

topic of matricular algebras are limited, but also *as operators within the entire derived domain of Grassmann*. The lectures contain a very simple and elegant treatment of various questions in the theory of matrices, including Sylvester's laws of nullity and latency, the proof of the identical equation and the reduction of a dyadic to a canonical form both in the general and special cases.

It is interesting and gratifying to note that the interest aroused in the general subject of Multiple Algebra among his pupils, stimulated and directed by Professor Pierpont through his lectures on Hypercomplex Numbers, has resulted in several noteworthy publications by the late Professor Starkweather and by Dr. Hawkes, which exhibit the method and spirit of Benjamin Peirce's memoir on Linear Associative Algebras in a new and remarkably fruitful light.

PERCEY F. SMITH.

SHEFFIELD SCIENTIFIC SCHOOL,
July, 1903.

NOTES.

AT the forty-second annual convention of the National educational association, held in Boston, July 6-10, 1903, a conference on mathematics was conducted by Professor D. E. SMITH. The topic considered was the organization and the work of associations of teachers of mathematics. Over two hundred teachers of mathematics from various parts of the country were present at the conference, and the following papers were read: "On the work of the Central association of science and mathematics teachers," by Mr. C. E. COMSTOCK; "On the New England Association," by Mr. E. H. NICHOLS; "On the proposed association for the middle states and Maryland," by Dr. J. S. FRENCH; "On the investigation being made in New England as to geometry in the grammar school," by Mr. W. T. CAMPBELL; "On the report of the committee appointed by the AMERICAN MATHEMATICAL SOCIETY, on college entrance requirements," by Professor H. W. TYLER; "The relation of these associations to the AMERICAN MATHEMATICAL SOCIETY," by Professor W. F. OSGOOD. From the inquiries made at the conference it is probable that several associations will be formed during the coming year.

AT the meeting of the London mathematical society, held on June 11, the president, Professor H. LAMB, announced that after the conclusion of the present volume some changes would be made in the form of publication of the *Proceedings*, the chief being an increase in the size of the page and the type. The following papers were presented: "The application of quaternions to the algebra of invariants," by Major P. A. MACMAHON; "Jacobi's construction for quadric surfaces," by Professor G. B. MATHEWS; "Automorphic functions in relation to the general theory of algebraic curves," by Mr. H. W. RICHMOND; "Addition to the paper on four known simple groups of order 25920," by Professor L. E. DICKSON. An informal communication "On a method of introducing the logarithmic function by means of geometrical properties of conics" was made by Professor A. C. DIXON.

THE Australasian association for the advancement of science will meet at Dunedin, New Zealand, in January next, under the presidency of Professor T. W. E. DAVID, of the University of Sydney. Professor W. H. BRAGG is president of Section A (astronomy, mathematics, physics, and mechanics).

OXFORD UNIVERSITY. — The following courses in mathematics are announced for the Michaelmas term, 1903: — By Professor E. B. ELLIOTT: Theory of numbers, two hours; Infinite series and products, one hour. — By Professor H. H. TURNER: Elementary mathematical astronomy, two hours. — By Professor W. ESSON: Analytic geometry of plane curves, two hours; synthetic geometry of plane curves, one hour. — By Professor A. E. H. LOVE: The mechanics of deformable bodies, two hours; Problems in applied mechanics, one hour. — By Mr. C. E. HASELFOOT: Algebra, two hours. — By Mr. C. LEUDESORF: Projective geometry, three hours. — By Mr. A. E. JOLIFFE: Analytic geometry, two hours. — By Mr. J. W. RUSSELL: Differential calculus, two hours. — By Mr. R. F. McNEILE: Curve tracing, one hour. — By Mr. A. L. PEDDER: Problems in pure mathematics, one hour. — By Mr. C. H. SAMPSON: Higher solid geometry, two hours. — By Mr. J. E. CAMPBELL: Differential equations, two hours. — By Mr. C. H. THOMPSON: Integral calculus, two hours. — By Mr. E. H. HAYES: Analytic statics, three hours. — By Mr. A. L. DIXON: Hydrostatics, two hours. — By Mr. H. T. GERRANS: Advanced rigid dynamics, two hours. — By Mr. P. J. KIRBY: Attractions and electrostatics, two hours.

THE German universities below announce for the winter semester, 1903–1904, courses in mathematics as follows :

UNIVERSITY OF GÖTTINGEN. — By Professor F. KLEIN : Differential and integral calculus, part 2, four hours ; Seminar, theory of probabilities, two hours. — By Professor D. HILBERT : Partial differential equations, four hours ; Number concept and quadrature of the circle, two hours ; Seminar in differential equations, two hours. — By Professor H. MINKOWSKI : Mechanics, part 1, four hours ; Geometry of numbers, two hours ; Seminar (with Professor Hilbert) in differential equations, two hours. — By Professor M. BRENDDEL : Geodesy, two hours ; Mathematical statistic, one hour ; Seminar in insurance, two hours. — By Professor F. SCHILLING : Descriptive and projective geometry, two hours, with exercises, four hours ; Kinematics, one hour. — By Dr. E. ZERMELO : Calculus of variations, three hours ; Determinants, one hour ; Exercises in the calculus, one hour. — By Dr. O. BLUMENTHAL : Automorphic functions, two hours. — By Professors HILBERT and MINKOWSKI and Drs. ZERMELO and BLUMENTHAL : Algebraic-arithmetical exercises, one hour.

UNIVERSITY OF JENA. — By Professor J. THOMÆ : Analytic geometry of space, four hours ; elementary theory of functions, four hours ; Seminar, two hours. — By Professor A. GUTZMER : Integral calculus, four hours ; Determinants and algebra, four hours ; Seminar exercises in integral calculus, one hour. — By Professor G. FREGE : Partial differential equations, four hours ; Symbolic language, one hour.

THE Royal academy of sciences and letters of Denmark proposes the following prize question for the current year :

“To state the necessary and sufficient conditions for the decomposition of two polyhedra into a finite number of parts congruent two by two, or to make a contribution to the solution of this general problem by giving at least the conditions for the case where one of the solids is a convex polyhedron and the other a cube. There should also be expressly indicated what pyramids satisfy the conditions discovered.”

The question is suggested by an address given by Professor Hilbert before the mathematical congress in Paris in 1901, and the subsequent researches of Messrs. Dehn and Vahlen (*Mathematische Annalen*, volumes 55, 56). The prize is the gold medal of the academy.

THE South African association for the advancement of science was inaugurated in April. The presidential address was delivered by Sir DAVID GILL, and the address before Section A (astronomy, chemistry, mathematics, meteorology and physics) by Professor P. D. HAHN.

PROFESSOR H. POINCARÉ has received the degree of doctor of science from Oxford University.

PROFESSOR MAX NOETHER of Erlangen has been elected a foreign member of the Hungarian academy of sciences at Buda Pesth.

PROFESSOR H. B. FINE, of Princeton University, has been made dean of the faculty.

PROFESSOR C. S. HOWE, of the Case School of Applied Science, Cleveland, Ohio, has been elected to the presidency of that institution.

PROFESSOR F. S. LUTHER, of the chair of mathematics and dean of the faculty of Trinity College, Hartford, Conn., has been made acting president of the college.

DR. E. R. HEDRICK, of Yale University, has been appointed to the professorship of mathematics in the University of Missouri.

AT the University of Michigan Dr. J. W. GLOVER has been promoted to an assistant professorship of mathematics; Dr. PETER FIELD and Dr. J. N. JAMES have been appointed instructors in mathematics.

DR. C. M. MASON has been appointed to an instructorship in mathematics in the Massachusetts Institute of Technology.

PROFESSOR LUIGI CREMONA died at Rome on June 10. Professor Cremona was born at Pavia, December 7, 1830. After holding the chairs of mathematics in the University of Bologna and the Polytechnic School of Milan, he was called in 1873 to the University and the directorship of the Engineering School at Rome, where the remainder of his life was spent. He was a member of the Italian Senate and had served as vice-president of the Senate and as minister of public instruction.

ERNEST DUPORCQ, one of the editors of the *Nouvelles Annales Mathématiques* and general secretary of the Paris congress of mathematicians, died on April 1, at the age of thirty years.