that the Brillouin zone in this case both changes *size* and changes *shape* under pressure. The extended Fermi surface remains, of course, spherical and its size changes in inverse proportion to the volume change of the metal. But because the Brillouin zone is changing shape, the lines of contact of the Fermi sphere with the zone boundaries are altered so that the sheets of the Fermi surface in the reduced scheme

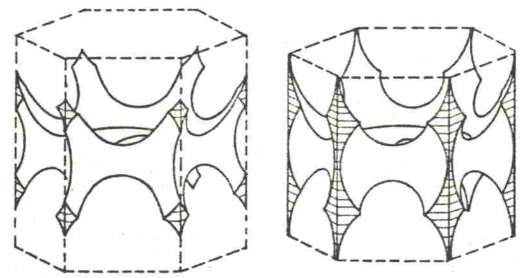

FIG. 6. The segment of the Fermi surface of a divalent hexagonal metal in the nearly-free-electron approximation: (a), corresponding to an axial ratio of 1·633; (b), corresponding to an axial ratio of 1·862. (From Harrison, 1965.)

change in magnitude relative to each other (cf. Figs. 6a and b). Consequently we see that if pressure can alter the c/a ratio sufficiently, it can change the connectivity of the Fermi surface. Lifshitz (1960) predicted striking changes in the thermodynamic and transport properties of a metal at transitions where this connectivity is broken. The search for such effects has been one of the impulses behind the study of pressure effects in the hexagonal metals.

It is now clear how it is possible to calculate the changes in dimension of the different sheets of the Fermi surface of Zn when the c/a ratio changes, provided that the nearly-free-electron picture holds good. The geometry has been worked out in detail (Harrison, 1960; Higgins and Marcus, 1966) and the predictions for changes under pressure deduced. For example the extremal area of the needles when the magnetic field is parallel to b_3 is given by:

$$S_1 = \frac{4\pi}{9}\left(\frac{2\pi}{a}\right)^2\left[\left(\frac{27\sqrt{3}\,z}{16\pi\, c/a}\right)^{\frac{1}{3}} - 1\right]^2 \tag{8}$$

where now $Z = 2$ for zinc. (This expression is in the form given by Higgins and Marcus, 1966.)