzite, sandstone, grit, basalt, porphyrite and hornfels fragments are obtained for use as road aggregate.

Limestone

Some of the limestones in the Great Estuarine Series are of fair quality but in general are not sufficiently good or accessible to be worth exploitation for anything but local use (Phemister in Muir and others 1956, p. 132).

Shell sand

The distribution of the shell and nullipore 'sands' of N. Skye has been described on p. 196. The latter is often of good quality. The analysis of a sample from Camas Ban, 4½ miles N.N.W. of Dunvegan and ¾-mile W.N.W. of Claigan, by Muir and Hardie (in Muir and others 1956, p. 64) showed 84.32 per cent $CaCO_3$ and 1035 per cent $MgCO_3$. The 'sand' has at times been dug locally for agricultural lime. It is estimated that a minimum of 2500 tons is available in Camas Ban (Claigan) at low tide, and rather less than half this at high tide. The total amount available is of the order of 5000 tons (Haldane 1939, p. 442; Robertson and others 1949, p. 125).

Honestone

Indurated Jurassic shale is a common feature in North Skye where the Tertiary dolerite sills have caused extensive alteration. In places, such as on the north side of Cairidh Ghlumaig, Duntulm, the shale has been converted into buchite, a rock in which abundant minute prisms of the mineral mullite have developed. Mullite is a compound chemically and physically identical with artificial sillimanite ($3Al_2O_3.2SiO_2$) and with a lower refractive index than true sillimanite ($A1_2O_3.SiO_2$). The rock therefore would serve as a honestone, but has never been exploited for this purpose (see Bailey and Anderson 1925, pp. 76–7; Bowen, Greig and Zies 1924, p. 183).

Water

Much of the domestic water in Skye is obtained from springs and wells supplemented in the larger communities by concrete cisterns and collecting tanks. Portree has a reservoir just north of the town fed by the R. Chracaig and Staffin is supplied from Loch Cleap. The water is acid and after periods of heavy rain is usually a rich brown due to included organic material from the peat.

In the landslip areas water-supply is difficult since most of it drains through the slip and emerges at its margins in the form of springs. Hydro-electric power has now been developed in the Portree area. The Bearreraig River, the outlet for Lochs Leathan and Fada, was dammed about 10 years ago and the level of the two lochs raised. The power house, situated on the 25-ft Beach at the mouth of the Bearreraig River, now supplies electric power to Portree and its woollen mill. In the south of Skye electricity is supplied from the mainland grid.

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