ıe range to which Bridgman's accurate.

nine the pressure value of the it was necessary to extend the r multianvil cubic apparatus. the use of tungsten carbide the manner described pre- were in the form of truncated hick and 3·30 cm long at the

sured both by the recently gauge with integral cali- ıltiple event resistance cells. small sections of Bi, Tl, and hs inversely proportional to tivities and encapsulated in oride sleeve. The transition rants were taken as 25·4, 37, I, Tl, and Ba, respectively.

AND DISCUSSION

st material most widely used uctive coil technique, and a eriments were made on it. made to test various refine- technique, which rendered in measuring "long range" well as vol. changes ac- hic transitions.

e vs. ram pressure curve is experimental set-up is such s proportionately with the ance, L, is related to sample p $L = V^{1/3}$.

r the transitions are calcu- nces at the terminal points because the transformations rly isobaric, and pressure ample are negligible in our supported by the fact that rp step separating the two of the range of applied load each transition. In cases jacketed by silver chloride, pressure required to com- s over twice that shown in . 3). This difference in load ted to the "cave principle" rlier.(7)

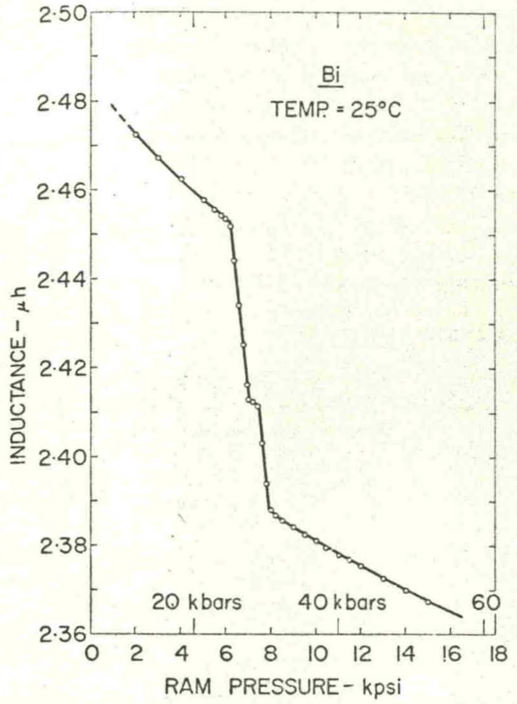

FIG. 1. Inductance of a coil wound on a threaded Bi core as a function of ram pressure at room temperature. Lead inductance was 0·5800 μH.

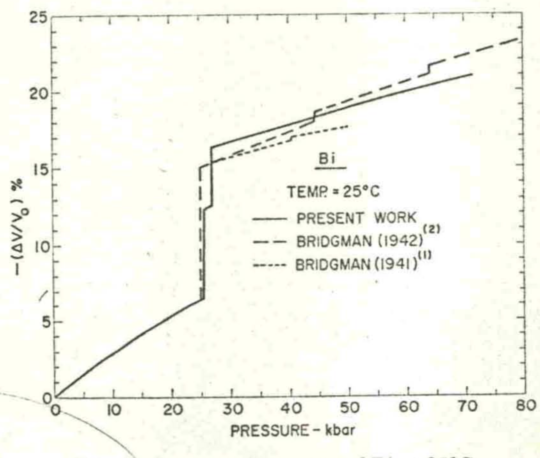

FIG. 2. Compression curve of Bi at 25°C.

The compression curve of Bi to 60 kbar at 25°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°C.* *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	$17{\cdot}2 \pm 0{\cdot}8$
5	1·5	40	$17{\cdot}8 \pm 0{\cdot}9$
10	2·8	45	$18{\cdot}3 \pm 0{\cdot}9$
15	4·1	50	$18{\cdot}9 \pm 0{\cdot}9$
20	5·3	55	$19{\cdot}4 \pm 1{\cdot}0$
25	6·3	60	$19{\cdot}9 \pm 1{\cdot}0$
	†		
30	$16{\cdot}7 \pm 0{\cdot}8$		

* Matched with BRIDGMAN's[2] data up to 20 kbar.

† (i) Transition at 25·4 kbar; compressions $-6{\cdot}4\%$ to $-(12{\cdot}2 \pm 0{\cdot}4)\%$; (ii) Transition at 26·8 kbar; compressions $-(12{\cdot}4 \pm 0{\cdot}5)\%$ to $-(16{\cdot}0 \pm 0{\cdot}8)\%$.

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_{I-II} and Bi_{II-III} transitions occur so close together in pressure that it was beyond the resolving powers of Bridgman's 50 kbar[1] and 100 kbar[2] apparatus to separate them. In earlier lower pressure work, however, he reported the vol. changes at the two transitions separately.[9] Table 2 compares the results and also includes LAMORI's[10] 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[9] 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[3] also observed a wide variation in the ratio of the resistance changes