THE MELTING POINT OF ORTHO-BORIC ACID

THE evidence obtained so far in support of the fact that orthoboric acid combines with many hydroxylic substances to form complex compounds is based on a study of some of the physical properties of aqueous solutions containing boric acid and the hydroxylic substances. But a search of literature revealed that no attempts have been made so far to construct the melting point composition curves of mixtures of ortho-boric acid with other substances. The reason for this is probably to be found in the fact that ortho-boric acid decomposes on heating. According to Merz[1] it is stable up to 70° C. while Lescoeur[2] found the temperature of stability to be 100°C. From the work of Stackelberg, Quatram and Dressel[3] it appears that ortho-boric acid is stable upto 140° C. Whatever the exact temperature upto which ortho-boric acid is stable it is clear that if the melting points of mixtures of boric acid with other substances are below 100° the decomposition of boric acid may be considered absent or negligible while studying the melting point diagram. In trial experiments with mixtures of boric acid with certain hydroxylic substances it was found that the melting points of these mixtures are below 100° C.

With mixtures of ortho-boric acid and glucose, galactose and tartaric acid it was found that the melting point diagrams are of the eutectic type although it is noticed that the two branches of the curves are not straight lines intersecting at the eutectic point. By drawing tangents to the curves parallel to the axis of composition the following data are obtained :—

Substance	Mol. per cent. boric acid	Minimum temp.
Glucose	45·8	51·7
Galactose	49·3	50·0
Tartaric acid	51·5	62·0

Using the expression given by Kordes[4,5] the melting point of ortho-boric acid was calculat-