

mathematical physicist

Schlumberger Well Surveying Corporation maintains a program of long-range industrial research projects at its Research Laboratory in Ridgefield, Connecticut.

The program includes such scientific fields as nuclear magnetic resonance, electromagnetic theory, nuclear physics, electronic systems, physical chemistry, wave propagation, data processing, sonics and fluid flow in porous media.

In order to implement our diversified program we have an opening for a Mathematical Physicist with a Ph.D. in physics, applied mathematics or electrical engineering with a strong interest in theoretical work. The applicant should have at least 2 years of experience in the use of mathematical techniques for the formulation and solution of physical problems.

Knowledge of transport theory, wave propagation or information theory are particularly useful. The research projects cover a wide spectrum from rather short feasibility studies to long term research programs in the fields mentioned. Specific projects involve the study of fluid flow in porous media, neutron and gamma-ray diffusion, sound wave propagation and digital computer processing of measurement data.

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reported by Allen and Ingram on the "semiconductor theory" brings one up to date on a fascinating idea originating with Szent-Györgi in 1941. The concept is that a protein molecule is large enough to be considered a semiconductor with band structure and forbidden gap. The pigment molecule melanin is one such structure on which first studies have been made. The electron-spin resonance signal in black hair, which has ample pigment, is large and is enhanced by exposure of hair to ultra-violet radiation. On the other hand, blonde hair shows little or no spin-resonance signal which, moreover, is not enhanced by ultra-violet excitations. The tentative picture is that the melanin molecule is a one-dimensional semiconductor with bound protons producing traps in the system. These solid-state concepts suggest the occurrence of holes in the banded systems and the possible relation of the holes to carcinogenic actions as a results of electron deletions.

This is an exciting and important book in that it shows specifically how basic physical properties of matter may determine chemical and biological aspects of living systems.

Nondestructive Testing. By Warren J. McGonnagle. 455 pp. McGraw-Hill Book Co., Inc., New York, 1961. \$15.00. *Reviewed by Walter G. Mayer, Michigan State University.*

PHYSICISTS, engineers, and technicians who are interested in the field of nondestructive testing will find a wealth of useful information in this book. The author has succeeded in writing a comprehensive text on the physical and technological aspects of a host of testing methods. Lucid descriptions of the various techniques are supplemented not only by numerous graphs, tables, and technical data but also by clear and thorough discussions of the physical principles involved. These discussions are very stimulating and give much more than a sketchy review.

Dr. McGonnagle treats the application of nearly every form of energy to nondestructive testing. The first chapter deals with visual inspections, and the reader soon recognizes that this topic is rather important despite the fact that it is frequently omitted from texts on testing techniques. The next ten chapters treat in thorough fashion the following testing methods: pressure and leak, penetrant, thermal, radiography, ultrasonics and dynamic tests, and the magnetic, electrical, and eddy-current techniques. Rarely will the reader have to go elsewhere to find answers to questions on either the technological aspects or the physical principles connected with these topics. A short chapter has been included with the intention of informing the reader of the existence of some additional useful techniques (spectrochemical analysis, spark tests, etc.). The concluding chapter deals with the application of various methods to one specific task: thickness measurement of some materials produced in sheet form.

Each chapter is followed by an extensive bibliography listing specific and general references related to

the topics treated. However, it is somewhat disturbing to find occasional misspelled names of authors, and references to *old* editions of rather well-known text books. Also, a little more attention should have been paid to the listing of articles in the bibliography. Almost all of the non-English titles are misspelled—one of them beyond recognition (Ref. 10, p. 300). But these typographical errors will probably create no serious problems for the reader.

The book is a first-rate text on the physical and technological aspects of nondestructive testing. It should be of great value to both the beginner and the person already familiar with the subject.

Einführung in die theoretische Gasdynamik (3rd ed.). By Robert Sauer. 214 pp. Springer-Verlag, Berlin, 1960. DM 29.70. Reviewed by Robert E. Street, *The University of Washington*.

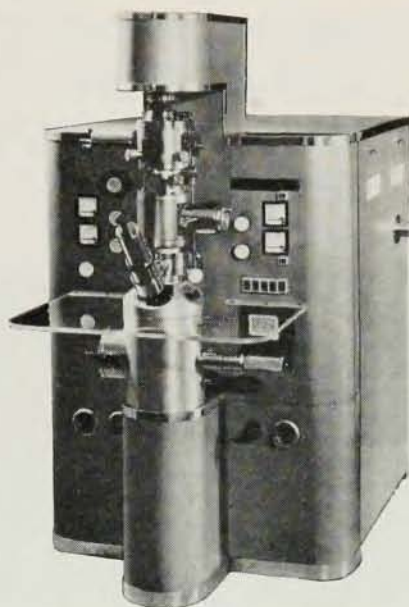
SINCE the appearance of its first edition during the war, when gas dynamics was in its infancy, Sauer's book has been a classic in the field. Although many of us obtained our introduction to gas dynamics, now also referred to as the aerodynamics of a compressible fluid, through Sauer's book (the first edition was soon translated into English), it was never considered a very good textbook and eventually yielded its place to texts such as those by Liepmann and Puckett, Shapiro, etc. One reason for this was that, although Sauer states in the foreword of each edition that he writes for the engineer or physicist, the book was, and still is, a book written in the style of an applied mathematician. No reference is made in any edition to experimental methods or data.

Still there is in Sauer's book a style and flavor which the student of fluid dynamics should know. The first edition gave methods of solution of flow problems, which were not to be found elsewhere, and although these methods are now well known, it is worthwhile to return to their original presentation; for example, the flow about bodies of revolution using the method of characteristics is one.

While the second edition was for the most part the same as the first, the third edition has been entirely rewritten. The arrangement is different, new topics have been added and although it is now a somewhat larger book, it remains a fairly thin and compact introduction. One good feature has been the replacement of the letter c by the letter a to represent the speed of sound, but, in order to retain the old tables, Sauer still takes $\gamma = 1.405$ for air.

New material includes a short discussion of the limiting case of first-order linearized flow over extremely slender bodies of revolution ("überschlanke Körper"), as well as a new section on transsonic and hypersonic plane flows. The section on linearized conical flow which was new in the second edition has been retained. Some topics are still too lightly touched upon, so the book remains what it has always been, an excellent monograph and an "introduction" only for those with some background in the field.

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