

table of natural functions. In no case is the last line of a page reproduced on the next page, so that in numerous cases one portion of a mantissa is at the bottom of the page and the remainder on the next page, in one instance requiring the leaf to be turned.

The natural function tables read down the page, while the log function tables read across, making the differences for the latter difficult of computation mentally. In the preface on page v, exponent is used for power, and  $10^5$  is given as 10000, also on page vii log 83.19 should be 1.920071. On page ix is found the objectionable form of negative characteristic with positive mantissa, also the symbol of identity to express "whose anti-log equals." On page x the reader learns that a negative number has no logarithm and that there are two kinds of logarithms, tabular and non-tabular; finally in these tables log cos  $72^\circ 25'$  must be taken as log cos  $72^\circ 24' 60''$ .

These tables are characterized by the almost complete absence of mechanical aids to the eye and are entirely unsuited to the use of the student or professional computer.

The following corrections should be noticed: broken type in log tan  $37^\circ 48' 50''$ ; log 8.140 should be .910624, a correction in the second digit which affects 170 logarithms following; log 8.760 should be .942504, similarly affecting 110 logarithms following. Isolated corrections are:

log sin $24^\circ 52' 20''$	9.623865	log tan $65^\circ 3' 20''$	10.332428
" " $31^\circ 22' 10''$	9.716466	" " $68^\circ 34' 20''$	10.406210
" " $38^\circ 38' 50''$	9.795549	nat sin $46^\circ 1'$	.719542
" " $48^\circ 54' 50''$	9.877212	" " $59^\circ 3'$	.857616
" " $50^\circ 2' 10''$	9.884483	" tan $57^\circ 36'$	1.57575
" " $61^\circ 3' 0''$	9.942029	" " $80^\circ 6'$	5.72974.
" " $81^\circ 14' 30''$	9.994906		

F. H. SAFFORD.

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#### NOTES.

THE April number (volume 18, number 2) of the *Transactions of the American Mathematical Society* contains the following papers: "Differential equations and implicit functions in infinitely many variables," by W. L. HART; "On the equivalence of écart and voisinage," by E. W. CHITTENDEN;

“On the theory of associative division algebras,” by OLIVE C. HAZLETT; “The converse of the theorem concerning the division of a plane by an open curve,” by J. R. KLINE; “On the conformal mapping of curvilinear angles. The functional equation  $\phi[f(x)] = a_1\phi(x)$ ,” by G. A. PFEIFFER; “Dynamical systems with two degrees of freedom,” by G. D. BIRKHOFF.

THE April number (volume 39, number 2) of the *American Journal of Mathematics* contains: “Fourier’s constants of functions of several variables,” by W. W. KÜSTERMANN; “Equations involving the partial derivatives of a function of a surface,” by C. A. FISCHER; “Invariants and covariants of the Cremona cubic surface,” by C. P. SOUSLEY; “The lines of electric force due to a moving electron,” by F. D. MURNAGHAN; “On inequalities of certain types in general linear integral equation theory,” by MARY E. WELLS; “A trigonometrical sum and the Gibbs’ phenomenon in Fourier’s series,” by H. S. CARSLAW; “On the relation between some important notions of projective and metrical differential geometry,” by F. M. MORRISON.

THE following advanced courses in mathematics are announced for the year 1917–1918.

COLUMBIA UNIVERSITY.—By Professor T. S. FISKE: Differential equations, four hours.—By Professor F. N. COLE: Theory of groups, three hours; Invariants and higher plane curves, three hours, first half-year.—By Professor JAMES MACLAY: Theory of geometric constructions, three hours, first half-year; Elliptic functions, three hours, first half-year.—By Professor C. J. KEYSER: Modern theories in geometry, four hours; Mathematics, three hours, second half-year.—By Professor D. E. SMITH: History of mathematics, two or three hours.—By Professor EDWARD KASNER, Seminar in differential geometry, two hours; (with Dr. C. A. FISCHER) Theory of functionals and integral equations, three hours, first half-year.—By Professor W. B. FITE: Differential equations, three hours, second half-year.—By Professor H. E. HAWKES: Differential geometry of curves, three hours, second half-year.

CORNELL UNIVERSITY.—By Professor J. McMAHON: Theory of probabilities, three hours; Introduction to actuarial science, three hours.—By Professor V. SNYDER: Projective geometry,

three hours.—By Professor F. R. SHARPE: Vector analysis with applications to physics, three hours (first term).—By Professor W. B. CARVER: Elementary theory of groups, three hours (second term); Synopsis of higher mathematics, three hours (with Dr. SILVERMAN).—By Professor A. RANUM: Differential geometry, three hours (first term).—By Professor D. C. GILLESPIE: Advanced calculus, three hours.—By Professor W. A. HURWITZ: Differential equations of physics, three hours.—By Professor C. F. CRAIG: Fourier series and the potential function, three hours; Teachers' course in mathematics, three hours.—By Professor F. W. OWENS: Mathematical physics, three hours.—By Dr. L. L. SILVERMAN: Infinite series, three hours.—By Dr. J. V. MCKELVEY: Algebraic curves, three hours.—By Mr. H. BETZ: Elementary differential equations, three hours.—By Dr. M. G. GABA: Theory of equations, three hours (first term).—By Dr. R. E. GILMAN: Advanced analytic geometry, three hours.

HARVARD UNIVERSITY.—By Professor W. F. OSGOOD: Advanced calculus, part II (second term), three hours; Infinite series and products (first term), three hours; Theory of functions, second course, three hours.—By Professor M. BÔCHER: Introduction to modern geometry and modern algebra, three hours; Algebra (second term), three hours.—By Professor C. L. BOUTON: Elementary differential equations (second term), three hours; Differential equations and Lie's theory, three hours.—By Professor J. L. COOLIDGE: Subject matter of elementary mathematics (first term), three hours; Probability (second term), three hours; Algebraic plane curves, three hours.—By Professor E. V. HUNTINGTON: Fundamental concepts of mathematics (first term), two or three hours.—By Professor H. N. DAVIS: Dynamics, three hours.—By Professor G. D. BIRKHOFF: Vector analysis (first term), three hours; Theory of heat and elastic vibrations (second term), three hours; Integral equations (first term), three hours.—By Professor D. JACKSON: Advanced calculus, part I (first term), three hours; Introduction to potential functions and Laplace's equation (first term), three hours; Developments in series (second term), three hours.—By Dr. G. M. GREEN: Theory of functions, three hours.—By Drs. G. M. GREEN and W. LER. HART: Differential geometry, three hours.—By Dr. W. LER. HART: Introduction to celestial mechanics (second term),

three hours.—By Dr. T. A. PIERCE: Theory of numbers (first term), three hours; Algebraic numbers (second term), three hours.

Professor Birkhoff will conduct a fortnightly seminary in analysis.

Courses of research are also offered by Professor Osgood in the theory of functions, by Professor Bôcher in the real solutions of linear differential equations, by Professor Bouton in the theory of point transformations, by Professor Coolidge in geometry, by Professor Birkhoff in the theory of differential equations, by Professor Jackson in the theory of functions of a real variable and by Dr. Green in differential geometry.

UNIVERSITY OF ILLINOIS.—All courses are three hours for the year except as otherwise indicated.—By Professor E. J. TOWNSEND: Functions of a complex variable; Differential equations and advanced calculus.—By Professor G. A. MILLER: Elementary theory of groups; Theory of equations and determinants (first semester).—By Professor H. L. RIETZ: Theory of statistics.—By Professor J. B. SHAW: General algebra.—By Professor C. H. SISAM: Algebraic surfaces; Solid analytic geometry (second semester).—By Professor A. EMCH: Projective geometry; Constructive geometry (second semester).—By Professor R. D. CARMICHAEL: Theory of linear difference equations.—By Professor A. R. CRATHORNE: Theory of mathematical instruments (second semester).—By Dr. E. B. LYTLE: Teacher's course (two hours, first semester); History of mathematics (two hours, second semester).—By Dr. A. J. KEMPNER: Modern algebra.

JOHNS HOPKINS UNIVERSITY.—By Professor F. MORLEY: Higher geometry, two hours; Theory of functions, two hours.—By Professor A. B. COBLE: Modular functions, two hours.—By Professor A. COHEN: Differential geometry, two hours; Theory of real functions, two hours.—By Dr. H. BATEMAN: Differential equations of physics, two hours.

PRINCETON UNIVERSITY.—By Professor H. B. FINE: Theory of functions of a complex variable, three hours.—By Professor L. P. EISENHART: Projective geometry, three hours; Calculus of variations, three hours (first term).—By Professor O. VEBLEN: Seminar, three hours.—By Professor E. P. ADAMS:

Analytic mechanics, three hours.—By Dr. J. W. ALEXANDER: Algebraic functions, three hours.—By Dr. G. A. PFEIFFER: Theory of functions of real variables, three hours.

YALE UNIVERSITY.—By Professor E. W. BROWN: Advanced calculus, three hours; Advanced dynamics, two hours.—By Professor J. PIERPONT: Theory of functions of a complex variable, two hours; Elliptic functions, two hours.—By Professor P. F. SMITH: Differential equations, two hours.—By Professor W. R. LONGLEY: Integral equations, two hours (second term); Potential theory and harmonic analysis (first term).—By Professor E. J. MILES: Calculus of variations, two hours.—By Professor J. I. TRACY: Modern analytic geometry, two hours.—By Dr. D. F. BARROW: Advanced algebra, two hours.—By Mr. W. L. CRUM: Statics and dynamics, two hours.—By Mr. J. K. WHITTEMORE: Differential geometry, two hours.

DEAN F. C. FERRY, of Williams College, has been elected president of Hamilton College.

PROFESSORS R. C. ARCHIBALD, FRANK MORLEY, and T. LEVI-CIVITA have been elected fellows of the American academy of arts and sciences.

AT the Massachusetts Institute of Technology, Professor E. B. WILSON has been appointed head of the department of physics.

AT Brown University assistant professor R. C. ARCHIBALD has been promoted to an associate professorship of mathematics.

MR. C. C. CAMP has been appointed professor of pure mathematics at Ottawa University.

DR. L. T. WILSON, of the University of Illinois, Mr. W. E. CURT, of Columbia University, and Dr. J. H. WEAVER, of West Chester, Pa., have been appointed instructors in mathematics at the U. S. Naval Academy.

PROFESSOR W. E. EDINGTON, of the University of New Mexico, and Mr. H. D. FRARY have been appointed assistants

in mathematics at the University of Illinois. Mr. R. E. BILLINGS has been appointed graduate assistant in mathematics.

At the University of Oklahoma, Dr. NATHAN ALTSHILLER has been promoted to an assistant professorship of mathematics.

Dr. J. W. NICHOLSON, for forty years professor of mathematics in the University of Louisiana and author of numerous textbooks, died on March 22.

Mr. W. C. WRIGHT, consulting actuary, died at his home in Medford, Mass., on April 23. Mr. Wright had been a member of the American Mathematical Society since 1898.

## NEW PUBLICATIONS.

### I. HIGHER MATHEMATICS.

- ALONSO-MISOL (F.). Elementos de las teorías de funciones y derivadas. Libro I. 2a edición. Madrid, Fortanet, 1916. Pes. 15.00
- BOREL (E.) and VOLTERRA (V.). Lectures delivered at the formal opening of the Rice Institute: Aggregates of zero measure and Monogenic uniform non-analytic functions by E. Borel and The generalization of analytic functions and On the theory of waves and Green's functions by V. Volterra. Translated into English by G. C. Evans and P. J. Daniell. (*Rice Institute Pamphlet*, Vol. 4, No. 1.) Houston, Rice Institute, 1917. 117 pp.
- CAUCHY (A.). Œuvres complètes. 2e série, Tome 12: Nouveaux exercices d'analyse et de physique, Tome 2. Paris, Gauthier-Villars, 1916. 4to. 472 pp. Fr. 25.00
- DANIELL (P. J.). See BOREL (E.).
- EVANS (G. C.). See BOREL (E.).
- GALDEANO (Z. G. DE). Tratado general de matemáticas. Zaragoza, Casañal, 1916. 8vo. 112 pp. Pes. 2.50
- LEVI (B.). Introduzione alla analisi matematica. I: Teorie formali. Paris, Hermann; Parma, presso l'autore (Napoli, B. de Rubertis), 1916. 8vo. 482 pp. L. 15.50
- LIBBY (W.). An introduction to the history of science. Boston, Houghton-Mifflin, 1917. 8vo. 12+288 pp.
- LICKS (H. E.). Recreations in mathematics. New York, Van Nostrand, 1917. 8vo. 162 pp. \$1.25