PROCEEDINGS

OF THE

ROYAL SOCIETY OF LONDON.

From April 12, 1888, to June 21, 1888.

VOL. XLIV.

LONDON:
HARRISON AND SONS, ST. MARTIN'S LANE,
Printers in Ordinary to Her Majesty.

MDCCLXXXVIII.
LONDON:
HARRISON AND SONS, PRINTERS IN ORDINARY TO HER MAJESTY,
ST. MARTIN'S LANE.
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clear air of Westgate-on-Sea, with a fine 12-inch mirror which has been kindly lent to me by Mr. Common, which have convinced me of the existence of bright carbon flutings in $\alpha$ Orionis. This is the most crucial observation I have been able to suggest.

The necessity for the employment of large apertures in the investigation is shown by the fact that with Mr. Common's mirror I was totally unable to see any lines in the spectrum of $\gamma$ Cassiopeiae except the red line of hydrogen.

The laboratory researches on the spectra of meteorites are also being continued. I am glad to be permitted to state that the meteorites employed from the commencement of my work are fragments of undoubted authenticity which have been placed at my disposal by the Trustees of the British Museum, and my best thanks are due to that body.

I have also to thank Professor Flower and Mr. Fletcher, the official in charge of the Mineral Department, for their kindness in giving me special facilities for studying our national collections.

Finally, as before, I have to thank my assistants, Messrs. Fowler, Taylor, and Richards for the manner in which they have helped me throughout these inquiries. Their intelligent and unflagging zeal have rendered me greatly their debtor.

I also wish to thank Mr. Collings for the care with which the illustrations have been prepared.

*Transactions.*


The Society.


The Museum.


The Society.


The School.


The Academy.

Frankfurt-am-Oder:—Naturwissenschaftlicher Verein. Monatliche Mittheilungen aus dem Gesammtgebiete der Naturwissenschaften. Jahrg. V. Nr. 9-10. 8vo. *[Frankfurt]* 1887-8;
Transactions (continued).
The Verein.
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Part 5. 8vo. Liverpool 1888.
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London:—Institution of Civil Engineers. Minutes of Proceedings.
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4to. London 1888; List of Fellows. 1887. 8vo.
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Royal College of Surgeons. Calendar. 1887. 8vo. London.
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Vol. IV. No. 2. 4to. London 1888.
The Institute.
Society of Antiquaries. List of Fellows. 1887. 8vo. [London.]
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Newcastle-upon-Tyne:—North of England Institute of Mining
and Mechanical Engineers. Transactions. 8vo. Newcastle 1888.
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Paris:—Bibliothèque de l'École des Hautes Études. Sciences Philo-
logiques et Historiques. Fasc. 75. 8vo. Paris 1888.
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8vo. Paris 1888.
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8vo. Paris 1888.
The Society.
St. Petersburg:—Académie Impériale des Sciences. Mémoires.
Tome XXXV. No. 10. 4to. St. Pétersbourg 1887.
The Academy.
Shanghai:—Royal Asiatic Society. (China Branch.) Journal.
Vol. XXII. Nos. 1–2. 8vo. Shanghai 1887.
The Society.
Vienna:—K. K. Geographische Gesellschaft. Mittheilungen. Band
XXX. 8vo. Wien 1887.
The Society.
Transactions (continued).
The Institute.
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Würzburg:—Physikalisch-Medicinische Gesellschaft. Sitzungs-
The Society.

Report.
Liverpool:—Free Public Library, Museum, and Walker Art Gallery.
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Journals.
American Journal of Philology. Vol. VIII. No. 4. 8vo. Baltimore
1887.
The Editor.
L’Ecole des Mines.
Dr. B. W. Richardson, F.R.S.
Bullettino di Bibliografia e di Storia delle Scienze Matematiche e
Fisiche. Tomo XX. Giugno—Luglio, 1887. 4to. Roma.
The Prince Boncompagni.
Janeiro 1888. The Imperial Observatory, Rio de Janeiro.
Royal Agricultural and Commercial Society of British Guiana.

Papers relative to the Royal Society formerly in the possession of Sir
Joseph Banks, including several autograph documents.
The Hon. Edw. Stanhope, M.P.
2. In the case of the perissads (the elements of uneven atomicity) the complete curve which includes their perturbations from the central curve is—

\[ y_n = k \log \left[ a \left( m + \frac{1}{3} \sin \frac{m\pi}{27} + \frac{1}{3} \sin \frac{m\pi}{18} + \text{subsequent terms} \right) \right], \]

the next term being probably either—

\[ -\frac{1}{3} \sin \frac{m\pi}{9}, \quad \text{or} \quad -\frac{2}{3} \sin \frac{m\pi}{9}. \]

3. The form of the function representing the perturbations of the articads is different, at all events after the third term.

Section 3.—There are other neighbouring logarithmic curves which pursue a course close to the observed positions, and in Section 3 the method adopted in dealing with these curves is described, and the grounds on which they have been successively excluded are stated. The evidence relied on has been, for the most part, that the perturbations from them are less reducible to order.

In Section 4 the curve finally selected is thrown into a polar form, and furnishes a diagram of singular convenience for laboratory use. It presents conspicuously the information which a Newlands and Mendelejeff's table is capable of supplying, with the further advantage of also placing before the eye an intelligible representation of the atomic weights.

The last section contains some observations suggested by the investigation.

Presented, April 19, 1888.

Transactions.

Baltimore:—Johns Hopkins University. Circular. Vol. VII. No. 64. 4to. Baltimore 1888. The University.


Transactions (continued).


Royal Society. List of Members. 1887. 4to.


No. 3. 8vo. Buckhurst Hill.


Transactions (continued).
Philadelphiia:—Academy of Natural Sciences. Proceedings. 1887.
No. 2. 8vo. Stockholm 1888. The Academy.

Observations and Reports.
Batavia:—Magnetical and Meteorological Observatory. Observa-
tions. Vol. IX. 4to. Batavia 1887; Regenwaarnemingen in
The Observatory.
Madrid:—Comisión del Mapa Geológico de España. Boletín.
Tomo XIII. Cuaderno 2. 8vo. Madrid 1886.
The Commission.
Mauritius:—Royal Alfred Observatory. Meteorological Results.
The Observatory.
4to. St. Pétersbourg 1887; Jahresbericht. 1887. 8vo. St. Péters-
bourg; Stern-Ephemeriden, 1888. 8vo. St. Pétersbourg 1887.
The Observatory.
Vienna:—K.K. Central-Anstalt für Meteorologie und Erdmagne-
tismus. Jahrbücher, 1886. 4to. Wien 1887.
The Institution.
West Point, N.Y.:—United States Military Academy. Annual
Report, 1887. 8vo. Washington; Official Register, 1887. 8vo.
West Point.
The Academy.
Winnipeg:—Board of Trade. Annual Report. 1887. 8vo. Winnipeg
1888. The Board.
the quadrate acts almost entirely as a tympanic frame. Incus and malleus fuse sometimes with each other, and lean on to the parotic region. The masticatory joint is doubly concave-convex (Monotremata).

VII. The quadrate is converted into the principal part of the tympanic frame, viz., annulus tympanicus. The mandible has lost its articulation with the quadrate, and the masticatory joint is a single concave-convex one, the convexity belonging to the mandible (Mono-
delphia).

Present, April 26, 1888.

Transactions.

Bern:—Naturforschende Gesellschaft. Mittheilungen. 1887. 8vo. 
Bern 1888. 

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The Director.

London:—Royal Institute of British Architects. Journal of Pro-

The Institute.

No. 65. 8vo. London 1888; The Meteorological Record. Vol.
VII. No. 27. 8vo. London [1888]; List of Fellows. 1888.
8vo.

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Madrid:—Real Academia de Ciencias. Memorias. Tomo XII.
8vo. Madrid 1887; Revista de los Progresos de las Ciencias.
Tomo XXII. No. 4. 8vo. Madrid 1887; Annuario. 1888.
12mo. Madrid 1888.

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8vo. Paris 1888.

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8vo. Roma 1888.

The Comitato.

Switzerland:—Schweizerische Naturforschende Gesellschaft. Ver-
handlungen. Jahresbericht 1886–87. 8vo. Frauenfeld 1887;
Compte Rendu des Travaux de la Société Helvétique des
Sciences Naturelles réunie à Frauenfeld, 1887. 8vo. Genève.

The Society.
Observations and Reports.

Calcutta:—Meteorological Observations made at Six Stations in India. October and November, 1887. 4to. [Calcutta].

The Meteorological Office, India.


The Earl of Crawford, F.R.S.


The Office.


The Office.


The Museum.


Dépôt de la Marine.


The College.


The Commission.


The Office.
amount of electrolytic decomposition in a voltmeter, it was practically impossible to have an acting E.M.F. as high as 1 volt, even with tolerably large platinum sponge plates.

Much the same result was obtained on opposing to one another two platinum sponge aeration plates, one in an atmosphere of hydrogen or coal-gas, the other in contact with air; in no case could any current capable of depositing a few milligrams of silver per day be obtained with an E.M.F. as great as 1 volt; i.e., a total depreciation of upwards of 0.5 volt was occasioned, or more than one-third of the energy due to the chemical change, viz., oxidation of hydrogen to water, representing 68360 gram-degrees, or 1470 volt. The economical production of currents by the direct oxidation of combustible gases, therefore, does not seem at present to be a problem likely to be readily solved.

The Society then adjourned over Ascension Day to Thursday, May 17th.

Presents, May 3, 1888.

Observations and Reports.

Barbados:—Report upon the Rainfall of Barbados, and upon its Influence upon the Sugar Crops. 1847-74. Folio. Barbados 1874.


The Office.

Cape Town:—Meteorological Commission. Reports. 1879, 1881-83. Folio. Cape Town 1880-84.


Folio and 8vo. Cape Town.

The Cape Government.


The Survey.


The Survey.
Observations, &c. (continued).


Nice:—Observatoire. Souvenir de la Conférence Géodésique, Session 1887. Obl. 4to. M. Bischoffsheim.

Trieste:—Osservatorio Marittimo. Rapporto Annuale. 1885. 4to. Trieste 1887. The Observatory.


________________________________________________________________________


Dawson (G. S.) Notes and Observations on the Kwakiutl People of Vancouver Island. 4to. Montreal 1888. The Author.


Hirn (G. A.) Remarques sur un Principe de Physique d'où part M. Clausius dans sa Nouvelle Théorie des Moteurs à Vapeur. 4to. Paris 1888. The Author.


Moukhtar Pasha (His Excellency) “The Garden of Moukhtar” [an

H.E. Ghazi Moukhtar Pasha.


Schiaparelli (G. V.) Osservazioni Astronomiche e Fisiche del Pianeta Marte (Mem. 3a). 4to. Roma 1886.


May 17, 1888.

Professor G. G. STOKES, D.C.L., President, in the Chair.

The Presents received were laid on the table, and thanks ordered for them.

The following Papers were read:—

I. "On the Electromotive Properties of the Leaf of Dionaea in the Excited and Unexcited State. No. II." By J. BURDON SANDERSON, M.A., M.D., F.R.S., Professor of Physiology in the University of Oxford. Received April 17, 1888.

(Abstract.)

The author has continued his experimental enquiries, of which the results were communicated to the Royal Society under the same title in 1881. In the introduction to the paper he gives a summary of his previous observations, which led to the conclusion that the property, by virtue of which the excitable structures of the leaf respond to stimulation, is of the same nature with that possessed by the similarly-endowed structures of animals. He then proceeds to state that the main purpose of his subsequent investigations has been to determine the relation between two sets of phenomena which might, in accordance with the language commonly used in animal physiology, be termed respectively those of the "resting current" and of the "action
end be “free,” a difficulty arises. At such an end the solution requires the existence of a radial stress $U \propto (2\ell + 1)^3 r (a^2 - r^2)/l^5$, where $\ell$ is an integer depending on the number of the harmonic of the fundamental note and $l$ denotes the length of the bar. The value given above for $k$ thus answers to a problem differing to a certain extent from that occurring in nature in the case either of “fixed-free” or of “free-free” vibrations. There will thus be a difference in these cases between the results of experiment and those of the accepted theory, even as amended by Lord Rayleigh. This divergence will increase rapidly with the order of the harmonic, and though very small for a long thin bar will increase rapidly as the ratio of the diameter to the length is increased. Since in dealing with the conditions at the curved surface, terms of the order $(a/l)^5$ were neglected, the same remarks apply, though to a smaller extent, in the case of the “fixed-fixed” vibrations.

From the values of $u$ and $w$, which are obtained explicitly, it is shown that the hypothesis made by Lord Rayleigh is true as a first, and only as a first, approximation.

The Society adjourned over the Whitsuntide Recess to Thursday, May 31st.

Presents, May 17, 1888.

Transactions.


Transactions (continued).


Journals.


The Editor.

Bullettino di Bibliografia e di Storia della Scienze Matematiche e Fisiche. Maggio, 1887. 4to. Roma.

The Prince Boncompagni.


The British Horological Institute.


The Editors.


The Editor.

Mittheilungen aus der Zoologischen Station zu Neapel. Bd. VIII. Heft 1. 8vo. Berlin 1888.

Dr. Dohrn.


Imperial Observatory, Rio de Janeiro.
May 28, 1888.

Professor G. G. STOKES, D.C.L., President, in the Chair.

The Croonian Lecture—"Üeber die Entstehung der Vitalen Bewegung"—was delivered by Professor W. Kühne, of Heidelberg, in the Theatre of the Royal Institution.

[Publication deferred.]

May 31, 1888.

Professor G. G. STOKES, D.C.L., President, in the Chair.

The Presents received were laid on the table, and thanks ordered for them.

Mr. George King (elected 1887) was admitted into the Society.

Pursuant to notice, Professors Edmond Becquerel, Hermann Kopp, Eduard F. W. Pflüger, and Julius Sachs were balloted for and elected Foreign Members of the Society.

The following Papers were read:

I. "On the Effect of Occluded Gases on the Thermo-electric Properties of Bodies, and on their Resistances; also on the Thermo-electric and other Properties of Graphite and Carbon." By JAMES MONCKMAN, D.Sc. Communicated by Professor J. J. THOMSON, F.R.S. Received May 1, 1888.

"Le Roux has shown that when a notch is filed into a wire and one side heated there is in general a thermo-electric current. He also found that when two wires of the same metal, with flat ends, are
Transactions.


University of the State of New York. Annual Reports. 1885–86. 8vo. Albany; Historical and Statistical Record of the University, 1784–1884. 8vo. Albany 1885. The University.


Transactions (continued).


Fayrer (Sir J.), F.R.S. The Natural History and Epidemiology of Cholera. 8vo. *London* 1888.


Jones (T. R.), F.R.S., and H. Woodward, F.R.S. On some Scandinavian Phyllocarida. Parts 1–2. 8vo. *Hertford* 1888; A Mono-
"On the Coagulation of the Blood." Preliminary Communication. By W. D. HALLIBURTON, M.D., B.Sc., Assistant Professor of Physiology, University College, London. Communicated by Professor E. A. SCHÄFER, F.R.S. (From the Physiological Laboratory, University College, London.) Received March 20,—Read April, 26, 1888.

The theory to account for the coagulation of the blood which is most generally accepted at the present day is that of Hammarsten; he teaches that coagulation is dependent upon the conversion of a proteid substance, fibrinogen, which exists in solution in the plasma, into fibrin by means of a ferment liberated by the disintegration of the white blood corpuscles which occurs when the blood leaves the living blood-vessels. This theory has replaced the older one of Al. Schmidt, who taught that fibrin is formed by the union of two fibrin-generators, one of which is the fibrinogen just mentioned, and the other of which he called fibrinoplastic substance or paraglobulin; this union, moreover, occurs under the influence of a third factor, the fibrin ferment.* Hammarsten† showed that paraglobulin, or as it is now more generally called serum globulin, is not necessary for the formation of fibrin.

The present research was directed to determining the nature of the ferment that produces this change in fibrinogen. The result at which I have arrived is sufficiently definite to warrant a preliminary statement of the facts observed; the full details of the experiments, as well as those of certain others which are at present in progress, will be reserved for a later communication.

I will first briefly relate some preliminary experiments‡ which had

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* Pflüger's Archiv,' vol. 6, p. 413 et seq.
† Ibid., vol. 14, p. 211; 17, p. 413; 18, p. 38; 19, p. 563.
‡ An account of some of these preliminary experiments is contained in the report VOL. XLIV.
(2)—are not obviated by section of all the visible branches of the annulus of Vienssens, and of the vago-sympathetic in the neck and thorax. They appear to depend on properties of the heart itself, and not on the influence of extra-cardiac nerves.

DESCRIPTION OF FIGURES.

Fig. 1.—Tracing of auricles and ventricles, showing effects of clamping descending aorta (Ao.). In the ventricular tracing the upward movement indicates contraction; in the auricular tracing the downward movement indicates contraction. The time tracing shows half seconds.

Fig. 2.—Tracing of auricles. Downward movement indicates contraction. Descending aorta clamped at the point marked ↓, and released at ↑. Time marker indicates half seconds.

Fig. 3.—Tracing of auricles and ventricles. In the ventricular tracing contraction is represented by the upward movement, in the auricular tracing by the downward movement. Time marker shows half seconds. Clamping of descending aorta.

Fig. 4.—Tracing of ventricles; upward movement indicates contraction. Increase in size of beats during the closure of the descending aorta. Time marker indicates half seconds.

Fig. 5.—Tracings of auricles, ventricles and blood-pressure in left carotid artery. The lowest tracing marks the time in half seconds. The level of the ventricular tracing rises during closure of the descending aorta; there is incomplete emptying of the left ventricle at each systole.

Transactions.


Transactions (continued).


Foote (R. B.) Notes on some recent Neolithic and Palæolithic Finds in South India. 8vo. Calcutta 1887.


Rambaut (A. A.) The Total Lunar Eclipse of 1888, January 28, observed at the Dunsink Observatory. 8vo. London 1888; with two other excerpts in 8vo.


Record Department, India Office.

Rokeby (T.) The Diary of Mr. Justice Rokeby. 4to. [London 1888.]

Sir H. Peek, Bart.

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for some time against it will wear grooves or facets upon it. When a cut diamond is rubbed on the surface of the skin, it will cut through it into the carbon beneath, making a black line or opening about \( \frac{1}{4} \)-inch long; the facet on the diamond, originally \( \frac{1}{32} \)-inch diameter, will have its corners evenly rounded, and its polished surface reduced to about one-half its original area; the appearance of the edges is as if they had been rubbed down by a nearly equally hard substance.

The subject of the last experiment is scarcely sufficiently investigated to warrant any definite conclusions.

The substance in the several ways it has so far been tested seems to possess a hardness of nearly if not quite the first quality. The minuteness of the particles, which appear more or less cemented together, and are less cohesive after the action of acid, make it very difficult to determine their distinctive features.

The mode of formation is not inconsistent with the conditions of pressure, temperature, and the presence of moisture, lime, silica, and other substances as they appear to have existed in the craters or spouts of the Cape Diamond Mines at some epoch.

From the few experiments that have been made it appears that at pressures below 3 tons per square inch, the deposit does not possess the same hardness, though somewhat similar in appearance.

What part the lime and silica play, whether the former only supplies moisture and oxygen which combine with the carbon, or whether the presence of lime is necessary to the action, is not clear.

We may, however, observe that so far it seems as if the lime and moisture combining with the carbon form a gas or liquid at great pressure, which combining with the silica, forms some compound of lime, silica, and carbon, or perhaps pure carbon only, of great hardness.

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Transactions.  


Transactions (continued).


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June 21, 1888.

Professor G. G. STOKES, D.C.L., President, in the Chair.

An Address to the Queen, expressing sympathy with Her Majesty and with her daughter, the Empress of Germany, on the death of the Emperor, was read from the Chair.

Colonel Alexander Ross Clarke, Professor Alfred George Greenhill, and Professor John Henry Poynting were admitted into the Society.

The Presents received were laid on the table, and thanks ordered for them.

The following Papers were read:

I. "Further Researches on the Physiology of the Invertebrata." By A. B. GRIFFITHS, Ph.D., F.R.S. (Edin.), F.C.S. (Lond. and Paris), Principal and Lecturer on Chemistry and Biology, School of Science, Lincoln; Member of the Physico-Chemical Society of St. Petersburg. Communicated by SIR RICHARD OWEN, K.C.B., F.R.S. Received May 25, 1888.

I. The Renal Organs of the Asteridea.

The digestive apparatus of Uranus rubens (one of the Asteridea) is briefly described as follows:—The capacious mouth, found upon the under side, leads into a short oesophagus, which opens into a wider sacculated stomach with thin distensible walls. There are five large stomach sacs; each of these is situated in a radial position and passes into the base of the corresponding ray. Each sac or pouch is kept in its place by two retractor muscles fixed to the median ridge of the ray, which lie between the two ampullæ or water-sacs. Passing
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quarter ended 31st December, 1887. Folio. Melbourne [1888.]”
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