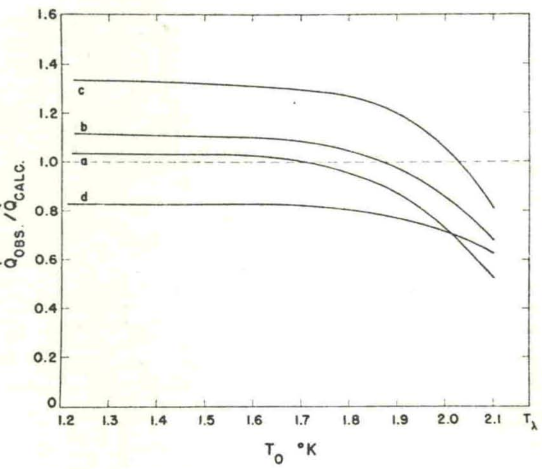

FIG. 2. Ratio of observed asymptotic ($T_1 = T_\lambda$) power input to that calculated on the basis of several theories as a function of T_0 ; $d = 3.36\ \mu$. Curve a—$m = 3$, $\mathbf{v}_c = 0$, A as given by Vinen (*4*); curve b—$m = 3$, $\mathbf{v}_c$ as given by Dash (*16*), A as given by Vinen; curve c—$m = 3$, $\mathbf{v}_c = 0$, $A = 50$ cm-sec/gm; curve d—$m = 4$, $\mathbf{v}_c = 0$, $A = 50$ cm-sec/gm.

to determine a few selected values of A in the region 1.7°–2.0°K for large $\bar{\mathbf{q}}$ where neither of these objections applies. We have not been able to solve the nonlinear integral equation (26) directly for $\bar{\mathbf{q}}$, but instead we have used a variance method pointed out to use by Dr. R. B. Lazarus.

We consider

$$\bar{\mathbf{q}}(\lambda, T) = \frac{d^2}{L} \int_{T_0}^{T} \frac{\Lambda}{1 + \lambda\delta}\, d\tau \tag{44}$$

where $\delta \equiv \alpha d^2 \bar{\mathbf{q}}^2$, $\lambda \equiv \alpha'/\alpha$ is a factor relating α (determined from Vinen's $A(T)$) and α' (the new value of α to be determined from the present experiments); τ is a dummy variable. Holding $\bar{\mathbf{q}}$ fixed and varying λ we obtain

$$0 = \frac{d^2}{L}\left[\frac{\Lambda}{1 + \lambda\delta}\left(\frac{\partial T}{\partial \lambda}\right)_{\bar{\mathbf{q}}} - \int_{T_0}^{T} \frac{\Lambda\delta}{(1 + \lambda\delta)^2}\, d\tau\right]; \tag{45}$$

and holding λ fixed and varying $\bar{\mathbf{q}}$

$$\left(\frac{\partial \bar{\mathbf{q}}}{\partial T}\right)_{\lambda} = \frac{d^2}{L}\left[\frac{\Lambda}{1 + \lambda\delta} - \int_{T_0}^{T} \frac{2\lambda\Lambda\delta}{\bar{\mathbf{q}}(1 + \lambda\delta)^2}\, d\tau \left(\frac{\partial \bar{\mathbf{q}}}{\partial T}\right)_{\lambda}\right]. \tag{46}$$

Combining (45) and (46) we find

$$\left(\frac{\partial T}{\partial \lambda}\right)_{\bar{\mathbf{q}}} = \frac{\bar{\mathbf{q}}}{2\lambda}\left[\left(\frac{\partial T}{\partial \bar{\mathbf{q}}}\right)_{\lambda} - \frac{(1 + \lambda\delta)L}{\Lambda d^2}\right] \tag{47}$$