Chapter 20 Kishorn to Loch Alsh

By B. N. Peach and J. Horne. The area described is comprised in Sheets 71 and 81 of the Geological Survey Map.

Between the Kishorn valley and Loch Alsh a considerable area of Torridon Sandstone is associated with the displaced masses that overlie the Kishorn thrust-plane. Throughout this district, with the exception of a strip of ground, about half a mile broad, extending along the shore between the mouth of Loch Carron and the Kyle of Loch Alsh, the strata are inverted. Though over much of this district, in spite of the great displacement which the Torridonian strata have undergone, they display a marked absence of schistosity, they have nevertheless been indurated, bleached, and, as shown in Chapter 16, present characters in some places approaching those of true schists. In the tract north of Loch Carron and for three miles to the south of that sea-loch, as far as Gleannan Dorch, the basal beds of the Torridon Sandstone pass, with an inverted easterly dip, underneath the overlying Lewisian gneiss.

The Diabaig and Applecross groups of the Torridonian formation are both represented in this district, but the Altbea series has not been detected.

(1) Diabaig Group

This division presents a strikingly different character here from that which it displays in the districts further north, which have been described in the foregoing chapters. In particular, it undergoes an extraordinary development both in thickness and in variety of sediment as it is traced towards the south-west, attaining its maximum in Skye. Its sub-divisions have been mapped in detail in that island, and having been first established there have subsequently been identified and followed north-eastwards on the mainland. But they rapidly diminish in thickness in that direction, until beyond Kishorn they are abruptly cut off by the Kishorn and Glen Logan thrust-plane. Adopting the classification established in Skye, we find the group in the present district to consist of the following sub-divisions in descending order:

Diabaig Group

(d) Grey sandy shales and fine-grained sandstones with massive grey and green grits; thickness 2,700 feet (Kinloch Beds).

(c) Fine-grained grey and green grits, sandstones, and flags; thickness 1,200 feet (Beinn na Seamraig grits).

(b) Grey, blue, and black shales, with calcareous bands and grits sometimes calcareous; thickness 500 feet (Loch na Dal Beds).

(a) Green epidotic grits with a conglomerate bed at the base, locally developed; thickness 60 feet.

(a) Epidotic Grits

The conglomerate, which is locally developed at the base of this sub-division, is best seen at Fernaig, by the roadside leading from Stromeferry to Plockton (Sheet 71), where the basal beds of the Torridon Sandstone dip eastwards at angles from 18° to 20°, and pass underneath deformed Lewisian gneiss. The conglomerate, from 15 to 20 feet thick, and the epidotic grits form a prominent ledge round the face of the crag to the south. The matrix, in which lie pebbles of various types of epidotic gneiss (Lewisian), from two to twelve inches across, consists of green epidotic grit. Perhaps its most characteristic feature is the abundance of well-rounded pebbles of vein-quartz, usually stained purple. The matrix here shows marked flaser structure, and the gneiss-pebbles are sometimes flattened, elongated, and under the microscope show remarkable cataclastic structures. The conglomerate is again exposed near the crest of the prominent crag south of Fernaig, at a point about a mile due east of the mansion-house of Duncraig.

The epidotic grits, which are charged with epidote and chlorite, show on the weathered surface numerous grains of blue quartz and epidotised felspar. Under the microscope the larger grains, specially of quartz, are granulitised, and the matrix

often forms a granulitic mosaic, rich in epidote and chlorite. This band of green epidotic grits can be traced continuously round the crag from Fernaig to the valley of the Gleannan Dorch, where they are truncated by a thrust to be referred to in the sequel. Northwards, the grits again appear at the foot of the great crag that bounds the 100-feet beach near Port-a-Chuilinn. On the north side of Loch Carron (Sheet 81) the characteristic features of these grits are well displayed on the shore section three-quarters of a mile west of North Strome Pier, where they are about 20 feet thick, and dip east below deformed Lewisian gneiss. Here the local basal conglomerate is absent, but no apparent plane of disruption can be detected. From the shore of Loch Carron the zone can be traced round the west slope of Bad a' Chreamha, but seems to disappear in a northerly direction; for, on the west face of An Sgorr, two miles and a half north of Stromeferry, the grey flags and dark shales of the Loch na Dal sub-division are in contact with the overlying gneiss. In Glenmore, about two miles east of Courthill House, Kishorn, a small exposure of epidotic grit is visible at the roadside, where the boundary line between the Torridon Sandstone and the overlying Lewisian gneiss is shifted by a normal fault. Northwards, the dark shales (Loch na Dal) are in contact with the Lewisian gneiss, and at Cearcall Dubh a local conglomerate appears in that position, the epidotic grits and Loch na Dal shales both being absent. These features evidently indicate the unevenness of the surface of gneiss on which the Torridonian sediments were laid down and the overlap of successive horizons against that ancient platform.

(b) Loch na Dal Shales

This sub-division consists of grey, blue, and dark striped shales, flags and calcareous bands, alternating with green and grey banded sandstones and pebbly grits. A characteristic feature of these strata is the occur- rence of grains of quartz and felspar in. the finer sediments. Some of the bands of shale and grit effervesce freely with acid, the grit frequently weathering with a carious surface. The shales pass into slates and phyllites. Further, the grits show marked flaser structure; the finer grains have been granulitised, while those of larger size show peripheral granulitisation. Sericite and, in some instances, brown mica have been developed as a result of the dynamic metamorphism which these rocks have undergone during the vast earth-movements which placed them in their present abnormal positions.

The Loch na Dal shales form a narrow belt to the west of the epidotic grits north of Loch Carron. Excellent exposures of them are to be seen on the shore three-quarters of a mile west of Strome Castle, on the west slopes of Bad a' Chreamha, and An Sgorr, east of Loch Kishorn. South of Loch Carron they are visible at the inner margin of the 100-feet beach at Port-a-Chuilinn. Beyond, at Fernaig, they appear on the roadside, and can be traced round the face of the great crag east of Duncraig to Gleannan Dorch, where, like the epidotic grits, they are truncated by an important thrust. Along this line they have a persistent reversed easterly dip, plunging underneath the epidotic grits, and resting on the members of the succeeding group.

(c) Beinn na Seamraig Grits

These consist of grey and green grits, showing alternations of fine flaggy sandstones with derivative mica, and containing lines of heavy minerals (iron-ores and sphene). Green sandy phyllites sometimes occur among them. The grits contain quartz, microcline, and oligoclase imbedded in a matrix usually granulitic, and containing sericitic mica. These strata are frequently traversed by quartzo-felspathic veins and strings of quartz and vermicular chlorite.

South of Loch Carron, as far as Gleannan. Dorch, this subdivision occupies a strip about three-quarters of a mile broad to the west of the striped Loch na Dal shales. Perhaps one of the best sections of these grits is that exposed on the south of Loch Carron, along the shore between Duncraig and Fernaig. South of Gleannan Dorch the sub-division is overridden by highly deformed gneiss, the boundary line between the two being a well-marked thrust-plane. The complicated structure of this region will be described in Chapter 38., Part 4, Sec. ii., i. The same strata reappear near Balmacarra Hotel and on the shore to the east of that point, where they are truncated by a thrust-plane to be referred to in the sequel. North of Loch Carroll they appear on the shore east of Loch Reraig, and extend northwards in the direction of Glenmore, east of Kishorn.

(d) Kinloch Beds

The prominent feature of this sub-division is the occurrence of zones of grey sandy shale, which at some places — for example, to the east of Kyle of Loch Alsh — have been quarried for slates.

These shales are associated with fine-grained green and grey sandstones and flags and massive grits, which, with their included quartz and felspar fragments, resemble arkoses of the Applecross group. In places along their outcrop the grits are markedly schistose, as, for instance, near Duncraig, where they contain clastic grains of quartz, microcline and oligoclase lying in a micro-crystalline matrix of sericite and chlorite, showing flaser structure. This matrix is largely of secondary origin. Indeed, over a large part of the area occupied by these grits they furnish remarkable evidence of the deformation which they have undergone.

Though shales occur at intervals throughout this sub-division, they are specially developed on two horizons — one near the top and the other near the base. The higher belt, which, as the strata are here inverted, is the more westerly of the two, is well exposed on the shore about half a mile east of Kyle of Lochalsh (Sheet 71), where the shales alternate with fine-grained green sandstone. The same strata occur at intervals eastwards as far as the Bay of Scalpaidh, presenting an easterly dip at angles ranging from 70° at their western limit to 20° on the east. They are traceable northwards by Loch Scalpaidh to Allt Dhuirinish, where they are worked for roofing slate, to the shore of Loch Carron between Duncraig and Plockton. They reappear on the north side of Loch Carron in a small bay one mile west of the head of Loch Reraig, and they cross the peninsula to the shore of Loch Kishorn near the pier at Achintraid.

The dark blue and grey slates and flags near the base of the Kinloch Beds are well exposed on the shore on the west side of Balmacarra Bay, where they dip a few degrees to the south of east at angles varying from 15° to 23°. They likewise form the hill-slope west of Balmacarra House. They are visible further east in the lower part of Balmacarra Burn, their occurrence there being due to a low arch of the inverted strata. (Part 4., Chapter 38) Northwards they are traceable by Carn Thollaid, the west end of Loch Achaidh na h-Ithinnich and the east side of Loch Lundie, to the south shore of Loch Carron, one mile east of Plockton. On the north side of that fjord shales, probably on the same horizon, appear on the hill north of the head of Loch Reraig, and by the footpath leading to Achintraid.

The pebbly grits and fine-grained sandstones lying between the upper and lower shale-zones of the Kinloch sub-division are well seen on the north shore of Loch Alsh between the Bay of Scalpaidh and Balmacarra, where they have an easterly dip at angles varying from 15° to 25°. Some of the more massive fine-grained sandstones display the contorted bedding so characteristic of the members of the Applecross group. Bands of shale from three to four feet thick are here intercalated with the grits and sandstones, which frequently show puckering and overfolding of the laminae, culminating in small reversed faults. (Foig. 15) The shales are usually cleaved. Northwards frm Loch Alsh the Kinloch Beds are well seen on the rocky hills north and south of Palascaig, where the more massive bands give rise to prominent escarpments. They form the wooded hills south of Duncraig, below which they appear on the shore, while north of Loch Carron they are seen west of Loch Reraig and extend northwards to Achintraid.

(2) Applecross Group

The massive sandstones and grits so characteristic of this group further north are here, as a rule, finer grained than in the typical Loch Torridon area. In places, however — as, for instance, a quarter of a mile north from Erbusaig and near Plockton — they are pebbly, and contain fragments of microcline and pink felsite. Though now usually grey or green in colour, it is probable that their original tint may have been purple, for in some places the latter is met with, and in others they have a blotched appearance. Induration and cleavage are common among them; indeed, in some of the railway cuttings near Erbusaig the sandstones have been so hardened as to present the characters of quartzites.

Lines and thin bands of heavy minerals — magnetite and zircon — are intercalated in some of the beds of arkose, as, for instance, in the Plock of Kyle, a quarter of a mile west of Kyle Inn, at the roadside a little north of Duirinish Bridge, and at several places on Coir à Mhuilt, half a mile S.S.W. of Duirinish. In some instances the bands containing these heavy minerals vary from two to ten inches in thickness.

The members of this group contain microcline, oligoclase, quartz, and scattered flakes of white mica. From the microscopic examination it appears that the deformation of the constituents decreases in a westward direction. At

Plockton the proofs of strain phenomena in the grits are more marked, and there is more secondary crypto-crystalline matter in the matrix than in specimens taken from a locality one mile further west. (See Chapter 16)

The arkoses of the Applecross group between Loch Alsh and Loch Carron form a belt upwards of a mile in width along the western seaboard from Kyle Inn north by Duirinish to Plockton. Over the greater part of this area their dip is easterly and Reference will be made in the sequel to the north and south axial line, to the west of which the inversion ceases. (Chapter 38)

To the east of the area of Torridon Sandstone described in this chapter, between Loch Carron and Loch Alsh, minor infolds of the formation have been caught in among the masses of deformed Lewisian gneiss. The strata so included comprise the basal conglomerate, the epidotic grits, the Loch na Dal shales, and perhaps some of the Beinn na Seamraig grits, all showing traces of deformation like those above noticed as observable between Fernaig and the Kyle of Lochalsh.