

example, of the classes considered, the negro males have the highest mortality, and the white females from the rural population have the lowest mortality. The tables give as the complete expectation of life at birth for the male negro 34.05 years and for the rural female 57.35 years. The average death rate per thousand of the total population of the former is 29.37 while that of the latter is 17.44. As another striking illustration, we note that white males in cities have a complete expectation at birth of 47.32 years and an average death rate per 1,000 of 21.13, while the rural white males have a corresponding expectation of 55.06 years, and an average death rate per thousand of 18.16.

These tables may well become standard for certain civil purposes, such as the valuation of life estates, where there does not exist the selection of lives such as is involved in the data on which life insurance tables are based.

H. L. RIETZ.

NOTES.

THE March number (series 2, volume 18, number 3) of the *Annals of Mathematics* contains the following papers: "Symmetric functions formed by systems of elements of a finite algebra and their connection with Fermat's quotient and Bernoulli's numbers," by H. S. VANDIVER; "The generalized Lagrange indeterminate congruence for a composite ideal modulus," by H. S. VANDIVER; "On the congruence $cx^\lambda + 1 \equiv dy^\lambda$ in a Galois field," by H. H. MITCHELL; "On the geodesics and geodesic circles on a developable surface," by W. C. GRAUSTEIN; "Note on representations of the partial sum of a Fourier's series," by DUNHAM JACKSON; "Acknowledgment," by FRANK IRWIN; "Certain general properties of functions," by HENRY BLUMBERG.

Under an arrangement by which the Mathematical Association of America will contribute to its financial support, the *Annals* will enlarge its annual volume by 100 pages, which will be devoted to expository and historical papers. The subscription price, beginning with volume 19, will be \$3.00, with a reduction of one half to members of the Association.

THE November, 1916, number (volume 2, number 11) of the *Proceedings of the National Academy of Sciences* contains

the following mathematical papers: "A set of independent postulates for cyclic order," by E. V. HUNTINGTON; "Certain general properties of functions," by HENRY BLUMBERG. The February and March, 1917, numbers (volume 3, numbers 2 and 3) contain: "Natural and isogonal families of curves on a surface," by JOSEPH LIPKA; "Some problems of Diophantine approximation: the series $\Sigma e(\lambda_n)$ and the distribution of the points $(\lambda_n \alpha)$," by G. H. HARDY and G. E. LITTLEWOOD; "A note on the fitting of parabolas," by J. R. MINER; "The complete enumeration of triad systems in 15 elements," by F. N. COLE, L. D. CUMMINGS, and H. S. WHITE.

AT the meeting of the London mathematical society held on January 18 the following papers were read: By G. H. HARDY and S. RAMANUJAN: "Asymptotic formulas in combinatory analysis"; by M. J. M. HILL: "The singular solutions of ordinary differential equations of the first order"; by H. BATEMAN: "The nature of a moving electric charge and its lines of electric force"; by L. J. ROGERS: "The expansion of the variables of a hypergeometric equation in terms of the ratio of two solutions"; by H. J. PRIESTLEY: "A problem in the theory of diffraction."

THE Swiss mathematical society held its regular summer meeting at Schuls (Engadine) August 6-9, 1916. The following papers were presented: By L. CRELIER: "The power of a line"; by O. SPIESS: "Closure problems for convex curves"; by C. CAILLER: "On imaginary ruled geometry"; by W. H. YOUNG: "Multiple integrals and Fourier series"; by GRACE C. YOUNG: "On the curves of Cellérier and Weierstrass"; by F. RUDIO: "Report on the new edition of Euler"; by M. GROSSMANN: "The completion of the general theory of relativity"; by H. WEYL: "The problem of analysis situs"; by L. G. DU PASQUIER: "On generalized arithmetic"; by G. PÓLYA: "A counterpart of the Liouville approximation theorem in the theory of differential equations"; by O. BERLINER: "On a projective natural geometry"; by K. MERZ: "Historical note on the Steiner surface"; by W. H. YOUNG and GRACE C. YOUNG: "The structure of functions of several variables"; by O. BLOCH: "On the geometry of the Gauss number plane."

AT the annual meeting of the Paris academy of sciences held on December 21, the following prizes were awarded in pure and applied mathematics:

As no satisfactory memoir was received on the problem set in 1915, the Grand prize was not awarded. But a prize of 2,000 francs was given to Professor N. E. NÖRLUND, of the University of Lund, for his contributions to the theory of linear equations in finite differences. The de Parville prize (1500 francs) was awarded to Professor L. TORRES, of Madrid, for his calculating machine for solving algebraic equations and other mechanisms invented by him. The prize in history and philosophy of the sciences (1,000 francs) was given to Professor J. BENSUAUDE, of Lisbon, for his book on nautical astronomy in Portugal during the great exploration period. The Francoeur prize (1,000 francs) was awarded to the late Professor L. COUTURAT, of the Collège de France, for his mathematical works. The Poncelet prize (2,000 francs) was awarded to Professor C. J. DE LA VALLÉE-POUSSIN, of the University of Louvain, for his mathematical works. The Lalande, Valz, and Janssen prizes in astronomy were divided among J. E. COGGIA, G. BOCCARDI, CH. FABRY, H. BUISSON, and H. BOURGET.

The following prizes are offered under the usual conditions, the awards to be made in December, 1917: Poncelet prize (2,000 francs) for a memoir in pure mathematics; Francoeur prize (1,000 francs) for the best essay in pure or applied mathematics; Montyon prize (700 francs) for the best practical application of mathematics; Fourneyron prize (1,000 francs) for the most meritorious investigation of ball bearings. The problem set for 1916 is also repeated: the most important improvement of motors used in aviation. The Boileau prize (1,300 francs) for theoretical and experimental progress in hydraulics; de Parville prize (1,500 francs) for a contribution to mechanics; Lalande prize (540 francs) and Valz prize (460 francs) for researches in astronomy; Grand prize (3,000 francs) for the best essay on the problem: "To improve in an important point the study of the successive powers of the same substitution, as the exponent of the power increases indefinitely;" Le Conte prize (50,000 francs) for work in mathematics (one eighth may be used for encouragement, and seven eighths in one or more prizes for results). The general prizes include, for recognition of mathematical accomplishment without more detailed specification, the following: Houllévigie prize (5,000 francs), Wilde prize (4,000 francs) and Jérôme Ponti prize (3,500 francs).

THE biennial Ackermann-Teubner prize (1,000 M) has been awarded to Professor E. ZERMELO, of the University of Zürich, for his investigations of the theory of sets, particularly for his memoir of 1907 on well ordered sets.

THE following university courses in mathematics are announced:

COLLÈGE DE FRANCE: (December 1, 1916–March 25, 1917).—By Professor G. HUMBERT: Abelian functions of two variables, two hours.—By Professor J. HADAMARD: Partial differential equations and the problem of Cauchy, two hours.—By Dr. M. BRILLOUIN (from January 2): Internal structure of the earth according to geodesy and seismology, two hours.—By Dr. L. LANGEVIN: Principle of relativity and the theory of gravitation, two hours.

COLUMBIA UNIVERSITY (summer session, July 9–August 17).—By Professor JAMES MACLAY: Fundamental mathematical concepts, five hours; Theory of geometric constructions, five hours; Theory of numbers, five hours.—By Professor EDWARD KASNER: Differential geometry, five hours; Theory of functions of a complex variable, five hours.—By Professor W. B. FITE: Projective geometry, five hours; Higher algebra (Galois theory of equations), five hours.

CORNELL UNIVERSITY (summer session, July 9–August 17).—By Professor V. SNYDER: Foundations of elementary mathematics, five hours; Ruler and compasses, five hours.—By Professor C. F. CRAIG: Higher analysis, five hours.—By Professor F. W. OWENS: Projective geometry, five hours. Professors SHARPE, CARVER, GILLESPIE, HURWITZ and Drs. McKELVEY and SILVERMAN will conduct a mathematical conference weekly.

UNIVERSITY OF PENNSYLVANIA (summer session, July 9–August 18).—By Professor G. H. HALLETT: Higher calculus, five hours.—By Professor R. L. MOORE: Foundations of geometry, five hours.—By Dr. F. W. BEAL: Continuous groups, five hours.

UNIVERSITY OF PENNSYLVANIA (academic year 1917–18).—By Professor E. S. CRAWLEY: Higher plane curves, two

hours.—By Professor G. E. FISHER: Functions of a complex variable, two hours.—By Professor I. J. SCHWARTZ: Infinite series and products, two hours.—By Professor G. H. HALLETT: Finite groups, two hours.—By Professor F. H. SAFFORD: Partial differential equations, two hours.—By Professor M. J. BABB: Theory of numbers, two hours.—By Professor G. G. CHAMBERS: Synthetic projective geometry, two hours.—By Professor O. E. GLENN: Calculus of variations (second semester), two hours.—By Professor H. H. MITCHELL: Algebraic numbers, two hours.—By Professor R. L. MOORE: Foundations of mathematics, two hours.—By Dr. F. W. BEAL: Differential geometry, two hours.

PROFESSOR C. J. DE LA VALLÉE-POUSSIN, of the University of Louvain, has been elected a foreign associate of the Royal society of Naples.

DR. A. TERRACINI has been appointed instructor in analytic geometry in the University of Turin.

PROFESSOR A. M. HARDING, of the University of Arkansas, has been promoted to a full professorship of mathematics.

AT Harvard University the two Benjamin Peirce instructorships have been filled for the coming year by the reappointment of Dr. W. L. HART and the appointment of Dr. T. A. PIERCE. Mr. B. H. BROWN and Mr. J. L. WALSH have been appointed instructors in mathematics. Dr. L. R. FORD, of the University of Edinburgh, has been appointed instructor in actuarial mathematics.

DR. G. R. CLEMENTS, of the University of Wisconsin, has been appointed instructor in mathematics in the U. S. Naval Academy.

PROFESSOR WILLIAM BEEBE, of Yale University, died March 11 at the age of sixty-six years.