of the volume. Moreover, the Fermi radius k_F is related to E_F by the relation:

$$E_F = \hbar^2 k_F^2/2m \tag{7}$$

so that k_F varies as $V^{-1/3}$, i.e., inversely as the interatomic distance. Thus the simplest effects of pressure on the Fermi surface would be to increase the Fermi energy and Fermi radius.

So far we have ignored the effect on the conduction electrons of the periodic potential inside the lattice. If the interaction of the electrons with the lattice potential is very weak, it makes itself felt only when the periodicity of the lattice in a particular direction coincides with or is a multiple of the periodicity of the electron wavelength propagating in that direction. On this basis the Brillouin zone structure of the lattice is built up. If, in k space, the k vector of a conduction electron reaches from the centre of the Brillouin zone to a point on the zone boundary then that electron satisfies the Bragg condition for reflection by the set of lattice planes associated with the particular zone boundary. Within a given zone, the surfaces of constant energy must be continuous; only at the boundaries of the zone can discontinuities appear. Thus, in the limit of a vanishingly small potential, the constant energy surfaces are still spheres with modifications to their connectivity at the Bragg-reflection planes. For this reason it is convenient to map back into the first zone all the fragments of the surface that overlap into the second zone; likewise for those fragments in the third zone and so on. In this way, each sheet of the Fermi surface, corresponding to each zone, forms a continuous surface when re-mapped. Harrison (1966) has devised a convenient method of doing this mapping and worked out the shapes of the various sheets of the Fermi surface (contributed by different zones) for various lattice structures with various numbers of valence electrons to the atom.

A simple illustration of the scheme is given in Fig. 5, which shows the nearly-free-electron model of the Fermi surface of a simple square lattice in two dimensions (cf. also Pippard, 1960). The reciprocal lattice is then also a square lattice. The Fermi surface is now a circle and the occupied region overlaps into the second Brillouin zone as seen in the *extended zone* scheme at (a). In (b), the first sheet or band (i.e., the occupied area in the first zone) is shown by itself unchanged; the second sheet or band, however, has now been re-mapped back into the first zone. This is called the *reduced zone* scheme and represents the