were rotated into the same plane and combined; for each of the specimens, however, it was found that the preferred orientation was such that the partial diagrams from different sections did not differ to any great extent.

The specimens may be divided into five groups, four of which correspond to the petrographic types mentioned above. Distinctive characters of the specimens in each group are listed below.

Quartzites of Type I: specimens 69, 62, E23, and E14 (diagrams D1, D2, D3, and D8, respectively).

The rocks are all characterized by a well-developed planar foliation (*S*) and strong penetrative lineation (*L*). In specimen 62, the least deformed of the group, the lineation is defined by "pipes" (annelid tubes in the "pipe rock") which lie with perfect parallel alignment in the plane of the foliation. The "pipes" have a flattened or elliptical cross section. The porphyroclastic quartz grains in the rocks of this group have a tabular or ribbonlike habit; the average mean grain dimension in the sections normal to the lineation ranges up to 1 mm, whereas in the most deformed specimen (69) the grains are up to 2 cm long in the section parallel to the lineations.

Quartzites of Type II: specimens X21 and E15 (diagrams D4 and D9, respectively).

Both specimens have a well-developed foliation (*S*) and lineation (*L*), and specimen X21 is closely folded about *B*. The dimensional orientation of the grains is weak; they are slightly flattened in the foliation and elongate parallel to the lineation as in the previous group.

Primary mylonitic rocks: specimens F6 (diagram D6), 50 (diagram D7), and 52 (diagrams D10, D11).

The rocks in this group have a strong platy foliation (*S*) and a rather weak lineation (*L*). The grains are just within the limits of measurement with the U-stage (average mean grain dimension is less than .01 mm), but are generally without undulatory extinction. Dimensional orientation of the quartz grains is very weak, but similar to that in the quartzites of Type II.

Moine schists: specimens 68 (diagrams D13, D14), X24 (diagrams D16, D17, D18), and X36 (diagrams D19, D20, D21).

There is a well-defined foliation in specimen 68, but in specimens X24 and X36 the foliation is weakly developed. Lineation is faint in all three specimens. In specimen X36, in addition to the fine lineation ($L_1 = L$) generally found in the rocks, there is a crude lineation (L_2), defined by the trace of mica flakes on the foliation. The rocks are fine-grained (average mean grain dimension is approximately .05 mm), and the dimensional orientation of quartz and feldspar is very weak; some of the grains are flattened in the foliation.

Quartz vein cutting mylonite: specimen 66 (diagram D5).

The vein (S_v) belongs to one of the systems of veins which cut the primary mylonitic rocks and the schists and is approximately normal to the foliation (*S*) and the lineation (*L*) in the specimen. The quartz grains in the vein are of variable size (average mean grain dimension is .2 mm), and are considerably larger than the grains in the mylonite of the specimen. Some of the grains show undulatory extinction and there is a strong dimensional orientation, the short axes of the grains being normal to the foliation in the surrounding mylonite.

The characteristic features of the patterns of preferred orientation of quartz and mica in each of the groups are summarized below. Reference is made to Sander's synoptic diagram showing the orientation of common maxima of [0001] axes of quartz in *S*-tectonites (1930, diagram D61), the essential features of which are reproduced in diagram D22. In this diagram Sander plotted the maxima for nineteen tectonites, oriented so that the foliation (*ab*) and the lineation (*b*) were parallel.*

Quartzites of Type I.—The pattern of preferred orientation of quartz [0001] axes in specimen 69 (D1), the least deformed of the rocks in this group, consists of a girdle normal to the lineation with high concentrations of axes near the position of maximum II of Sander's diagram. The girdle tends to divide near the pole of the foliation. Diagrams D2 and D3 show a stronger preferred orientation than D1, with very strong maxima corresponding to maximum II of Sander's diagram; the maxima spread into a partial girdle which is divided near the pole of the foliation (*S*). The orientation diagram for the remaining specimen of the group (D8) shows two almost complete crossed girdles which are equally inclined to the foliation and intersect in an axis normal to the lineation. The strongest maximum is situated near the intersection of the girdles (maximum I of Sander's diagram), and numerous submaxima occur within the girdles. The symmetry of diagrams D2 and D3 is perfectly orthorhombic, and that of diagrams D1 and D8 is almost orthorhombic.

Quartzites of Type II.—The diagrams (D4, D9) for specimens in this group consist essentially of two crossed girdles, intersecting in an axis normal to the lineation. In diagram D4 the strongest maxima are close to the orientation of maximum IV of Sander's diagram, but additional maxima are situated elsewhere in the girdles; one of the girdles is markedly stronger than the other and the symmetry of the patterns is triclinic (though tending toward orthorhombic). Diagram D9 is characterized by a large maximum near the intersection of the girdles and smaller maxima with varied orientation within the girdles. The symmetry is again almost orthorhombic.

Primary mylonitic rocks.—The diagrams (D6, D7, D10, D11) showing the preferred orientation of quartz in the specimens of this group all show crossed girdles intersecting in an axis normal to the lineation. The strongest maxima are generally situated at or near the intersection of the girdles (D6, D10, D11), but in diagram D7 they lie within the girdles with an orientation close to maximum IV of Sander's diagram. The symmetry of all four diagrams again approximates to orthorhombic.

Diagrams D10 and D11 are based on measurements made in separate limbs of the fold shown in diagram D12. The diagrams are similar with regard to the orientation of girdles, maxima, and symmetry planes, so that the quartz orientation may be regarded as homogeneous throughout the fold.

Moine schists.—The diagrams (D13, D16, D19) showing the preferred orienta-

* It is standard procedure to describe patterns of preferred orientation of quartz and other minerals with reference to fabric axes (*a*, *b*, *c*) derived from a study of the megascopic fabric of the specimen. But there is considerable evidence that the quartz orientation in the rocks discussed here was not produced at the same time as the foliation and the folding, and for this reason I have not followed this procedure.