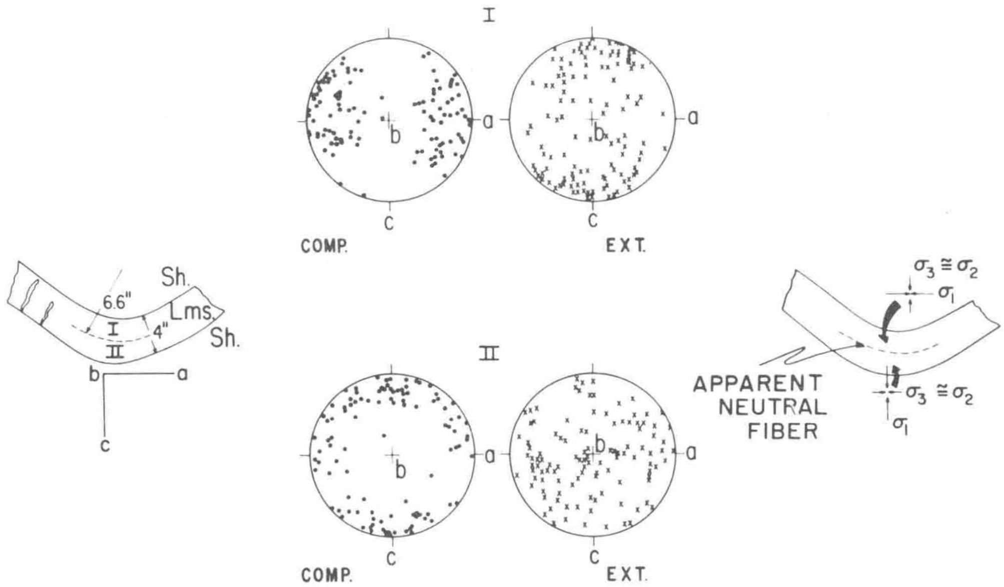

Fig. 30—Diagrams of compression and extension axes determined from calcite twin lamellae in regions I and II of a folded limestone bed in the Silurian McKenzie Creek formation of western Maryland (Conel, Ref. 119, Figs. 10a and 14). In region I, 114 compression axes are grouped about the a reference axis, and the 117 extension axes form a wide bc girdle with a tendency to be grouped about the c reference axis. In region II, 105 compression axes tend to be grouped about the c reference axis, while the 112 extension axes are diffusely oriented but show a tendency to lie in an ab girdle. Dynamic interpretation of these patterns is idealized at the right.

Hansen and Borg[120] studied deformed calcite cement in three specimens of folded Oriskany sandstone from eastern Pennsylvania. They found that the derived compression axes are oriented parallel to bedding and normal to the fold axis, while the extension axes are concentrated normal to bedding. This study will be discussed in more detail later in connection with quartz deformation lamellae.

Nissen[121] recently described a naturally deformed crinoidal limestone in which many of the individual calcite (crinoid) crystals exhibit two equally well developed sets of e twin lamellae. Nissen modified the Turner technique to locate the compression and extension axes that would produce equal S_o values on each of the two sets of twin planes. Thus, his compression axis is parallel to the crystallographic a axis cozonal with e_1 and e_2, and his extension axis is normal to the undeveloped or poorly developed third set of twin planes (e_3) in each grain. In Nissen's specimens these gave essentially the same stress pattern as that derived through use of the Turner technique.

Gliding mechanisms in dolomite have been determined from studies of experimentally deformed dolomite single crystals and rocks.* Only two gliding systems are known (Fig. 31):

(1) Translation gliding on c{0001} parallel to an a axis in either sense is the dominant flow mechanism below 400°C.

(2) Twin gliding on f{02$\bar{2}$1} in a negative sense along a line of the type [f_2:a_3] begins to occur at 400°C and is the major flow mechanism at 500°C.[55]

The writer is aware of only two studies in which dolomite twin lamellae have been dynamically interpreted by the Turner technique. This is in part due to the fact that twin gliding in dolomite is

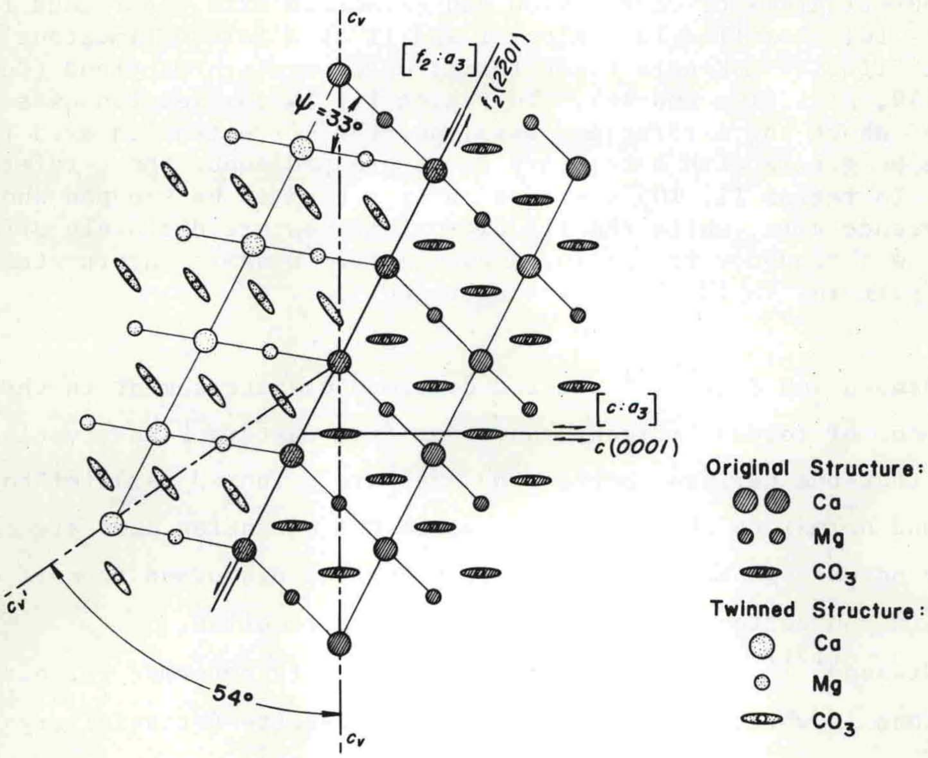

Fig. 31—Diagrammatic representation of the dolomite structure. Plane of the section is parallel to a_3(11$\bar{2}$0). Gliding direction for translation on {0001} is not in the plane of the section, but is parallel to any of the three a axes. The system for twin gliding parallel to f is also illustrated.

*See Refs. 52, 55, 122, and 123.