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Book Review

Error Correcting Codes, Edited by Henry B. Mann, 1969, 228 pages. (John Wiley & Sons Ltd., Price 75s.)

The reader must first be warned that a more informative title for this book would have been '*Recent Advances* in Error Correcting Codes': being neither introductory nor encyclopaedic, it is not to be regarded as a manual or textbook. For example the first chapter is a Historical Survey by Mrs. F. J. MacWilliams which is delightful reading for anyone knowledgeable in the subject, but the lack of any bibliography makes it tantalising to the outsider; but of course it was addressed to experts, since the book is a record of the proceedings of a symposium organised by the Mathematics Research Centre of the U.S. Army at the University of Wisconsin. The computer user may be astonished that whereas he is accustomed to having one parity bit and 31 information bits in a word of 32 bits, a typical code discussed in this book provides 6 bits of information in each block of 32 bits; but the key words in the sponsorship of the symposium are *mathematics* and *U.S. army*. It is particularly for space vehicles that these elaborate codes have been designed, because the premium on weight and power is so high that almost any degree of complexity in the ground station can be tolerated if it allows some reduction in radio transmitter power on the space vehicle. Whether such tactics will ever be economic for terrestrial communication is another matter. But the mathematical interest is great and involves very varied topics. For example, the code discussed in Chapter 2 is presented graphically as a rectangular matrix of black and white squares: this is particularly appropriate since its construction is based on the Hadamard matrix which was first described in connection with the design of tessellated pavements.* The 'Fast Fourier Transform', which is a product of computer programming, has proved invaluable in the de-coding of certain types of code. The construction of error correcting codes may be based on combinatorial algebra or on topology. If some British mathematicians can be persuaded to read this book, and if as a result they become interested in the mathematical problems of error correcting codes, this may help to bring Britain forward in a subject in which we lag sadly behind the space-inspired Americans and Russians.

D. A. BELL (Hull)

*SYLVESTER, J. J., 'Tnoughts on inverse orthogonal matrices, simultaneous sign successions, and tessellated pavements in two or more colours, with applications to Newton's rule, ornamental tile-work and the theory or numbers.'
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