yields $\Delta H_m = 6.19$ cal/g, whereas the calorimetric value of Giauque and Clayton[17] is $6.15 \pm 0.05$ cal/g; the agreement is satisfactory if one considers that Eq. (4) combines extrapolations of the melting curve below 23 kg/cm$^2$ and of $\Delta V_m$ below 79 kg/cm$^2$.

### D. Question of a Critical Point in Melting Curves

In a review article, Bridgman[19] summarized the experimental and theoretical work done on the fusion process, pointing out that the question remained as to whether the melting curve: (1) ends in a critical point; (2) rises to a maximum temperature and then falls; (3) rises to an asymptotic temperature; or (4) rises indefinitely with increasing pressure and temperature. Bridgman concluded, from his measurements[20] to 50 000 kg/cm$^2$ of melting phenomena and of the volumetric behavior of liquid and solid phases, that Hypothesis (4) is valid. Certain assumptions applied to the temperature-perturbed Thomas-Fermi atomic model led Gilvarry[21] to predict a melting curve with normal behavior; i.e., with $dP/dT$ always positive and always increasing with $P$. In addition, he showed that $\Delta H_m/\Delta V_m$ always has a positive pressure coefficient, which is consistent with the absence of a critical point.

Recently Ebert,[3] combining Bridgman's data with analogies drawn from the vaporization process, showed that, for certain substances, $\Delta S_m$ and $\Delta V_m$ might extrapolate to zero at the same pressure, a criterion of a critical point. It should be pointed out, however, that $\Delta S_m$ was calculated from $P_m$, $T_m$, and $\Delta V_m$ by means of the Clapeyron equation. Then if $dP/dT$ remains finite, as required by the Simon melting equation, $\Delta V_m$ and $\Delta S_m$ must necessarily vanish at the same pressure. Since the Simon equation has been strengthened by several theoretical derivations,[16,22–24] it is interesting to compute $P_m = 18\,500$ kg/cm$^2$ and $T_m = 256$°K from Eqs. (1) and (3) when $\Delta V_m = 0$ for $N_2$. These values indicate that the vanishing of $\Delta V_m$ might occur within the range of experimental pressures.

## V. ACKNOWLEDGMENTS

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