QUERIES—REPLIES

15. Cube Roots (Q 11, p. 372). In Vega-Hülsse, *Sammlung mathematischer Tafeln*, Leipzig, 1840, or 1849, or 1865, there is a table, p. 476–575, which has square roots and cube roots for $x = [1(1)10000]$; square roots to 12D, cube roots to 7D. The desired function in this Query may be obtained by multiplying the cube roots from 1000 to 2000 by .046415888... = 10000$^{-1/3}$.

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Editorial Note: A cube-root table, of the same range as that of Vega-Hülsse, is given in editions of *Barlow’s Tables* printed before 1930.

16. Rounding-off Notation (Q 10, p. 335).—Devices to indicate something of the $n + 1$st place in an $n$-place table are desirable if the extra something is occasionally useful but generally to be ignored. For this purpose the high and low dots of Milne-Thomson & Comrie\(^1\) (e.g., $2\frac{1}{2} < 3 < 2\frac{3}{4}$, $3 < 3\frac{1}{2} < 4 < 3\frac{3}{4}$, etc.) are to be preferred to either of the uses of the $+$ sign referred to in Q 10, since the former usage leaves the last figure of the $n$-place table as it should be (i.e., rounded off).

As an example of the possible utility of the M.-T. & C. device we may consider the applicability of the *American Air Almanac* to surface navigation; it is said to be used in preference to the *American Nautical Almanac* already 80% of the time, at least in the U. S. Navy. It is generally accepted that the error of astronomical sights is probably of the order of 5 to 15 minutes, or nautical miles, in the air, 1 or 2 only at sea. In order not to increase these errors the ephemerides and correction tables are given to the nearest minute in the *Air Almanac*, to the nearest tenth of a minute in the *Nautical Almanac*. It is clear in the first place that the former will satisfy the normal demands of sea navigation, and secondly that the greatest accuracy obtainable would be satisfied by about a third of a minute, rather than a tenth, in the tables. Accordingly, the introduction of the high and low dots into the *Air Almanac*, together with the improvement of some of its correction tables,\(^3\) would give it the accuracy needed in the most refined sea navigation without affecting its convenience for air navigation.

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\(^1\) L. M. Milne-Thomson & L. J. Comrie, *Standard Four-Figure Mathematical Tables*, London, Macmillan, 1931.

\(^2\) W. J. Eckert, in “Air Almanacs,” *Sky and Telescope*, v. 4, p. 12–15, 17, Nov. 1944, shows that the French air almanac uses such a device, but one which, in the writer’s opinion, is inferior to that of Milne-Thomson & Comrie, because the last figure must be altered in some cases, when accuracy to the nearest minute only is desired.

\(^3\) The writer has discussed a new kind of “critical graph,” which is used in the same manner as a critical table but can be read to greater accuracy, if need be, in “The Air Almanac refraction tables,” U. S. Naval Institute, *Proc.* v. 70, Sept. 1944, p. 1140–1141; Univ. Calif., Los Angeles, *Astronomical Papers*, no. 5.

CORRIGENDA ET ADDENDUM

P. 305, J. Steiner 13, l. 1, for v. 1, read v. 11.

P. 391, 1. 16, 15, for $A = $ Airey, $C = $ Comrie, $M = $ Miller, read $A = $ Airey, $C = $ Comrie, $M = $ Miller.

P. 392, 1909, 28 Line 9, for $\pi^2$, and $\pi$, read $\Pi^2$, and $\Pi$.

P. 394, 1909, 138, l. 2, move A.M., 18 up to l. 1.

P. 397, l. 9 for $\gamma$, read $C$, and add: We here use $C = \ln \gamma$ for Euler’s constant, in place of the $\gamma$ commonly used by British writers.

P. 403, l. 3, for H. Böckh, read R. Böckh.