and prefer to extrapolate the c_{22} values beyond the directly measured upper limit (850° K) assuming a smooth curve, which is parallel to that obtained from the spurious values. When these extrapolated c_{22} values are used in eq. c_{66} (3), the c_{66} values up to 923° K fall along a linear extrapolation of 298° to 850° K curve. With regard to the shape of the c_{66} vs temperature curve, both equations show the same abnormally large curvatures, between 500° and 800° K.

If 0.5 % probable error at 923° K is assumed for each of the diagonal moduli and the ϱV^2 values, the largest probable errors in c_{12}, c_{13} and c_{23} are 1.5 %, 3 % and 1 % respectively.

3.3. TEMPERATURE DEPENDENCE OF THE STIFFNESS MODULI

Values of the nine stiffness moduli at temperatures between 44° and 923° K are given in table 3. The smoothed curves for c_{11}, c_{22} and c_{33} are given in fig. 3 along with those for ϱV^2, ϱV_E^2 and ϱV_F^2. [The c_{11} curve below 44° K is shown in [3]]. Between 298° and 923° K the
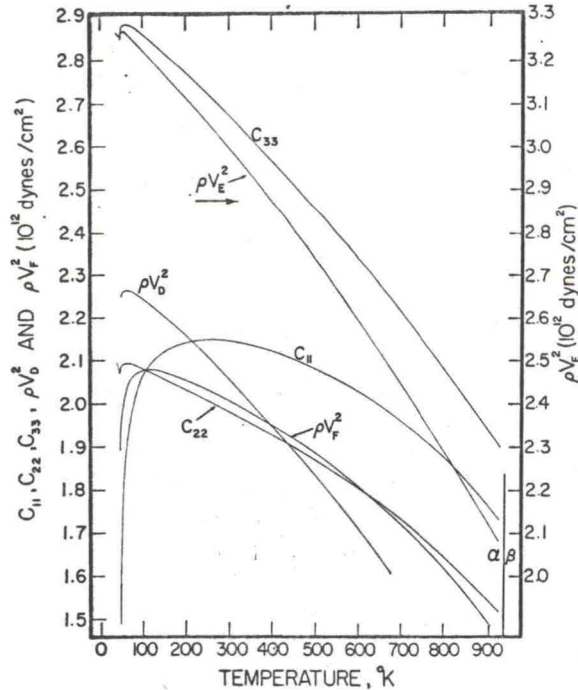

Fig. 3. Temperature dependence of the compressional stiffness moduli for alpha uranium.
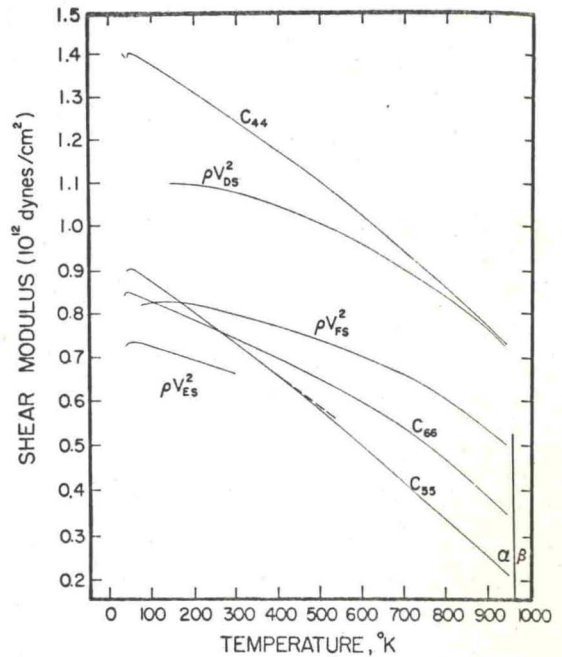

Fig. 4. Temperature dependence of the shear stiffness moduli for alpha uranium.

curves have increasing negative curvatures. The temperature coefficients $(1(c_{ii})/(dc_{ii}/dT)$, decrease from -57 ppm/°K at 298° K to -640 ppm/°K at 923° K for c_{11}, from -251 ppm/°K at 298° K to -630 ppm/°K at 923° K for c_{22} and from -280 ppm/°K to -718 ppm/°K for c_{33}.

The smoothed curves for the shear moduli are shown in fig. 4. These curves exhibit relatively abrupt changes in slope, in contrast to those for the compressional moduli. The c_{44} curve is very nearly linear between 200° and 500° K and again between 750° and 923° K. The temperature coefficients for c_{44} decrease from -560 ppm/°K to -1180 ppm/°K between 298° and 923° K. The c_{55} curve also consists of two very nearly linear parts, as described above, with significant curvature only between 425° and 450° K. The c_{55} temperature coefficients decrease from -1060 ppm/°K at 298° K to -3400 ppm/°K at 923° K. The c_{66} curve also consists of two linear parts, 200° to 400° K and 800° to 923° K; the curvature, however, is most pronounced in the 700° to 800° K range. At 298° K and 923° K the temperature coefficients