thermocouple. The barium samples were extruded from commercial stock with a purity of 99+%. Copper or platinum wires were tied around the ends of the .015 to .030" barium samples to provide resistance measurement leads. No correction was made for the effect of pressure on the emf of the chromel-alumel thermocouples. The thermocouple was positioned about .020" from the center of the barium wire and was electrically insulated from it by the pyrophyllite, boron nitride or AgCl. Temperatures are thought to be accurate to $\pm$1.5%. Pressure calibration was made in the usual way[6,7] with bismuth and thallium as well as barium wires being placed in each of the sample cell configurations used. The pressure values are believed to be accurate to $\pm$2.5% assuming no pressure correction due to the elevated temperature. All data were automatically recorded to facilitate analysis.

The data obtained on melting and on the BaI-BaII transition are shown in Fig. 1. The experimental points shown were taken directly from resistance-temperature curves (isobars) or resistance-pressure curves (isotherms) and the solid lines represent what we consider to be the best fit to the experimental points. The scatter in the data is thought to be caused by the pressure uncertainty. No data are shown below 20 kb because of equipment limitations at high temperatures in this pressure range. Our melting curve data agree quite closely with that of Jayaraman, et. al[1], but the BaI-BaII transition line obtained in the present work has a pronounced negative slope in contrast with the positive slope found by differential thermal analysis. Repeated attempts failed to show any resistance