



Fig. 2. Results of high-pressure runs on the quartz-coesite transition at 1100°C using different pressure cells.

the pressure vessel and to friction within the talc and boron nitride. It represents a -4% pressure correction to a two-stage compression run, and the quartz-coesite transition at 1100°C, using this correction, is placed at 34.3 kb.

With the silver chloride + boron nitride pressure medium for a two-stage compression run, the quartz-coesite transition at 1100°C occurs at a nominal pressure of 32.5 kb; in a two-stage decompression run it occurs at 31 kb. Thus the difference in pressure between compression and decompression results for the quartz-coesite transition is 1.5 kb. This is attributed to piston friction and to friction within the boron nitride, since friction losses in the silver chloride are considered to be negligible, and it represents a -2% friction correction to a two-stage compression run. The quartz-coesite transition at 1100°C, using this correction, is placed at 31.8 kb.

There remains a discrepancy of 2.5 kb between the results obtained using talc and silver chloride pressure mediums, even after corrections for friction losses have been made. To bring these results into agreement, a further correction of -7% is needed for a two-stage compression run with talc + boron nitride as the pressure medium.

DISCUSSION

This work indicates that at 35 kb and 1100°C a total pressure correction of -11% is needed on a two-stage compression run, and this correction appears to consist of two components. The first of these is an irreversible component being characterized by hysteresis; it is attributed to frictional losses between the piston and cylinder and in the talc + boron nitride pressure medium. This correction amounts to -4%. The second component of pressure loss is re-

versible (i.e., it is not steresis) and is attributed to the distribution of stress in the experimental work established of this component as a distribution of stress in likely to occur even in there is no irreversible piston friction. It is probably caused by differences in strengths and compressive components of the pressure medium. For example, the talc and silver chloride have substantially greater strength than the graphite furnace and its especially since the graphite furnace is hotter than most of the other pressure cells. In boron nitride cylinders. Friction losses on the end of the pressure vessel are the same as the actual pressure in the middle of the sample in the middle of the pressure vessel. This effect that causes the discrepancy between the results for the silver chloride and talc cell with significant strength.

In Table 2 a comparison is made of the results of previous workers with the results of this work. Good agreement is seen between England's early, corrected results and those from their design. We agree with their conclusion that the strength of the pressure medium increases with increasing temperature but that a pressure correction is therefore no longer required at higher temperatures. It probably remains essentially constant over the run temperature because of the small volume of the talc column in the vicinity of the hot spot, which is affected by changes in run temperature. It is shown that, as well as an increase in pressure loss, there is also a decrease in pressure loss due to the appreciable pressure cell.

The difference between the results for our piston-cylinder apparatus and Kennedy's apparatus were due to variations in design and to the different time factors used in the experiments used to determine the transition. Kennedy and co-

TABLE 2. Quartz-Coesite Transition at 1100°C as Determined in Piston-Cylinder Apparatus

	<i>Boyd and England</i> [1960a]	<i>Kitahara and Kennedy</i> [1964]	<i>Khitarov</i> [1964]	This Work
Corrected pressure, kb	32.3	32.8	31.8	31.8
Uncorrected pressure, kb	35	35.3		35.5