

that were originally of coarser grain size. These outcrop extensively in the vicinity of the Stack of Glencoul in the northern part of the area, and near Cnoc a' Chaoruinn in the south, but most of the pelitic rocks in the mylonite zone show phyllonitic textures. Kakirites, cataclasites, and phyllonites are referred to below as *secondary mylonitic rocks*, as there is good evidence that many of them were produced from primary mylonitic rocks (Christie, 1960).

The textures in the primary mylonitic rocks are predominantly crystalloblastic, and the gradation into normal low-grade Moine schists suggests that they may have been produced at the same time as the schists. The textures of the secondary mylonitic rocks, on the other hand, are almost purely cataclastic; as they are formed from primary mylonitic rocks, they indicate at least one later phase of deformation affecting the rocks in the thrust zone. The relationship between these separate phases of deformation and the metamorphism and deformation of the Moine schists is discussed after the structural evidence is described.

MEGASCOPIC STRUCTURES

THE MOINE THRUST

PRELIMINARY SURVEY

The strike of the Moine thrust, which is so remarkably constant over most of its outcrop, varies considerably in Assynt, giving rise to the embayment in the outcrop known as the "Assynt bulge." Round the southern part of the bulge, east of Knockan Crag, the strike of the thrust is approximately east and the dip is toward the south at low angles; along the eastern margin of the bulge the strike of the thrust is north-northeast and the dip is toward the east-southeast; to the north, from the headwaters of the river Cassley to the Stack of Glencoul, the strike becomes northwest with dip toward the northeast. Mylonitic rocks of various types are developed both above and below the surface mapped as the Moine thrust. The commonest of these are the finely laminated, color-layered primary mylonitic rocks which occupy a zone of variable thickness above the thrust. Overlying the mylonitic rocks are the low-grade quartzo-feldspathic schists of the Moine series.

Where the trend of the outcrop of the thrust is north-northeast, the mylonitic rocks form a well-marked scarp feature which generally affords good exposures. In the northern and southern portions of the bulge, however, where the outcrop trends northwest and west, the scarp feature is not so distinct and the rocks are poorly exposed. Only at a few localities, notably at Knockan Crag and the Stack of Glencoul, is the thrust well exposed. The Moine schists throughout the area are very poorly exposed; they give rise to rounded, featureless hills which are thickly covered with peat, and the only available exposures are in the beds of comparatively large streams and at widely scattered localities where the peat is deeply eroded.

The foliation in the primary mylonitic rocks and the Moine schists is parallel to the Moine thrust. East of Knockan Crag the strike of the foliation is east, and the dip is toward the south. The strike swings round the southeast corner of the bulge and becomes north-northeast, parallel to the regional strike of the Moine schists. In the northern part of the area the strike of the foliation is generally northwest, and the dip is toward the northeast. There is no evidence of large-scale

folding of the foliation in the mylonitic rocks or in the Moine schists within at least a mile of the thrust, but small-scale folds are conspicuous in the mylonitic rocks. A fine penetrative lineation is present in the primary mylonitic rocks and the Moine schists, and also in some deformed Cambrian and Torridonian rocks below the Moine thrust.* The orientation of small-scale folds and penetrative lineations measured in a survey of the thrust zone extending from Knockan Crag to the Glencoul River is shown in figure 3. There is a marked preferred orientation

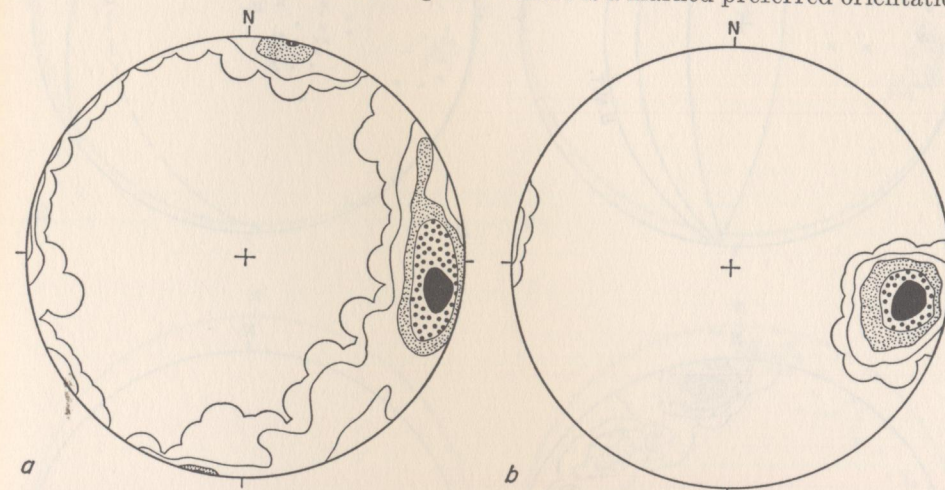


Fig. 3. Orientation of linear structures measured in the preliminary survey of mylonitic rocks along the Moine thrust. *a*. Axes of 166 small folds. Contours: .6, 2, 4, 6, 12 per cent per 1 per cent area. *b*. 112 penetrative lineations. Contours: 1, 5, 10, 20, 30 per cent per 1 per cent area.

of fold axes (fig. 3, *a*) with a strong maximum plunging at a low angle to approximately N. 100° E., and a submaximum with north-south trend. The penetrative lineations (fig. 3, *b*) show a higher degree of preferred orientation than the fold axes; they define a strong maximum which coincides with the maximum of fold axes. The lineation is therefore a *B*-lineation. The east-southeast-plunging folds and lineations are present in the mylonitic rocks along the whole extent of the outcrop of the Moine thrust, but the majority of the folds with north-south trend occur in two small areas. The larger of these areas is in the north of Assynt, near the Stack of Glencoul, and the other is in the southeast, on Cnoc a' Chaoruinn (Cnoc Chaornaigh on the 1-inch geological map of Assynt). It is significant that these are the two areas in which the Survey geologists reported the greatest development of mylonites in the Assynt region (Clough, in Peach *et al.*, 1907, pp. 502-507; Phemister, in Read *et al.*, 1926, p. 21).

The distribution of the minor folds has been mapped in these two areas, and the relationship of the two groups of folds to each other and to the thrusts has been investigated. The fabric of a third area, at Benmore Lodge, north of Loch Ailsh, has also been studied in detail. Certain other sections across the thrust zone and the overlying schists, notably in the vicinity of Knockan Crag, have also been subjected to a detailed investigation.

* This lineation, defined by the elongation of quartz grains and a preferred orientation of chlorite and sericite, is continuous throughout the rock; it is described as penetrative in order to distinguish it from superficial streaking on foliation and shear surfaces, such as slickensides.