

Aerodynamics

Supersonic Aerodynamics, A Theoretical Introduction. By Edward R. C. Miles. 255 pp. McGraw-Hill Book Company, New York, 1950. \$4.00.

Foundations of Aerodynamics. By A. M. Kuethe and J. D. Schetzer. 374 pp. John Wiley and Sons, Inc., New York, 1950. \$5.75.

Just to be arbitrary suppose we consider the two books in the reverse order in which they appear above. The Kuethe-Schetzer book is precisely the type of book I should like to use for a group of advanced students. It seems to me that the sophistication implied in their approach is exactly what we should try to impart to all students of fluid dynamics. The almost arithmetical fluid dynamics which is frequently found in introductory courses never gives the student the perspective he needs to meet the problems in this field. From the outset Kuethe and Schetzer use the methods of vector analysis without which a really sound course in fluids is not possible. Their book covers the usual topics with notable differences and additions. For example they have put in chapters on energy and wave forms, both of which deserve considerable attention (I wish the authors had expanded these chapters even more) and have not hesitated to introduce thermodynamics at numerous points, in several instances devoting time specifically to thermodynamics as such.

Somewhat on the debit side is the lack of a more detailed discussion of viscous flow which is relegated to a relatively brief treatment. However, this is not a fault peculiar to this particular text, and actually the treatment here is better than in most similar books. Although the authors do not pretend to be writing a book in applied aerodynamics, they do include sufficient material to give the student a picture of some of the problems involved in this area. There are two excellent appendices, one on dimensional analysis and one on the Navier-Stokes and Energy Equations. Several tables of coefficients and flow parameters are interspersed throughout the text, which should prove very helpful. The approach is, of course, principally analytical but particularly in the sections dealing with turbulence the authors describe some of the experimental techniques and methods used in the laboratory.

Returning to Professor Miles' book we find a treatment that would follow rather naturally from the Kuethe-Schetzer work, although there is no intention to imply that this is anything but coincidental. The level at which Professor Miles has written his book fits in very well for anyone who has had his initial preparation in aerodynamics with the Kuethe-Schetzer book;

both use vector analysis freely and in general have the same sophisticated approach to their subjects. Professor Miles covers such topics as the potential equation, linear theory of plane flow, linear potential theory in three dimensions, shock waves, and potential flow in the hodograph plane among others. Since the author is a mathematician a number of the problems take on a rather mathematical form, almost, at times, to the exclusion of the physical implications. It is not at all unusual in present-day aerodynamics and plasticity to treat problems as though they were invented for the edification of mathematicians, rather than for the purpose of solving problems in the physical and engineering world. I would guess that Professor Miles suspected this charge because in his preface he expresses the hope that readers will find his book sufficiently "practical". From the teacher's point of view the book is practical but it will have to be left to the actual designers in the field to determine how practical it may be for them.

While the Kuethe-Schetzer book needs a few more problems, the Miles book has what appears to be an ample supply which will probably keep both instructor and student quite busy. From the teaching point of view, the combination of these two books would make an excellent three or four semester course starting in perhaps the senior year of college and carrying on through the first year of graduate work. There is plenty of room for expansion by the instructor within this framework and at the same time the student would be given a preparation which gives an excellent picture of modern aerodynamics and the trends it is taking. Not only has aerodynamics advanced enormously as a science in the past ten years but the art of writing textbooks in this field has also marched forward. Both books should receive serious consideration in any school offering work in this area and should surely be on the bookshelf of all those interested in fluid dynamics.

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Many Particle Systems

Perturbation Methods in the Quantum Mechanics of n-Electron Systems. By E. M. Corson. 308 pp. Hafner Publishing Company, New York, 1951. \$11.00.

Publication of Dr. Corson's book fills an important gap in the literature of contemporary physics in that it provides a unified and comprehensive treatment of the quantum mechanics of many-particle systems. There has been a great need for a book dealing with the area between elementary quantum mechanics on the one hand and the fields of specialized applications on the other hand. Thus, there have been available many adequate books on the elements of quantum mechanics, and a considerable number of treatises on such specialized subjects as atomic spectra, radiation theory, and solid state theory. Dr. Corson's book offers for the first time, to this reviewer's knowledge, a thorough exposition of the theory and methods for studying the