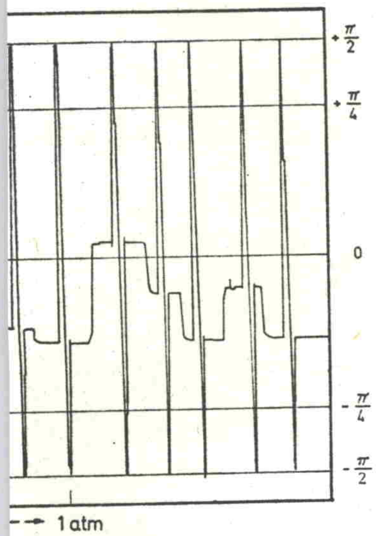
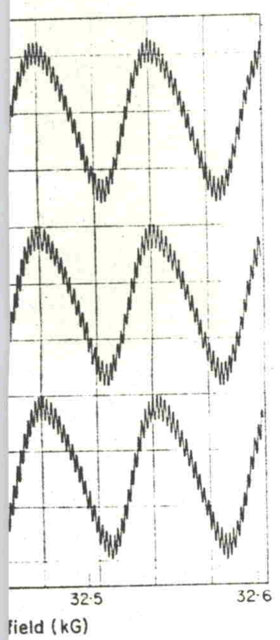


oscillations of Au due to pressure
om Templeton, 1966.)



[111] direction in the de Haas–van
s. The arrows indicate corresponding
e change with pressure. (From Tem-

by the change of pressure was just offset by a suitable change in a supplementary source of magnetic field. The phase shift could then be calculated from the required field change.

In Fig. 14 we see how in Templeton's method the relative phase of belly and neck oscillations is compared at different pressures. In these measurements there is no change of phase with pressure as long as different parts of the Fermi surface just scale in the same proportion. The method thus detects directly *distortion* of the Fermi surface with pressure. In the Figure, the high-frequency oscillations arise from the belly and the low frequency oscillations from the necks. The arrows indicate one particular belly cycle; to follow its position without ambiguity it is necessary to make measurements at smaller pressure intervals than those illustrated in the Figure.

Once the relative phase change between the belly and neck oscillations has been determined, we can then find the relative changes in area as follows. The cross-sectional areas A_n of the allowed orbits of the electrons in a field H are given by:

$$A_n = 2\pi(n+\gamma)\, eH/\hbar \qquad (33)$$

where γ is a phase factor that we assume remains constant and n is an integer. Now let $N_{\rm N}$ and $N_{\rm B}$ be the corresponding values of $n+\gamma$ for the neck and belly oscillations, respectively, at a given value of H:

Therefore:

$$\frac{N_{\rm N}}{N_{\rm B}} = \frac{A_{\rm N}}{A_{\rm B}} \qquad (34)$$

where $A_{\rm N}$ and $A_{\rm B}$ are the cross-sectional areas of the extremal neck and belly orbits.

Consequently if we fix on a given neck orbit and so keep $N_{\rm N}$ constant but allow $A_{\rm N}$ and $A_{\rm B}$ to change because of the pressure, the change in $N_{\rm B}$ is given by:

$$-\frac{\Delta N_{\rm B}}{N_{\rm B}} = \frac{\Delta A_{\rm N}}{A_{\rm N}} - \frac{\Delta A_{\rm B}}{A_{\rm B}} \qquad (35)$$

It is clear from this result that if the two orbits scale in the same proportion $\dfrac{\Delta A_{\rm N}}{A_{\rm N}} = \dfrac{\Delta A_{\rm B}}{A_{\rm B}}$ and $\Delta N_{\rm B} = 0$. From the experiment on