Book Reviews

Wing Theory. A. Robinson and J. A. Laurmann. Cambridge University Press, London, 1956. 569 pp. Illus. $13.50.

So far as I can recall, this is the only textbook or treatise in this important field of fluid mechanics that has appeared in 20 years. It is closer to 30 years, in fact, since Glauert's well-known *Aerofoil and Airscrew Theory* was first published. The present work may be the modern counterpart of Glauert's book—from the same publisher, incidentally—and, if so, the difference in size (a factor of roughly 2.5) probably represents the increase of scope of what we call "wing theory" during these 30 years. For in these days wings are expected to operate not only at low speeds, where compressibility of the air is negligible, but also at high subsonic, transonic, and supersonic speeds as well. This is a book concerned with wings in all of these speed regimes. It is intended as a textbook for advanced courses, and "more generally, for all those . . . who are interested in aerofoil theory for either practical or theoretical reasons."

It begins with a well-written, 80-page, introductory chapter called "Foundations." Here the basic ideas of fluid mechanics are reviewed, and the standard approximations of wing theory are set in their proper relation to the phenomena of real, viscous gas flows: turbulence, boundary layers, and so forth. We then proceed to chapters on two- and three-dimensional wing theory for incompressible steady flow, airfoils in compressible steady flow, and airfoils in unsteady motion. The scope is ambitious; for example, cascades of airfoils are treated, and wind-tunnel wall interference is discussed as well. Hodograph methods, transonic similitude, and reverse-flow theorems are all presented, at least briefly. Shock waves are discussed, and the shock relations are treated in detail. In connection with the matter of profile drag and its experimental determination, even the Karman-Pohlhausen boundary-layer theory is brought in.

Throughout the book, the mathematical treatment is relatively elegant and complete and sometimes a bit formal. Nevertheless, it is always accompanied by clear and sound explanations of the physical situations. There is no attempt, such as is sometimes made, to reduce wing theory to a branch of mathematics. Nevertheless, I do have an impression that at times the elegance and mere length of the mathematical development may obscure the subject, and some of my graduate students who have used the work confirm this. The index seems admirably complete, and the authors' knowledge of the literature of fluid mechanics is truly impressive. References are always included in the text, and in addition there is an extensive appended bibliography.

In summary, I feel secure in recommending this new book as a reference book for many research workers and engineers. The expanding aeronautical industry has recruited many of its research and development personnel from other branches of engineering, physics, and mathematics, and from among young aeronautical engineers who have not progressed very far in modern aerodynamics. These people would do well to study this book. As a textbook for graduate students it may suffer from the elaborate detail of the mathematical presentation. Nevertheless, in some aeronautical programs, wing theory practically replaces fluid mechanics because of time limitations. Where this occurs, the present textbook might well be recommended, since its viewpoint is so broad. It will not, I think, produce "handbook engineers."

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Actions Chimiques et Biologiques des Radiations. vol. II. M. Haïssinsky, Ed. Masson, Paris, 1956. 221 pp. Illus. Cloth, F. 3400; paper, F. 2800.

The first volume of this series included three papers in radiobiology, by L. H. Gray, M. Lefort, and W. M. Dale, respectively, on "Physical aspects of radiobiology," "Radiation chemistry of aqueous solutions," and "Modern trends in radiation biochemistry."

In volume II some very fundamental subjects, less well known and understood by biologists and medical practitioners, are presented: "Chemical effects produced by ionizing radiations in the gaseous phase," by W. Mund; "Phenomena of luminescence induced by high-energy radiations," by M. Ageno; and "Introduction to radiation dosimetry," by N. Miller.

By some standards, especially that of a teacher, the order of presentation is somewhat peculiar, in that most instructors and writers prefer to progress from physical aspects to physicochemical aspects, to dosimetry, and thence to radiation biology. There is, however, much to be said for an order of progression, when one is writing for students of a specific regimen, such as biologists and physicians, in which one might develop the lectures from better known to lesser known material, thus enlarging and deepening the understanding. This seems to be the approach used in these volumes.

In volume II, as in volume I, the authors have made a real effort to show the evolution of the three fields from observation of the phenomena, to measurement, to utilization of the specific information in practical problems. Considering this, the reader loses the feeling that a somewhat unorthodox presentation has been given in the volume, and the impression is created that a cooperative effort is being made to consolidate knowledge for application in the problem of how high-energy radiations bring about their effect in biological material.

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The Life of Bacteria. Their growth, metabolism, and relationships. Kenneth V. Thimann. Macmillan, New York, 1955. 775 pp. Illus. $13.50.

Lengthy gestation is frequently associated in folk literature with a remarkable competence on the part of the newly born. Considered, then, against a background of the case histories described by François Rabelais, it is not particularly surprising to learn that Kenneth Thimann's exceedingly competent creature was 15 years *in utero*!

The Life of Bacteria presents, with a rare literary and scientific skill, a superb summary of general microbiology as that burgeoning field exists at mid-century. What emerges from this presentation is not only an outstanding advanced textbook in general microbiology but also an image of the cultured scholar-author, which appears all too infrequently in this age of terse, expository "scientific" writing.

Naturally, in a domain as vast as general microbiology, it is easy to find fault with the particular prejudices and interests of a writer, which are then interpreted as grievous over- or underemphases when scrutinized by the reviewer. In