under pressure thus demands the combination of low temperatures and high pressures.

In the second place, we may wish to work at low temperatures simply to get rid of thermal motion and its complications. As we approach the absolute zero, we reach a condition where all changes are governed by mechanical, as opposed to thermodynamic, criteria of stability (i.e., the entropy terms in the free energy become negligible). In this way, for example, a P–V measurement can reveal and reflect rather directly the interatomic forces in a solid. Or again the mechanical properties of solids may take on a special simplicity in the absence of thermally activated processes.

Thirdly, the technique of investigation may itself require low temperatures. For example, most of the standard methods of determining Fermi surfaces require that the conduction electrons involved have long mean free paths and this in turn implies the use of low temperatures to diminish scattering by phonons.

In what follows we shall be concerned mainly with the effect of pressure on electrical conductivity in metals, in particular at low temperatures. However, in order to understand these effects, we need to know as much as possible about their high-temperature behaviour. Moreover, as we shall see, we must also have as much information as possible about the Fermi surface, the velocities of the conduction electrons and so on. We shall therefore also be concerned with the recent developments in which measurements of the change in Fermi surface under pressure are being studied.

In all that follows, we shall limit the discussion to the effect of *hydrostatic* pressures.

II. Techniques

To work at low temperatures with high pressures introduces its own problems. All substances under appreciable pressure become solid at very low temperatures so that we have to contend first with the problem of producing at low temperatures as good an approximation as possible to a truly hydrostatic pressure. Various methods have been used, but recent work has shown that some of these techniques are not always satisfactory. General techniques for using high pressure at low temperatures have been reviewed recently by Swenson (1964). We