l. The output from the pick-
ay tube, along with a signal
ay can then be photographed
sequently be measured.
ue was introduced by Shoen-
he extreme stability of super-
cting mode of operation. In
le a superconducting solenoid
kG). When the current in the
lue, the value of the current
e applications the magnet is
the field constant). An addi-
field in the specimen at quite
60 c/s presents no difficulties).
is oscillatory, there is a non-
enience the second (or higher)
up and amplified. From this
the period of the de Haas–van

be made so low, this method
surements; the superconduct-
e pick-up coil can all be out-
contain only the single crystal
ple, O'Sullivan and Schirber,

netic susceptibility known as
ussed, arises from the quanti-
field. These oscillatory effects
f the electrons is sufficiently
> 1. Here ω_c is the cyclotron
of the conduction electrons
red.

roperties show corresponding
resistivity of the sample in
e Haas effect — Shubnikov
n–Nernst effect. Both of these

have been used to study the Fermi surface under pressure. As in the de Haas–van Alphen effect the period of the oscillations as a function of $1/H$ measures the area of the extremal cross-section(s) normal to H.

In addition to this oscillatory effect in the magneto resistance, the field dependence of the magneto-resistance for different directions of the applied field can be used to determine certain dimensions of the Fermi surface related to its topology. This method was used by Caroline and Schirber (1963) to look for changes in the Fermi surfaces of Cu and Ag under pressure. The main features of the method are as follows.

Lifshitz and Peschanshii (1958) have shown that multiply-connected (open) Fermi surfaces show very characteristic behaviour in magneto-resistance at high fields. In a closed Fermi surface all the electron orbits in an applied magnetic field are necessarily closed. In these circumstances the magneto-resistance $\varrho(H)$ saturates at high fields. This is true provided that the metal is not a compensated metal, i.e., with equal numbers of electrons and holes. If the metal is compensated with a closed Fermi surface $\varrho(H)$ varies as H^2 for all field directions (see Fawcett, 1964).

In an open Fermi surface it may be possible to find for certain field directions orbits that can, because of the topology of the surface, never close. For these directions $\varrho(H)$ varies as H^2, whereas in the others where only closed orbits can occur $\varrho(H)$ saturates. Of the possible open orbits one kind (referred to by Chambers (1962) as type B open orbits) can occur in a whole region of angles around certain symmetry directions. The solid angles that enclose these directions that support open orbits thus show on a stereogram as the boundaries of two-dimensional *areas*. Type A open orbits can occur in *planes* of applied magnetic field so that their directions are represented by *lines* on a stereogram. The dimensions of these regions or lines can be found because sharp peaks in the magneto-resistance are observed when the applied field direction passes through a type A region or crosses a boundary of a type B region. $\varrho(H)$ depends not only on the direction of the applied magnetic field but also on α, the angle between the direction of the open orbit and the direction of the electric current. In fact $\varrho(H)$ varies as $H^2 \cos^2 \alpha$ in directions where open orbits are involved.