chines cannot be considered a substitute for the ingenious mathematical and laboratory techniques of analysis which have been devised. . . ." However, this reviewer is convinced that such ingenuity when properly coupled with the power of modern computers will provide greater insight than analytical methods alone.

A. H. T.

29[X].—(a) D. S. MITRINOVIĆ, "Sur les nombres de Stirling de première espèce et les polynômes de Stirling," *Publ. de la Fac. d'Électrotechnique de l'Univ. à Belgrade* (Série: Math. et Phys.), No. 23, 1959, 20 p. (Serbian with French summary. Tables by Miss RUŽICA S. MITRINOVIĆ.)

(b) D. S. MITRINOVIĆ & R. S. MITRINOVIĆ, "Sur les polynômes de Stirling," *Bull. Soc. Math. Phys. Serbie*, v. 10 (for 1958), p. 43–49, Belgrade. (Summary in Russian.)

(c) D. S. MITRINOVIĆ & R. S. MITRINOVIĆ, "Tableaux qui fournissent des polynômes de Stirling," *Publ. Fac. Élect. Univ. Belgrade* (Série: *Math. et Phys.*), No. 34, 1960, 24 p. (Summary in Serbian.)

These three papers are concerned with the Stirling numbers of the first kind, S_n^r, which may be defined for positive integral n by

$$x(x-1)(x-2)\cdots(x-n+1) = \sum_{r=0}^{n} S_n^r x^r.$$

Altogether the numbers S_n^{n-m} are tabulated for $m = 1(1)32$, $n = m + 1(1)N$, where $N = 200$ for $m = 1(1)5$, $N = 100$ for $m = 6$, and $N = 50$ for $m = 7(1)32$. The values for $m = 1(1)7$ are given in (a), for $m = 8(1)13$ partly in (a) and partly in (c), for $m = 14(1)20$ partly in (b) and partly in (c), and for $m = 21(1)32$ in (c). The authors found no discrepancy as a result of some checking against unpublished tables by F. L. Miksa (see *MTAC*, v. 10, 1956, p. 37).

Algebraic expressions for S_n^{n-m} in the form of binomial coefficients $\binom{n}{m+1}$ multiplied by polynomials (with factors $n(n-1)$ separated out if m is odd and not less than 3) are given for $m = 1(1)13$ in (a) and for $m = 1(1)9$ in (c).

S_n^{n-m} may also be expressed as a sum of multiples of binomial coefficients in the form

$$S_n^{n-m} = \sum_{k=0}^{m-1} C_m^k \binom{n}{2m-k}.$$

Altogether the values of the coefficients C_m^k are given for $k = 0(1)31$, $m = k + 1(1)32$, the values for $k = 0(1)19$, $m = k + 1(1)20$ being found in (b) and the remaining values in (c).

A. F.

30[Z].—WAYNE C. IRWIN, *Digital Computer Principles*, Van Nostrand Co., Inc., Princeton, 1960, vi + 321 p., 24 cm., $8.00.

This book contains material presented at a training course in the Electronics Division of the National Cash Register Company. It is an extremely elementary "book for the beginner. No previous acquaintance with computers, electronics or mathematics is necessary."

The book is divided into nine sections and forty-two chapters. The section titles are: Methods of Computation, Symbolic Logic, Mechanization of Logic, Mechanization of Storage, Timing, Mechanization of Arithmetic, Control, Communication with the Computer, Preparation of Instructions, Reduction of Errors, and Present Trends.

The author has placed more emphasis on symbolic logic than on any other subject. This section of the book begins with Boolean algebra and terminates with a discussion of the Harvard Minimizing Chart. However, even in this section, the best written one in the book, the author does not develop the mathematical ideas involved adequately or prove statements. He describes various facts and illustrates the use of various techniques.

The author does not go very far in the discussion of any topic he selects, and he omits many significant points in his discussion. Some omissions are noted in footnotes but some are never mentioned. For example, "asynchronous machines" are dismissed with a footnote on page 145. The words "round-off" and "rounded multiplication" are never mentioned in the text and neither word can be found in the index. The existence of a computer using a number representation other than one with a signed absolute value is never mentioned.

It is unfortunate that the author did not see fit to include in the bibliography references to the reports by von Neumann and his co-workers at the Institute for Advanced Study. The discussion given in these reports of arithmetic performed in a computer with a two's complement representation of numbers is clear and complete, and would supplement very nicely the author's limited discussion of arithmetic in a binary machine.

A. H. T.

31[Z].—T. E. Ivall, *Electronic Computers, Principles and Applications*, Second Edition, Philosophical Library, New York, 1960, viii + 263 p., 22 cm. Price $15.00.

This is a revised version of the first edition published in 1956 under the same title [1]. In the first edition the author acts as an editor, publishing in book form the separate contributions of a number of English writers working in the field of computers. In the present edition the author attempts to regroup and rewrite the material so as to present a more coherent picture. He also adds three short chapters, as follows:

(1) In place of one chapter on Analogue Computing Circuits the new edition now contains two chapters, Analogue Computing Circuits—1, and Analogue Computing Circuits—2.

(2) A chapter on Programming Digital Computers is added.

(3) The chapter, Computers of the Future, somewhat rewritten, now becomes Recent Developments, and a new chapter, Computers of the Future, is added.

The book is intended as an introduction to the computer field for the non-technical reader. It can adequately fulfill this purpose. However, the book has a number of deficiencies. It also appears that the author has not really kept abreast with modern developments in this field, nor with the rapid advances which are taking place in this country. In his brief chapter, Computers of the Future, he discusses mainly some future potential applications of computers rather than the exciting developments which are taking place in the field of computer design. He sometimes betrays