

There is one other alloy for which activation volume data are available for an ordering process, viz. Ag-Zn (see Table 1) where the measurements were done by an anelastic relaxation method. As in Cu-Au there is an appreciable size difference but, in this case, there is a large decrease in  $V^*$  relative to the value in pure Ag. (Even if  $V^*$  for self diffusion in Ag proves to be too high, this would probably still be true.) It must be, then, that the anelastic, stress-induced ordering effect is responsive to the motion of the smaller, and presumably more mobile, atom in the alloy as contrasted with the homogeneous change in long range order in  $\text{Cu}_3\text{Au}$  whose rate is controlled by the mobility of the more slowly moving atom.

The observed  $V^*$  for ordering in  $\text{Cu}_3\text{Au}$  can be used to calculate the activation entropy  $S^*$ , defined as

$$S^* = \left( \frac{\partial G^*}{\partial T} \right)_P$$

by means of the relation

$$\frac{S^*}{V^*} = \frac{\alpha}{\beta}$$

deduced by Lawson.<sup>24</sup> In this equation  $\alpha$  is the thermal expansion coefficient and  $\beta$  the compressibility. It is found that  $S^* = 12 \text{ cal/mole}^\circ\text{K}$  which is very nearly the same as the value computed for pure Au.