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Book Review

Computers in Biomedical Research, Vol. 1, edited by Ralph W. Stacy and Bruce Waxman, 1965; 545 pages. (New York: *Academic Press*, 160s.)

According to the editors this book and its companion volume aim to provide realistic information on the state of computer application to the life sciences; and to provide guide lines for those entering the field in the near future. So far as is possible with such a wide field, this objective is achieved.

Virtually all facets of what can be conceived by the expression "life sciences" are included: applications in medicine, biochemistry, psychiatry, molecular biology and psychology. Some background of digital computer techniques and analogue computers is also provided.

With such a broad spectrum there must inevitably be a certain lack of detail. An attempt to counter this is made by dealing with each subject as a review with the narrative setting in place a wealth of references.

A typical chapter is the one of diagnosis. This opens with a historical survey and is then subdivided under the headings of diagnostic classification, diagnosis techniques, and diagnostic teaching. Under the heading "Diagnosis Techniques" the problems of communication of information concerning the patient are outlined. This is followed by a discussion on comparison, scoring and decision-making processes including multiple discriminant analysis, Bayesian conditional probability techniques, and principal axis factor analysis.

There are other medically orientated chapters devoted to the analysis of E.C.G. and E.E.G., biochemical analyses, the calculation of radiation dosages, multiphasic screening, medical records, and the evaluation of fœtal distress.

In the fields of psychology and psychiatry, little headway has been achieved with the application of computers. However, because so much illness comes into these categories it is justifiable that a substantial portion of the book is devoted to them.

The first chapter in this section reports the use of computers in designing and running experiments and analyzing the results obtained. These are relatively straightforward techniques but nevertheless indicative of steady progress. Another chapter describes the work carried out at the University of Minnesota on evaluation of personality tests. The two remaining chapters report first steps of progress in the simulation of mental processes, but from very different standpoints: one deals with the development of perceptrons as neural models and the other with the simulation of psychiatric dialogue.

The value of the book to medical personnel is enhanced by the inclusion of a few chapters on general techniques of using analogue and digital computers, including one on programming packages.

The remaining sections of the book contain some of the most stimulating chapters. One is by George Dantzig on new mathematical techniques applied to the simulation of multi-compartmental exchange systems as occur in the lungs. Another, by Charles Coulter, is on the determination of protein structures from X-ray diffraction patterns.

It is a pity that a little more effort could not have been applied to sub-editing to avoid the irritating repetition of stereotyped introductions. However, this is a quibble and should not detract from the success of marshalling thirty-five authors, twenty-two chapters and quoting fifteen hundred references: surely no mean achievement!

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