LONDON:
HARRISON AND SONS, Printers in Ordinary to Her Majesty,
ST. MARTIN'S LANE.
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**Presents, December 5, 1889.**

**Transactions.**


Transactions (continued).

Observations and Reports.
Calcutta.—Meteorological Observations recorded at Seven Stations in India. Description of the Stations. 4to. Calcutta 1889. Meteorological Office, Calcutta.
Christiania.—Norwegisches Meteorologisches Institut. Jahrbuch, 1887. 4to. Christiania, 1889. The Institute.
Dun Echt.—Observatory. Circulars. Nos. 171-178. 4to. [Sheet.] 1889. The Earl of Crawford, F.R.S.
Edinburgh.—Royal Observatory. Circular. No. 1. 4to. [Sheet.] 1889. The Observatory.
Greenwich.—Royal Observatory. Rates of Chronometers on Trial by the Board of Admiralty. 4to. [London] 1889; Rates of Deck Watches on Trial for Purchase by the Board of Admiralty. 4to. [London] 1889. The Observatory.
Observations, &c. (continued).


Science and Art Department. Report to the Department on the Action of Light on Water Colours. 8vo. London 1888. The Department.


Framed Engraved Portrait of Brook Taylor, LL.D. (Sec. R. S., 1714). Prof. Greenhill, F.R.S.
Transactions.


The Association.


St. Bartholomew's Hospital. Statistical Tables of Patients under Treatment during 1888. 8vo. London 1889. The Hospital.


Transactions (continued).


Journals.


Asclepiad (The). Vol. VI. Nos. 23–24. 8vo. London 1889. Dr. Richardson, F.R.S.


Journals (continued).


The Horological Institute.


Mittheilungen aus der Zoologischen Station zu Neapel. Bd. IX. Heft 2. 8vo. Berlin 1889.

Dr. Dohrn.


The Editors.


Finlayson (J.) Account of the Life and Works of Maister Peter Lowe, Founder of the Faculty of Physicians and Surgeons of Glasgow. Sm. 4to. Glasgow 1889. The Author.


Rust (A.) Electricity theoretically and practically considered by the aid of Thermo-Electricity. 8vo. London 1888. The Author.

change of curvature is large in comparison with the extension, except at points in the neighbourhood of the edge, where $a \left(\frac{1}{2} \pi - \phi\right)$ is comparable with $b$.

It is also shown that the tension $T_1$ parallel to the axis, and the couple $G_2$ about a circular section do not vanish at the circular edges, but have finite values; and therefore a tension and a couple of the proper amount, which tends to produce synclastic curvature of the generating lines must be applied at the circular edges. If, therefore, this force and couple were removed, anticlastic curvature of the generating lines would be produced, and this would involve extension of the middle surface parallel to the axis. It is, however, obvious that a thin shell, under these circumstances, does not assume a saddle-back form, and therefore the anticlastic curvature, and the extension upon which it depends, must be exceedingly small, except in the neighbourhood of the circular edges.

The difficulty of satisfying the boundary conditions at a curved free edge, when the middle surface is supposed to be inextensible, partly arises from the fact that it is impossible for the flexural couple about the curved edge to vanish, unless some extension or contraction takes place in the neighbourhood of the edge; but the inference to be drawn from the statical problem considered above is, that when a thin shell, whose edges are free, is vibrating, the amplitudes of those terms upon which the extension depends are small in comparison with the amplitudes of those terms upon which the bending depends. Moreover, a variety of results which have been obtained during recent years indicate, that the pitch of notes which depend upon extension is very high, compared with the pitch of notes which depend upon flexure; and this circumstance, combined with the smallness of the amplitudes of the extensional vibrations, points to the conclusion that the former notes are usually feeble in comparison with the latter.

The values of the edge stresses and the equations of motion are also obtained for a spherical shell, but the work is the same as in the case of a cylindrical shell, except in matters of detail.

The Society adjourned over the Christmas Recess to Thursday, January 9th, 1890.

*Presents, December 19, 1889.*

Transactions.

Halle:—Verein für Erdkunde. Mitteilungen. 1889. 8vo. *Halle*

1889. The Verein.


fors* 1888. The Society.

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Transactions (continued).


Transactions (continued).


The Club.


Observations and Reports.


India:—Tide-Tables for the Indian Ports for 1890. Parts 1–2. 12mo. *London* [1889]. The India Office.


Observations, &c. (continued).

Observatory. Monthly Record. 1888, November to December, 1889, January to June. 8vo. Melbourne. The Observatory.


The Observatory.


The Observatory.

Newcastle-upon-Tyne:—Public Library. Eighth Report. 1888–89. 8vo. Newcastle 1889; List of Books added to the Lending and Juvenile Department 1887–89. 8vo. Newcastle 1889.

The Library.

New Haven:—Observatory, Yale University. Report, 1888–89. 8vo. [New Haven].

The Observatory.


The Department.


Department of Mines, Sydney.


The Survey.


The Observatory.


The Service.


The Commission.


The Observatory.


The Observatory.


The Bureau.


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


The Observatory.


The Museum.

Observatory. Results of Meteorological Observations made in New South Wales during 1887. 8vo. Sydney 1889; Results of Rain, River, and Evaporation Observations made in New South Wales during 1888. 8vo. Sydney 1889.

The Observatory.


The Australian Museum.

Triest:—Osservatorio Marittimo. Rapporto Annuale. 1886. 4to. Trieste 1889.

The Observatory.


The Observatory.


The Author.


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Bldget (L.) Climatology of Pennsylvania. 8vo. Harrisburg 1889.

Franklin Institute, Philadelphia.


Prof. Bütschli.


The Author.

Cunningham (D. J.) The Occasional Eighth True Rib in Man and its Relation to Right Handedness. 8vo. [London 1889.] With one other Excerpt. 8vo.

The Author.


Meteorologiska Observatorium, Upsala.


The Author.


Ministère de l'Instruction Publique, Paris.


Mensbrugghe (G. van der) Sur un Genre Particulier d'Expériences Capillaires. 8vo. Bruxelles 1889. With one other Excerpt. 8vo. The Author.


Academia Real das Ciencias, Lisboa.


Rosa (A. de la) Estudio de la Filosofia y Riqueza de la Lengua Mexicana. 8vo. Guadalajara 1889.

Observatorio Meteorol.-Magnético Central, México.


The Author.

Russell (H. C.), F.R.S. Address at the First Meeting of the Australasian Association for the Advancement of Science. 8vo. [Sydney 1889]. With Six additional Pamphlets. 8vo. [1888-89]. The Author.

Scaechi (A.) Il Vulcanetto di Puccianello. 4to. Napoli 1889.

The Author.


cules which the impressed electromotive force can detach and send off from the hot negative electrode.

This unilateral conductivity of vacuous spaces having unequally heated electrodes has been examined by MM. Elster and Geitel (see 'Wiedemann's Annalen,' vol. 38, 1889, p. 40), and also by Goldstein ('Wied. Ann.,' vol. 24, 1885, p. 83), who in experiments of various kinds have demonstrated that when an electric discharge across a vacuous space takes place from a carbon conductor to another electrode, the discharge takes place at lower electromotive force when the carbon conductor is the negative electrode and is rendered incandescent.

III. "A Milk Dentition in Orycteropus." By OLDFIELD THOMAS, Natural History Museum. Communicated by Dr. A. GÜNTER, F.R.S. Received December 12, 1889.

[Publication deferred.]

Transactions.


The Trustees.
Transactions (continued).


Journals.


Analyst (The). July to November, 1889. 8vo. London. The Editor.
Journals (continued).


Athenæum (The) July to December, 1889. 4to. London. The Editor.

Builder (The) July to December, 1889. Folio. London. The Editor.


Chemical News (The) July to December, 1889. 8vo. London. Mr. W. Crookes, F.R.S.


Electrical Engineer (The) July to December, 1889. Folio. London. The Editor.

Electrical Review (The) July to December, 1889. Folio. London. The Editor.

Electrician (The) July to December, 1889. Folio. London. The Editor.

Industries. July to December, 1889. 4to. London. The Editor.


Morskoi Sbornik. [Russian.] July to December, 1889. 8vo. St. Petersburg. Compass Observatory, Cronstadt. The Editor.

Naturalist (The) July to December, 1889. 8vo. London. The Editors.


Notes and Queries. July to December, 1889. 4to. London. The Editor.

Observatory (The) July to December, 1889. 8vo. London. The Editors.


Symons's Monthly Meteorological Magazine. July to December, 1889. 8vo. London. Mr. Symons, F.R.S.

where $\theta$ in both lies between 0 and $\frac{1}{2}\pi$, and $\cos^{-1} a$ is the inclination of the stream to the plane.

In the second part of the paper, some general transformation theorems are obtained, which are applicable to problems of electric condensers, forms of hollow vortices, &c.

If two polygons lie one within the other, the transformation of the area between them which makes the boundaries $\psi$ curve is

$$\frac{dz}{dw} = \Pi_r\left\{\theta[a(w-w_r)]H[a(w-w_r)]\right\}^{-\frac{\alpha_r}{\pi}}$$

where $\alpha_r$ is the internal angle of the polygon at $w = w_r$, and $\theta, H$ are the elliptic functions usually so indicated.

A similar transformation is given for the case in which one polygon lies outside the other. The method is then applied to find the form of hollow vortices in certain cases. The transformation which gives the motion due to a stationary hollow vortex between two parallel planes is

$$z = A \log \tan (w - \frac{1}{2}iK').$$

Transactions.


Transactions (continued).


Transactions (continued).


The Academy.


The Society.


The Academy.

Observations and Reports.


The Registrar-General.


The Office.


The Office.


The Survey.


The Commission.


The Office.


The Office.

Balfour (T. Graham), F.R.S. Address delivered before the Royal Statistical Society, November 1889, as President. 8vo. London.

The Author.


The Author.


The Author.


The Author.
Marriott (W.) The Thunderstorms of June 2nd, 6th, and 7th, 1889. 8vo. [London.] The Author.
Transactions.


Transactions (continued).


The School.


The Academy.


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The Society.

University. Calendar. 1889. 8vo. Sydney.

The University.

Observations and Reports.


The Library.

University of the State of New York. Reports. 1887–89. 8vo. Albany.

The University.


The Registrar-General.


Department of Mines, Sydney.


The Government of Victoria.


The Registrar-General.


The Observatory.


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


January 30, 1890.

Sir G. GABRIEL STOKES, Bart., President, in the Chair.

In pursuance of notice sent to the Fellows, an election was held to fill the vacancy upon the Council occasioned by the death of the Rev. S. J. Perry.

The Statutes relating to the election of the Council and the Statute relating to the election of a Member of Council upon the occurrence of a vacancy were read, and Mr. Hulke and Mr. Stainton having been, with the consent of the Society, nominated Scrutators, the votes of the Fellows present were taken, and Mr. William Henry Mahoney Christie, Astronomer Royal, was declared duly elected.

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

The following Papers were read:—

I. "Investigations into the Effects of Training Walls in an Estuary like the Mersey." By L. F. VERNON-HARCOURT, M.A., M.Inst.C.E. Communicated by A. G. VERNON-HARCOURT, F.R.S. Received January 21, 1890.

(Abstract.)

A description was given in a previous paper of the results of experiments with training walls in a working model of the tidal Seine,* and the present investigations were carried out with a similar working

Presents, January 30, 1890.

Transactions.


Transactions (continued).
Nottingham:—University College. Calendar. 1889–90. 8vo. Nottingham.

Argutinsky (P.) Muskelarbeit und Stickstoffumsatz. With two other excerpts in one part. 8vo. Bonn 1890.
Cassal (C. E.) Annual Reports of the Public Analyst for the Parish of St. Mary, Battersea; St. George, Hanover Square; and the Parish of Kensington. 1889. 8vo. London.
Coode (Sir J.) Address as President of the Institution of Civil Engineers. 8vo. London 1889.

considered, which is in fact that of fundamental or single-unitary symmetric functions.

These partition operations possess an algebra also in exact correspondence with the algebra of quantity.

In § 10 the partition obliterating operations are applied to the theory of multiplication.

In § 12 a transformation is established by means of which functions of differences can, with special exceptions, be converted into non-single-unitary symmetric functions. This theorem is the analogue of the transformation of the theory of invariants first given by the author in Vol. 6 of the 'American Journal of Mathematics.'

§ 15 proves a useful law to which the tabular numbers are subject, connected with the idea of grouping the separations together in a particular manner.

In conclusion the memoir consolidates and largely generalises the author's recent researches alluded to above at the beginning of the Abstract.

Presents, February 6, 1890.

Transactions.


Transactions (continued).


Royal Society of Edinburgh. List of Members, November 1889. 4to. *[Edinburgh 1890]*. The Society.


Anderson (J.) F.R.S. English Intercourse with Siam in the Seventeenth Century. 8vo. *London* 1890; Contributions to the Fauna of Mergui and its Archipelago. 2 Vols. 8vo. *London* 1889. [Chiefly reprints of papers by Dr. Anderson and others.] Dr. Anderson, F.R.S.


et la distance des arêtes serait, à 62° F., en arrondissant le chiffre des microns:

1.001801 m.

G. DEFFORGES.

[Note.—Since the above was in type I have been favoured by Mr. O. H. Tittmann with a copy of the U. S. Coast and Geodetic Survey’s ‘Bulletin,’ No. 9, dated 15th June, 1889, on the relation of the yard to the metre, in which it is shown that the value 1 metre = 39.36980 inches is somewhat more probable than the value above adopted from Col. Clarke. This value makes the distance between divisions 0 and 39.4 of the Shuckburgh scale = 39.399796 inches, showing an error of −0.0002 instead of +0.0004 inches, as above indicated.—March 24, 1890.—J. T. W.]

III. “Note on the Spectrum of the Nebula of Orion.” By J. NORMAN LOCKYER, F.R.S. Received February 13, 1890.

[Publication deferred.]

IV. “Preliminary Note on Photographs of the Spectrum of the Nebula in Orion.” By J. NORMAN LOCKYER, F.R.S. Received February 13, 1890.

[Publication deferred.]

Transactions.


London:—Middlesex Hospital. Reports of the Medical, Surgical, and Pathological Registrars. 1888. 8vo. London 1889. The Hospital.

Transactions (continued).


Louvain:—Université Catholique. Theses. 1888–89. 8vo. Lovaniæ; Annuaire. 1890. 12mo. Louvain. With various miscellaneous publications of the University. 8vo. 1887–89.

The University.


The Society.


The Society.

Montpellier:—Académie des Sciences et Lettres. Mémoires (Section des Lettres). Tome VIII. Fasc. 3. 4to. Montpellier 1889.

The Academy.


The College.


The Society.


The Academy.


The Institute.


The Institute.


The Society.


The Academy.

Transactions (continued).

The Society.

The Society.

Journals.

The Editor.

R. Istituto Veneto.

Natural History Society, Montreal.


British Horological Institute.

Medico-Legal Society, New York.

Prof. Gegenbaur, For. Mem. R.S.

Naturalist (The) Nos. 174-175. 8vo. London 1890.
The Editors.

Revista de los Progresos de las Ciencias Exactas, Físicas y Naturales. Tomo XXII. Nos. 5-7. 8vo. Madrid 1888-89.
Academy of Sciences, Madrid.

The Observatory, Rio de Janeiro.

Revue Médico-Pharmaceutique. Année II. Nos. 7-12. 4to. Constantinople 1889.
The Editor.

Prof. Pasquale Freda.

Toesin (The) No. 7. 4to. London 1889.
The Editor.

Year-Book of Pharmacy. 1889. 8vo. London.
The Pharmaceutical Society.
sine, and hydrocyanic acid. It thus appears probable that the colour 
reaction of the proteids that occurs on addition of a cupric salt and 
an alkali is due to the existence in the proteid also of cyanogen. 

Just as some proteids give a rose-red colour, and others a violet, so, 
in the list of substances just enumerated, some give a rose-red, and 
some a violet. Biuret was the substance in which a rose-red colour 
was first noted; hence the term biuret reaction, as applied to peptones. 
Cyanuric acid was the substance in which a violet colour was first 
noted. Probably in both cases the reaction is due to a cyanogen 
radicle; but the cause of the difference in colour is unknown. In the 
same way, our ignorance of the constitution of the proteid molecule 
stands in the way of our discovering the difference between peptones 
that give a rose-red colour and albumins that give a violet colour. 

The term biuret reaction is to some extent a misnomer, as applied 
to the peptones and albumoses; the test with the modification I have 
introduced behaves a little differently in the two cases. The substance 
that peptone most nearly resembles in its colour reactions is hydro-
cyanic acid, as is shown in the table (p. 209), in which a contrast is 
drawn between the chief substances which I have examined. 

Using the word cyanogen in the widest possible sense, the con-
clusion I should draw from such a series of experiments is that the 
colour reaction with a cupric salt and an alkali is a cyanogen 
reaction. Among the simpler organic bodies examined, we have 
certain cyanogen compounds, like cyanuric acid, that give a violet 
colour; and certain proteids (the albumins and globulins) give the 
same colour. There are certain other substances, like biuret, which 
give a red colour without any intermediate violet stage; there are 
others, like hydrocyanic acid, which give a violet colour with 
ammonia, which is turned red by potash or soda; and to this last 
group the peptones also belong. Just as there is a different combina-
tion of the cyanogen in cyanuric acid from that in hydrocyanic acid, 
so there is probably the same difference between the combination of 
the cyanogen in albumin and peptone respectively; and this difference 
is, as a rule, brought about by a digestive ferment.
Transactions (continued).


Albert 1st, Prince de Monaco. Résultats des Campagnes Scientifiques accomplies sur son Yacht. Fasc. 1. 4to. Monaco 1889.

H.S.H. Prince Albert of Monaco.


The Bavarian Academy of Sciences.


The Government of India.
vate the fungus in one green-house and the host in another, each by itself, we should endeavour to provide the one set of conditions for the fungus, and another and very different set for the host.

*Presents, February 27, 1890.*

Transactions.


The Society.

Amsterdam:—Koninklijke Akademie van Wetenschappen. Verhandelingen (Letterkunde). Deel XVIII. 4to. *Amsterdam* 1889; Verslagen en Mededeelingen (Letterkunde). Deel V. 8vo. *Amsterdam* 1888; Ditto (Natuurkunde). Deel V. 8vo. *Amsterdam* 1889; Jaarboek. 1888. 8vo. *Amsterdam* [1889.]

The Academy.


The Institute.


The Society.
Transactions (continued).


Observations and Reports.


The Survey.
Observations, &c. (continued).
San Fernando:—Instituto y Observatorio de Marina. Anales (Observaciones Meteorológicas). Año 1888. 4to. San Fernando 1889. The Observatory.

"On the Steam Calorimeter." By J. Joly, M.A., B.E., Assistant to the Professor of Civil Engineering, Trinity College, Dublin. Communicated by Professor Fitzgerald, M.A., F.R.S., F.T.C.D. Received November 26,—Read December 19, 1889.

[Plates 6, 7.]

In two papers read before the Royal Society,* some three years ago, I described a "Method of Condensation" in calorimetry. A number of experiments in support of the reliability of the new method are contained in those papers, as well as a description of such forms of apparatus as I had then been using. The apparatus, however, could not be said to be the result of a very prolonged study of the capabilities of the method, and possessed many defects, chiefly on the score of convenience in effecting the measurements. A continued use of the method since that time and its application to some exacting measurements have led to various alterations in the apparatus, so that, after many reconstructions, entirely new forms have been conferred on the instrument. I purpose to describe two new forms: a single calorimeter similar in type to the older instrument, but differing in construction; and a differential calorimeter, rendering possible measurements which could hardly be effected in the single type of instrument.

In the interval, too, a wider knowledge of the capabilities of the method has been acquired. Its errors have been enquired into. On the question of the errors arising from radiation many hundreds of experiments have been made. The general results of these will be found in the following pages. Again, I have from time to time tabulated such data as are of use in the applications of this calorimetric method. These I ask permission to include, so as to render this account of the method as complete as it can, within convenient bounds, be made. As, however, descriptions of the principles of the method, and of many experimental tests to which it has been subjected, are accessible both in Professor Bunsen's paper† on the

Transactions.
Royal College of Physicians. List of Fellows, &c. 1890. 8vo. London.
Transactions (continued).


The Academy.


The Academy.


The Institution.


The Institute.


The Society.


The Academy.


The Academy.

Observations and Reports.


The Institute.


The Census Commission.


The Observatory.


The Institute.


The Office.


The Department.


The Observatory.
March 13, 1890.

Sir HENRY E. ROSCOE, Knt., Vice-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 Organisation of the Fossil Plants of the Coal-measures. Part XVII." By WILLIAM CRAWFORD WILLIAMSON, LL.D., F.R.S., Professor of Botany in the Owens College, Manchester. Received February 8, 1890.

(Abstract.)

In 1873 the author described in the 'Phil. Trans.' an interesting stem of a plant from the Lower Carboniferous beds of Lancashire, under the name of Lyginodendron Oldhamiun. He also called attention to some petioles of ferns, more fully described in 1874 under the name of Rachiopteris aspera. The former of these plants possessed a highly organised, exogenously developed, xylem zone, whilst Rachiopteris was only supplied with what looked like closed bundles. Since the dates referred to, a large amount of additional information has been obtained respecting both these plants. Structures, either not seen, or at least ill-preserved, have now been discovered, throwing fresh light on their affinities; but most important of all is the proof that the Rachiopteris aspera is now completely identified as the foliar rachis or petiole of the Lyginodendron; hence there is no longer room for doubting that, notwithstanding its indisputable possession of an exogenous vascular zone, the bundles of which exhibit both xylem and phloëm elements, along with medullary and phloëm rays, it has been a true Fern. Though such exogenous developments have now been long known to exist amongst the Calamitean and Lycopodiaceous Ferns, as well as in
Although microscopically its form differs slightly when grown in broth and the ammoniacal solution respectively, yet its identity was established beyond question by its returning to its characteristic bacillo-coccus form when grown again in the ammoniacal solution.

The authors have also been able to induce its tardy growth in gelatine-peptone by passing it first through broth cultivations.

The paper is accompanied by carefully executed drawings of the nitrifying organism when grown in the various media employed.
Transactions (continued).
Session 71. 8vo. Soleure 1888; Compte Rendu des Travaux présentés à la 71e Session. 8vo. Genève 1888.

The Society.
The University.

The Institute.


The Institute.

Observations and Reports.


Dun Echt:—Observatory. Circular. No. 179, and last. 4to. [Sheet.] Dun Echt 1890. The Earl of Crawford, F.R.S.


Lyme Regis:—Rousdon Observatory. [Account of the Progress of Observations.] 4to. [Sheet.] 1890. Mr. C. E. Peek.


March 20, 1890.

Sir G. GABRIEL STOKES, Bart., President, in the Chair.

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

The Bakerian Lecture was delivered as follows:—

Bakerian Lecture.—"The Discharge of Electricity through Gases. (Preliminary Communication.)" By ARTHUR SCHUSTER, F.R.S., Professor of Physics in Owens College, Manchester. Received March 20, 1890.

[Publication deferred.]

Transcripts.


Transactions (continued).
No. 3. 8vo. Moscow 1890; Meteorologische Beobachtungen ausgeführt am Meteorologischen Observatorium der Landwirthschaftlichen Akademie. 1889. Erste Hälfte. Obl. 4to. Moskau. The Society.

Observations and Reports.
Observations, &c. (continued).
The Bureau.


McIntosh (W. C.), F.R.S., and E. E. Prince. On the Development and Life Histories of the Teleostean Food- and other Fishes. 4to. Edinburgh 1890. With a number of Excerpt Papers, by Professor McIntosh, and conjointly with various Authors. 4to and 8vo. Professor McIntosh, F.R.S.


Sarasin (E.), and L. de la Rive. Sur la Résonance Multiple des Ondulations Électriques de M. Hertz se propageant le long de Fils Conducteurs. 8vo. Genève 1890. The Authors.

Scacchi (A.) La Regione Vulcanica Fluorifera della Campania. 4to. Firenze 1890; Notizie Istoriche della Società Reale di Napoli. 8vo. Napoli 1889. With Two Excerpts. 4to. The Author.

March 27, 1890.

Sir G. GABRIEL STOKES, Bart., President, in the Chair.

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

The following Papers were read:—

I. "On Black Soap Films." By A. W. REINOLD, M.A., F.R.S., and A. W. RÜCKER, M.A., F.R.S. Received March 1, 1890.

[Publication deferred.]

II. "The Variability of the Temperature of the British Isles, 1869—1883, inclusive." By ROBERT H. SCOTT, F.R.S. Received March 3, 1890.

[Plate 9.]

The mean diurnal variability of temperature has been the subject of several papers which have appeared in the 'Zeitschrift der Oest. Gesells. für Meteorologie,' and elsewhere. Of these the most important is that by Dr. Julius Hann, entitled "Untersuchungen über die Veränderlichkeit der Tagestemperatur."* This paper contained, for ninety stations, distributed over the earth’s surface, the mean diurnal variability of temperature—that is, the mean difference of the temperature of each day from that of the next—and also the frequency of a variation of 2° C., 4° C., 6° C., &c., in each month. Dr. Hann also investigated for a few stations the probability of a change of 2° C. and of 4° C.

In the case of some of the stations taken by Dr. Hann the figures compared were not daily means, but actual readings at corresponding hours on successive days. In such cases the results for variability

* 'Sitzungsberichte der K. Akad. der Wiss. in Wien,' vol. 71, 1875.
(2) (6.) Constriction of blood-vessels of ear.
(7.) Withdrawal of nictitating membrane.

(1) Constant differences between these have not been observed.
(2) These have not been directly compared, but in separate experiments each has been obtained when (1.) to (5.) were no longer seen.

Dog.

(1.) Dilation of arteries of bucco-facial region.
(2.) Movements of eye and opening of eyelids.
(3.) Withdrawal of nictitating membrane.
(4.) Constriction of arteries of gums and lips.
(5.) Dilation of pupil.
(6.) Secretion from sub-maxillary gland.
(7.) Constriction of blood-vessels of the sub-maxillary gland.

(1) Differences between these have not always been observed.

At a certain stage of nicotine poisoning, when stimulation of the sympathetic does not cause withdrawal of the nictitating membrane, but does cause dilation of the pupil, a partial closing of the eye is obtained by stimulating the sympathetic.

It will be noticed that in each animal nicotine abolishes most of the effects of stimulating the cervical sympathetic at very nearly the same time. With regard to these, we think that there is only a *prima facie* case for regarding the differences observed as due to an unequal paralysis of the nerve cells of the superior cervical ganglion, for it is possible that the differences may be due to an unequal tonic stimulation reaching the parts by nerve fibres other than the sympathetic. But the greater differences observed, for instance, between the secretion of saliva and the dilation of the pupil in the cat, the flushing of the lips and the constriction of the vessels of the sub-maxillary gland in the dog, we do not think can be due to such a cause, and we attribute them to an unequal paralysing action of nicotine upon the nerve cells of the superior cervical ganglion.

The Society then adjourned over the Easter Recess to Thursday, April 17th.

*Transactions, March 27, 1890.*


The Society.


The Society.
Transactions (continued).


Transactions (continued).
Heft 1–4. 8vo. Wien 1888–89; Sitzungsberichte (Philos.-
Register zu den Bänden 91 bis 96 der Sitzungsberichte (Math.-
Wien.
The Academy.

Journals.
Archives Néerlandaises des Sciences Exactes et Naturelles. Tome
XXIV. Livr. 1. 8vo. Harlem 1890.
Société Hollandaise des Sciences, Harlem.
Asclepiad (The) Vol. VII. No. 25. 8vo. London 1890.
Dr. Richardson, F.R.S.
Ateneo Veneto. Revista Mensile di Scienze, Lettere ed Arti. 1886,
Novembre–Dicembre; 1887, Gennaio–Febbraio; 1888, Gennaio–
Ottobre. 8vo. Venezia.
Reale Istituto Veneto.
Bullettino di Bibliografia e di Storia delle Scienze Matematiche e
Fisiche. Tomo XX. Indici 1868–1887. 4to. Roma 1890.
The Prince Boncompagni.
Natural History Society, Montreal.
Physikalische Gesellschaft, Berlin.
Galilée (Le) 1890. No. 2. 8vo. Paris 1890.
The Editor.
British Horological Institute.
Naturalist (The) No. 176. 8vo. London 1890.
The Editors.
The Editors.
Christiania 1887, 1889.
The Editors.
Observatory of Rio de Janeiro.
Revue Médico-Pharmaceutique. 1890. Nos. 1–2. 4to. Constantinople.
The Editors.
8vo. Asti 1890.
The Editor.
Royal Agricultural and Commercial Society of British Guiana.
(a.) The early assumption of their permanent position by the limbs.
(b.) The late appearance and obviously degraded character of the hyoid portion of the tongue-bone.
(c.) The position of the nostrils and the peculiar mode of development of the respiratory section of the nasal chamber.
(d.) The total absence of clavicles.

Such characters as the position of the basi-pterygoid processes, the broad vomer, and the presence of Jacobson's cartilages, being paralleled in existing Carinate, some of them even in Passerines, can hardly be considered as of fundamental importance, since they may be derived from a proto-carinate or from an early typical carinate stock.

Before considering the peculiarities in the development of the sternum as of fundamental importance, it will be necessary to study that of the flightless Carinate, and especially of *Stringops*.

The general balance of evidence seems to point to the derivation of both Ratitæ and Carinate from an early group of typical flying birds or *Proto-Carinate*.

IV. "Notes on some peculiar Relations which appear in the Great Pyramid from the precise Measurements of Mr. Flinders Petrie." By Capt. Downing, R.A. Communicated by Sir F. Abel, F.R.S. Received March 13, 1890.
Transactions (continued).


Observations and Reports.


Edinburgh:—Royal Observatory. Circular. No. 6. 4to. [Sheet] 1890. The Observatory.


Liverpool:—Observatory. Results of Meteorological Observations. 1879–83. 8vo. Liverpool 1884; Report of the Astronomer to the Marine Committee, Mersey Docks and Harbour Board. 8vo. Liverpool 1883. The Observatory.

Observations, &c. (continued).

1890; with Reports for 1887-88 of the Agricultural Adviser to the Lords of the Committee of Council for Agriculture. 8vo. London. Mr. C. Whitehead.


The Observatory.


The Bureau.


The Observatory.


Bile Flow for 24 Hours, without Iridin.  

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* 10 a.m., iridin, gr. iv.

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**Transactions.**


Transactions (continued).

Liége:—Société Géologique de Belgique. Annales. Tome XVII.
Livr. 1. 8vo. Liége 1890. The Society.
London:—Institution of Mechanical Engineers. Proceedings. 1889. No. 4. 8vo. London [1890]. The Institution.


Observations and Reports.

Observations, &c. (continued).
The Fur-Seal and other Fisheries of Alaska. Report from the Committee on Merchant Marine of the House of Representa-

Bakerian Lecture.—“The Discharge of Electricity through Gases. (Preliminary Communication.)” By Arthur Schuster, F.R.S. Received and Read March 20, 1890.

“If we accept the hypothesis that the elementary substances are composed of atoms, we cannot avoid concluding that electricity also, positive as well as negative, is divided into definite elementary portions, which behave like atoms of electricity.”—Helmholtz (Faraday Lecture).

I. Introduction.

The phenomena of the electric discharge in gases excite a widespread interest at the present time. It could hardly be otherwise; for although our knowledge of electric manifestations is increasing in all directions, we cannot be assured of the correctness of our explanations while the mysterious appearance of the gas discharge remains unexplained. As long as we still have to account for a series of most puzzling facts, it seems possible that we are on the wrong road altogether, and that there may be some surprise in store for us which will ultimately compel us to reconsider all our present ideas. I have endeavoured during the last ten years to study the gas discharge, with a view to finding some explanation which should be in agreement with the conclusions drawn from other parts of physics.

In the year 1884 I presented to the Royal Society* an outline of a