

geometric progressions (Chapter XIV). In Chapter XVII (Sequences and Limits), limits of variables are defined and discussed. This fourteen page chapter contains also explanations of the derivative of a power function, of the geometric interpretation of the derivative, and of maxima and minima.

A more detailed study of these texts will, of course, reveal other interesting material, and it will deepen the reader's conviction that the second book follows the traditional lines more closely and that, while the authors of the first and third texts differ radically from one another in their aims, each has succeeded in presenting an attractive book that has a distinct place.

E. B. COWLEY.

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#### NOTES.

THE twenty-seventh summer meeting and ninth colloquium of the American Mathematical Society will be held at the University of Chicago, extending through the week September 6-11. The regular sessions of the Society and also those of the Mathematical Association of America will occupy the first days of the week, without conflict of hours. The joint dinner will be held on Tuesday evening. The Colloquium will open on Wednesday and extend to Saturday noon. It will consist of two courses of five lectures each by Professors G. D. BIRKHOFF, of Harvard University, and F. R. MOULTON, of the University of Chicago. Titles and principal topics of the lectures follow:

Professor BIRKHOFF: "Dynamical systems." The last forty years have witnessed fundamental advances in the theory of dynamical systems, achieved by Hill, Poincaré, Levi-Civita, Sundman, and others. The lectures will expound the general principles underlying these advances, and will point out their application to the problem of three bodies as well as their significance for general scientific thought. The following topics will be treated:

Physical, formal, and computational aspects of dynamical systems. Types of motions such as periodic and recurrent motions, and motions asymptotic to them. Interrelation of types of motion with particular reference to integrability and

stability. The problem of three bodies and its extension. The significance of dynamical systems for general scientific thought.

Professor MOULTON: "Certain topics in functions of infinitely many variables." I. On the definition and some general properties of functions of infinitely many variables. II. On infinite systems of linear equations. III. Infinite systems of implicit functions. IV. Infinite systems of differential equations. V. Applications to physical problems.

It is announced that an international congress of mathematicians from the Entente and approved neutral countries will be held at Strasbourg, opening on September 22, 1920. The congress will divide into the usual four sections, with convenient subdivisions. A detailed programme, with information regarding transportation, hotels, receptions and excursions will be issued later. The membership fee is sixty francs, payable to M. Valiron, treasurer of the congress, 52 Allée de la Robertsau, Strasbourg. Each member will receive a copy of the published proceedings of the congress, which will contain at least a summary of papers and transactions. A member can obtain additional cards for his family at thirty francs each.

Information regarding the congress can be obtained from Professor G. KOENIGS, general secretary of the French national committee of mathematicians, 96 Boulevard Raspail, Paris. Titles of papers intended for presentation at the congress should be in Professor Koenigs' hands by July 1.

THE opening (January) number of volume 42 of the *American Journal of Mathematics* appears in a new dress. Sylvester's quarto page, luxurious margins, and large type are now a memory of the past. The number contains the following papers: "Groups of order  $2^m$ " which contain a relatively large number of operators of order two," by G. A. MILLER; "The Green's function for a plane contour," by H. D. FRARY; "On the solution of certain types of linear differential equations in infinitely many variables," by W. G. SIMON; "Periodic orbits on a surface of revolution," by DANIEL BUCHANAN.

AT the meeting of the London mathematical society on

January 15, the following papers were read: By P. A. MACMAHON, "The divisors of numbers"; by H. STEINHAUS, "Fourier coefficients of bounded functions"; by S. P. OWEN, "The lag of a thermometer in a medium whose temperature is a linear function of the time."

At the meeting of February 13, papers were read by G. S. LEBEAU, "A property of polynomials whose roots are real"; by the late E. K. WAKEFORD, "Canonical forms"; by E. LANDAU and A. OSTROWSKI, "A problem of Diophantine analysis"; by G. H. HARDY and J. E. LITTLEWOOD, "The zeros of Riemann's zeta function."

At the meeting of the Edinburgh mathematical society on February 13, the following papers were read: By T. M. MACROBERT, "On the modified Bessel function  $K_n(z)$ "; by E. M. HORSBURGH, "A radial transparent scale for use with an abacus"; by W. A. BARCLAY, "Nomograms for financial formulae."

At the meeting of March 12, papers were read by C. TWEE-DIE, "The life of James Stirling, the Jacobite mathematician, with exhibition of autograph letters by N. Bernoulli, Clairaut, Cramer, Euler, Maclaurin, and Stirling"; by J. MITCHELL, "On the arrangement of the signs of the terms in a certain double series given by Arndt."

THE following university courses in mathematics are announced for the summer session:

UNIVERSITY OF CHICAGO (first term, June 1 to July 28; second term, July 29 to September 3). By Professor E. H. MOORE: Hermitian matrices of positive type in general analysis, four hours; Limits and series, four hours, first term only.—By Professor G. A. BLISS: Functions of a complex variable, four hours.—By Professor L. E. DICKSON: Theory of matrices and bilinear quadratic forms, four hours; Theory of numbers, four hours.—By Professor M. W. HASKELL: Projective geometry, four hours; Topics in analytic geometry, five hours.—By Professor J. W. A. YOUNG: Theory of equations, four hours.—By Professor E. W. CHITTENDEN: Differential equations, four hours.—by Professor W. D. MACMILLAN: Celestial mechanics II, four hours.

THE Society of sciences of Göttingen announces the following prize problem for the year 1921: Riemann conjectured

that all the non-negative zeros of the zeta function have their real part equal to one half; a proof or disproof of this is desired, or other important discoveries with regard to the location of the roots of the Riemann zeta function or related functions. Competing memoirs should be sent to the Society before August 1, 1921. The prize is 1000 marks.

THE Prince Jablonowski Society of Leipzig announces as the subject of its prize memoir for 1921 a certain type of generalization of the addition theorem for elliptic functions. Further information can be obtained from the Society, to which competing memoirs should be sent before October 31, 1921. The prize is 1500 marks.

THE prize of the Peter Wilhelm Müller Foundation, which is awarded every three years for achievement in some one of the arts or sciences, was assigned to mathematics in 1918, and was divided between D. HILBERT, for his entire mathematical work, and A. EINSTEIN, for his work in mechanics, especially in relativity and gravitation theory.

PROFESSORS O. PERRON, of the University of Heidelberg, and I. SCHUR, of the University of Berlin, and Dr. H. WIELEITNER have been elected members of the K. Leopoldinisch-Carolinischen Deutschen Akademie der Naturforscher in Halle.

PROFESSORS L. POCHHAMMER, of the University of Kiel, and A. WANGERIN, of the University of Halle, have retired from active teaching.

A JOINT committee has been appointed by Cambridge University and the Royal Society of London for the purpose of taking steps to secure an appropriate memorial to the late Lord RAYLEIGH.

MR. W. J. HARRISON has been appointed university lecturer in mathematics at Cambridge University.

PROFESSOR JACQUES HADAMARD delivered a series of three lectures on "The first years of the work of Poincaré" at the Rice Institute in March.

THE French government has conferred the decoration "Officier de l'instruction publique" upon Professor E. B. VAN VLECK, of the University of Wisconsin, in recognition of his services as teacher and investigator and for his work during the war.

PROFESSOR ALFRED BAKER, of the department of mathematics of the University of Toronto, has retired, after forty-four years of service. Professor A. T. DELURY succeeds him as head of the department. Mr. I. R. POUNDER has been promoted to an assistant professorship of mathematics.

PROFESSOR W. W. LANDIS, of Dickinson College, has returned to his academic work with the honorary rank of major in the Italian army, conferred on him in recognition of his work as a Y. M. C. A. secretary in Italy during the war.

AT Cornell University, Professor JAMES McMAHON has been granted leave of absence for the year 1920-1921, Professor ARTHUR RANUM for the first term, and Professor F. R. SHARPE for the second term. Mr. D. S. MORSE, of Union College, Professor W. L. G. WILLIAMS, of William and Mary College, and Mr. H. PORITZKY have been appointed instructors in mathematics.

PROFESSOR J. L. JONES, of Syracuse University, has been appointed head of the department of mathematics at Akron University.

AT the College of the City of New York, Mr. J. A. BREWSTER has been promoted to an assistant professorship of mathematics, and Mr. W. A. WHYTE to an instructorship in mathematics.

AT the University of Maine, Mr. A. S. PRATT, of Brown University, has been appointed instructor in mathematics, and Mr. J. P. BALLANTINE, of Harvard University, instructor in mathematics and physics.

MR. Y. H. HO, fellow in mathematics at Cornell University, died February 22, 1920, at the age of twenty-seven years. He was elected to membership in the American Mathematical Society in 1919.