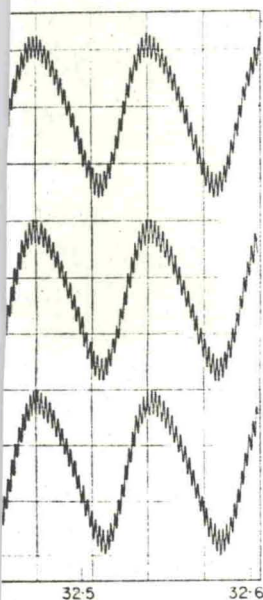


oscillations of Au due to pressure
(from Templeton, 1966.)



[111] direction in the de Haas-van
Alphen effect. The arrows indicate corresponding
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:

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

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

Therefore:

$$\frac{N_N}{N_B} = \frac{A_N}{A_B} \quad (34)$$

where A_N and A_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_N constant but allow A_N and A_B to change because of the pressure, the change in N_B is given by:

$$-\frac{\Delta N_B}{N_B} = \frac{\Delta A_N}{A_N} - \frac{\Delta A_B}{A_B} \quad (35)$$

It is clear from this result that if the two orbits scale in the same proportion $\frac{\Delta A_N}{A_N} = \frac{\Delta A_B}{A_B}$ and $\Delta N_B = 0$. From the experiment on