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Medical Images: Formation, Perception and Measurement, proceedings of the Seventh L. H. Gray Conference held at the University of Leeds, 13-15 April 1976, edited by George A. Hay, 1977; 368 pages. (*The Institute of Physics and John Wiley*, £12·50)

It is always difficult to review conference proceedings when one has not been present at the conference. However, it should be said at once that this is a well produced book containing a collection of high quality papers. Only the statements about the papers' origin and the reproduction of some of the discussion discloses how they came to be written. The handling of complex images from a wide variety of sources has become very much part of the stock in trade of the medical physicist from both the academic and the service point of view. This has taken them into instrumentation technology, pattern recognition and computing. This book provides papers on various aspects of the present and future development of multifarious aspects of this complex subject and provides a valuable review of the state of the art—as one might expect from an L. H. Gray Conference.

The main sections in the book are concerned with recent advances in imaging devices, methods of assessment of instrument performance, the detection and perception of image formation, the quantitative assessment of image processing and the extraction of numerical information from images. The papers vary from ones dealing with instrumentation and experimental topics to those concerned with the mathematical analysis of system function. A wide variety of physical systems are included from ionography, computerised transaxial tomography, radioisotope imaging with gamma cameras, thermography, acoustic and ultrasonic imaging.

The papers individually are up to full academic standards in presentation, content and bibliography. The provision of the proceedings of such a standard and within a year of the original conference is a practice that one wishes would be more widely followed. This book will be a valuable addition to personal and departmental libraries.

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Computer Science and Multiple-valued logic, edited by D. C. Rine, 1977; 548 pages. (*North Holland*, US$ 50.95)

Although multiple-valued logic (which admits more numerals than the 0/1 alternatives of the binary system) has held the interest of mathematicians since the 1920's, its relevance to computer science has had a rather bumpy history. In 1947 Norbert Wiener produced a brilliant argument for the optimality of the binary system for *storing* information. There have been other arguments (in my opinion bogus) for the optimality of a base of e which is most closely approximated by 3. However, when it comes to hardware for *processing* as opposed to storage it may be that multiple-valued systems offer interesting and possibly even economical alternatives.

However, the author claims that the recent revival of interest heralded by this book is partly underpinned by the idea that multiple-valued decisions are often made in programming (when one wants to branch with one or several 'maybe' alternatives). The editor structured the book by inviting 26 experts to write in four areas: algebraic theory, logic design, ternary logic, physical components and applications.

The first, theoretical, part collates various points of view applying the ideas first put forward by E. L. Post in 1921 and is clearly fertile ground for rigorously pursuing the properties of concepts such as 'implication' and 'completeness' in multiple-valued systems. The last paper in this section provides probably the most exhaustive bibliography on the subject in existence (464 citations). The second part runs through all those topics familiar to 'binary' switching theorists: minimisation, sequential machine design and computer aided design—all, I feel, somewhat uninteresting due to a certain lack of fundamentality. A brief section on ternary logic is followed by one on electronics, oriented part on rather ingenious forms of implementation.

Possibly the most interesting paper for the computing scientist (as distinct from the computer engineer) is a short nine page description of multi-valued logic in programming applications (part V of the book). The sheer conciseness of this contribution in a rather thick, expensive volume belies a little the author's claim that '. . . there is a good chance that the impact of multiple-valued software considerations will be at least as important as hardware considerations on the use of fourth and fifth generation computing and data processing systems . . .' However, putting the emphasis on the 'will be' in the above statement, the book could be recommended as background to those who would like to be involved in making the editor's prediction come true.

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