As characteristic constants for the oil the energy of activation has been
determined. The change of this activation energy for oils, which have
been altered in transformers and in the laboratory, shows the particularly
feature, that the curves which represent the activation constant as a
function of the inverse temperature of reaction are straight lines showing
single point of intersection. The temperature of this point of intersection
is of utmost importance for the use of the oil in the transformer. The
theorem holds that the oil in the transformer ought not to come above
this intersection temperature.

Theoretical explanation of the phenomena found in the oxidation process
can be given assuming that it consists of a chain of reactions. Measuring
the dipole moment as a function of the alteration we could show that
indeed dipoles are formed by oxidation.

Physics. — *Measurements of the latent heat of tin in passing from the
supraconductive to the non-supraconductive state.* — By W. H.
Keesom and P. H. van Laer. (Abstract of Communication
No. 242a from the Kamerlingh Onnes Laboratory at Leiden).

(Communicated at the meeting of April 25, 1936).

As a continuation of former calorimetric experiments on supracon­
ductors, we made some measurements of the latent heat of tin connected
with the transition from the supraconductive to the normal state, a constant
external magnetic field being applied.

To be able to calculate the magnetic properties of the body, we used a
block which had the shape of a rotation-ellipsoid, axis of rotation 17.5 cm,
short axis 3.5 cm.

Measurements were made in an external field of 50, 100 and 140 gauss,
applied after the tin block had been cooled below the transition point in a
zero magnetic field. The latent heat, as determined from these experiments,
agreed very well with the value which, in the supposition that the
transition would be a reversible one, was derived from thermodynamical con­
siderations.

So it was concluded that in the transition, if performed in this way, no
irreversible heat process takes place.

The temperature range of the transition for the different series was only
about 0.02 degree larger than was calculated in connection with the form
of the block. The transition temperature in all cases is a few hundredths
of a degree higher than it should be according to the threshold value curve
for restoring resistance in monocrystalline tin wires. Both facts may per­
haps be accounted for by the polycrystalline structure of the block.
By means of a bismuth wire in a hollow of the block, the magnetic field within the body could be observed. It appeared that it was zero as long as the whole body was supraconductive, in the transition range it increased gradually, at an accelerated rate, however, at the end of a heating or immediately after. The integral external field is found in the hollow when about half of the block has passed into the normal state.

Also a few experiments were made in which the block passed from the supraconductive to the normal state at a constant temperature. The latent heat found in this way was appreciably smaller than in the measurements in a constant external field. This may be ascribed to the Joule heat in the non-supraconductive parts of the body resulting from the Foucault currents which were excited in the transition region, the magnetic field being increased step by step.

Physics. — Comparison of platinum resistance thermometers with the helium thermometer from $-190^\circ C$ to $-258^\circ C$. By W. H. Keesom and A. Bijl. (Abstract of Communication No. 242b from the Kamerlingh Onnes Laboratory at Leiden).

(Communicated at the meeting of April 25, 1936).

The resistance curves of four platinum resistance thermometers have been determined between $-190$ and $-258^\circ C$.

The platinum wires had a diameter of 0.05 mm. They were wound round porcelain tubes.

$Pt\, 48$ was of an older type and had a rather low temperature coefficient. The protecting tube was of German silver.

$Pt\, C$, $Pt\, 59$ and $Pt\, 61$ were more recent models, with open glass protecting tubes. The most important improvement was the better heat treatment.

The platinum used for the wires of $Pt\, C$, $Pt\, 48$ and $Pt\, 61$ was provided by Heraeus. For $Pt\, 59$, however, we used platinum prepared by Reerink. This platinum was obtained by thermal decomposition of PtCOC1$_2$ on a heated platinum core.

It appeared that the resistance curves of $Pt\, C$ and $Pt\, 61$ are practically parallel, though the deviations from parallelism exceed the experimental error in the liquid hydrogen region. At the higher temperatures the curve of $Pt\, 48$ is also parallel to that of $Pt\, C$, but at $-240^\circ C$ the difference between $Pt\, 48$ and $Pt\, C$ becomes smaller.

The resistance curve of $Pt\, 59$ is entirely different from the others. Between 0 and $-190^\circ C$ its value of $R/R_0$ continually exceeds that of $Pt\, C$. Below $-210^\circ C$, however, the resistance decreases with abnormal rapidity. In the liquid hydrogen range the resistance curve is approximately