36[A].—H. S. UHLER, *Exact values of n!*, $n = 201(1)300$. A photostat of a typed copy (20 leaves) is in the Library of Brown University.

This calculation is an extension of results in the booklet by this author, 12 Hawthorne Ave., Hamden 14, Conn., reviewed in *MTAC*, p. 312.

37[D].—*Table of (1/x) tan x*, manuscript prepared by, and in possession of, the Westinghouse Electric Corporation, Research Laboratories, East Pittsburgh, Pa.

In some computations on transmission line measurements it was found that a table of $(1/x) \tan x$ was necessary and this was computed for the following radian arguments: $x = [0(.0001).1(.001)3.15(.01)6.3(.1)10;\ 4D]$. For values of the parameter up to $x = 2$, the values of the tangent (to 8S) were taken from the NYMTP volume (1943; see *MTAC*, p. 178f), and for $x > 2$, from K. HAYASHI, *Fünfstellige Funktionentafeln*, Berlin, 1930, where $x = [0(.01)10;\ 5D]$. In this manuscript each value of the argument is followed by the value of tan in the table used, followed by the 4-place value of $(1/x) \tan x$. The only previously published table of this function appears to have been the one in JAHNKE & EMDE, *Tables of Functions*, $x = [0(.01)3.14;\ 4\text{–}5S]$.

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EDITORIAL NOTE: Since Hayashi's table referred to above, is only 5-place, a 4-place table derived from it must be uncertain in the last figure; but furthermore, all of Hayashi's tables are unreliable. If the NYMTP volume for $\tan x$, $x = [2(\cdot 1)10;\ 10D]$, p. 402–403, had been used, much greater security would have been achieved. Then Hayashi's 10-place table of $\tan x$, *Sieben- und mehrstellige Tafeln der Kreis- und Hyperhelfunktionen . . .*, Berlin, 1926, $x = 2(\cdot 01)6\cdot 3$, p. 128(2)180, could be employed for filling in the remaining gap.

38[A].—J. W. WRENCH Jr., $\pi^{\pm n}$.

This table of $\pi^{\pm n}$, $n = 1(1)110$, was calculated by involution of π and $1/\pi$, to 206S at least, and corresponding powers were checked by multiplication to yield a product differing from unity by less than 10^{-206}. Incidentally, the value of π^2 as computed by H. S. UHLER to 262D and my approximation of π^{-1}, correct to 253D, appeared in Nat. Acad. Sci., *Proc.*, v. 24, 1938, p. 29; see *MTAC*, p. 55. Subsequently, I extended the approximation of π^{-1} to 358D.

Upon collation of my results with those given by PETERS & STEIN, *Anhang*, p. 2, of PETERS *Zehnstellige Logarithmentafel*, v. 1, Berlin, 1922, it was found that their tables of $\pi^{\pm n}$, $n = [1(1)32;\ 32S$ and $32D$ respectively$]$, are entirely free from error.

It is intended that the present table shall provide the basis for an extensive table of $\pi^n/n!$ to be used in evaluating various transcendental functions corresponding to rational multiples of π in the argument.

J. W. WRENCH, JR.

MECHANICAL AIDS TO COMPUTATION

16[Z].—F. J. MAGINNISS, "Differential analyzer applications," *General Electric Rev.*, v. 48, May, 1945, p. 54–59.

The paper presents a brief description of problems which have been treated on the differential analyzer at the General Electric Co. References to original publications are given for most of the problems outlined. Although the bibliography of papers describing applications is not complete, it is a useful selection covering a wide field of interest and is reproduced below.

H. P. KUEHNI & H. A. PETERSON, "A new differential analyzer," *Electrical Engineering*, 1944, p. 221–235, discussion p. 431; A.I.E.E., *Trans.*, v. 63, 1944. See *MTAC*, p. 430f.

V. Bush, "The differential analyzer: a new machine for solving differential equations," Franklin Institute *J.*, v. 212, 1931, p. 447–488.

Irven Travis, "Differential analyzer eliminates brain fag," *Machine Design*, July, 1935, p. 15–18.

Hans Kraft & Charles G. Dibble, "Some two-dimensional adiabatic compressible flow patterns," *J. Aeronautical Sci.*, v. 11, 1944, p. 283–298.

F. J. Maginniss & N. R. Schultz, "Transient performance of induction motors," A.I.E.E., *Trans.*, v. 63, 1944, p. 641–646, discussion p. 1458.

E. G. Keller, "An analytical theory of landing-shock effects on an airplane considered as an elastic body," *J. Appl. Mech.*, v. 11, Dec. 1944, p. A219–228; A.S.M.E., *Trans.*, v. 66.

C. Concordia, "Network- and differential-analyzer solution of torsional-oscillation problems involving nonlinear springs," *J. Appl. Mech.*, v. 12, Mar. 1945, p. A43–47; A.S.M.E., *Trans.*, v. 67.

C. Concordia and F. J. Maginniss, "Inherent errors in the determination of synchronous-machine reactances by test," *Electrical Engineering*, 1945, p. 288–294, A.I.E.E., *Trans.*, v. 64.

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J. G. Brainerd & C. N. Weygandt, "Unsymmetrical self-excited oscillations in certain simple nonlinear systems," I.R.E., *Proc.*, v. 24, 1936, p. 914–922.

G. Lemaitre & M. S. Vallarta, "On the allowed cone of cosmic radiation," *Phys. Rev.*, v. 50, 1936, p. 493–504.

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Hans Roder, "Effect of tuned circuits upon a frequency-modulated signal," I.R.E., *Proc.*, v. 25, 1937, p. 1617–1647.

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Edith Clarke, C. N. Weygandt, & C. Concordia, "Overvoltages caused by unbalanced short circuits; effect of amortisseur windings," *Electrical Engineering*, 1938, p. 453–466, discussion p. 468; A.I.E.E., *Trans.*, v. 57.

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C. Copple, D. R. Hartree, A. Porter & H. Tyson, "The evaluation of transient temperature distributions in a dielectric in an alternating field," I.E.E., *J.*, v. 85, 1939, p. 56–66.

C. CONCORDIA, S. B. CRARY & E. E. PARKER, "Effect of prime-mover speed governor characteristics on power system frequency variations and tie line power swings," *Electrical Engineering*, 1941, p. 559–567, discussion p. 734f; A.I.E.E., *Trans.*, v. 60.

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C. CONCORDIA, H. S. SHOTT & C. N. WEYGANDT, "Control of tie line power swings," *Electrical Engineering*, 1942, p. 306–313, discussion p. 395; A.I.E.E., *Trans.*, v. 61.

J. G. BRAINERD & H. W. EMMONS, "Effect of variable viscosity on boundary layers, with a discussion of drag measurements," *J. Appl. Mech.*, v. 9, 1942, p. A1–6; A.S.M.E., *Trans.*, v. 64.

S. H. C.

NOTES

40. CORRECT, BUT—!.—In H. LEVY & L. ROTH, *Elements of Probability*, Oxford, 1936, p. 80, is the following footnote: "For example, if $n = 10$, the error in replacing $(1 - 1/n)^{-n}$ by e does not affect the sixth decimal place." This is a footnote to the word "large" in the text statement, "If n is sufficiently large, $(1 - 1/n)^{-n}$ is approximately e. . . ."

The correct values of $(.9)^{-10}$ and e, to 9D, are respectively as follows: 2.867 97$\underline{1}$ 991 and 2.718 28$\underline{1}$ 828.

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EDITORIAL NOTE: It may be noted that LEVY & ROTH evidently did not carry out the necessary computations; perhaps they had in mind the well-known fact that when e is expressed as the infinite sum of reciprocals of successive factorials one needs to take only a few terms in order to obtain a fair approximation to the value of e. Indeed, if one confines one's self to $n = 10$, and carries out computations to 9D, then

$$e \doteq 1 + 1/1! + 1/2! + 1/3! + \cdots + 1/10!,$$

and the sum of the terms is 2.718 281 801. In other words, "if $n = 10$, the error in replacing $\sum_{n=0}^{10} 1/n!$ by e does not affect the sixth [or even the seventh] decimal place."

41. EARLY DECIMAL DIVISION OF THE SEXAGESIMAL DEGREE (see N **29**, p. 400f).—In our previous note on this topic we listed seven or eight editions of *De Thiende*, 1585, by Simon Stevin, including Norton's English translation. We forgot to give a reference to the English edition, 8 or 9, of VERA SANFORD, in *A Source Book in Mathematics*, ed. by D. E. SMITH, New York, 1929, p. 20–34. This was translated from no. 4, Girard's French edition of 1634.

R. C. A.

42. FIRST MORTALITY TABLE (see *MTAC*, p. 402f).—A facsimile of R. So. London, *Phil. Trans.*, 1693, p. 600, including Halley's first mortality table, is printed in *Isis*, v. 23, 1935, p. 16.

G. SARTON

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43. FRANCIS WILLIAM NEWMAN (1805–1897).—Newman was a younger brother of J. H. NEWMAN (1801–1890), the English cardinal. He had a brilliant career at Oxford where he obtained a double first in classics and