easy to visualize if the triclinic cell is oriented as shown in Fig. 5.3(a). To obtain this orientation of the cell requires three rotations of the lattice with respect to the set of fixed coordinates in Fig. 5.2(a): (1) rotate the lattice around the z axis through an angle of $+45°$, which gives the parallel (110) planes shown in Fig. 5.2(b); (2) rotate the lattice around the y axis by $+90°$, which results in the (110) planes parallel to the xy plane; (3) rotate the lattice around the z axis through an angle of $-35°15'$, which orients the triclinic cell as in Fig. 5.3(a).

The shear mechanism for bcc to hcp transformation is illustrated in Fig. 5.3(a) and (b) where a shear on the $(\bar{1}12)$ plane in the $[1\bar{1}1]$ direction changes the $70°30'$ angle between the two sides in the basal plane to a $60°$ angle. The open circles in Fig. 5.3(b) represent atomic positions before shear. The resulting cell has hexagonal symmetry but is not close-packed because of the central atom. The central atom must be shifted, as indicated by the two open circles in the center plane of the cell of Fig. 5.3(b), to bring it into line with the interstitial position between the trio of atoms in the basal planes above and below. Further slight adjustments of cell dimensions are necessary for conformance with lattice parameters of the hcp phase.

The transition is initiated when a critical value of shear stress is exceeded for a row of close-packed atoms such as the $[1\bar{1}1]$ direction on the $(\bar{1}12)$ plane.

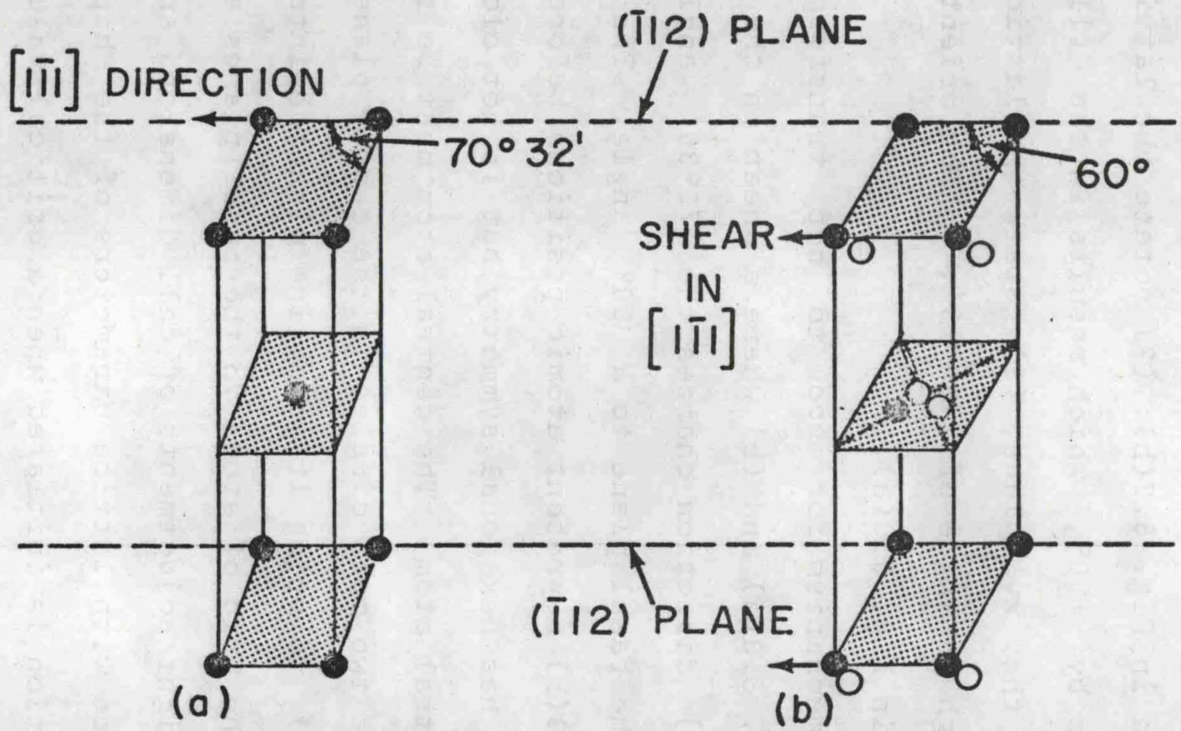

Fig. 5.3.--Shear mechanism for body-centered-cubic to hexagonal-close-packed transformation.