Substituting Eq. (6), i.e. the value Y obtained from the electronic method into (5), we may now solve for $\overline{\nu^2}$ and find

$$\overline{\nu^2} = 7.8 \pm 0.6 \tag{8}$$

The film data as shown on Fig. 2 does confirm the theoretical prediction that the fluctuations should rise with increasing gate-widths. The dotted curve in Fig. 2 was constructed by assuming $\alpha = 156\ \text{sec}^{-1}$ is correctly given by (7) and normalizing the curve to the electronic method point at 283 milliseconds. It will be seen that the agreement of the dotted curve with the film method experiment is only qualitative. It would appear that a fit to experiment calls for a lower value of α than (7). In particular the solid curve which gives a reasonably good fit to the data was constructed with $\alpha = 115\ \text{sec}^{-1}$. This discrepancy does not reflect on the value of $\overline{\nu^2}$ deduced from (5) and (6) where α enters only very insensitively through B. Putting it another way, for the electronic method at 283 milliseconds we need only know the value of the integral quantity $\alpha\tau$ which is directly related to the measured γf, whereas for the variation of Y with t, an independent knowledge of both α and τ are called for.

V. DISCUSSION OF RESULT

Our experiment, performed in 1944, has determined the second moment in the distribution of the number of neutrons in the thermal fission of U235 as being 7.8 ± 0.6. To familiarize ourselves with the