based on the extrapolation of limited experimental data, and in an attempt to provide a more fundamental approach one of the present writers attempted to find a reduced melting formula which would apply to all substances, and in which the reducing parameters could be related to definite physical properties of the individual substances. The formula proposed was (see Simon 1937)

$$\frac{p}{a} = \left(\frac{T}{T_0}\right)^c - 1,\tag{1}$$

where T_0 is the normal melting-point of the substance, a the internal pressure, and c a constant whose value was about 2 for most substances (except for metals). This formula was found to fit all the existing experimental data quite accurately; for helium the quantity T_0 needed reinterpretation, but the use of the internal pressure a as a parameter automatically took account of the quantum effects. Recent experimental work has confirmed this formula over a very much wider range than that for which data were available when it was proposed (Holland, Huggill, Jones & Simon 1950; Holland, Huggill & Jones 1951). At this point we would like to correct a statement erroneously attributed to one of us in the literature (e.g. Bridgman 1935) 'that the melting curve will end in a critical point'. Our statement actually was that the reasons brought forward for the impossibility of a critical point did not seem conclusive; a decision could only be given by experiments and the best chance of success would, according to relation (1), be with the low boiling-point gases.

Recently, equation (1) has also received some theoretical justification for substances in the classical region. Domb (1951) has shown that by a reinterpretation of the Lennard-Jones & Devonshire theory of melting, a formula similar to (1) can be derived for high pressures, the constant c being related to the intermolecular potential energy. De Boer (1952) has completed the derivation by showing that the internal pressure does in fact enter the formula in the way suggested by Simon. (See also Note added in proof, p. 309).

We feel, therefore, that the 'reduced' formula for the temperature dependence of the melting pressure has the same kind of validity as that of the 'reduced' vapour-pressure formula, even in the case of substances in which quantum effects play a role; hence the fact that helium can be solidified at temperatures of about fifty times the 'normal' melting temperature by exerting pressures of about five hundred times the internal pressure may be taken to apply to other substances under similar conditions (Simon 1952). This statement naturally is only valid if the particular conditions of pressure and temperature do not produce changes on a subatomic scale (e.g. changes in electronic configuration), for such changes cannot of course be taken care of by our formula.

The experiments mentioned so far were solely concerned with the position of the melting-point at different pressures and were not concerned with other thermodynamic properties along the melting curve. But there is another property of helium which is of great consequence when making thermal measurements. The heat capacities of all the materials used in constructing the apparatus are very much smaller at low temperatures than those of helium, and it is therefore