(D13), suggesting that the principal stresses were unequal ($\sigma_1 > \sigma_2 > \sigma_3$), but the stress inferred from M15 (D12) and M18 (D14) seems to be axial ($\sigma_1 > \sigma_2 = \sigma_3$). The orientations of the axes of greatest and least principal stress, as indicated by the maxima of *C*- and *T*-axes in the specimens, are shown in the synoptic diagram D15 (fig. 21, in pocket). The axes *C* and *T* (σ_1 and σ_3) inferred from the twinning in M14, M15, and M18 lie close to a great circle normal to *B*, and the *C*-axes for M14, M15, and M17 are almost parallel, plunging steeply toward west-northwest. The parallelism of the axes of maximum principal stress in three of the four specimens indicates strong compression in this direction, which is more or less perpendicular to the plane of the Moine thrust.

The evidence derived from the fabric of specimen M17 is not consistent with that derived from the other specimens. The paired maxima in the pattern of [0001] axes (fig. 21, D4) are considerably weaker than in other specimens with similar patterns, and there is a rather diffuse girdle about a northward-plunging axis; it is also evident that the maxima do not lie in the girdle about the regional *B*-axis (fig. 21, D6). The twinning in the rock, moreover, reflects a deformation in which the axes of maximum and minimum principal stress lay in a steep plane with easterly strike (fig. 21, D15). This indicates that the last deformation of the rock was related to a north-trending *B*-axis, and it is possible that the preëxisting pattern of [0001] axes was partially rotated and disrupted during the deformation.

Although a considerable proportion of the grains in all the specimens contain two or three sets of $\{02\bar{2}1\}$ lamellae, optically recognizable twinning is scarce, and there is no evidence that any of the grains are more than half-twinned. The evidence of twin gliding on $\{02\bar{2}1\}$, even with considerable translation on {0001}, is inadequate to account for the strong preferred orientation of the dolomite lattice in the rocks (Christie, 1958). It is probable that the preferred orientation existed in the rocks before the visible lamellae were produced, and that the principal stress axes inferred from the lamellae relations in the rocks reflect only the final stage of the deformation (cf. Turner, 1953). The patterns of preferred orientation of [0001], however, are so similar to those of dolomite tectonites described by Fairbairn and Hawkes (1941) and Ladurner (1953) that there can be little doubt that they originated by deformation. There is a rather close approach to orthorhombic symmetry in patterns of preferred orientation of [0001], notably for specimens M13, M14, and M18, indicating that the deformation that oriented the grains had this symmetry.

Table 3 shows the degree of preferred orientation of [0001] axes in the fabric of each of the specimens and the proportion of granulated material present. The degree of preferred orientation is given in terms of the size of the *pole-free area* (Ladurner, 1953), and the maxima, measured on the original contoured diagrams (net of 10-cm radius) with a planimeter. The importance of the pole-free area in comparing the degree of preferred orientation in different specimens of carbonate rocks has been pointed out by Ladurner. The pole-free areas, together with areas of high concentration, afford a reliable basis for comparing the degree of preferred orientation of a fabric element in a number of rocks, provided that (1) the orientation patterns are similar, and (2) the same number of recordings is considered for each rock. The degree of preferred orientation of [0001] in specimens M13, M14, M17, and M18 may be compared in this way, as the diagrams fulfill both these conditions. It is evident that there is no correlation between the strength of the preferred orientation and the degree of granulation in the specimens. This lack of correlation provides support for the view that the preferred orientation in the rocks was not attained during the movements that caused the visible granulation along grain boundaries and plastic deformation of the grains.

The evidence of the microfabric of the Loch Ailsh dolomites seems to warrant the following conclusions. The crystalline fabric of the dolomites is a tectonite fabric with almost orthorhombic symmetry; the recrystallization was therefore probably caused by regional metamorphism and not thermal metamorphism, as is true of many of the crystalline marbles of the Assynt region. In varying degrees the rocks suffered postcrystalline deformation as a result of strong compression along an axis plunging steeply to west-northwest, and this was accompanied or followed by rotation about a *B*-axis plunging 25° to slightly north of east. The fabric of specimen M17 suggests that there was also local rotational movement about a northward-plunging axis, but this conclusion, based on the evidence of a single specimen, is advanced tentatively and will be considered along with other evidence at a later stage of the discussion.

Grain Orientation in Quartzose Rocks

INTRODUCTION

The rocks on which fabric analysis was carried out vary from pure Cambrian quartzites to micaceous and chloritic quartzo-feldspathic schists, but they all contain more than 50 per cent quartz. The specimens were collected at the localities shown on the map (fig. 22). The petrographic character of the rocks is described briefly, and certain conclusions are drawn concerning the sequence of movement and crystallization, before the lattice orientations of quartz and mica are described.

PETROGRAPHY

The Cambrian quartzites along the eastern margin of the zone of dislocation show progressive mylonitization toward the Moine thrust. Plate 8, *a*, shows a slightly deformed quartzite, without foliation or lineation, in which the clastic grains of quartz are considerably flattened; the grains show undulatory extinction and development of deformation lamellae, and there is granulation along grain boundaries and in zones cutting the rock. In the more intensely deformed, foliated, and lineated quartzites (pl. 9, *a–b*), the granulation is more advanced and the dimensional orientation of the relict grains is much stronger; the ratio of the grain dimensions is of the order of 1:10:100, the shortest axis being normal to the foliation and the longest parallel to the lineation. The grains show intense undulatory extinction in bands subparallel to [0001], but deformation lamellae are absent. Close to the Moine thrust the mylonitic textures are obliterated by recrystallization; the rocks consist of an equigranular (granoblastic) aggregate of quartz grains, which, though small, show no trace of ruptural strain (pl. 8, *b*). The dimensional orientation in these rocks is weak compared with that in the quartzites described above, but the grains are slightly flattened in the foliation and elongate parallel to the lineation. These two types of quartzites, one showing