enough to claim the admiration, of the most nonchalant reader. Much as the author's scientific economics appeals to us, we must say that his sturdy vision into society and social evolution are even more to our liking; and there can be little doubt that for many of us, mathematicians or otherwise, the most inspired portions of Pareto's Manuel will be the societology of Chapters II and IX.

In closing this review it may be only proper to apologize a bit for its tardiness. At the same time we may perhaps point out that it is now while we are in the midst of modifying constitutions, whether actually or under various disguises such as preferential primaries or judicial rule of reason, while we are attacking or about to attack the formerly sacred institution of private property, under many a pretext other than the real one that might makes right, now while we in America are perhaps more than ever conscious of our present or impending social evolution is the time when we may derive the most benefit from having our attention called to Pareto's observations on the ills that beset us. As for the mathematical economics, that is still good, and still will be good at any time when we may settle down to study it.

EDWIN BIDWELL WILSON.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

NOTES.

THE programme of the Fifth international congress of mathematicians at Cambridge, England, begins on Wednesday evening, August 21, with a reception of the members in the Hall of St. John's College. The opening meeting will be held on Thursday morning and the afternoon will be devoted to organisation, election of officers, and two of the special lectures. On the following days sectional meetings will be held in the morning and lectures will be delivered in the afternoon. The congress will divide into four sections: I. Arithmetic, algebra, analysis; II. Geometry; III. Mechanics, physical mathematics, applications; IV. Philosophical, historical, and didactic questions. In connection with Section IV three discussions inaugurated by the International commission on the teaching of mathematics will be held. The sections will be further subdivided as the number of papers may require.

The following special lectures are announced: M. BÔCHER: "Boundary problems in one dimension." E. BOREL: "Définition et domaine d'existence des fonctions monogènes uniformes." E. W. BROWN: "Periodicity in the solar system." F. ENRIQUES: "I problemi relativi ai principii della geometria." B. GALITZIN: "The principles of instrumental seismology." E. LANDAU: "Gelöste und ungelöste Probleme aus der Theorie der Primzahlverteilung und der Riemannschen Zeta-funktion." J. LARMOR: "The dynamics of radiation." W. H. WHITE: "The place of mathematics in engineering practice."

Members of the congress unaccompanied by ladies can be accommodated in the colleges at a fixed payment of 6s. per day for rooms, attendance, breakfast, and dinner. Luncheon will be provided at 1s. 6d. Ladies will be received at Newnham College at 6s. per day for rooms, attendance, and meals. Members desiring accommodation in the Colleges are requested to notify the general secretary, Professor E. W. Hobson, Christ's College, before August 1. The fee for membership in the congress is £1. The family of a member are entitled to the privileges of membership, except the receipt of a copy of the Proceedings, on payment of 12s. each.

AT the meeting of the London mathematical society held on April 17 the following papers were read: By H. S. Carslaw "An application of the theory of integral equations to the equation $\nabla^2 u + k^2 u = 0$"; by A. Cunningham, "On Mersenne's numbers."

THE following university courses in mathematics are announced for the year 1912–1913:

UNIVERSITY OF CHICAGO. All courses are four hours a week.—By Professor E. H. MOORE: Integral equations in general analysis; General seminar on mechanical quadrature, continued fractions, and boundary problems (throughout the year).—By Professor G. W. MYERS: History of mathematics (winter).—By Professor L. E. DICKSON: Theory of invariants (autumn and winter); Theory of numbers (winter); Theory of equations and linear algebras (spring).—By Professor J. W. A. YOUNG: Limits and series (winter).—By Professor H. E. SLAUGHT: Differential equations (autumn).—By Professor G. A. BLISS: Theory of functions (autumn); Definite integrals and

abelian integrals (winter); Hyperelliptic functions (spring).—
By Professor E. J. WILCZYNSKI: Selected topics in geometry
(autumn and winter); Projective differential geometry (spring).
—By Professor A. C. LUNN: Graphical analysis and theory of
attraction and potential (autumn); Fourier series and Bessel's
functions and vector analysis (spring).

CLARK UNIVERSITY.—By Professor W. E. STORY: Analytic
geometry of higher plane curves, higher surfaces, and twisted
curves, three hours; Calculus of operations and finite differ-
ences, three hours; Theory of errors, three hours first half-year;
Infinitesimal geometry, three hours second half-year; Semi-
nar.—By Professor H. TABER: Theory of functions, five
hours; Integral equations, two hours first half-year; Hyper-
complex number systems, two hours second half-year; Semi-
nar.—By M. DE PEROTT: Theory of numbers, two hours
first half-year; Abelian integrals, two hours second half-year.

HARVARD UNIVERSITY.—By Professor W. E. BYERLY: Ad-
vanced calculus, three hours; Dynamics of a rigid body, three
hours; Trigonometric series, introduction to spherical har-
monics and the potential function, three hours, with Professor
B. O. PEIRCE.—By Professor W. F. OSGOOD: Advanced al-
gebra, three hours (second half year); Theory of functions,
second course, three hours.—By Professor M. BÔCHER: Ordi-
nary linear differential equations, three hours.—By Professor
C. L. BOUTON: Elementary theory of differential equations,
three hours (first half year); Geometric transformations,
three hours.—By Professor E. V. HUNTINGTON: Fundamental
concepts of mathematics, three hours (second half year).—
By Professor J. L. COOLIDGE: Introduction to modern geom-
etry and modern algebra, three hours; Geometry of the circle,
three hours.—By Professor G. D. BIRKHOFF: Theory of func-
tions, first course, three hours; Calculus of variations, three
hours (first half year).—By Dr. D. JACKSON: Infinite series
and products, three hours (first half year); Definite integrals,
three hours (second half year).

Various courses in reading and research are also offered on
special topics, and Professors OSGOOD and BIRKHOFF will
conduct a fortnightly seminar in the theory of functions.

UNIVERSITY OF ILLINOIS.—By Professor E. J. TOWNSEND:
Complex variables, three hours.—By Professor G. A. MILLER:

Elementary group theory, three hours.—By Professor H. L. RIETZ: Actuarial theory, three hours (first term).—By Professor C. H. SISAM: Differential geometry, three hours.—By Professor J. B. SHAW: Fourier series, three hours.—By Professor A. EMCH: Elliptic functions, three hours.—By Dr. A. R. CRATHORNE: Linear differential equations, three hours.—By Dr. R. L. BÖRGER: Modern algebra, three hours.—By Dr. E. B. LYTLE: History of mathematics, three hours.

INDIANA UNIVERSITY.—By Professor S. C. DAVISSON: Ordinary differential equations (a, w), three hours; Fourier's series (s), three hours; Theory of functions (a, w, s), two hours.—By Professor D. A. ROTHROCK: Advanced calculus (a, w, s), three hours; Higher geometry (a, w), three hours.— By Professor U. S. HANNA: Theory of errors (a), three hours; Substitution groups and Galois theory (w, s), three hours.— By Professor R. D. CARMICHAEL: Functions of an infinite number of variables (a, w), three hours; Partial differential equations (a, w), three hours; Theory of numbers (s), five hours; Seminar in difference equations (a, w, s), two hours.
 (a, w, s=autumn, winter, spring quarters.)

JOHNS HOPKINS UNIVERSITY.—By Professor F. MORLEY: Higher geometry, two hours; Dynamics, two hours (second term); Seminar, two hours.—By Professor A. B. COBLE: Theory of correspondences, two hours; Theory of probabilities, two hours (second term).—By Professor A. COHEN: Theory of functions, two hours; Differential equations, two hours (first term); Theory of numbers, two hours (second term).—By Mr. H. BATEMAN: Integral equations, two hours.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY.—By Professor H. W. TYLER: Elements of the theory of functions, two hours.—By Professor F. S. WOODS: Partial differential equations, two hours.—By Professor F. H. BAILEY: Fourier series, two hours.—By Professor E. B. WILSON: Advanced calculus and differential equations, three hours; Hydrodynamics, one hour; Theoretical mechanics, two hours; Mathematics of wireless telegraphy, two hours.—By DR. H. B. PHILLIPS: Thermodynamics, two hours.—By DR. F. L. HITCHCOCK: Curve tracing, two hours; Elementary theory of the potential function, two hours.

PRINCETON UNIVERSITY.—By Professor H. D. THOMPSON: Analytic geometry, three hours; Infinitesimal geometry, three

hours.—By Professor L. P. EISENHART: Differential geometry, three hours; Mechanics, three hours.—By Professor O. VEBLEN: Algebra, three hours; Seminar, three hours.—By Professor J. G. HUN: Analytic projective geometry (second term), three hours.—By Professor E. SWIFT: Calculus of variations (second term), three hours.—By Professor J. H. McL. WEDDERBURN: Theory of functions of a complex variable, I (first term), three hours.

THE following courses are announced for the summer session of 1912:

UNIVERSITY OF CHICAGO.—All courses are four hours a week. —By Professor E. H. MOORE: Integral equations, first term; General analysis, first term.—By Professor E. J. WILCZYNSKI: Synoptic course in advanced mathematics; Higher geometry. —By Professor A. C. LUNN: Graphical analysis; Units and dimensions; Vector analysis.—By Professor E. R. HEDRICK: Definite integrals; Theory of functions of a complex variable. —By Professor G. A. MILLER: Finite groups.

COLUMBIA UNIVERSITY.—By Professor JAMES MACLAY: Theory of functions of a complex variable.—By Professor M. W. HASKELL: Modern analytic geometry.—By Professor W. B. FITE: Theory of groups of finite order.

CORNELL UNIVERSITY.—All courses are five times a week. —By Professor V. SNYDER: Projective geometry.—By Professor W. B. CARVER: Teachers' course in geometry.—By Dr. C. F. CRAIG: Differential equations.—By Dr. F. W. OWENS: Teachers' course in algebra.

INDIANA UNIVERSITY.—By Professor S. C. DAVISSON: Ordinary differential equations, five hours, first half-quarter.— By Professor D. A. ROTHROCK: Advanced calculus, five hours; Higher plane curves, three hours.—By Professor R. D. CARMICHAEL: Linear differential equations, five hours; Infinitesimal analysis, three hours; Difference equations, two hours.

PROFESSOR G. KOWALEWSKI, of the technical school at Prague, has accepted a professorship of mathematics at the German University of Prague.

DR. R. COURANT has been appointed docent in mathematics at the University of Göttingen.

DR. HOSTINSKY has been appointed docent in mathematics at the Bohemian University of Prague.

DR. F. PFEIFFER has been appointed docent in mathematics at the technical school at Danzig.

PROFESSOR P. APPELL, of the University of Paris, has been elected a corresponding member of the academy of sciences of St. Petersburg.

PROFESSOR E. CZUBER, of the University of Vienna, has been elected to membership in the academy of sciences of Halle.

PROFESSOR A. DEMOULIN, of the University of Ghent, has been elected a corresponding member of the royal society of Liège.

PROFESSOR G. A. MILLER, of the University of Illinois, has recently been elected corresponding member of the Sociedad matemática Española of Madrid.

PROFESSOR P. P. BOYD, of Hanover College, Indiana, has accepted a professorship of mathematics at the Kentucky State University.

PROFESSOR H. B. FINE, of Princeton University, has been granted leave of absence during the academic year 1912–1913, to study and travel in Europe.

MR. W. W. DENTON and DR. M. W. CHITTENDEN have been appointed instructors in mathematics at the University of Illinois.

MR. C. A. BARNHART, of the University of Illinois, has been appointed professor of mathematics at Carthage College, Carthage, Illinois.

DR. R. K. MORLEY, of the University of Illinois, has been appointed assistant professor of mathematics at the Worcester Polytechnic Institute.

DR. G. F. MCEWEN, of the University of Illinois, has accepted a position as hydrographer for the biological station of the University of California.

MR. A. S. GALAJIKIAN, of Cornell University, has been appointed assistant professor of mathematics at the University of the Philippines.

MR. L. C. COX, of State College, Pennsylvania, has been appointed instructor in mathematics at Purdue University.

DR. J. R. CONNER, of the Johns Hopkins University, has been appointed associate in mathematics at Bryn Mawr College.

DR. J. I. TRACEY has been appointed instructor in mathematics in the academic department of Yale University.

DR. R. M. WINGER has been appointed instructor in mathematics at the University of Illinois.

MR. H. BATEMAN, of Bryn Mawr College, has accepted a teaching scholarship at the Johns Hopkins University.

MR. W. V. LOVITT, of the University of Washington, has been appointed instructor in mathematics at Harvard University; Mr. A. L. MILLER has been advanced to an instructorship in mathematics.

PROFESSOR A. E. HAYNES, of the University of Minnesota, has retired after thirty-eight years continuous service as a teacher.

PROFESSOR S. W. SHATTUCK, of the University of Illinois, will retire at the end of the present academic year. He has been connected with the department of mathematics since the founding of the University in 1868.

PROFESSOR M. C. ARZELÀ, of the University of Bologna, died at St. Stephen di Magra, March 16, 1912, at the age of 65 years. He was a member of the Academy dei Lincei and of the national Italian society of sciences.

NEW PUBLICATIONS.

I. HIGHER MATHEMATICS.

ADHÉMAR (R. d'). Leçons sur les principes de l'analyse. Tome 1: Séries. Déterminants. Intégrales. Potentiels. Equations intégrales. Equations différentielles et fonctionelles. Paris, Gauthier-Villars, 1912. 8vo. 6+324 pp. Fr. 10.00

BACHELIER (L.). Calculs des probabilités. Tome 1. Paris, Gauthier-Villars, 1912. 4to. 7+518 pp. Fr. 25.00

CALVET-AZAL. Essai sur la notion de quantité imaginaire. Paris, Gauthier-Villars, 1912. 8vo. 48 pp.