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REVIEWS

Experimental Methods of Hypersonics. By J. LUKASIEWICZ. Marcel Dekker, 1973. 388 pp. $24.50.

Experimental methods are a means to an end and for that reason seldom form the subject of a complete book. They are usually relegated to a single chapter in some mammoth series devoted to an otherwise theoretical display of aerodynamic expertise. There they languish, often rapidly assuming an historical mantle as techniques develop, change and become obsolete.

Dr Lukasiewicz has avoided many of these dangers by omitting instrumentation and concentrating on a mainly descriptive treatment of the many types of hypersonic wind tunnel. To this extent the title is misleading. There is no mention of the myriad probes, gauges, films and transducers whose development and eventual fast response made hypersonic testing possible. Instead there are chapters on simulation, power and energy requirements, the flow in hypersonic nozzles and the design of diffusers, followed by sections dealing with every type of hypersonic facility. The shock tube, expansion tube, shock tunnel, conventional tunnel, hot-shot, long-shot, launchers and ranges are all there, adequately described and copiously referenced.

But what distinguishes this book from many others is its critical commentary. The author begins by describing the dangers of incorrect simulation by reference to the early flights of Gemini and Apollo which landed 60 and 205 miles respectively before they were expected to. The way in which subsequent tests provided more accurate data to explain why both these vehicles under-shot makes compelling reading. Later the author is even more daring, he plots a graph showing the gross discrepancies between predicted and actual performance of various facilities, discusses the reasons and suggests a way of improving our judgement. Whether you agree with his analysis or not this historical survey raises some very interesting questions.

One of the most exciting aspects of the development of hypersonic tunnels has been the increasing utility of short duration facilities. Test times have receded from hours to minutes then seconds, even to milli- and microseconds. Consequently costs have been reduced, making it easier for universities and colleges to take part in an experimental programme. The continual demonstration of the usefulness of even a few milliseconds of good test flow has persuaded many designers of new facilities in much lower speed regimes to think again. The author is well aware of this influence and has done much to emphasize its importance. I am only sorry that he does not make the point even more strongly in his final chapter since so much thought is now being given to high Reynolds number tunnels at low and transonic speeds.

In summary the book is not only essential for anyone designing a new hypersonic facility but relevant to all those considering future wind tunnels, no matter what the Mach number range. It is a valuable source of references and within its compass represents an interesting historical survey of the last 25 years.

My greatest regret is that the absurd price for this slender volume will make it yet another book for the library, and not for the individual.

J. L. STOLLERY

SHORTER NOTICES

Recent Developments in Shock Tube Research. Edited by D. BERSHADER and W. GRIFFITH. Stanford University Press, 1973. 828 pp. £16.00.

Using offset lithography this book presents in full all 76 papers delivered at the Ninth International Shock Tube Symposium held at Stanford University in 1973. The range of topics discussed is extremely large and this volume should be a useful reference for workers in the field.

Low Reynolds Number Hydrodynamics. By J. HAPPEL and H. BRENNER. Noordhoff International, 1972. 553 pp. Dfl. 86.00.

This book is claimed by the publishers to be a "second revised edition". A quite careful inspection, however, indicates that the material presented does not differ in any way from that in the original publication by Prentice-Hall, reviewed by this Journal in volume 28, pp. 826–828.

Annual Review of Fluid Mechanics. Volume 6. Edited by M. VAN DYKE, W. G. VINCENTI and J. V. WEHAUSEN. Annual Reviews Inc., 1974. 371 pp. $12.00.

This year's volume, slimmer than its predecessors, commences with an inspiring article by G. I. Taylor, and continues with several interesting papers by some well-known authors. The complete list of contents is as follows.