

PROCEEDINGS
OF THE
LONDON MATHEMATICAL SOCIETY.

VOL. XVIII.

TWENTY-THIRD SESSION, 1886—1887.

November 11th, 1886.

ANNUAL GENERAL MEETING, held at 22 Albemarle Street, W.

J. W. L. GLAISHER, Esq., F.R.S., President, in the Chair.

Mr. F. S. McAulay, M.A., Mathematical Master, St. Paul's School, was elected a Member.

The Treasurer (Mr. A. B. Kempe) read his Report. Its reception was moved by Captain Macmahon, R.A., seconded by Mr. A. B. Basset, and carried.

At the request of the Chairman, Mr. G. Heppel consented to act as Auditor.

From the report of the Secretaries, it appeared that the number of Members since the General Meeting held November 12th, 1885, had increased from 181 to 184, of these 68 being Life Members.

The Society had lost one member by death, viz., Mr. Duncan Brockelbank, who died September 27th, 1885, on board the "Melbourne," during his passage to Australia.

The following communications had been made:—

On Waves Propagated along the Plane Surface of an Elastic Solid: Lord Rayleigh.

On the Application of Clifford's Graphs to Ordinary Binary Quantics: Mr. Kempe.

On Clifford's Theory of Graphs: Mr. Buchheim.

On Unicursal Curves: Mr. B. A. Roberts.

VOL. XVIII.—NO. 280:

B

- On some Consequences of the Transformation Formula $y = sn(L + A + B + C + \dots)$:
Mr. J. Griffiths.
- On the Numerical Solution of Cubic Equations: Mr. Heppel.
- On a Theorem in Kinematics: Mr. J. J. Walker.
- Note on the Induction of Electric Currents in an Infinite Plane Current Sheet,
which is rotating in a field of Magnetic Force: Mr. Basset.
- Logarithms in General Logic: Mrs. Bryant.
- On a Class of Integrable Reciprocants: Mr. Hammond.
- On Perpetuant Reciprocants: Captain Macmahon.
- Note on the Functions $Z(u)$, $\Theta(u)$, $\Pi(u, a)$: Mr. Glaisher.
- Note on a $Z(u)$ Function: Mr. J. Griffiths.
- On Polygons Circumscribed about a Conic, and Inscribed in a Cubic: Mr. R. A.
Roberts.
- On an Instantaneous Proof of the Expression for the Number of Linearly Inde-
pendent Invariants or Seminvariants of a given Type, and also of the corres-
ponding Expression for Reciprocants: Prof. Sylvester.
- On Ternary and n -ary Reciprocants: Mr. Elliott.
- Homographic, Circular, and Projective Reciprocants: Mr. L. J. Rogers.
- A Proof of Cayley's Fundamental Theorem of Invariants: Captain Macmahon.
- Note on the Invariantisors of a Binary Quantic: Mr. J. Griffiths.
- On the Number of Linearly Independent Invariants (or Seminvariants), Reci-
procants, or in general of Integrals of any Assigned Type, of a Homo-
geneous and Isobaric Linear Partial Differential Equation: Prof. Sylvester.
- On some Results connected with the Theory of Reciprocants: Mr. Leudesdorf.
- On Cremonian Congruences contained in Linear Complexes: Dr. Hirst.
- Solution of the Cubic and Biquadratic Equation by means of Weierstrass's Elliptic
Functions: Prof. Greenhill.
- On the Complex of Lines which meet a Unicursal Quartic Curve: Prof. Cayley.
- On the Airy-Maxwell Solution of the Equations of Equilibrium of an Isotropic
Elastic Solid under Conservative Forces: Mr. Ibbetson.
- On the Converse of Stereographic Projection and on Contangential and Coaxial
Spherical Circles: Mr. Jeffery.
- Reciprocation in Statics: Prof. Genese.
- Formula for the Interchange of the Independent and Dependent Variables, with
some applications to Reciprocants: Mr. Leudesdorf.
- Second Paper on Reciprocants: Mr. Rogers.
- On the Theory of Screws in Elliptic Space (Third Note): Mr. Buchheim.
- On the Motion of a Liquid Ellipsoid under the influence of its own attraction:
Mr. Basset.
- Some Applications of Weierstrass's Elliptic Functions: Prof. Greenhill.
- Electrical Oscillations on Cylindrical Conductors: Prof. J. J. Thomson.

Minor communications were made by the President, Messrs. Kempe and H. M. Taylor, Captain Macmahon, and the Rev. T. C. Simmons.

The same Journals had been subscribed for as in the preceding Session.

No addition had been made to the List of Exchanges.

The meeting next proceeded to the election of the new Council. The Scrutators (Prof. W. Woolsey Johnson and the Rev. T. B. Terry)

having examined the Balloting Lists, declared the following gentlemen duly elected:—

President, Sir James Cockle, F.R.S.; Vice-Presidents, J. W. L. Glaisher, F.R.S., Prof. Hart, Lord Rayleigh, Sec.R.S.; Treasurer, A. B. Kempe, F.R.S.; Hon. Secs., M. Jenkins, M.A., R. Tucker, M.A.; other Members, Prof. Cayley, F.R.S., E. B. Elliott, M.A., Prof. Greenhill, M.A., J. Hammond, M.A., Prof. Hill, M.A., C. Leudesdorf, M.A., Captain P. A. Macmahon, R.A., S. Roberts, F.R.S., and J. J. Walker, F.R.S.

The new President, having taken the chair, thanked the members present and the Society for the honour they had done him, and then called upon Mr. Glaisher to read his Presidential Address. After the reading, Mr. S. Roberts moved that the Address be printed in the Society's *Proceedings*; the motion, having been seconded by Mr. Greenhill, was carried by acclamation.

The following communications were then made:—

Certain Operators in connection with Symmetric Functions: Mr. Lachlan.

On the Transformations of the General Elliptic Element $\frac{\delta x}{\sqrt{U_x}}$,
where $U_x = x - \alpha \cdot x - \beta \cdot x - \gamma \cdot x - \delta (= ax^4 + 4bx^3 + 6cx^2 + 4dx + e)$:
Mr. Robert Russell.

Discussion of a Multilinear Operator, with applications to the Theories of Invariants and Reciprocants: Captain Macmahon, R.A.

The Theory of Screws in Elliptic Space (Fourth Note): Mr. Buchheim.

The Rectification of certain Curves: Mr. R. A. Roberts.

The Rectification of a Sphero-Conic: Mr. H. F. Burstall.

Third Paper on Reciprocants: Mr. L. J. Rogers.

The "Sine-Triple-Angle" Circle: Mr. Tucker.

The following presents were received:—

"Educational Times," for November.

"A Synopsis of Elementary Results in Pure Mathematics," by G. S. Carr, M.A. royal 8vo; London, 1886: from the Author.

"Beiblätter zu den Annalen der Physik und Chemie," Band x., St. 10.

"Jornal de Sciencias Mathematicas e Astronomicas," Vol. vii., No. 2; Coimbra, 1886.

"Bollettino delle Pubblicazioni Italiane," ricevute per Diritto di Stampa, Nos. 19, 20; Firenze,

"Atti della R. Accademia dei Lincei—Rendiconti," Vol. ii., Fasc. 6 and 7; Roma.

- “*Memorie della R. Accademia di Scienze, Lettere, ed Arti*,” in Modena, Serie II., Vol. III., 4to; Modena, 1885.
- “*Rendiconti dell’ Accademia delle Scienze, Fisiche, e Matematiche*,” Napoli, Anno XXII., 1883; XXIII., 1884; XXIV., 1885; and XXV., 1886; (Fasc. 1, 2, and 3), 4to; Naples.

PRESIDENTIAL ADDRESS.

By J. W. L. GLAISHER, M.A., F.R.S.

The Mathematical Tripos.

It is with the greatest pleasure that I avail myself this evening of the already well-established custom which permits one of our members, once in two years, to address to his colleagues a few general remarks connected with the science that forms our common bond of union. It is not often that a mathematician has an opportunity of laying before his fellow-workers, by word of mouth, any views of his own, except such as relate to the actual mathematical investigations upon which he is engaged, which, from their very nature, can appeal directly only to the few who have laboured in the same field; and I feel it to be a high privilege to be permitted, in this room, and surrounded by familiar faces, to give expression to my thoughts and hopes upon subjects that are of common interest to us all as mathematicians.

I have not ventured to attempt any remarks upon the wide region of pure mathematics, or even upon the progress of such portions of it as have attracted the greatest share of interest among ourselves. I have felt that, as one who has resided and lectured in Cambridge for the past fifteen years, the most appropriate subjects for my address would be those upon which my residence in the University during an eventful period, or my experience as a lecturer, might to some extent qualify me to speak. Still, even when so restricted, I have found it no easy matter to decide upon the subjects to which I was most desirous of drawing your attention to-night.

I should have liked to speak at length upon the theory of elliptic functions. For fourteen years I have lectured regularly, each year, upon this subject, and no lectures of mine have been of so much in-