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 .04641 5888... = $10000^{-1/3}$.

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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 + 1st 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., $2\frac{1}{2} \leq$ **3.** $\leq 2\frac{5}{6}$ $\leq$ **3** $\leq 3\frac{1}{6} \leq$ **3˙** $\leq 3\frac{1}{2} \leq$ **4.** $\leq 3\frac{5}{6}$, 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*,[2] 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 1_2, l. 1, *for* v. 1, *read* v. 11.

P. 391, l. −16, −15, *for* A = Airey, C = Comrie, M = Miller, *read* A = Airey, C = Comrie, M = Miller.

P. 392, 1909, 28 Line 9, *for* π^2, and π, *read* Π^2, and Π.

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

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

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