and Drickamer[7] obtained from x-ray measurements were used. For the other metals the shock-wave data of Rice, McQueen, and Walsh[8] and of McQueen and Marsh[9] were used. Their data show no discontinuity for titanium so it is not clear whether they had the high-pressure phase or a metastable hcp phase. The volume change at the transition is very probably too small to affect the qualitative discussion given below.

The dotted lines in Figs. 2 and 3 represent the isomer shifts calculated using the slope from Eq. (2), which was obtained assuming the Fe^{57} 4*s*-electron-density scales with bulk density. Although this assumption is

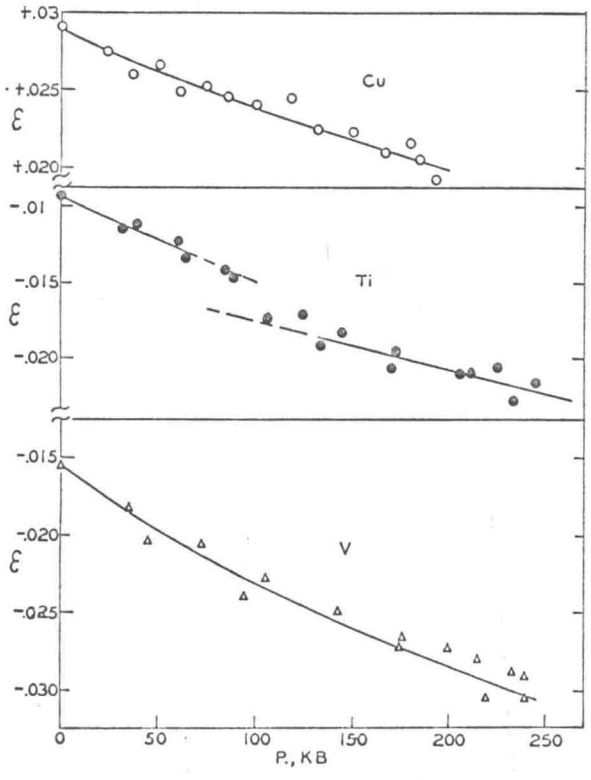

FIG. 1. Isomer shift versus pressure for Fe^{57} in copper, titanium, and vanadium.

only a first approximation, some interesting qualitative conclusions can be drawn comparing this calculated slope with those actually observed. Metals crystallizing in the bcc structure, namely, vanadium and iron in the low-pressure phase, show an Fe^{57} 4*s*-electron density which scales with bulk density at least below 100–150 kbar. On the other hand, the closer packed materials, namely copper, and the hcp phases of titanium and iron show a slower rate of increase of Fe^{57} 4*s*-electron density than predicted from the scaling assumption.

[7] R. L. Clendenen and H. G. Drickamer, J. Phys. Chem. Solids (to be published).

[8] M. H. Rice, R. G. McQueen, and J. M. Walsh, in *Solid State Physics*, edited by F. Seitz and D. Turnbull (Academic Press Inc., New York, 1958), Vol. 6.

[9] R. G. McQueen and S. P. Marsh, J. Appl. Phys. 31, 1253 (1960).

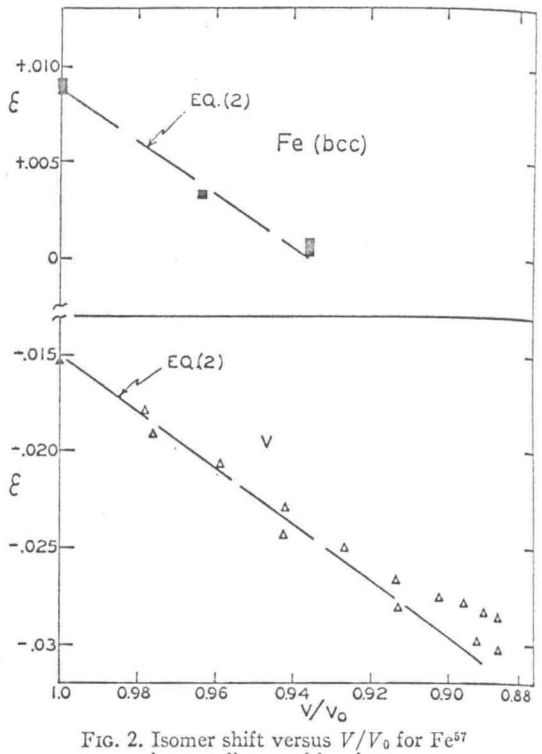

FIG. 2. Isomer shift versus V/V_0 for Fe^{57} in vanadium and bcc iron.

In considering these results one must bear in mind that metals of the iron transition series possess the fol-

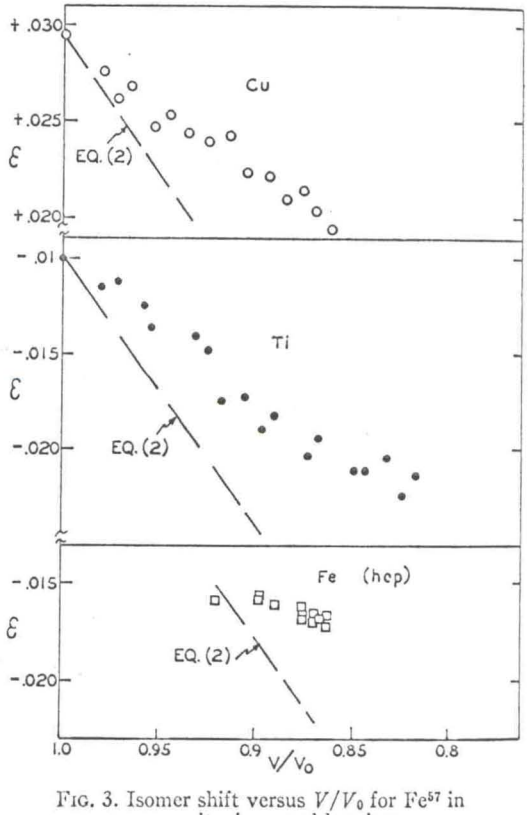

FIG. 3. Isomer shift versus V/V_0 for Fe^{57} in copper, titanium, and hcp iron.