at the right and bottom of the page is used. Values less than 665 are given to one decimal; other values to the nearest integer.

Tables A and B are credited to S. OGURA, hydrographic engineer of the Japanese Navy.

Table A-Polar is similar to Table A, except that latitudes 60° to 90° are covered and values of A less than 665 are given to one decimal, other values of A to the nearest integer.

Weems suggests that the formula $B(h) = A + B(K \sim d)$ be used for the determination of the altitude and that the azimuth diagram of ARMISTEAD RUST, USN Captain (retired), be used to determine the azimuth. This diagram is reproduced on a scale 1.5 times the original on two pages, one of which is folded. A diagram enabling one to determine the hour angle of a celestial body on the prime vertical takes care of the ambiguous case in the determination of the quadrant of the azimuth angle arising when the latitude is of the same name and greater than the declination.

Auxiliary tables given in the volume are those providing corrections for observed altitudes obtained with ordinary sextants and with bubble sextants. A brief but adequate explanation of the use of the tables is given and several examples are worked out.

In the preface to the third edition, the author says, "The Line of Position Book has stood the test of time. No errors have been noted in the Altitude Tables. Except for the method of H.O. 214, it remains the shortest, easiest method for working the line of position." In this statement, the author fails to mention one of the strong points of his method, namely that it works in all latitudes and for all altitudes. All of the modern tables with which a sight can be reduced in appreciably less time than with the *Line of Position Book* are limited methods, usually limited in both latitude and altitude.

Perhaps the outstanding criticism to be made of this book of tables is that local hour angle changes from page to page rather than latitude. There is a definite advantage in finding all of the data to be used at one time on a single page rather than scattered through the book. By the same argument, the polar table should be amalgamated with Table A. It may be noted here that these changes have been made by the author in his *New Line of Position Tables*, Annapolis, Md., 1944.

CHARLES H. SMILEY

MATHEMATICAL TABLES—ERRATA

References have been made to Errata in RMT **286** (Silberstein); N **53** (Furnas, Wrinch); **54** (McIntyre); Q **17** (?).

79. *Barlow's Tables of Squares, Cubes, Square Roots, Cube Roots, and Reciprocals, of all Integer Numbers up to* 12500, edited by L. J. COMRIE. Fourth ed., 1941. See *MTAC*, v. 1, p. 16–17.

As a part of the checks applied in the transcription of these tables to punch-cards, the tabular values of $f(n) = \sqrt{n}$, $\sqrt{10n}$, $\sqrt[3]{n}$, and $1/n$ for $n = 1000(1)12500$ were inverted; i.e., $f^{-1}[f(n)]$ was found. Differential corrections accurate to a few additional decimal places were computed. Doubtful cases were further examined. All values were found to be correct, except two which need a correction of a unit in the last place:

1) For $n = 3195$, $\sqrt{10n}$ is tabulated as 178.745630. The correct value is 178.7456293, which rounds off to 178.745629. Also the corresponding differences must be changed to 27975, 27971.

2) For $n = 4575$, $\sqrt[3]{n}$ is tabulated as 16.600851. The correct value is 16.6008516, which rounds off to 16.600852. Also the corrected differences, 1210, 1209.

L. J. CUNNINGHAM

Aberdeen Proving Ground

EDITORIAL NOTE: These errors are also to be found in the third ed. 1930, and in the 1935 pirated ed.

80. JAMES BURGESS, "On the definite integral $(2/\pi^{\frac{1}{2}})\int_0^t e^{-t^2}dt \cdots$," See *MTAC*, v. 1, p. 449.

In trying to use Burgess' Table of L as a check on certain computations we found several errors in this table. However, to decimals varying from 11 to 15, we checked Wrench's corrections to Burgess' table except for $t = 6$. There we agreed with Burgess rather than Wrench. In order to settle this point once and for all we made three separate computations, one using the 15th convergent of a continued fraction for $L/2t$, the second using the 16th convergent, and the third using the asymptotic series for L. All three were sufficiently accurate to verify Burgess' 15 decimal value and refute Wrench's value. In addition we made use of a trick for increasing the accuracy obtainable from an asymptotic series to compute the value

$$.98665\ 31092\ 31165\ 44447 \quad \text{for } L \text{ at } t = 6.$$

J. BARKLEY ROSSER
EDWARD M. COOK
JOHN A. BRITTAIN

Alleghany Ballistic Laboratory
Cumberland, Md. 15. XI. 45

I carefully recalculated $L(6)$, this time using all 24 decimal places of $F(x)$ and its reduced derivatives for $x = 8.4$ and 8.5 as tabulated by Sheppard. The final result is $L(6) = .98665\ 31092\ 31165\ 44446\ 847$ where the error in the 23rd place is less than one unit. This confirms the above result to 20D. In view of our agreement in all other cases this should conclude the checking of the L-table.

J. W. WRENCH, JR.

4211 Second St., N.W.
Washington 11, D. C. 20.XI.45

81. OLINTHUS GILBERT GREGORY (1774–1841), *Mathematics for Practical Men* . . . second American ed. from the second London edition, Philadelphia, Baird, 1863. In the supplementary tables is, "A Table of Circles, from which knowing the diameters, the areas, circumferences, and sides of equal squares are found." At the conclusion of the tables Gregory states that they "were computed with great care by the author's esteemed friend, the late H. GOODWIN, Esq. of Blackheath, a gentleman whose indefatigable perseverance and remarkable accuracy in reference to numerical computations cannot be too highly characterized. They are inserted here to supersede the necessity of consulting some erroneous tables of the areas, etc., of circles recently put into circulation."

These three tables are each for Diameter (D) = [1(.25)100.75; 8D], except that the Area for D = 1 is to 7D. With these same values of D I recalculated the whole of the table for circumferences (C) and found that of Goodwin's 400 tabular values of C, 126 are correct, one is too small by 3 units in the last figure, 22 are deficient by 2 final units, 244 are too small by one unit in the last place, and one is too great by 3 final units. The following major errors were discovered in this table:

D	*For*	*Read*
37.75	118.59572267	118.59512267
43.00	135.08348410	135.08848410
48.00	150.79644797	150.79644737
50.25	157.96503084	157.86503084
81.75	256.82579942	256.82519943
84.00	263.89378269	263.89378290
96.25	302.37829269	302.37829291

STANLEY M. SHARTLE

353 South Indiana St.,
Danville, Indiana

EDITORIAL NOTE: The posthumously published "Goodwin" table, discussed by Mr. Shartle, appeared as Table II in the first London edition of Gregory's work, London, 1825, p. 399–406; in the third London edition, 1848, edited, rev., and enl. by Henry Law, it is Table VII in the Appendix, p. 66–72. In each of these editions the seven sets of figures, quoted above as erroneous, are in agreement. Furthermore, the quotation from Gregory concerning the tables is identical with what appears in the first edition. In at least four of the cases cited by Mr. Shartle, errors made by Gregory, in seeing one of the tables through the press, are definitely suggested. "H. Goodwin" is undoubtedly the HENRY GOODWYN to whom we have already referred, *MTAC*, v. 1, p. 22–23, 67, 100, 372. According to the *Gentleman's Magazine*, v. 94, p. 381, he died at Blackheath Sept. 27, 1824, aged 79. The most extensive tables (in decimal places) listed in the FLETCHER, MILLER & ROSENHEAD, *Index*, are as follows: Circumference, for D = [2(2)200; 6D], in L. POTIN, *Formules et Tables Numériques*, Paris, 1925, p. 204 205; Area, for D = [0(.1)100; 6D], in °C. TODD, *A Series of Tables*. Second ed., London, 1853. In Wölffing's *Mathematischer Bücherschatz* we find °M. F. KUNZE, *7-stellige Kreisflächen von 0.01 bis 99.99*. Dresden, 1868; and in Kayser's *Bücher-Lexicon* is the following: °J. MODER, *Tabellen nebst Anweisung zur bequemen Aufsuchung d. Kreisumfangs, d. Kreisfläche, der Oberfläche der Kugel, d. Kubikinhalts der Kugel bis auf 20 Dezimalstellen, sowie zur Aufsuchg. d. Diameters resp. Radius wenn e. der obigen Dimensionen gegeben ist, f. alle Bauhandwerker u. Solche, welche m. Vermessungsarbeiten zu thun haben, sowie zum Selbstunterricht* . . . Wiesbaden, 1886, 30 p.

A copy of the first London edition of Gregory's volume is in the Athenaeum Library, Providence, R. I. The first American edition of Gregory (from the second London edition of 1833) was published at Philadelphia in 1834.

In DeMorgan's article on "Table" in the *English Cyclopaedia, Arts and Science Section*, v. 7, 1861, we find the following in col. 982: "Mr. Goodwyn (of Blackheath) was an indefatigable calculator, and the preceding tables are the only ones of the kind which are published. His manuscripts, an enormous mass of similar calculations, came into the possession of Dr. Olinthus Gregory, and were purchased by the Royal Society at the sale of his [Gregory's] books in 1842." It would be of interest to learn about the contents of Goodwyn's manuscripts, which are now available at Burlington House.

82. NYMTP, *Table of Characteristic Values of Mathieu's Differential Equation*, 1945. See *MTAC*, v. 2, RMT **290**.

For $r \geqslant 0$, *read* $r > 0$, in the following: p. xiii, l. 10 and 14; p. xiv, l. 5, 10, and 14; p. xv, l. 12.

NYMTP

83. N. NIELSEN, *Recherches Numériques sur certaines Formes Quadratiques*. Copenhagen, 1931. xi, 160 p. Tables I–II, p. 1–17.

Errors in T. I II are indicated in my "A List of errors in a table of numbers D for which $x^2 - Dy^2 = -1$ has solutions in integers," *Nieuw Archief v. Wiskunde*, s. 2, v. 21, 1943, p. 194–196. Table I gives all numbers D under 10000 for which the equation

$$x^2 - Dy^2 = -1 \quad (1)$$

is solvable; Table II gives those D's which are sums of two squares and less than 10000 for which (1) is insolvable.

The following is a complete errata list.

Table I. *Insert:* 2153, 4330, 4777, 5545, 5597, 5669, 6418, 7274, 7330, 8125, 9434, 9442, 9802.
Delete: 2157, 2353, 4705, 4786, 5218, 5986, 5989, 6338, 6505, 6605, 7294, 8585, 8725, 9477, 9962.

Table II. *Insert:* 2353, 4546, 4705, 5218, 5986, 5989, 6338, 6505, 6605, 8585, 8725, 9701, 9962.
Delete: 4330, 4777, 5545, 5597, 6418, 7330, 8125, 9442, 9802.

This list was obtained by a recalculation and comparison with two other tables:

P. SEELING, "Ueber die Auflösung der Gleichung $x^2 - Ay^2 = \pm 1$ in ganzen Zahlen, wo A positiv und kein vollständig Quadrat sein muss," *Archiv Math. Phys.*, v. 52, 1871, p. 48–49.

° W. Patz, *Tafel der regelmässig Kettenbrüche für Quadratwurzeln aus den natürlichen Zahlen* 1–10000. Leipzig, 1941. Errata were found in these tables as follows:

Seeling: *Insert* 3802; *delete* 4717.

Patz: The diamond sign is printed one line too low at 6938, 6949, 6953, 9698.

N. G. W. H. Beeger

Nicolaas Wirsenkade 10,
Amsterdam

UNPUBLISHED MATHEMATICAL TABLES

References have been made to unpublished tables in RMT **279** (Beeger); MTE **81** (Goodwyn); N **52** (NYMTP); QR **23** (Hillman & Salzer).

42[F].—N. G. W. H. Beeger, *Second List of Additions* to *Binomial Factorisations*, Manuscript table of 5 p. in possession of D. H. L.

The title refers to A. J. C. Cunningham's extensive *Binomial Factorisations* in 9 v., London, 1923–1929. The first list of additions was prepared by Beeger in 1933 and published under the title *Supplement to Binomial Factorisations by the late Lt.-Col. Allan J. C. Cunningham, R.E. vol. I to IX*, by the London Mathematical Society, London, 1933. The present second list gives the factorizations of 81 numbers left unfactored in v. 1 and v. 2 and the 1933 Supplement.

D. H. L.

43[F].—Hansraj Gupta, Three ms. tables in possession of the author at Government College, Hoshiarpur, India.

(a) Tables of partitions giving the values of $p(n, m)$, the number of partitions of n into exactly m non-zero summands for values of $n \leqslant 200$. This table gives also the number of partitions of n in which the largest part is exactly m. [Compare *MTAC*, v. 1, p. 313–314.—Ed.]

(b) Tables of distributions giving the values of $u(m, a)$, the number of ways in which m different particles can be accommodated in exactly a similar cells. $m \leqslant 50$.

(c) The number of lattice points on the sphere $x^2 + y^2 + z^2 = n$, for values of $n \leqslant 10000$.

H. Gupta

44[F].—H. K. Hammer, *Tables of Periods of Reciprocals of Primes in Various Number Systems*. Typed mss. prepared by, and in possession of the author at 21 West Street, New York City 6. There are copies of these mss. in the Library of Brown University. 11 leaves + 35 leaves. 21 × 29.5 cm.

Each of the first 11 leaves is devoted to the periods of $1/p$, $p < 100$, in each one of the number systems with base 2(1)12. The number of integers in each period, t, varies from 1 to 96. The next 35 leaves contain the periods $1/p$, $p < 1000$ in the decimal notation; t varies from 1 to 982.

H. K. Hammer

Editorial Note: All of the periods listed on the last 35 leaves were included in those published by Henry Goodwyn in his *A Table of the Circles arising from the Division of a Unit or any other whole number, by all the integers from* 1 *to* 1024, *being all the Pure Decimal Quotients that can arise from this source*. London, 1823. Tables of the period of $1/p$, for $p < 1000$, were given by K. F. Gauss, in his *Werke*, v. 2, 1863, second ed., 1876, p. 412–434. A table of periods of $1/p$ to the base 2, for $p \leqslant 383$, has been given by G. Bellavitis, in R. Accad. Naz. d. Lincei, *Cl. d. Sci. fis., mat., e nat., Memorie*, s. 3, v. 1, 1877, p. 790–794.