tion for these five metals was calculated by using Eqn. (7) and was found to be 0.01 cal/g-at. deg. for cerium, praseodymium and terbium, 0.02 for neodymium and 0.46 for samarium.

TABLE II. Coefficients of Thermal Expansion, Atomic Volumes and Compressibilities Used to Calculate C [9]

Rare Earth	Coefficient of Expansion $\alpha \times 10^6$ ($^\circ C^{-1}$)	Atomic Volume (cm^3/g-at.)	Compressibility $\beta \times 10^7$ (cm^2/kg)
γ-Ce	8.5	20.69	40.97
Pr	6.79	20.82	32.08
Nd	9.98	20.59	30.02
Sm	10.4	19.95	33.36
Eu	33.1	28.98	66.63
Gd	6.26	19.94	25.59
Tb	10.3	19.26	24.6
Dy	10.0	18.99	25.52
Ho	10.7	18.75	24.72
Er	12.3	18.46	23.88
Tm	13.3	18.13	24.71

The dilation term is given by

$$C^d = \frac{9\alpha^2 TV}{\beta} \tag{8}$$

where α is the linear coefficient of thermal expansion, V the atomic volume and β the isothermal compressibility. The values of α, V and β which were used in Eqn. (8) to calculate C^d are listed in Table II.

From the Debye theory of the lattice specific heat we have the following expression for C_v^l :

$$C_v^l = 3R[K(y) - yK'(y)] \tag{9}$$

where R is the gas constant, $y = \theta/T$ (θ is the Debye temperature and K(y) is given by

$$K(y) = \frac{3}{y^3}\int_0^y \frac{y^3 dy}{e^y - 1} \tag{10}$$

TABLE III. Debye Temperatures Used to Calculate C_v^l [9]

Rare Earth	Debye Temperature[a] (°K)
γ-Ce	138
Pr	138
Nd	148
Sm	148
Eu	121[b]
Gd	155
Tb	158
Dy	158
Ho	161
Er	163
Tm	167

a. Based on specific heat data taken from about 15° to 300°K.
b. Calculated by ref. [9] from Lindemann equation.

The integral in Eqn. (10) has been solved, and tables of C_v^l vs θ/T may be found in a number of sources* (of these, we have used the tables of Lewis *et al.* [16a] to determine C_v^l at 300°K). The Debye temperature used to calculate C_v^l are listed in Table III.

After these three contributions to specific heat were calculated, they were added together and subtracted from C_p to give C_v^e . The values for the various contributions to the specific heat are summarized in Table IV along with the resultant C_v^e term and the electronic specific heat constant, γ.

* Some of these sources are listed in the compilation by Gschneidner. [9].