Book Reviews

Nondestructive Testing. H. B. Egerton, Ed. Oxford University Press, London (1969) 233 pp. $8.00.

This publication is composed of a series of articles on Nondestructive Testing (NDT) by several English investigators. The stated purpose of the book is to illustrate advances in NDT with emphasis on electronics and data processing. However, it is more a discussion of work performed at the Harwell NDT Centre since 1967 and is, therefore, oriented toward nuclear reactor technology. The book is based on courses given at Harwell for managers and design engineers. The NDT engineer, actively engaged in NDT development, will be disappointed since, with minor exceptions, the techniques discussed are not new. The beginning engineer will receive little benefit because of lack of detail.

On its behalf, the book does contain an excellent bibliography, many of the articles present some theory as well as experimental investigation, and extensive use of figures and photographs is made.

The book is divided into three parts, *Views*, *Previews*, and *Reviews*. The *Views* section contains three articles. The first of these, "Processing NDT Data" by W. L. Hodgkinson, discusses two data forms, analogue and digital, and the methods of processing them—recorders, meters, and computers. The troublesome Mufax facsimile recorder is praised, although much better ones are now available. The second article, "The Electronic Approach to NDT," by F. H. Wells, describes means of extracting data from NDT experiments and presenting the output in a clear and precise form. The types of forms used in NDT, electrostatic, electromagnetic, radiation, and mechanical, are reiterated. A detailed description of analogue-digital converters and electronic data analysis methods, such as scalars, multichannel analyzers, and digital computers is presented. The title of the final article, "Implications for the Designer of Advanced NDT Techniques" by L. G. Archer, is misleading. It is intended for the designer of the test part, not the test technique. The author does make a valid criticism, i.e., too much effort is expended in developing advanced NDT for interesting applications without considering the interpretation/presentation of data to provide the design engineer with needed information.

The *Previews* section (8 articles) may be just that for those unaware of the state-of-the-art of NDT; however, personnel actively engaged in NDT will receive little enlightenment. The first two articles, "The Estimation of Grain Size in Metals" and "Recording Ultrasonic Micrometers" by E. E. Aldridge, are concerned with ultrasonics. The first treats another relatively impractical use of ultrasonics for determining grain size in reactor tubes. A rather lengthy discussion of the Rayleigh, stochastic, and diffusion scattering regions is presented. The latter article treats the well-known use of Lamb waves for measuring plate thickness. A pulsed system, utilizing a single transducer, represents a novel measurement approach. A system utilizing a CRT spot to scan the profile of a specimen is discussed in "Automatic Profile Recording" by C. N. Davey. However, only the upper profile can be scanned, with two measurements being obtained per scan. "Acoustic Emission from Materials" by A. A. Pollock contains a brief discussion of the theory of this relatively new NDT discipline and the work of several investigators in this field. In "Practical Neutron Radiography" by M. R. Hawkesworth, the author refutes the title by acknowledging that nuclear reactors are required for neutron radiography. No mention of recent work on neutron sources is made. "Television Radioscopy as an Inspection Tool" by A. B. Joinson is a rather dated treatment of a Harwell research program on imaging tubes. Better systems are commercially available in the U.S. "A Capacitance Gauge for Measurement of Tube Bore" by K. Cotterell, discusses an improvement to the single electrode system developed several years ago. For the uninformed, "Holography" by J. D. Redman offers an excellent treatise of the production and reconstruction of holograms. However, the paper neglects to mention vibration problems and recent developments such as crystal storage.

The final section, *Reviews*, contains seven articles. The first two, "Radioisotope Techniques in Process Control and Analysis" by J. L. Putman and "Radioisotope Techniques for Coating Thickness Measurement and Analysis" by J. R. Rhodes, offer extensive treatments of x-ray, gamma-ray, and beta-ray transmission and backscatter gages. Working equations are presented to facilitate the determination of test feasibility, source type, and source energy. "Leak Detection Techniques" by C. A. Mann contains a simple description of ten basic methods of leak detection. "Inspection Techniques for Pressure Containment Materials and Components" by R. F. Hanstock treats the conventional techniques of x-ray penetrants, magnetic particle, and ultrasonic testing of thick nuclear reactor sections for flaws in plates, tubes, and welds. "A Review of Ultrasonic Probe Technology Within the U.K.A.E.A." and "The Manufacture of Probes" by A. Reid include a description of transducer details and a discussion of probes fabricated at Harwell. An excellent step-by-step instruction for do-it-yourself probe building is presented. The final article, "Nondestructive Testing Information" by W. A. Dowden describes the NDT Information Centre at Harwell. The Centre is similar to those in the U.S., e.g., Watertown Arsenal and Oak Ridge National Laboratories.

In conclusion, this book's merits far outweigh its demerits. Its reading is recommended to management as an

educational reference and to NDT engineers for its excellent bibliography.

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January 28, 1970

William H. Thompson is presently the Group Supervisor of the Lockheed-Georgia Company's Proficiency Development Laboratory in Marietta. The laboratory is responsible for developing nondestructive test equipment and techniques for the Company's Quality Assurance organization for testing of aircraft structures. He received a BS in Engineering Physics from the University of Chattanooga in 1961 and a MS in Physics from the University of Tennessee in 1966. Prior to joining Lockheed, he was employed by Union Carbide Nuclear Division at their Y-12 Plant, Oak Ridge, Tennessee as a Physicist responsible for nondestructive testing development. He is a member of the American Society for Nondestructive Testing.

Nuclear Desalination. Elsevier Publishing Co., Amsterdam (1969). 941 pp. $38.50.

The subtitle, "Proceedings of a Symposium on Nuclear Desalination held by the International Atomic Energy Agency in Madrid, 18-22 November 1968," explains the content of this volume far more than the main title. The book includes the complete text of the 64 papers presented (50 in English, 12 in French, and 2 in Spanish) and the discussions that followed each paper. It is impossible to review the information contained in so many papers in a reasonable space, but it should be noted that they cover the complete range from overall descriptions of the programs on nuclear desalination of various nations (United States, United Kingdom, France, and Japan) to detailed discussions of the design, construction, and operation of proposed and actual desalting plants. Unfortunately, the Russian papers listed in the original program were withdrawn just prior to the meeting and therefore are not included.

The papers covered will be used as references many times, just as those have been from the "First International Conference on Water Desalting," and the "Water for Peace Conference." Consequently, in spite of the price, this volume is a must for workers in the desalination field and for those concerned with the use of nuclear energy for desalting. The publisher is to be commended for finishing this book in about a year in contrast to the two or three years required in the case of some proceedings.

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February 16, 1970

About the reviewer: Karl Johnsson is director of the Nuclear Desalination Information Center at Oak Ridge National Laboratory. He is a chemical engineer from the University of Florida and came to Oak Ridge in 1943 from Pan American Airways. In Oak Ridge, he worked on uranium chemistry and the development of the process for uranium tetrafloride production and later on thorium oxide production. Prior to his present position, he was a senior editor in the Technical Information Division of ORNL.