the value 7730 kgf cm^{-2}, which is much closer to the later results. Babb (1963) has recently discussed a possible revision of the scale based on Bridgman's work.

Johnson and Newhall (1953), using the volume change method, arrived at a value of 7717 kgf cm^{-2}, but with the rather wide limits of accuracy of $\pm$ 53 kgf cm^{-2}. More recently Newhall, Abbot and Dunn (1963) have followed a similar method with improved techniques and give the value 7715·6 kgf cm^{-2} with estimated limits of error or about $\pm$ 4 kgf cm^{-2}. This value, however, appears to rest on a single complete measurement and no information as to the dispersion within a series of measurements is given. A rather surprising feature of the measurement technique is the high running temperature of the pressure balance piston, quoted as between 35 and 50°C, compared with the ambient temperature, stated to be in the range 21·5–23·0°C. No explanation of the increased piston temperature is given. It is of interest to note that these authors attempted initially to use the method of electrical resistance change but were unable to obtain satisfactory results. They attribute this in part to sluggishness in the freezing and melting of the mercury and time delays in pressure transmission through the connecting lines. This result is not in accordance with our experience in the present investigation.

In several papers from 1955 onwards Zhokhovskii and his associates (1955, 1957, 1958, 1959) have reported determinations of the dependence of the freezing pressure of mercury on temperature, with a view to establishing this relationship in numerical form as a basis for a pressure scale. In their last paper (Zhokhovskii *et al.* 1959) they extend the scale to 25 000 kgf cm^{-2}. The experimental value 7715 kgf cm^{-2} originally stated for 0°C (Zhokhovskii 1955) is based on measurements at the temperature 0·035°C using a pressure balance. No precise limits of error, or evidence as to the dispersion of the data on which this result is based, are given. Zhokhovskii *et al.* have fitted their data over the whole range up to 25 000 kgf cm^{-2} to a function, based on the Simon equation, which corresponds at 0°C to the smoothed value 7719 kgf cm^{-2}. They observe that their representation is in good agreement with earlier work by Michels, Wassenaar and Blaisse (1942) covering the range from 0 to 3000 kgf cm^{-2}. The process of fitting the large number of experimental points given by Zhokhovskii *et al.* by a smooth mathematical function should considerably reduce the effects of random errors, and this may provide reasons for preferring their smoothed value for 0°C to the individual experimental result for that temperature. The smoothed value, 7719 kgf cm^{-2}, is in striking agreement with the result 7718·5 kgf cm^{-2} given by the present investigation and the above argument suggests that this agreement may have an important measure of significance.

4. Conclusion

Measurements of the freezing pressure of mercury at 0°C have been carried out by the direct use of calibrated pressure balances, and have yielded a value in close agreement with the smoothed value for that temperature corresponding to the melting formula adopted by Zhokhovskii *et al.* The technique used, depending on observation of the phase change by the change in electrical resistance, proved very successful and has the advantage of requiring only a very small volume of mercury so that disturbances to equilibrium arising from volume changes in the system are reduced to negligible proportions. This technique may well prove the most suitable for practical applications of the fixed point such as the calibration of manganin resistance, or other secondary gauges. It is expected that further measurements will be carried out at other temperatures in due course.

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