inspection for trends. (See **Table 5**). After each data set a page of statistics is printed, giving the number of test function values with bit deviations of 0, 1, . . . 7 units in the 60th bit position. (Thus for example, a three bit deviation in the 60th place would actually affect the 60th and 59th bit positions, since it has the binary representation 11.) The number of function values with more than 7 bits deviation from that data set is also printed. Finally, the number of function values tested is printed.

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Book review

Computers and Automata, edited by Jerome Fox, 1971; 653 pages. (*Polytechnic Press of the Polytechnic Institute of Brooklyn*, £9·85)

This book contains 28 papers presented at a Microwave Research Institute Symposium held at the Polytechnic Institute of Brooklyn in April 1971. Two introductory papers have been added. The main aim of the symposium was to promote stronger links between practical computing and automata theory. As well as a table of contents the book includes the programme of the symposium, which divides the papers into the main areas of Programming Languages, Operating Systems, Computation Complexity, Logical Design and Computer Models. The titles of some papers in the contents are different to the corresponding ones in the programme and the latter lists a paper by Somalvico under Computation Complexity and a paper by Lazarev under Logical Design which have not been included.

It is with considerable pleasure that one picks up a book with the title *Computers and Automata*, because the relationships between the two have not been given nearly enough attention in the past. Computing is now complex enough to need a coherent way of stating and investigating the principles being used and it is unfortunate, as A. E. Laemmel says in his introduction, that 'Automata theory . . . has grown into an independent discipline whose connections with practical problems is at times quite tenuous'. The situation being what it is this book is inevitably something of a disappointment in that the problems have not been solved. Signs of promise however can be seen.

'Toward a mathematical semantics for computer languages' by Scott and Strachey is one of the most interesting papers in *Computers and Automata* to aim at a general theory. Ultimately the authors' approach should enable us to define the semantics of computer languages without ambiguity and without having to state how particular features should be implemented. The paper by Dennis, 'On the design and specification of a common base language', is an example of an alternative approach that regards the base language as a specification of the functional operation of a computer system and so as a suitable vehicle for the definition of computer languages. Many papers describe algorithms for the solution of computing problems, a few discuss computing systems based upon theoretical work.

In the section on Programming Languages, Lewis and Rosenkrantz describe a 2-pass ALGOL 60 compiler that uses a finite-state machine for lexical analysis and a deterministic pushdown machine for syntactical analysis. Other topics covered are machine language design, a theory to help in program design and fuzzy programs that, in difficult situations, 'do the best that they can'. The section on Operating Systems mainly consists of papers giving new or improved methods for solving system design problems. Computation Complexity covers a variety of subjects, from measures for computation complexity to problems in artificial intelligence. The section on Logical Design consists mainly of extensions to the theory that already exists. Computer Models includes a discussion by Zeigler on criteria for determining when one system simulates another and theoretical work on cellular computers that is claimed to be applicable to parallel computers.

Altogether, this is a valuable collection that should help us to focus our attention on an important area.

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