which is bound to aggravate continuously their catalogers and readers and to hinder them in their operations and services. But if Dr. Fuchs' commentary is not to stop the course of the revision in progress, it will contribute to a sound revision. For aside from interpreting the instructions, Dr. Fuchs discusses throughout the commentary many cataloging issues which every code must consider and resolve, and these discussions will benefit all who are interested in the problem of cataloging generally and particularly all who are engaged in the preparation or revision of cataloging codes.

In his chapter on cataloging in Milkau's *Handbuch der Bibliothekswissenschaft* (1933) Rudolf Kaiser deprecates the thought that a catalog once well made can forever be continued, and says that "here, too, the saying is valid: every time has its catalogs." This is a time of widespread reexamination of cataloging thoughts and methods, and in Germany as in other countries the time for a new catalog seems to have arrived.—*Seymour Lubetzky, Library of Congress.*

Machine Literature Searching

Machine Literature Searching. By James W. Perry, Allen Kent, and Madeline M. Berry. New York: Interscience Publishers, 1956. 162p. $3.75.

This volume reprints ten essays that originally appeared in *American Documentation* during the last two years and adds five new chapters.

The first chapter deals with the general background material and outlines machines searching requirements; the second covers the intellectual problems involved in preparing material for machine searching and the types of indexing; the third, the conversion of indexes to make them more suitable for machines handling; the fourth, the methods used by the authors in collecting terms; the fifth, the method developed by the authors for attempting to systematize terminology for code development so that the specific terms will all be joined with generic broader terms; the sixth, the method for constructing a code to increase the effectiveness of machine searching; the seventh, the need for determining uses to be made of the information so that the level of headings can be made suitable; the eighth, definition of the operational criteria for determining whether a retrieval system is efficient and evaluation of the retrieval system; the ninth, the operational characteristics of searching machines including such characteristics as ability to identify one or more patterns, interpretation of certain patterns denoting the beginning and end of an organized sequence, ability to handle generic relationships as well as specifics, detection of logical relationships between criteria, etc.; the tenth and final essay in the reprinted group is a discussion of the factors underlying development of machine language.

Chapters 11-15 (pages 72-134) are the new materials in the book. Chapter 11 discusses the purpose of machine language, analytical and synthetical relations, machine language and machine capabilities, relationship of machine language to codes, methods of showing relationships by codes, etc. Chapter 12 covers the problem of coding of diagrams, of geographic areas, and of chemical structural formulas. Chapter 13 handles the encoding of abstracts by reducing redundancy of words so that they may be searched directly by machines. Chapter 14 deals with searching strategy and association-trails.

The final chapter, entitled "A Look Into the Future," is quite general and concludes that there are "a number of theoretical and practical problems [that] will require careful investigation. Even when utmost care is devoted to perfecting information processing methods, major investments of effort and money will be required to process research and professional publications so that they may be used most effectively. Such investment is apparently justified particularly in the field of science and technology."

The basic assumption that underlies this series of studies is that we have machines capable of doing literature searches. The authors state: "Modern automatic equipment is able to scan and recognize index entries . . . Scanning can be directed to one or simultaneously, several entries. Speeds of operation are such as to permit scanning and correlating of generic and specific aspects of indexes in reasonable time" (page 1). As a matter of fact there are no machines in production that will do even a fraction of what

is claimed here. The machine on which most of the authors' work was based was an experimental model of the IBM machine developed by Mr. Luhn, on which development work was discontinued more than a year ago. The only others that might be considered as remotely approaching these claims are Eastman's Minicard, of which the first experimental model has not yet been completed, and the Rapid Selector, of which only a prototype has been built.

Similarly, a second common thesis in papers such as these is that conventional classification has become less and less effective in coping with the problem of a mounting mass of materials, because, the authors say, "Conventional classification is characterized by the following feature. Criteria are combined in a rigid array as a basis for defining the subdivisions. Thus, for example, dyestuffs may be classified as to features of their chemical constitution." However this is not avoided in the authors' classification scheme. It is different from others, and the notation scheme is different from that of other classification schemes. But we have a broad concept followed by a more specific concept and then by the next more specific concept in fixed array in their classification just as in what they term conventional classification schemes.

Having based the argument largely upon the need for multi-dimensional searches which can not be made by a rigid classifications scheme, the authors go on to say: "Another question that must also be decided relates to the degree of detail to be accorded consideration during indexing . . . In a strictly logical sense all these details must be included in our indexing if it is to be complete. Practical considerations based on experience and common sense, however, must guide us in determining what degree of indexing is to be carried through . . . It is obviously useless to index something to which a search will never be directed . . . There are a number of consequences that flow immediately from the fact that the purpose to be served by the index is a determining factor in deciding how the indexing step is to be accomplished . . ." (page 8). Thus, starting with the basic argument that we need to have much more intimate indexing for multi-dimensional searching, we wind up with the argument that we must still use judgment in determining the level of indexing. It would appear, therefore, that the authors do not subscribe to the theory that indexing can be made detailed enough so that multi-dimensional searches, in all combinations, can be done automatically by machine.

Despite the fact that this whole series of studies is based on the theory that the mounting mass of recorded information is responsible for the lengthening time required for searching larger and larger indexes, etc., no evidence is given as to what is considered large, or large enough to justify machines.

Another intellectual base for these studies, which is common in studies of this type, confuses library book classification with classification of knowledge and points to the obvious inadequacies of a system designed to put a physical object in place in the files as the reason for doing something different and radical. This passes over all the work that has been done, particularly in Europe, on classified indexes using conventional classification schemes.

It may very well be that the code or notation system developed by the authors is a better notation system for either machine or manual searching than are many other notation schemes. This has not been established in practice and, in fact, there are no examples of successful experience with this scheme in large-scale operation.

The combination of semantic factors and analytic relations, plus arbitrary assigned differentiating numerals, described in detail on pages 81 to 90 is fascinating. But it is difficult for this reviewer to see how much space is saved by using MUSRMACHTWMP 03 for the word *thermometer*. It requires 40 spaces to write Springfield, Illinois, and 44 to write Chicago, so this notation would overflow from a punched card with only Springfield and Chicago needed on one card. The usefulness of a notation this long on a medium capable of storing a total of 80 characters only is open to question.

This is a field in which this reviewer normally is made to feel exceedingly stupid by practically everything he reads, and that it is just as true of this book as of other materials he has seen. As in most cases in this general subject area there appear to this reviewer to be many things that are given as obvious conclusions which are not particu-

larly obvious. Assumptions as to the state of development of machines for information handling which are contrary to fact form the basis of this study (and many similar studies), and the conclusions frequently appear, in this as well as in other treatments of this subject, to represent unfamiliar and confused terminology rather than a revolution in information handling.

Nevertheless the authors represent one of the major schools of thought in this part of the field of documentation and it is, therefore, probably a good thing to have the quintessence of their studies over the last ten years brought together in one volume.—*Ralph R. Shaw, Rutgers University.*