

5. "Daily Thermometrical Observations at Cape Palmas, for May 1841."

These last three papers were communicated to the Society by the direction of the Lords Commissioners of the Admiralty.

November 30, 1841.

At the Anniversary Meeting,

SIR JOHN WILLIAM LUBBOCK, Bart., V.P. and Treas.,
in the Chair.

Francis Baily, Esq., on the part of the Auditors of the Treasurer's Accounts, reported, that the total receipts during the last year, inclusive of a balance of 937*l.* 19*s.* 7*d.*, carried from the account of the preceding year, amounted to 3874*l.* 14*s.* 9*d.*; and that the total payments in the same period amounted to 3265*l.* 12*s.* 1*d.*, leaving a balance in the hands of the Treasurer of 609*l.* 2*s.* 8*d.*

The thanks of the Meeting were given to the Auditors, for the trouble they have taken in examining the Treasurer's accounts.

The thanks of the Meeting were also voted to the Treasurer, for his services to the Society.

The following Letter from the President addressed to the Society, was read:—

GENTLEMEN,

I regret extremely that my absence from England will prevent my having the honour and pleasure of meeting you at the Anniversary of the Royal Society. The Council will therefore perform the duty, which would otherwise have fallen on me, of adverting to the continued prosperity of our Society, to the losses which it has, however, undergone in the course of nature, and to the adjudication of our Medals. This duty I am sure that they will perform better than I could do, so that, in that point of view, you will be no losers; the loss of a great pleasure in meeting so many scientific friends will fall on myself; but I look forward to the spring, when I hope again to meet you, both in my own house and at our ordinary weekly Meetings. Meanwhile the Royal Society has, as it ever will have, my most earnest wishes for its prosperity and its success, in carrying forward the great object for which it was established—the increase of human knowledge in every department of physical science.

The Vice-President in the Chair informed the Meeting that the Council had voted the following Address to Her Majesty the Queen:—

"To the Queen's most Excellent Majesty.

"The humble Address of the President, Council, and Fellows of the Royal Society of London for improving Natural Knowledge.

"MOST GRACIOUS SOVEREIGN,

"We, Your Majesty's most dutiful and loyal subjects, the President, Council, and Fellows of the Royal Society of London for im-

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proving Natural Knowledge, approach Your Majesty to offer our humble and heartfelt congratulations on the birth of the Heir to the Throne of the British Empire. The Almighty Disposer of events has vouchsafed to Your Majesty His protection in a season of much pain and peril ; and we pray that a life so dear to Your Majesty's subjects may long be preserved, through the same Divine Grace.

" We ardently hope that Your Majesty's Son may be endowed with health and strength ; that he may be adorned with every virtue which can dignify his station ; and we pray that Your Majesty may continue to be blest with all prosperity."

The Vice-President in the Chair also stated to the Meeting that the Council had adopted the following Address to His Royal Highness Prince Albert of Saxe-Coburg and Gotha :—

" To His Royal Highness Prince Albert of Saxe-Coburg and Gotha, K.G., F.R.S.

" The humble Address of the President, Council, and Fellows of the Royal Society of London for improving Natural Knowledge.

" May it please Your Royal Highness,

" We, the President, Council, and Fellows of the Royal Society of London for improving Natural Knowledge, beg leave to approach Your Royal Highness with our most sincere congratulations on the safety of Your Royal Highness's Consort, our beloved Sovereign, and on the birth of His Royal Highness the Duke of Cornwall. It is our most earnest wish that Your Royal Highness may enjoy every domestic blessing, and may witness the maturity of Your Son in every manly virtue."

The Secretary then read the following

Report of the Council to the Society.

The Council have the satisfaction of being able to report to the Society, that the system of Magnetical and Meteorological Observations proposed by the Royal Society, and carried on at various stations on the globe, at the fixed observatories established by the governments of this and of other countries, is at present in full and active operation ; and that an immense mass of documents, relating to terrestrial magnetism and meteorology, is in progress of collection, from which it may reasonably be expected that, after they shall have been properly arranged and digested, the most valuable results, advantageous both to physical science and to practical navigation, will be derived. It may also be noticed, in connexion with this subject, that the series of instructions to the officers of the expedition lately sent out to Africa, for conducting magnetic observations, prepared by Lieut.-Colonel Sabine, has been adopted by the Council, and communicated to the Lords Commissioners of the Admiralty.

The Council have received with gratitude the intimation, com-

municated by the Baron de Brunow, of the earnest desire of the Russian Government to co-operate in the magnetical inquiries now carrying on in various parts of the world. A paper, containing supplemental instructions for the use of the Magnetical Observatories, drawn up by Professor Lloyd, has also, with the sanction of the Council, been recently printed and circulated.

The Astronomer Royal having suggested, that observations on Atmospheric Electricity might with advantage be made at the Meteorological Observatory at Greenwich, the Council, on the advice of the Committee of Physics, have concurred in these views, and have ordered that the requisite instruments should be procured for the purpose of carrying them into effect.

Reference was made to the Council, on the 10th of December last, by the Lords Commissioners of the Admiralty, for their opinion, both of the absolute and the relative merits of certain improvements in the construction of Chronometers, for which rewards were claimed by the inventors. In compliance with this request, the Council appointed a Committee, consisting of the Astronomer Royal, Mr. Wheatstone, and the Rev. R. Willis, to conduct the inquiry and communicate the result to the Council. This task they have accomplished, and have made an able report, which was laid before the Council, and adopted by them on the 10th of June.

A large number of boxes and casts, containing specimens of natural history, received by the Lords of the Admiralty from the Antarctic Expedition, having been sent by them to the Royal Society, with a view to their being placed, or caused to be placed, in such hands as were most likely to secure their present safe custody, and accompanied with the condition that they should not be alienated, nor described in publications before the return of the expedition, the Council, in conformity with this request, have transmitted them to the British Museum, together with the intimation of the wishes of the Lords of the Admiralty relative to their preservation.

The Council have to express their especial thanks for two presents made to the Society: the first, from Charles Vignolles, Esq., of an original portrait of Sir Isaac Newton, painted by Vanderbank; the second, of a portrait of Dr. Dalton, painted by B. R. Faulkner, Esq., which was presented by a Committee appointed at Manchester for procuring a memorial of the distinguished merits of that philosopher.

Report on the state of the Society's Library.

The alterations in the Library of the Society, occasioned by the erection of the gallery, by the removal of the presses from the fire-place, and by the dislocation and re-union of the tracts, having necessarily created much irregularity and confusion, the Council, being desirous of rendering the Library as available as possible to the Members of the Society, have turned their attention, during the last session, to provide greater facilities for reference and consultation, by adopting a new collocation of the books. With this view, after having expended the sum appropriated by the Council for the bind-

ing of all the books that required it, the Library Committee proceeded to consider, first, the means of gaining greater space on the shelves, by collecting together, as far as it was practicable, books of a similar size; and secondly, by adopting a classed arrangement, so that the places occupied by the books should correspond, as nearly as their sizes would admit, with their order in the Catalogue. The Council have the satisfaction of reporting, that this useful and laborious work has, by the great exertions of the Librarian during the summer recess, been effectually performed; and they congratulate the Society on the greater advantages which they will derive from the possession of their extensive collection of books in every department of mathematical and physical science, by the increased facilities now afforded of finding readily any book that may be wanted.

The Council have also to announce that a Catalogue has been made of the books relating to Miscellaneous Literature in the Society's Library. Copies of this Catalogue are now ready for distribution to the Fellows.

The Society is probably aware that, during the preceding year, a Catalogue has been made, in conformity with the directions of the Council, by James Orchard Halliwell, Esq., F.R.S., of the Miscellaneous Manuscripts, comprising highly interesting correspondence of many learned men with the Society, from its first formation to nearly the middle of the eighteenth century.

The re-arrangement of the Library being now completed, it will probably be satisfactory to the Society to know its contents and condition. The Librarian has accordingly been requested to draw up a summary, of which the following is an abstract:—

The total number of bound volumes contained in the Library amounts to	19,045
Besides which, there are contained in it unbound Reports of the House of Commons, in number.	823
There are also 810 unbound tracts, which would form, if bound together, a number of volumes about	150

So that the total number of volumes may be estimated at 20,018

Of these, there are of Scientific volumes	8304
_____ Miscellaneous Literature	5049
_____ Transactions	2076
_____ Journals	3616

Although this is an exact enumeration of the volumes contained in the Library, it is scarcely a just appreciation of their number, from the circumstance of there being, in a multitude of instances, two or three volumes bound in one. The Librarian is not sufficiently prepared, at the present moment, to give satisfactorily the exact number of these, or of the distinct works, throughout the Library and in the different classes; for the precise numbers of volumes in these classes cannot as yet be ascertained. But that the Library is much richer than it would seem from the above enumeration, appears from the circumstance, that, in the Scientific division, 592 volumes con-

tain 3883 distinct tracts; and, in the Miscellaneous portion, 173 volumes contain 1402 tracts. Thus 765 volumes of the above total of 20,018 volumes, comprise as many as 5285 separate works.

The Library contains, besides, a valuable collection of Oriental Manuscripts, especially Sanscrit, formed by Sir William Jones during his residence in the East, and presented to the Society, after his decease, by Lady Jones. Many of these are unique in Europe; and their value is attested by learned foreigners coming to this country for the express purpose of consulting them. Of the Miscellaneous Manuscripts, the autograph of the *Principia*, presented by Sir Isaac Newton to the Society, and from which the first edition was printed, must be considered invaluable. An unpublished MS. of Aubrey's is also in the Library, and contains curious researches frequently referred to by antiquaries. The collection likewise contains MSS. of Pappus Alexandrinus, Statius, Jordanus, Nemorarius, Malpighius, John Robins, &c. The Catalogue of Miscellaneous Literature is peculiarly valuable, as containing autograph letters of the majority of distinguished individuals throughout Europe since the first formation of the Society; for instance, of Newton, Leibnitz, Wren, Hevelius, Huygens, Lister, Ray, Willoughby, &c. &c.

The Library possesses, besides, a large collection of Maps and Charts, and many Engravings; but of these no catalogue is as yet published.

In almost every department of Science, the Library contains all the most valuable works, especially in the mathematical sciences.

In the Miscellaneous division of the Library, the largest proportion of which was acquired by the bequest of the Earl of Arundel, the Library possesses some very interesting books, especially some of the early works of the fifteenth and sixteenth centuries, and many *Editiones principes* of the Classics. The majority of these came into the possession of the Earl of Arundel by the purchase of the library of the celebrated Bilibaldus Pyrcckheimer; particularly the jurists and the early reformers. Of these, the first editions of many of Luther's tracts are interesting. There are, besides, some curious collections of Italian and Spanish poetry.

The earliest printed book in the Library is a splendid copy upon vellum of the Decretals, printed by Fust in 1465, and Tully's Offices, also on vellum, by Fust in 1466; and there are specimens of many of the early German and Italian presses. Of our own, there are copies of Caxton's second edition of Chaucer's Canterbury Tales, and Pynson's first edition of the same works, the first half of which was revised by Caxton. Neither have dates; but the former is supposed by Tyrwhit to have been printed about 1482, and the latter about 1493. With these exceptions, the Library contains but few early English books; for the second folio edition of Shakspeare cannot be so called, as there are scientific books of an earlier date than this in the Library. There are also the majority of the books printed by the Record Commission and by the Oriental Translation fund.

Awards of Medals.

The Council has awarded the Copley Medal for the present year to Dr. G. S. OHM, of Nuremberg, for his researches into the laws of Electric Currents, contained in various memoirs published in Schweigger's Journal *, Poggendorff's Annalen, and also in a separate work, entitled *Die Galvanische Kette Mathematisch Bearbeitet*, published at Berlin in the year 1827. In these works, Dr. Ohm has established, for the first time, the laws of the electric circuit; a subject of vast importance, and hitherto involved in the greatest uncertainty. He has shown that the usual vague distinctions of intensity and quantity have no foundation, and that all the explanations derived from these considerations are utterly erroneous. He has demonstrated, both theoretically and experimentally, that the action of a circuit is equal to the sum of the electro-motive forces divided by the sum of the resistances; and that whatever be the nature of the current, whether voltaic or thermo-electric, if this quotient be equal, the effect is the same. He has also shown the means of determining with accuracy the values of the separate resistances and electro-motive forces in the circuit. The light which these investigations has thrown on the theory of current electricity is very considerable; and although the labours of Ohm were, for more than ten years, neglected, (Fischner being the only author who, within that time, admitted and confirmed his views,) within the last five years, Gauss, Leng, Jacobi, Poggendorff, Henry, and many other eminent philosophers, have acknowledged the great value of his researches, and their obligations to him in conducting their own investigations. Had the works of Ohm been earlier known, and their value recognised, the industry of experimentalists would have been better rewarded. In this country those who have had most experience in researches in which voltaic agency is concerned, have borne the strongest testimony to the assistance they have derived from this source, and to the invariable accuracy with which the observed phenomena have corresponded with the theory of Ohm. This accordance, it may be observed, is altogether independent of the particular hypothesis which may be adopted as to the origin of electro-motive force; and obtains equally, whether that force is regarded as being derived from the contact of dissimilar metals, or as referable to chemical agency.

* 1. On the electric conductivity of the metals. (Schweigger's Journal, second series, vol. xiv.)

2. Experiments to discover the power of electro-magnetic multipliers. (Ibid. vol. xxv.)

3. Researches to ascertain the nature of unipolar conductors. (Ibid. vol. xxix.)

4. On hydro-electric currents. (Ibid. third series, vol. iii.)

5. Statement of facts destroying the relations which have been confusedly established between several galvanic properties, and particularly hydro-electric conductors. (Ibid. vol. v.)

6. Theory of galvanic currents. (Ibid. vol. vii.)

The Council have awarded one of the Royal Medals for this year, which had been proposed for the subject of Chemistry, to ROBERT KANE, M.D., M.R.I.A., Professor to the Royal Dublin Society, for his paper "On the Chemical History of Archil and Litmus," published in the Philosophical Transactions for 1840.

It has been found that various lichens, which communicate no colour to pure water, strike a fine blue with solution of ammonia. The valuable colouring matters archil, litmus and cudbear, are commercial preparations of these lichens. Some progress had already been made in the investigation of their colouring principles by the labours of Robiquet, Heeren, and Dumas; of which the most important step was the discovery of *Orcine*, and also of *Orcéine*, into which the former is converted by ammonia; but the observations were isolated, and the whole subject was in the greatest obscurity. The present memoir by Dr. Kane records the first attempt to sketch a general history of the class: and, considering the great and peculiar difficulties attending inquiries into organic colouring matters, the attempt may be esteemed eminently successful. It proved an investigation of considerable intricacy and great extent, involving several hundred organic analyses; and it has been conducted in a manner highly creditable to the author's skill as an analyst. The paper contains an account of the discovery of a large number of new compounds, not less than twelve, derived from archil and litmus, together with the more exact discrimination of several others, already known, but imperfectly described. The distinction made of two *Orcéines*, which have hitherto been confounded as one, is a striking result contained in the paper: while the observations on the action of chlorine and of nascent hydrogen upon several of the bodies described, open new branches of inquiry.

The objects which the author had in view in these inquiries were the three following: namely, first, to ascertain the primitive form of the colour-making substance in a given species of lichen, and trace the stages through which it passes before the coloured substance is developed; secondly, to determine the nature of the various colouring substances which exist in the archil of commerce; and thirdly, to examine the colouring materials of ordinary litmus. He finds in the lichen *Rocella tinctoria* the following bodies, either pre-existing in the plant, or formed during the processes employed for its analysis: 1. Erythryline; 2. Erythrine (the Pseudo-erythrine of Heeren); 3. Erythrine bitter; 4. Telerythrine; and 5. Roccelline (the Roccellic acid of Heeren). The properties and constitution of these substances are then described, and the chemical formulæ given, which are deducible from their respective analyses. The author finds the archil of commerce to consist essentially of three ingredients, namely, orceïne, erythroleic acid, and azoerythrine; of each of the two former there exist two modifications, and there is, in addition, a yellow matter. After comparing his results with those obtained by Heeren, by an examination of the products evolved by his erythrine in contact with air and with ammonia, and stating reasons for some changes in nomenclature, the author gives the chemi-

cal formulæ resulting from his own analysis of these different substances.

His inquiries into the constitution of ordinary litmus, which form the last division of his subject, lead him to the conclusion that that substance contains the principles designated by him as Erythrolein, Erythrolitmine, Azolitmine, and Spaniolitmine; and that the colouring constituents of litmus are, in their natural condition, red; the blue substances being produced by combination with a base, the bases in that of commerce being lime, potass, and ammonia; and there is mixed up in the mass a considerable quantity of chalk and sand. The details of the analyses of these several substances, and the resulting chemical formulæ representing their constitution, are then given.

The concluding section of the paper is occupied by an inquiry into the decoloration of the bodies which exist in archil and in litmus. The latter of these, the author concludes, is reddened by acids, in consequence of their removing the loosely combined ammonia by which the blue colour is produced; and the so-called hydrogen-acids liberate the colouring matter by their combining with the alkali to form bodies (either chlorides or iodides), with which the colouring matter has no tendency to unite. Hence it appears that the reddening of litmus is no proof that chloride of hydrogen is an acid, and that the double decomposition which occurs is the same in principle, whether hydrogen or a fixed metal come into play. After detailing the blanching effects of other deoxydizing agents on the colouring matter of litmus, and the action of chlorine on orceïne and azolitmine, the author remarks, that in these actions chlorine is subjected to conditions different from those which determine the nature of the results with the generality of organic bodies, and that the displacement of hydrogen, so marked in other cases, does not exist in the class of substances under consideration; but that, in reality, the products of the bleaching energy of chlorine resemble in constitution the compounds of chlorine which possess bleaching powers.

This paper may be viewed as a very important contribution to organic chemistry, and as highly deserving of the Royal Medal; an award which will, doubtless, be hailed by chemists as a just encouragement to perseverance in skilful analytical research.

There being no paper on Mathematics coming within the stipulations regulating the awards of the Royal Medals, which has been deemed worthy of that for Mathematics in the present year, the Council have, in virtue of the power given to them, under these circumstances, by the regulations prescribed by Her Majesty, awarded the other Royal Medal to EATON HODGKINSON, Esq., for his paper, which was published in the Philosophical Transactions for 1840, and is entitled "Experimental Researches into the Strength of Pillars of Cast Iron, and other materials."

This paper has been esteemed by the Council to be peculiarly valuable in a practical as well as theoretical point of view, and therefore to deserve, in an eminent degree, the honour of a Royal Medal. It contains the results of an immense series of experiments, conducted

with great patience and admirable skill, and at a very considerable cost. Mr. Hodgkinson's position among the manufactories of Manchester, together with the unlimited command over the resources of one of the largest engineering establishments, which he obtained through the liberality of its proprietor Mr. Fairbairn, enabled him to direct his inquiries to the forms of pillars which are found most useful in practice. The results of his labours he has reduced to empirical formulæ, peculiarly adapted for application to the purposes of mechanical art.

Among the most useful of the practical conclusions to which he has arrived, the following are more particularly deserving of notice.

Mr. Hodgkinson has found, that in all long pillars of the same dimensions, the resistance to crushing by flexure is about three times greater when the ends of the pillars are flat, than when they are rounded. A long uniform cast-iron pillar, with its ends firmly fixed, whether by means of discs or otherwise, has the same power to resist breaking as a pillar of the same diameter, and half the length, with the ends rounded, or turned so that the force would pass through the axis. The strength of a pillar with one end round and the other flat, is the arithmetical mean between that of a pillar of the same dimensions with both ends round, and one with both ends flat. Some additional strength is given to a pillar by enlarging its diameter in the middle part.

The strength of long cast-iron pillars with relation to their diameter and length is also made the subject of Mr. Hodgkinson's investigations; and the result he deduces from them is, that the index of the power of the diameter, to which the strength is proportional, is 3.736. He has also determined, by a comparison of experimental results, the inverse power of the length to which the strength of the pillar is proportional. The highest value of this power he finds to be 1.914, the lowest 1.537, and the mean of all the comparisons 1.7117. He thus deduces, first, approximate empirical formulæ for the breaking weight of solid pillars, and afterwards, more correct methods of determining their strength. From experiments on hollow pillars of cast-iron, formulæ representing the strength of such pillars are, in like manner, deduced.

The strength of pillars of wrought iron and of timber, in relation to their dimensions, is made the subject of another series of experiments. The result for wrought iron is, that the strength varies inversely as the square of the length of the pillar, and directly as the power 3.75 of its diameter, the latter being nearly identical with the result obtained for cast iron; while in timber, the strength varies nearly as the fourth power of the side of the square forming the section of the pillar. In like manner, the power of cast-iron pillars to resist long-continued pressure, and the relative strengths of long pillars of cast iron, wrought iron, steel and timber, are determined.

The inquiry which constitutes the subject of this paper is not, however, the first of the kind in which Mr. Hodgkinson has been engaged; several series of experiments and papers on the strength of iron, in various forms, have been published by him at different

times; and their accuracy has established his claim to our confidence on the present occasion.

The several medals, thus awarded, were then delivered, with appropriate addresses, by the Vice-President in the Chair.

The Copley Medal, adjudicated to Dr. Ohm, was, in the absence of Professor Daniell, the Foreign Secretary, delivered to Dr. Roget, in order that it may be forwarded to its destination.

The Royal Medal, adjudicated to Dr. Kane, was delivered to Francis Baily, Esq., whom Dr. Kane had deputed to receive it for him.

The other Royal Medal, adjudicated to Eaton Hodgkinson, Esq., was delivered to himself.

List of Admissions into the Royal Society since the last Anniversary (1840).

James Alderson, M.D.
Charles Dickson Archibald, Esq.
David Francis Atcherley, Esq.
Sir Thomas Baring, Bart.
Peyton Blackiston, Esq.
Edward Blore, Esq.
William Bowman, Esq.
Henry Rowland Brandreth, Esq.
The Rt. Hon. George Stevens
Byng.
Samuel Cartwright, Esq.
John Clendinning, M.D.
Hart Davis, Jun., Esq.
Rev. Joshua Frederick Denham,
M.A.
Joseph Edye, Esq.
Charles Enderby, Esq.
Earl de Grey.
William Robert Grove, Esq.
Eaton Hodgkinson, Esq.
Rev. John Hoppus, LL.D.

Julius Jeffereys, Esq.
Sir Richard Jenkins.
Robert Masters Kerrison, M.D.
Henry Gally Knight, Esq., M.P.
Robert Lister, Esq.
Lord Viscount Melbourne.
James Cosmo Melvill, Esq.
Lord Monteagle.
Samuel Seaward, Esq.
Edward James Seymour, Esq.
Robert W. Sievier, Esq.
Alfred Smee, Esq.
Lt.-Col. Sir J. M. Frederic Smith,
R.E.
Henry Harpur Spry, Esq.
Rev. Mark Aloysius Tierney.
Lord Vivian.
The Marquis of Westminster.
Lieut.-Col. Thomas Wood.
Charles Woodward, Esq.
Lord Wrottesley.

List of Fellows of the Royal Society deceased since the last Anniversary (1840).

On the Home List.

Francis Bauer, Esq.
Sir Francis L. Chantrey, Knt.
Sir Astley Paston Cooper, Bart.
Lieut.-Gen. Sir Rufane Shaw
Donkin, K.C.B.
Neil Benj. Edmonstone, Esq.
Robert Ferguson, Esq.
Sir George Harrison, Knt.
John Hawkins, Esq.
James Hope, M.D.

The Rt. Hon. Sir Robert J. W
Horton, Bart.
James Rawlins Johnson, M.D.
John Knowles, Esq.
Captain John Lihou, R.N.
Alexander Melville, Esq.
George Watson Taylor, Esq.
John Whishaw, Esq.
Sir John Wesley Williams, Knt.
The Lord Bishop of Worcester
(Dr. Robert James Carr)

On the Foreign List.

Augustin Pyramus De Candolle, of Geneva.

The two following names of Fellows who died in the year 1840 were omitted in the report of last year, and require, therefore, to be noticed in the present report :

Simon L'Huillier, of Geneva.

Félix Savart, of Paris.

Ceased to be Fellows in default of their annual payments,

Francis Corbaux, Esq.

Edmund S. Halswell, Esq., M.A.

The Rev. Dionysius Lardner, LL.D.

The Vice-President in the Chair having called upon Dr. Roget, the senior Secretary, to read to the Meeting the biographical memoirs which he had written of some of the Fellows lately deceased,

Dr. Roget begged leave to observe, that, for many years past, it has been customary for the President, in his anniversary addresses to the Society, to give narratives of the leading incidents in the lives, and an account of the scientific labours of the more distinguished associates of whom death had deprived us during the preceding year. The utility of such a retrospect, he remarked, is sufficiently obvious. Consolation may be afforded to the survivors by the just tribute thus publicly paid to the memory of those they mourn. In marking the several steps of their ascent to eminence, in retracing the services they have rendered to science and to mankind, and in establishing their respective claims to our respect, our admiration and our gratitude, fresh motives of emulation are presented to those who are following in the same arduous paths, and aspiring to the same honourable distinctions. The Society can never forget how well these objects have been fulfilled by the excellent biographical notices we have been accustomed to hear from our Presidents on each returning anniversary, and must feel how much reason they have to regret the omission of the usual discourse from the Chair on the present occasion. It is with a view to prevent this interruption of the series being drawn into a precedent, that Dr. Roget has now been induced, by the desire of the President, to attempt supplying, however imperfectly, the omission he has alluded to. Having but little leisure to perform this task, he wished to claim the indulgence of the Meeting for the many imperfections they will discover in the mode of its execution.

Of the deceased members on the home list, Dr. Roget has been able to notice only two, namely, Mr. Bauer and Sir Astley Cooper, not having received, with regard to the rest, any authentic information which was deserving of record in this place. It is impossible for him, however, to pass over in complete silence the honoured name of one, whose loss within these few days we all so deeply deplore—the late SIR FRANCIS CHANTREY*. But the calamity is too recent

* He was born in 1782, and expired quite suddenly on the 25th of the present month (Nov. 1841); only five days before the present meeting.

and too sudden to afford the opportunity, if indeed the effort could, under these painful circumstances, have been made, of collecting the materials for a narrative which might render adequate justice to his superior merits as an artist, and to his exemplary character as a man. This tribute to his memory must be reserved for a period when his biographer will be able to review the subject more extensively, and with more calm deliberation.

FRANCIS BAUER was born at Feldsberg, in Austria, on the 4th of October, 1758. While yet a boy he lost his father, who held an appointment as painter to Prince Lichtenstein; so that the care of his education devolved upon his mother. He manifested very early a talent for botanical drawing; and the first published production of his pencil, at the age of thirteen, was a figure of the *Anemone pratensis* appended to a work of Stoerck. He came to England in the year 1788, and was about to proceed to Paris; when, on the eve of his intended departure, he was offered by Sir Joseph Banks the appointment of draughtsman at the Royal Gardens at Kew, a proposal which induced him to relinquish his intentions of leaving England. He took up his residence near those Gardens, and he continued to dwell, during the remainder of his life, in their neighbourhood. The salary of the new office which Mr. Bauer held was defrayed by Sir Joseph Banks during his own life, and its continuance after his decease was provided for by his will.

Mr. Bauer, in fulfilment of his engagement, made numerous drawings and sketches of the plants in the Garden; and these are now preserved in the British Museum. A selection from his drawings was published in 1796, under the title of "Delineations of Exotic Plants cultivated in the Royal Gardens at Kew," containing in all thirty plates of different kinds of Heaths. His drawings have also illustrated several papers published in the Linnæan Transactions, and particularly those of Mr. Brown. The 13th volume of that work contains a paper by Mr. Bauer on the Ergot of Rye, drawn up from materials collected between the years 1805 and 1809; and the plate which illustrates it is derived from drawings forming part of an extensive series in the British Museum, illustrating the structure of the grain, the germination, growth and development of wheat, and the diseases of that and other Cerealia. This admirable series of drawings constitutes perhaps the most splendid and important monument of Mr. Bauer's extraordinary talents as an artist, and of his skill in microscopic investigation. The subject was suggested to him by Sir Joseph Banks, who was engaged in an inquiry into the disease of corn known by the name of *blight*; the part of Mr. Bauer's drawings which relates to that disease was published in illustration of Sir Joseph's memoir on the subject, and has been several times reprinted with it. Mr. Bauer himself gave, in the volume of the Philosophical Transactions for 1823, an account of his observations on the *Vibrio tritici* of Gleichen, with the figures relating to them; and another small portion of his illustrations of the diseases of corn has since been pub-

lished by him in the 'Penny Magazine' for 1833. His figures of a somewhat analogous subject, the apple-blight, and the insect producing it, accompany Sir Joseph Banks's memoir on the introduction of that disease into England, in the second volume of the Transactions of the Horticultural Society.

Mr. Bauer had commenced, before the close of the last century, a series of drawings of Orchideæ, and of the details of their remarkable structure, to which he made additions from time to time, as opportunities offered, nearly to the termination of his life. A selection from these, which form one of the most beautiful and extensive series of his botanical drawings, was lithographed and published by Professor Lindley, between the years 1830 and 1838, under the title of "Illustrations of Orchidaceous Plants."

A paper by Mr. Bauer, entitled "Some Experiments on the Fungi which constitute the colouring matter of the Red Snow discovered in Baffin's Bay," was published in the Philosophical Transactions for 1820. By mixing the snow containing these fungi with water, he found that they could be made to vegetate, but that they produced new fungi of a green instead of a red colour. By exposure to excessive cold the primitive fungi are killed, but their seed still retains vitality, and, if immersed in snow, which appears to be their native soil, they reproduce new fungi, which are generally of a red colour.

The Philosophical Transactions for 1823 contains the paper by Mr. Bauer already alluded to, entitled "Microscopical Observations on the Suspension of the Muscular Motions of the *Vibrio tritici*," which forms the Croonian Lecture for that year. This minute worm, which infests wheat, and is the immediate cause of that destructive disease called the *Ear Cockle* or *Purples*, congregates in immense numbers in the substance of the grains thus diseased, forming masses of a white and apparently glairy mucus, which, when immersed in water, separate and exhibit, under the microscope, the worms in lively motion. After they have become perfectly dry, and apparently lifeless, they may be readily revived by being moistened with a drop of water, when they become as lively as before. Mr. Bauer determined, by a series of experiments, that the ova of these worms are conveyed into the cavities of the germens by the circulating sap. On inserting some of the worms into sound grains of wheat, and allowing them to germinate, he found the worms, in different stages of their growth, in the stalk, and ultimately in the germens of the new plant.

In the year 1816 he commenced lending the assistance of his pencil to Sir Everard Home, in the various anatomical and physiological investigations in which the latter was engaged; and in the course of ten or twelve years furnished, in illustration of Sir Everard's numerous papers in the Philosophical Transactions, more than a hundred and twenty plates, which were afterwards reprinted in his 'Lectures on Comparative Anatomy.' These plates, which form together the most extensive series of Mr. Bauer's published works, embraced a great variety of important subjects, chiefly in

microscopic anatomy, and afford abundant evidence of his powers of observation and skill in depicting the most difficult objects. It is this rare and previously almost unexampled union of the observer and the artist that has placed Mr. Bauer in the first rank of scientific draughtsmen. His paintings, as the more finished of his productions may well be termed, are no less perfect as models of artistic skill and effect, than as representations of natural objects.

He died at his residence on Kew Green, on the 11th of December last, in the 83rd year of his age*.

SIR ASTLEY PASTON COOPER, Bart., was the fourth son of the Rev. Dr. Samuel Cooper, of Yarmouth in Norfolk. His mother was a daughter of James Bransby, Esq., of Shottisham, and was known as the authoress of a novel entitled 'The Exemplary Mother.' Sir Astley was born at Brooke, in the same county, on the 23rd of August, 1768. Even in his boyhood he was noted for his bold and enterprising spirit, the sociability and kindness of his disposition, and for the animation with which he entered into all the sports of his juvenile companions. After receiving from the village schoolmaster, and from his father, who was a good scholar, some portion of classical instruction, he was placed, at the age of fifteen, with Mr. Turner, a surgeon and apothecary at Yarmouth. Here he remained but a few months, and was then sent to London, and bound apprentice to his uncle, Mr. William Cooper, one of the surgeons of Guy's Hospital, but was soon after transferred, by his own desire, to Mr. Cline, who had already attained great eminence, and was surgeon of St. Thomas's Hospital. This connexion afforded him ample opportunities of acquiring professional knowledge, under the guidance of a master distinguished by a truly philosophical mind, and for whom his pupil always felt the most profound regard and veneration. Young Cooper's labours in the wide field of observation thus open to him, both in the hospital and dissecting-room, were unremitting; and the practical information he there acquired formed the solid basis of his future fame. He made a short visit to Edinburgh in the year 1787, and, although only in his nineteenth year, was a distinguished member of the Royal Medical Society of that place. On his return to London, Mr. Cline, who was the teacher of anatomy, physiology and surgery at St. Thomas's Hospital, appointed him his demonstrator of anatomy, and soon after gave up to him a part of the anatomical lectures. Sir Astley also gained the consent of Mr. Cline and the other surgeons of the hospitals of Guy and St. Thomas, to give a course of lectures on the principles and practice of surgery, a subject which had previously only formed a part of the anatomical course. He had now full scope for the display of those talents which afterwards shone forth on the wider theatre of the world, in a profession of which he became the brightest ornament. At first he was attended only by fifty students; but

* The above account is chiefly an abridgement of that contained in the Proceedings of the Linnean Society for 1841, p. 101.

his class soon increased to four hundred, which was by far the largest that had been known in London. His popularity as a teacher rapidly increased: he made no attempts at displays of oratory, but always studied to render the subject which he treated as plain and intelligible as possible to his hearers, wisely avoiding distracting their attention by entering on controversial topics connected with physiology.

On the close of 1791, the year he commenced as a lecturer, he married the daughter of Thomas Cock, Esq., of Tottenham, who was a distant relation of Mr. Cline: but as a proof of his constant solicitude never to neglect the performance of any public professional duty, it is remembered that on the evening of the day on which the marriage ceremony was performed he delivered as usual his lecture, without the slightest intimation to his class of what had happened in the morning; and even at the time when he was most fully engaged in this exceedingly laborious practice, he never omitted to deliver his regular lectures at the hospital.

In 1792, after spending some months at Paris and attending the lectures of Dessault at the Hotel Dieu, and also those of Chopart, he commenced practice in London, taking up his residence in the city, where he dwelt for many years before he removed to the west end of the town. The popularity he enjoyed as a surgeon, and the extent of his practice, have probably surpassed that of any of his predecessors: and the large fortune which he acquired was the just and honourable reward of distinguished merit and the most unremitting application.

Sir Astley Cooper was elected a Fellow of this Society on February the 18th, 1802. He had previously contributed to the Philosophical Transactions two papers: the first entitled "Observations on the Effects which take place from the Destruction of the Membrana Tympani of the Ear*," and the second containing "Further Observations on the same subject, together with an Account of an Operation for the removal of a particular kind of Deafness†." The operation of puncturing the membrana tympani for the relief of that species of deafness which arises from an obstruction of the Eustachian tube, suggested itself from observing that, in several cases, an aperture in the membrane did not essentially diminish the powers of the ear, and that even its total destruction by disease is not followed by total deafness. Several cases are described in which the operation proved successful; but of course, when deafness proceeds from any other cause, the operation is not likely to be of the least benefit.

The other professional publications of Sir Astley are exceedingly numerous; they all bear the stamp of the peculiar character of his mind: simple and unaffected in point of style, and without pretension to elegance, they contain a plain relation of facts, unbiassed by preconceived theories, the fruits of a long and extended experience, and leading to sound practical conclusions. He never sought pecuniary advantage by his publications; and while he spared no ex-

* Phil. Trans. for 1800, Part I. p. 151.

† Phil. Trans. for 1801, Part II. p. 435.

pense in the execution of such engravings as were best calculated to afford instruction, he invariably published them at a low price.

His publications relate chiefly to the following subjects, namely, the anatomy and treatment of the various kinds of hernia; of aneurism; of spina bifida; of dislocations and fractures; of exostoses; of encysted tumors; the extraction of calculi from the bladder; the structure and diseases of the breast and of the testis. Among the last subjects to which he had particularly turned his attention was the structure and functions of the thymus gland.

The splendid anatomical and pathological museum which he had collected and created entirely by his own industry and labour, and chiefly within the few last years of his life, at a period when the ardour of most men for scientific pursuits begins to flag, consists of nearly three thousand preparations, each most exquisitely worked out, and the whole admirably arranged. The injected preparations are of unrivalled beauty, and show that he had acquired a facility and perfection in the art of anatomical injection quite peculiar to himself.

He was latterly engaged in an experimental investigation on the functions of the different parts of the brains of the lower animals. His health had suddenly declined a short time before his death, which happened on the 12th of February, 1841.

Sir Astley was left a widower in June 1827; the year following, he married the daughter of John Jones, Esq., of Derry Ormond, in Cardiganshire. He has left no children, and has bequeathed by his will the whole of his museum to his nephew, Mr. Bransby Cooper, and he has also left some property in the funds (namely, £4000 three per cent. consols), of which the interest is to be given as a triennial prize for the best original Essay or Treatise on given subjects in Anatomy, Physiology or Surgery, to be awarded by the Physicians and Surgeons of Guy's Hospital*.

AUGUSTIN PYRAMUS DE CANDOLLE, one of the most distinguished botanists of the present age, was born at Geneva on the 4th of February, 1778. The same year is also memorable by the death of Linnæus, the father of modern botany, which took place about three weeks before the birth of one, who was destined to emulate his fame in the same department of natural history. When seven years of age, De Candolle sustained a serious attack of hydrocephalus, a disease generally so fatal in its tendency, that the present affords a remarkable instance of complete recovery, after life had been, for many days, despaired of.

Possessing a remarkable facility of writing verses both in French and Latin, and having at the same time a keen relish for the study of history, young De Candolle at first resolved to make literature his profession; aspiring, as the summit of his ambition, to the fame

* The greater part of this memoir of Sir Astley Cooper, and especially the account of his early life, has been extracted from Pettigrew's 'Medical Portrait Gallery.'

of being a great historian. But this dream of his youth was effaced by a new taste, imbibed during a residence in the country, where he amused himself with examining the plants of the neighbourhood, and with writing their descriptions, before he had even opened a single book on botany. The few pages he there read of the volume of nature were sufficient to captivate his affections for the pursuit which henceforth became the dominant passion of his life. The botanical lectures of Professor Vaucher, which he attended in 1794, increased his ardour, and confirmed him in the resolution he had formed, of devoting himself to the cultivation of botany as his primary object, to which all other sciences, as well as branches of literature, were hereafter to be deemed subordinate, and to be followed merely as recreations from severer study.

A visit to Paris, which he made in 1795, gave him the opportunity of attending the lectures of Cuvier, Fourcroy, Vauquelin, and other distinguished Professors of that period, and of forming friendships with Desfontaines and Lamarck. He always prided himself in having been the pupil of Desfontaines, in particular, towards whom he continued through life to feel the warmest gratitude and affection.

The establishment of the Society of Physics and Natural History at Geneva, which took place, after his return, under the auspices of the celebrated De Saussure, gave a fresh and powerful impulse to his exertions; as was evinced by the numerous memoirs which he presented to that Society.

The state of Geneva being, soon after this period, absorbed into the French empire, De Candolle was induced to quit that city and attend the medical lectures in Paris; a course of study which, tending to enlarge his views of the physiology of organized beings, contributed greatly to the success with which he afterwards cultivated the Philosophy of Botany. While at Paris, he founded, in conjunction with his friend M. Benjamin Delessert, the *Société Philantropique*. One of the first advantages resulting to the public from this institution was the distribution of economical soups throughout the different quarters of the city. Of this institution he was the active secretary for ten years; during which period another society was also formed under his direction and management for the *Encouragement of National Industry*.

In 1804 he gave lectures on Vegetable Physiology at the "Collège de France," and published an outline of his course in 1805, in the *Principes de Botanique* prefixed to the *Flore Française*.

In 1806 he was commissioned by the French Government to collect information on Botany and the state of Agriculture through the whole of the French empire, the limits of which, at that time, extended beyond Hamburgh to the north, and beyond Rome to the south. Every year, during the following six years, he took a long journey in the fulfilment of the task assigned him, and drew up a report of his observations for the minister. In these annual reports, however, he did not confine himself to the special objects of his commission, but made known his views with regard to the internal ad-

ministrations of the countries he visited, suggesting at the same time measures for their amelioration and for the correction of existing abuses. He had projected a great work on the agricultural state of the empire, and had even executed considerable portions of it, comprehending the French Flora arranged according to modern views of classification, when the political events of 1814 put an entire stop to the work.

In 1807 he was appointed Professor of Medicine at Montpellier; and in 1810, a chair of Botany was instituted in the same Academy, which he was invited to occupy. Under his superintendence, the Botanical Garden of that city was more than doubled in extent, and the study of Botany assumed a degree of importance it had never before possessed. De Candolle quitted Montpellier in 1816, very much to the regret of the students and of his colleagues, who employed every means in their power to induce him to remain among them: but his country had been restored to liberty, and he was firm in his determination to fix himself in his native city, and devote to its services the remainder of his days.

Soon after his return to Geneva he was appointed to the chair of Natural History, an office which had been created expressly that he might occupy it. Among the first of the public benefits which he conferred upon his countrymen was the establishment of a Botanic Garden. The government of Geneva willingly lent their aid in forming so laudable an institution, in which he was also assisted by a great number of voluntary subscribers. The enthusiasm which he inspired for his favourite science was remarkably displayed on one particular occasion, when, being desirous of procuring for Geneva a copy of a Flora of Mexico which had been deposited with him for a few days, an appeal which he made to the public was responded to with such alacrity, that in the course of eight days, one thousand drawings had been finished by amateurs, who volunteered their services on the occasion.

The activity and powers of De Candolle's mind were displayed in a multitude of objects of public utility, the furtherance of which ever called forth in him the most lively interest;—whether it was the improvement of agriculture, the cultivation of the fine arts, the advancement of public instruction, the diffusion of education, or the amelioration of the legislative code. Feeling deeply of what vast importance to the welfare of mankind it is that sound principles of political economy should be extensively promulgated and well understood by all ranks of men, De Candolle never failed to develop and enforce those principles in his lectures and popular discourses, as well as in his official agricultural reports. On these subjects, and especially with respect to the immense advantages which would accrue to the community from the unrestricted freedom of commerce, his views were those of the most enlightened policy, and exhibited a sagacity in advance of the times in which he lived.

As a lecturer, he possessed in an eminent degree the power of imparting to his auditors the enthusiasm which glowed within his own breast for the pursuits of natural history. Complete master of the

subject of his discourse, his ample stores of knowledge never failed to supply him with illustrations; and even in his extempore effusions, all his ideas were developed in the clearest order, and explained with singular perspicuity*. His chief delight was to afford assistance of every kind to such students as needed it, and in whom he perceived a desire of improvement. His great aim was to inspire and diffuse a taste for the study of botany by rendering it popular among all ranks. His library, which contained the richest collection of works on that subject, and the volumes of his *hortus siccus*, were always open to those who wished to consult them. Often has he been known to discontinue researches which he had commenced, on finding that a similar design was entertained by another person; and he hastened, on these occasions, to communicate to this inquirer his own views on the subject, to place in his hands the materials he had collected, and to put him in possession of the fruits of his own experience. His sole object was the advance of knowledge; and whether this was effected by himself or by others was to him a matter of total indifference.

De Candolle had been visibly declining in health for some years before his end. The sudden death of Cuvier had impressed him with the apprehension that a similar fate might be impending; and that he himself might, in like manner, be cut off before he had accomplished the great works in which he was then engaged. He, in consequence, resolved to set aside all other occupations, and concentrate all his efforts in completing those more important designs. During the last year of his life he undertook, with the vain hope of improving his strength, a long journey, in the course of which he attended the scientific meeting held at Turin, where, as might be expected, he met with the most flattering and cordial reception. His death took place on the 9th of September, 1841, in the 64th year of his age†.

* The substance of De Candolle's popular courses of lectures on the physiology of plants is contained in 'Conversations on Vegetable Physiology; comprehending the Elements of Botany, with their application to Agriculture,' by the accomplished authoress of 'Conversations on Chemistry,' 'Natural Philosophy,' and other well-known works. The first edition appeared in 1829.

† An oration by M. Rigaud, the Syndic of Geneva, pronounced at the "*Conseil Représentatif*," on the 27th of September, is the source which has supplied the information here given with regard to De Candolle. The following is a catalogue of such of his works as are in the library of the Royal Society:—

1. *Essai sur les propriétés médicales des plantes, comparées avec leurs formes extérieures et leur classification naturelle.* 8vo. Paris, 1816.

2. *Regni vegetabilis systema naturale; sive ordines, genera, et species plantarum secundum methodi naturalis normas; vol. 1 et 2:* 8vo. Parisiis, 1818 et 1821.

3. *Théorie élémentaire de la Botanique, seconde édition,* 8vo. Paris, 1819. (The first edition appeared in 1813.)

4. *Prodromus systematis naturalis regni vegetabilis; sive enumeratio contracta ordinum, generum, specierumque plantarum hucusque cognitarum*

SIMON L'HUILLIER, for many years Professor of Mathematics at Geneva, was born in that city on the 24th of April, 1750. The rapid progress which he made in his collegiate studies was viewed with so much interest by one of his relations, a minister of the reformed church of Geneva, that he bequeathed him a large portion of his fortune, on the express condition that he would embrace the clerical profession: but young l'Huillier, feeling no inclination to the studies which this condition would have imposed upon him, resisted the temptation, and preferred devoting himself to the pursuits of abstract science. The spirit of independence evinced by this sacrifice, together with the extraordinary aptitude he displayed for mathematical acquirements, excited the interest and conciliated the affection of another of his relations, the celebrated Le Sage, by whose instructions and counsels the most salutary influence was exercised over the studies of his pupil. Bertrand, who then occupied the chair of Mathematics in the same college, was also one of those who discerned in l'Huillier the dawn of genius; and even at that early period he regarded him as destined to be his successor in that professorship.

As l'Huillier advanced to manhood, it became necessary for him to engage in some active employment, in which he could turn to account his academical attainments. He had the good fortune, at this critical time of his life, to be chosen tutor to Prince Czartorynski, with whom he remained for a period of thirteen or fourteen years; ever honoured with the friendship and respect of all the members of the Prince's family. He dedicated to the father of his pupil his first work, which was published at Warsaw in 1782, under the title of *De relatione mutuâ capacitatis et terminorum figurarum*,

juxta methodi naturalis normas digesta: partes I.—IV. 8vo. Parisiis, 1824—1830.

5. Mémoire sur la famille des Légumineuses; 4to. Paris, 1825.

6. Plantes rares du Jardin de Genève; livraisons I.—III.; 4to. Genève, 1826.

7. Organographie Végétale, ou Description raisonnée des plantes; 2 vols. 8vo. Paris, 1827. (This work has been translated into German by Meissner, in 1828.)

8. Collection de mémoires pour servir à l'histoire du Règne Végétal: 1°. Mémoire sur la famille de Mélastomacées; 2°. Mémoire sur la famille des Crassulacées: 2 vols. 4to. Paris, 1828.

9. Mémoire sur la famille des Ombellifères; 4to. Paris, 1829.

10. Mémoire sur la famille des Onagracées; 4to. Paris, 1829.

11. Mémoire sur la famille des Loranthacées; 4to. Paris, 1830.

12. Mémoire sur la famille des Valerianées; 4to. Paris, 1832.

13. Cours de Botanique; seconde partie. Physiologie Végétale pour servir de suite à l'Organographie Végétale, et d'introduction à la Botanique Géographique et Agricole; vol. i.—iii.; 8vo. Paris, 1832.

De Candolle was also the author of an essay on Geographical Botany, prefixed to the second volume of the 'Flore Française' (1805).—Of the article "Géographie botanique et agricole," in the 'Dictionnaire d'Agriculture,' published in 1809.—Of the article "Géographie botanique," in the 'Dictionnaire des Sciences Naturelles,' 1820.—And of the article "Phytographie," in the 'Dictionnaire classique d'histoire naturelle.'

geometricè consideratâ ; seu de Maximis et Minimis pars prior elementaris, and in which he treats geometrically, and with singular elegance and vigour of demonstration, all the elementary problems relating to isoperimetric figures and solids. About the same time he presented to the Academy of Berlin a memoir, which was afterwards published in its Transactions, on the minima relating to the figure of the cells of bees, a subject which he appears, in that paper, to have exhausted.

The prize proposed by the same Academy in 1786, was adjudicated to him for a memoir, which was since published under the title of *Exposition élémentaire des principes des calculs supérieurs*. In this masterly essay the differential calculus is derived from a principle which D'Alembert had, in the first edition of the *Encyclopédie*, so happily illustrated, and which is now so generally recognised as the basis of that calculus ; namely, the doctrine of limits.

On his return to Geneva in 1789, l'Huillier published an opuscle, which acquired great celebrity, entitled *La Polygonométrie ; ou de la mesure des figures rectilignes, et abrégé d'isopérimétrie élémentaire, ou de la dépendance mutuelle des grandeurs et des limites des figures* ; at the conclusion of which he gives a masterly summary of his former researches on elementary isoperimetry. In this work are given several formulæ of great generality, and which, at that time, were entirely new, and were calculated to facilitate the study of numerous relations arising from the perimeters and areas of polygons. About the same period, indeed, Mascheroni published formulæ very analogous to those of l'Huillier ; but the latter afterwards succeeded in showing that he had arrived at the same results by original processes.

During the tempestuous years of the revolution, l'Huillier sought in Germany the retirement so necessary to his pursuits ; and chose Tübingen as his residence. The fruit of his labours during this seclusion was a work almost wholly new, which appeared at Tübingen, in 1795, under the title *Principiorum calculi differentialis et integralis expositio elementaris*.

He was invited, about this time, to the chair of the Higher Mathematics in the University of Leyden ; but his attachment to his native country was too deeply rooted to admit of his accepting this flattering offer : and eventually, in June of the same year (1795), he attained the object of his highest ambition, by receiving, after a successful public competition, the appointment of Professor of Mathematics in the Academy of Geneva.

At a subsequent period he was associated with his friend and colleague Professor Prévost in the composition of several memoirs on the calculation of probabilities, which appeared under their joint names in the memoirs of the Berlin Academy. The questions treated of in these memoirs, although they do not reach the higher problems belonging to this department of mathematics, are yet resolved by methods remarkable for their perspicuity and elegance. L'Huillier published, in 1804, his *Elémens raisonnés d'Algèbre, publiés à l'usage des étudiants* ; in 2 vols. 8vo, a work of considerable

merit, as developing with clearness the true principles by which the understanding advances from that which is known to that which is unknown.

His last work, the *Elémens d'Analyse Géométrique et Algébrique, appliquées à la recherche des lieux géométriques*, in 4to, appeared in the year 1809. It was dedicated to his former pupil, Prince Czartorynski, who was, at that time, minister of public instruction in the vast empire of Russia, but who has since become better known to Europe as the most illustrious of the exiled Poles.

The declining health of l'Huillier obliged him at length to resign a professorship which he had held during five-and-twenty years, and the duties of which he had ever discharged with the most undeviating regularity, and the most scrupulous exactness. Even while suffering acutely from a painful attack of sciatica, he insisted on being carried to his class, lest any detriment should arise to his pupils from an interruption to his lectures. Many of these pupils have subsequently distinguished themselves in their scientific career; among these may be cited one of our illustrious foreign members, Professor Sturm.

For the simplicity of his manners and the strict integrity of his character, l'Huillier was no less remarkable than for the vigour and extent of his mathematical powers: by these qualities he was endeared to his friends, and esteemed and respected by all, during a life protracted beyond the ordinary duration. His death occurred on the 28th of March, 1840, when he had nearly completed his 90th year, with a constitution, however, which had some time previously been shattered and broken down by the infirmities incident to so advanced an age*.

FÉLIX SAVART, a philosopher distinguished more especially for his researches in the science of Acoustics, was born on the 30th of June, 1791, at Mézières, the capital of the Department of the Ardennes, in France. He very early exhibited a decided turn for mechanical invention, and his greatest delight was to contrive and construct with his own hands musical instruments and apparatus illustrative of Natural Philosophy, a study of which he was passionately fond. His parents had been connected with the school of engineers at Mézières; and several of his relations having been distinguished as artists, he was himself educated with a view to the same destination. But the family afterwards removing to Metz, the path which had at first been marked out for him was abandoned, and he prepared himself for another profession, by directing his whole attention to medicine. In course of time he obtained the appointment of Assistant Surgeon in the Military Hospital. Not satisfied with this probation, he, in 1814, repaired to Strasburg for the purpose of prosecuting his medical studies in the Military

* The above account is derived from a biographical notice by Professor De La Rive, which forms part of the *Compte rendu de l'état de l'instruction publique de Genève pendant l'année scolaire, 1839-1840*.

Hospital of that town ; and he subsequently, in 1816, took a degree in medicine in the University. He then returned to his paternal roof at Metz, with the intention of settling, and of applying himself diligently to the practice of his profession. But on being restored to the scene of his youthful occupations, the renewed sight of those philosophical instruments to which so many delightful associations were attached, rekindled in full force the innate predilection for the physical sciences, which, during so long an interval, had lain dormant in his breast. The charms of science, arrayed in her most attractive colours, glittered before his imagination, and were contrasted, in his ardent mind, with the cares, the toils, and the anxieties of the profession in which he was embarking. He yielded to the powerful fascination, and disregarding all considerations of prudence, took the irrevocable step of abandoning the prospects which were opening in a career to which his youth had been devoted, and by which alone it had, till then, been his ambition to earn fortune, reputation and independence. Confiding in his knowledge of Acoustics, which was ever his favourite study, and in which he conceived he had made discoveries, he quitted his provincial domicile and repaired to the metropolis, as to the mart where his acquisitions would be best valued. He arrived in Paris with but scanty means of immediate support, without a friend, and unprovided with a single letter of recommendation. But Fortune took him by the hand, and favoured his first endeavour to obtain notice. He presented himself to Biot, and communicated to him his views, and the results of his researches in Acoustics. He met with the kindest reception from that philosopher, who had himself been occupied with similar inquiries, and was well qualified to appreciate the merits of Savart. Biot was ever after his friend and patron, and it was chiefly through his influence that Savart was, in the year 1820, appointed Professor of Natural Philosophy in one of the Institutions at Paris ; an office which he continued to hold till the year 1827, when he was nominated a Member of the Academy of Sciences. Soon after this he was associated with Thénard, as Conservator of the Cabinet of Physics of the College of France. Thus raised to a state of independence, he had full leisure to devote himself to the science he had ever particularly cherished, and of which his labours have greatly extended the boundaries. His admirable researches on the laws of the vibrations of solid bodies of different forms and kinds, and in particular, of cords, of membranes, of rods, whether straight, or bent, or of an annular shape ; of flat discs, and of solids of revolution, both solid and hollow, have furnished results of great value and importance. His investigation of the structure and functions of the several parts of the vocal organs, and his theory of the voice, both in man and in the lower animals, show great originality of research, and have thrown considerable light on a very difficult department of Physiology.

Savart was elected, in the year 1839, a Foreign Member of the Royal Society, an honour which his unconquerable prejudice against the English, and everything emanating from England, prevented

his ever acknowledging. His premature death, on the 16th of March, 1840, has, unfortunately for science, arrested the brilliant career of discovery, which he was pursuing with so much ardour and success, and will, it is to be feared, deprive the world of the fruits of many of his unfinished labours*.

* The materials for the above sketch were furnished by the Funeral Oration on Savart pronounced before the Royal Academy of Sciences of the Institute of France, by M. Becquerel, on the 18th of March, 1841.

The following is a list of Memoirs by Félix Savart :—

1. Mémoire sur la construction des instrumens à cordes et à archet. (Paris, 1819.)
2. Mémoire sur la communication des mouvemens vibratoires entre les corps solides. (Annales de Chimie, tome xiv.)
3. Recherches sur les vibrations de l'air. (Ibid. t. xxiv.)
4. Mémoire sur les vibrations des corps solides considérées en général. (Ibid. t. xxv.)
- 5 Recherches sur les usages de la membrane du tympan et de l'oreille externe. (Ibid. t. xxvi.)
6. Nouvelles recherches sur les vibrations de l'air. (Ibid. t. xxix.)
7. Mémoire sur la voix humaine. (Ibid. t. xxx.)
8. De l'influence exercée par divers milieux sur le nombre de vibrations des corps solides. (Ibid. t. xxx.)
9. Note sur la communication des mouvemens vibratoires par les liquides. (Ibid. t. xxxi.)
10. Mémoire sur la voix des oiseaux. (Ibid. t. xxxii.)
11. Note sur les modes de division des corps en vibration. (Ibid. t. xxxii.)
12. Note sur les sons produits dans l'expérience de M. Clement. (Ibid. t. xxxv.)
13. Recherches sur les vibrations normales. (Ibid. t. xxxvi.)
14. Mémoire sur un mouvement de rotation dont le système de parties vibrantes de certains corps devient le siège. (Ibid. t. xxxvi.)
15. Sur la décomposition de l'ammoniaque par les métaux. (Ibid. t. xxxvii.)
16. Recherches sur l'élasticité des corps qui cristallisent régulièrement. (Ibid. t. xl.)
17. Recherches sur la structure des métaux. (Ibid. t. xli.)
18. Mémoire sur la réaction de torsion des lames et des verges rigides. (Ibid. t. xli.)
19. Note sur la sensibilité de l'organe de l'ouïe. (Ibid. t. xliv.)
20. Note sur la perception des sons graves. (Ibid. t. xlvii.)
21. Mémoire sur la constitution des veines liquides lancées par des orifices circulaires en minces parois. (Ibid. t. liii.)
22. Mémoire sur le choc d'une veine liquide lancée contre un plan circulaire. (Ibid. t. liv.)
23. Mémoire sur le choc de deux veines liquides animées de mouvemens directement opposés. (Ibid. t. lx.)
24. Recherches sur les vibrations longitudinales. (Ibid. t. lxxv.)
25. Extrait d'un mémoire sur les modes de division des plaques vibrantes. (Ibid. t. lxxiii.)
26. Note sur les causes qui déterminent le degré d'élévation des sons. (Ibid. t. lxxv.)
27. Biot et Savart.—Sur la mesure de l'action exercée à distance sur une particule de magnétisme par un fil conjunctif. (Journal de Physique, t. xci.)

The thanks of the Meeting were given to Dr. Roget for having drawn up these biographical notices, which were ordered to be printed.

The Statutes relating to elections were then read.

Joseph Smith, Esq., and Richard Horsman Solly, Esq., were appointed Scrutators, to assist the Secretaries in examining the balloting lists.

The ballot was then taken, and Dr. Roget, on the part of the Scrutators, reported the following gentlemen as being duly elected Officers and Council for the ensuing year:—

President.—The Marquis of Northampton.

Treasurer.—Sir John William Lubbock, Bart., M.A.

Secretaries. { Peter Mark Roget, M.D.
 { Samuel Hunter Christie, Esq., M.A.

Foreign Secretary.—John Frederic Daniell, Esq.

Other Members of the Council.—Neil Arnott, M.D.; Francis Baily, Esq.; William Thomas Brande, Esq.; Richard Bright, M.D.; William Henry Fitton, M.D.; Sir William J. Hooker, K.H., LL.D.; William Hopkins, Esq., M.A.; William Lawrence, Esq.; Gideon Algernon Mantell, Esq., LL.D.; William H. Pepys, Esq.; The Rev. Baden Powell; George Rennie, Esq.; Lieut.-Col. William H. Sykes; Charles Wheatstone, Esq.; Rev. William Whewell, D.D.; Rev. Robert Willis, M.A.

The thanks of the Meeting were given to the Scrutators for their trouble in examining the lists.

The following is the statement of the Receipts and Payments of the Society during the preceding year, which was laid on the table by the Treasurer:—

Statement of the Receipts and Payments of the Royal Society between Nov. 28, 1840, and Nov. 28, 1841.

RECEIPTS :—		£	s.	d.
Balance in the hands of the Treasurer at the last Audit ..	937	19	7	
26 Weekly Contributions, at one shilling	67	12	0	
184 Quarterly Contributions at £1.....	748	0	0	
		815	12	0
40 Admission Fees	400	0	0	
2 Compositions for Annual Payments at £40	80	0	0	
6 Compositions for Annual Payments at £60.....	360	0	0	
Rents :—				
One year's rent of estate at Mablethorpe: due	£	s.	d.	
at Michaelmas 1840	107	0	0	
One year's rent of lands at Acton: due at				
Michaelmas 1840	60	0	0	
One year's fee-farm rent of lands in Sussex;				
land-tax deducted: due at Michaelmas 1840	19	4	0	
Carried forward	186	4	0	2593 11 7

	£	s.	d.	£	s.	d.
Brought forward . . .	186	4	0	2593	11	7
One-fifth of the clear rent of an estate at Lambeth Hill, from the Royal College of Physicians, in pursuance of Lady Sadleir's will: due at Midsummer 1840	3	0	0			
				189	4	0
Dividends on Stock :—						
One year's dividend on £14,000 Reduced 3 per cent. Annuities	420	0	0			
Dividend on 3452 <i>l.</i> 1 <i>s.</i> 1 <i>d.</i> Consols, the produce of the sale of the premises in Coleman-street	103	11	2			
One year's dividend on £200 Consols	6	0	0			
<i>Donation Fund.</i>						
One year's dividend on 4544 <i>l.</i> 16 <i>s.</i> 9 <i>d.</i> Consols	136	6	10			
<i>Rumford Fund.</i>						
One year's dividend on 2292 <i>l.</i> 11 <i>s.</i> 7 <i>d.</i> Consols	68	15	6			
<i>Fairchild Fund.</i>						
One year's dividend on £100 New South Sea Annuities	3	0	0			
				737	13	6
Miscellaneous Receipts :—						
Received of Dr. Knorr for the Royal Society's Pendulum				50	0	0
Sale of Philosophical Transactions, Abstracts of Papers, and Catalogues of the Royal Society's Library				299	15	8
Sale of Nine Scientific Catalogues to Subscribers				4	10	0
Total Receipts				£3874	14	9

	£	s.	d.
PAYMENTS :—			
<i>Fairchild Lecture.</i> —The Rev. J. J. Ellis, for delivering the Fairchild Lecture for 1840	3	0	0
<i>Bakerian Lecture.</i> —George Newport, Esq., for the Bakerian Lecture for 1841	4	0	0
<i>Rumford Fund.</i> —M. Biot: Two years' dividend on the Augmentation Fund, 1840	71	11	6
<i>British Museum Fund.</i> —			
Bailliere: for Books	33	0	6
Stibbs: for ditto	5	0	0
Carried forward	38	0	6
			78 11 6

	£	s.	d.	£	s.	d.
Brought forward	38	0	6	78	11	6
<i>British Museum Fund.</i> —						
Weale : for Books	30	8	10			
Robinson : for ditto	15	2	0			
Crofts : for ditto	16	9	3			
Sundry, for ditto	1	18	6			
	<hr/>			101	19	1
Grubb :						
For two Magnetometers for the Norwegian Observatory	78	15	6			
Ditto, for two Magnetometers for the Cairo Observatory	76	0	0			
Troughton and Simms :						
For instruments for the Pacha of Egypt . .	67	4	0			
Ditto ditto for the Hammerfest Ob- servatory	9	3	0			
Robinson : for ditto	27	5	0			
	<hr/>			258	7	6*
Salaries :—						
Dr. Roget, one year, as Secretary	105	0	0			
S. H. Christie, Esq., one year, as Secretary . .	105	0	0			
Ditto for Index to Phil. Trans.	5	5	0			
John F. Daniell, Esq., one year, as For. Sec.	20	0	0			
Mr. Robertson, one year, as Assistant-Secretary	200	0	0			
Mr. W. E. Shuckard, one year, as Librarian . .	50	0	0			
Mr. Holtzer, one year, as Porter	30	0	0			
Ditto, for extra Portage	10	0	0			
	<hr/>			525	5	0
Few, Hamilton and Few, Solicitors :						
Law Expenses		15	16	2		
Ditto, for Mablethorpe Tithe Suit		10	3	8		
Mablethorpe Tithe Suit :—Society's proportion of the Costs of defending the Suit		110	0	0		
Ditto, for Rate		82	10	0		
Fire Insurance, on the Society's Property		22	11	6		
Mrs. Coppard : Gratuity		10	0	0		
Mr. Shuckard, for making Catalogue of Miscellaneous Books		54	0	0		
Ditto, for rearranging the Library		150	0	0		
Ditto, for completing Scientific Catalogue and Tracts		50	0	0		
Mr. Tuckett : for assisting with same		29	8	0		
Bills :—						
Taylor :						
Printing the Phil. Trans., 1840, part 2 . .	265	16	6			
Ditto, 1841, part 1	74	15	0			
Ditto, Proceedings, Nos. 45—48; Circulars, Lists of Fellows, Ballot-lists, Statement of Payments, and Minutes of Council; &c. &c.	124	16	6			
	<hr/>			<hr/>		
Carried forward . . .	465	8	0	1498	12	5

* This amount will be repaid to the Society.

	£	s.	d.	£	s.	d.
Brought forward	465	8	0	1498	12	5
Taylor :						
Printing Supplemental Instructions for the						
Magnetic Observatories, &c.	6	1	6			
Ditto, Catalogue of Miscellaneous Books..	136	7	0			
Ditto, Catalogue of MS. Letters	137	9	6			
	<hr/>			745	6	0
Bowles and Gardiner :						
For Paper for the Phil. Trans., 1840, part 2,						
and 1841, part 1				165	0	0
Basire :						
For Engraving and Copper-plate Printing						
for Phil. Trans., 1841, part 1				181	2	10
Walker :						
For Plates for Phil. Trans. 1840, part 1,						
and for Plates for Scientific Report.				25	7	2
Gyde :						
Boarding and Sewing 800 Parts of Phil.						
Trans., 1840, part 2	27	4	0			
Ditto, 1841, part 1	27	4	0			
Ditto, 1831, part 1 and 2, &c.	1	18	8			
Boarding Catalogue of Miscellaneous Lite-						
rature.	12	14	2			
Ditto, 400 Catalogues of MS. Letters	7	10	0			
	<hr/>			76	10	10
Tuckett :						
Bookbinding	204	15	2			
Pouncey and Sons :						
For Stationery	8	2	10			
Saunderson :						
For Shipping Expenses	8	10	5			
Brecknell and Turner :						
Wax Lights, Candles, and Lamp Oil	39	16	0			
Cubitt :						
For Alterations in Library, Lower Library,						
and Council Room, and repairing and re-						
laying Carpets, &c.	112	6	7			
Exchequer Fee for paying dividend	0	13	0			
Clerks : Christmas Fee	1	1	0			
Arnold :						
For Coals	20	6	0			
Ditto (Porter's yearly allowance)	4	7	0			
Murray :						
For taking Meteorological Observations	7	0	0			
Smith, Elder, and Co. :						
Writing Circular Letter to the Pacha of Egypt	4	14	0			
Gwillim :						
Mats, Brushes, Fire-wood, &c.	4	1	10			
	<hr/>			<hr/>		
Carried forward . . .	415	13	10	2691	19	3

	£	s.	d.
Brought forward . . .	415	13	10
Cardinal :			
For Turkey Carpet for Lower Library	23	18	9
Black and Armstrong :			
For Carriage of Books from Rotterdam	4	0	0
		443	12 7
Taxes and Parish Rates :			
Land and Assessed Taxes	26	9	5
Poor Rate	15	11	8
Church Rate	12	15	0
Rector's Rate	1	8	4
Sewer's Rate	2	2	6
		58	6 11
Petty Charges :			
Postage and Carriage	10	14	7
Expenses on Foreign Packets, &c.	10	16	8
Stamps	2	14	6
Charwoman's Wages	27	6	0
Ditto, Extra work	2	9	0
Miscellaneous expenses	11	8	7
Library and Window-cleaning, &c.	2	14	0
Packer, for ingrossing Addresses	3	10	0
		71	13 4
Total Payments	£3265	12	1
Total Receipts and Balance	3874	14	9
Balance in the hands of the Treasurer	£ 609	2	8

JOHN WILLIAM LUBBOCK, *Treasurer.*

November 29th, 1841.

The Balances in hand, now belonging to the several trusts, are as under:
viz :—

	£	s.	d.
<i>Donation Fund</i>	260	16	10
<i>Rumford Fund</i>	140	17	0

The following table shows the progress and present state of the Society, with respect to the number of Fellows :—

	Patron and Honorary.	Foreign.	Having com- pounded.	Paying £2 12s. Annually.	Paying £4 Annually.	Total.
November 1840....	12	49	537	25	189	812
Since elected.....	.....	.....	6	.....	33	39
Since re-instated ..	.....	.....	.....	.....	.....	.....
Since compounded	.....	.....	+ 2	.....	— 2	
Since deceased, &c.	.....	— 3	— 15	.....	— 3	— 21
Defaulters .....	.....	.....	.....	.....	— 3	— 3
November 1841....	12	46	528	25	216	827

Weekly and Quarterly Contributions.

1830.....	£363	4	0
1831.....	286	0	0
1832.....	255	6	0
1833.....	283	7	6
1834.....	318	18	6
1835.....	346	12	6
1836.....	495	0	0
1837.....	531	0	0
1838.....	599	4	0
1839.....	666	16	0
1840.....	767	4	0
1841.....	815	12	0