

FIG. 1. Inductance of a coil wound on a threaded Bi core as a function of ram pressure at room temperature. Lead inductance was  $0.5800 \mu\text{H}$ .

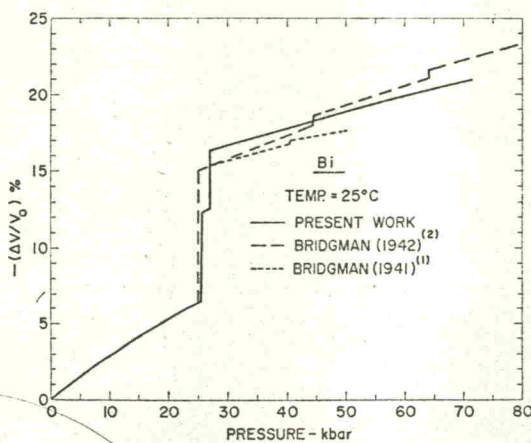


FIG. 2. Compression curve of Bi at  $25^\circ\text{C}$ .

The compression curve of Bi to 60 kbar at  $25^\circ\text{C}$  is shown in Fig. 2 which also shows Bridgman's results for comparison. The data is tabulated at 5 kbar increments in Table 1. These results are

Table 1. Compression of Bismuth at  $25^\circ\text{C}$ .<sup>\*</sup> The listed values are the means and standard deviations for eight experiments

$P$ (kbars)	$-(\Delta V/V_0)$ %	$P$ (kbars)	$-(\Delta V/V_0)$ %
0	0	35	$17.2 \pm 0.8$
5	1.5	40	$17.8 \pm 0.9$
10	2.8	45	$18.3 \pm 0.9$
15	4.1	50	$18.9 \pm 0.9$
20	5.3	55	$19.4 \pm 1.0$
25	6.3	60	$19.9 \pm 1.0$
30	$16.7 \pm 0.8$		

<sup>\*</sup> Matched with BRIDGMAN's<sup>(2)</sup> data up to 20 kbar.

† (i) Transition at 25.4 kbar; compressions  $-6.4\%$  to  $-(12.2 \pm 0.4)\%$ ; (ii) Transition at 26.8 kbar; compressions  $-(12.4 \pm 0.5)\%$  to  $-(16.0 \pm 0.8)\%$ .

based on eight runs for which the experimental set-ups differed among each other in some respect, such as sample size, pressed powder vs. cast samples, thickness of silver chloride jacket (when used), and whether or not a thin pyrophyllite sleeve was placed on the coil before enclosing it in silver chloride. On completely identical set-ups the reproducibility was better than  $\pm 2\%$  of the vol. changes themselves.

The over-all results are in fairly good agreement with Bridgman's data. The most significant differences occur in the region of the transitions. The Bi<sub>I-II</sub> and Bi<sub>II-III</sub> transitions occur so close together in pressure that it was beyond the resolving powers of Bridgman's 50 kbar<sup>(1)</sup> and 100 kbar<sup>(2)</sup> apparatus to separate them. In earlier lower pressure work, however, he reported the vol. changes at the two transitions separately.<sup>(9)</sup> Table 2 compares the results and also includes LAMORI's<sup>(10)</sup> data obtained by the piston displacement technique.

The ratios of the sudden vol. changes I-II: II-III varied between 1.41:1.0 and 1.60:1.0 for the various runs. By way of comparison BRIDGMAN's data<sup>(9)</sup> yielded a ratio of 1.53:1.0 and that of LaMori 1.33:1.0. It is not clear why there should be such a large scatter in this ratio. In his resistance work, BRIDGMAN<sup>(3)</sup> also observed a wide variation in the ratio of the resistance changes