at approximately 12,000 bars. The freezing pressure of the 15% solution was measured by a method which has already been described[20] and consists essentially of finding the intersection of the pressure piston-displacement curves for the solution alone and for an equilibrium mixture of ice and solution. The intersection of the "after melting" curve and the freezing curve (triangles) is shown in Fig. 5 at a pressure of 10,984 bars. The average of two determinations which differed by 40 bars gave 10,965 bars for the freezing pressure of the 15% solution of ammonium nitrate. This agrees well with 10,930 bars, the value of the freezing pressure of this solution as calculated from the thermodynamic data.

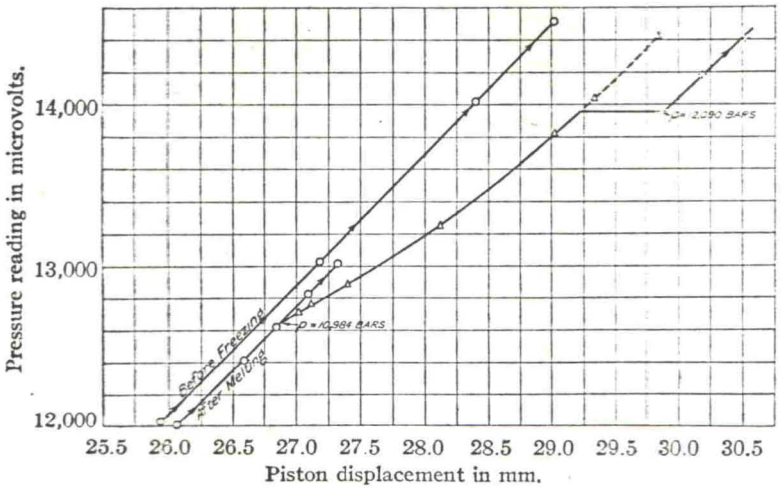


Fig. 5.—Graphical illustration of the direct determination of the freezing pressure of a 15% solution of ammonium nitrate and of the eutectic pressure in the system, NH_4NO_3–H_2O, at 25°.

The procedure for measuring directly the eutectic pressure has already been detailed.[21] The pressure is raised until so much ice has frozen out that the solution becomes sufficiently concentrated for the salt to separate—a super pressure of several hundred atmospheres often being needed. As long as three phases in equilibrium are present the pressure remains constant even though the piston displacement is changed.

Two direct determinations of this constant pressure gave as a mean 12,125 bars, the difference being 70 bars. The agreement between this figure and 12,100 bars, the pressure at which the two calculated solubility curves intersect, is most satisfactory.

In estimating the solubility of ammonium nitrate under pressure we placed a 30% solution in a cylindrical capsule and subjected it to a pressure

[20] Adams, Ref. 1a, p. 3811.

[21] Adams, Ref. 1b, p. 2241.