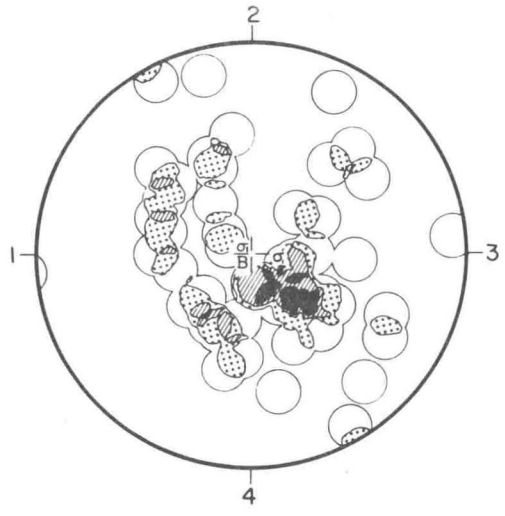


Fig. 27—Diagram of 50 compression axes derived from sets of $e_1$ twin lamellae in 50 calcite-cement crystals from an experimentally deformed calcite-cemented sandstone (from Friedman, Ref. 59, Fig. 16c). Specimen was shortened 9.2 per cent under 2-kb confining pressure at 300°C. Plane of the diagram is normal to the long axis of the deformed cylinder with the known position of $\sigma_1$ at the center of the diagram. Contours are at 2, 4, 6, and 8 per cent per 1 per cent area. The derived position of $\sigma_1$ is 10 to 15 degrees SE of the center.

or unfavorable orientation for twinning of a given crystal with respect to an assumed east-west $\sigma_1$. Moreover, compression and extension axes derived from $c_v$ and $e_1$ lamellae in each grain are strongly oriented parallel to bedding and trend N-75°-W and N-15°-E, respectively, when the beds are unfolded (Figs. 29(b) and 29(c)). These results are in good agreement with the geologic framework because these directions are within 15 degrees of being perpendicular and parallel, respectively, to a series of nearly parallel north-south fold axes located where the sample was collected some 7 mi south of Drummond, Montana.

Twin lamellae in complexly deformed metamorphic rocks have been studied in considerable detail. Turner[111] applied his technique to the study of three marbles and concluded that the visibly twinned e lamellae developed during the last stages of deformation. McIntyre and Turner[113] employed the same methods in a study of three different marbles from Scotland and also concluded that twinning in calcite was the expression of minor postcrystallization deformation, probably compression transverse to the regional fold axis. Gilmour and


Fig. 28—Photomicrograph of a transverse section through a gastropod. Plane of the photomicrograph is also parallel to bedding. North is as indicated after the bedding is rotated to the horizontal. East-west diameter of the gastropod is approximately 4 mm (from Friedman and Conger, Ref. 112, Plate 1).

Carman,[114] taking the same approach, found that the compression axis deduced from postcrystallization e twin lamellae confirmed the direction of movement deduced from megascopic structures. Clark[115] studied the calcite twinning in still other marbles from the Scottish Highlands and found a consistent stress pattern over the 5 sq mi investigated. He concluded that the calcite twinning could best be explained by a compression oriented normal to the trend of the regional fold axis, followed by a mild "squeeze" at right angles. Weiss[116] investigated the dynamic significance of visibly twinned e lamellae in a marble-quartzite complex in southern California. He found that only