Table VII

q	$Q' \times 10^{-14}$, dyn/cm²	$Q \times 10^{-10}$ dyn/cm²	β_0, $\frac{\text{ergs}}{\text{g-deg}^2}$
7.7845	22.68	107.4	1551
8.85	55.54	95.44	930

them are given in the upper row of Table VII. In the equation of state of Zharkov and Kalinin, the magnitude of the electronic Grüneisen coefficients γ_e is unjustifiably large in the density range considered (up to $\sigma = 2.0$), changing from 3.7 to 3.2. Extrapolation of their adiabat in the region $P_H > 5 \times 10^6$ atm contradicts the experimental data (see Fig. 6).

A much better description of the shock adiabat of iron is achieved for $\gamma_e = 1.5$ (see Fig. 6) and a somewhat larger value of q than in [12]. The parameters of the equation of state of iron and the characteristics of the dynamic adiabat are given in the lower rows of Tables VII and VI. The relative positions of the curve $P_c(\sigma)$, obtained in the present work, and the curve $P_c(\sigma)$ from [11] are shown in Fig. 6. The curve $P_c(\sigma)$ from [1] is located close to the corresponding curve in [11]. In both cases, the gentle slope of $P_c(\sigma)$ is explained by the increase in the thermal pressure. In [11], this is associated with large γ_e; in [1], the decrease of γ_l with density was not taken into account.

4. EXTRAPOLATION OF THE ZERO ISOTHERMS

The equations obtained are suitable for a description of the course of the zero isotherms in the range of the experiment and for nearby extrapolation. For iron, nickel, zinc, and copper their application is probably limited to densities less than $2.5\rho_0$. For the remaining metals, $\rho < 3\rho_0$.

For high degrees of compression, the isotherms of absolute zero are taken into account with sufficient reliability by quantum mechanical methods. More accurate and convenient for practical application at the present time are the corrected Thomas-Fermi (TFC) curves computed by Kalitka, [14] which consider both exchange and quantum corrections. In log P vs. $\log(\sigma - 1)$ coordinates, long portions of the TFC curves are straight lines. In P vs. $\sigma - 1$ coordinates, they are parabolic curves of the form $P = B(\sigma - a)^n$. A shift of the vertices of the parabolas to the position $P = b$, $\sigma = a$ makes it possible to obtain a smooth connection of the experimental isotherms

Table VIII

Metal	$b \times 10^{-10}$, dyn/cm²	$B \times 10^{-10}$, dyn/cm²	a	n
Ni	5.77	821.180	1.013	2.078
Cu	210.80	840.767	1.364	2.043
Fe	197.07	730.693	1.305	2.042
Zn	112.96	438.112	1.373	2.091
Cd	5.59	196.250	0.917	2.265
Sn	52.04	70.848	0.329	2.420
Pb	50.65	68.559	0.331	2.520

P_c in the form (5) with extrapolated curves of the form

$$P_{c,\text{extrap}} = b + B(\sigma - a)^n. \qquad (9)$$

The four desired constants in (9) are found by successive approximations, inasmuch as the introduction of the parameters b and $a \neq 1$ changes the values of B and n somewhat for the new coordinates P, b and σ, a,

The constants of the extrapolated equation are shown for seven metals in Table VIII. For $\sigma = 2.0$, the plotted curves of $P_{c,\text{extrap}}(\sigma)$ and its derivatives coincide with the experimental values. For large σ, the curves of $P_{c,\text{extrap}}$ merge asymptotically with the TFC curves. In the aggregate,

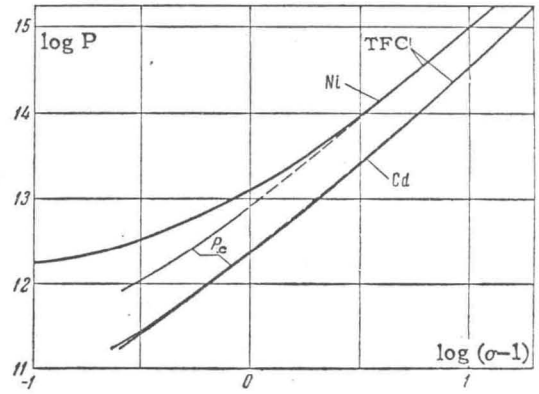


FIG. 8. Extrapolation of the zero isotherms for nickel and cadmium (the values of P are in dyn/cm²). The dashed line is the extrapolation of P_c according to [9].

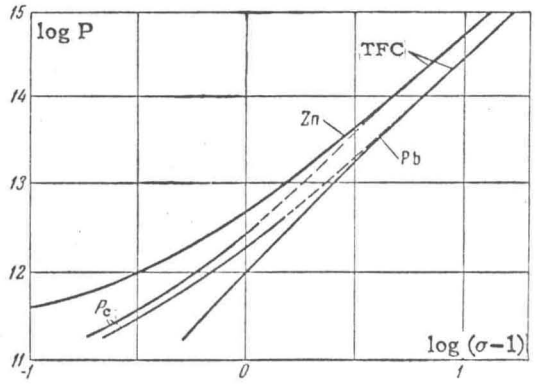


FIG. 9. Extrapolation of the zero isotherms for zinc and lead.