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REVIEWS

Annual Review of Fluid Mechanics, Volume 1. Edited by W. R. SEARS. Annual Reviews, Inc., 1969. 459 pp. $8.50 ($9.00 outside U.S.A.).

Annual Reviews, Incorporated, is a non-profit organization that has been established in California 'to promote by its various activities the advancement of the sciences'. Its main activity is to publish reviews annually in various scientific fields. The first Annual Review appeared in 1932, and now 15 fields are being covered, most of them being on the biological side. The reviews are intended to be critical surveys which take stock of progress in specific subjects, rather than comprehensive summaries of all recent relevant papers. The volumes vary in length between 400 and 650 pages, and contain from 15 to 30 review articles; and all have the same agreeably low price, which was $8.50 prior to 1 January 1970 and is $10.00 since that date.

This is an admirable prescription, and all readers of this *Journal* will be pleased to know that fluid mechanics has been added to the list of fields being covered. The rate at which papers pour off the printing presses and appear in many different journals is too great for anyone to be able to 'keep abreast' of the literature. Many of the papers published are neither significant nor interesting, but only a specialist can make a rapid assessment of their worth. And even after the significant advances have been identified, it is very helpful to have a lucid account of them, set in perspective, by an author who can write with authority about the new developments and their background. A need for regular critical reviews exists in all scientific fields; and I think it may be a more acute need in a field like fluid mechanics, some aspects of which are highly analytical and abstract, and in which the reading of a paper does not always lead readily to an understanding of it. It follows that the writing of clear and perceptive surveys in fluid mechanics is probably more difficult than in fields of a more descriptive character, and that good reviewers will not be numerous.

Professor Sears has been assisted in the preparation of volume 1 by five other distinguished members of the fluid mechanics community in the U.S.A., and the standing of this editorial committee has no doubt helped them to secure the services of first-rate authors. The volume contains 16 reviews of specific topics, together with a historical article. The reviews are drawn mainly from U.S.A., and there are a number from U.K., U.S.S.R. and Japan. The authors, almost to a man, are well known internationally, and it will be some time before as illustrious a group of authors are brought together in one volume. The editorial committee have, understandably, started off with a bang, and no one should be surprised or disappointed if subsequent volumes contain fewer big names. The topics chosen for the first volume are mostly attractive and interesting, and of current interest. The articles that I have read seem to me to serve their purpose well, and to be of the high standard expected of their authors. There is a great deal of good reading here, and I expect to return often to the volume, sometimes out of simple curiosity and sometimes out of need to know what is going on in

certain areas. Without question, this is a volume which all professional students of fluid mechanics will wish to possess and study.

I do not think it is appropriate to describe the articles individually. Many of them lie outside my field of competence; and, more importantly, this volume has significance more as the first instalment of a new regular publication in fluid mechanics than as a specific collection of review articles, and an assessment should concentrate on that role. However, readers will wish to see at least the list of titles and authors, which is as follows:

Fluid mechanics in the first half of this century, Sydney Goldstein
Buoyant plumes and thermals, J. S. Turner
Laminar separation, S. N. Brown and K. Stewartson
Stratified flows, Chia-Shun Yih
Electrohydrodynamics: a review of the role of interfacial shear stresses, J. R. Melcher and G. I. Taylor
The formation of sediment ripples, dunes, and antidunes, John F. Kennedy
Boundary-layer transition, Itiro Tani
Hydrodynamic noise, J. E. Ffowcs Williams
Blood flow, Robert T. Jones
Shear-flow turbulence, O. M. Phillips
Higher-order boundary-layer theory, Milton Van Dyke
Surface-tension-driven phenomena, V. G. Levich and V. S. Krylov
The transition from continuum to molecular flow, Frederick S. Sherman
The aerodynamics of turbo-machinery, W. R. Hawthorne and R. A. Novak
Drag reduction by additives, J. L. Lumley
Shock waves and radiation, Ya. B. Zel'dovich and Yu. P. Raizer
Hydromechanics of aquatic animal propulsion, M. J. Lighthill.

I note some apparent difference, of secondary importance only, between the objectives and general rules laid down by Annual Reviews, Inc., and the needs of fluid mechanics. According to the brochure about the whole series of Annual Reviews, 'in general, the contents of a Review are so organized as to provide, at a somewhat advanced level, an annual or biennial survey of the principal advances in the entire field under review'; and observe that the title of each volume is 'Annual Review of...', not 'Annual Reviews of...'. It is perhaps in accordance with this general aim that the review articles are of approximately the same length, and that a subject index and a cumulative index of authors cited are included at the end of the volume under notice. I think it is not feasible, and probably not even desirable, to produce in one volume an annual survey of the main advances in the *entire* field of fluid mechanics. There is an irreducible minimum length of a readable review article, and if all the different sections of fluid mechanics (supposing they could be defined) were reviewed each year the number of pages would be enormous; and one year is much too short an interval for successive reviews of the same topic. The more practical plan, which the editorial committee have in fact adopted, is to review only a

certain limited number of topics in one volume, and presumably to choose quite different sets of topics for the next few volumes, the whole field of fluid mechanics thereby being covered in due course. I think it would be consistent with this more realistic objective to allow considerable variation of length of the review articles (uniformity of coverage within one volume being no longer a—theoretical—requirement), in the interests of topics which are best reviewed as a whole and which are too broad for 20–30 pages to be sufficient. The subject index might be seen from this viewpoint as unnecessary since the titles and section headings of the articles on specific topics provide a quicker route to the required information; and likewise the cumulative index of authors cited has doubtful value (provided that reviewers in subsequent volumes follow the lead given by three out of the sixteen reviewers in volume 1 and arrange their references alphabetically rather than in order of appearance).

We may give an unqualified welcome to this new publication, which is certain to become an integral and prominent part of the fluid mechanics literature. It complements *Journal of Fluid Mechanics* and other similar journals in a way which has the look of rightness about it. We look forward to the regular stream of future volumes.

G. K. BATCHELOR

Thermoelasticity. By A. D. KOVALENKO. Translated from the Russian by D. B. MacVean. Wolters-Noordhoff, 1969. 251 pp. Fl. 39.80 or $11.00.

This book is based on a course of lectures by the author in the department of applied mathematics at Kiev. The foundations of thermoelasticity are treated rather briefly and without regard to recent reassessments of the axiomatics of reversible or irreversible processes, especially by the American school of rational mechanics. References to principles and applications do not go beyond 1964.

The emphasis falls on detailed analytical solutions, mainly with steady temperature fields, for disks and cylinders, shells of revolution, and the general plane and axi-symmetric problems. Comparatively little is included on thermal shock or coupling, nor on the precise circumstances where these phenomena become significant. On the other hand there is a substantial appendix on thermoelastic stability; not however by the author but by J. B. Alblas.

Few numerical results appear and no account is taken of modern computing techniques. Many 'solutions' are left at an uninformative stage, at least for anyone interested in physical magnitudes and overall trends. In this respect the general tenor of the book recalls the older standard works on classical elasticity.

The translation is competent but tends to be stiff and formal. The attainment of a pleasant style was no doubt partly hindered by the author's predilection for paragraphs of one or two sentences only.

R. HILL