belong to the molecule as a whole. For the noble metals the electrons have almost the characteristics of free electrons. It can be shown that a perfectly periodic array of atoms would offer no resistance to electronic motion. In a real lattice the atoms are vibrating about an equilibrium position and these displacements tend to scatter electrons. Under these circumstances, the resistivity should increase linearly with temperature, and this actually obtains for many metals. Impurities give additional scattering, and complications in band structure can grossly modify this "almost free electron" picture. Even the sign of the temperature coefficient of resistance may be changed. One can speak of "typically metallic behavior", but one cannot simply characterize all metals from their resistivity behavior.

Finally, it is not necessary that a gap exist between the highest filled band and the next empty band at the equilibrium interatomic distance. These two bands may overlap, and incur typically metallic behavior for a solid of closed shell atoms. The crystals of the alkaline earths provide an example of such behavior.

In general, the effect of pressure is to reduce the interatomic distance. In a pressure range of several hundred kilobars, salts such as the alkali halides may decrease in volume as much as 40-50%, while even such metals as silver compress by 20% or more, so the changes in interatomic distance are significant.

In the case of internal transitions, the effect of increasing pressure is to increase the perturbing effect of the field provided by the lattice. Where a theory predicts the effect of the field, this can provide a quantitative test of the theory. Where two theories predict different effects of increasing field intensity, pressure experiments provide a choice between theories.