

between German texts available for a qualitative introduction to the subject and high-level treatises on theoretical nuclear physics. Portions of the text are taken from his lectures at the Darmstadt Technical Institute.

Those topics presented appear to be thoroughly treated and clearly presented. A comprehensive set of problems is also furnished.

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Computing without tears

OMNITAB: A COMPUTER PROGRAM FOR STATISTICAL AND NUMERICAL ANALYSIS. (NBS-101). Joseph Hilsenrath, Guy G. Ziegler, Carla G. Messina, Philip J. Walsh, Robert Herbold, eds. 275 pp. National Bureau of Standards, Washington, D.C., 1968. \$3.00

by DAVID JOWETT

The title of this book is deceptive, for it offers more than conventional computer programs and provides in fact a language in which to write programs. The operative phrase in the title "for statistical and numerical analysis" covers a useful and varied range of computer applications. Within this range, OMNITAB grants easy access to the computer for unsophisticated users, enabling them to carry out complex calculations of their own devising, assisted by standard routines for more conventional tasks.

The program does not replace symbolic languages such as FORTRAN, which explains the authors' reluctance to present it as "just another computer

language." Rather it provides an easily mastered substitute for them in a limited range of circumstances. The limits are such that many users will rarely go further.

Joseph Hilsenrath and his colleagues at the National Bureau of Standards have taken an elementary piece of scientific equipment, a worksheet, and stored it in the computer. The scientist's worksheet characteristically consists of a sheet of paper, ruled by rows and columns, in which he enters data and operates on them in a variety of ways. OMNITAB makes it as easy to explain to the computer what is to be done, as it would be to write instructions for a computational assistant. Thus the command MULTIPLY COLUMN 1 BY COLUMN 2 AND STORE IN COLUMN 3 suffices to carry out the operation described. More complex operations with many steps, such as matrix inversion and least-squares fitting, are often initiated with a single command.

The book is well documented and contains many examples related to physics and engineering. It also contains many illustrations produced by the data-plotting routines in the program. The capacity to produce plots easily and cheaply on the line printer is perhaps the most significant feature distinguishing OMNITAB from programmable desk-top machines. Using such plots intelligently provides a powerful means whereby large sets of data can be examined without tedious labor.

The descriptions of OMNITAB commands are generally clear and concise. They are classified as input, output, manipulative and matrix and scattered throughout the book interspersed with textural material and examples. This makes it a little difficult to use for self-instruction or teaching. However, the commands are listed at

the beginning, and many of them are self-explanatory.

In the section on self-teaching the authors emphasize that the program may provide the easiest resolution of questions or ambiguities. To learn how to use OMNITAB one starts with real problems, using this book as a reference to the meaning and utility of the commands. If doubt arises, the command should be used on a trial basis and the output examined. The natural progression to increasingly complex problems leads to greater competence.

David Hogben has contributed a useful essay on statistical applications of the program in an appendix. However, as Hogben readily admits, this can do no more than indicate the generality of the program, to which no manual can possibly do full justice. Any scientist or teacher should examine this book if he is not confident that both he and his students are already using the computer to the fullest possible extent. But the book should be used in conjunction with the program, which is now available for several computer systems.

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After obtaining a PhD in botany and spending six years in Uganda with the British Colonial Service, David Jowett joined the statistics laboratory, Iowa State University in 1965. He now teaches and consults in statistics, making extensive use of OMNITAB in both these activities.

In a past context

PRACTICAL PHYSICS. By G. L. Squires. 244 pp. McGraw-Hill, New York, 1968. \$6.50

by ERNEST C. POLLARD

I read this book with the wisdom (or burden) of teaching laboratory physics for three full generations. I can well remember in the first generation the predecessor to this same course at Cambridge, where G. F. C. Searle sharply, nervously and shrewdly ran the laboratory. I can hear him now telling students *never* to call him "sir," watch him getting out his "lady elevators" to help the girl students reach over the bench to read instruments and producing from his knapsack a thermos flask of tea that was shared with various embarrassed students each time. The next generation is represented by John Strong with *Pro-*

