collection of every computer scientist. In addition, mathematicians, both pure and applied, should benefit greatly from the reading of this book, if not for the concepts involved, then certainly as a diverse exercise in mathematics for the pure enjoyment of a well-written, well-planned book.

Due to an adequate number of challenging problems, the book is certainly a worth-while textbook for an introductory senior or graduate level course in automata theory, formal languages, or other closely related subject areas. At the end of each chapter, literature references for the concepts introduced in the chapters are presented. A bibliography is provided at the end of the book.

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About the Reviewer: James B. Morris received his PhD degree, with a major in computer science, from the University of Texas at Austin in August, 1969. He is currently employed by the computer science research group at the University of California, Los Alamos Scientific Laboratory, Los Alamos, New Mexico. His special interests include the design of programming language translators and the theory of alogorithm equivalence.

Information Retrieval Systems Characteristics, Testing, and Evaluation. By F. Wilfrid Lancaster. John Wiley & Sons, Inc., New York (1968). 222 pp. $9.19.

The author views his subject through the eyes of a professional librarian actively engaged in lecturing on information retrieval and in evaluating information systems. Methods of measuring, monitoring, and improving the operation of these systems complete the volume.

Persons interested in an introduction to the field will find a clear and concise presentation of the terminology and concepts in the first nine chapters. Mr. Lancaster defines his terms in a scholarly manner and illustrates the concepts introduced with easily understood examples. Chapter 1 distinguishes among document, subdocument, reference, and data retrieval; between system staff who prescribe input and system users who request output information. Chapters 2 and 3 deal with subject indexing and the more general classification process. Historical treatment of Batten's "optical coincidence" retrieval, Mooer's "Zatocoding," and Taube's "Uniterms" is provided, and application of Boolean functions, hierarchical structure, and link and role relationships is described. Organization of the index, or search, file and retrospective, demand, and current awareness (SDI) searching are covered in Chaps. 4 and 5. The two standard quantitative measures of IR system effectiveness—recall and precision ratios—are discussed in the next three chapters together with factors influencing their values, in particular *exhaustivity* of the indexing and *specificity* of the indexing language. System coverage, the amount of user effort and response time required, as well as the form in which system output is provided, are considered as measures of system performance from a user's viewpoint. Chapter 9, a survey-type presentation of the application of computing equipment to information retrieval concludes the first half.

This chapter, like several others in the latter half, suffers from the author's attempt to utilize previously published material. It appears to have been hastily updated; there are few references more recent than the original 1964 publication date.

The final seven chapters comprising the second half of the book will be of interest primarily to information scientists, and in particular, those engaged in the design or development of information retrieval systems. In these chapters the evaluation of an information system is considered. Chapters 10 through 12 cover the development of procedures for testing system performance, analysis of the test results, and application of these findings to the creation of an improved system. Economic factors are treated in Chap. 13, with a discussion of personal vs delegated search philosophies, searching strategies, and on-line interactive system considerations in Chaps. 14 and 15. In his conclusion, the author lists the principal steps involved in system design emphasizing the need to tailor individual systems to their environment and to continuously monitor their performance to achieve the optimum system. This reviewer felt a lack of cohesiveness in these chapters, introduced perhaps by the inclusion of the previously published material. The concise presentation of the earlier presentation is missing.

This is one of the volumes in the Wiley Information Science Series. As such, it represents the field from the author's viewpoint. Many of the examples are taken from Mr. Lancaster's work with the ASLIB Cranfield Project at the College of Aeronautics, Cranfield, England, and on the MEDLARS Evaluation Program at the National Library of Medicine, Bethesda, Maryland. Other selections in the series would be more appropriate for those interested in a computer-oriented look at information retrieval. The low level of exhaustivity and specificity of the index hampers the retrieval of the book's excellent definitions as a reference glossary. That's IR jargon and when you've read the book you'll know what it means!

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Induced Radioactivity. M. Barbier. North-Holland Publishing Co., Amsterdam (1969). 424 pp. $21.00.

This is an interesting and useful reference book. Discussions of the various topics begin with elementary principles so that one need not be a specialist to use it. The material is presented in a short introduction, seven chapters, and extensive appendixes. There are over 260 drawings of good quality. The introduction covers nuclear reactions, radiations, and modes of decay, and the first chapter deals with generalities such as cross sections, activation formulas, and dose rates. Subsequent chapters include, in order, activation by spallation, fission products and neutron activation, compound nucleus reactions, elec-