

tion of unused words, together with convenient handling of recursive functions, relieves the programmer of most of the book-keeping.

Perhaps more important than the precise handling of the data structures is the fact that the program is stored in the form of such a structure, with the result that it can be manipulated by the program itself. Interpreters and compilers within LISP are simply functions which do such manipulation. In particular, the interpreter can be written in about a page of LISP. The simplicity of the interpretive process reflects the clarity of syntax and semantics in the language. Unfortunately, such clarity is not appreciated by the casual Fortran programmer, who soon tires of prefix notation for arithmetic and assignment operations and the innumerable parentheses. The latest version of LISP, LISP 2, will allow Algol-like notation, as well as more types of data structure.

LISP provides unquestionably the best existing introduction to nonnumeric programming. Although this book is far from ideal for teaching purposes, it is the only one available other than the LISP 1.5 manual, also by M.I.T. Press. The first five articles are tutorial in nature, including exercises and comments on debugging and programming styles. The second section contains descriptions of implementations for the Q-32 and M460 computers, articles describing applications of LISP to problems in logic and inference, and descriptions of extensions of LISP. Lengthy appendices contain code for a number of the papers. Three articles, the two by Saunders and the one by Hart and Evans, provide a reasonable introduction to LISP and its implementation.

As machines become faster, and it becomes apparent that mere speed does not solve the more significant nonnumeric problems, programming languages with the power and flexibility of LISP will become increasingly important.

MALCOLM HARRISON

New York University  
Courant Institute of Mathematical Sciences  
New York, New York 10012

**79[X, Z].**—TORGIL EKMAN & CARL-ERIK FRÖBERG, *Introduction to ALGOL Programming*, Studentlitteratur, Lund, Sweden, 1965, 123 pp., 25 cm.

This informal exposition of all of Algol 60 is very carefully done and stresses elegance of expression in programming. The text contains many examples and there are about fifty exercises with solutions. Diagrams are used to explain conditional expressions and block structure, and as a unique feature, the book contains two photographs of some of the personalities behind Algol.

The first of the twenty chapters gives a brief history of computers and programming, Chapters 2–14 explain Algol programming, and the last six chapters deal with the following topics: The Algol report, peculiar and controversial features of Algol, the IFIP input-output primitives, the IFIP Algol subset, stack compilation of an arithmetic expression, and “the future of Algol.”

A bibliography and a two-page index complete the book.

F. BUSINGER

University of Texas  
Austin, Texas