Some comments on notation are required. Lattice planes are defined by Miller indices with integer components (a',b',c').[50] Directions in the lattice are given as vectors with integer components [a,b,c]. A bar above a component, such as $(\bar{a}',b',c')$, indicates a negative value. In cubic crystals, a direction [a,b,c] is perpendicular to a plane (a,b,c) having the same indices.

A bcc cell has six different symmetric planes which are "most densely packed" (not close-packed): $(1\bar{1}0)$, (110), (101), (011), $(0\bar{1}1)$, and $(\bar{1}01)$. Figure 5.2(a) shows a most densely packed (110) plane with rows of close-packed atoms such as A, B, and C along each cube diagonal. It is along these close-packed rows that slip, twinning, and some phase transformations take place due to applied shearing forces. These rows lie in either $(\bar{1}12)$ or $(1\bar{1}2)$ planes; e.g., the row ABC in Fig. 5.2(a) is in the $(1\bar{1}2)$ plane.

Changes in a particular triclinic cell illustrate how the bcc lattice can be transformed to hcp by shear deformation. In Fig. 5.2(b) three sequential (110) planes are represented in an isometric drawing; separations between planes are exaggerated for clarity. These planes are, for example, those containing atoms D, B, and E, respectively, as shown in Fig. 5.2(a). The triclinic cell of interest is outlined by dashed lines in Fig. 5.2(b) with four sides perpendicular to the (110) planes and lying in either the $(\bar{1}12)$ or $(1\bar{1}2)$ planes. It is along these sides that shearing action for the transformation will take place. The shear mechanism for transformation is

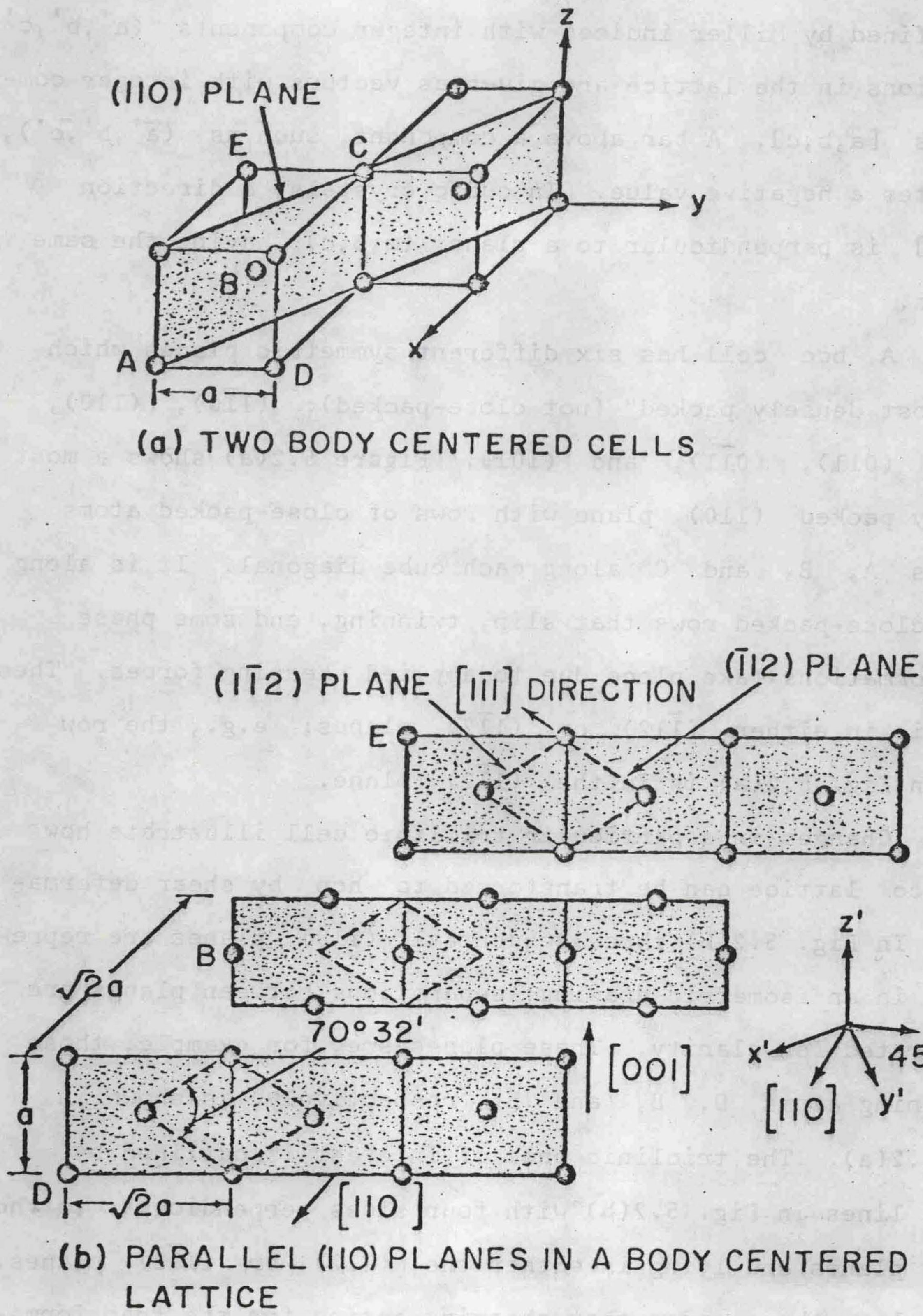

Fig. 5.2.--Body centered lattice.