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REVIEW

Vortex Motion. Edited by H. G. HORNUNG and E. A. MÜLLER. Vieweg, 1982. 172 pp. DM46.—.

A colloquium was held in Göttingen in November 1982 to celebrate the 75th anniversary of the establishment of the Aerodynamische Versuchsanstalt, under the leadership of Ludwig Prandtl, in 1907. Although not all the people invited were able to attend, a substantial number of distinguished speakers were present, as is indicated by the following list of contributors:

N. Didden (USC California and MPI Göttingen) 'On vortex formation and interaction with solid boundaries';

A. Dyment (Lille) 'Vortices following two-dimensional separation';

J. P. Guiraud & R. Zeytounian (Paris and Lille) 'Vortex sheets and concentrated vorticity. A variation on the theme of asymptotic modelling in fluid mechanics';

S. Leibovich (Cornell) 'Wave propagation, instability and breakdown of vortices';

H. Ludwieg (AVA Göttingen) 'Widerstandsreduzierung bei kraftfahrzeugähnlichen Körpern';

H. J. Lugt (David W. Taylor Naval Ship Research Center, Maryland) 'Analogies between oscillation and rotation of bodies induced or influenced by vortex shedding';

D. W. Moore (Imperial College, London) 'A point vortex method applied to interfacial waves';

A. E. Perry, M. S. Chong & T. T. Lim (Melbourne) 'Vortices in turbulence';

R. Rotunno (NCAR, Colorado) 'On the relation between the thunderstorm updraft and tornado formation';

P. G. Saffman (Caltech) 'Structure and stability of streets of finite vortices';

J. H. B. Smith (RAE) 'The representation of planar separated flow by regions of uniform vorticity'.

The topics considered by the authors included vortex formation, roll-up of vortex sheets, steady and unsteady separation, dynamics of vortex filaments and of vortices with cores, vortex breakdown, road-vehicle dynamics, structural implications of vortex shedding including galloping of cables, vortices and vortex pairing in turbulent flows, thunderstorm updrafts and tornadoes, and plane separated flows with regions of uniform vorticity.

While appreciating all these articles, I was particularly impressed by those of D. W. Moore and P. G. Saffman. Professor Moore's account of point-vortex methods and interfacial waves is both scholarly and cogent, but draws attention to grave numerical difficulties that may arise. These are shown to be due to the growth of an instability, probably associated with an inadequate representation by the numerical scheme of the dispersion relationship for the linearized theory. This is a real problem, and Moore's paper should be read by all workers who use point-vortex methods in computational fluid dynamics.

Professor Saffman's article contains a valuable discussion on the effects of finite core area on the dynamics and stability of vortex arrays. Particularly novel, perhaps, is the investigation of the stability properties of a Kármán vortex street when the individual vortices have a finite area of uniform vorticity. In contrast with Kármán's result for point vortices, namely that there is stability only with an aspect ratio of 0.281, Saffman shows that finite area induces a stabilization, at least if the

perturbations have the form of vortex pairing. The stability condition with pairing is

$$\kappa_c - 0.58\alpha^2 < \kappa < \kappa_c + 1.64\alpha^2,$$

where κ is the spacing ratio, $\kappa_c = 0.281$ and α represents the area of each vortex core. However, it is understood that later numerical work by Saffman and his colleagues suggests that pairing does not give the most unstable mode (as Kida had earlier suggested), and that there is then stability only for a unique aspect ratio, which depends on the size of the vortices. This result is thus qualitatively similar to Kármán's.

As well as the two articles particularly mentioned above, I believe that many other contributions in this brief volume will be valued by workers in the field of vortex dynamics.

J. T. STUART

CORRIGENDUM

Trapping of water waves above a round sill

By YURIKO RENARDY

Journal of Fluid Mechanics, vol. 132, pp. 105–118

In the second sentence of p. 106,

'viscous effects are estimated to make less than 1 % difference in the amplitudes, even at...'

should be changed to

'viscous effects are estimated to make less than 1 % difference in the l_2 errors, calculated with respect to the experimental values of BPP, for the amplitudes, even at...'.