2·2. *Temperature scale*

The thermometer was a 10 Ω, 1 W, Allen–Bradley carbon resistor; its plastic cover was ground off and the resistor then placed inside its cavity with varnish. It was calibrated against the vapour pressures of helium (^4He) and hydrogen (of known ortho-para composition) close to their normal boiling points. For interpolation the two-constant formula (Clement 1955) was used,

$$\left(\frac{\log R}{T_c}\right)^{\frac{1}{2}} = a + b \log R, \qquad (1)$$

where R is the resistance and the constants a and b are determined from the calibration points. Temperatures as determined from equation (1) are for clarity designated by T_c.

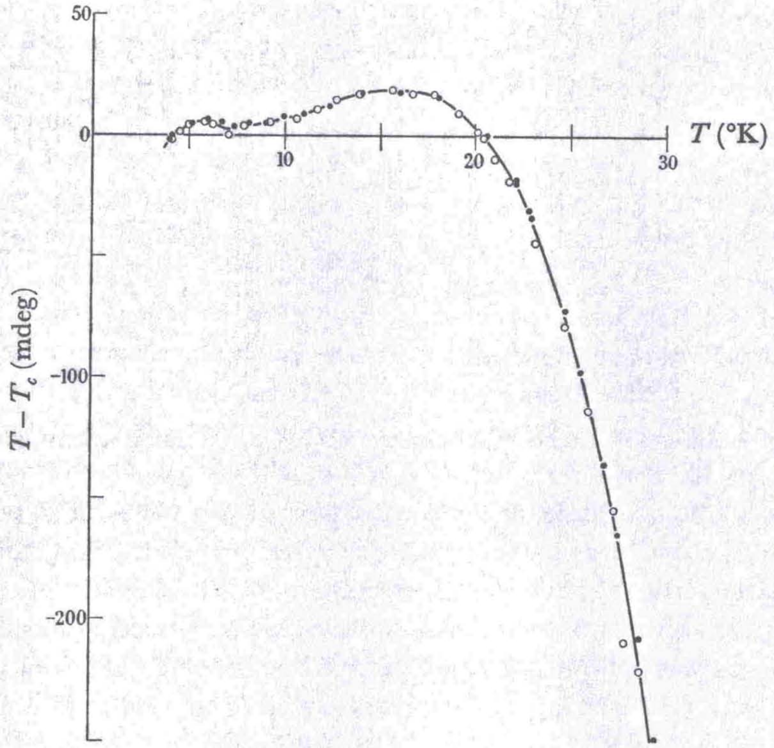

FIGURE 3. Corrections applied to the carbon thermometer temperature T_c to convert it to the absolute temperature T.

This calibration was performed each time after the thermometer had been allowed to warm up to room temperature and a slight change of the constants a and b was observed after each warm-up.

It is known that interpolation with equation (1) leads to serious deviations from true temperature, especially above 20 °K. A complete calibration of the thermometer against the helium gas thermometer was therefore obtained. The technique employed was as described by Franck & Martin (1961). Temperatures as obtained from the gas thermometer readings are designated T and are believed to be accurate to within ± 5 mdeg. The results of two calibrations are given in figure 3 as $T - T_c$ plotted against T.

From previous experience with thermometers of the Allen–Bradley type it was known that the effect of successive warm-ups on the deviation curve $T - T_c$ is almost negligible