Translation gliding involves displacement through an integral number of interionic distances so that after slip the configuration of the crystal lattice is unchanged across the slip plane (Fig. 20). The slip need not be equally distributed throughout the deformed crystal, and the shear strain is not fixed. Although no general theory relates the translation gliding system to a particular crystal structure, in metals the gliding plane is usually one of high atomic

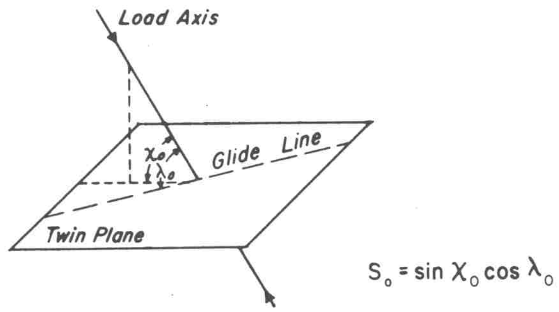

Fig. 19—Diagram showing nature of the resolved shear stress coefficient (S_o).

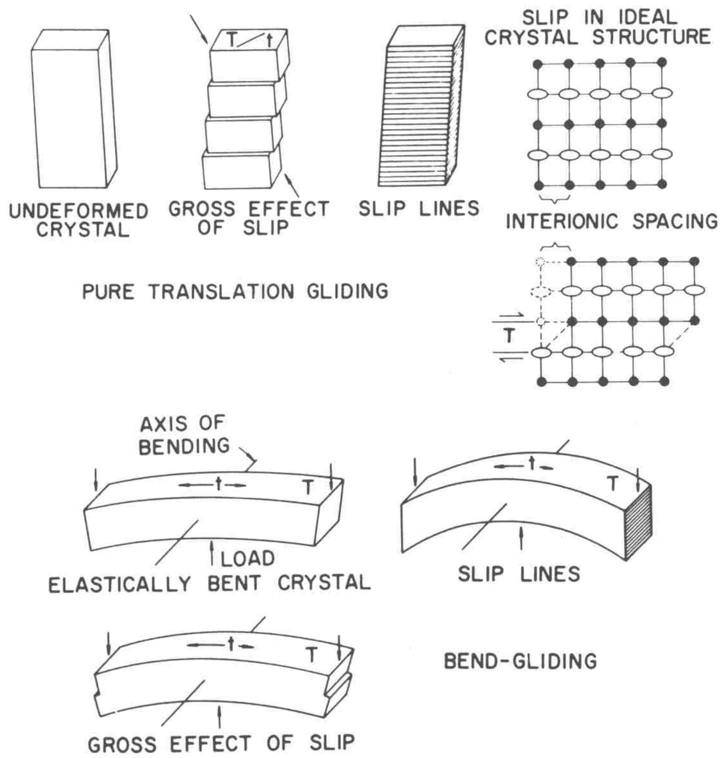

Fig. 20—Models of translation gliding.

or ionic density and of simple crystallographic index. The gliding direction is usually the densest atomic row (Ref. 93, p. 86). Bend gliding (Fig. 20) is a special form which occurs when planes are initially oriented parallel or normal to the load axes and are bent elastically before slip occurs. A compilation of translation gliding systems in 80 crystals is given by Handin.[96]

In mechanical twin gliding each ionic layer moves through a fixed fraction of the interionic distance so that the shear is fixed and the twinned portion of the crystal is in the proper symmetrical relationship to the original untwinned structure. The physical discontinuity between the twinned and untwinned portions of a crystal makes twin lamellae conspicuous in thin section (Figs. 21 and 22). The morphology of

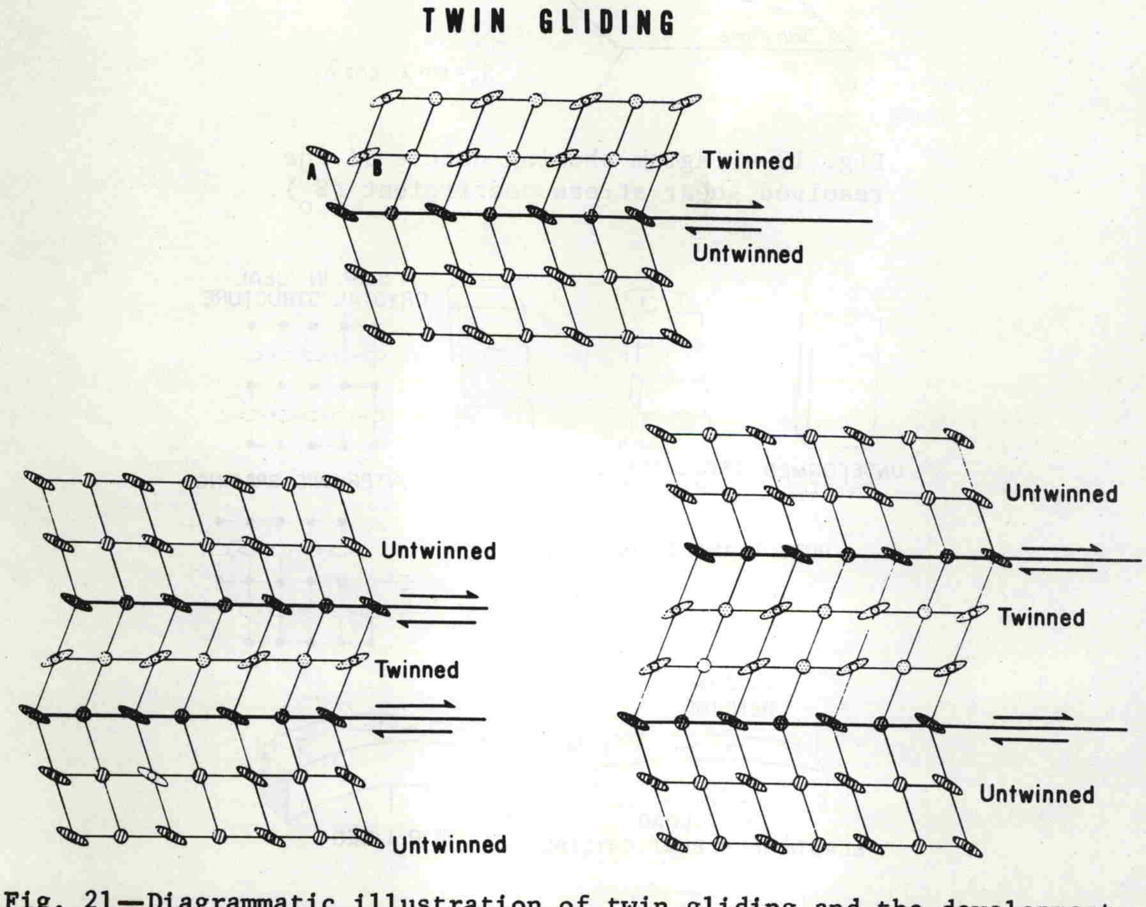

Fig. 21—Diagrammatic illustration of twin gliding and the development of a twin lamella. The movement along any one ionic layer (gliding plane) is a fixed fraction of the unit interionic distance, e.g., ion at A moves to B. As a result, a symmetrical relationship exists across the twin plane. A twin lamella is formed if twinned material is bounded on both sides by untwinned structure.