46. MEDKEFF, R. J., and MATTHEWS, H. "Solving Process-Control Problems by Analog Computer," *Instr. and Autom.*, October 1954.
47. MCILROY, M. S. "Direct-Reading Electric Analogue Computer helps solve Distribution Problems," Paper to Distribution Conf. Operation Sect. Amer. Gas Ass., April 1952; abridged in *Gas Age*, 17 July 1952.
48. GILLINGS, D. W. "Analog Aids Economic Estimation," *Chem. Eng.*, 16 November 1959.
49. TUCKER, G. K. "The Analog Simulation of Industrial Instrumentation," *Proc. Instrum. Soc. Amer.* 1959, Vol. 14 (1), Paper No. 54–59, 9.
50. TOLIN, E. D., *et al.* "An Analog Computer for On-line Control of a Chemical Reactor," *Proc. Instrum. Soc. Amer.*, 1959, Vol. 14 (1), Paper No. 24–59, 12.

Book Reviews

Computer Engineering. Edited by S. A. LEBEDEV, 1960; 184 pages. (Oxford: Pergamon Press Ltd., 63s. 0d.)

This book contains eight papers on some aspects of computer engineering in U.S.S.R. translated into English. The references quoted by these papers are not later than 1956, which makes the book something of a "period piece." In view of the rapid strides in computer technology since that date, both inside U.S.S.R. and elsewhere, the interest of the book is historical rather than technical.

The first paper deals with power supplies for the original BESM machine and deals with regulation and also marginal checking by variation of filament supplies. There follows a long paper of 74 pages on Digital Differential Analysers which is almost entirely a review article of U.S.A. practice. No less than 21 out of 22 references are to U.S.A. publications!

Next appears a very good account of "Dynamic Flip-Flops and their Use in Parallel Action Computers." This extends over 38 pages and is quite stimulating. Interesting applications are shown for frequencies up to 1 Mc/s. Naturally, this is entirely based on thermionic valves and not transistors.

The remaining papers are shorter and deal with a form of parity checking in a serial arithmetic unit; dictionary look-up for mechanical translation; properties of ferrite cores for coincident current and word selection stores; and a glossary of technical terms. There is nothing novel in these papers and comparable information is readily available in the usual scientific and technical journals.

There are a few small misprints, particularly among the references, but these will not mislead any historians of computers.

P. TAYLOR.

Sampling Methods for Censuses and Surveys, by FRANK YATES, 1960; 440 pages. (London: Charles Griffin & Co. Ltd., 54s. 0d.)

This is the third edition of a very successful and well known book by the President of the Society. The subject-matter of the book is well described by the title; it is not a treatise on mathematical statistics, but is intended as a manual for those who plan and carry out censuses and statistical surveys of various kinds. The author has primarily in mind surveys of an official or scientific character. The same statistical principles apply, however, to opinion polls and surveys conducted for the purpose of market research, and the book will be of general interest to those engaged in these subjects. A perusal of the less technical parts of the book would also be profitable for those on whose behalf market research surveys are undertaken; they would then understand that it is not as simple as it sounds to obtain reliable information by sampling, and that if results are to be obtained quickly and cheaply some risk must be taken of introducing bias into the sampling.

Earlier editions of the book contained sections on the use of Hollerith punched-card equipment for census and survey work, and the author has now added a chapter on the use of electronic computers. This will be useful in drawing the attention of practical statisticians to the advantages that can be obtained from the use of computers, both in the reduction and in the critical evaluation of data. A section on the editing of data with the aid of a digital computer is of special interest. Those who have not been concerned with data reduction, whether the data arise from statistical surveys or from scientific experiments, may not realize how important this is. Any large body of data is bound to contain errors and inconsistencies and these must be taken care of by the machine, at machine speed, if a bottle-neck is not to arise. The machine must be programmed so as to subject the data to a close scrutiny, and to reject, correct, or refer for future examination, any which fail to pass the tests. In cases where some rejection of data may be necessary there is a distinct advantage in having it done by a program rather than by a human being, since the machine can be trusted to apply the rules impartially, and, if it is later suspected that bias has been introduced, an examination of the program will reveal the exact nature of the criteria that were used.

The critical analysis of results calls for much computation. Most of the procedures used are straightforward in themselves, but the necessity of developing approximate methods which could be applied without excessive labour has in the past tended to confuse and complicate them. The coming into wide-spread use of digital computers should enable many sources of mystery to the uninitiated to be removed.

M. V. WILKES.