urements and at the same time to claim the observations are fitted best by a theory which does not include the critical velocity. However, the situation is not as inconsistent as it may appear. As indicated above, $\mathbf{q}_c$ has been determined from the point of first perceptible deviation of the observations from the linear theory; at this point the calculations involving the Gorter-Mellink term with $\mathbf{v}_c = 0$ lie generally about 5% below the experimental data and the linear theory. From the manner in which the observed points deviate from the linear theory it is reasonable to suppose that for $\bar{\mathbf{q}}$ less than $\mathbf{q}_c$ the Gorter-Mellink term does not play a significant role, but that near $\mathbf{q}_c$ the full mutual friction force begins to contribute. For wide slits Vinen has observed a similar behavior and has given a rather detailed discussion of it in relation to the possible existence of "sub-critical" mutual friction (*19*).

In principle the procedure just described for deriving critical velocities from the experimental data ought to be applicable to the computed curves; and it should be possible thereby to obtain graphically values of the "critical velocity" even though the thermohydrodynamical equations used in the calculation do not include critical velocity effects. When we attempt to do this, certain qualitative differences between the calculated and experimental curves emerge rather clearly: whereas in detail the experimental results permit visual recognition of a region in which the character of flow is changing, from which one may infer a critical velocity, the theoretical curves are substantially smoother and a critical velocity does not suggest itself so readily. (A comparison of curves a, d and the dashed line in Fig. 1a illustrate this point nicely.) This is to say that although the theory reproduces the major features of the experimental results, it fails to reproduce the subtleties. Nevertheless, with the aid of reasonable arbitrary criteria we may continue the exercise, the results of which are instructive and perhaps reflect upon an area in which the experimentalist may readily be led astray.

Our prescription for computing $\mathbf{v}_c$ from calculated curves in which no $\mathbf{v}_c$ is used is as follows: For given values of T_0, curves computed with and without inclusion of the Gorter-Mellink term are compared; the heat current corresponding to some arbitrarily chosen deviation of the curves from each other, say 5%, is defined as the "critical heat current"; from this a "critical velocity" may be calculated. Using this prescription results are found in remarkably good agreement with the critical velocities determined from the experimental curves for temperatures below about 1.8°K. However, above 1.8°K the "critical velocity" obtained in this manner falls toward zero, in contrast to the observed values, thereby pointing up the inadequacy of our prescription. Yet the existence of this spurious "critical velocity" criterion may serve as a warning to the experimentalist that care must be exercized in interpreting changes in the character of the solutions of the flow equations in relation to changes in experimentally measured quantities. In passing we note that the criterion used above essentially