(3) oscillations in the inner region of the source lines then commenced,
(4) finally, oscillations in the outer region of the sink lines developed.

Assuming that this development could be extended to the axial flow condition, it may be suggested that, due to the greater change in the vortex boundaries near to the outer wall of the annular gap, the fluctuations in that region will be greater. This contention is supported by the results of Fig 7, u'/U increasing markedly after $Ta^* \cong 6$ for $R' = 0.75$. It is suggested that the increase and subsequent decrease in turbulent intensity in the range $2.6 \leqslant Ta^* \leqslant 60$ is due to wavy vortices collapsing and reforming into another stable state, a stable condition being indicated by a decrease and breakdown of the vortices being indicated by an increase in intensity.

Conclusions

1. For the axial flow under consideration, the effect of the transitions in vortex flow on the thermal boundary layer, and consequently on the heat transfer rates, is significant.
2. A positive radial thermal gradient is seen to have little effect on the flow.
3. Under adiabatic conditions, axial flow tends to be stabilising, damping out the velocity fluctuations. Under diabatic conditions, however, the opposite is true.
4. The following characteristics of turbulent vortex transition have emerged from the present study:
   - the turbulent vortices were found to have greatest intensity near the outer wall of the annular gap, whereas the initial spiral vortex instability occurs near the inner wall;
   - a dual peak probability density distribution exists having a gradual decrease in skewness;
   - the completion of the flow reorganisation is marked by a decrease in the turbulence intensity at the outer wall.

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Letter to the Editors

On reading through the published version of our paper 'Fluid Mechanics of Turbomachines: A Review' (Vol 3, No 1), we realised that we had not referred to three recent important contributions, namely the two papers by Adler and Krimerman[1,2] on the application of the finite element method to flow calculations in turbomachines and Kerrebrock's Dryden Lecture[3] on transonic flow in compressors. We would like, therefore, to draw readers' attention to these papers.

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H. Marsh

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