

Symbols and Storage

Symbolic Languages in Data Processing. Proceedings of the Symposium sponsored and edited by the International Computation Centre, Rome, March 26-31, 1962. New York: Gordon and Breach, 1963. xii + 849p. \$34.50.

Librarians are becoming increasingly aware of the potential of the digital computer in problems of information storage and retrieval. One of the reasons that work in this important field is not moving more rapidly is the difficulty presented by programming. Few working librarians have the time to learn how to program a computer, particularly since program problems vary from machine to machine. It is for this reason that computer experts have developed symbolic languages, defined as "completely formalized language (s) structurally and conceptually rich enough for communication between computers, between computer and man, and even between man and man in the computer field." Such symbolic languages, the best known of which are probably the FORTRAN, COBOL, and ALGOL systems, permit communication with the machine without tedious study of programming techniques. There are two drawbacks to the use of such languages, however: (1) there is no generally accepted single symbolic language, so that the investigator must at present learn a number of languages if he is uncertain of the computer he may have to use; (2) since symbolic languages are used in so many ways by so many fields, they tend to grow rather rapidly and to become unmanageable. The present book represents an attempt to solve many of the problems inherent in computer languages by an international symposium. Though it does not seem to have reached definitive conclusions, this symposium is to be heralded as a step in the right direction.

The book consists of lectures given by the participants in the symposium, grouped around six panel discussions: Metasyntactic and Metasemantic Languages, Languages for Aiding Compiler Writing, Philosophies for Efficient Processor Construction, Reflec-

tions from Processor Implementers on the Design of Languages, Are Extensions to ALGOL 60 Necessary?, and Is a Unification of ALGOL-COBOL, ALGOL-FORTRAN Possible? The Question of One or Several Languages. The panel discussions are given in the now familiar but tedious form of transcription from tapes, and one is occasionally unsure of what went on.

The last question, namely the possibility of uniting the FOR (mula) TRAN (slation) system developed for the IBM 700 series, the CO(mmon) B(usiness) O(riented) L(anguage) sponsored by the U.S. Department of Defense, and the European-American ALGO (rithmic) L(anguage), which is intended as an international standard, is in my opinion the most important of all for the user of the computer who is not himself a computer man. It is unfortunate that the conclusions of the panelists seems to have been that no unification is possible. In fact, it seems from the tenor of the discussion that we must look for a continued proliferation of computer languages.

It is for this reason that the first section of the book, "Theory of Languages—Syntactical Structure and Metalanguages," is so important. If we are to have a multitude of computer languages, the normal noncomputer-trained user of the machine needs a further language which will permit him access to the computer language. Of particular importance is an article by J. Riguet on programming and the theory of categories; in this article, M. Riguet outlines the theory of categories, which he thinks will replace set theory as the basic language of mathematics, and shows how programs may be cast in its terms. The theory is so simple and easy to understand that it seems at least as powerful as set theory for purposes of programming. If computer languages could be cast in the form of some other more powerful and generally used language such as the theory of sets or categories, the goal of international cooperation in this field could be realized, and the artificial restrictions at present placed on the growth and proliferation of computer languages could be lifted.

Also of great interest is the section on the use and design of languages to aid compiler

writing. A compiler is a program which equips the particular computer to accept programs in a problem-oriented language and to transform these into machine language instructions. Again, the panel and the lecturer represent no unified opinion on this matter, and no synthesis is presented. With the widespread international use of the computer for language processing, such programs should be made available widely. The book under review here represents an advance in that it is based on international cooperation; it is disappointing in that it yields so little evidence of a realization of this fact on the part of the participants. The nonprofessional user of the computer will find little comfort in the professional's attitude towards him as revealed in the pages of the symposium report.—James W. Marchand, *Vanderbilt University*.

General Bibliography on Information Storage and Retrieval. By Marshal Spangler. Phoenix, Ariz.: General Electric Computer Department, 1962. 390p. Apply.

Literature on Information Retrieval and Machine Translation. By Charles F. Balz and Richard H. Stanwood. White Plains, N.Y.: IBM Processing Division, 1962. 117p. Apply.

Permuted indexes are falling upon us in profusion, but the two under review here are the first extensive ones to appear in the field of librarianship. Although IBM calls its process "Key Word in Context" (which shortens into the happy designation KWIC) whereas General Electric says "significant word in context," the two efforts use essentially the same devices for controlling the same body of literature. Large libraries will want both of these bibliographies even though they are very similar in subject and scope.

The General Electric bibliography lists alphabetically by main entry 1550 books and journal articles in the broad area of information storage and retrieval, including such tangential but related subjects as mechanical translation, character and pattern recognition, speech analysis and synthesis, self-organizing systems, and artificial intelligence. Almost all references are to writings since 1949, although a few significant earlier works are included.

The General Electric bibliography has an index to secondary authors and an index to source journals. (This latter index, for example, shows that nine items are listed that had been published in *College and Research Libraries*. As would be expected, *American Documentation* furnished more items than any other journal with 329). This is followed by a chronological index, and the book closes with the permuted word index. Approximately 7,250 entries in this index indicate a ratio of not quite five per item.

The IBM bibliography contains about twice as many main entries, again with each entry indexed under an average of five terms permuted from its title. There is an author index but no source nor chronological indexes. An interesting sophistication is a list of words not used in developing the permuted index. Among this homogeneous but useless lot of discarded terms are Don, Force, Poughkeepsie, September, and Versus. Although more comprehensive than the General Electric list, the IBM compilation is printed at a reduction in size giving it a somewhat handier format.

These are good practical examples of what the permuted index can do. It will be interesting and indicative to observe how much we use them.—D.K.

Statistics

Library Statistics of Colleges and Universities, 1959-60, Part 2: Analytic Report. Washington: U.S. Office of Education, Library Services Branch, Bureau of Educational Research and Development, 1962. 45p. 40c.

One of the problems which was never adequately solved by the hardworking, deadline-pushed ACRL Statistics Committee (now LAD LOMS Statistics Committee for College and University Libraries) was that of providing for academic librarians a useful or significant analysis of the raw data supplied in the tables formerly published in this journal each January. When the collection and publication of statistics was turned over to the USOE Library Services Branch in 1959, it was with the understanding that the data processing machinery of that agency would provide a more detailed statistical analysis as Part 2 of its yearly publication of