

REVIEWS AND DESCRIPTIONS OF TABLES AND BOOKS

29[B].—GEORGE E. REYNOLDS, *A New Method of Cube Root Extraction on Desk Calculators*, Electronics Research Directorate, Air Force Cambridge Research Center, Air Research and Development Command, USAF, April 1958, (ASTIA Doc. No. AD 133760), vi + 27 p., multilithed.

The method consists of the use of one iteration of a third-order iterative process for computing $\sqrt[3]{N}$, with the aid of a table from which certain functions of an approximate root A can be read. The iterative formula is used in the form

$$\frac{(2A) \left(\frac{N}{A^3} + \frac{1}{2} \right)}{\frac{N}{A^3} + 2},$$

both $2A$ and A^3 being read from a table. Thus only one multiplication and two divisions, plus some minor auxiliary operations, are necessary.

Three tables are provided, these being so-called five-place, six-place, and seven-place cube root tables. The author states that a maximum error of one unit in the last significant digit of the rounded answer can be achieved. A few spot checks have revealed no cases in which the statement is false. It is worth noting that the only instance discovered by the reviewer in which the result obtained from the tables differed from the correct result by one unit in the last digit occurred in the beginning of the five-place table for the range in which the tabulated value of $2A$ has 5S instead of 6S. This agrees with the author's statements on p. 11–12 concerning the location of the maximum error in the tabulated values.

The instructions as to procedure are sufficiently explicit except in respect to the number of guard figures to be kept in the quotient N/A^3 . One may infer from the corrected version (furnished with the review copy as an erratum) of the example on p. 15 that the author believes one guard figure will suffice, although there is no consideration of this issue in the paper.

Equation (21) is incorrect. Its right side should read

$$(2A)(N/A^3 + \frac{1}{2}) \div (N/A^3 + 2).$$

The reviewer is allergic to the use (p. 9) of the colloquial phrase "several times greater than" in lieu of "several times as large as". There is no such thing (p. 13, line 3 *fb*) as *the* Newton-Raphson Method for the cube root, since there are many equivalent equations with the cube root of N as a solution. The reviewer is unfamiliar with the term (p. 14, line 8) "increasing asymptotically". Is "monotonically" the adverb intended?

THOMAS H. SOUTHART

University of California,
Los Angeles, California

30[G].—JOHN L. SELFRIDGE, *On Finite Semigroups*, Dissertation, University of California, Los Angeles, multilithed typescript, iv + 185 pp.

A *system* is a set of abstract elements, together with a binary operation [in this review called multiplication] defined from the cartesian product $S \times S$ to a set V . For $a, b \in S$, the value of the product is written ab . The system is *closed* whenever $V \subset S$. The *order* of the system is the number of elements in S .