PROCEEDINGS

OF

THE LONDON MATHEMATICAL SOCIETY.

VOL. XXVIII.

THIRTY-THIRD SESSION, 1896–97

(since the Formation of the Society, January 16th, 1865).

November 12th, 1896.

THE THIRD ANNUAL GENERAL MEETING OF THE LONDON MATHE-
MATICAL SOCIETY, as incorporated under the Companies Act,
1867, on October 23rd, 1894, held at 22 Albemarle Street, W.

Major MACMAHON, R.A., F.R.S., President, in the Chair.

Present, twenty-four members and one visitor.

The following members were admitted into the Society: Miss
Hardcastle, Mr. Gallop, and Mr. Western.

The Treasurer gave an abstract of his report. Its reception was
moved by Mr. Kempe, and seconded by Mr. S. Roberts. The former
gentleman thought that more strenuous efforts might be made by
present members to increase the number of members. The reception
of the report was carried unanimously.

The Rev. T. R. Terry having consented, at the request of the
President, to again act as Auditor, he was appointed to that office.

The senior Secretary stated that the present number of members
was 226, of whom 114 were life compounders. He also mentioned
that the following additional exchanges had been made during the
Session :—with the Physical Society, of London, with the *Monatshefte
für Mathematik und Physik*, Vienna, and with the American Mathe-
matical Society.

The following communications had been made or received :—

On the Stability and Instability of certain Fluid Motions (iii.), and on the Propagation of Waves upon the Plane Surface separating Two Portions of Fluid of different Vorticities : Lord Rayleigh.

Note on Matrices : Mr. J. Brill.

Determination of the Volumes of certain Species of Tetrahedra without employment of the Method of Limits : Prof. M. J. M. Hill.

Some Algebraical Theorems connected with the Theory of Partitions : Prof. Forsyth.

Certain general Series : Mr. F. H. Jackson.

An Extension of Sylvester's Constructive Theory of Partitions : Major MacMahon.

Note on the Representation of a Conic by a Linear Equation : Mr. J. Griffiths.

On the Representation of a Number as a Sum of Squares : Prof. Mathews.

Researches in the Calculus of Variations—Pt. vii., Limiting conditions in Multiple Integrals; Pt. viii., Reduction of the Problem of the Discrimination of Maxima and Minima Values in Double Integrals with Variable Limits to a New Problem in Single Integrals : Mr. E. P. Culverwell.

A Note on certain Forms of the Equation of Normals to Conic Sections : Mr. J. L. S. Hatton.

On the Evaluation of a certain Dialytic Determinant : Mr. W. W. Taylor.

Criterion of 2 as a 16-ic Residue, with remarks upon some of Mersenne's Numbers : Lt.-Col. Cunningham.

Note on the Convergency of Series : Dr. R. Bryant.

On the Distribution of Electricity induced on an Infinite Plane Disc with a Circular Hole in it : Mr. H. M. Macdonald.

On the Double Foci of a Bicircular Quartic, and the Nodal Focal Curves of a Cyclide : Dr. R. Lachlan.

Note on a Ternary Cubic : Prof. Tanner.

On Boltzmann's Law of the Equality of Mean Kinetic Energy for each Degree of Freedom : Mr. S. H. Burbury.

Examples illustrating Lord Rayleigh's Theory of the Stability or Instability of certain Fluid Motions : Mr. Love.

Geodesics on Quadrics, not of Revolution : Prof. Forsyth.

The Continuity of Pressure in Vortex Motion, and an Ellipsoidal Vortex : Mr. R. Hargreaves.

On the Enumeration of Groups of Totitives : Prof. Tanner.

The Motion of the Top, and the Catenary on the Paraboloid and Cone : Prof. Greenhill.

On the Isomorphism of a Group with itself : Prof. W. Burnside.

The Division of the Lemniscate : Prof. Mathews.

On some general Formulæ for the Potentials of Ellipsoids, Shells, and Discs : Dr. Hobson.

The Compensation for Difference of Capital in Gambling *à outrance:* A Contribution to the Theory of Duration of Play : Major MacMahon.

On the Stability of a Frictionless Liquid—Theory of Critical Planes : Mr. Bassot.

The Bitangents of a Plane Quartic Curve and the Straight Lines of a Cubic Surface : Mr. Baker.

On the Application of the Principal Function to the Solution of Delaunay's Canonical System of Equations : Prof. E. W. Brown.

Waves in Canals : Mr. H. M. Macdonald.

On the *a, b, c* Form of the Binary Quintic : Mr. J. Hammond.

Construction for the Four Normals to a Central Conic drawn through a given Point : Prof. Mathews.

On a Two-fold Generalization of Stieltjes' Theorem : Dr. H. Tabor.

The Construction of Nasik Squares : Rev. A. H. Frost.

The same journals had been subscribed for and the same exchanges of *Proceedings*, in addition to those named above, made as in the preceding Session. No presents had been made to the Society's Albums.

The President stated the grounds of the award by the Council of the Society of the De Morgan Medal to Mr. Samuel Roberts. After receiving the medal, Mr. Roberts cordially thanked the Council and the members generally for the honour they had conferred upon him, and, in a brief review of his long connexion with the Society, said that it had been most useful as well as agreeable to him.

Prof. Tanner and Mr. S. O. Roberts having been appointed Scrutators, the ballot was taken, with the result that the following gentlemen, nominated by the Council, were elected to serve as the Council for the ensuing Session:—Prof. Elliott, F.R.S., President; Dr. Hobson, F.R.S., Mr. M. Jenkins, and Major MacMahon, R.A., F.R.S., Vice-Presidents ; Dr. J. Larmor, F.R.S., Treasurer ; Mr. R. Tucker, and Mr. A. E. H. Love, F.R.S., Hon. Secs. Other Members of the Council:—Lt.-Col. Cunningham, R.E., Mr. H. T. Gerrans, Dr. Glaisher, F.R.S., Prof. Greenhill, F.R.S., Prof. M. J. M. Hill, F.R.S., Prof. W. H. H. Hudson, Mr. A. B. Kempe, F.R.S., Mr. F. S. Macaulay, and Mr. D. B. Mair.

Prof. Elliott, having taken the Chair, called upon Major MacMahon to read his Valedictory Address, which was entitled " Combinatory Analysis : a Review of the present State of Knowledge." Upon the motion of the President, seconded by Prof. Greenhill, Major MacMahon consented to the publication of his address in the Society's *Proceedings*.

Mr. S. Roberts gave a brief abstract of an Essay by Herr E. Lasker, " On the Geometrical Calculus."

The following papers, owing to the lateness of the hour, were communicated by their titles only :—

Symbolic Logic : Mr. H. MacColl.

On a General Integral with some Physical Applications : Mr.
G. J. Hurst.

On Ratio : Prof. M. J. M. Hill.

On the Geometrical Construction of Models of Cubic Surfaces :
Mr. W. H. Blythe.

Theory of Vortex Rings : Mr. H. S. Carslaw.

Differentiation of Spherical Harmonics : Mr. E. G. Gallop.

(i.) On the application of Jacobi's Dynamical Method to the
General Problem of Three Bodies, and (ii.) On certain Pro-
perties of the Mean Motions and the Secular Accelerations of
the Principal Arguments used in the Lunar Theory : Prof.
E. W. Brown.

Note on the Symmetric Group : Prof. W. Burnside.

Note on the Capacity of a Conductor in the Form of Two
Intersecting Spheres : Mr. W. D. Niven.

The following presents were received for the Library :—

"Mathematical Questions and Solutions from the 'Educational Times,'" edited
by W. J. C. Miller, Vol. LXV., 8vo; London, 1896.

"Proceedings of the Cambridge Philosophical Society," Vol. IX., Pt. 3 ; 1896.

"Beiblätter zu den Annalen der Physik und Chemie," Bd. XX., St. 9 ;
Leipzig, 1896.

"Journal of the Institute of Actuaries," Vol. XXXIII., Pt. I. ; October, 1896.

"Proceedings of the Royal Society," Nos. 361, 362 ; 1896.

"Monatshefte für Mathematik und Physik," Vol. VII., Hefte 10, 11, 12 ;
Wien, 1896.

"Proceedings of the Physical Society," Vol. XIV., Pts. 10, 11 ; 1896.

"Bulletin of the American Mathematical Society," Vol. III., No. 1, October,
1896 ; New York.

"Tōkyō Sūgaku-Butsurigaku Kwai Kiji," Maki 7, Dai 6.

"Nieuw Archief voor Wiskunde," 2e Reeks, Deel III., St. 1 ; Amsterdam, 1896.

"Bulletin des Sciences Mathématiques," Tome XX., Sept., 1896 ; Paris.

"Atti della Reale Accademia dei Lincei—Rendiconti," Sem. 2, Vol. V.,
Fasc. 6, 7, 8 ; Roma, 1896.

"Acta Mathematica," XX., 2 ; Stockholm, 1896.

"Transactions of the Cambridge Philosophical Society," Vol. XVI., Pt. 1 ; 1896.

"Educational Times," November, 1896.

"Annali di Matematica," Serie 2, Tomo XXIV., Fasc. 4 ; Milano, 1896.

"Journal für die reine und angewandte Mathematik," Bd. CXVII., Heft 1 ;
Berlin, 1896.

"Indian Engineering," Vol. XX., Nos. 12-16, Sept. 19th to Oct. 17th, 1896.

"Philosophical Transactions of the Royal Society," A. Vol. CLXXXVI., Pts. 1, 2 ;
B. Vol. CLXXXVI., Pts. 1, 2 ; 1896.