PROCEEDINGS

OF THE

ROYAL SOCIETY OF LONDON.

From November 17, 1898, to March 16, 1899.

VOL. LXIV.

LONDON:
HARRISON AND SONS, ST. MARTIN'S LANE,
Printers in Ordinary to Her Majesty.
MDCCXCIX.
LONDON:
HARRISON AND SONS, PRINTERS IN ORDINARY TO HER MAJESTY,
ST. MARTIN'S LANE.
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November 17, 1898.

The LORD LISTER, F.R.C.S., D.C.L., President, in the Chair.

A List of the Presents received was laid on the table, and thanks ordered for them.

In pursuance of the Statutes, notice of the ensuing Anniversary Meeting was given from the Chair.

Major MacMahon, Dr. Ludwig Mond, and Professor Seeley were by ballot elected Auditors of the Treasurer's accounts on the part of the Society.

The following Papers received during the recess and published, in full or in abstract, in accordance with the Standing Orders of Council, were read in title:—


Dr. Vaughan Harley. The Influence of Removal of the Large Intestine and increasing Quantities of Fat in the Diet on general Metabolism in Dogs.

The Lord Rayleigh, F.R.S. On the Character of the Impurity found in Nitrogen Gas derived from Urea.

Dr. C. J. Martin. Further Observations concerning the Relation of the Toxin and Anti-Toxin of Snake-Venom.

The following Papers were read:—

I. "Further Note on the Sensory Nerves of the Eye-Muscles." By Professor Sherrington, F.R.S.


III. "Contributions to our Knowledge of the Formation, Storage, and Depletion of Carbohydrates in Monocotyledons." By J. Parkin.


November 24, 1898.

Dr. W. J. RUSSELL, Vice-President, in the Chair.

A List of the Presents received was laid on the table, and thanks ordered for them.

In pursuance of the Statutes, notice of the ensuing Anniversary Meeting was given from the Chair, and the list of Officers and Council nominated for election was read as follows:—

President.—Lord Lister, F.R.C.S., D.C.L.

Treasurer.—Alfred Bray Kempe, M.A.

Secretaries.—Professor Michael Foster, M.A., M.D., D.C.L., LL.D.

Professor Arthur William Rücker, M.A., D.Sc.

Foreign Secretary.—Sir Edward Frankland, K.C.B., D.C.L., LL.D.


The following Papers were read:—


IV. “Memoir on the Theory of the Partitions of Numbers. Part II.” By Major MacMahon, F.R.S.
December 8, 1898.

The LORD LISTER, F.R.C.S.; D.C.L., President, in the Chair.

Dr. Alexander Buchan was admitted into the Society.

A List of the Presents received was laid on the table, and thanks ordered for them.

The President announced that he had nominated as Vice-Presidents for the ensuing year—

The Treasurer.
Professor Bonney.
Mr. Story Maskelyne.
Dr. W. J. Russell.

The following Papers were read:—

I. "Effects of Prolonged Heating on the Magnetic Properties of Iron. (Second Paper.)" By S. R. Roget, B.A. Communicated by Professor Ewing, F.R.S.

II. "On the Topographical Anatomy of the Abdominal Viscera, especially the Gastro-Intestinal Canal in Man." By Christopher Addison, M.D., B.S. (Lond.), F.R.C.S., Professor of Anatomy, University College, Sheffield. Communicated by Professor Alexander Macalister, F.R.S.


IV. "'Nitragin' and the Nodules of Leguminous Plants." By Maria Dawson, B.Sc. (Lond. and Wales). Communicated by Professor H. Marshall Ward, F.R.S.
December 15, 1898.

The LORD LISTER, F.R.C.S., D.C.L., in the Chair.

A List of the Presents received was laid on the table, and thanks ordered for them.

The Right Hon. the Lord Curzon of Kedleston, a member of Her Majesty's Most Honourable Privy Council, was balloted for and elected a Fellow of the Society.

The following Papers were read:—

I. "Application of Liquid Hydrogen to the Production of High Vacua, and their Spectroscopic Examination." By James Dewar, LL.D., F.R.S.

II. "On the Boiling Point of Liquid Hydrogen under reduced Pressure." By James Dewar, LL.D., F.R.S.

III. "Ionic Velocities." By Orme Masson. Communicated by Professor Ramsay, F.R.S.

IV. "Note on the Densities of 'Atmospheric Nitrogen,' Pure Nitrogen, and Argon." By William Ramsay, F.R.S.

V. "The Preparation and some of the Properties of Pure Argon." By William Ramsay, F.R.S., and Dr. Morris W. Travers.


VII. "The Action of Magnetised Electrodes upon Electrical Discharge Phenomena in Rarefied Gases. Preliminary Note." By C. E. S. Phillips. Communicated by Sir William Crookes, F.R.S.

VIII. "On the Reciprocal Innervation of Antagonistic Muscles. Fifth Note." By C. S. Sherrington, M.A., M.D., F.R.S.

The Society adjourned over the Christmas Recess to Thursday, January 19, 1899.
gen in one and not in the other, leaves the presence of free hydrogen in the atmosphere as a question for further inquiry. The tube that did not contain hydrogen was heated very hot in order to get a discharge, and then the spectrum showed some bands like the negative glow of nitrogen. Occasionally, a jar discharge was got to pass, and when this took place the nitrogen lines could be seen. An electrodeless tube filled carefully with oxygen made from fused chlorate of potash, which was contained in an extension of the vacuum tube gave nothing but the carbonic oxide bands. In future experiments it will be easy to concentrate all the most volatile material in air or other gases, and thereby to make a more thorough examination of the spectrum. In the meantime my object is to show one of the scientific uses of liquid hydrogen.

I have to thank Mr. Robert Lennox for efficient aid in the conduct of the difficult experiments. Mr. Heath has also helped in the work.

January 19, 1899.

The LORD LISTER, F.R.C.S., D.C.L., in the Chair.

A List of the Presents received was laid on the table, and thanks ordered for them.

The following Papers were read:—

I. "Observations upon the Normal and Pathological Histology and Bacteriology of the Oyster." By Professor W. A. Herdman, F.R.S., and Professor R. Boyce.

II. "On the Formation of Multiple Images in the Normal Eye." By Shelford Bidwell, F.R.S.

III. "On the Vibrations in the Field round a Theoretical Hertzian Oscillator." By Professor Karl Pearson, F.R.S., and Miss Alice Lee.

IV. "On the Refractive Indices and Densities of Normal and Semi-normal Aqueous Solutions of Hydrogen Chloride and the Chlorides of the Alkalis." By Sir John Conroy, Bart., F.R.S.
the oscillator. A fourth wave dealt with by Hertz, namely, the wave of magnetic induction, does not, as he supposes, start with zero phase from the origin, but with a finite phase. The wave in the equatorial plane, largely relied upon by Hertz for his interference experiments "of the first kind," is a compound of the waves of transverse and axial electric force, and has a much more complex series of velocity changes than Hertz appears to have realised.

(iv) The existence of the two electric force waves and the singular points or surfaces for the wave motion in the neighbourhood of the oscillator very possibly throw light on the difficulties which arise in Hertz’s experiments. It would seem that such experiments should be made at distances greater than 6 to 7 (λ/2π) from the centre of the oscillator, or, roughly, about a wave-length from the oscillator. In Hertz’s case this amounts to about 10 metres—a distance at which Hertz rather terminated than started his interference experiments. Only at such a distance are the phase curves sensibly linear.

The authors are not unaware of the physical difficulties of experiment at great distances, and wish, therefore, to emphasise again the fact that they are dealing with a theoretical oscillator. It is, however, this type for which Hertz himself endeavoured to provide a mathematical investigation, and it is that investigation which, in the first instance, they have attempted to expand and modify.

January 26, 1899.

The LORD LISTER, F.R.C.S., D.C.L., President, in the Chair.

A List of the Presents received was laid on the table, and thanks ordered for them.

The Right Hon. G. J. Shaw-Lefevre, a member of Her Majesty’s Most Honourable Privy Council, was balloted for and elected a Fellow of the Society.

The following Papers were read:—


III. "On the Nature of Electro-capillary Phenomena. I. Their Relation to the Potential Differences between Solutions." By S. W. J. Smith. Communicated by Professor Rückner, Sec.R.S.


(Abstract.)

The existence of a group of fossil plants, combining in their organisation certain characters of the Ferns and the Cycads, has been recognised, of late years, by several palæobotanists, as, for example, by the late Professor W. C. Williamson, Count Solms-Laubach, Mr. Seward, and the author. The convenient name, Cycadofilices, has recently been proposed by Professor Potonié to designate the group in question, which now includes several, somewhat heterogeneous, genera, among which Lyginodendron, Heterangium, and Medullosa may be mentioned.

Several species of the genus Medullosa (founded in 1832 by Cotta) have already been described, from the Permian and Upper Coal-measures of the Continent. They agree in the extraordinarily complex structure of the stem, which, as shown by Zeiller and Solms-Laubach, resembles in the ground plan of its organisation, that of a highly differentiated Fern, of the usual polystelic type, but with the addition of a zone of secondary wood and bast, sometimes reaching an immense thickness, developed around each stele. The mature stem thus acquired a Cycad-like character. The structure, however, has been extremely difficult to interpret owing to the comparative rarity and incomplete character of the specimens hitherto known.

No stem of a Medullosa has hitherto been recorded from this country, though specimens of Myeloxylon, now known to have been the petioles of Medullosa, are frequent in the calcareous nodules of the Lower Coal-measures.

The author has recently had the opportunity of investigating several excellent specimens of a new species of Medullosa from the Ganister Beds of Lancashire. These fossils are of special interest on several grounds; they are considerably more ancient than any members of the genus previously described, they are the first English specimens recorded, they are preserved in a more complete and perfect form than
10. The influence of removal of the large intestine on the total alkaline and aromatic sulphates.

The total sulphates are influenced in the same manner in the dogs without the large intestine as in normal animals by increasing the fat in the diet. The alkaline sulphates decrease with the diminution in the quantity of nitrogen eliminated in the urine. This diminution is due to the decrease in the alkaline sulphates, the same as in the normal dogs.

The increased quantity of fat in the diet has no influence apparently on the quantity of aromatic sulphates eliminated in the urine. The removal of the large intestine tends markedly to diminish the quantity of aromatic sulphates daily eliminated, the quantity eliminated being less than half the quantity found in a normal dog on the same diet; so that the removal of the large intestine evidently causes a marked diminution in the intestinal putrefaction, or rather has removed the principal seat for intestinal putrefaction. (Table XXVI. Dogs 4 and 5.)

February 2, 1899.

The LORD LISTER, F.R.C.S., D.C.L., in the Chair.

A List of the Presents received was laid on the table, and thanks ordered for them.

The following Papers were read:—

I. "Sets of Operations in Relation to Groups of Finite Order." By A. N. WHITEHEAD, M.A. Communicated by Professor A. R. FORSYTH, F.R.S.


III. "On the Effects of Strain on the Thermo-electric Qualities of Metals." By MAGNUS MACLEAN, M.A., D.Sc. Communicated by LORD KELVIN, F.R.S.

was directly focussed on the sensitive film without the interposition of the prism. The photographs show a straight image of the slit followed by a number of curved bands extending from both poles into the spark gap.

The straight image we consider to be the initial discharge through air creating sufficient heat to fill the space with vapour through which the oscillating discharges may then pass. Our experiments point to the fact that the periodic time was rather too small in our experiments to give the best results. The metallic molecule before it has had time to reach through a sufficient distance was possibly affected in its motion by the subsequent oscillation. We hope to remedy this defect by introducing still higher capacities than those used. Our experiments allow us to give the following approximate numerical data. The air rendered luminous by the first discharge remains luminous for a time of about $5 \times 10^{-7}$ second, the metallic vapours then begin to diffuse and reach the centre of the spark (the gap being 1 cm. long) in a time which in the case of cadmium was about $6 \times 10^{-6}$ second. The periodic time of the oscillations with our six jars and a circuit possessing as little self-induction as possible was about $2 \times 10^{-6}$ second. The metallic vapours remain luminous in the centre of the spark for a longer period than near the poles, the duration of the time during which some luminosity can be traced with a discharge from six Leyden jars is about $1.5 \times 10^{-5}$ second.

February 9, 1899.

The LORD LISTER, F.R.C.S., D.C.L., President, in the Chair.

A List of the Presents received was laid on the table, and thanks ordered for them.

The following Papers were read:—

I. "On the Reflection of Cathode Rays." By A. A. C. SWINTON. Communicated by LORD KELVIN, F.R.S.

II. "On the Recovery of Iron from Overstrain." By JAMES MUIR, B.Sc. Communicated by Professor EWING, F.R.S.

III. "A Soil Bacillus of the Type of De Bary's *B. megatherium*." By W. C. STURGIS, M.A., Ph.D. Communicated by Professor MARSHALL WARD, F.R.S.
February 16, 1899.

The LORD LISTER, F.R.C.S., D.C.L., President, in the Chair.

A List of the Presents received was laid on the table, and thanks ordered for them.

The President announced the acceptance by the Council of a portrait of Lord Kelvin, presented to the Society by Dr. Thorpe, on behalf of a large number of the Fellows.

The following Papers were read:—

I. "On the Reflex Electrical Effects in Mixed Nerve, and in the Anterior and Posterior Roots." By Miss S. C. M. Sowton. Communicated by Dr. A. D. Waller, F.R.S.

II. "The Characteristic of Nerve." By A. D. Waller, M.D., F.R.S.

III. "Observations on the Cerebro-spinal Fluid in the Human Subject." By StClair Thomson, M.D., L. Hill, M.B., and W. D. Halliburton, M.D., F.R.S.

IV. "The Thermal Deformation of the Crystallised Normal Sulphates of Potassium, Rubidium, and Cæsium." By A. E. Tutton, B.Sc. Communicated by Captain Abney, F.R.S.

"Observations on the Cerebro-Spinal Fluid in the Human Subject." By StClair Thomson, M.D., Leonard Hill, M.B., and W. D. Halliburton, M.D., F.R.S. Received January 31,—Read February 16, 1899.

One of us (StC. T.) has had under his care for some years a young woman who has suffered from continuous dripping from the nose. The case has not been amenable to any treatment. At first it was thought to be one of nasal hydorrhœa, but certain characters in the affection convinced the observer that this could not be so, and that the fluid, which dropped from one nostril only, was cerebro-spinal fluid. This was supported by the results of the chemical examination of the fluid. The escape of cerebro-spinal fluid from the nose has long been known to follow traumatic injury to the cribiform plate of the ethmoid bone, but the possibility of its spontaneous escape from the nose does not
Throughout the experiments fallacies arising through induction were carefully guarded against, the negative variation was tested by reversing the direction of the stimulating current; and as a final test for current escape the led-off nerve was cut through with wet scissors in such a way that the severed ends remained in contact, though physiological continuity was destroyed; the stimulation was then repeated, but in no case was there any deflection after such section.

In the main my results exhibit—

I. Electrical effects of an indubitably reflex character in the mixed nerve and in the anterior roots alone.

II. Slight effects of doubtful character in the posterior roots.

My warmest thanks are due to Professor Hering for the courteous hospitality of his laboratory, and to Professor von Frey I would offer my grateful acknowledgment of his ready help.

February 23, 1899.

The LORD LISTER, F.R.C.S., D.C.L., in the Chair.

A List of the Presents received was laid on the table, and thanks ordered for them.

The following Papers were read:—

I. "On the Order of Appearance of Chemical Substances at different Stellar Temperatures." By Sir NORMAN LOCKYER, K.C.B., F.R.S.

II. "The Efficiency of Man, or Economic Coefficient of the Human Machine." By Dr. W. MARCET, F.R.S., and R. B. FLORIS.

III. "Some Experiments bearing on the Theory of Voltaic Action." By J. BROWN. Communicated by Professor EVERETT, F.R.S.

IV. "Deposition of Barium Sulphate as a Cementing Material of Sandstone." By Dr. F. CLOWES. Communicated by Professor ARMSTRONG, F.R.S.
March 2, 1899.

The LORD LISTER, F.R.C.S., D.C.L., President, in the Chair.

A List of the Presents received was laid on the table, and thanks ordered for them.

In pursuance of the Statutes the names of Candidates for election into the Society were read as follows:

| Allen, Alfred Henry, F.C.S. | Head, Henry, M.D. |
| Ardagh, Sir John, Major-General, R.E. | Hiern, William Philip, M.A. |
| Ballance, Charles Alfred, F.R.C.S. | Hill, Leonard, M.B. |
| Barrett, Professor W. F., F.R.S.E. | Hills, Edmond Herbert, Captain, R.E. |
| Booth, Charles. | | |
| Bridge, Professor Thomas William, M.A. | Hopkinson, Edward, M.A. |
| Brown, John. | Jackson, Henry Bradwardine, Captain, R.N. |
| Bruce, Surgeon-Major David, M.B. | Lansdell, Rev. Henry, D.D. |
| Budge, Ernest A. Wallis, D.Litt. | Lister, Joseph Jackson, M.A. |
| Callaway, Charles, D.Sc. | MacArthur, John Stewart, F.C.S. |
| Cardew, Philip, Major, R.E. | MacGregor, Professor James Gordon, D.Sc. |
| Copeman, Sydney Monckton, M.D. | Maclean, Magnus, D.Sc. |
| Crookshank, Professor Edgar March, M.B. | Mallock, Henry Reginald Arnulph. |
| Darwin, Horace, M.A. | Mance, Sir Henry C., C.I.E. |
| David, Professor T. W. Edgeworth, B.A. | Mansergh, James, M.Inst.C.E. |
| Dixon, Professor Alfred Cardew, M.A. | Marsh, James Ernest, M.A. |
| Dixon, Professor Augustus Edward, F.C.S. | Mather, Thomas. |
| Feilden, Colonel Henry Wemyss. | Matthey, Edward, F.C.S. |
| Gamble, James Sykes, M.A. | Morgan, Professor Conway Lloyd, F.G.S. |
| Gray, Professor Thomas, B.Sc. | Muir, Thomas, M.A. |
| Haddon, Professor Alfred Cort, M.A. | Notter, James Lane, Surgeon-Lieut.-Col. |
| Hamilton, Professor David James, M.D. | Perkin, Arthur George. |
| | Rambaut, Professor Arthur A., M.A. |
| | Reid, Clement, F.G.S. |
| | Russell, James Samuel Risien, M.D. |
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Salomons, Sir David, M.A.
Saunders, Edward.
Schlich, Professor William, C.I.E.
Sell, William James, M.A.
Shaw, Professor Henry S. Hele, M.Inst.C.E.
Sidgreaves, Rev. Walter, S.J.
Smith, James Lorrain, M.D.
Smith, Professor William Robert, M.D.
Smithells, Professor Arthur, B.Sc.
Spencer, Professor W. Baldwin, B.A.
Starling, Ernest Henry, M.D.
Swinton, Alan Archibald Campbell, Assoc. M.Inst.C.E.
Tanner, Professor Henry William Lloyd, M.A.

Tatham, John F. W., F.R.C.P.
Thomas, Michael Rogers Oldfield, F.Z.S.
Threlfall, Professor Richard.
Tutton, Alfred E., B.Sc.
Ulrich, Professor George Henry Frederic, F.G.S.
Walker, James, M.A.
Walker, Professor James, D.Sc.
Watson, William, B.Sc.
Whitehead, Charles, F.L.S.
Whymper, Edward, F.R.G.S.
Windle, Bertram Coghill Allen, M.D.
Woodward, Arthur Smith, F.G.S.
Wright, Professor Edward Perceval, M.A.

The following Papers were read:

I. "Perturbations of the Leonids." By Dr. G. J. STONEY, F.R.S.
and Dr. Downing, F.R.S.

II. "On Flapping Flight of Aéroplanes." By Professor M. F. FITZ-
GERALD. Communicated by Professor G. F. FITZGERALD, F.R.S.

III. "On Hydrogen Peroxide as the Active Agent in producing Pictures
on a Photographic Plate in the Dark." By Dr. J. W. RUSSELL,
F.R.S.

"Perturbations of the Leonids." By G. JOHNSTONE STONEY, M.A.,
D.Sc., F.R.S., and A. M. W. DOWNING, M.A., D.Sc., F.R.S.
Received February 8,—Read March 2, 1899.

When the present investigation was undertaken, our knowledge of
the perturbations of the Leonids was due to an investigation carried
on thirty years ago by Professor J. C. Adams.*

His object was to compute the shift in the nodes of the meteoric
orbit due to perturbations, and to compare the calculated amount with
the amount which had been deduced by Professor Hubert A. Newton
from observations made at intervals during the last 1000 years.†

For Professor Adams's purpose the perturbations to be computed

* 'Comptes Rendus,' March 25, 1867, p. 651; and for a fuller account see
'Monthly Notices of the Roy. Astron. Soc.,' April, 1867, p. 247; or 'Monthly
Notices,' March, 1897, p. 387, where the last-mentioned paper is reprinted.
† 'Silliman's Journal,' 1864, vol. 37, p. 377; and vol. 38, p. 53.
the oxide is still active, or it may be dried over calcium chloride or even exposed to a vacuum for some time, and it is still active, but if heated to 55° for seventeen hours then its activity is gone and a picture the reverse of the former one is obtained, that is, the oxide is now quite inactive, but the metal itself is very slightly active. Oxides of zinc, cadmium, and magnesium, if wetted with peroxide of hydrogen solution, act in the same way and retain their activity with great pertinacity.

From the foregoing experiments it is then concluded that hydrogen peroxide is the agent which directly or indirectly causes the changes in the photographic plate.

This investigation has been carried on in the Davy-Faraday laboratory, and I would again tender my best thanks to the managers of the Royal Institution for allowing me to work there. My thanks are also due to Mr. O. F. Block who has most efficiently helped in carrying on the above experiments.

March 9, 1899.

The LORD LISTER, F.R.C.S., D.C.L., President, in the Chair.

A List of the Presents received was laid on the table, and thanks ordered for them.

The following Papers were read:

I. "A Preliminary Note upon certain Organisms isolated from Cancer, and their Pathogenic Effects upon Animals." By H. G. PLIMMER. Communicated by Dr. ROSE BRADFORD, F.R.S.

II. "On the Gastric Gland of Mollusca and Decapod Crustacea; its Structure and Functions." By Dr. C. A. MACMUNN. Communicated by Professor M. FOSTER, Sec. R.S.

III. "On the Structure and Affinities of Matonina pectinata, R. Br., with Notes on the Geological History of the Matonineae." By A. C. SEWARD, F.R.S.

IV. "A Sugar Bacterium." By Professor MARSHALL WARD, F.R.S., and Professor REYNOLDS GREEN, F.R.S.

V. "Note on a new Form of Light Plane Mirrors." By A. MALLOCK. Communicated by LORD RAYLEIGH, F.R.S.
March 16, 1899.

The LORD LISTER, F.R.C.S., D.C.L., President, in the Chair.

A List of the Presents received was laid on the table, and thanks ordered for them.

The Croonian Lecture, "On the Relation of Motion in Animals and Plants to the Electrical Phenomena which are associated with it," was delivered by Professor Burdon Sanderson, F.R.S.

The following Papers were read:—


II. "On Transmission of Proteosoma to Birds by the Mosquito: a Report to the Malaria Committee of the Royal Society." By Dr. C. W. Daniels.

The Society adjourned over the Easter Recess to Thursday, April 20th.

"On Transmission of Proteosoma to Birds by the Mosquito: a Report to the Malaria Committee of the Royal Society." By Dr. C. W. Daniels. Communicated by Dr. M. Foster, Sec.R.S., by direction of the Malaria Committee. Received February 13,—Read March 16, 1899.

I have the honour to report the results of my observations since my arrival here (Calcutta) on December 21, 1898.

2. Major Ronald Ross, I.M.S., after demonstrating and explaining to me his method of dissecting the mosquito, showed me in prepared specimens the pigmented bodies met with in the stomach walls of mosquitoes fed on birds infected with Proteosoma, and also the changes which these bodies undergo day by day. Finally he demonstrated to me the "germinal threads" in cysts in the stomach wall, in the fluids of the body, and in the cells of the veneno-salivary glands.

3. On my arrival there were in the laboratory, in test-tubes, several series of mosquitoes which had fed on birds infected with Proteosoma on the nights of November 30, December 10, December 12, December 15, and December 20.