Chapter 26 Cambrian area from Strath Kanaird to Strath na Sheallag

By W. Gunn. The district described in this chapter is comprised in Sheets 92 and 101 of the Geological Survey Map of Scotland, on the scale of 1 inch to a mile (1:63 360).

In Strath Kanaird the quartzite is repeated by a north-east fault. Its western portion rises to no great altitude, and soon ends to southward, while the eastern forms a narrow band extending to Loch Broom. Near Creag na h Iolaire it reaches a height of more than 900 feet, and in Creag na Feola of 824 feet. From the sea-level at Loch Broom it rises to 1400 feet near Loch Sagaidh, to fall again in the valley of Little Loch Broom, whence it rises gradually to over 1500 feet to the east of An Teallach, while in the three outliers on the spurs of that mountain it exceeds a height of 3000 feet. Along the greater part of its course the quartzite forms a series of crags facing the west, with dip slopes to the east. These white steep slopes, very noticeable to the south of Dundonnell, are beautifully polished by glacial action, and as the dip is from 15° to 20°, they are in some places impassable. Except near Ullapool, the thrust Cambrian strata lie generally at a lower elevation than those which have not been involved in the displacements. The higher Cambrian rocks (limestone and fucoid-beds) do not form conspicuous features in the district, and as a general rule occur at lower altitudes than the quartzite.

Although the Cambrian quartzite is, here as elsewhere, unconformable on the Torridon Sandstone, few sections in this district exhibit the fact in small compass. The base of the quartzite is usually marked by a conglomerate, sometimes eight or ten feet thick, which, while it has been in the main derived from the Torridon Sandstone, is quite different in character from that rock. But it must be confessed that there often seems to be no marked difference of dip in the two formations either as regards direction or amount. Probably, taken all together, the dip of the Torridon Sandstone is more variable and at lower angles than that of the overlying quartzite. It does not average more than 10°, while in the quartzite the inclination is almost everywhere from 15° to 20°. Further, the direction of dip in the Torridon series is generally towards south-east, while that of the quartzite is steadily about E.S.E. In certain places, indeed, the unconformability is strikingly visible, as on the south side of Beinn Giubhais, north of the Ullapool River; under Cnoc na Croiche, to the north of Hill Cottage, Ullapool; and on the ground to the east of the Royal Hotel. Perhaps, however, the best section in this district to show the unconformability between the two formations is to be seen near the quarry to the south-east of the hotel, not far from the smithy, where the irregularly-bedded and nearly horizontal Torridon Sandstone is overlain by the quartzite, which presents its usual steady dip of 12°–15° to the E.S.E.

Quartzite

Generally throughout this district the lower portion of the Cambrian series, from the base of the quartzite up to the serpulite grit, can be traced in complete or unbroken succession; but the Durness limestone is not continuous, and is more or less thrust almost everywhere. It principally occurs between Strathkanaird and the Ullapool River, and is conspicuous at the latter place. South of Loch Broom it is only found in one place, east of Dundonnell Lodge. The thrust quartzite which occurs north of the Ullapool valley is mostly pipe-rock, or the upper division. The basal quartzite in this area seems generally, from the mean of several estimates or measured sections, to be about 325 feet thick, and the pipe-rock from 250 to 300 feet. The basal breccia or conglomerate may be seen at Creag na h Iolaire, to the north of Ullapool. It is well exposed south of Loch Broom, near the small lochs west of Loch Lagaidh, and in the main burn east of Dundonnell Lodge. In the burn west of Camas a Chonnaidh, Loch Broom, where it reaches a thickness of 10 feet, it is mainly pink in colour from the large felspar fragments derived from the underlying Torridon Sandstone. The false-bedding of the basal quartzite is well exhibited by the roadside to the south-east of Ullapool, about 500 yards east of the Royal Hotel, where, while the true dip in white quartzite is 12° to 15° to E.S.E., the false-bedding dips S. 30° E. at 25°–30°. About 150 yards farther east the true bedding preserves the same inclination and direction, but the false-bedding dips S. 35° E. at 20°–25°. This basal quartzite is banded, pink and white, and is generally coarse — in fact. some parts of it may be called conglomerate. Coarse or gritty bands abound in it, and in the stream east of Dundonnell Lodge it includes a thin band of hard shale several inches thick. A similar or perhaps the same band was observed by the side of the fault due east from the middle spur of An Teallach.

The usual sub-divisions in the pipe-rock can be traced through this district, and sections of them abound in the scars and streams. Perhaps the best general section of the Cambrian rocks here to be found lies along the banks of the Ullapool River. to the north-east of Ullapool. The white glaciated quartzite is conspicuous in the scars to the east of Ullapool and along the shores of Loch Broom, south from that village. A fine exposure of the vertical pipes may be seen in a scar by the side of the fault which crosses the quartzite in a north-east direction on the south side of the valley of Little Loch Broom and south-west of Corryhallie. As a general rule, the most prominent inland quartzite-scars are formed by the false-bedded quartzite, together with a portion of the overlying pipe rock, but the whole thickness of the quartzite is never to be seen here in any single scar. Good sections are displayed on Creag na Feola, a mile and a half north of Ullapool, and at Creag na Fhithich, on the south side of Loch Broom, to the west of Camas a Chonnaidh.

The upper zones of the pipe-rock are well exposed in a low scar by the roadside opposite the Braes of Ullapool, the coarse red grit being particularly well seen, and the following section was measured to the east of a small stream called Allt Glac an't Seilich, which falls into the Ullapool River on the north side about a mile and a quarter above the bridge:

Fucoid Beds	Feet	Inches
Piped quartzite, thin and impure towards the top	20	0
Grit, red below and whitish-yellow above	2	6
Grit, coarse, red, piped	6	6
Gap, probably coarse grit	3	6
Grit, thick-bedded and coarse above, but mostly fine, red, with few pipes	14	0
Thin-bedded layers of red and light-coloured rock alternating, seen in places; many white pipes (sub-zone 4)	12	0

The remarkable outliers of quartzite which cap the three eastern spurs of An Teallach furnish evidence that the Cambrian rocks once extended much further to the west than they now do. The most northerly of these outliers on Glas Mheall Mor is an oval patch, about 130 yards long, consisting of only a portion of the lower part of the basal quartzite, with some five or six feet of the basal conglomerate. Each of the others embraces the whole of the basal quartzite, together with a small part of the pipe-rock; but much of the rock is loose and slightly out of place, and the junction with the Torridon Sandstone along the hillsides is much obscured by debris from above. In each of these detached areas the rock has the same dip as in the main mass to the eastward, viz., 15°–18°. The outlier in Sail Liath is the largest of the three, and affords the best sections, though the central one, which caps the spur called Glas Mheall Liath, presents the most striking appearance as seen from the east, whence it assumes the form of an almost perfect cone, though in reality it is only the steep extremity of a ridge, slightly higher than the part connecting it with the main mass of the mountain.

Further proof of the former westerly extension of the Cambrian formation is furnished by the detached portions of them observable in various places on the downthrow side of the large fault that passes in a S.S.W. direction through Coigach and by the entrance to Little Loch Broom. The largest of these outliers is exposed on the shore west of the Free Church, Achiltibuie (east side of Baden Bay), and lies about nine miles .to the west of the main outcrop. Both the basal quartzite and the pipe-rock are here represented in their natural order, though many of the beds are much crushed, especially those of the pipe-rock which lie nearest to the fault.

Another isolated patch of quartzite may be seen near the fault west of Scoraig, on the north side of the entrance to Little Loch Broom. A third example, though too small to be marked on the map, is of sufficient interest to deserve notice. It occurs on the south side of Gruinard Bay and on the southern slope of Beinn Dearg Bad Chailleach (north-west corner of Sheet 92). Perhaps the rock should be regarded as a mass of fault-breccia, but its existence here certainly proves the former extension of the Cambrian strata at least as far west as this place. Fine white and grey siliceous grit, which is seen here in place and can be traced by fallen blocks for about 30 yards, almost certainly belongs to the serpulite-grit, while a mass of limestone, three feet long and nine inches thick, is observed in another place. These Cambrian relics are situated about 11½ miles to the west of the main outcrop of the series.

Fucoid Beds

This sub-division maintains throughout the district its usual character of laminated or flaggy impure yellow compact limestone bands, alternating with fine compact gritty bands and layers of hard shale. It is not well exposed in the ground south of Loch Broom, but numerous sections of it, both in the unthrust and thrust areas, occur near Ullapool and in Strathkanaird. One of the best of them has been already alluded to as visible on the north side of the Ullapool River. Other good sections have been laid open by the Corry Burn, near the cloth mill south of the Braes of Ullapool, and along the shore of Loch Broom to the southward. In the latter place the dark shaly bands have been well searched several times for the *Olenellus* fauna, but hitherto only fragments have been found.<ref>In 1894 A. Macconochie detected fragments of trilobites together with other fossils on both sides of Loch Broom, and in various places to the north of Ullapool.</ref> The fucoid-beds seem to be entirely cut out under the scar called Creag Chorcurach, east of Dundonnell Lodge, the Moine-schist being thrust over the quartzite.

Serpulite Grit

The Serpulite grit is here generally well exposed near the same places where the fucoid-beds crop out, such as many parts of the ground south of Strathkanaird and up the Ullapool River, especially on the north side. In the Corry Burn, south of Ullapool, this grit forms a single mass about 15 feet thick, which has given rise to a waterfall just below the bridge. In many places it appears as a small crag crowning the fucoid-beds. Throughout the greater part of the district all the strata above the serpulite grit have been displaced by thrust movements. South of Loch Broom, under Creag Chorcurach, the serpulite grit disappears, together with the fucoid-beds. It is also cut out by the Moine thrust for a distance of from two to three miles near Achneigie in Strath na Sheallag, about five miles south of Dundonnell Inn.

Durness Limestone

This important member of the Cambrian series, owing to normal faults as well as to thrusts, has been isolated in several small detached areas south of Strathkanaird, but, as most of the sections are intimately connected with the thrust-movements, their description is reserved for Part 4. The largest area lies to the north of Loch na Maoile. Another extensive outcrop may be seen about Loch Ob an Lochan. Where the rock is not covered with drift it supports a short green grassy herbage, which presents a great contrast to the surrounding darker heathery ground. For some distance south of Loch Dubh, although no limestone is seen at the surface, a swallow-hole indicates its presence in at least one place. In the valley E.N.E. of Creag na Feola (north of Ullapool) the limestone again appears, and is repeated four times owing to the effect of two cross faults. The most southerly of these four exposures is cut off by a thrust which brings over it the limestone first, the Torridon Sandstone, and afterwards a complicated assemblage of other rocks, until at the extensively-denuded Ullapool valley a large area of limestone is again laid bare. The calcareous rocks are here unfossiliferous. They no doubt belong to the two lower zones — the Ghrudaidh and the Eilean Dubh which, however, cannot well be differentiated owing to the numerous small thrusts which traverse them, and which greatly exaggerate their true thickness. Most of the limestone, which has been largely quarried and burnt for lime, is of a white colour, and probably belongs to the Eilean Dubh sub-division. Several small outcrops of the limestone are found among the thrust rocks east of Ullapool. An interesting section occurs at the bridge over the Corry Burn, three-quarters of a mile south-east of Ullapool, where a dark-grey oolitic limestone (with serpulites) is overlain by thrust Torridon. Sandstone This band extends some distance southwards, and a quarter of a mile from the bridge it is thrown up nine feet by a normal E.N.E. fault, and soon disappears under the waters of Loch Broom. No limestone is exposed beneath the thrust rocks for several miles southwards from Loch Broom, until at the principal burn east of Dundonnell Lodge (the one that issues from Loch a' Charnain Bhain) the following section is to be seen:

Thrust Torridon Sandstone	
Grey limestone	about 26 feet
Serpulite grit	12 to 15 feet
Fucoid-beds, flaggy, rather siliceous	a few feet

Further south for many miles no trace of the Durness limestone is to be seen.

It seems probable that a fault runs along the line of Loch Broom to the south of Ullapool, having a downthrow to the north-east. The Cambrian rocks on each side of the loch have the same dip and strike, the dip being generally E.S.E. at angles of 15° to 20°. Were there no fault, any given bed should be found on the south side of the loch to the S.S.W. of the same bed on the opposite side. But, as a matter of fact, the outcrops on the south side lie almost due south of those on the north. The thrust planes and rocks between them appear also to be shifted in the same way, and the Moine-thrust, which on the east side is found at Camas an Daimh, appears on the west side far up the loch near Rhiroy, and nearly S.S.E. from its corresponding position on the other side, instead of S.S.W. as we should expect it. Confirmatory evidence has been obtained south of Inverbroom, above the head of the loch, that this valley and loch lie along a line of fault.

A little to the north of the mouth of the Corry Burn many small faults range E.N.E., and throw down. north from a few inches to about two feet. Still further north several lines of rupture traverse the quartzite in the same direction. Opposite the Royal Hotel a more considerable fault runs also E.N.E., with a downthrow to the north. An east and west fault appears along the next burn, where the quartzite is much crushed. Branch faults strike off from this dislocation to the N.N.E., and are probably connected with the large fault which, crossing the Ullapool River in this direction, has a throw considerably greater than the whole thickness of the basal quartzite — not less, therefore, than 300–400 feet. This fault is one of the two that repeat the limestone east of Creag na Feola — the other being a large fault ranging E.S.E., and throwing down on the north. In Strathkanaird two large faults cross one another, and nearly repeat the curious arrangement seen east of Creag na Feola. One of these, which trends to the north-east, runs nearly along the road between Ardmair and Strathkanaird for a distance of two miles. The crushed rock which accompanies it has doubtless materially oontributed to the formation of the valley in which the road runs. This dislocation must have a downthrow to the north-west of 700–800 feet, as it is considerably more than the total thickness of the quartzite. As the fault proceeds north of the river its throw becomes a good deal less, and it probably is taken in part by the east and west fault which runs nearly parallel to the valley, and which also throws down on the north, so as to bring the base of the quartzite on the south side opposite to the serpulite grit on the north side. This must be a vertical displacement of 600–700 feet.