

THE MOINE THRUST ZONE IN THE ASSYNT REGION, NORTHWEST SCOTLAND

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ABSTRACT

On the basis of a preliminary survey of the Moine thrust zone in the Assynt region, several areas were selected for a detailed study of the small folds and lineations, and of their relationship to the major thrusts and faults. A study was also made of the microfabric of quartz-bearing rocks in the Moine thrust zone and of the Moine schists, and of deformed dolomite rocks below the Moine thrust at Loch Ailsh.

Two groups of mylonitic rocks are developed in the thrust zone. The *primary mylonitic rocks*, which show considerable evidence of recrystallization, form a thick zone along the boundary mapped as the Moine thrust. Locally, these mylonitic rocks and the Moine schists are crushed and phyllonitized, resulting in the *secondary mylonitic rocks*. This evidence indicates at least two distinct periods of deformation (I and II).

Structural evidence shows that the first deformation (I) affected the primary mylonitic rocks, the Moine schists, and the Cambrian rocks. Folds and lineations (*B*) resulting from this deformation plunge at low angles to the east-southeast; the deformation was contemporaneous with the regional metamorphism of the Moine schists, which must therefore be of post-Cambrian age. Structural and petrofabric data suggest that three phases may be recognized in this deformation. During the early phase (*Ia*) there was movement of the Moine nappe to the south-southwest along the Moine thrust zone, along with displacement of the underlying thrust sheets. This was followed by a phase (*Ib*) in which the Moine schists and the primary mylonitic rocks were flattened in a direction normal to the Moine thrust and elongated in a west-northwest direction, parallel to the fold axes; the preferred orientations of quartz originated during this phase of deformation. This may have been followed by a third phase (*Ic*) during which the Moine schists were shortened in a north-south direction, perhaps with some transport of the Moines to the north. During the second deformation (II), folds with northerly trend were developed in the Moine thrust zone and the underlying thrust sheets. The Ben More thrust and associated reverse faults date from this deformation. The Moine thrust and the Glencoul (Assynt) thrust are displaced by the Ben More thrust (the former by approximately 500 feet), and the most extensive development of secondary mylonitic rocks is in the Moine thrust zone immediately above the Ben More thrust. The Moine schists were transported to the west during this deformation (II), but the amount of displacement may have been small.

Two large thrust sheets, the upper and lower Assynt nappes, are recognized between the Moine thrust and the sole, and their mode of emplacement is discussed.

INTRODUCTION

THE MOINE THRUST is now known to geologists throughout the world as one of the classic examples of a large-scale thrust zone. The zone extends from the Point of Sleat in Skye, in the south, to Whiten Head on the north coast of Sutherland, in the north—a distance of approximately 120 miles. It is well developed at both extremities and must extend farther in both directions. The thrusts are very well defined in the Assynt region, between the Cromalt Hills, in Wester Ross, and Loch Glendhu, in Sutherlandshire. In this region there is a wide embayment in the outcrop of the Moine thrust, generally known as the "Assynt bulge" or the "Assynt Culmination" (Bailey, 1935). Within this bulge several slices of rock carried on thrusts underlying the Moine thrust crop out. The region has become